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AGSE-E184-G02 (11C3359P02)

GEnx-1B Air-Freight Roll-Over Stand

For Air Transport in B747, B777 or B787 Freighter

ORIGINAL MANUAL DATED..... 12/11/2010

LATEST MANUAL REVISION LEVEL.....11/10/2022 (REV R)

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NOTICE

1. Alteration, Modification, Reengineering, or Reproduction of Equipment

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These modifications include but are not limited to:

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- Reverse engineering of AGSE equipment and parts.

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Once reviewed by our Engineering team, a Customer Support Letter (Subject: No Technical Objection) will be issued for any approved modifications.

NOTE

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Unauthorized modifications void AGSE's and the OEM's (Engine and/ or Airframer) approval and authority to use the product for its intended application.

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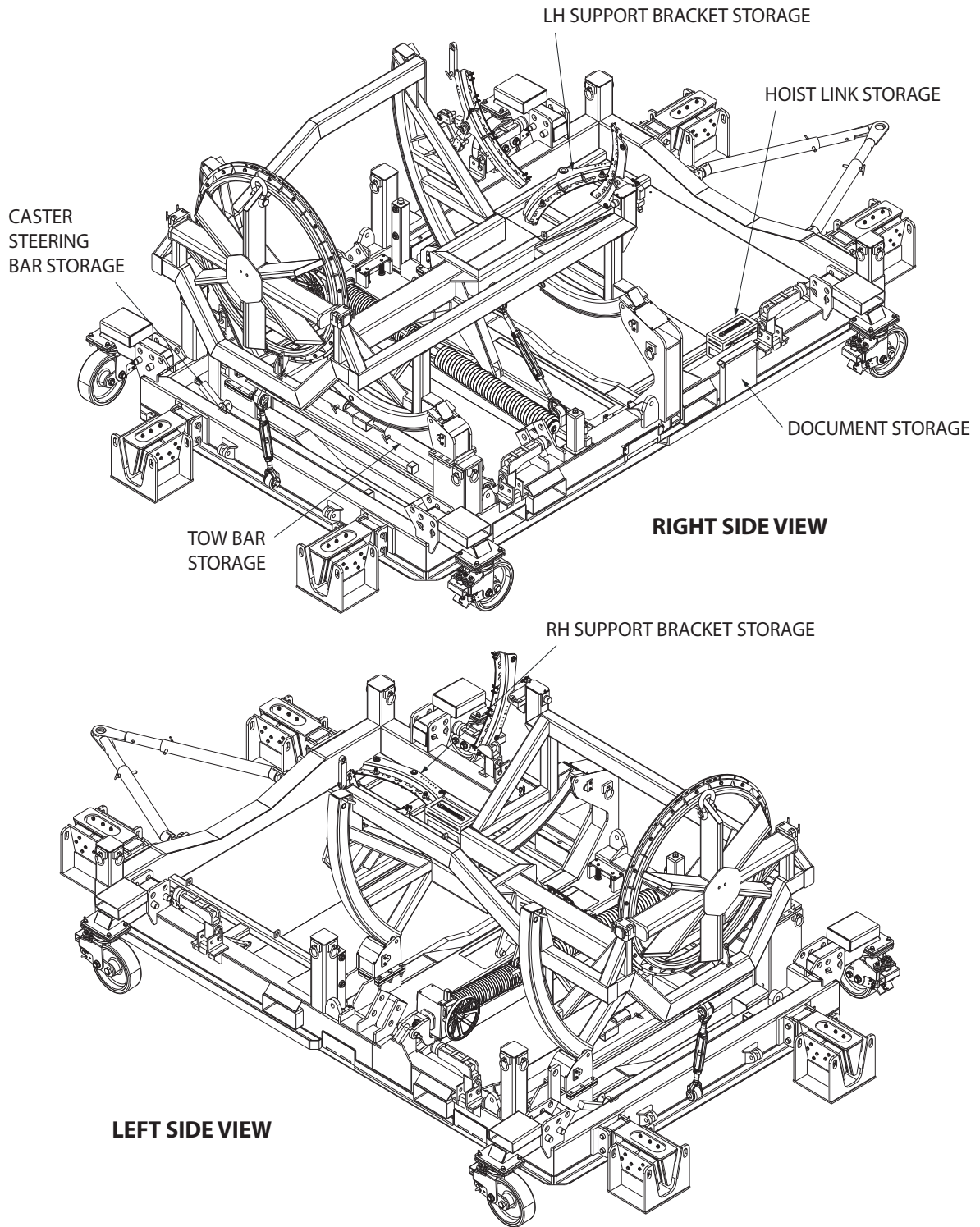
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1.0 – Revisions

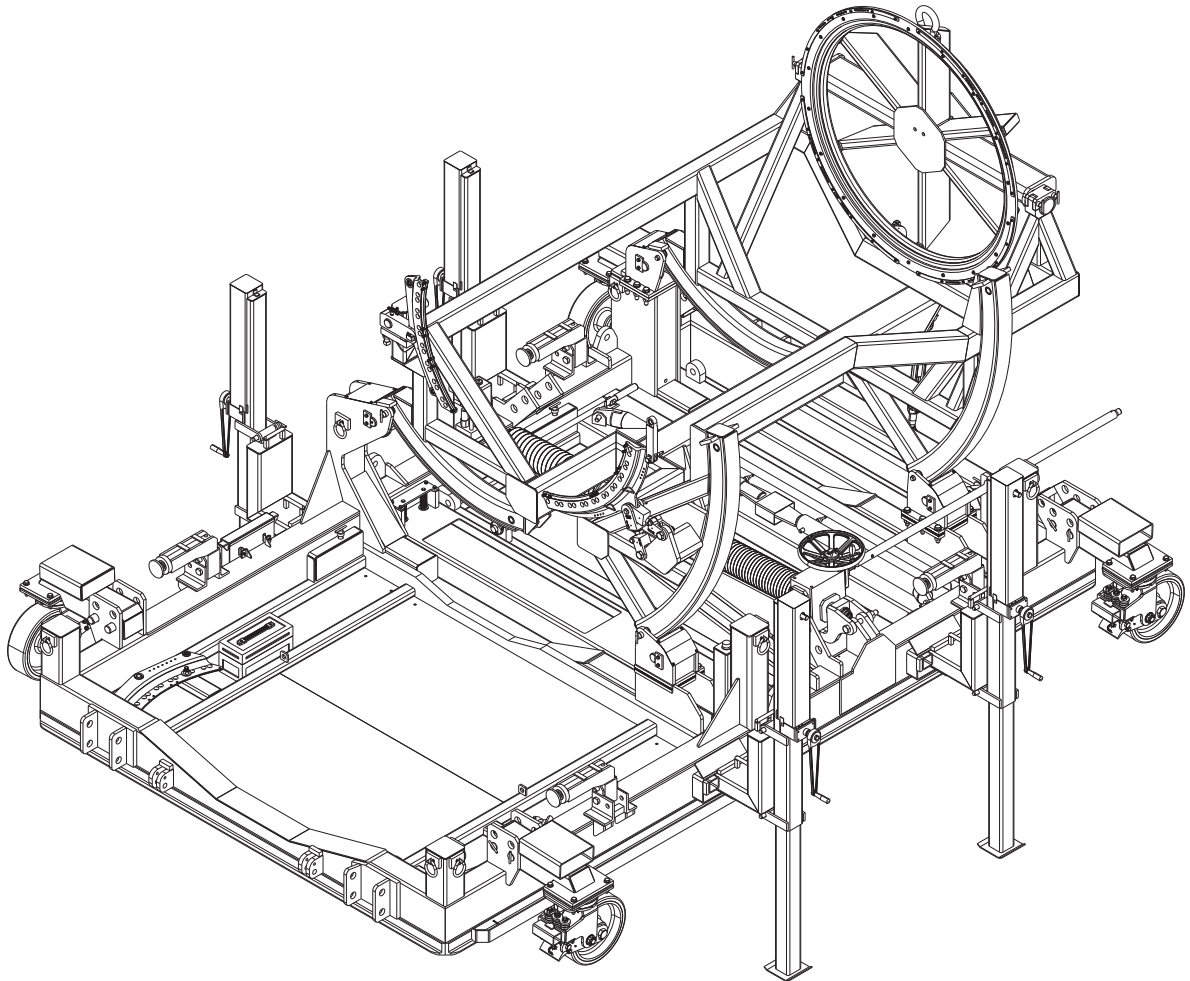
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4.5	R	Updated Section 4.6	11/10/2022
8.7	R	Updated Part Number Item 7	11/10/2022
8.14	R	Updated Item 38	11/10/2022
8.15	R	Added Item 65	11/10/2022
8.17	R	Updated Figure 8.8-2	11/10/2022
8.23	R	Updated Part Number Item 18	11/10/2022
8.30	R	Updated Part Number Item 11	11/10/2022
8.32	R	Updated Quantity Item 12	11/10/2022
8.32	R	Updated Part Number Item 17 & 28	11/10/2022
9.0	R	Updated Section 9.2	11/10/2022

2.0 Illustrations (For Reference Only)

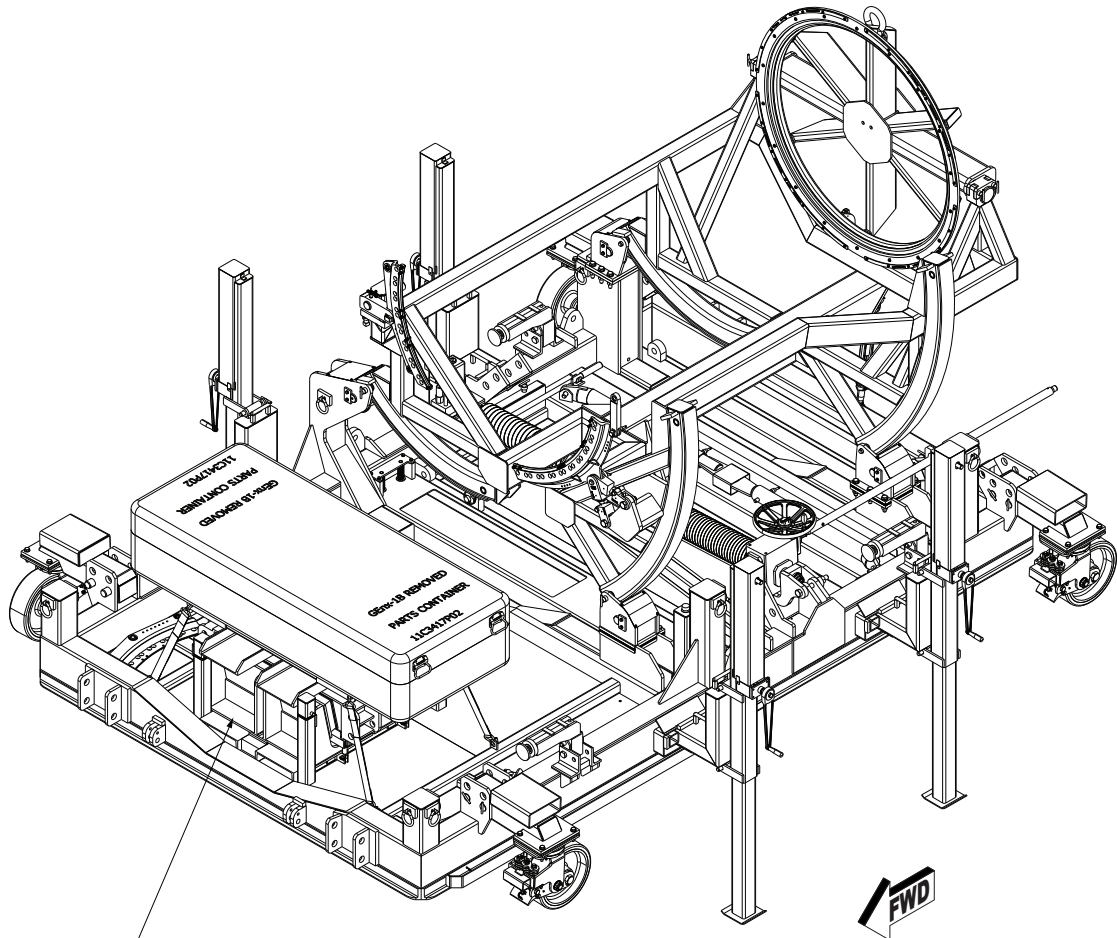


NOTE: SHOCK MOUNTS NOT INSTALLED WHEN ON CASTERS FOR TOWING

Figure 2.0-1 - AGSE-E184-G02 (11C3359P02) Roll-Over Engine Ship Stand

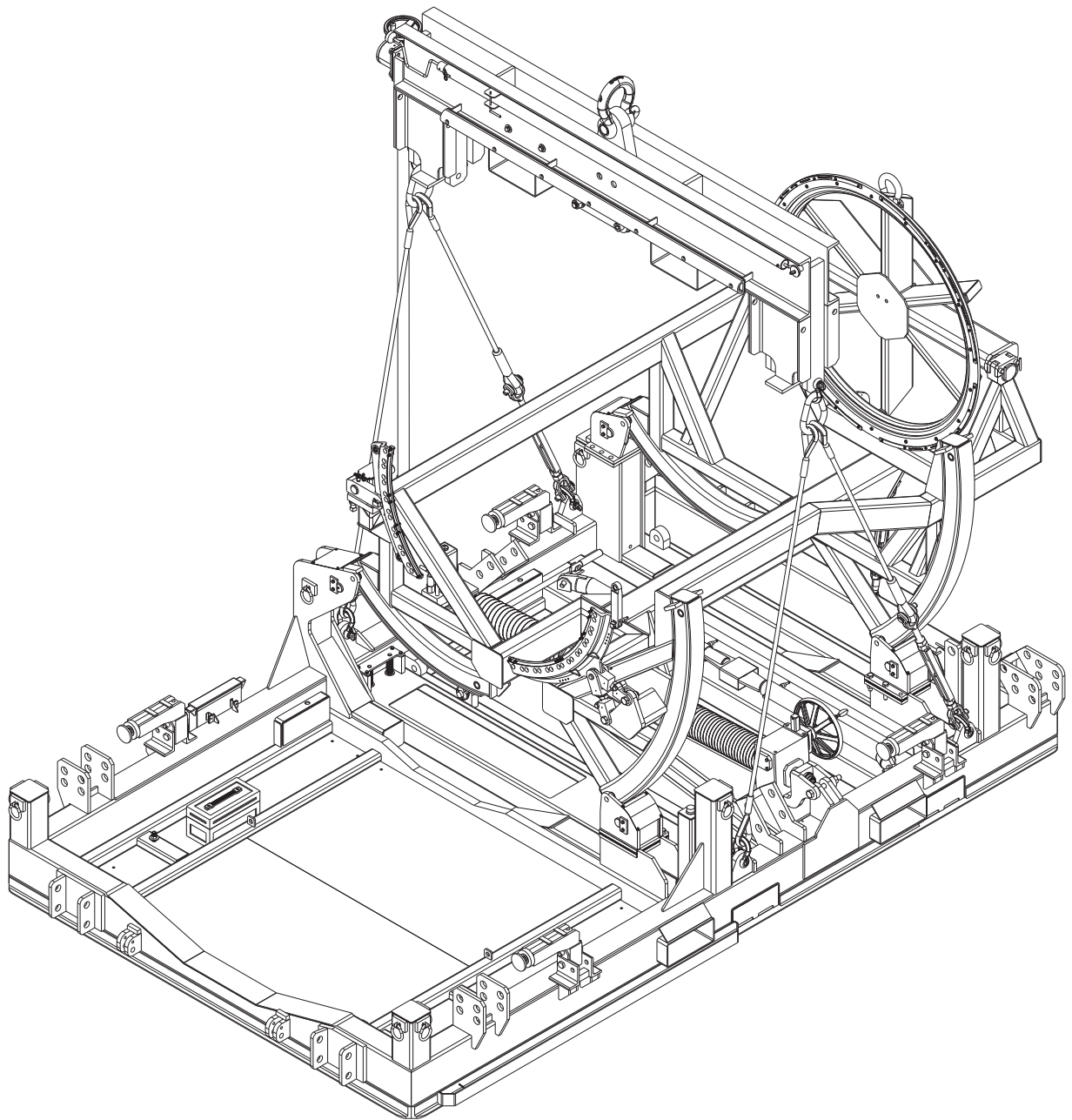


*Figure 2.0-2 - AGSE-E184-G02 (11C3359P02) Roll-Over Stand
with Optional Manual Jacking Legs*



OPTIONAL SHOCK MOUNT STORAGE (AGSE-C108-S01) AND REMOVED ENGINE COMPONENTS STORAGE (11C3417P02)

Figure 2.0-3 - AGSE-E184-G02 (11C3359P02) Roll-Over Stand with Optional Shock Mount (AGSE-C108-S01) and Removed Engine Components Storage (11C3417P02)



*Figure 2.0-4 - AGSE-E184-G02 (11C3359P02) Roll-Over Stand
Shown with 11C4484P03 (AGSE-L038-G03) Sling*

3.0 – Specification

3.1 General

The AGSE-E184-G02 (11C3359P02) Basic Roll-Over Stand is specifically designed to be compliant with the General Electric Statement of Work 11C3359P02 - Rev D - 27 May 2008, in a height restricted air or truck/trailer shipping mode. The stand (with engine in rolled position) is suitable for air transport on the main deck of B747, B777 or B787 freighter aircrafts only in axial orientation. The stand includes a self-contained manual jackscrew for rotating the cradle and engine at 53° to achieve the minimum height and width to pass through the large side cargo door. Several external components/assemblies must be removed to maximize door clearance. These components are listed in GE Engine Transportation Manual and are stored in container 11C3417P02.

CAUTION

This engine must be properly configured. Components must be removed and secured in qualified designated shipping container before rotation, otherwise engine damage may occur. See Section 5.0 - Operation for rotation procedures.

3.2 Mobility

The stand can be fork lifted from the right side of the stand only. The stand may be fork lifted when empty, or with an engine in the fully raised or fully lowered position. Only use a fork lift that meets the size, capacity and balance requirements (See Section 5.4 for complete instructions). The stand may also be lifted by single-point lift sling (11C4484P03 - AGSE-L038-G03) or dual-lift sling (11C4542P01 - AGSE-L033-G01).

WARNING

Stand with engine must NEVER be moved without securing cradle with pins and shipping braces.

3.3 Design

The design, construction and integrity of this unit are in accordance with acceptable commercial manufacturing practices. All tests of unit's design and structural integrity (proof load, fit and function, hoist tests, etc.) are completed on the first article and documented accordingly.

3.3.1 Base

Base measures (128"x196") for air transport of entire stand, with or without engine. Base features include: Right-side-only fork lift access, left side guide fixed to prevent engine contact with door frame & latch pins and multiple tie-down rings for securing empty stand to truck and stand with engine to aircraft floor. Features also include hydraulic jacks sockets for hydraulic jack legs and brackets for installing/stowing casters, tow bars, flat bed truck loading of stand with/without engine and installing shock mounts, also include brackets for lifting by sling or slings and sockets for high lift (~48") manual jacking legs.

CAUTION

The stand with engine MUST NEVER be tied directly to the truck bed. Only use the tie-down provisions on the truck shipping shock mounts. The engine MUST only be shipped by truck with a trailer equipped with an “air-ride” type suspension system.

3.3.2 Cradle

Unit is capable of rotating the cradle a total of 53°, which lowers the engine centerline a total of 20” to accommodate the “Low Profile” features of unit. Activation of the rotation feature is by manual ball screw actuator.

3.4 Fabrication and Finish

The stand is fabricated from structural steel shapes conforming to ASTM A500, A513, and A36 materials. All bolted connections use A325 structural bolts or SAE Grade 5 commercial hardware. Unit is primed and painted with high-grade, Skydrol resistant enamel, with color optional. Pins and miscellaneous hardware are manufactured from corrosion resistant materials, or plated as required.

3.5 Dimensions

	Without Engine	With Engine Unrolled	With Engine Rolled
Width*	128 in 325 cm	140 in 356 cm	131 in 333 cm
Height **	117 in 297 cm	142 in 361 cm	122 in 310 cm
Total Weight***	13,770 lbs 6,246 kg	28,370 lbs 12,868 kg	28,370 lbs 12,868 kg
Length	202 in 513 cm	202 in 513 cm	202 in 513 cm

* No Casters/Upright/Raised

** On Base, Add 3” for Casters

*** Without optional manual jacking legs or shock mount/engine components storage container

3.6 Shock Mount Storage

The shock mounts store in 11C3417P02, which is designed to fit on the forward end of the empty stand with a storage box for removed components (See IPB Figure 16 for details).

4.0 – Maintenance and Inspection

4.1 General

Life expectancy of this equipment can be extended if it is properly maintained. By design, there is only minimal periodic servicing required. Annual inspections for damage, weld cracks, or corrosion are recommended. Prior to each use, this equipment should be inspected for obvious signs of abuse or shipping damage. Observed damage should require complete inspection of the affected area to ensure structural integrity is not compromised.

4.2 Cleaning and Painting

This equipment should be cleaned periodically with a soap and water solution and rinsed thoroughly.

CAUTION

Re-lubricate any mechanically moving parts and friction points where needed (bearings, shafts, grease zerk fittings etc.) after cleaning this equipment.

Damaged paint should be touched-up with Skydrol resistant high-grade enamel paint. Superficial scratches are expected during normal usage and will not affect function.

4.3 Scheduled Service

All bearings should be lubricated every 90 days with the following extreme pressure grease or equivalent grease:

Manufacturer	Product
Mobil Oil Company	Mobilplex E.P. #1
Texaco Oil Company	Texaco E.P. #1
Gulf Oil Company	Gulf Crown E.P. #1
Shell Oil Company	Shell Alavania E.P. #1

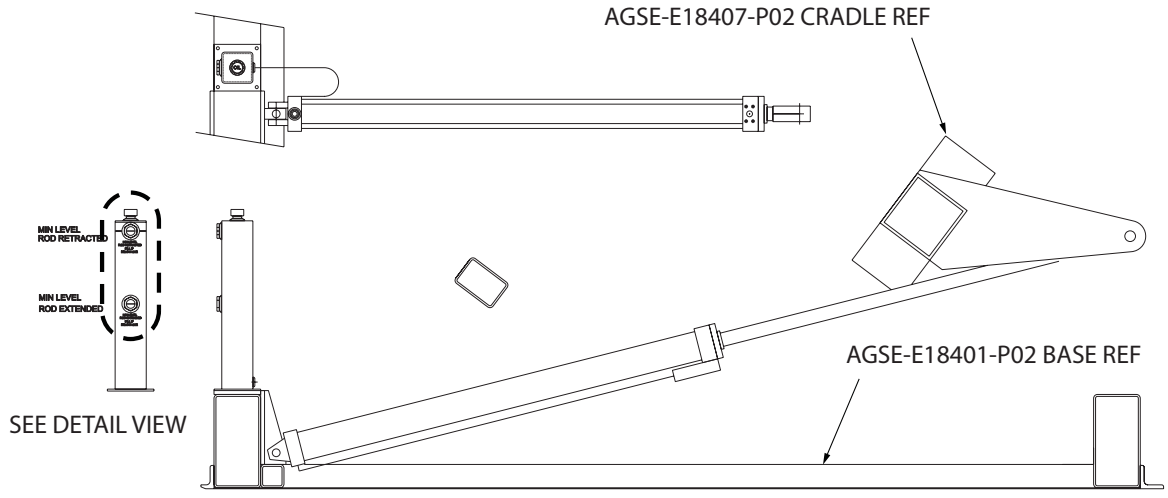
All non-painted machined surfaces should be coated with a light grade oil spray every 90 days. Spray with rust inhibitor LPS-3 (MIL-C-16173D, Gr. 2) or equivalent.

4.4 Scheduled Inspection

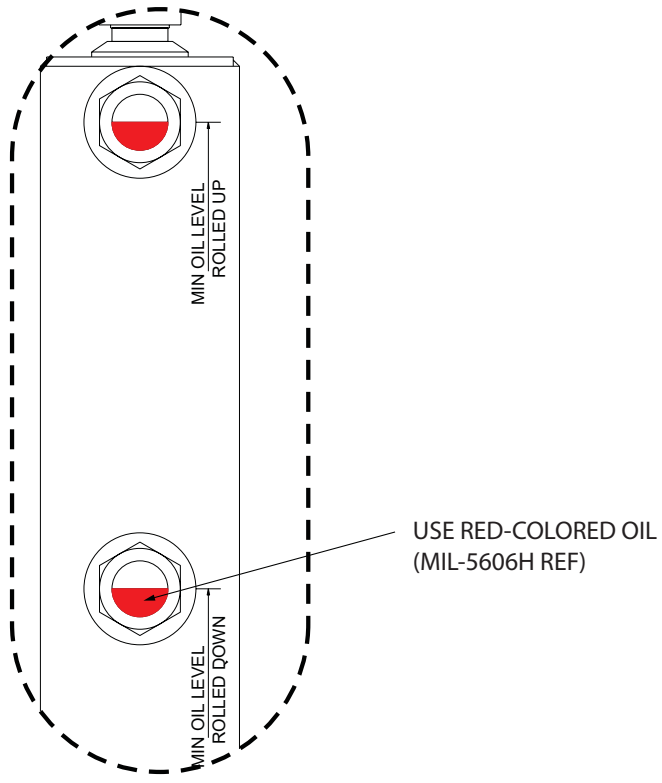
CAUTION

Prior to each use, this equipment should be inspected for obvious signs of abuse or shipping damage. Observed damaged or missing parts should require complete inspection of the affected area to ensure structural integrity is not compromised.

Annual inspections of machined surfaces, pins, fasteners, structure and shock mounts are recommended. The machined surfaces (wheels, axles, pivots) are to be visually inspected for signs of wear or corrosion. Action is to be taken immediately if areas are determined to be potentially dangerous to operating personnel, or a detriment to the equipment. Pins and fasteners are to be visually inspected for cracks, damage, or corrosion. Loose fasteners should be tightened. The structure is to be visually inspected for damage, weld cracks, or corrosion. The fail-safe cylinder reservoir oil levels should be checked before using stand. Maintain minimum oil levels as shown in Figure 4.4-1, page 4.2. Use the red-colored oil type (MIL-H-5606 Type). See Section 4.7 for shock mount inspection.



INSTALLATION - FAILSAFE CYLINDER
(ROTATED/LOWERED POSITION REF)



11C3359 FAILSAFE CYLINDER RESERVOIR DETAIL VIEW

Figure 4.4-1 Failsafe Cylinder

4.5 Friction Clutch Inspection and Maintenance

The inspection and maintenance of the roll operation friction disc clutch (Figure 4.5-1) should be made before each use. All four (4) safety pins (IPB Fig. 1 - Item 6) should be installed to prevent cradle rotation. Install wood blocks at the free end of the jack screw tube brace to maintain the jack current position. Then free the jack screw nut assembly to travel by removing four (4) screws, four (4) lock washers (IPB Fig. 2 - Items 16 and 17) and the two (2) pivot pins (IPB Fig. 2 - Item 3). Rotate the jack screw hand wheel one to two turns and note the amount of force required. The force required to overcome the friction clutch and turn the hand wheel should be approximately 10 to 15 lbs. (45 to 67 N). Inspection and adjustment of the friction clutch assembly is required if there is little or no resistance felt when the hand wheel is rotated.

The friction disk (IPB Fig. 10 - Item 43) is seated in the hand wheel pressure plate (IPB Fig. 10 - Item 40) located between the gear box and hand wheel. Two (2) compression springs (IPB Fig. 10 - Item 21) are installed in the pressure plate to exert pressure on the friction disk and the hand wheel hub. Increasing the spring pressure increases the friction resistance of the disk and force required to turn the hand wheel.

Adjustment is made by removing the two locking compression spring cap screws located on the face of the brake plate, then turning the internal compression spring adjustment screws equally clockwise to increase pressure and counterclockwise to decrease pressure. After each adjustment, rotate the hand wheel one or two turns to determine the force required to turn the wheel. Once the above referenced resistance force can be felt, install the locking compression springs and reconnect the jack screw nut assembly to the cradle rotation arm.

If the disk pressure cannot be adjusted to provide hand wheel resistance then the clutch assembly should be disassembled and visually inspected. Remove the hand wheel retainer pin (IPB Fig. 10 - Item 51), hand wheel and friction disk. Inspect the friction disk surface for smoothness/chips/cracks and replace if the thickness is less than 0.063-inch (1.6 mm). Remove the compression spring cap screws (2), adjustment screws (2) and compression springs (2) to visually inspect for broken coils and replace as required. Install the compression springs and adjustment cap screws to compress the spring approximately 0.25-inches (6.4 mm). Install the hand wheel with sufficient pressure to seat the hub surface on the friction disk then retain with the retainer pin (IPB Fig. 10 - Item 51). Adjust the friction clutch as described in the previous paragraph.

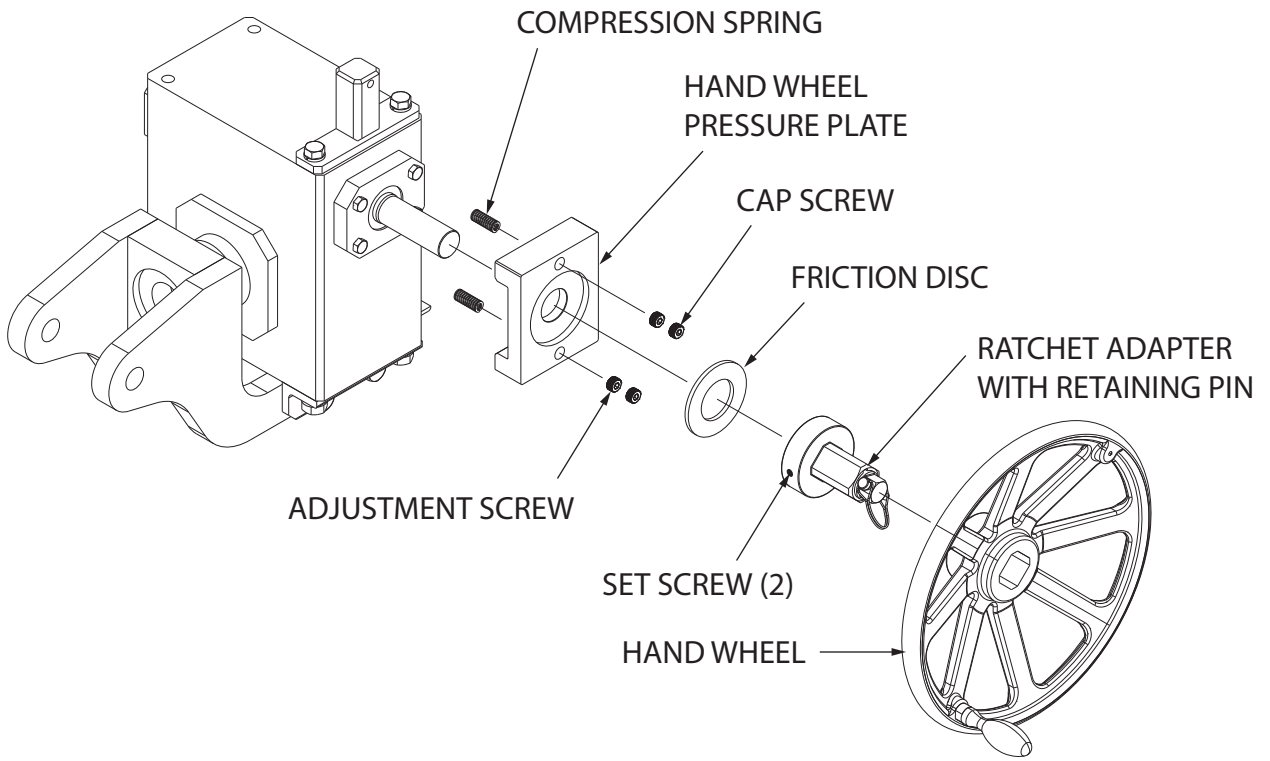


Figure 4.5-1

4.6 Hydraulic Jacking Legs Inspection and Maintenance

Before using the hydraulic Jacking Legs to raise the stand (either from off of the casters or off of the floor), visually inspect each Jacking Leg cylinder end to check if the stop ring is protruding beyond the end of the cylinder body (Illustration Figure 4.6-1). If the stop ring is more than one thread beyond the end of the cylinder body do not use the leg to lift the stand until the ring has been rethreaded back into the cylinder body. The stop ring has small grooves on the face, to allow the use of a spanner wrench type tool or a pin drive punch tool. Apply Loctite 222 (or equivalent) to the threads before threading the stop ring back into the cylinder body.

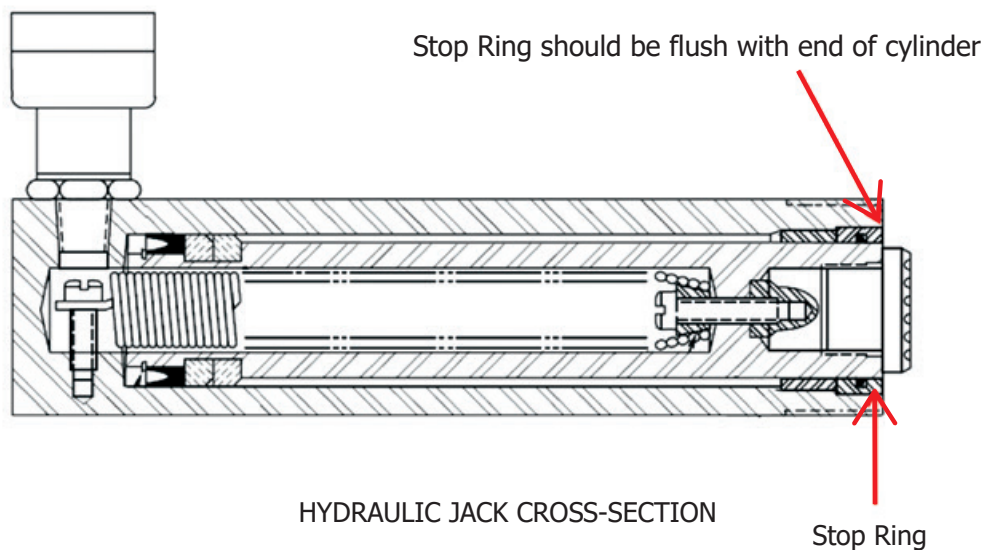
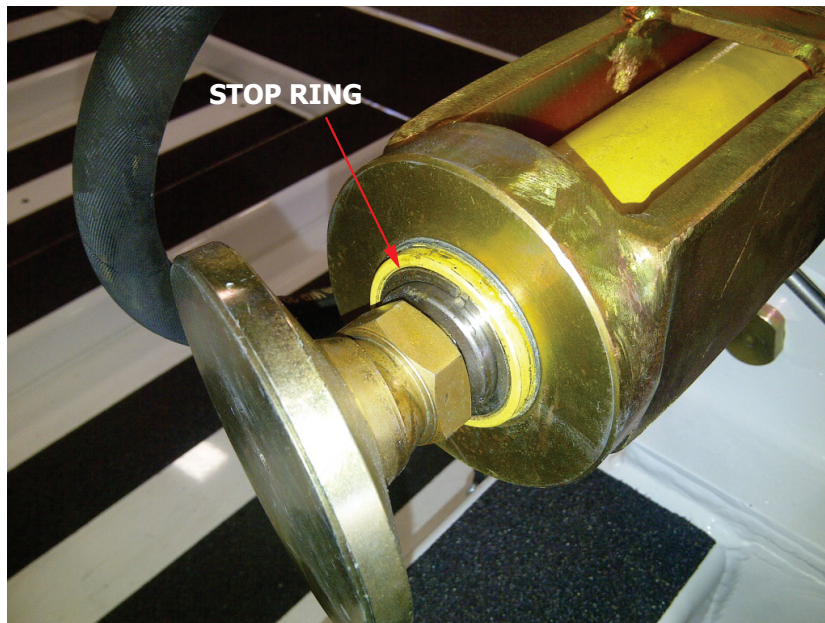


Figure 4.6-1 Hydraulic Jack Inspection

4.7 Shock Mount Replacement

CAUTION

AGSE recommends that shock mounts be replaced every five (5) years. Additionally, periodic inspections should be performed and any of the following conditions are proper cause for replacement of the shock mounts prior to their expiration:

- 1. Visible evidence of cracks.**
- 2. Discoloration: visible damage caused by solvents.**
- 3. Permanent deformation.**
- 4. Mount does not flex during engine loading/unloading.**
- 5. Significant corrosion on shock attach-plate.**

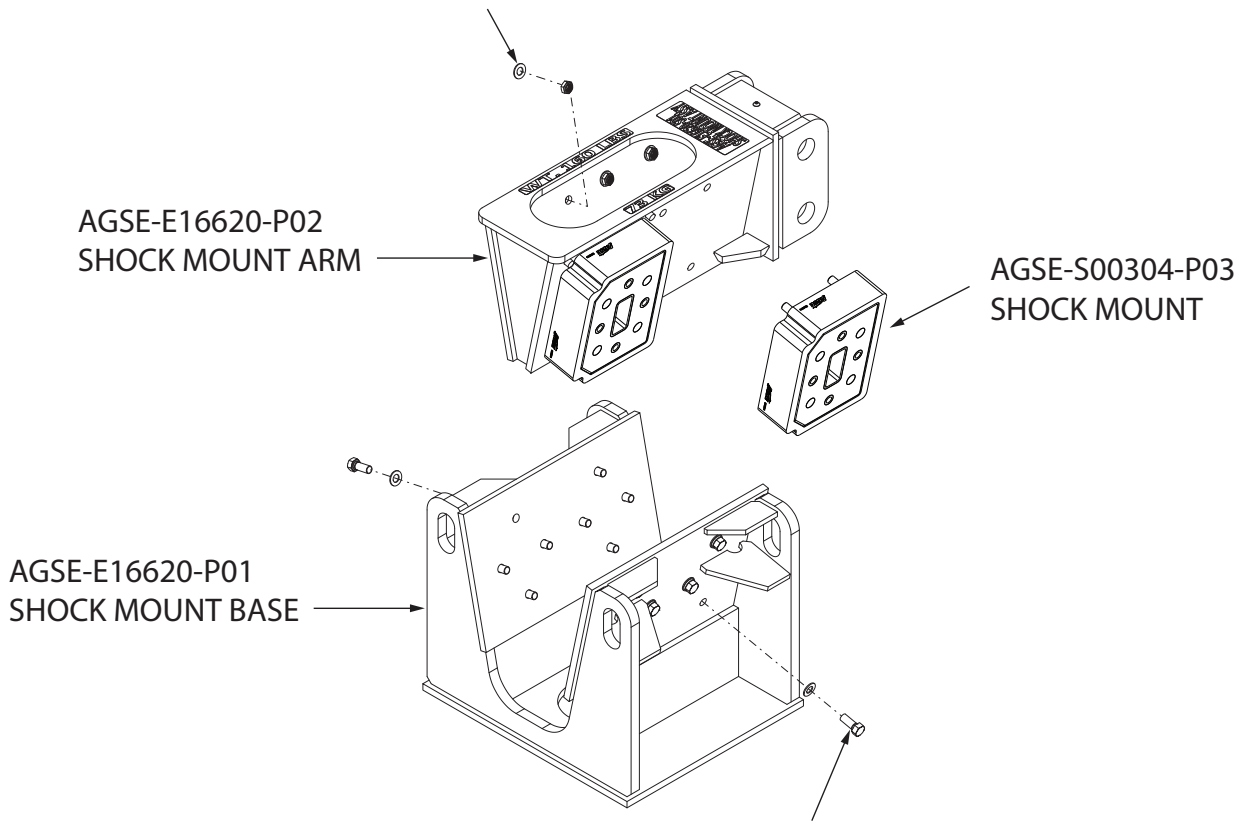
The following exposures can reduce the life of shock mounts and it is recommended to avoid them where possible.

- High humidity and/or salty air
- Direct sunlight
- Solvent, corrosive liquids, and fumes
- Oils, jet fuel, or Skydrol hydraulic fluid
- Extreme temperatures
- Ozone or engine exhaust

To replace an old shock mount:

1. Remove sixteen (16) 1/2" x 1" HHCS and sixteen (16) 1/2" washers (IPB Figure 16 - Items 6 and 7) to remove the AGSE-E16620-P02 shock mount arm (IPB Figure 16 - Item 2) from the AGSE-E16620-P01 shock mount base (IPB Figure 16 - Item 1). (Illustration Figure 4.7-1).
2. Remove the AGSE-S00304-P03 shock mount (IPB Figure 16 - Item 3) by removing four (4) 1/2" hex jam lock nuts and four (4) 1/2" flat washers (IPB Figure 16 - Items 5 and 6) securing the shock mount to the shock mount arm.
3. Install the new shock mount and secure with the hardware removed in steps 1 and 2.

REMOVE
1/2" HEX JAM LOCK NUT (4)
1/2" FLAT WASHER (4)
(FOR EACH SHOCK MOUNT)
TO REMOVE THE SHOCK MOUNT
FROM THE SHOCK MOUNT ARM



REMOVE
1/2" x 1" HEX HEAD CAP SCREW (16)
1/2" FLAT WASHER (16)
TO REMOVE THE SHOCK MOUNT
ARM AND SHOCK MOUNTS
FROM THE SHOCK MOUNT BASE

Figure 4.7-1 Shock Mount Replacement

4.8 General Maintenance Schedule

NOTE:

This Maintenance Schedule does not supersede the maintenance described by Customers' Company Maintenance Policy. Intervals indicated are recommendations only and should be altered to take into consideration usage factors and environmental conditions.

Component	Task to be Performed	Maintenance Intervals			
		Monthly	3 Months	6 Months	Yearly
General	Inspect for missing parts	1*			
	Inspect paint/plating finish			I	
	Inspect exposed/bare metal for rust		H		
	Function check equipment				2*
	Inspect all stencils/placards/stamps			I	
Casters	Check wheel condition			I	
	Tighten mounting bolts			T	
	Check swivel lock/brake			I	
	Lubricate bearings			L	
Structure	Inspect frame for damage/cracked welds			I	
	Tighten all bolts		T		
	Lubricate/protect moving joints		H	L	
Pins	Inspect for damaged/bent/worn pins			I	
	Inspect for broken/cracked pin handles			I	
	Inspect for broken/cut lanyards			I	
Shock Mounts	Check date				3*
	Inspect rubber for cracking/deformation			I	
	Inspect for permanent set/deformation			I	
Manual	Check manual is present/readable			4*	
	Check manual revision is current				5*

1* - Inspection for missing parts before every use.

2* - Carry out function test if equipment has not been used for extended period of time.

3* - AGSE recommends that shock mounts be replaced within five (5) years.

4* - Check that manual is present before every use.

5* - Latest manuals are available from www.agsecorp.com or call (562) 906-9300

Legend

I - Inspect/Check

T - Tighten

L - Lubricate

H - Spray with rust inhibitor

R - Replace

Recommended Lubricant: Chevron Dura-Lith Grease EP, NLGI2 or equivalent.

5.0 – Operation

WARNING

1. **Extreme caution must be taken during loading and unloading engine onto stand with overhead hoists or crane to minimize pinch point and/or crushing hazards due to tight clearances between engine and stand.**
2. **Caution must be taken when lifting and moving stand with a forklift. A safety zone must be established to avoid potential crushing injury. (See Section 5.4 for complete instructions.)**
3. **Be sure cradle-to-base safety pins and shipping braces are installed before moving and shipping stand.**
4. **A minimum of four (4) spotters is recommended during loading and unloading engine onto stand. One spotter is recommended at each of the four (4) mount adapters to guide and to prevent contact between engine and stand.**

5.1 Rotation of Empty Cradle

- 1) Remove four (4) cradle-to-base lock pins (IPB Figure 1 - Item 6) (Figure 5.1-2).
- 2) Loosen and disconnect the FWD and AFT shipping braces (IPB Figure 1 - Item 3) (Figure 5.1-2).
- 3) Turn the hand wheel in the direction indicated by stencils to rotate cradle in direction required (AFT looking FWD): CCW to rotate and lower cradle CCW and CW to rotate and raise cradle CW (Figure 5.1-1).
- 4) The air ratchet extension may be used to turn the hand wheel to lower or raise the cradle (Figure 5.1-1A)

CAUTION

Clearances between support rollers and cradle are very close. Spotters are strongly recommended to watch and warn the operator of potential personnel injuries.

NOTE

If required, the hand wheel may be released at any time during the rotation cycle.

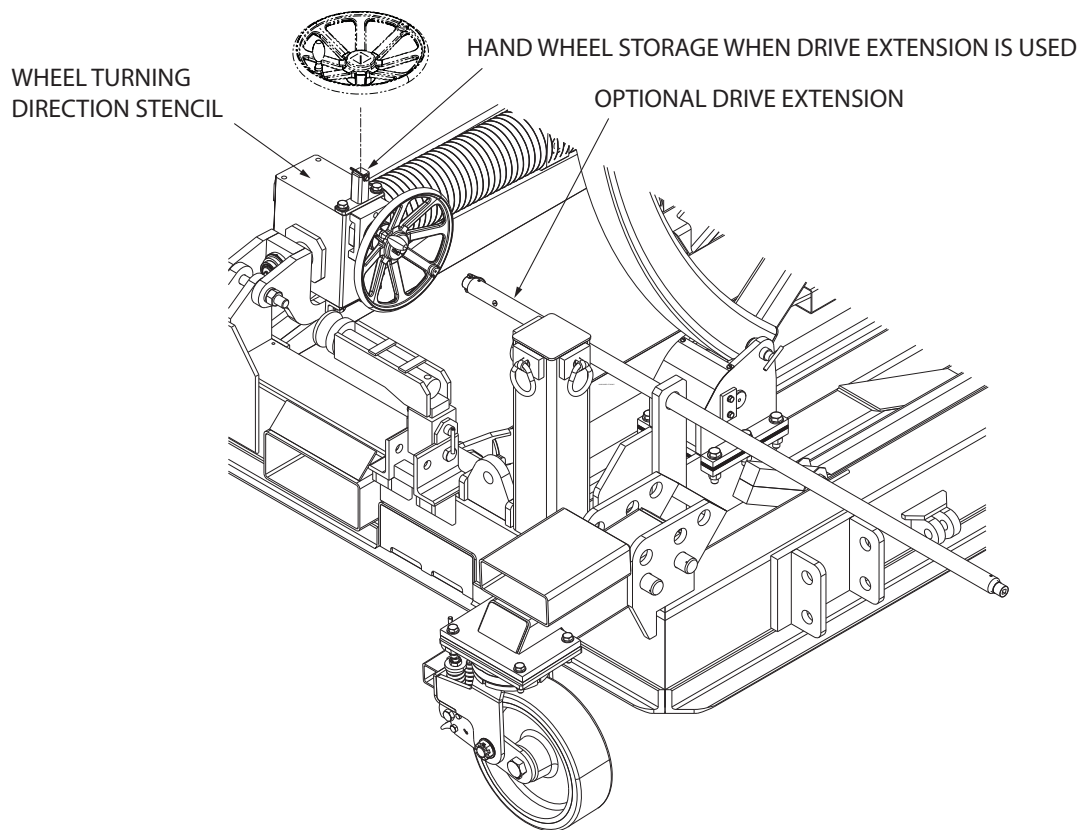


Figure 5.1-1 Hand Wheel Storage and Drive Extension

CAUTION

If the hand wheel begins to turn when released, maintain a constant grip on the wheel until rotation cycle is completed and pins are installed. See Figure 5.1-4 and Section 4.5 for friction drag force adjustment.

- 4) When rotation cycle is complete, install the four (4) cradle-to-base lock pins. (Figure 5.1-2)
- 5) Re-install shipping braces. Tighten in tension mode. There should be NO GAPS between cradle and support rollers.

CAUTION

Operator MUST NOT let the hand wheel “free spin” at any time. Maintain constant pressure on the hand wheel at all time while rotating “up” or “down”. Release hand wheel ONLY AFTER cradle is securely pinned in place.

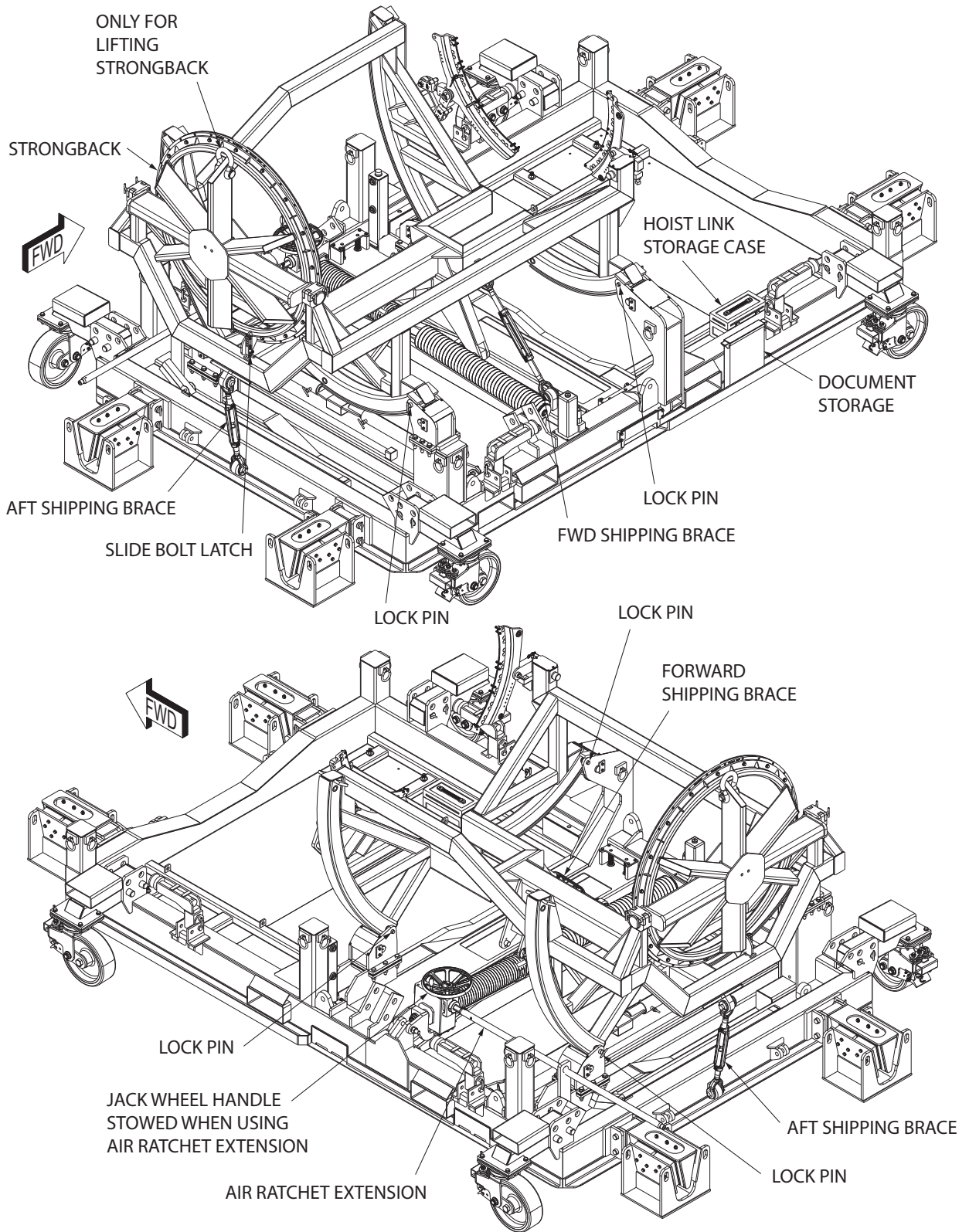


Figure 5.1-2 Stand Shown with Cradle in Upright Position

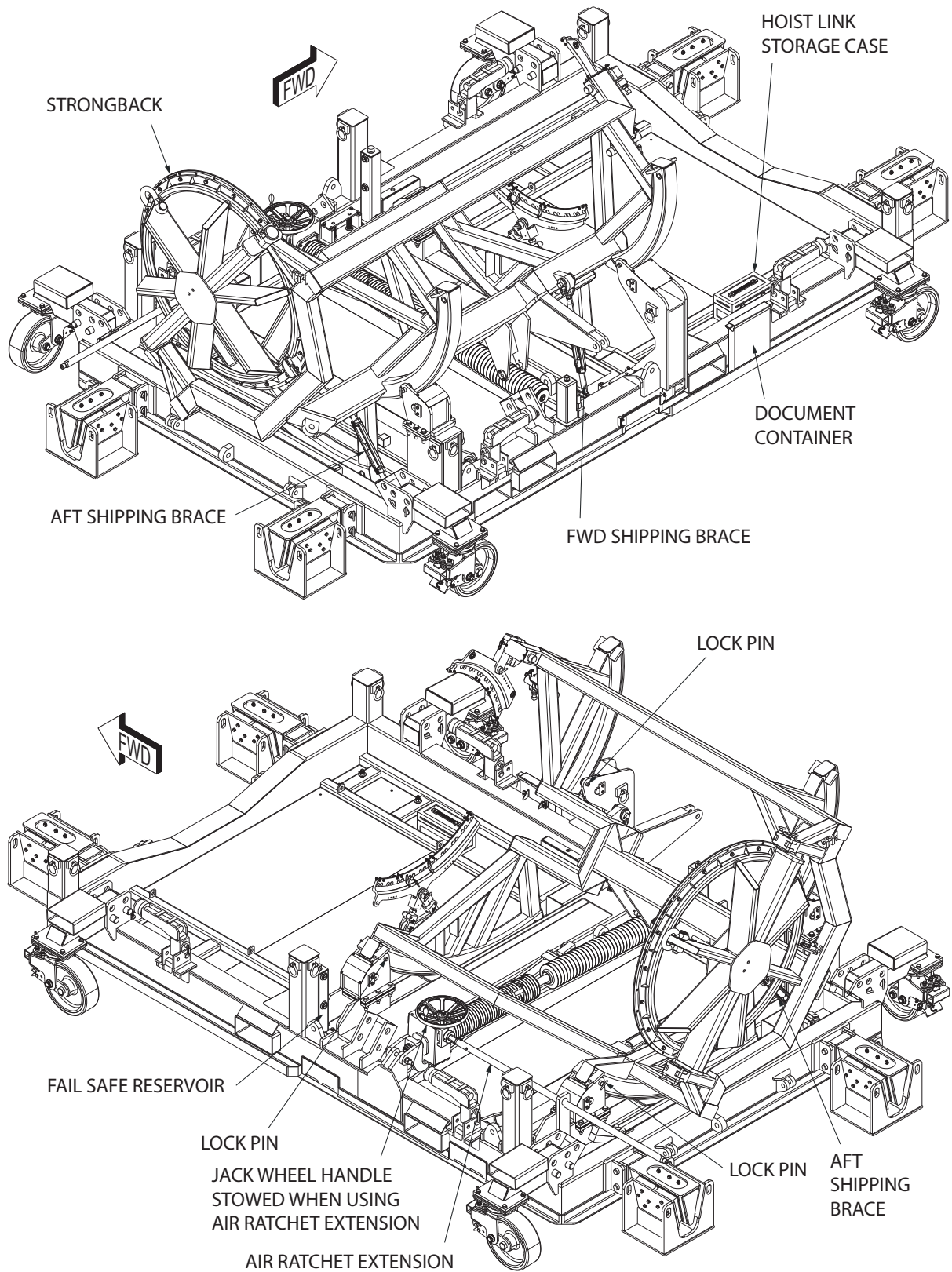


Figure 5.1-3 Stand Shown With Cradle Rotated

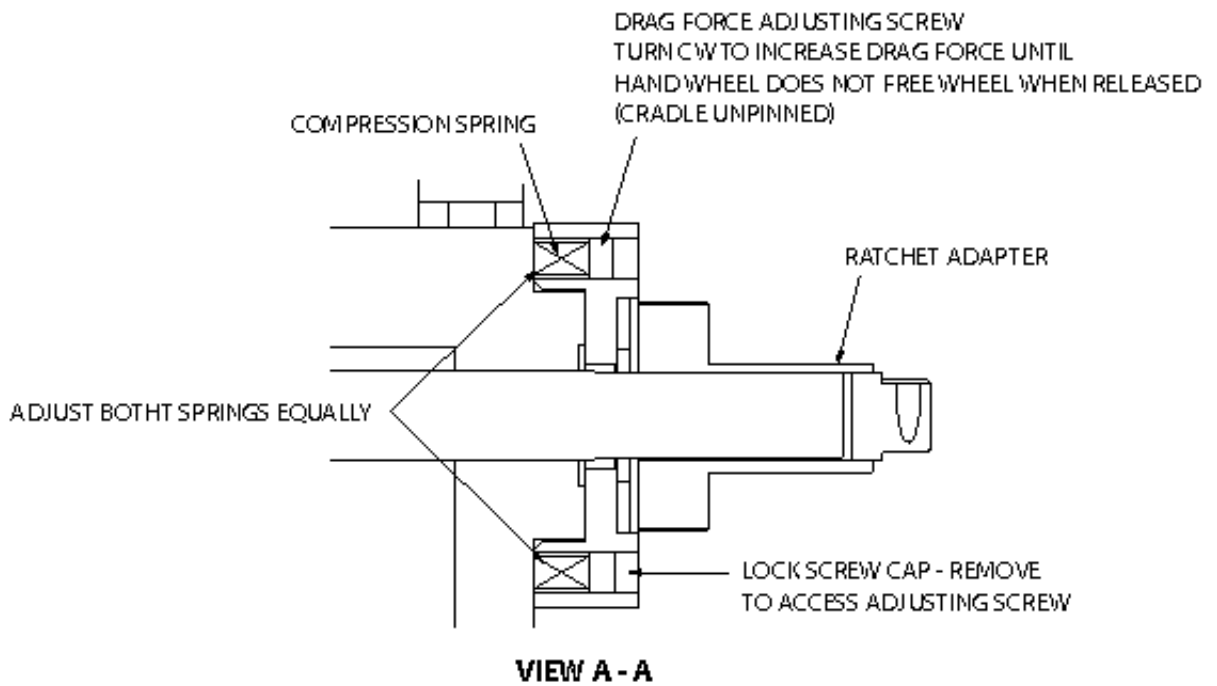
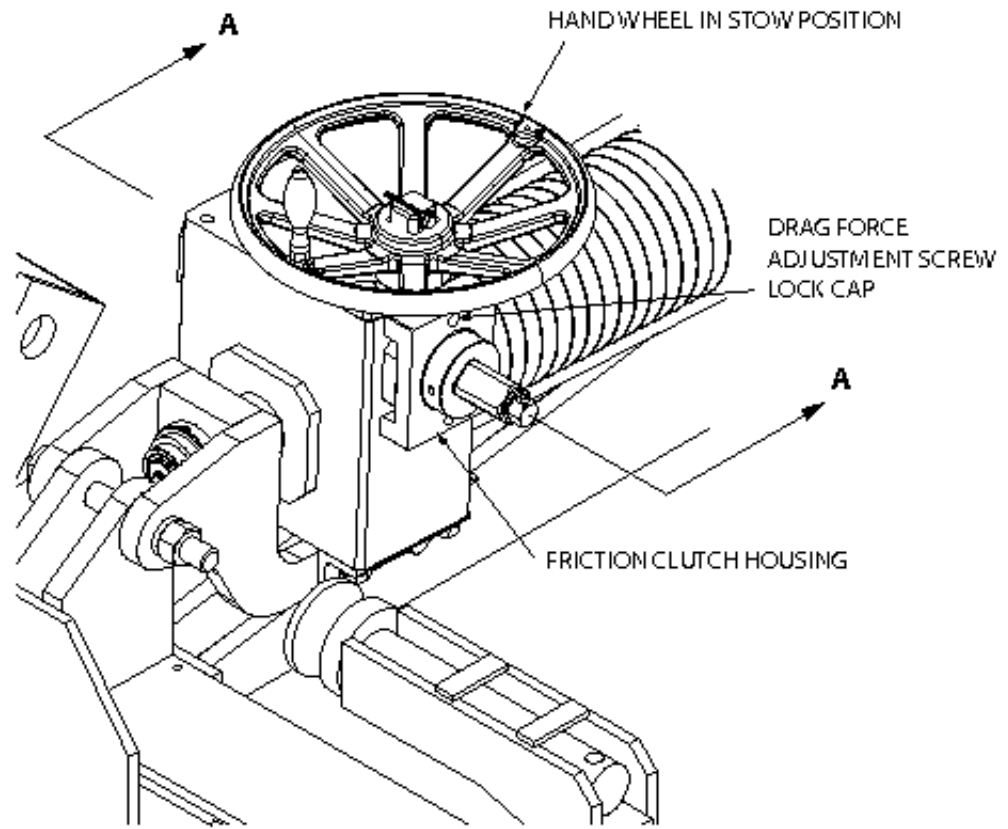


Figure 5.1-4

WARNING

1. Loose clothing must never be worn when performing tasks described in this section.
2. A safety zone must be established to avoid potential crushing or pinching during cradle rotation.
3. Stand with engine **MUST NOT** be moved or lifted at any position other than full down or full up without installing and tightening the two (2) turnbuckle shipping braces.

5.2 Installing Engine onto Stand

Preparation Notes:

- a. Inspect stand for damage and missing parts. Do not proceed if stand is in an unsafe condition. Repair damage, replace missing parts before proceeding.
- b. Engine is supported by overhead hoist system.
- c. Cradle must be in raised position and secured by four (4) locking pins. Turnbuckle shipping braces must be loose or disconnected.
- d. Remove FWD adapters and supports from storage positions on base. Remove AFT adapter ring from strongback. **THE STRONGBACK IS TO REMAIN ATTACHED TO THE CRADLE WHEN INSTALLING THE ENGINE INTO THE STAND.**
- e. A minimum of four (4) spotters is recommended. One spotter is recommended at each of the four (4) engine attaching points to the stand to prevent contact between engine and cradle.

WARNING

Stand with engine MUST NOT be moved or lifted without installing and tightening the two (2) FWD and AFT turnbuckle shipping braces.

The following installation procedures are included as a supplement to the engine and aircraft manufacturer's procedures and instructions for engine handling.

5.2.1 Removal of Engine Parts

All of the following items **MUST** be removed from the engine prior to installation in the shipping stand.

Part Number	Nomenclature	Qty
Oil Tubes and Hose Clamps		
ER4406G01	Tube Hose - PDOS - Assembly RHS - Fan Cowl	1
2426M59P01	Tube and Hose, Oil - Vent	1
2366M93G01	Tube, Oil - Return	1
ER4407G01	Tube Hose - PDOS - Assembly RHS- Fan Cowl	1
J1432P16	Clamp, Loop - Hinges	1

Part Number	Nomenclature	Qty
Anti Ice Duct and Valve HW		
ER5578G01	Tube, Air - Sense Line	1
ER5345P01	Cover, Sense Line	1
ER5346P01	Cover, Sense Line	1
ER5580P01	Cover, Sense Line	1
ER5580P02	Cover, Sense Line	1
3291952-2	Fan EAI Valve	1
Wire Brackets		
2366M64G01	Bracket	1
2366M53G01	Bracket, Support	1
2366M67G01	Bracket, Electrical	1
2366M43G01	Bracket, Support - Tube PS3 & PS 25 and Electrical Cable	2
2366M44G01	Bracket	1
2366M45G01	Bracket, Electrical	1
Upper Wire Brackets		
2366M63G01	Bracket, Wiring	1
FADEC Wire Manifold Bracket		
2366M59G01	Bracket, Support	1
Air Tubes and Brackets		
2351M18G01	Bracket, Support	3
2365M42P01	Tube - Hose - Air, PS3	1
2365M41P01	Tube - Hose - Air, P25	1
TRF Drain Tubes and Brackets		
2437M24G01	Manifold, Drain Mast	1
2379M96G01	Bracket, Support - Drain	1
2379M95G01	Bracket, Tube - C Sump	1
2379M94G01	Bracket, Tube - C Sump	1
2353M43	Bracket, TRF Lower Bumper	12
2343M50G01	Bracket - Cross Tie Support, Thrust Reverse	1
2343M51G01	Bracket - Cross Tie Support, Thrust Reverse	1
Blank-Off/Deflector Panels		
2323M90G01	Blank-Off Panel	2
2323M90G02	Blank-Off Panel	3
2323M58G01	Deflector Panel	6
2323M89G01	ACC Inlet Panel	1

Part Number	Nomenclature	Qty
	Rating Plug	
2125M32P02	Rating Plug, FADEC	1
	EMU and EMU Brackets	
2122M32P08	EMU	1
2438M38G01	Bracket, Support - EMU	1
2447M81P01	Bracket, Support	1
2436M06G01	Bracket, Support - Mounting, EMU	1
2447M76G01	Bracket	1

There are storage locations in the 11C3417P02 container for all of the removed components. See the AGSE-C108-S01 (11C3417P02) manual for details.

WARNING

Do not install any foam padding or bubble wrap on the Fan Case or Lower Bifurcation. The addition of padding may cause damage to the engine as it is rolled. There is very little clearance between the Fan and Stand as well as around the outside of the Fan Case as it slides through the aircraft cargo door. Exceptions include the Spinner Cover, Oil Tank Cover and FADEC Cover.

NOTE

Consult GE Engine Manual for the latest list of removed components.

5.2.2 Securing Wires

Secure the loose wires by spreading them out and forming them within the radial profile, between the B Flange and C1 Flange on the fan case. Secure the wires with plastic zip ties. (Figure 5.2.2-1).

WARNING

If this step is ignored or done carelessly, the wires may be crushed during the engine roll.

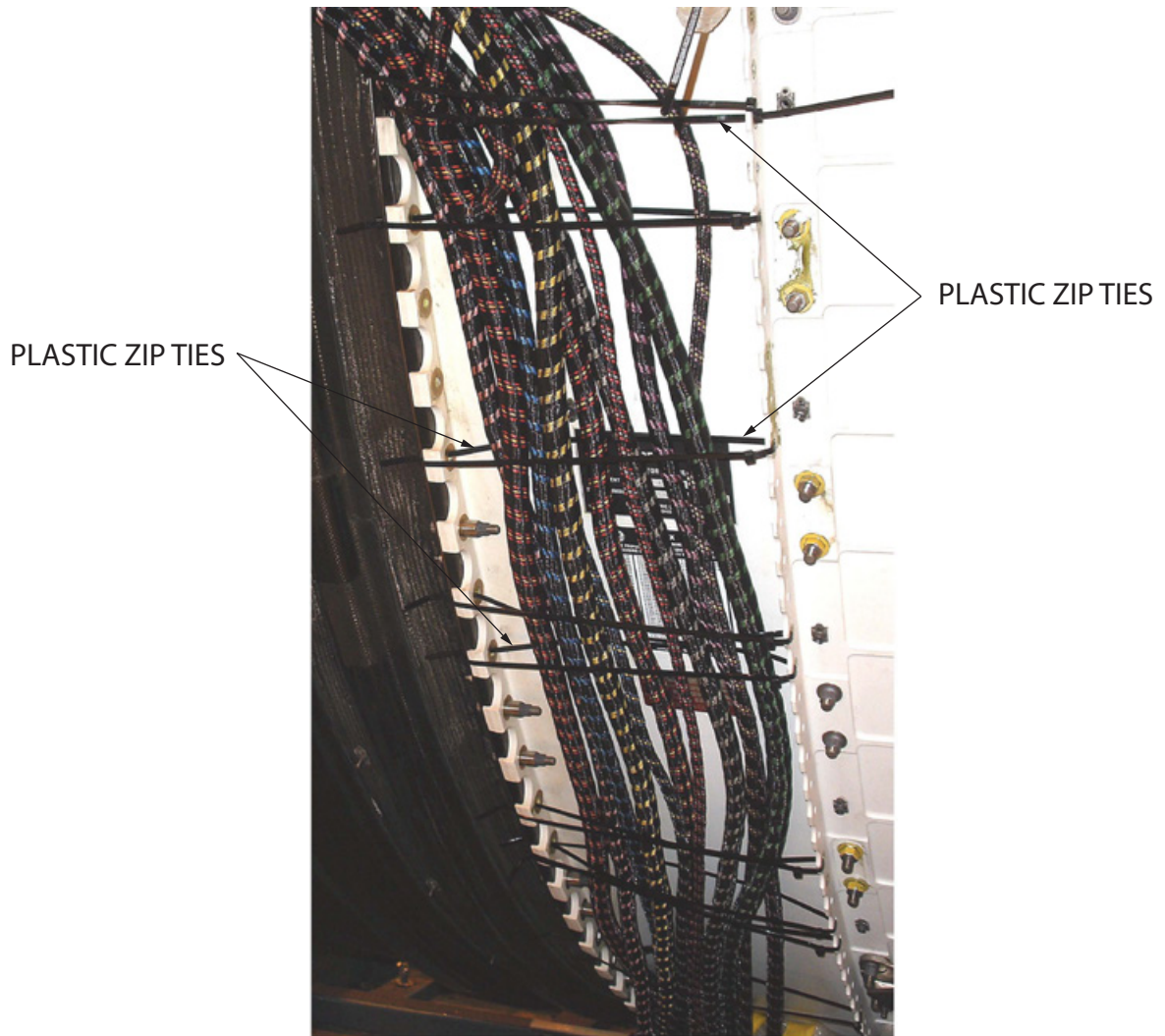


Figure 5.2.2-1

5.2.3 Engine Installation From Wing/By Overhead Hoist System

- 1) Position stand centered and under engine by moving stand in from behind. (See page 5.12 for special instructions).
- 2) Remove the LH and RH engine support brackets (IPB Figure 2 - Item 6) from the stand by removing the index pin and the T-handle ball lock pin (IPB Figure 2 - Items 5 and 11) for the RH support bracket and the adapter pin and ring-handle ball lock pin (IPB Figure 5 - Items 7 and 8) for the LH support bracket. (See Figure 5.2.3-1).

NOTE

The wires should be secure between the C1 and C2 flanges.

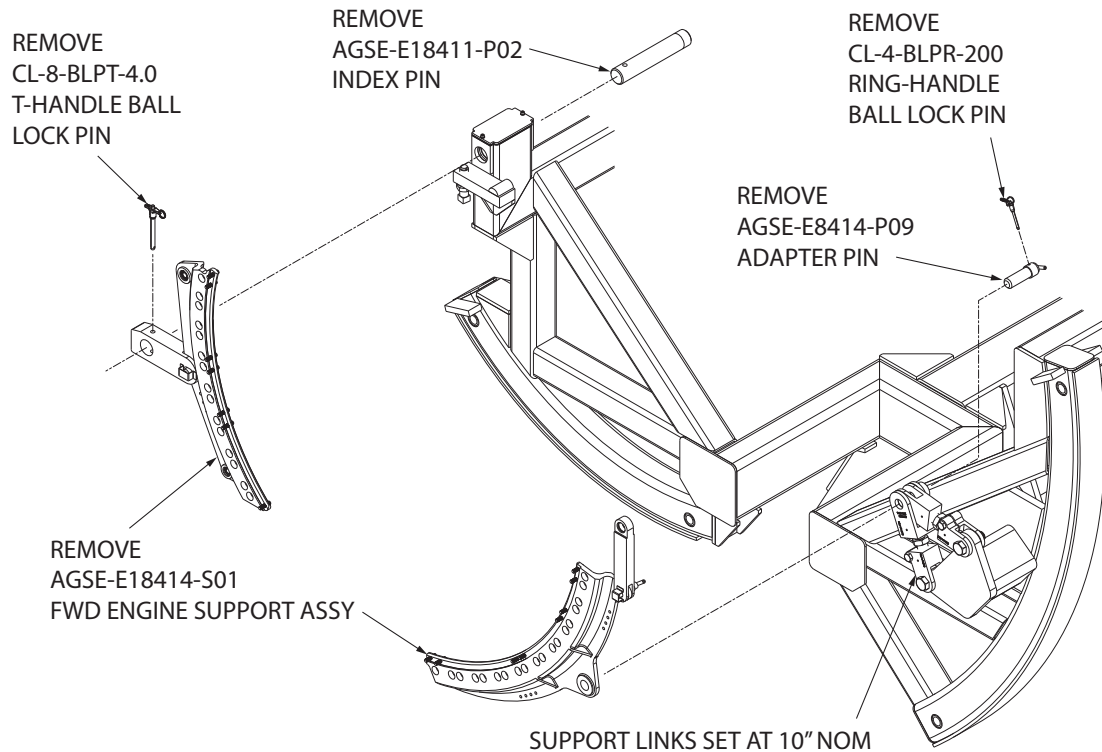


Figure 5.2.3-1

- 3) Remove the 15 indicated hardware bolts which are used to connect the fan cowl support bracket to the fan hub frame. There are tapped holes in the brackets for storage of these bolts. One additional bolt must be removed as shown in Figure 5.2.3-2.

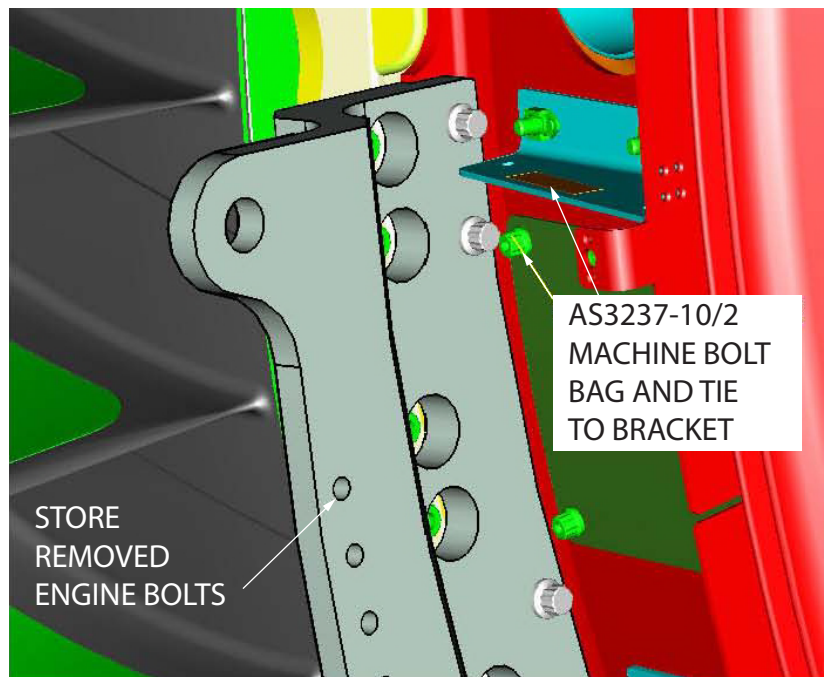


Figure 5.2.3-2

- 4) Install the fan hub frame support brackets. Use the 15 bolts (Grade 8) that are provided with the brackets. Torque these bolts to a value of 20 ft-lb. (Figure 5.2.3-3).

WARNING

1. Do not use the engine hardware bolts to secure the engine support brackets.
2. Remember to re-install engine hardware bolts when the support brackets are removed.
3. Do not remove any QEC bolts.
4. The support brackets are very heavy. Two persons are recommended for the installation task.

NOTE

The support links should be pre-adjusted to a nominal 10" between hole to hole centers and may only be adjusted +/- .25.

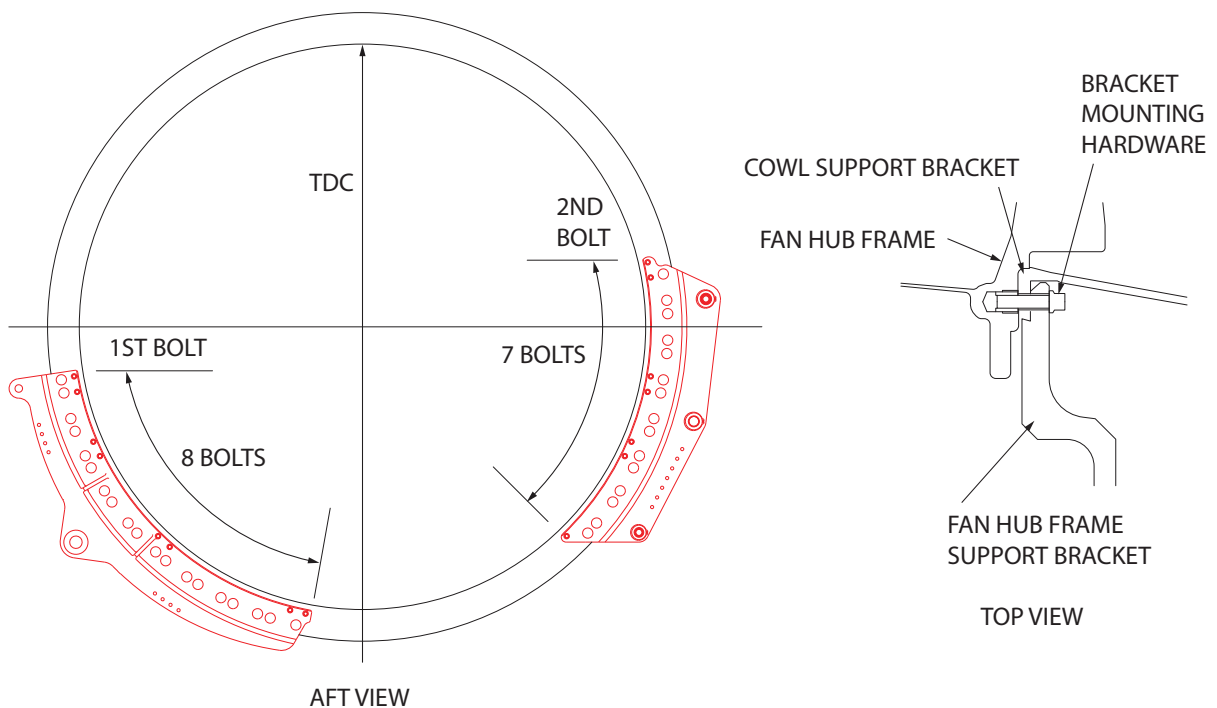


Figure 5.2.3-3

CAUTION

Safety harness should be used to prevent slipping and falling from ladder's or platform's height. It is also recommended to use lanyards tied to wrist for tools to avoid dropping tools or metal parts from a height.

- 5) Remove the exhaust nozzle and exhaust cone and two (2) guide pins on either side of the outer flange near 6 o'clock CL.
- 6) Attach the AFT adapter ring (IPB Figure 3 - Item 2) with four (4) back-up ring segments (IPB Figure 3 - Item 3) to the AFT TRF flange of the engine using the 28 bolts and nuts (IPB Figure 3 - Items 4 and 5) provided. Install the bolts in a criss-cross pattern to ensure even loading and progressively torque the bolts to 8 - 10 ft-lbs. (Figure 5.2.3-4).

NOTE

1. The bolts must be installed toward the AFT direction.
2. The chamfer on the inner AFT edge of the FWD segmented ring must be facing the AFT direction.

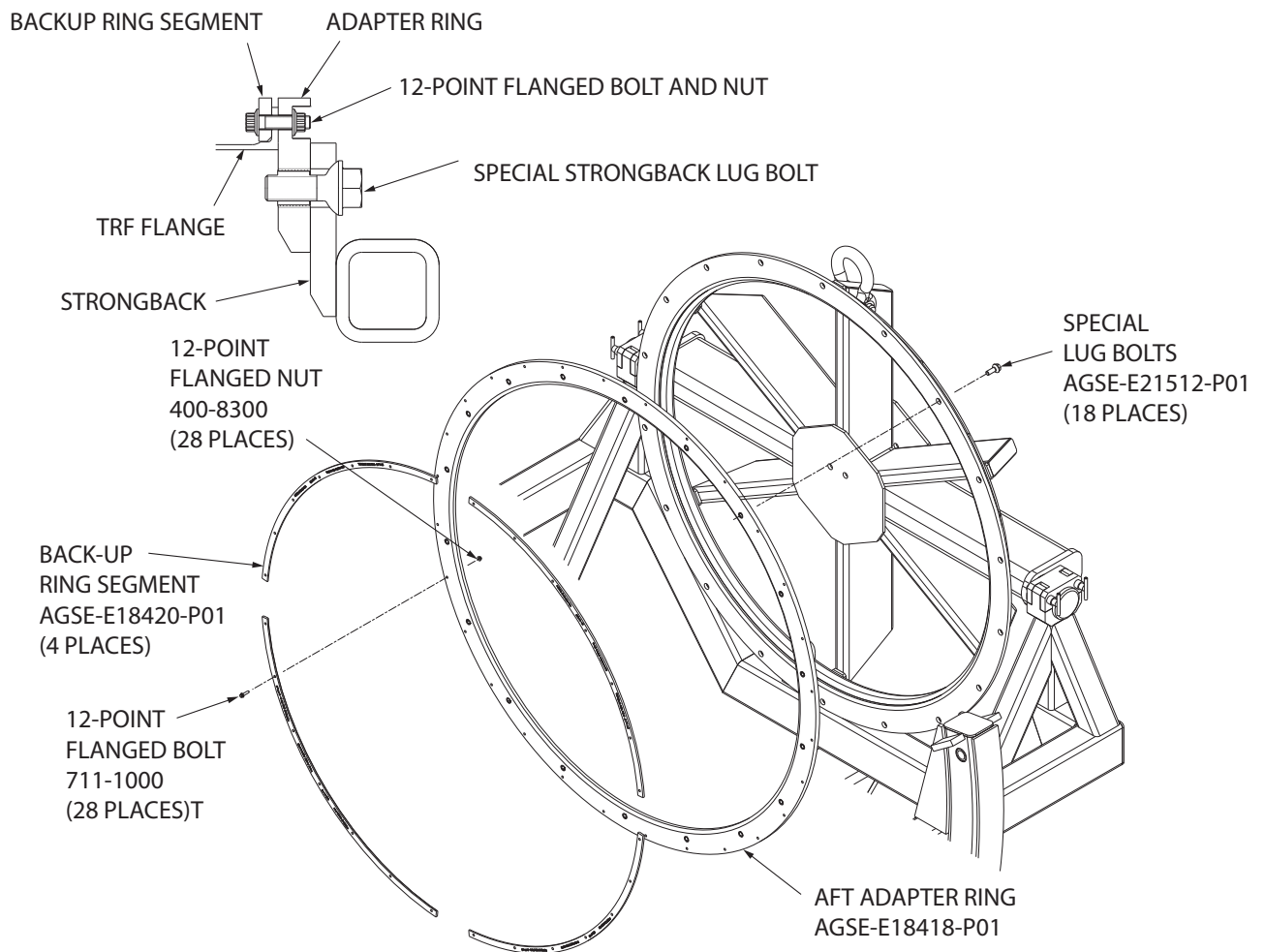


Figure 5.2.3-4

Special Instructions for Bootstrapping from Wing:

In cases when the aircraft is in the maximum take-off weight condition, to maneuver the stand under the Pylon Boat-Tail, the strong back may need to be pivoted about its trunnions, such that the top of the strongback pivots backward. In order to pivot the strongback, release the slide bolt latch (IPB Figure 2 - Item 20). (See Figure 5.2.3-5).

WARNING

Hold onto the strongback when releasing the slide bolt latch. This is for “Worst Case” engine inlet at approximately 29” to the ground.

NOTE

Do not align stand to engine still on pylon. Engine must be hanging from bootstrap hoists with lower Bi-fi plumb to the ground, engine center line level and not less than 90” from the floor. (inlet not less than 20” from the floor).

The fan inlet and fan cowl support beam may be left on the engine during the removal from the wing, however they must be removed prior to rotating the stand.

The casters may need to be deployed at the bootstrapping position. Use hydraulic jack legs to pin caster mounts into upper position. This lowers the stand to approximately 1” ~ 3/4” ground clearance. (See Figure 5.2.3-6).

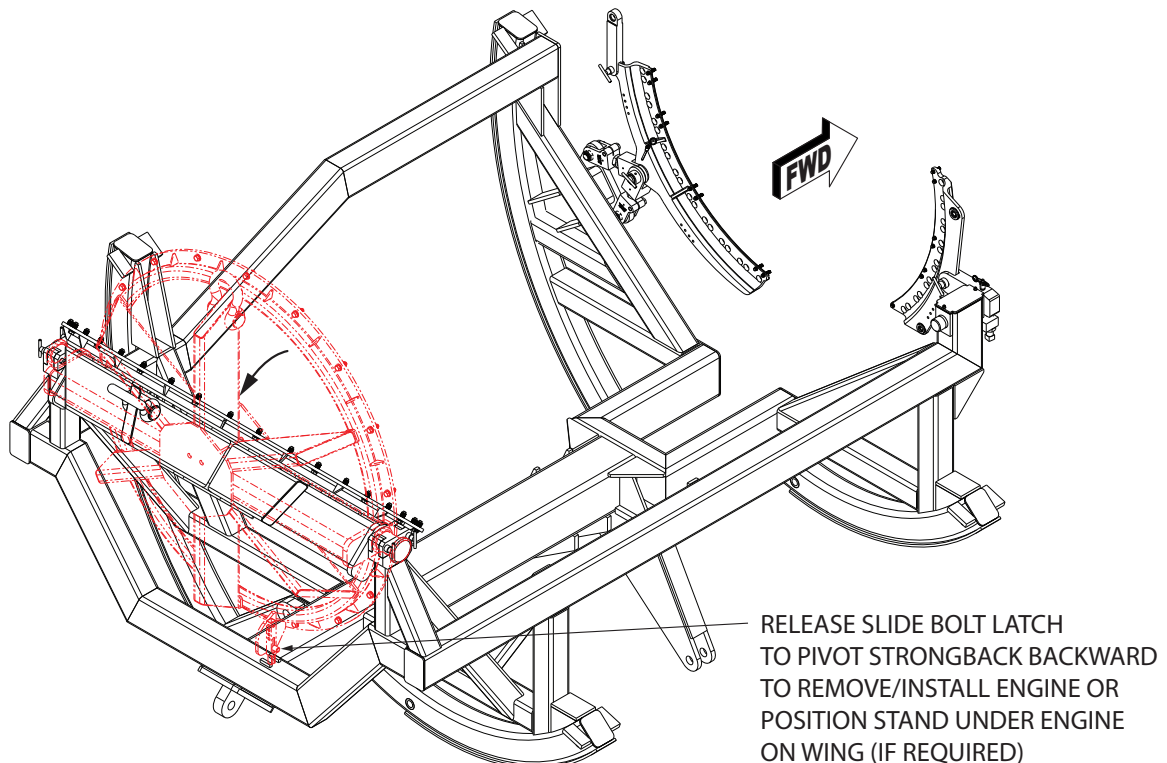
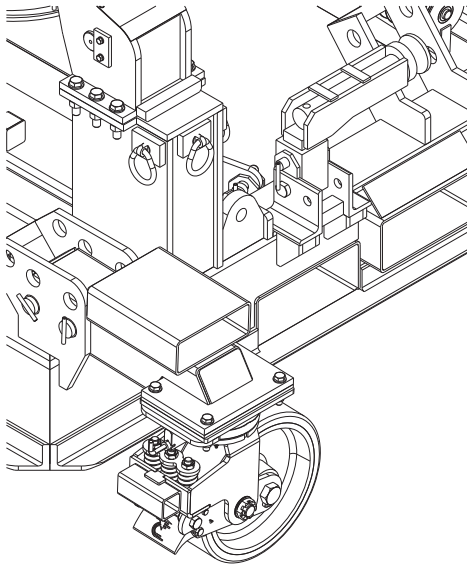
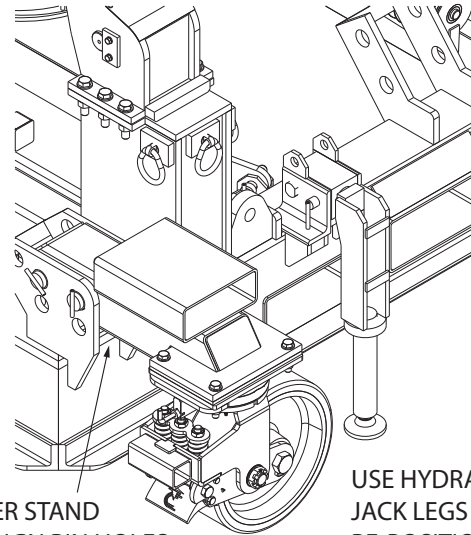


Figure 5.2.3-5



GENERAL TOWING CASTER POSITION



LOWER STAND
TO ALIGN PIN HOLES

USE HYDRAULIC
JACK LEGS TO
RE-POSITION CASTERS

BOOTSTRAPPING CASTER POSITION

Figure 5.2.3-6

- 6) Disengage the slide bolt latch on the strongback (Item 20 - Figure 8.2-1) before installing “special bolts”. (Figure 5.2.3-5)
- 7) Lower the engine and align the adapter ring bolt holes with those of the strongback. Install the 18 strongback special lug bolts in a criss-cross pattern to connect the adapter ring to the strongback frame. The stand can be moved side to side by using the steering bars in the casters to swivel the casters to move the stand. The cradle can also be rotated slightly as required to align bolt holes.

NOTE

The strongback must be initially sitting lower than the engine. DO NOT ATTEMPT TO DRAW THE ENGINE UPWARD TO THE STRONGBACK.

CAUTION

Use ONLY the special attaching special lug bolts provided with the strongback. The bolts should first be installed hand-tight in a criss-cross pattern. After all the bolts have been installed, progressively tighten the bolts to 25 - 30 ft-lbs torque in a criss-cross pattern to ensure even loading on the bolts.

- 8) Lower the FWD end into position and locate and install the FWD RH mount adapter.
- 9) Lower FWD end of engine and install the RH mount adapter to cradle. Before connecting LH links, pin should be approximately centered in slot, and loose with LH links stayed on the cradle.

- 10) Pin LH support links to support bracket. Adjust links as required to install the pin. Note there are witness holes in the connecting links for maximum extension. If the links must be adjusted beyond the maximum (approximately 10-1/4" between hole centers), lower engine until link lengths are within 9-3/4"-10-1/4" between hole centers. Tighten clamping bolt on each link to secure the link length.
- 11) After engine is secure, release overhead hoist system from engine. Roll cradle counterclockwise to tighten pins. Attach shipping braces and tighten in a compression mode and secure with lock nuts.

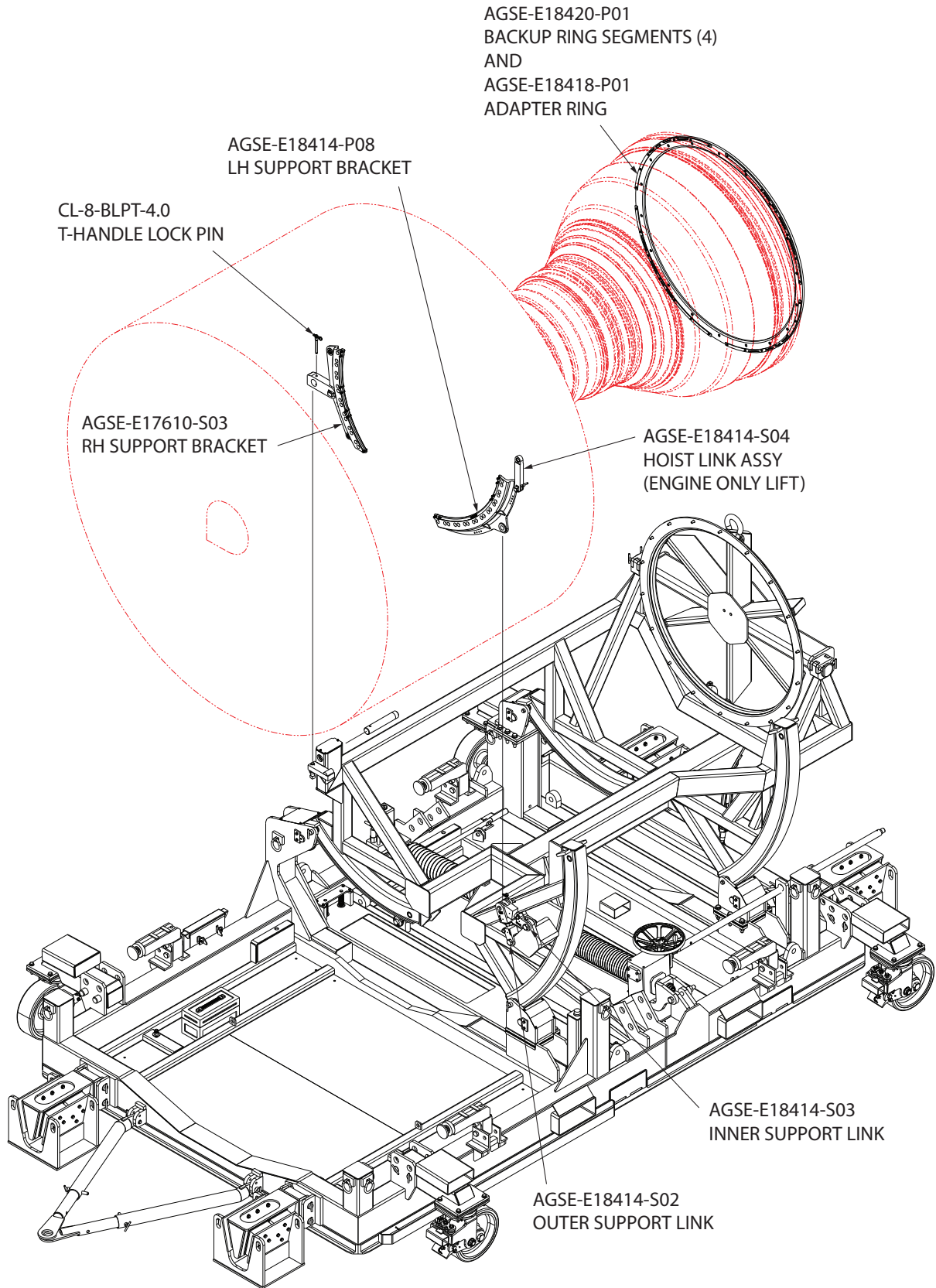


Figure 5.2.3-7 Engine Installation onto Cradle

5.3 Engine Install/Removal Into/Out of Stand

The following installation procedures are included as a supplement to the engine and aircraft manufacturer's procedures and instructions for engine handling.

5.3.1 Engine Installation Into The Stand In The Rolled Up Position

1. The engine is to be installed by the engine bootstrap system or a suitable overhead hoist system with two-point control for balance adjustment.
2. Install the AFT adapter ring (IPB Figure 3 - Item 2) and four (4) quarter backup segments (IPB Figure 3 - Item 3) to the engine AFT support flange. Install the 28 connection bolts and nuts (IPB Figure 3 - Items 4 and 5) along with the backup segments. The adapter ring's weight allows for it to be supported by two persons while the backup segments bolts are installed. Install the bolts in a criss-cross pattern to ensure even loading and progressively torque the bolts to 8 - 9 ft-lbs.
3. Install the RH FWD bracket support (IPB Figure 4 - Item 8) by positioning and installing the connecting pin (IPB Figure 4 - Item 7). Allow the bracket to hang free from the support bracket. Remove the strong back from the crane.
4. Position the engine approximately 6 inches (16 cm) FWD of the AFT strong back frame (IPB Figure 3 - Item 1). Move the engine to center the adapter ring (IPB Figure 3 - Item 2) with the strong back and align the mating surfaces with approximately ¼-inch (1 cm) gap. Disengage the strong back latch. Install the 18 strong back connecting bolts (IPB Figure 3 - Item 6) in a criss-cross pattern across the diameter to mate the adapter ring and strong back surfaces evenly. The bolts will close the gap between the mating surfaces when installed. Then tighten the bolts in the same sequence to 25-30 ft-lbs.
5. Lower the FWD end of the engine and install the RH FWD bracket support (IPB Figure 4 - Item 8). Align the index pin (IPB Figure 2 - Item 5) and support bracket then slide the pin forward. Rotate and slide the index pin to install the ball lock pin (IPB Figure 2 - Item 11). Lower the engine to allow the support bracket to rotate down and rest on the cradle mounting support.

5.3.2 Engine Removal With Engine In The Stand In The Rolled Up Position

- 1) The engine is to be removed by the engine bootstrap system or a suitable overhead hoist system with two-point control for balance adjustment.
2. Disengage the RH FWD mount shipping set screw (IPB Figure 2 - Item 9) by holding the screw with a suitable wrench and rotating the jam nut (IPB Figure 2 - Item 19) counterclockwise. The set screw can then be rotated counterclockwise to provide clearance under the RH FWD bracket support (IPB Figure 4 - Item 8).
3. Slightly lift the engine to engage the support of the hoisting equipment.

4. Disconnect the FWD LH inner and outer support link assemblies (IPB Figure 4 - Items 2 and 1). Lift the engine to free the support of the connecting pin (IPB Figure 4 - Item 7) and remove the ball lock retainer pin (IPB Figure 2 - Item 11). Remove connecting pin in the direction towards the rear of the engine. The inner and outer clevis connection links can fall free once the pin is removed and should be held in position. Allow the outer link assembly (IPB Figure 4 - Item 1) to rotate downward and rest on the cradle frame. The inner link assembly (IPB Figure 4 - Item 2) can then rotate downward to freely rest on the cradle frame. Due to the engine position, the link assemblies may not rotate clear and must be adjusted for free movement. Adjustments of the links are made by loosening the clamping clevis (IPB Figure 5 - Item 1 or 6) screws (IPB Figure 5 - Item 5). This will allow rotation of the adjustment screw (IPB Figure 5 - Item 2) until the link assemblies are free to rotate clear.
5. The RH FWD bracket (IPB Figure 4 - Item 8) is then disconnected from the cradle by removing the ball lock pin (IPB Figure 2 - Item 11) and sliding the index pin (IPB Figure 2 - Item 5) toward the rear of the stand until the FWD bracket is free to rest on the cradle.
6. If the engine is to be removed with the bootstrap system, or a two-point control hoist system, the AFT strong back frame (IPB Figure 3 - Item 1) may remain clamp supported on the cradle. After all bolts are removed, engage the slide bolt latch on the strong back. (If two-point control hoist equipment is not available and a single point lift system is used, skip step 7 and 8, go to step 9). Remove every other bolt of the 18 strongback bolts (IPB Figure 3 - Item 6) connecting the strongback to the adapter ring (IPB Figure 3 - Item 2) in a criss-cross pattern. Loosen the remaining bolts in a symmetrical pattern across the ring diameter as the engine may be in a clocked position not allowing the free rotating of the last few remaining bolts. The engine position must then be adjusted with the overhead lifting equipment to allow free removal of the remaining bolts. This will prevent the sudden jerk of the engine once not supported by the strong back system. Once free, remove the engine approximately 6 inches (16 cm) forward to provide clearance for vertical movement or move stand 6 ft AFT.
7. Once clear of the engine stand and suspended by overhead equipment, the adapter ring (IPB Figure 3 - Item 2) and four (4) back-up segments (IPB Figure 3 - Item 3) are removed from the engine. Remove the 28 connection bolts (IPB Figure 3 - Item 4) along with the back-up segments. The adapter ring's weight allows it to be supported by two persons while the back-up segments are removed.
8. Remove the RH FWD bracket support (IPB Figure 4 - Item 8) by removing the connecting pin (IPB Figure 4 - Item 7) and allowing the bracket to slide free from the support.
9. Disengage the RH FWD mount shipping set screw (IPB Figure 2 - Item 9) by holding the screw with a suitable wrench and rotating the jam nut (IPB Figure 2 - Item 19) located under the mounting plate counterclockwise. The set screw can then be rotated counterclockwise to provide clearance under the RH FWD bracket support (IPB Figure 4 - Item 8).
10. Lift the engine to engage the support of the hoisting equipment.

11. Remove the FWD LH inner and outer support link assemblies (IPB Figure 4 - Items 2 and 1). Lift the engine to free the support of the connecting pin (IPB Figure 4 - Item 7) and remove the ball lock retainer pin (IPB Figure 2 - Item 11). Remove the connecting pin in the direction towards the rear of the engine. The inner and outer clevis connection links can fall free once the pin is removed and should be held in position. Allow the outer link assembly (IPB Figure 4 - Item 1) to rotate downward and rest on the cradle frame. The inner link assembly (IPB Figure 4 - Item 2) can then rotate downward to freely rest on the cradle frame. Due to engine position, the link assemblies may not rotate clear and must be adjusted for free movement. Adjustment of the links is made by loosening the clamping clevis (IPB Figure 5 - Item 1 or 6) screws (IPB Figure 5 - Item 5). This will allow rotation of the adjustment screw (Item 2) until the link assemblies are free to rotate clear.
12. The RH FWD bracket (IPB Figure 4 - Item 8) is then disconnected from the cradle by removing the ball lock pin (IPB Figure 2 - Item 11) and sliding the index pin (IPB Figure 2 - Item 5) toward the rear of the stand until the FWD bracket is free to rest on the cradle.
13. The adapter ring (IPB Figure 3 - Item 2) and four (4) backup segments (IPB Figure 3 - Item 3) are removed from the engine. Remove the 28 connection bolts and nuts (IPB Figure 3 - Items 4 and 5) along with the backup segments. The adapter ring's weight allows for it to be supported by two persons while the backup segments are removed.
14. Remove the RH FWD bracket support (IPB Figure 4 - Item 8) by removing the connecting pin (IPB Figure 4 - Item 7) and allowing the bracket to slide free from the support.

5.4 Stand Lifting

5.4.1 Fork Lifting (Figure 5.4-1)

The stand can be fork lifted from the right side of the stand only. The stand may be fork lifted when empty, or with an engine in the fully raised or fully lowered position. Only use a fork lift that meets the size, capacity and balance requirements listed below. Follow all fork lift operating and safety procedures supplied by the fork lift manufacturer as well as the cautions listed below.

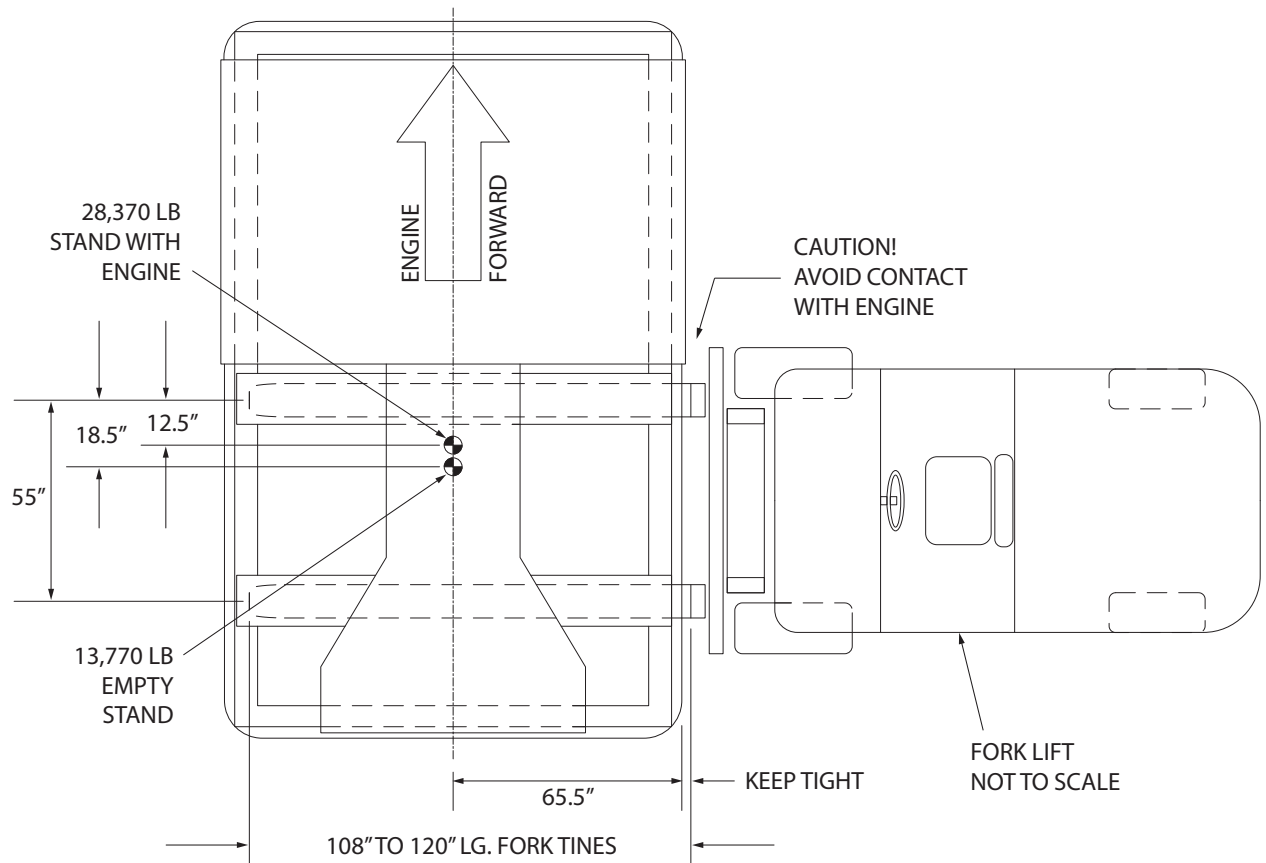


Figure 5.4-1

The stand with an engine is an especially large and heavy load with the majority of weight concentrated on the forward fork tine. The user must ensure that the fork lift to be used has the capability to safely lift and move the stand with an engine while maintaining overall stability. Fork lift requirements include:

- Minimum 108 to 120 inches long fork tines on a 55-inch spread. (Fork tine length in excess of 120 inches cannot be fully engaged due to blocked fork pockets on the left side).
- Lifted load of 28,370 pounds.
- Load center is 12.5 inches from the center of the forward fork pocket.
- Load center is 65.5 inches away from the pallet edge.

AGSE recommends that the user contact the fork lift manufacturer for confirmation of usage for this application.

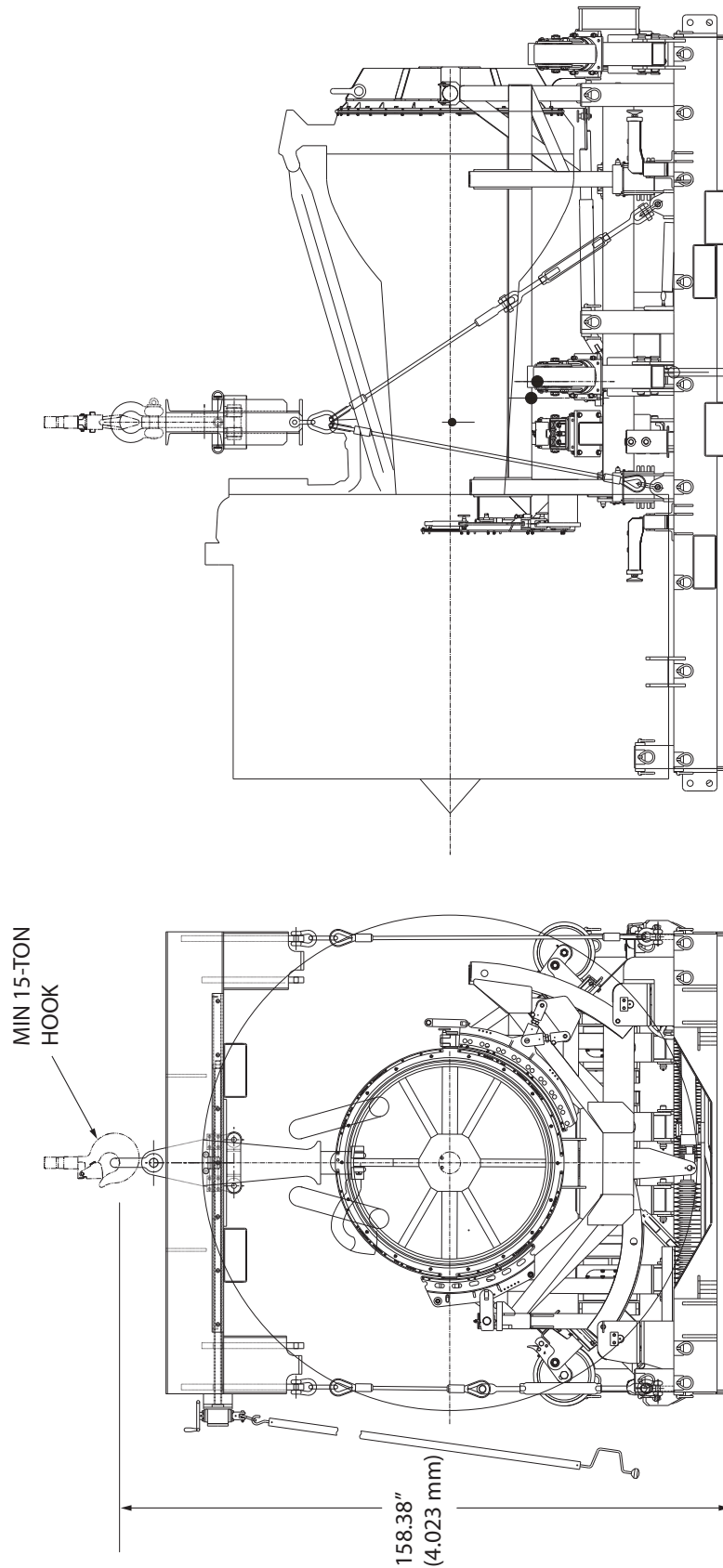
CAUTION

Follow all safety instructions listed below:

- **Ensure that the engine is properly installed in the stand with the cradle pinned in the fully raised or fully rolled position and with the shipping braces installed and tightened.**
- **Do not attempt to fork lift the stand when the hydraulic jacks or optional AGSE-E18412 (11C4510P01) jacking legs are deployed. The stand should be supported directly on the integral pallet, on casters or on the external cantilevered shock mounts before fork lifting.**
- **Carefully insert the fork tines into the fork pockets ensuring the forward pocket spring-loaded top plate is lifted.**
- **Avoid contact of the engine with the fork lift.**
- **Engage fork tines as far as possible. (See Figure 5.4-1).**
- **Keep the forks and lifted load low to the ground while maintaining adequate ground clearance when moving the stand/engine.**
- **If a ramp or incline must be traversed, keep the engine stand on the uphill side whenever possible.**
- **GO SLOW! The engine stand does not offer shock attenuation to the engine when it is being moved by a fork lift. Avoid bumps or impacts which may cause damage to the engine bearings.**

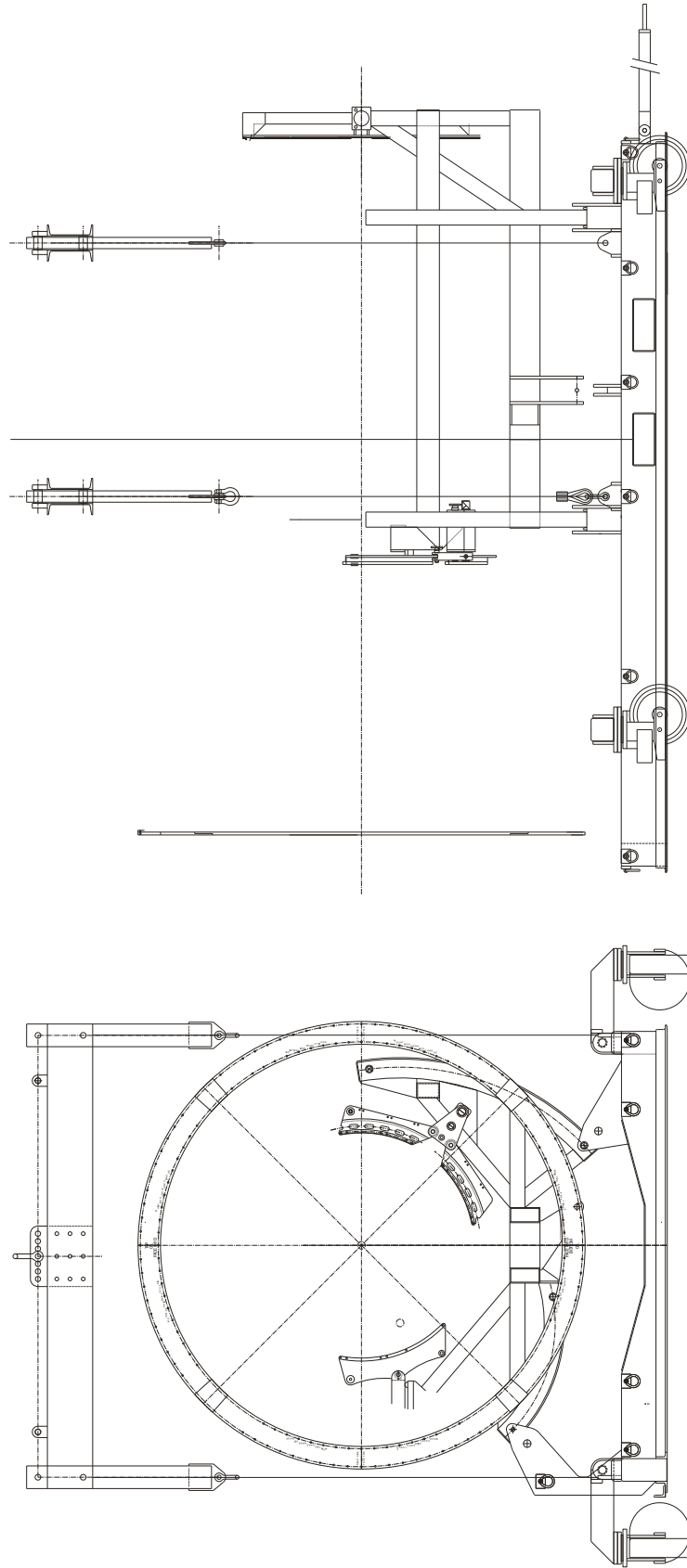
5.4.2 Single Point Lifting (Figure 5.4-2)

The stand can also be lifted using a single-point lifting system (11C4484P01 - Ref. AGSE-L018 or 11C4484P03 - Ref. AGSE-L038-G03), attached to the four (4) designated hoist points on the base. See AGSE-L018 and AGSE-L038 Stand Lift Fixture manuals for more information.



11C3359P02 STAND AND 11C4484P02 SLING

Figure 5.4-2 Single-Point Lifting



11C3359P02 STAND AND AGSE-L033-G01 LIFT BEAM

Figure 5.4-3 Two-Point Lifting

5.5 Preparing Engine for Rotation for Transport - (Only if air ride transport is used.)

- 1) Drain fluids as required by GE Engine Manual.
- 2) Remove items listed in Engine Manual. (See Section 5.2.1)
- 3) Install protective covers, caps, etc. as required by GE's Engine Manual.
- 4) Rotate engine to transport position. (See Section 5.1)

CAUTION

Stand can only be fork lifted on the right hand side of stand. A sling (AGSE-L018/11C4484P01 or AGSE-L038-G03/11C4484P03) with spreader beam can also be used and must be attached to the four (4) designated hoist points on the base. Approximate weight of stand and engine is 28,400 Lbs. CG is behind FWD cradle roll frame. (See Figures 5.4-1, 5.4-2).

5.6 Casters and Tow Bar Installation and Usage (Figure 5.6-1)

- 1) Lift stand/engine using an overhead hoist system, manual jacking legs or hydraulic jack legs.
- 2) Relocate FWD caster mount assemblies (IPB Figure 1 - Item 5) from their storage location to their working position then secure with safety pins (IPB Figure 13 - Item 9).
- 3) Pull safety pin off rear caster mount assemblies and rotate from upper storage position down into lower working position and secure with safety pins (IPB Figure 13 - Item 9)
- 4) Install tow bar assembly (IPB Figure 1 - Item 4) at the AFT end of the stand using two (2) safety pins (IPB Figure 12 - Item 4)

5.7 Manual Jacking Legs Usage and Operation (Figure 5.7-1)

5.7.1 Usage

The jacking legs are used to lift stand with or without engine to:

- 1) Install casters (IPB Figure 1 - Item 5).
- 2) Install shock mounts (IPB Figure 1 - Item 9).
- 3) Lift 48 inches to place stand onto or take off from pallet dolly or truck trailer.

5.7.2 Operation

- 1) Install the leg mounts (4) (IPB Figure 15 - Items 1 and 2) first into the jacking leg sockets on stand base. Secure using the safety pins (IPB Figure 15 - Item 21).

NOTE

There are RH and LH leg mounts with tapered spacer block facing FWD.

- 2) Install jacking leg assemblies (4) (IPB Figure 1 - Item 10 or 11) on the leg mounts and secure with safety pins (IPB Figure 15 - Item 4)

NOTE

Any jacking leg assembly can be installed on any leg mount.

- 3) Use provided ratchet crank handle to raise or lower the stand. There are two (2) cranking speeds:
 - Top shaft for high speed (for no or low load).
 - Bottom shaft for low speed (for high load).

CAUTION

The maximum difference in jacking leg height is not to exceed 1 inch between pairs of jacks, and 2 inches maximum difference overall for all four jacks.

A fixed structural stop prevents the jack nut from travelling past the end of the jack screw.

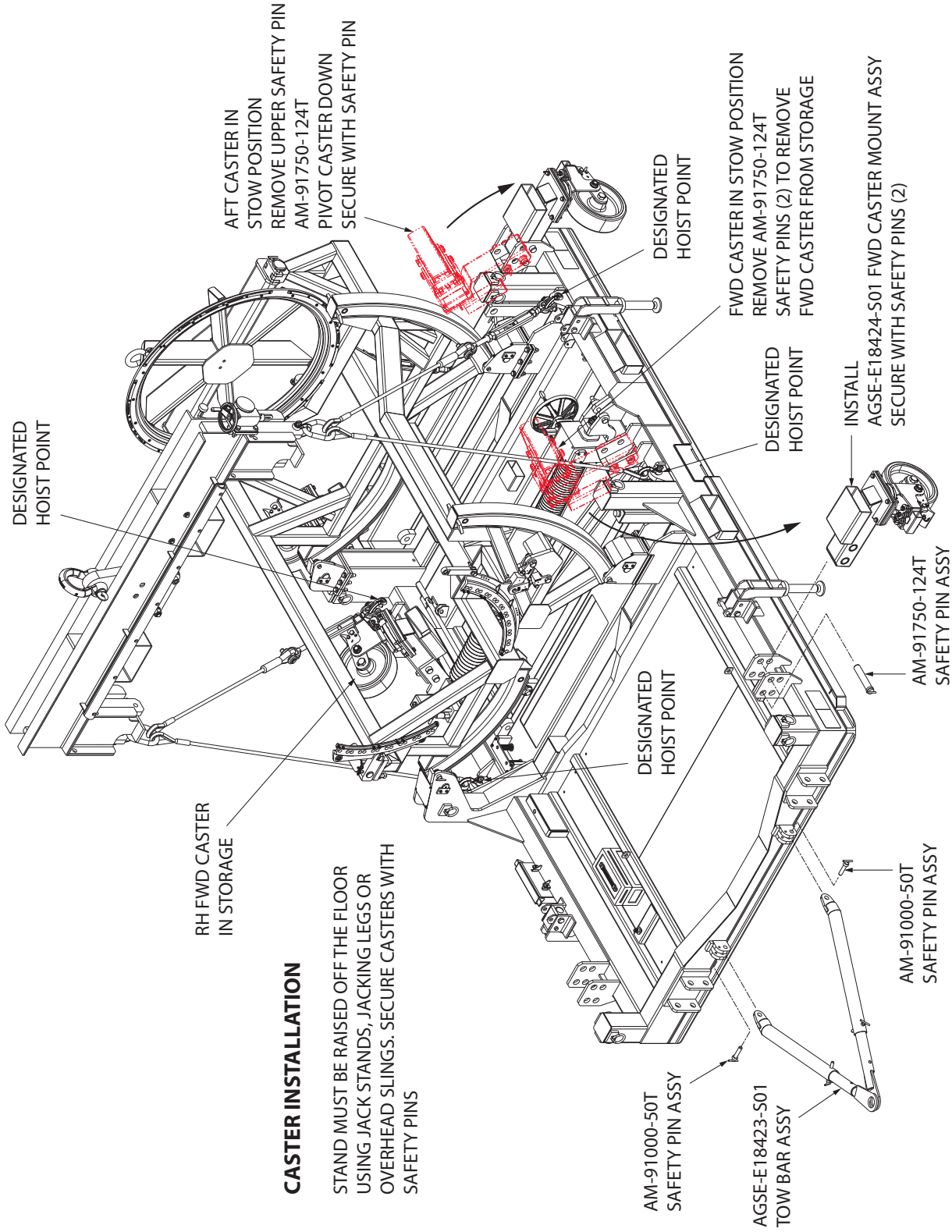


Figure 5.6-1 Caster and Tow Bars Installation

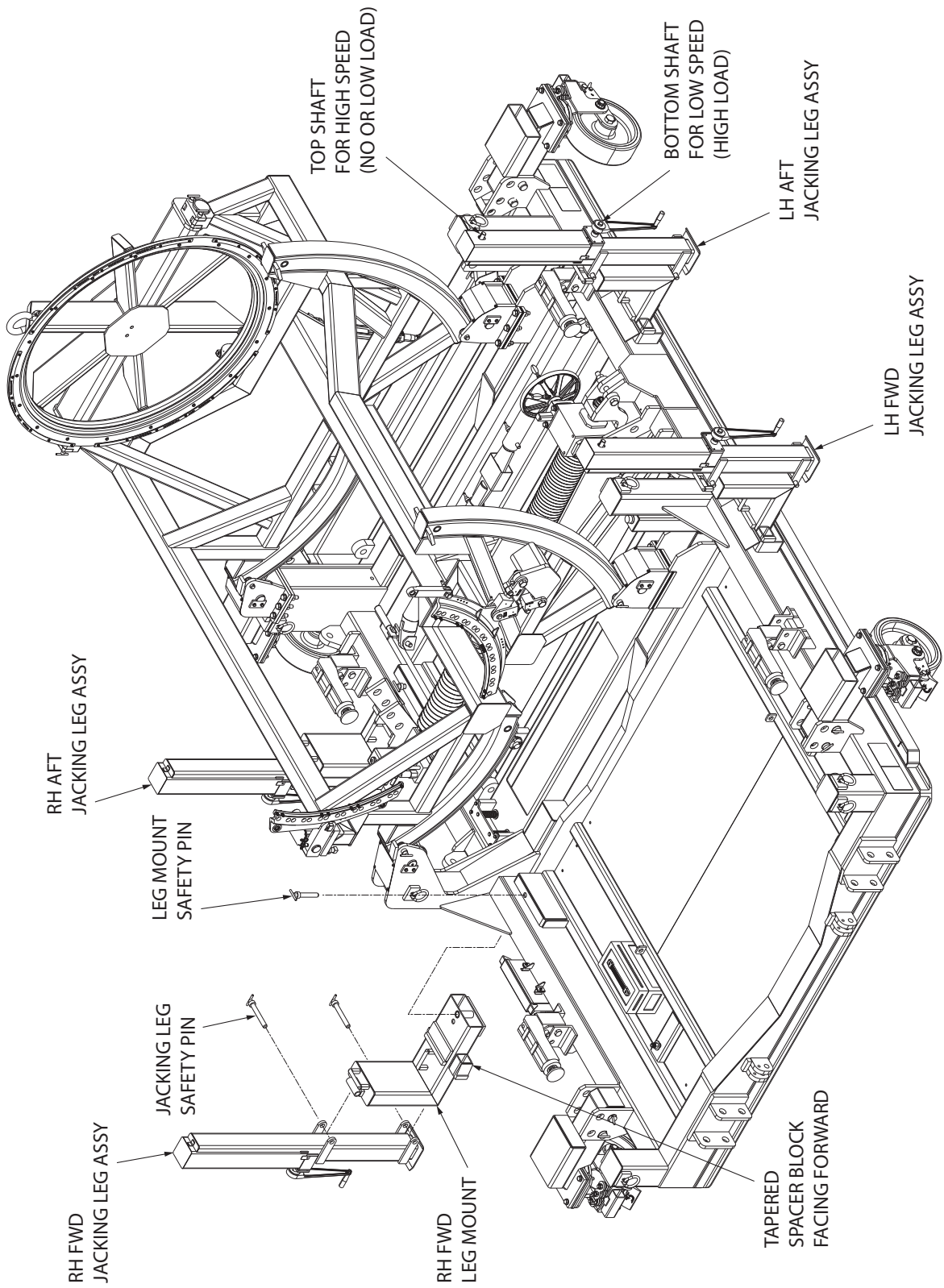


Figure 5.7-1 Manual Jacking Legs Installation

5.8 Shock Mount Usage and Installation (Figure 5.8-1)

5.8.1 Usage

Shock mounts are stored on 11C3417P02 base (see 11C3417P02 manual for info) and are used when transporting engine stand on tractor trailer. Only use tie-down slots on each shock mount to secure stand/engine to truck trailer during stand transportation. There are placards on each shock mount for truck tie-down instructions.

CAUTION

DO NOT use tie-down rings on the stand base when transporting engine stand.

5.8.2 Installation

Jacking legs or sling may be used to lift stand approximately 12,7 cm (5 inches) to install shock mount assemblies (4) (IPB Figure 1 - Item 9). Secure shock mounts on stand with safety pins (IPB Figure 14 - Item 4).

WARNING

Shock mount assemblies are very heavy. Each unit weighs approximately 150 lbs (68 kg). A minimum of 2 persons is required to move or lift each unit.

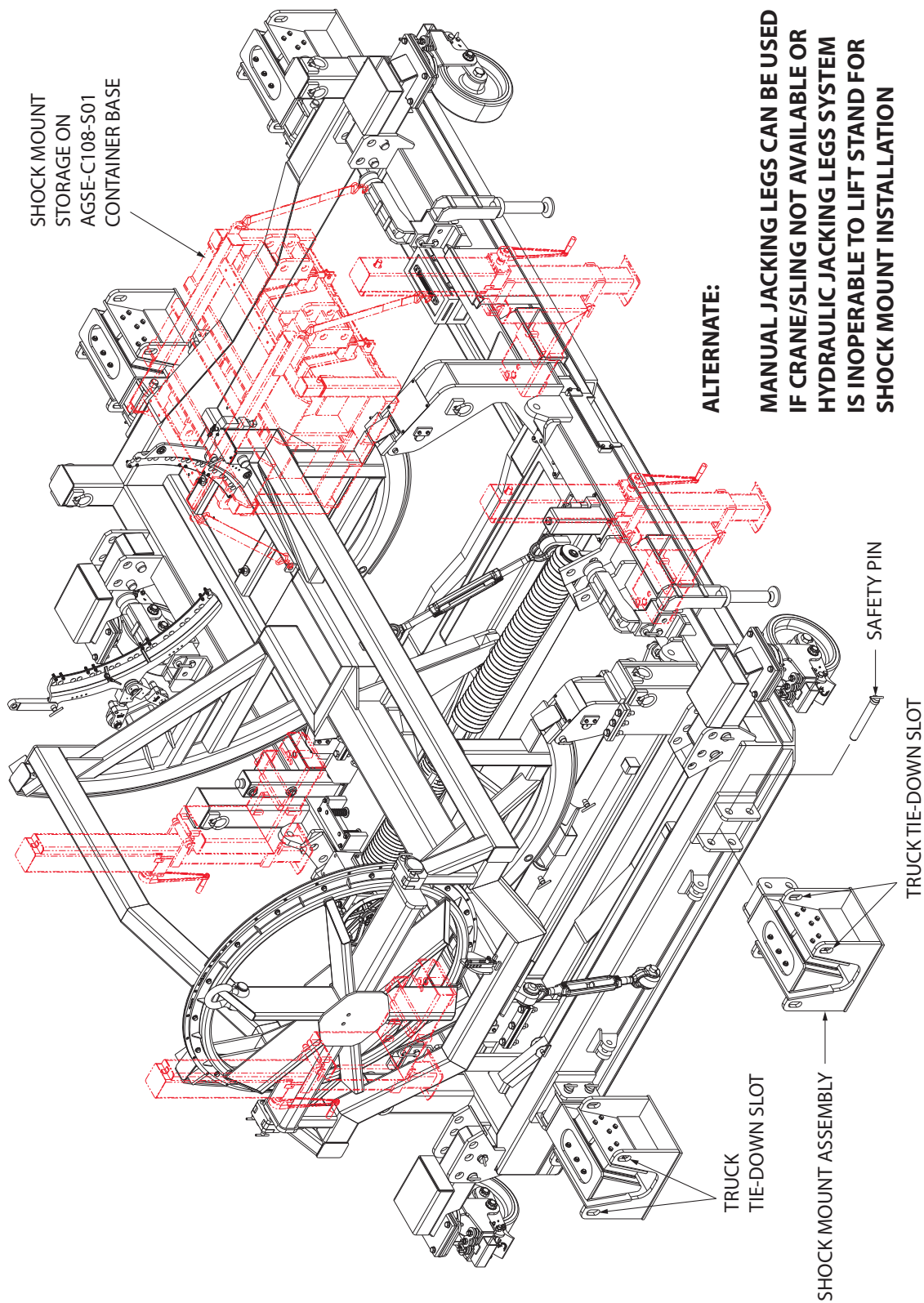


Figure 5.8-1 Shock Mounts Installation Using Hydraulic Jack Legs

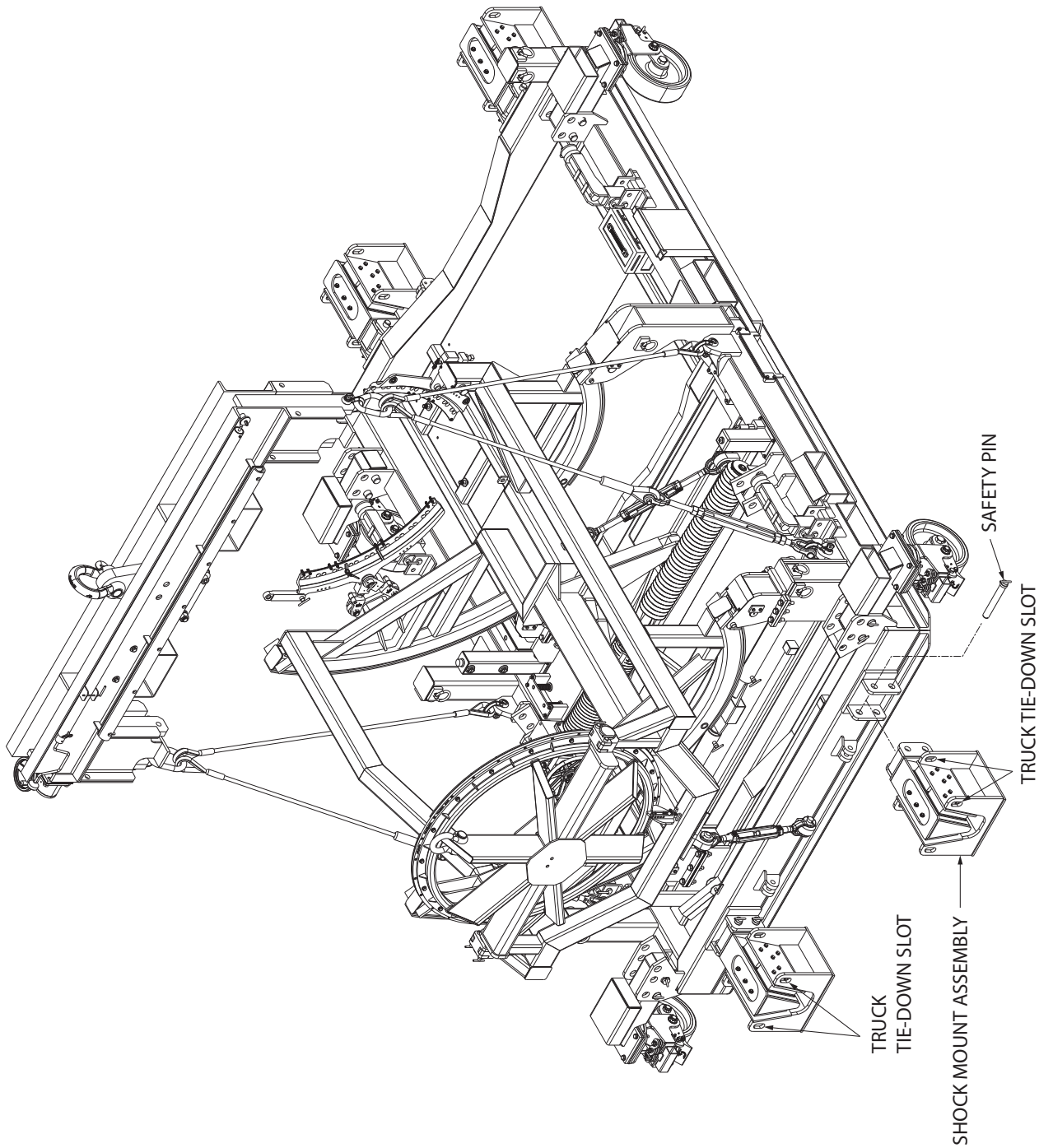


Figure 5.8-2 Shock Mount Installation Using a Sling

5.9 Hydraulic Jack Legs Usage and Operation

There are four (4) hydraulically operated jack legs located at the four corners of the base (Figure 5.9.1). These legs are used to install/remove/stow casters and shock mounts and support the stand while positioning the casters and also to level and stabilize the stand as required during bootstrap procedures. A manual hydraulic pump is secured to the base and is connected to the jack legs through rigid mounted tubing and hose assemblies. Ball valves located near the pump are used to separate the FWD jack legs from the AFT jack legs. The system can be used to raise the stand approximately 9.5” off the ground. However, the stand only needs to be raised approximately 4.5 inches to install/remove casters and/or shock mounts.

To deploy a jack leg, firmly hold the leg and remove the safety pin holding the leg in the stow position. Carefully and slowly swing the leg outward and down then re-install the pin through the support bracket and leg. To operate the pump, close the pressure release screw. Use the handle provided to operate the pump mechanism. (Illustration Figure 5.9-1).

CAUTION

The pump is capable of producing very high pressure. When the handle effort increases or the jack legs stop extending, stop pumping.

5.9.1 Hydraulic Installation Configuration 1 (Dual Selector Valves)

To extend the jack legs, remove the pump handle from its storage and pin it to the pump linkage handle. Check the pressure release screw and see if it is closed. Operate the pump to pressurize the system, move the selector valve handle toward the direction indicated to extend either the FWD or AFT pair of jack legs. Keep feet clear of the stand. Follow the instructions on the base (alternating between FWD and AFT legs). Slowly turn the pressure release screw counter-clockwise. (Illustration Figure 5.9.1-1).

To retract the jack legs, move the selector valve handle to either FWD or AFT pair of jack legs then slowly turn the pressure release screw clockwise.

NOTE

When the stand is empty, the rear of the stand is heavier and will lower quicker. When the stand is loaded with a full engine, the forward end is heavier and will lower quicker. A preset flow control valve limits the lowering speed.

CAUTION

The FWD hydraulic jack legs MUST be stowed pointing forward.

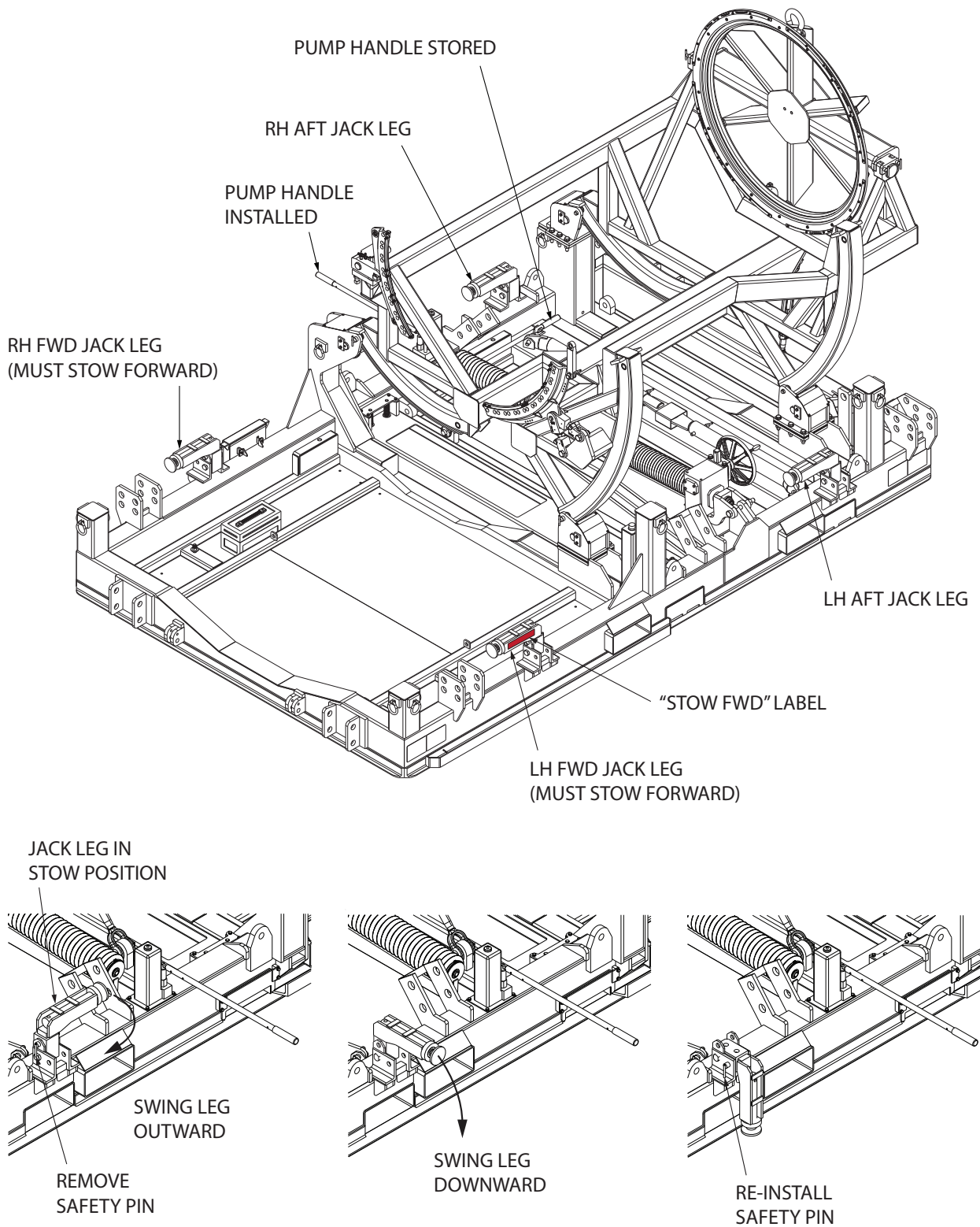


Figure 5.9-1

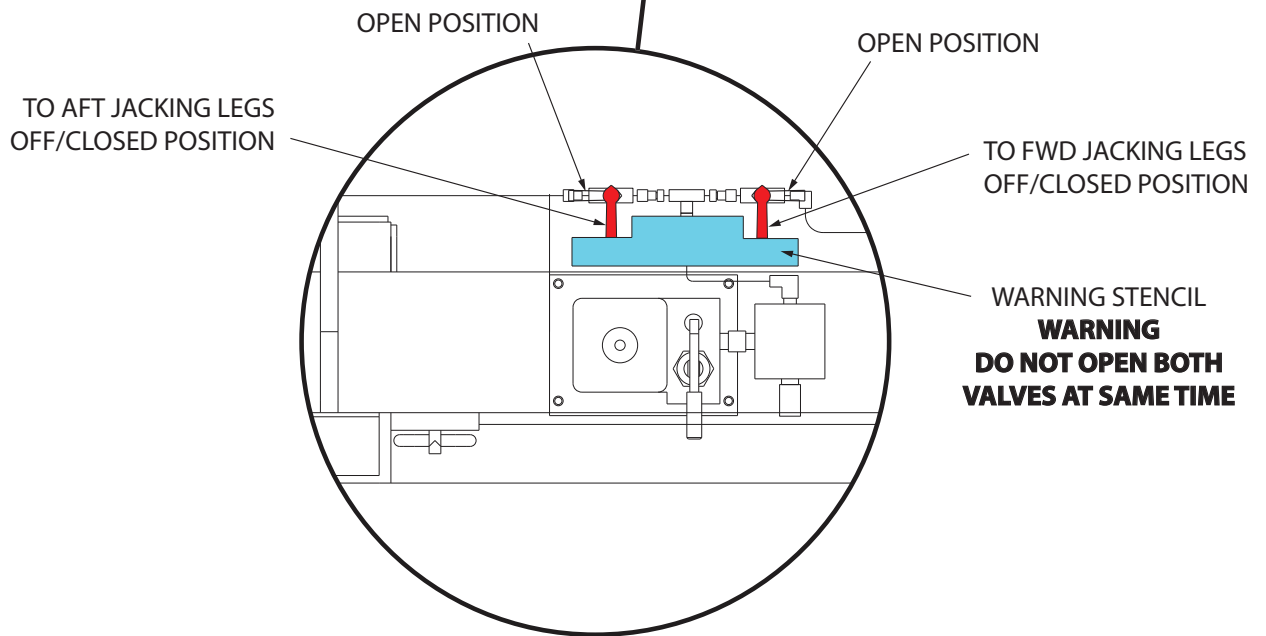
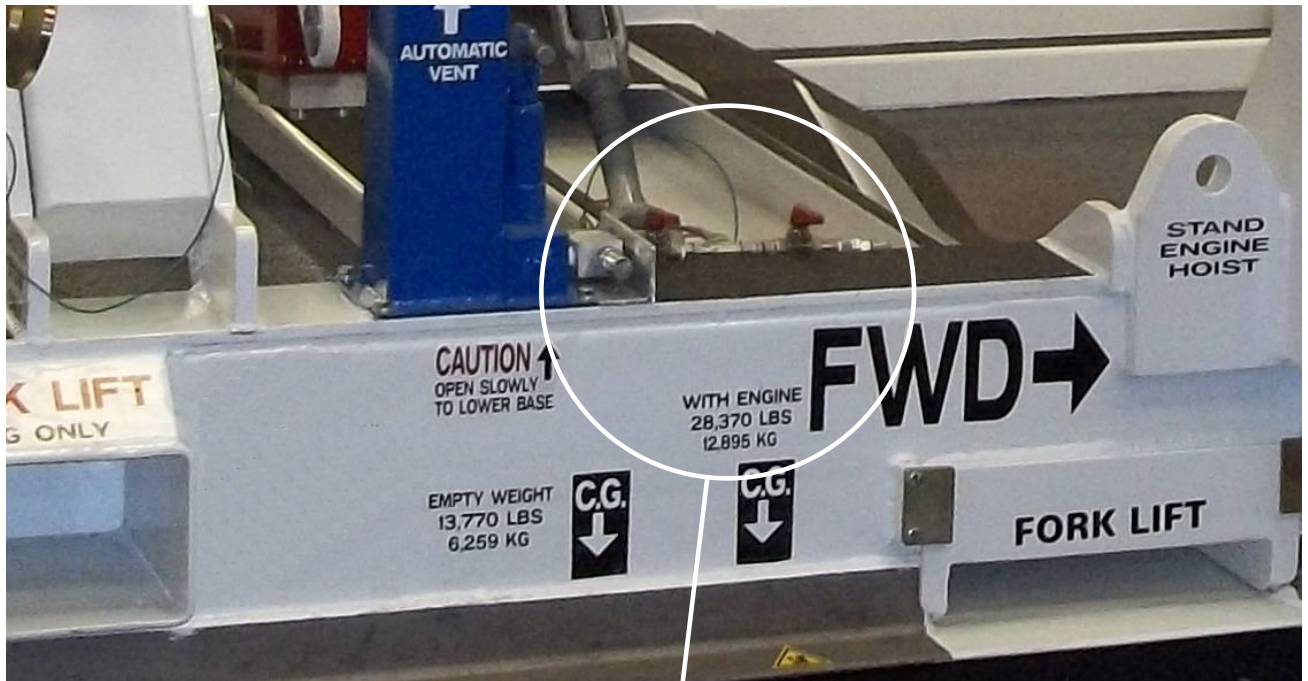


Figure 5.9.1-1 Hydraulic Jack Leg Installation - Configuration 1

WARNING

NEVER open both valves at the same time unless the weight is off all jack legs.

5.9.2 Hydraulic Installation Configuration 2 (Single Selector Valve)

To extend the jack legs, remove the pump handle from the AFT base cross member and pin it to the pump linkage handle. Move the selector valve handle toward the direction indicated to extend either the FWD or AFT pair of jacking legs. (Illustration Figure 5.9.2-1). Operate the pump handle to extend the legs. Follow the instructions on the base near the pump to extend the legs (alternating between FWD and AFT legs). Rotate the spring-loaded pressure release handle counter-clockwise to extend the legs.

NOTE

The pressure release handle is self-centering and must be held in the rotated position.

To retract the jacking legs, move the selector valve handle to either FWD or AFT pair of jacking legs. Rotate and hold the pressure release handle clockwise to allow the legs to retract.

NOTE

When the stand is empty, the rear of the stand is heavier and will lower more quickly. When the stand is loaded with a full engine the FWD end is heavier and will lower more quickly.

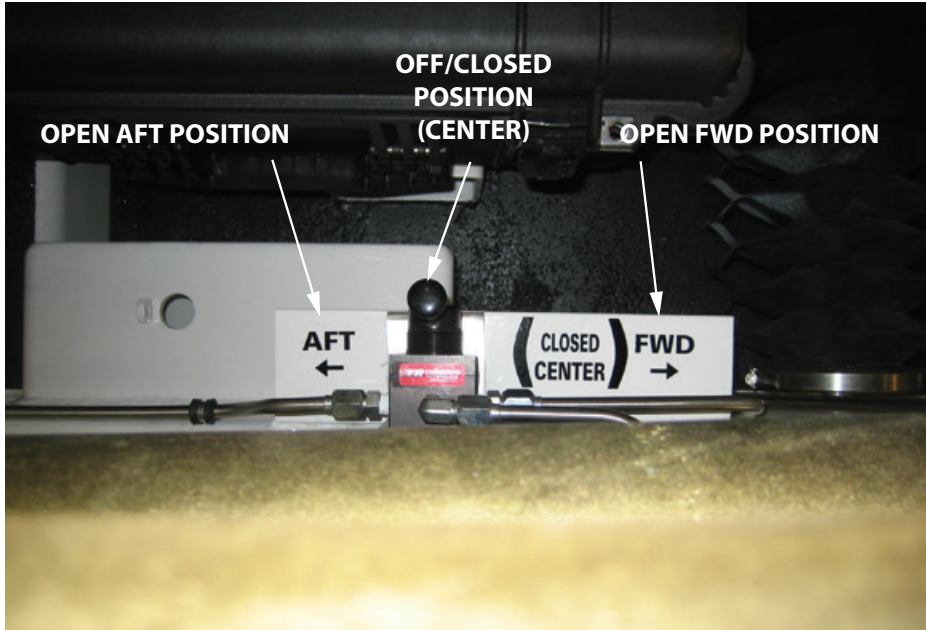
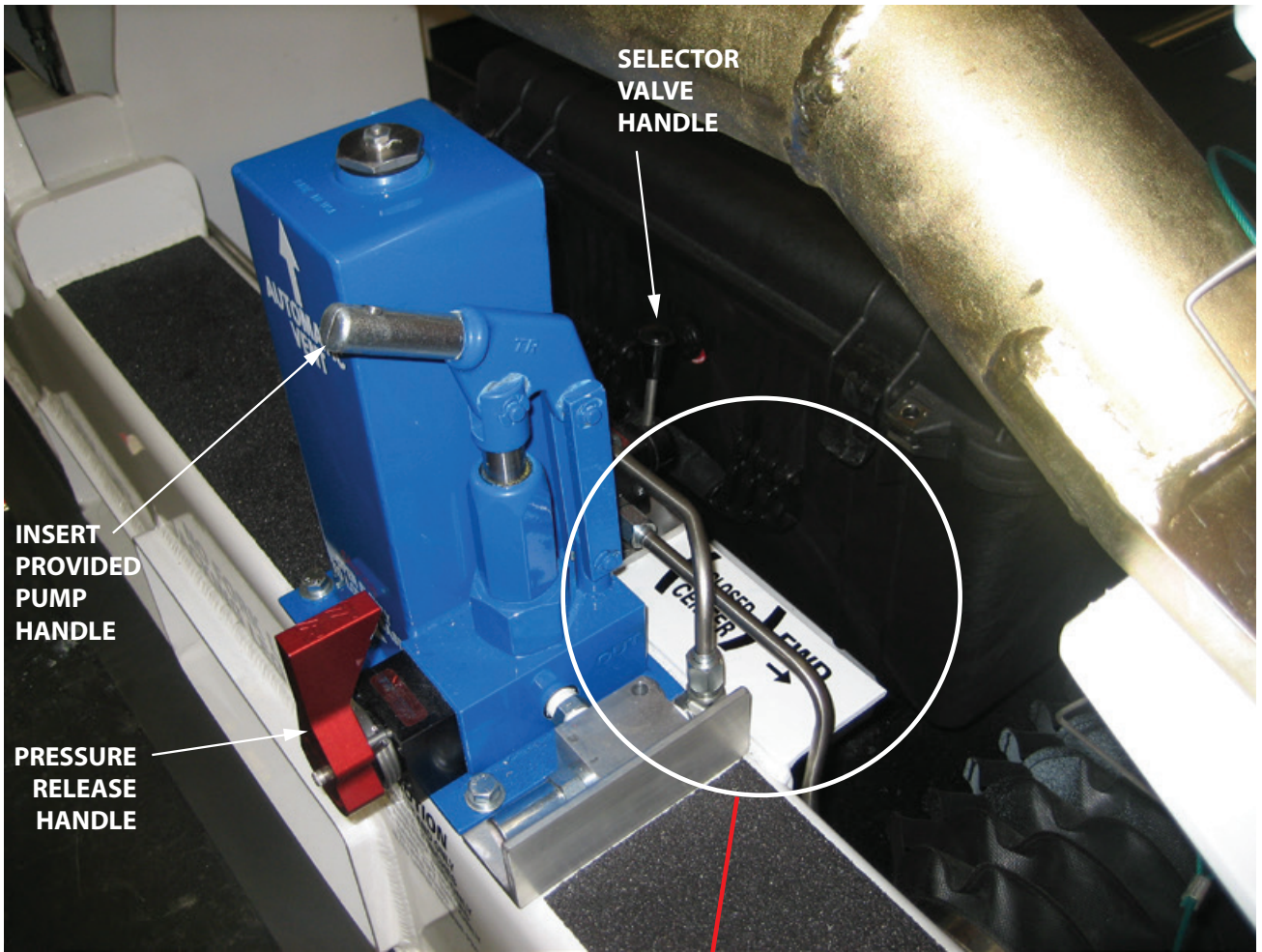


Figure 5.9.2-1 Hydraulic Jack Leg Valve - Configuration 2

5.10 Caster Stowing Procedures

The weight of each of the four AGSE-E18424-S01 caster assemblies is 300 lbs., 136 kg. They can be moved safely and accurately positioned for stowage by three or more people manhandling the unit. However, for personnel safety and possible damage to the engine caused by external tools, the following procedure is recommended to place the caster assemblies in the stowed shipping position. The stand base structure must be supported on ground, by forklift, or lifting jacks to free the casters from supporting the stand. Both forward casters are to be removed from their forward supports and moved to their caster stowage positions located at approximately the midpoint on each side of the stand. This can be done by manually rolling the assembly on the caster wheel or with the use of a forklift or overhead crane. Once pinned into the stowage position, manhandle or use the following procedure to rotate to the storage position. Both aft casters remain in their current positions and are rotated to the storage position in the same manner.

1. Rotate the caster so the steering socket is positioned away from the stand for accessibility. Attach a suitable chocker style web sling with a minimum 1000 lbs (455kg AGSE-S00342-P01, IPB Figure 8 Item 65) through the tube socket and connect to and overhead crane or forklift as shown in Figure 5.10-1.
2. The caster assembly will rotate to the stored position, therefore the lifting equipment must be able to lift and move horizontally toward the stand. Remove the caster securing pin if installed, raise the caster and move horizontally to follow the rotation path of the assembly.
3. Once the caster assembly has reached the maximum elevation point, figure 5.10-2, move horizontally to move, the center of gravity of the assembly, over center to continue along the rotation path. Lower the forklift and continue to move horizontally towards the stand until the caster assembly comes to rest in the storage position, shown in figure 5.10-3.
4. Install the securing pin and remove the overhead lifting equipment and sling.
5. Follow steps 1 through 4 in reverse order to deploy the aft casters or remove the forward casters from the storage position. Direction of horizontal movement will be away from the stand to follow the rotation path of the caster.

WARNING

- **The swivel lock MUST be engaged when rolling the caster manually.**
- **The swivel lock and wheel brake MUST be engaged when manually rotating the caster into its storage position.**

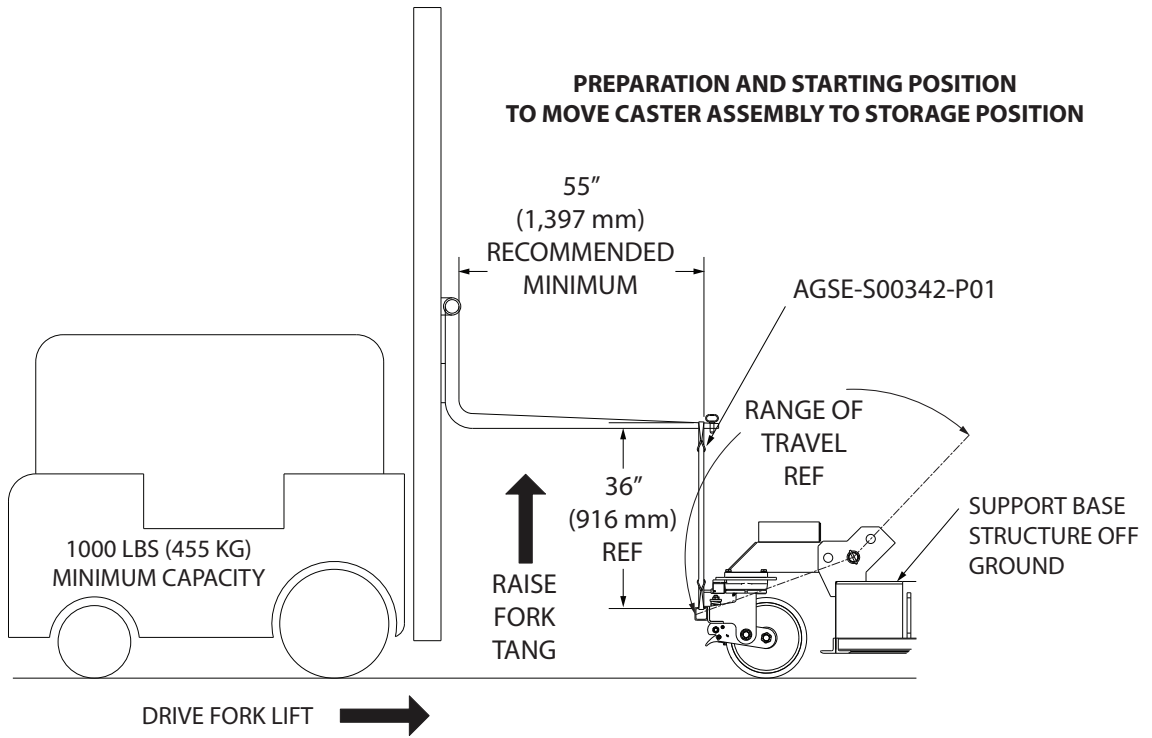


Figure 5.10-1

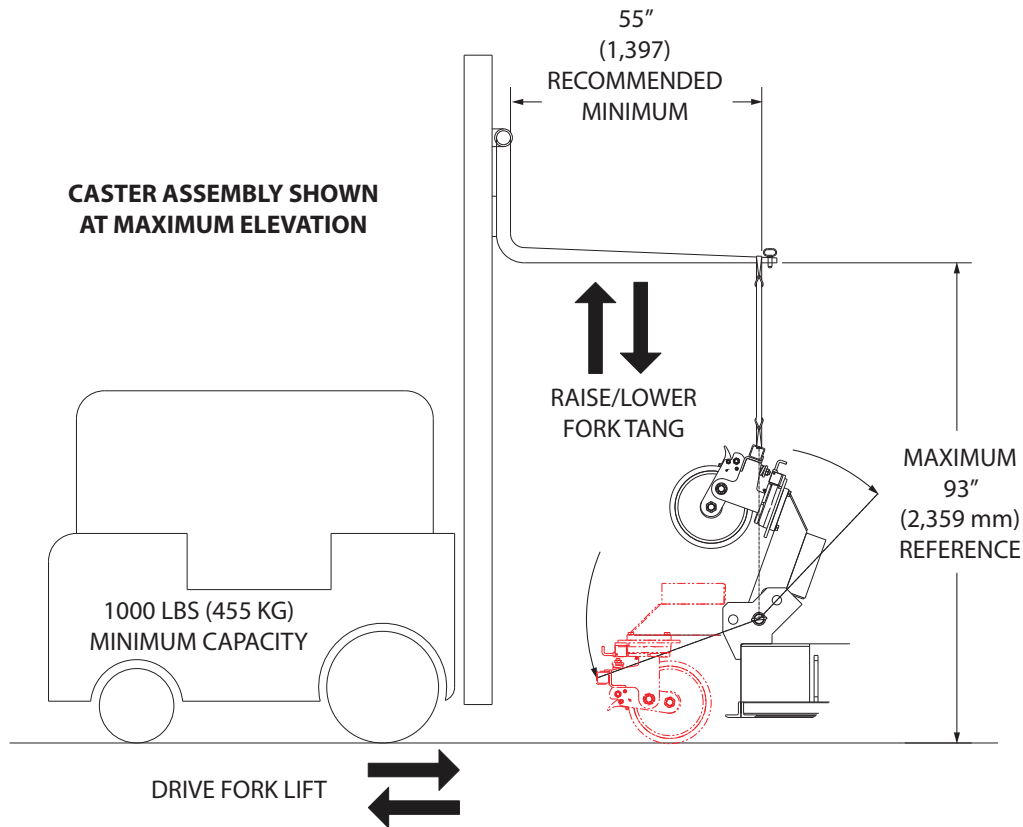


Figure 5.10-2

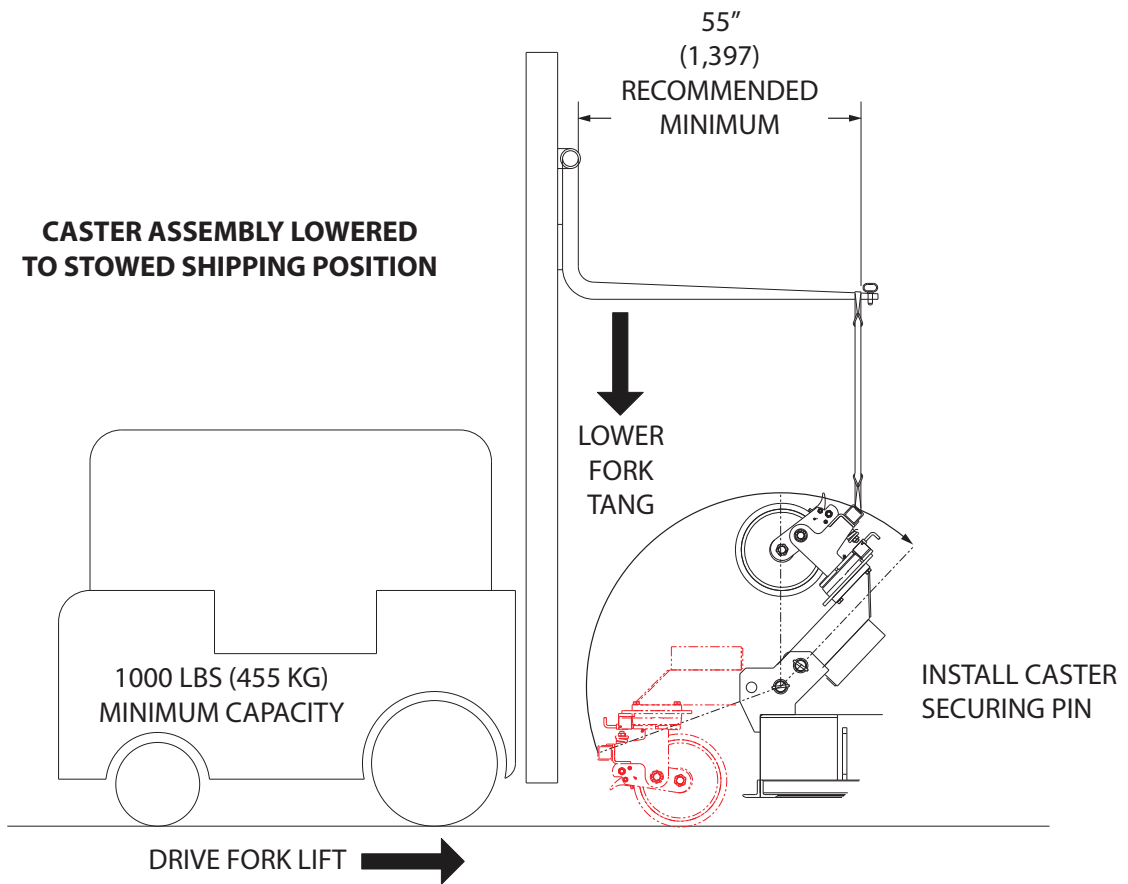


Figure 5.10-3

5.11 Ground Shipment

WARNING

When the engine is transported by truck, the shock mounts **MUST** be used and the shock mounts **MUST** be the sole constraint to be chained and secured to the truck bed. Any other constraint to the stand itself will essentially short-out the shock dampening system and may result in internal engine damage.

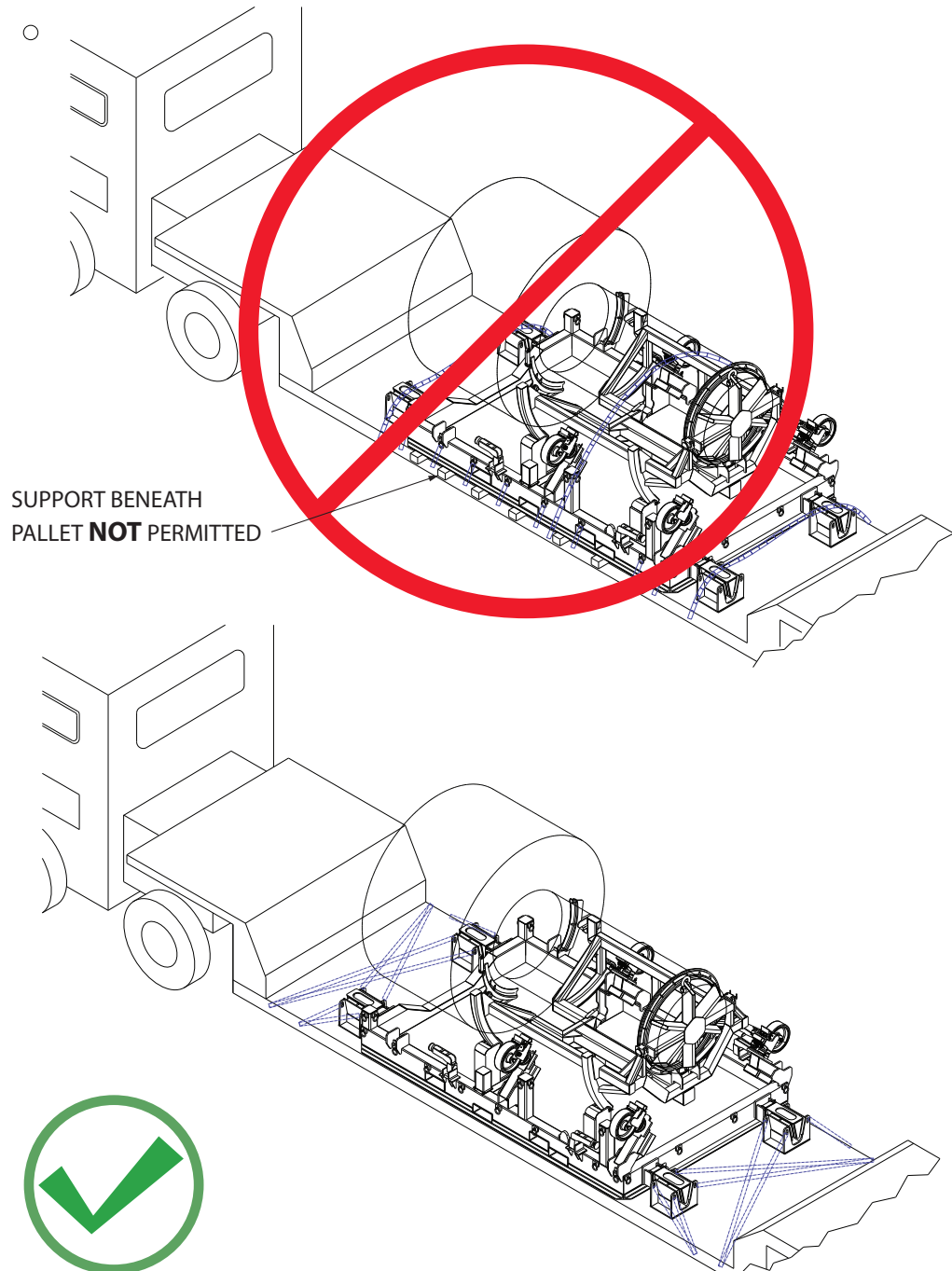


Figure 5.11-1

6.0 – SAFETY

6.1 Stress

Design stress safety factors are compliant with industry standards.

6.2 General

Most accidents are the result of violating standard safety rules in operation or improper servicing and maintenance of equipment.

Many safety features have been incorporated into the design to assist in safe operation of this equipment. These items do not fool-proof the equipment nor do they replace the operator's responsibility to operate the equipment in a safe manner.

6.3 Prevention

A good preventative maintenance program should include periodic lubrication, adjustment, and immediate correction of defects revealed through inspections. Preventive maintenance will not only contribute to safe operation, but will also extend useful service life as well.

NOTICE

Failure to carry out periodic inspections and routine maintenance will result in the voiding of any implied or expressed warranties.

6.4 Risk Assessment

6.4.1 Limits of the Machinery

The AGSE-E184-G02 (11C3359P02) Roll-Over Engine Ship Stand is a commercial product designed specifically only to store and/or transport the General Electric GENx-1B engine. The equipment is to be used only by trained mechanics free from physical impairment and who are familiar with this or similar fixture. The equipment is not to be used or made available to the general public.

6.4.2 Risk Assessment and Residual Risk

The risk evaluation performed was based on objective observation based on the experience of AGSE with similar equipment. Necessary Warning and Caution Notes have been incorporated into the Operation Section of the GENx-1B Roll-Over Engine Ship Stand Operation Manual along with instructions. Stencils also have been put on the equipment to identify hazardous and/or potential risk areas.

The operation of the AGSE-E184-G02 (11C3359P02) Roll-Over Engine Ship Stand can be with medium risk of injury and is considered safe to use under supervision. Low residual risks include potential pinch points during operation of the equipment.

Equipment detailed in this manual has undergone stringent safety analyzing using methods and standards set forth withi European Standard EN 1050 and is considered to be safe for its intended use. Reports on risk analysis and evaluation according to 2006/42/EC Machinery Directive (17 May 2006) are available upon request.



EC DECLARATION OF CONFORMITY

The machinery listed below fulfills all relevant provisions of the directives listed:

- 2006/42/EC Machinery Directive (2006/05/17)

Machinery covered by this Declaration:

Description: Engine Rollover Ground and Air Transport Stand, GENx-1B
Model: AGSE-E184
Part Number: AGSE-E184-G02 (11C3359P02)
Serial Number: _____

Harmonized Standards:

- ISO 12100:2010 Safety of Machinery - General Principles for Design - Risk Assessment and Risk Reduction
- ISO/TR 14121-2:2012 Safety of Machinery - Risk Assessment - Part 2: Practical Guidance and Examples of Methods

Standards and Specifications:

- GE Aircraft Engines, GSE SOW, 11C3359-P01 and 11C3359-P02, GENx-1B Engine Rollover Ground and Air Transport Stand, 2008/05/27 Rev D
- AGSE Quality System Procedure Number QSP-006
- Aerospace Recommended Practice Standard, SAE ARP 1840, 2007/02 Rev B

Place: Santa Fe Springs, California, USA

Date: _____

Signed: _____
Quality Representative

Technical File: Pedro Fernandes
Advanced Ground Systems Engineering
Pct Ana Maria Bastos, N20
A-dos-Cunhados, Portugal 2560-005
+351-96-520-4851

7.0 – Warranty

7.1 Statement of Warranty

Advanced Ground Systems Engineering LLC (AGSE) warrants to original purchasers that its products will be free of defects in material and workmanship under normal use and conditions for claims received within a period of one year from date of purchase (final billing date), and to the extent that if any AGSE product fails in operation because of such defect, the company will replace or repair, at its option, the defective article. Prior to the repair or replacement of any defective product, the company shall be notified in writing as to the nature of the defect. The company shall assume no liability for freight, disassembly, removal, refitting and installation charges on any article returned unless such charge(s) is approved by AGSE in writing prior to the return. On component items purchased by AGSE for incorporation into an AGSE manufactured product, only the component manufacturer's warranty (if any) shall apply to that component. Said manufacturer's warranty shall be passed on to AGSE's customer to the extent permitted. This warranty is applicable only when AGSE products are operated for intended purposes within the recommended procedures, load limits, properly maintained, not damaged or abused, etc., including as indicated in company manuals, catalogs, and drawings. All warranty claims must be applied for within sixty days from when the defect becomes known. The foregoing warranty is in lieu of all other warranties, or liabilities, either expressed or implied, and AGSE expressly excludes all implied warranties of merchantability and fitness for a particular purpose and all non-infringement warranties as well as disclaims all liabilities to third parties. In no event shall AGSE be liable for any amounts in excess of the purchase price of the product.

CAUTION

Failure to conduct periodic inspections, routine maintenance, or improper operation will result in voiding the warranty.

8.0 – Parts Breakdown

8.1 General

The following pages can be used in the identification of components used in the product described in this manual. Parts Lists are broken down by “ITEM”, “PART NUMBER”, “QTY”, and “DESCRIPTION.”

NOTICE

“ITEM” numbers are for reference to the Illustrated Parts Breakdown (IPB) only. Do not order replacement parts by “ITEM” number. Order parts by “PART NUMBER” only.

8.2 Illustrated Parts Breakdown

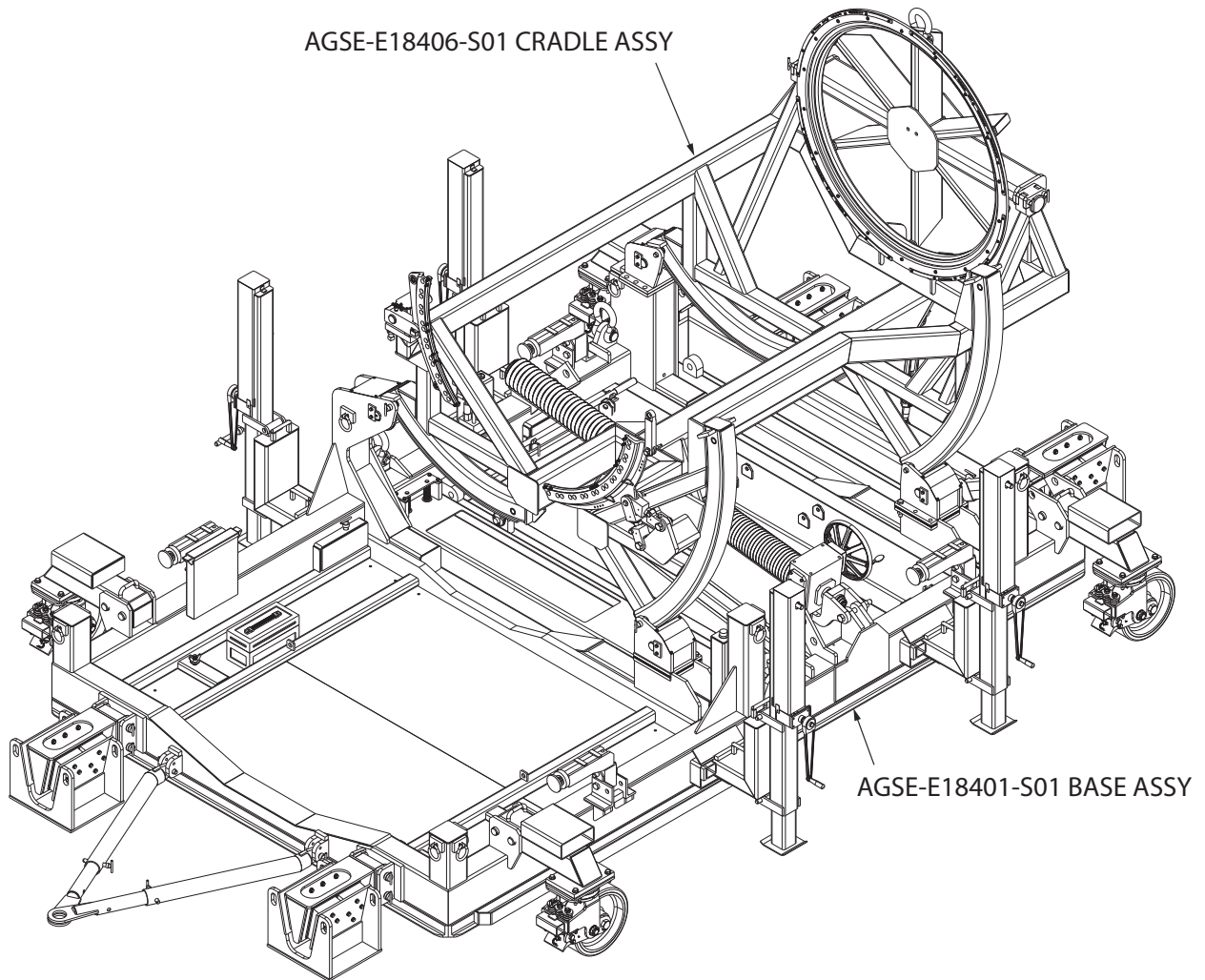


Figure 8.1-0 AGSE-E184-G02 (11C3359P02) Roll Over Ship Stand

IPB Figure 1 - AGSE-E184-G02 Roll-Over Engine Ship Stand

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E184-G02	-	Engine Ship Stand Assy (Figure 8.1-1)
1	AGSE-E18401-S01	1	Base Assy (See IPB Figure 8 for Details)
2	AGSE-E18406-S01	1	Cradle Assy (See IPB Figure 2 for Details)
3	1032938	2	Jaw-jaw Turnbuckle - 1-1/2" x 12"
4	DELETED	1	Tow Bar Assy (S/N 101 Only) (See IPB Figure 12 for Details)
4	AGSE-E18423-S01	2	Tow Bar Assy (See IPB Figure 12 for Details)
5	AGSE-E18424-S01	4	Caster Mount Assy (From P/N E16616-S02 Caster Mount Assy) (See IPB Figure 13 for Details)
6	AM-91000-120T	4	Safety Pin
7	NOT USED		
8	NOT USED		
9	AGSE-E16620-S01	4	Shock Mount Assy (See IPB Figure 14 for Details)
10	AGSE-E18412-S01	2	Jacking Leg Assy - 48" Lift - RH (See IPB Figure 15 for Details)
11	AGSE-E18412-S02	2	Jacking Leg Assy - 48" Lift - LH (See IPB Figure 15 for Details)
12	AGSE-E10710-P03	2	Caster Steering Bar
13	AGSE-E21527-P01	4	Placard "CORRECT TIE-DOWN VERSION"
14	AGSE-E21527-P02	4	Placard "INCORRECT TIE-DOWN VERSION"
15	90081A077	32	U Drive Nail #2 - 1/4" Lg - Stl - Zinc Plt
16	AGSE-E16650-S02	1	Air Ratchet Extension (Ref IPB Figure 10 - Item 52)
17	PMP-10111	16	Tie-Down Ring (10,000 Lbs Cap)

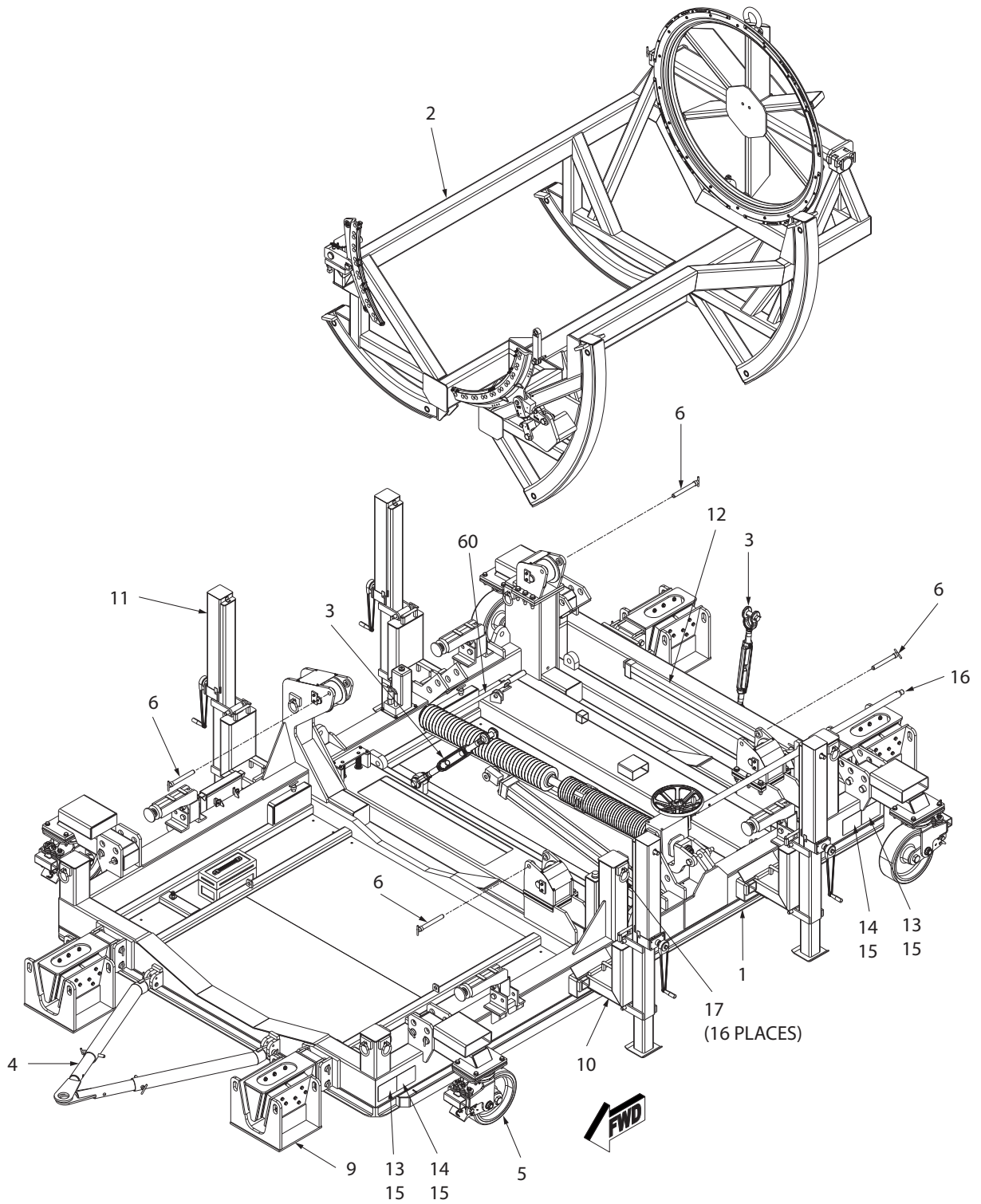


Figure 8.1-1 AGSE-E184-G02 View Looking Aft

IPB Figure 2 - AGSE-E18406-S01 Cradle Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18406-S01	-	Cradle Assy (Figure 8.2-1)
1	AGSE-E18407-P02	1	Cradle Weldment
2	AGSE-E18407-P03	2	Cap
3	AGSE-E18407-P04	2	Pivot Pin
4	AGSE-E18419-S01	1	Strongback Assy (See IPB Figure 3 for Details)
5	AGSE-E18411-P02	1	Index Pin
6	AGSE-E18414-S01	1	FWD Engine Support Assy (See IPB Figure 4 for Details)
7	DELETED	2	Modified Bolt
8	AGSE-E10805-P03	1	Cap
9	AGSE-E10805-P06	1	Set Screw - Modified
10	AM-90750-48T	4	Safety Pin
11	CL-8-BLPT-4.0	1	T-Handle Ball Lock Pin
12	AGSE-E10805-P05	2	Set Collar Modified
13	Commercial	3	FHMS - #10-32 x 5/8" x 82 ⁰ - SS
14	Commercial	2	Lock Washer - 1/4"
15	Commercial	2	HSHCS - 1/4"-20-3/4"
16	Commercial	4	Lock Washer - 3/8"
17	Commercial	4	HHCS - 3/8"-24UNF - 3/4"
18	Commercial	1	Lock Washer - 1"
19	Commercial	1	Hex Jam Nut 1"-8UNC
20	1253A11	1	Slide Bolt Latch
21	AGSE-E18429-P01	2	Pivot Stop
22	Commerical	4	HHMS 1/4"-20UNC x 2" Lg, Zinc Plt
23	Commercial	4	Lock Nut 1/4" ID x 1/2" OD, Zinc Plt
24	Commercial	4	Flat Washer 1/4" ID x 1/2" OD, Zinc Plt

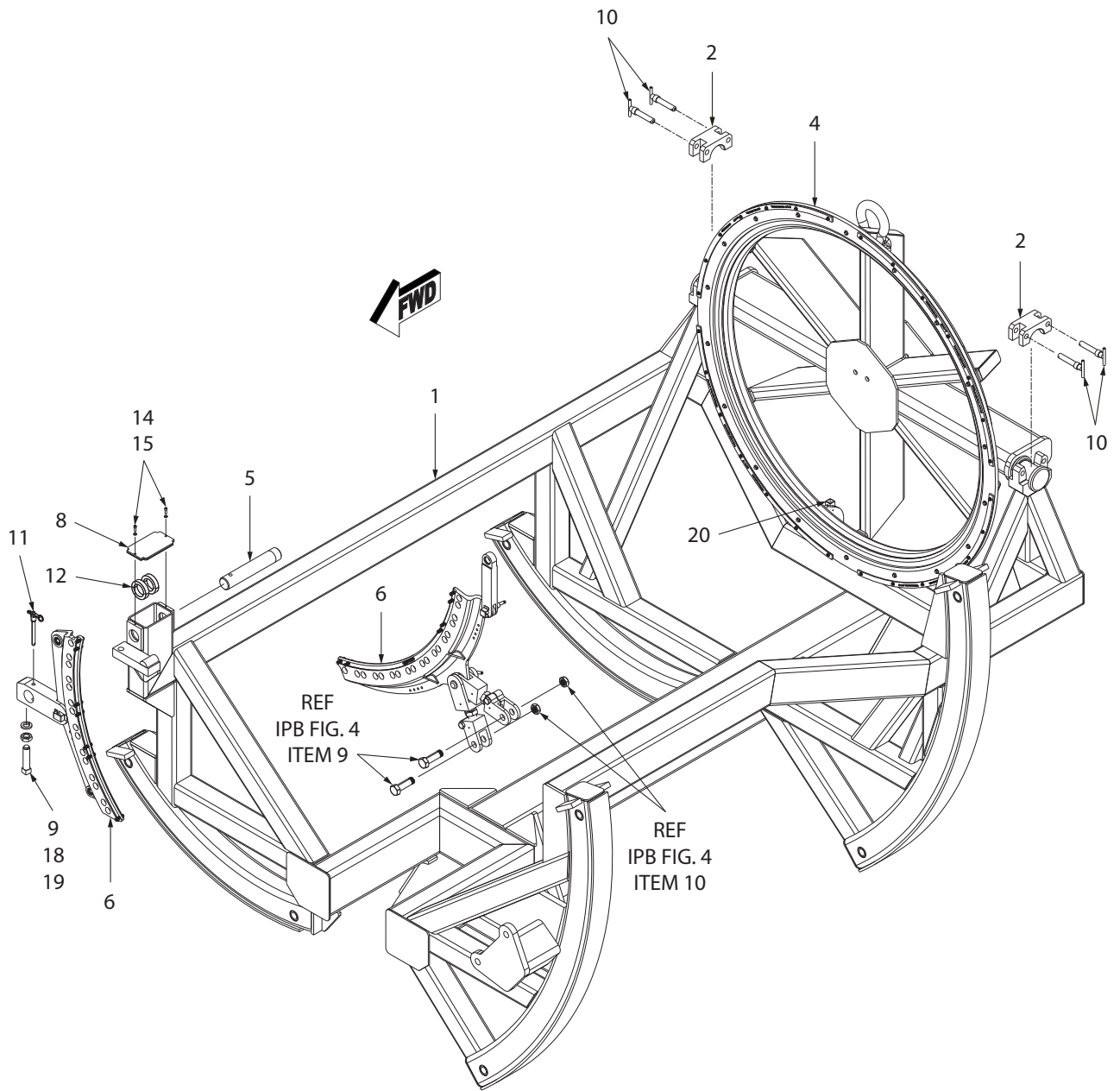


Figure 8.2-1 AGSE-E18406-S01 Cradle Assembly

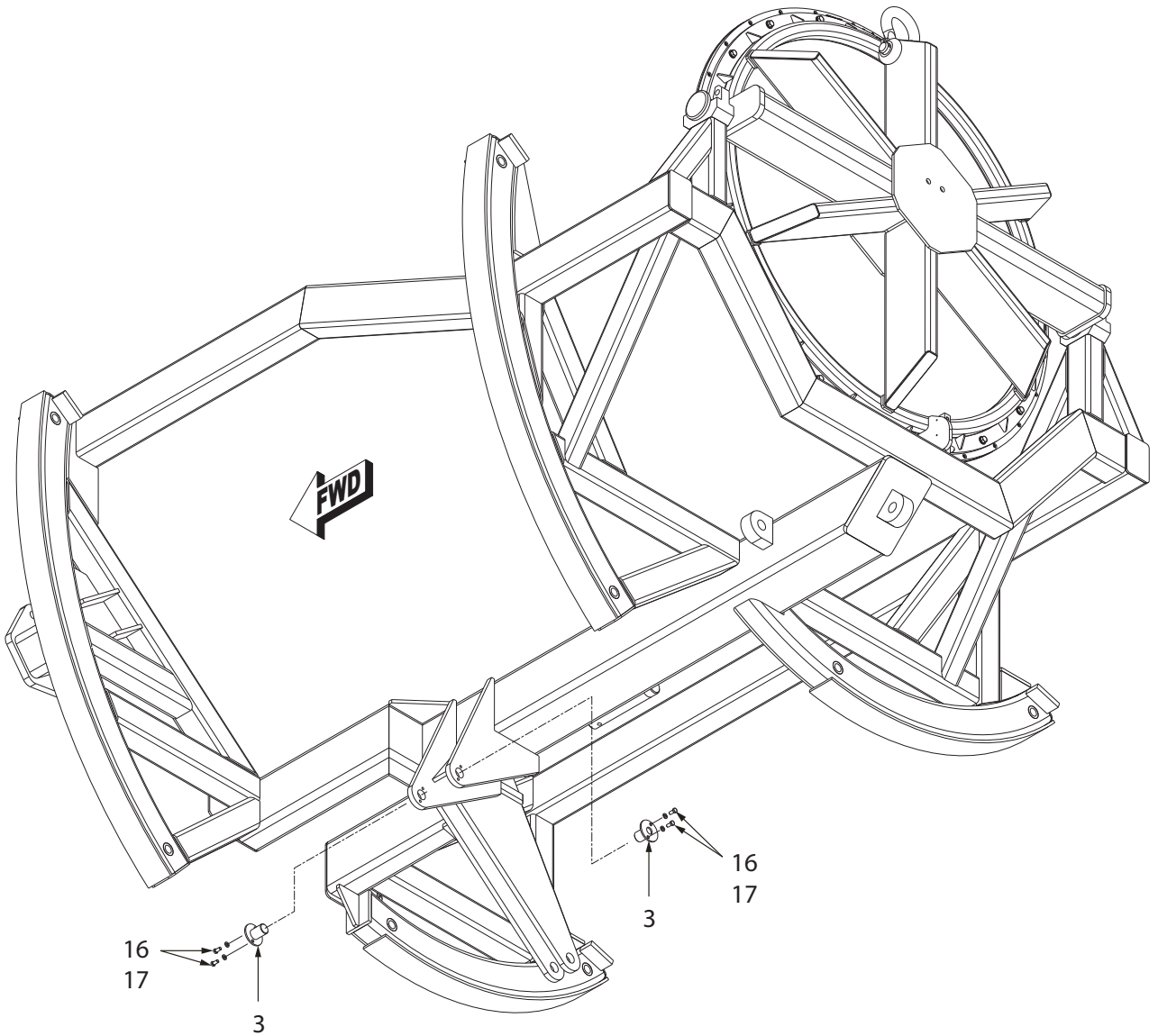


Figure 8.2-2 AGSE-E18406-S01 Cradle Assembly

IPB Figure 3 - AGSE-E18419-S01 Strongback Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18419-S01	1	Strongback Assy (Figure 8.3-1)
1	AGSE-E18417-P01	1	Strongback Frame
2	AGSE-E18418-P01	1	Adapter Ring Assy
3	AGSE-E18420-P01	4	Back-up Segment
4	711-1000	28	12-Point Flanged Bolt - 1/4"-28 UNF x 1" Lg 170 KSI Tensile - S.S.
5	400-8300	28	12-Point Flanged Nut - 1/4"-28 UNF - 170 KSI Tensile - S.S.
6	AGSE-E21512-P01	18	Strongback Bolt
7	G-213-1.375	1	Round Pin Anchor Shackle - 1-3/8" DI 13-1/2" Ton Cap - Forged Steel - Galv.

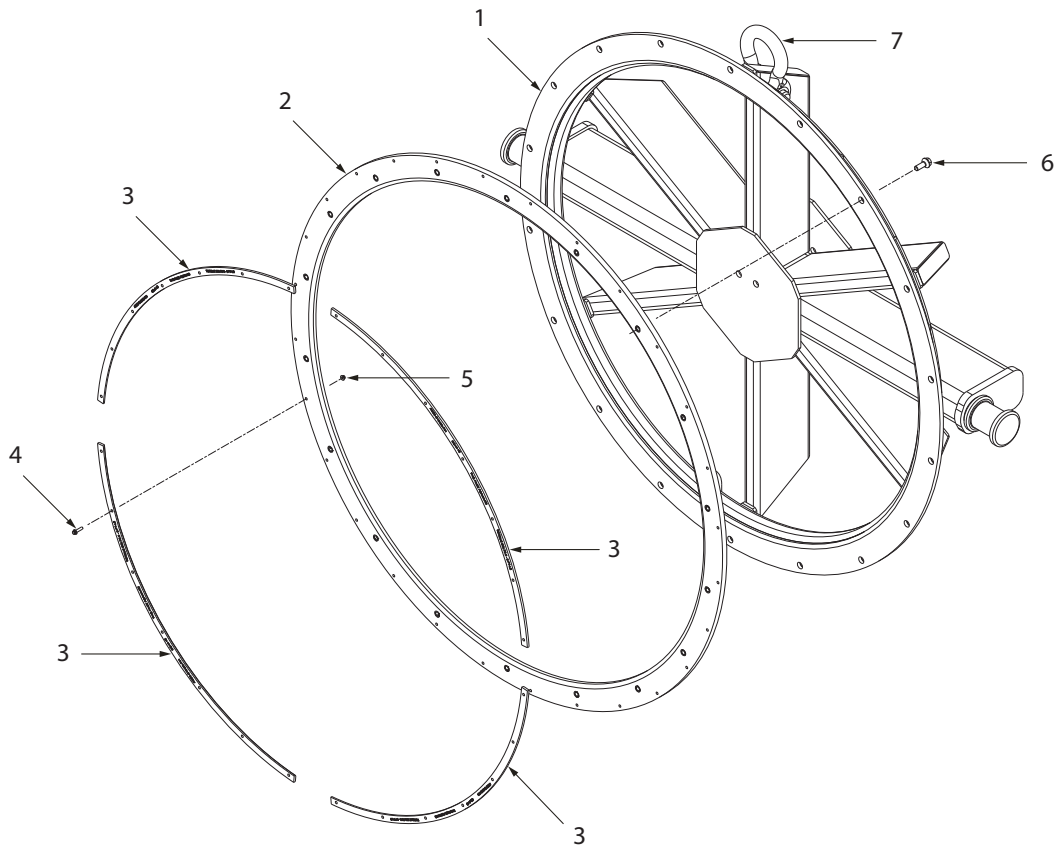


Figure 8.3-1 AGSE-E18419-S01 Strongback Assembly

IPB Figure 4 - AGSE-E18414-S01 Forward Engine Support Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18414-S01	-	FWD Engine Support Assy (Figure 8.4-1)
1	AGSE-E18414-S02	1	Outer Support Link Assy (See IPB Figure 5 for Details)
2	AGSE-E18414-S03	1	Inner Support Link Assy (See IPB Figure 5 for Details)
3	AGSE-E18414-S04	1	Hoist Link Assy (See IPB Figure 6 for Details)
4	AGSE-E18414-P08	1	Support Bracket - LH
5	3AJ1.250-12CLF	15	Bolt - 12 pt - 3/8"-24 UNF x 1-1/4" Lg
6	AGSE-E17610-S03	1	Support Bracket Assy - RH (See IPB Figure 7 for Details)
7	AM-91000-32T-H1025	1	Safety Pin Assy
8	AGSE-E18411-P01	1	Bracket Support
9	91259A136	2	Hex Soc Hd Shoulder Screw 1" Dia. x 2-1/2" Lg
10	91735A280	2	Hex Nut - Self-Locking - 3/4"-10 UNC
11	AM-91250-40-H900	2	Safety Pin Assy (Alternate for Item 9)

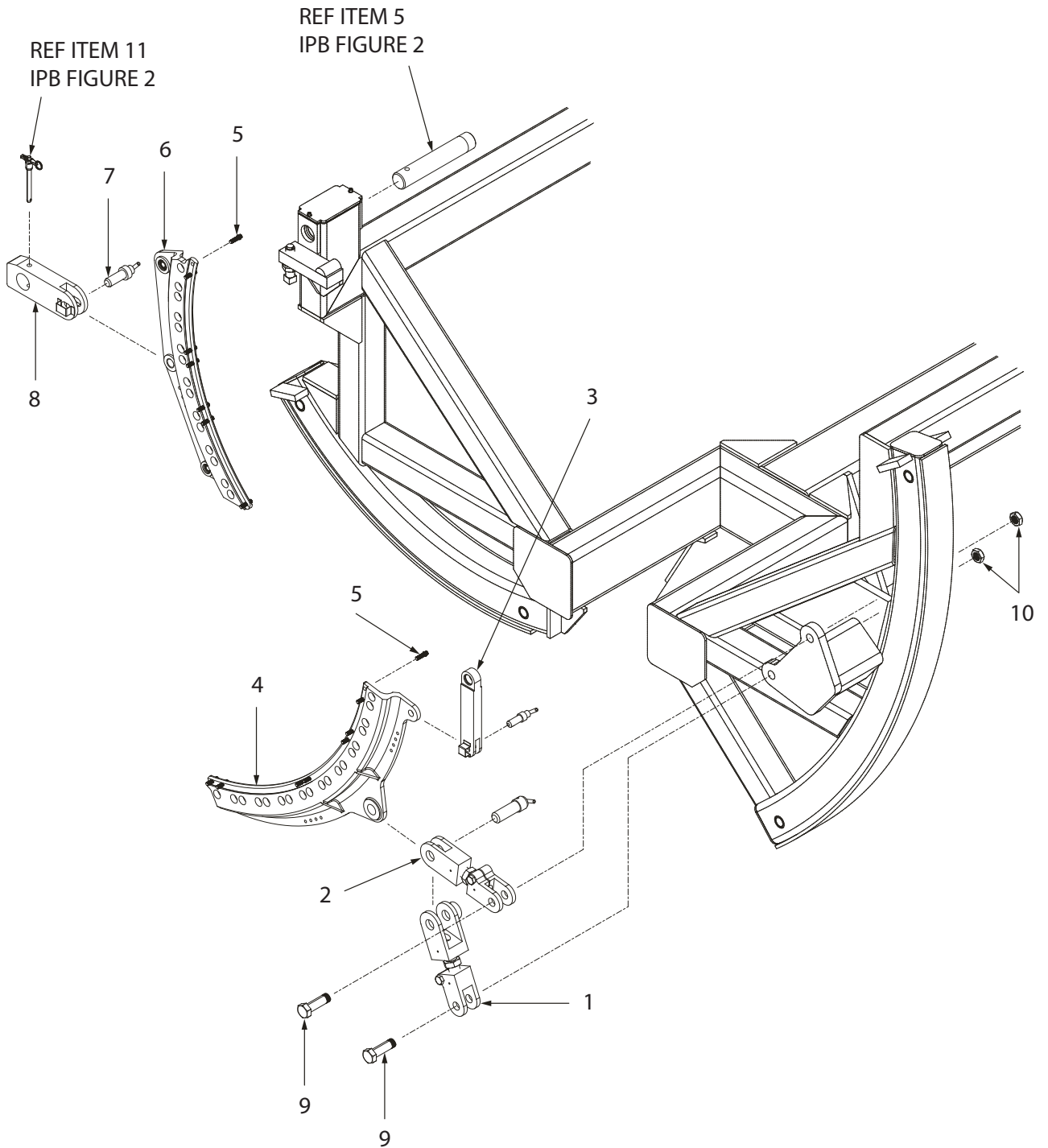


Figure 8.4-1 AGSE-E18414-S01 FWD Engine Support Assembly

IPB Figure 5 - AGSE-E18414-S02/S03 Support Link Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18414-S02	-	Outer Support Link Assy (Figure 8.5-1)
	AGSE-E18414-S03	-	Inner Support Link Assy
1	AGSE-E18414-P01	1	Clamping Clevis (Used on AGSE-E18414-S03)
2	AGSE-E18414-P03	1	Adjusting Screw
3	AGSE-E18414-P04	1	Outer Clevis (Used on AGSE-E18414-S02)
4	AGSE-E18414-P05	1	Inner Clevis (Used on AGSE-E18414-S03)
5	Commercial	1	HHCS - 5/8"-18UNF x 2-1/2" Lg Gr. 5 - Zinc Plt
6	AGSE-E18414-P02	1	Clamping Clevis (Used on AGSE-E18414-S02)
7	AGSE-E18414-P09	1	Adapter Pin (Used on AGSE-E18414-S02)
8	CL-4-BLPR-2.00-S	1	Ring Handle Ball Lock Pin 1/4" Dia. x 2" Lg (Used on AGSE-E18414-S02)

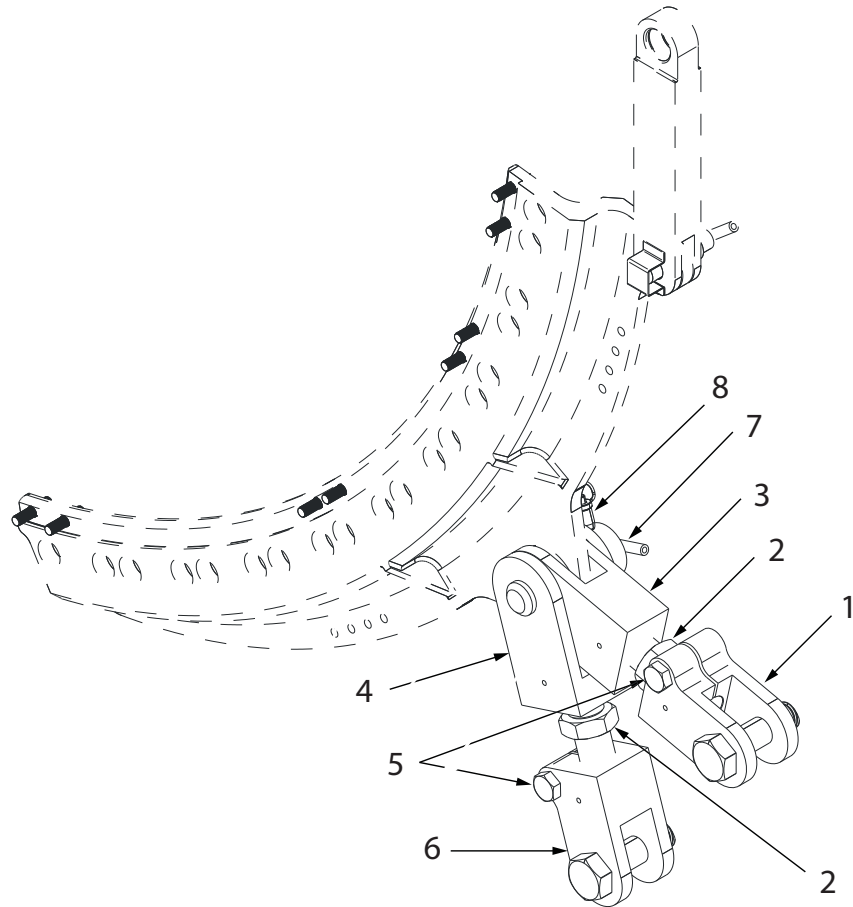


Figure 8.5-1 AGSE-E18414-S02/-S03 Outer and Inner Support Link Assemblies

IPB Figure 6 - AGSE-E18414-S04 Hoist Link Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18414-S04	-	Hoist Link Assy (Figure 8.6-1)
1	AGSE-E18414-P07	1	Hoist Link
2	AS14102-10	1	Self-Lubricating Bearing
3	5008-118	1	Internal Snap Ring
4	AM-90750-20-H900	1	Safety Pin Assy

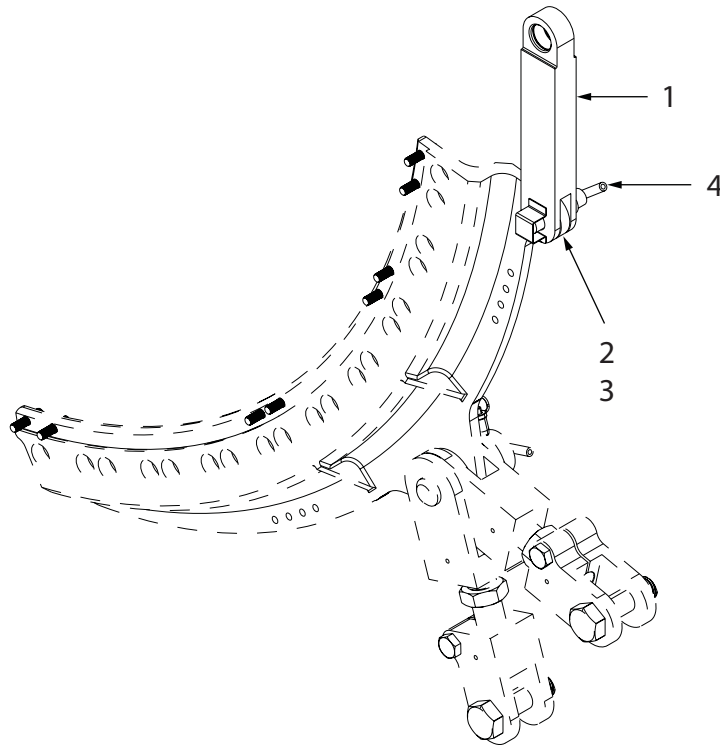


Figure 8.6-1 AGSE-E18414-S04 Hoist Link Assembly

IPB Figure 7 - AGSE-E17610-S03 RH Support Bracket Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E17610-S03	-	RH Support Bracket Assy (Figure 8.7-1)
1	AGSE-E17613-P01	1	Support Bracket - RH
3	AGSE-E17615-P01	1	Bushing - 1.19" ID
4	AGSE-E17615-P02	1	Bushing - 1.005" ID
5	AGSE-E17615-P03	1	Bushing - 0.75" ID
6	91590A141	2	External Snap Ring - 1.75" Shaft
7	91590A139	1	External Snap Ring - 1.50" Shaft
8	AS14102-10	1	Self-Lubricating Bearing
9	5008-118	1	Internal Snap Ring - 1.19" ID - Bore
11	GEZ010ES	1	Plain Spherical Bearing
12	5008-106	1	Internal Snap Ring - 1.06" ID - Bore

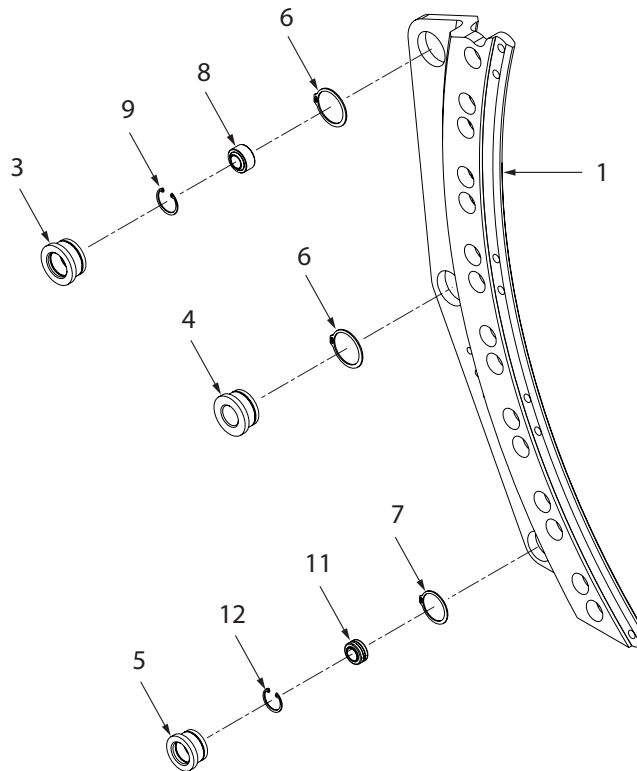


Figure 8.7-1 AGSE-E17610-S03 RH Support Bracket Assembly

IPB Figure 8 - AGSE-E18401-S01 Base Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18401-S01	-	Base Assy (Figure 8.8-1)
1	AGSE-E18401-P01	1	Base Weldment
2	AGSE-E18401-P02	2	Inner Fork Tube Guide
3	AGSE-E18401-P03	1	Retainer Pin - 1-3/8" Dia. x 3-5/8" Grip
4	AGSE-E16631-P02	1	Support Roller Guard
5	AGSE-E10709-P04	4	Leveling Pad
6	AGSE-E18403-P01	1	Inner Fork Tube Weldment
7	AGSE-E18403-P02	4	Spring Guide
8	AGSE-E18403-P03	2	Cap Plate
9	PMP-10111	16	Tie-Down Ring
10	AGSE-E16602-S01	4	Support Roller Assy
11	AGSE-E16602-S02	4	Roller Shaft Assy
12	AGSE-E16606-P01	1	Roller Support - LH
13	AGSE-E16606-S01	A/R	Roller Support Shim Set - LH
14	AGSE-E16630-P01	2	Support Roller Guard
15	AGSE-E16602-P05	8	Shaft Keeper
16	DELETED	1	Cradle Jack Assy (See IPB Figure 10 for Details) (S/N 101)
16	AGSE-E16626-S04	1	Cradle Jack Assy (See IPB Figure 10 for Details)
17	AGSE-E18405-S02	1	Hydraulic Cylinder Assy (See IPB Figure 9 for Details)
18	811	4	Compression Ring - 1.375" OD x 4.50" Lg
19	ADV004SC-10	1	Storage Case
20	69094	1	Knuckle - 1-1/4"-12"

IPB Figure 8 - AGSE-E18401-S01 Base Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
21	Commercial	6	Slotted RHCS - 1/4"-20UNC - 0.75"
22	Commercial	22	Lock Washer - 1/4"
23	DELETED	6	Flat Washer - Wide - 1/4"
24	Commercial	4	HHCS - 3/8"-16UNC - 0.75"
25	Commercial	20	HHCS - 3/8"-16UNC - 1"
26	Commercial	24	Lock Washer - 3/8"
27	Commercial	8	Flat Washer - 3/8"
28	Commercial	17	HHCS - 3/4"-10UNC - 3.5"
29	Commercial	36	Flat Washer - 3/4"
30	Commercial	17	Lock Washer - 3/4"
31	Commercial	2	Lock Nut - 1/4"
32	Commercial	18	Hex Nut - 3/4"-10
33	Commercial	1	HHCS - 1"-8UNC - 8.5"
34	Commercial	1	Lock Washer - 1"
35	DELETED	2	Flat Washer - 1"
36	Commercial	1	Hex Nut - 1"-8UNC
37	Commercial	1	Flat Washer - 1-3/8"
38	Commercial	1	Cotter Pin - 1-1/4" x 2"
39	AGSE-E18415-P01	1	FWD Roller Support - LH
40	AGSE-E18415-P02	A/R	FWD Roller Support Shim - 1/16" Thk - LH
41	AGSE-E18415-P03	A/R	FWD Roller Support Shim - 1/8" Thk - LH
42	AGSE-E18415-P04	A/R	FWD Roller Support Shim - 1/4" Thk - LH
43	AGSE-E18426-P01	1	Document Box
44	AGSE-E18416-P01	1	AFT RH Roller Support Housing
45	AGSE-E18416-P02	A/R	AFT RH Roller Support Shim - 1/16" Thk
46	AGSE-E18416-P03	A/R	AFT RH Roller Support Shim - 1/8" Thk
47	AGSE-E18416-P04	A/R	AFT RH Roller Support Shim - 1/4" Thk

IPB Figure 8 - AGSE-E18401-S01 Base Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
48	AGSE-E18416-P05	1	Roller Guard
49	AGSE-E18402-S01	1	Jack Leg Hydraulic Installation (See IPB Figure 11 for Details)
50	AGSE-E10709-P02	4	Pivot Block
51	AGSE-E10709-P01	4	Jack Leg Weldment
52	AGSE-E10709-P03	8	Pivot Pin
53	AGSE-E10712-P01	1	Hydraulic Pump - Modified
54	AM-91000-74L	4	Safety Pin - 1" Dia. x 4-5/8" Grip - No Collar
55	AM-90375-38L	2	Safety Pin - 3/8" Dia. x 2-3/8" Grip
60	AGSE-E21523-S01	1	Pump Handle and Safety Pin Assy
61	9195T71	A/R	2" Black and Yellow Hatched Reflective Tape
62	3741K46	1	Sleeve Bearing - 2" OD x 1-3/4" ID x 1" Lg - Bronze
63	722A54	1	Hex L-Key 1/2"
64	5551A49	1	Wrench 1-3/4" Size Open End
65	AGSE-S00342-P01	1	Web Sling Strap
66	AM-2383	16	Tie-Down Ring Plate
67	Commercial	4	HHCS - 3/4"-10UNC x 2-1/2" Lg - SS
68	Commercial	4	Flat Washer - 3/4" - SS

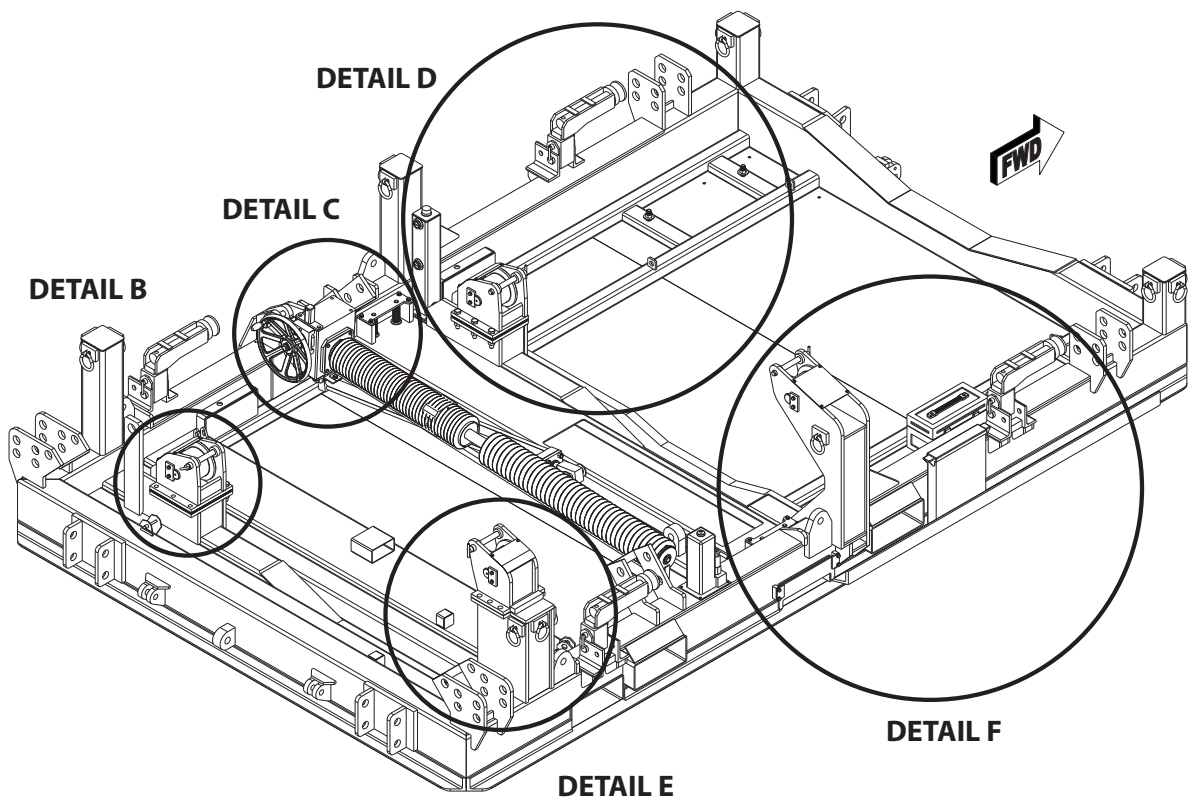
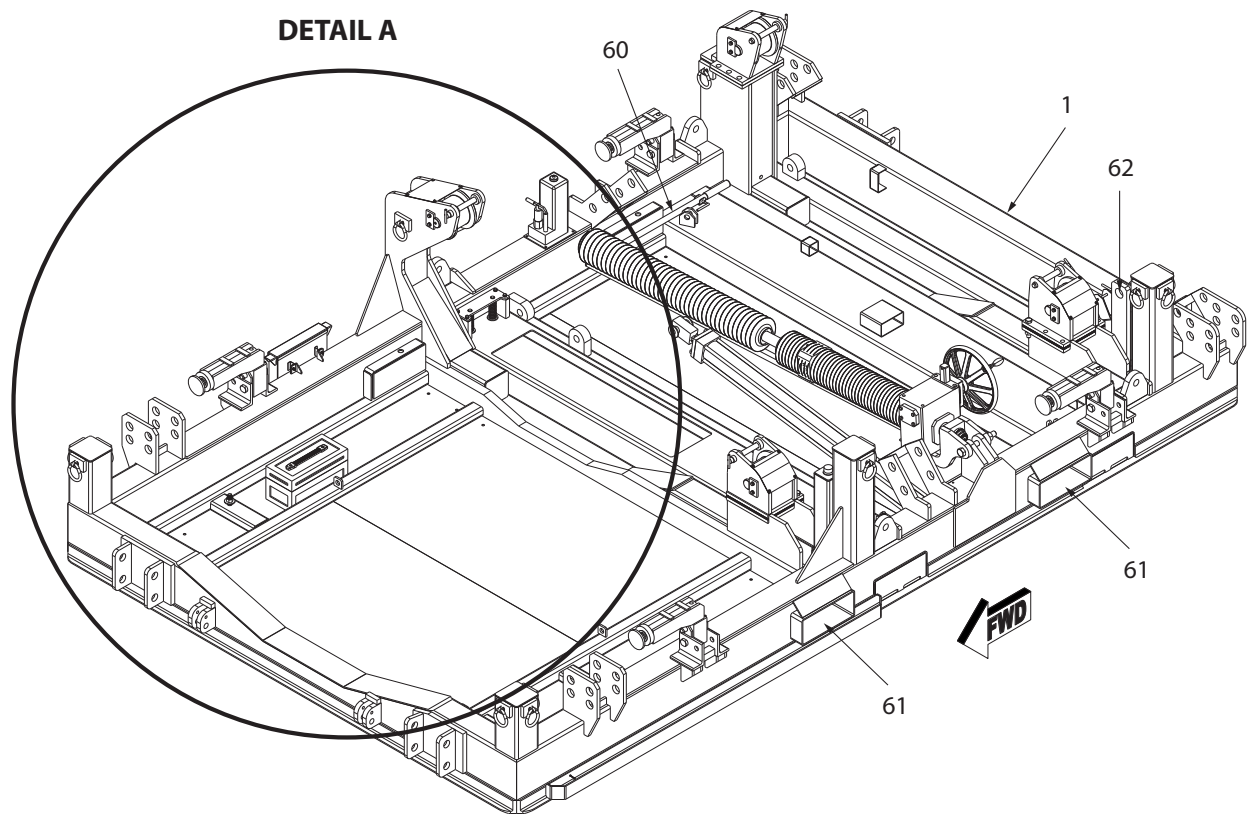


Figure 8.8-1 AGSE-E18401-S01 Base Assembly

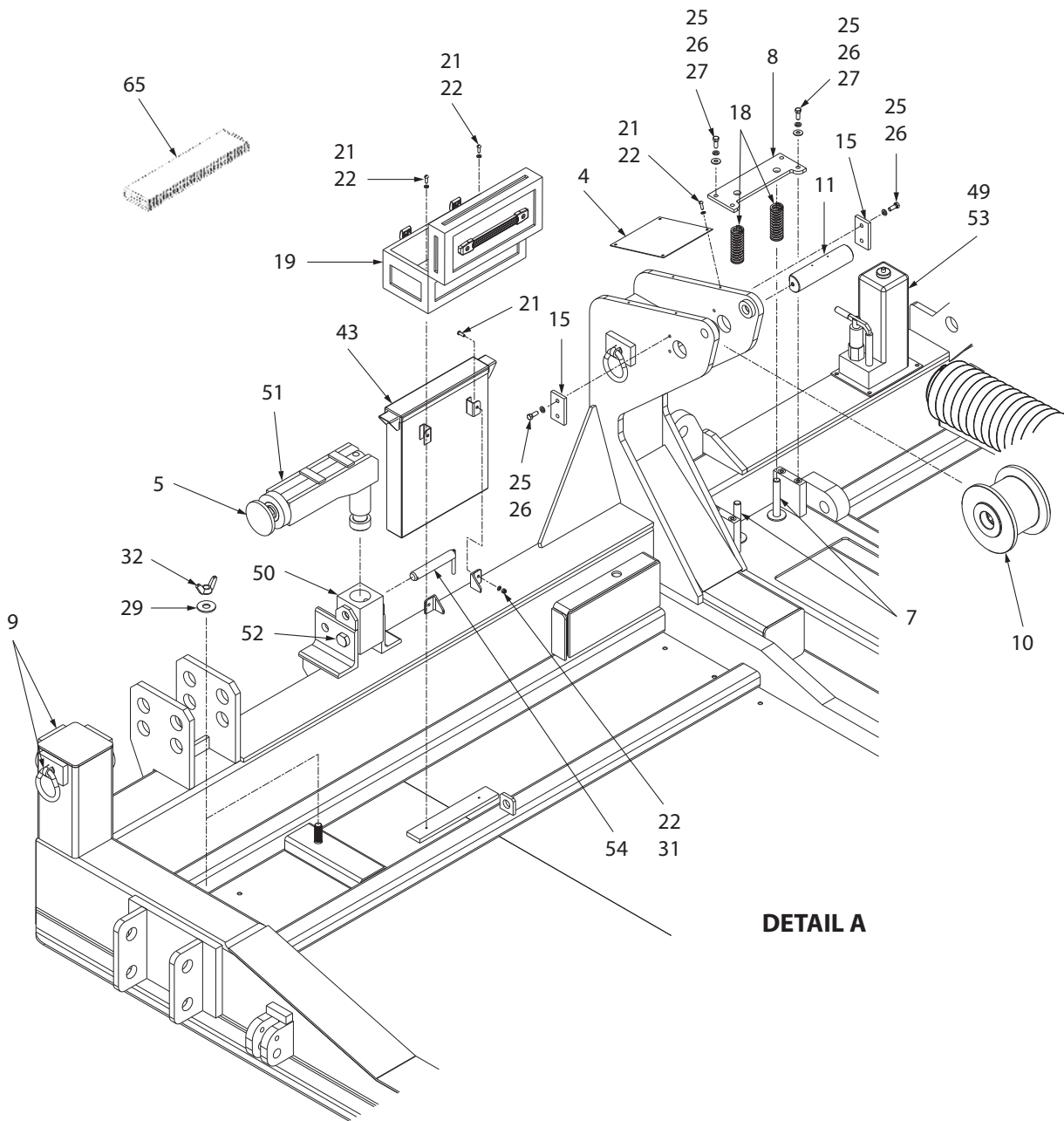


Figure 8.8-2 AGSE-E18401-S01 Base Assembly

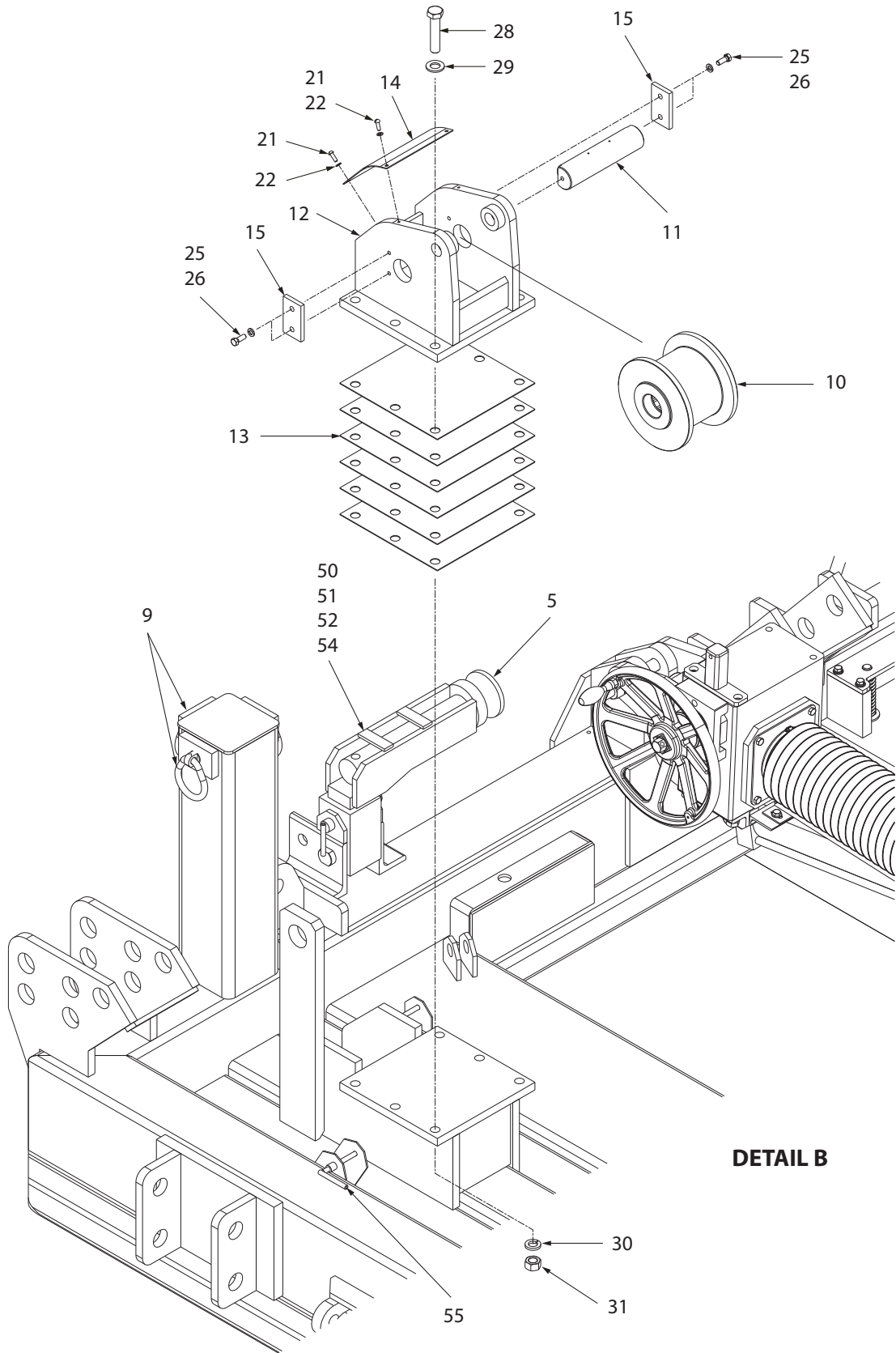


Figure 8.8-3 AGSE-E18401-S01 Base Assembly

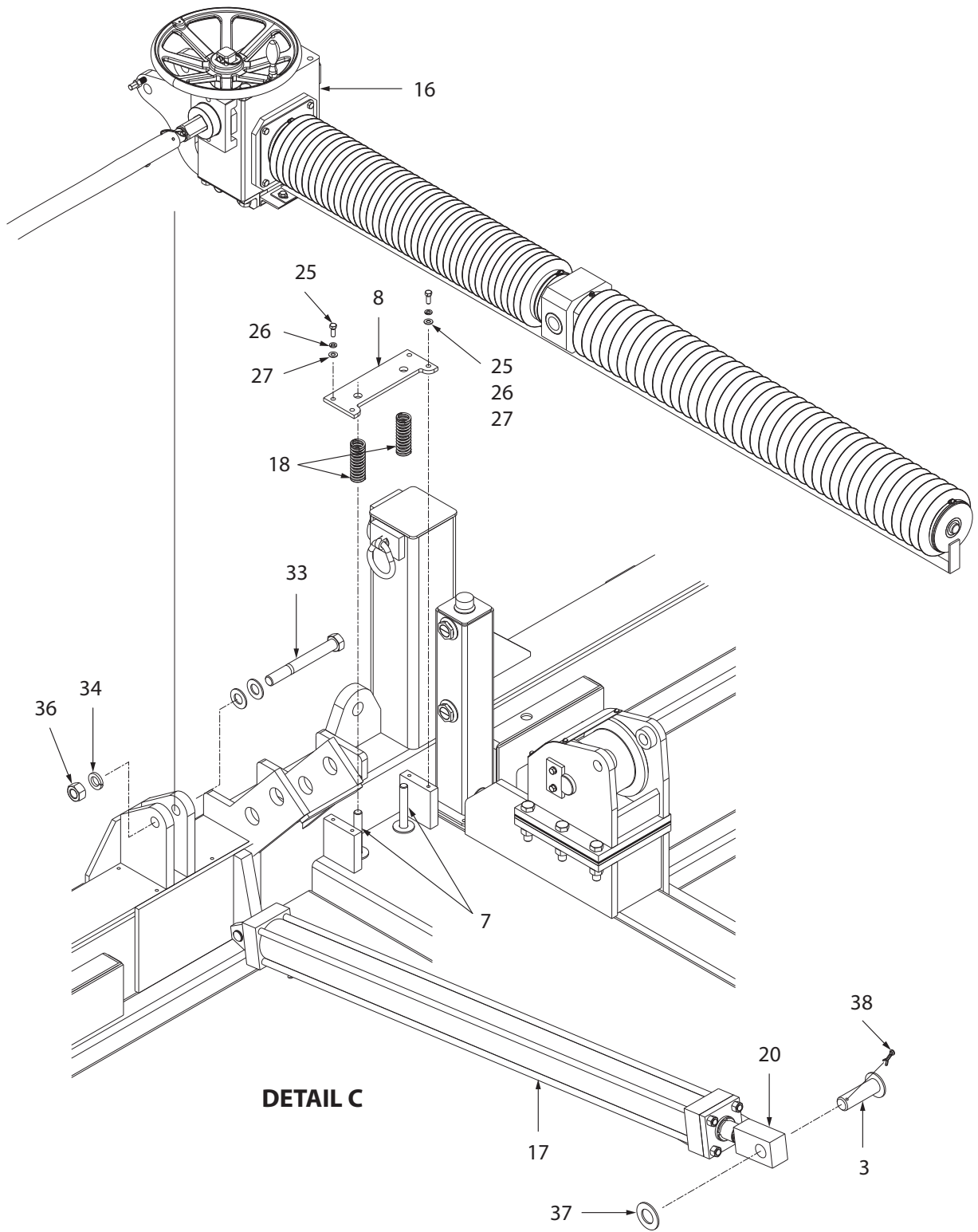


Figure 8.8-4 AGSE-E18401-S01 Base Assembly

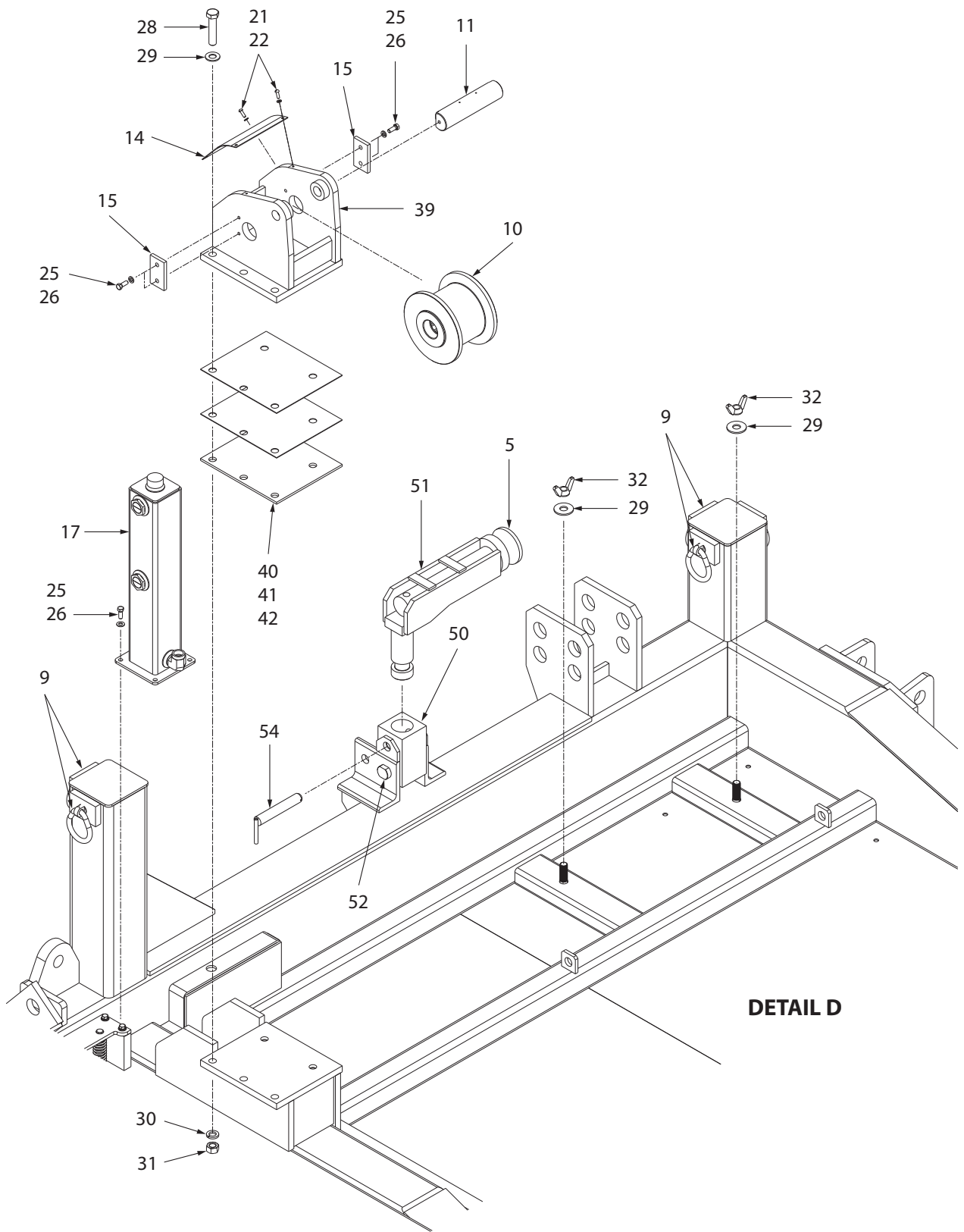
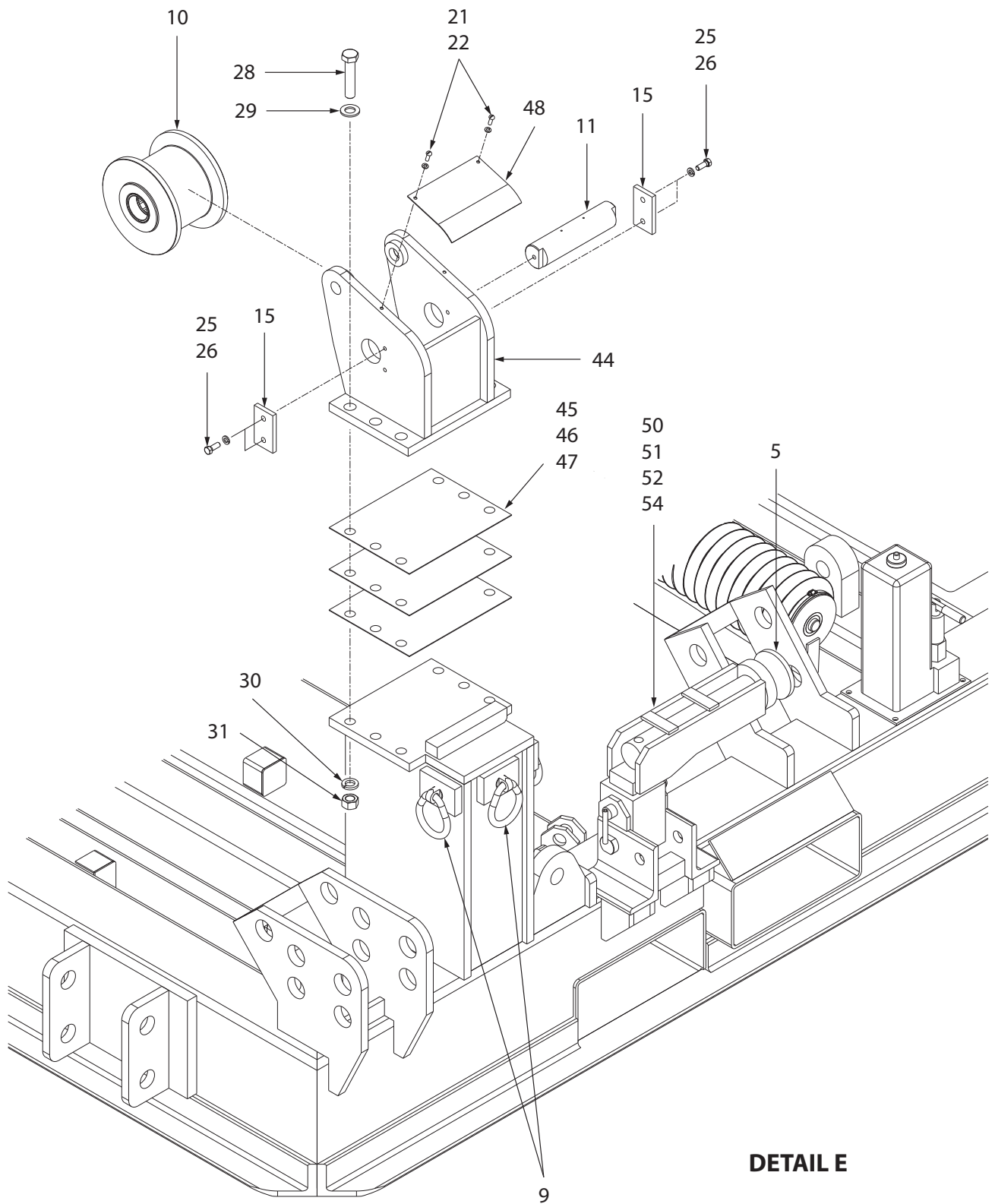


Figure 8.8-5 AGSE-E18401-S01 Base Assembly



DETAIL E

Figure 8.8-6 AGSE-E18401-S01 Base Assembly

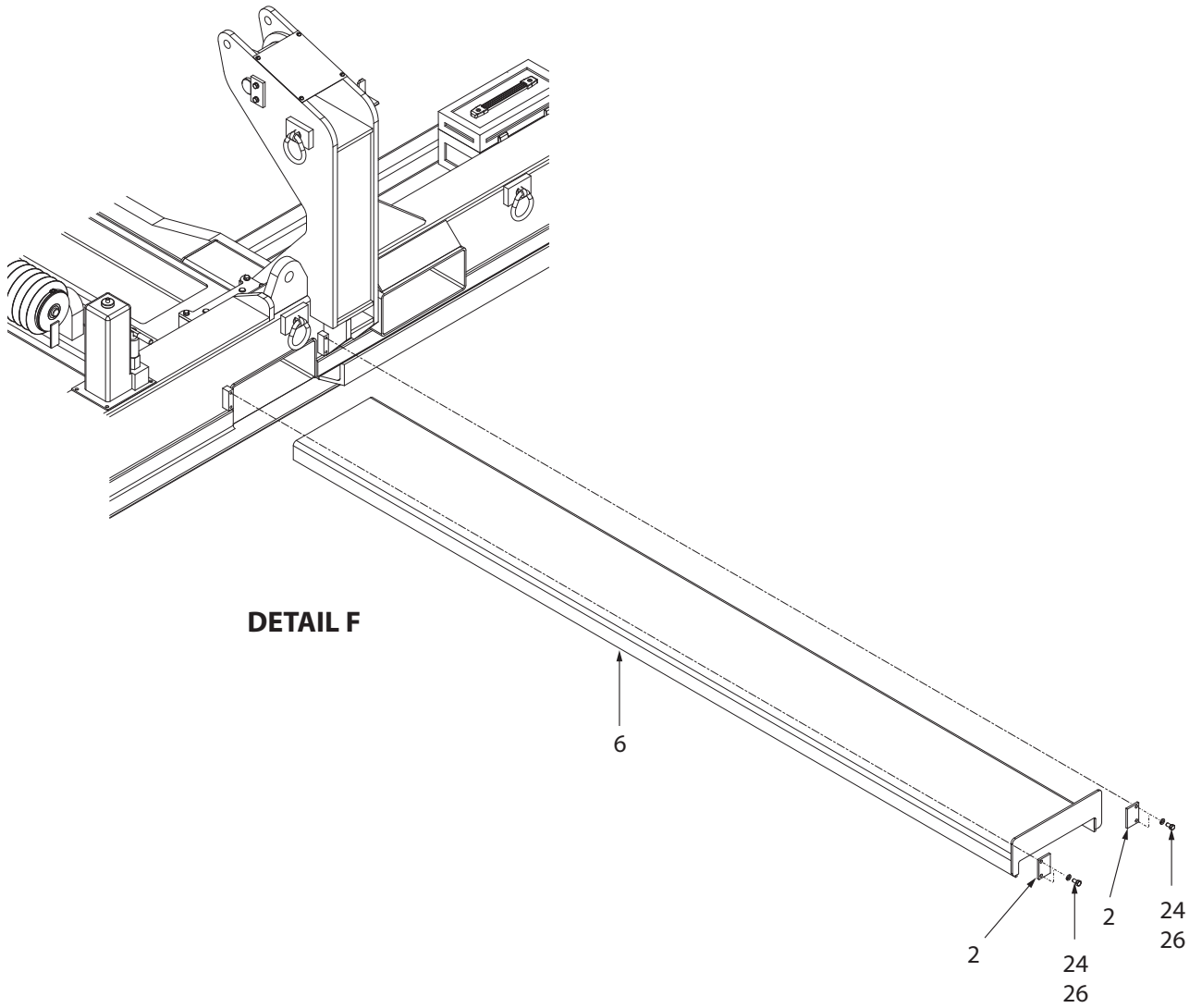
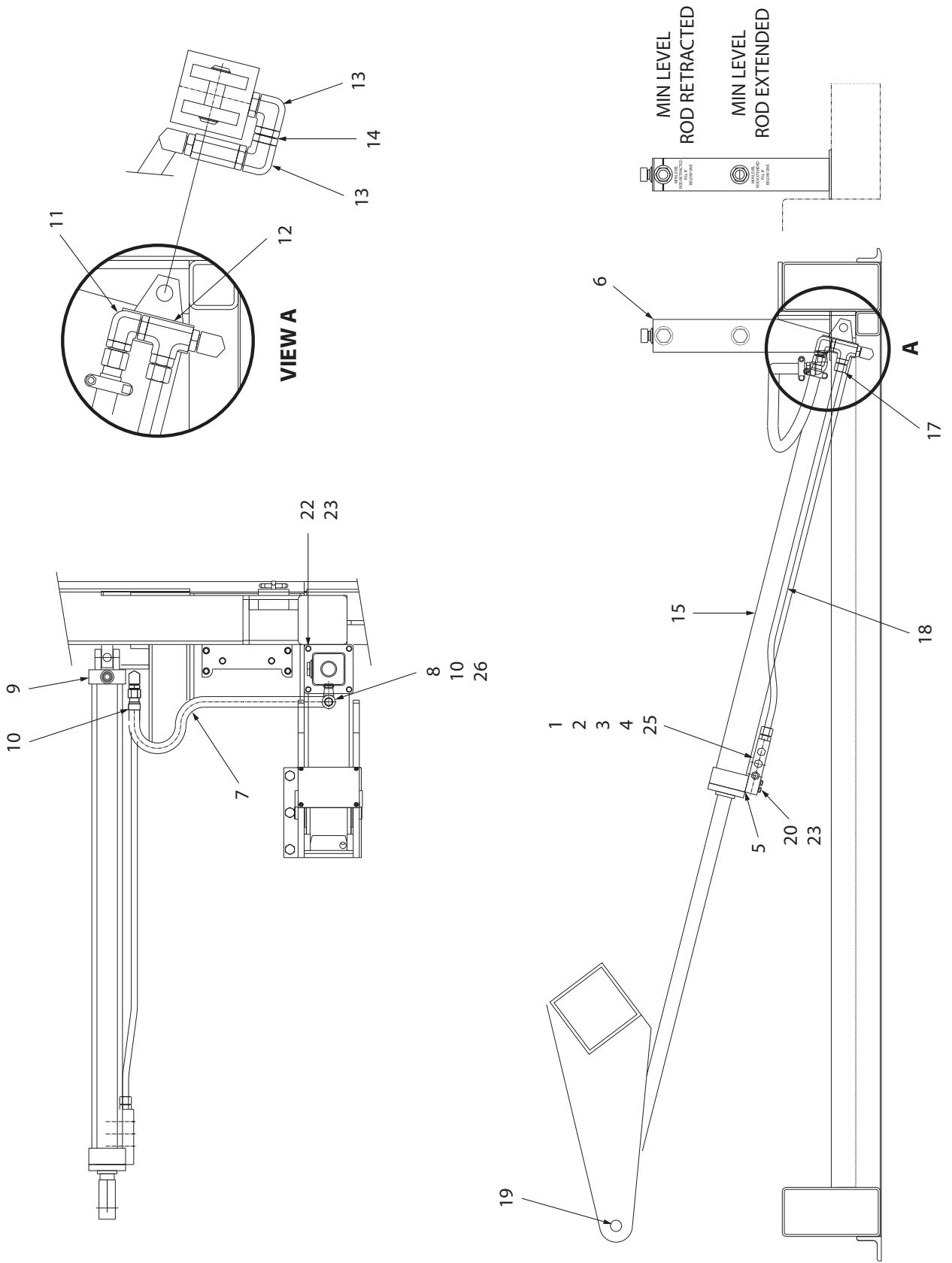


Figure 8.8-7 AGSE-E18401-S01 Base Assembly

IPB Figure 9 - AGSE-E18405-S02 Cylinder Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18405-S02	-	Cylinder Assy (Figure 8.9-1)
1	AGSE-E21521-P01	1	Valve Manifold Block
2	RDDA-CAN	1	Relief Valve - Set 3000PSI
3	FQCA-XAN	1	Flow Fuse Valve - Set .5 GPM
4	CXCD-XZN	1	Check Valve
5	2-021 NBR	1	O-Ring - Nitrile
6	AGSE-E18405-S01	1	Reservoir Assy (See IPB Figure 9A for Details)
7	881-12	1	Hose - 3/4" ID - 300 PSI Wp x 36" Lg
8	0188-12-12	1	Hose Fitting Male - 3/4" NPT
9	0688-12-12	1	Hose Fitting Female - 12 JIC 37° Swivel
10	88DB-12	2	Hose Clamp
11	12 C50X-S	1	Straight Thrd Elbow - 12SAE Male x JIC 37° Flare
12	12G5G5JG5-S	1	Straight Thread Tee - 12SAE
13	12 A0EG5-S	2	Male Elbow - 12SAE Male x 12SAE Female
14	12 F50HA0-S	1	Union - 12 SAE
15	SCD-1037	1	Cylinder Specification Drawing
16	69094	1	Knuckle - 1-1/4"-12UNF
17	12F5BU-S	2	Straight Thrd Connector - 12SAE X -12JIC
18	AGSE-E18432-P01	1	Hydraulic Tube
19	AGSE-E18401-P04	1	Connecting Pin
20	Commercial	4	HHCS - 3/8"-16UNC X 2-1/4" Lg - Gr 5 - Zinc Plt
22	Commercial	4	HHCS - 3/8"-16UNC x 1" Lg - Gr 5 - Zinc Plt
23	Commercial	8	Lock Washer - 3/8" Nom ID - Zinc Plt
25	8 P50N-S	1	Plug 8 SAE
26	3/4-CD-S	1	Street Elbow - 3/4" NPT Steel



IPB Figure 9A - AGSE-E18405-S01 Reservoir Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18405-S01	-	Reservoir Assy (Figure 8.9A-1)
1	AGSE-E18405-P01	1	Reservoir Weldment
2	HC-120-T12P-AS-B	1	Filler Breather
3	HC-SP-16	2	Oil level Sight Plug

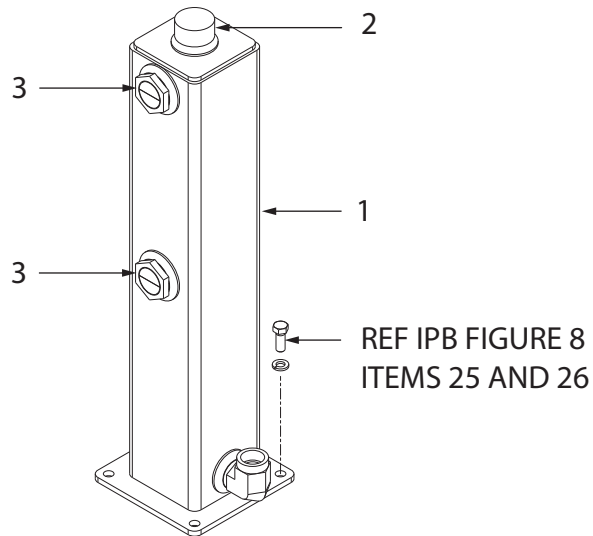


Figure 8.9A-1 AGSE-E18405-S01 Reservoir Assy

IPB Figure 10 - AGSE-E16626-S04 Cradle Jack Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E16626-S04	-	Cradle Jack Assy (Figure 8.10A-1)
1	AGSE-E16626-S02	1	Screw Support
2	AGSE-E16626-S03	1	Nut Carrier Assy
3	AGSE-E16626-P01	1	Jack Mount
4	AGSE-E16626-P02	1	Nut Carrier (Detail Part of Item 2)
5	AGSE-E16626-P03	1	Screw Support Weldment (Detail Part of Item 1)
6	AGSE-E16626-P04	1	Bellow Mount
7	AGSE-E16626-P05	1	Bearing Shaft Washer
8	AGSE-E16626-P06	2	Gear Support Angle
9	AGSE-E16626-P07	2	Nut Carrier Bushing (Detail Part of Item 2)
10	AGSE-E16626-P13	1	Bearing Shaft Washer - 1/2" Thk
11	DELETED		
12	AGSE-E16627-S01	1	Thk Large-Lead Rolled Ball Screw (Modified)
13	B2228-8	1	Bearing - Oil-Impregnated - Cylindrical Sintered Bronze - 1.753" OD - 1.378 ID x 1" Lg
14	B1624-12	1	Bearing - Oil-Impregnated - Cylindrical Sintered Bronze - 1.503" OD - 1.003" ID x 1" Lg (Detail Part of Item 1)
15	CL-550-RHS	1	Revolving Handle - Rounded Design - Threaded - Stainless (USA)
16	GR-H-842-40-H2-27	1	Style "H" 242 Single Reduction Hollow Shaft Worm Gear - 40:1 - Assembly PSTN #2 - 1.688" Bore
17	5011T35	3	316 SS Worm-Drive Hose & Tube Clamp - 2-1/2" to 5-1/2" Clamp Dia Range - 1/2" Band Width

IPB Figure 10 - AGSE-E16626-S04 Cradle Jack Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
18	5011T41	1	316 SS Worm-Drive Hose & Tube Clamp - 3-1/16" to 4" Clamp Dia Range - 1/2" Band Width
19	AGSE-E16652-S01	1	Special Nut Assy (for the Ball Screw)
20	9421T21	1	One Piece Clamp on Shaft Collar - 1-1/4" Bore, 2-1/16" OD, 1/2" Width
21	9297K16	2	Die Spring - 1/2" OD x 1-1/4" Lg
22	HGF-40	1	Grease Fitting - SS - 1/8" NPT 90°
23	MK-MF-10	1	Hydraulic Grease Fitting - Metric - M6 x 1 Thd - Straight
24	T169	2	Banded Thrust Bearing - 1.697" Bore (TTC)
24	T176	2	Banded Thrust Bearing - 1.697" Bore (TTC)
25	THK-SS-120108-A	1	Bellow - SS
26	THK-SS-120108-B	1	Bellow - SS
27	Commercial	2	HHCS - 3/8"-16UNC x 1"
28	Commercial	2	Lock Washer - 3/8"
29	Commercial	2	Flat Washer - 3/8"
30	Commercial	2	Hex Nut - 3/8"-16UNC
31	Commercial	4	HHCS - 5/8"-11UNC x 1-1/2"
32	Commercial	4	HHCS - 5/8"-11UNC x 2"
33	Commercial	10	Lock Washer - 5/8"
34	Commercial	4	SHCS - M14 x 40 mm Lg - Gr 8 - Zinc Plt
35	Commercial	4	Lock Washer - SS - M14
36	Commercial	1	3/8" Sq Key x 7-9/16" Lg - Plt Key Stock
38	Commercial	1	HHCS - 1"-8UNC x 8-1/2" Lg - Zinc Plt - Modified
39	Commercial	1	Hex Lock Nut - 1"-8UNC - Zinc Plt
40	AGSE-E16626-P10	1	Brake Plate

IPB Figure 10 - AGSE-E16626-S04 Cradle Jack Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
41	96235K7	4	Die Spring Screw Cap - 9/16"-18UNF - 1/4" Hex - 5/16" Thk
42	6391K293	1	Sleeve Bearing - 1-1/2" OD x 1" ID x 3/4" Lg
43	6525K1	1	Friction Disc - 3-3/8" OD x 1-7/8" ID
44	DELETED		
45	Commercial	2	Flat Washer - 5/8" ID
46	Commercial	2	HHCS - 5/8"-11UNC - 1-1/4" Lg
47	AGSE-E16648-P01	1	Hand Wheel/Ratchet Adapter
48	94105A614	2	Set Screw - 3/8"-16 x 3/4" Lg - Alloy
49	AGSE-E16648-P02	1	Hand Wheel
50	AGSE-E16648-P03	1	Handwheel Storage Bracket
51	98416A125	2	Retainer Pin
52	AGSE-E16650-S02	1	Air Ratchet Extension Bar Assy
54	Commercial	2	Flat Washer - 2" OD x 1" ID Nom. - Zinc Plt

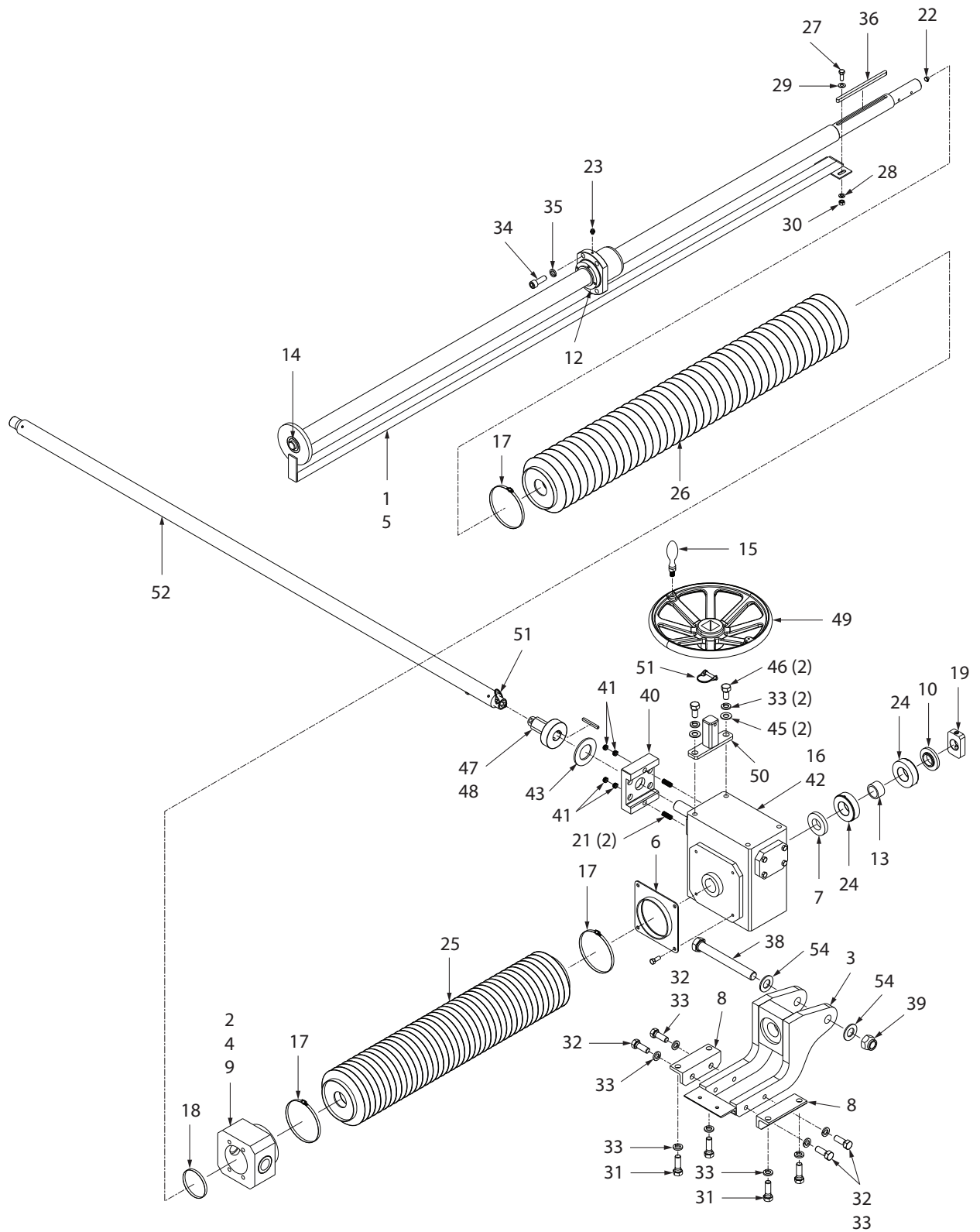


Figure 8.10-1 AGSE-E16626-S04 Cradle Jack Assembly

IPB Figure 11 - AGSE-E18402-S01

Jack Leg Hydraulic Installation - Configuration 1

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18402-S01	-	Jack Leg Hydraulic Installation (Figure 8.11-1)
1	100920	1	Pump
2	Commercial	A/R	Hyd Tube - 3/8" OD x .035" W
3	6-6CBTX-S	5	Male Connect Fitting - 3/8T x 3/8P
4	6JBTX-S	3	3/8T Union Tee Fitting
5	301-6	4	Hose - 3/8" ID x 24 Hose
6	20630-6-6	4	Hose Straight Swivel Fitting - 3/8"
7	23930-6-6	4	90° Elbow Swivel Hose Fitting
8	7115F4Y	2	1/4" NPT Ball Valve
9	6FBTX-S	4	Male Connect Fitting - 3/8T x 1/4P
10	6HBTX	2	Union Fitting - 3/8T
11	AGSE-S00208-P02	4	Hyd Cylinder - 10" Stroke
12	3225T23 SS	12	Cushioned Tube Clamp - SS
13	Commercial	12	HHCS - 1/4"-20UNC x 1" Lg
14	Commercial	4	HHCS - 3/8"-16UNC x 1" Lg
15	Commercial	4	Lock Washer - 3/8" ID
16	#3/8-FF-S	1	Hex Pipe Nipple - 3/8" NPT
17	#FOBA-LAN-GAB	1	Flow Control Valve w/Body

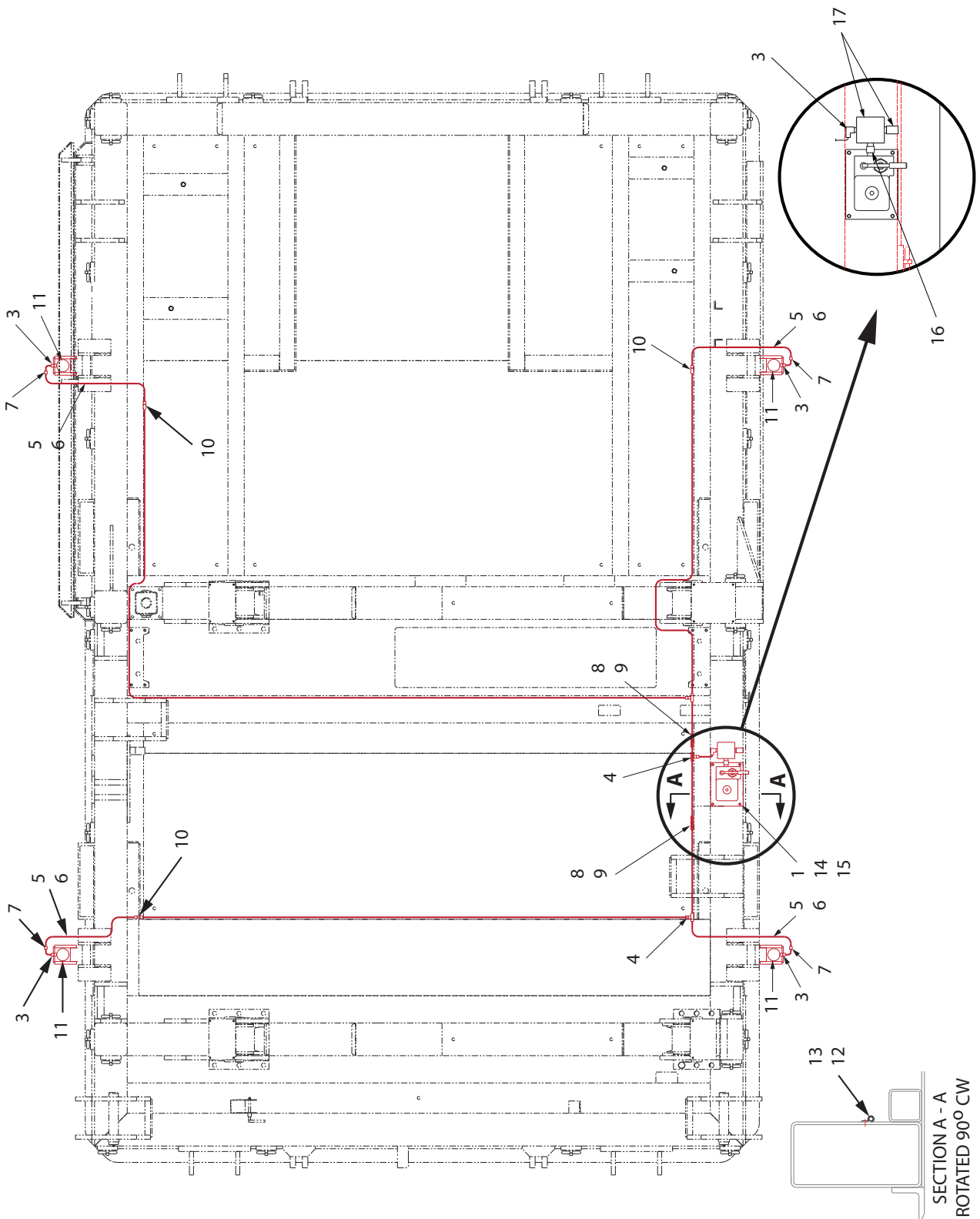


Figure 8.11-1 AGSE-E18402-S01 Jack Leg Hydraulic Installation - Configuration 1

IPB Figure 11A - AGSE-E18402-S01 Jack Leg Hydraulic Installation - Configuration 2

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18402-S01	-	Jack Leg Hydraulic Installation (Figure 8.11A-1)
1	100966	1	Pump - Modified
2	Commercial	A/R	Hyd Tube - 3/8" OD x .035" W
3	FDBA-LAN-GAB	1	Flow Control Valve w/ Body
5	6CBTX-S	1	Male Elbow
6	6FBTX-S	2	Male Connector
7	6-6FBTX-S	4	Male Connector - 3/8 x 3/8
9	23930-6-6	4	Elbow - 3/8 - 90 ⁰ - Swivel Hose Fitting
10	6-6CBTX-S	1	Elbow
11	3/8-FF-S	1	Hex Pipe Nipple - 3/8" NPT
12	10343-6-6	3	Male JIC Hose Crimp Fitting
13	6-JBTX-S	3	Tee Fitting - 3/8T
14	Commercial	4	HHCS - 3/8"-16UNC x 1" Lg
15	Commercial	4	Lock Washer - 3/8" ID
16	Commercial	12	HHCS - 1/4"-20UNC x 1" Lg
17	AGSE-S00208-P02	4	Hydraulic Cylinder - 10" Stroke
18	3225T23	40	Tube Clamp - Cushioned - SS
19	302-6	4	Hose - 3/8" ID x 30"
20	700154	1	Directional Control Valve
21	AGSE-E21522-P01	1	Valve Mounting Bracket
22	Commercial	4	SHCS - #10-24UNC x 1" Lg - SS
23	Commercial	4	Flat Washer - #10 Nom ID - SS
24	Commercial	4	Lock Washer - #10 Nom ID - SS
25	Commercial	3	FSHCS - 3/8-16UNC x 1" Lg - SS
26	Commercial	3	Flat Washer - 3/8" Nom ID - SS
27	Commercial	3	Hex Lock Nut - 3/8"-16UNC - SS
28	20630-6-6	1	Female JIC - 37 Deg. Swivel

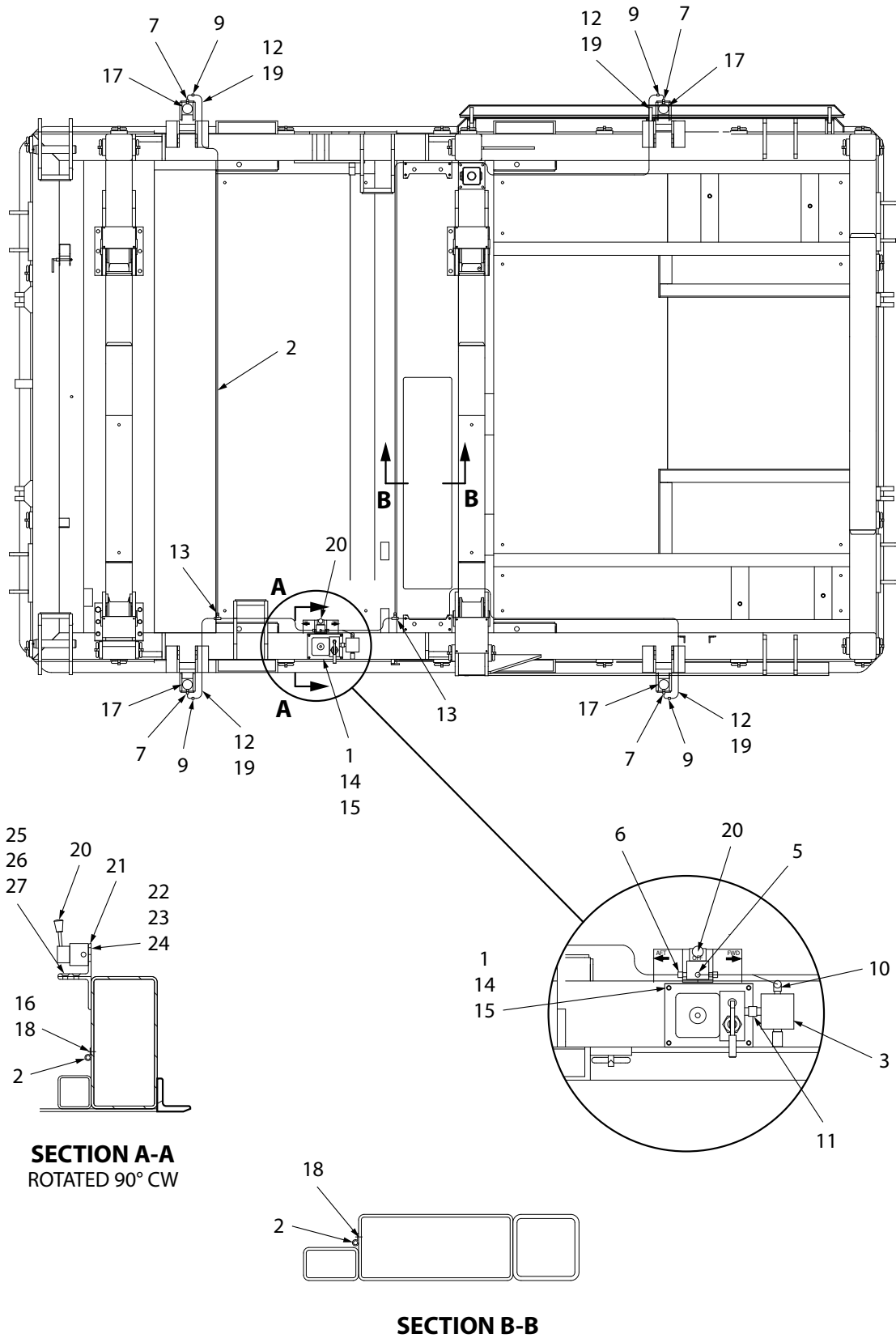


Figure 8.11-1 AGSE-E18402-S01 Jack Leg Hydraulic Installation - Configuration 2

IPB Figure 12 - AGSE-E18423-S01 Telescoping Tow Bar Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18423-S01	-	Telescoping Tow Bar Assy (Figure 8.12-1)
1	AGSE-E18423-P01	1	Inner Tube Weldment
2	AGSE-E18423-P02	1	Outer Tube Weldment
3	AM-90750-72T	1	Safety Pin - 3/4" Dia. x 4-1/2" Grip
4	AM-91000-50T	1	Safety Pin

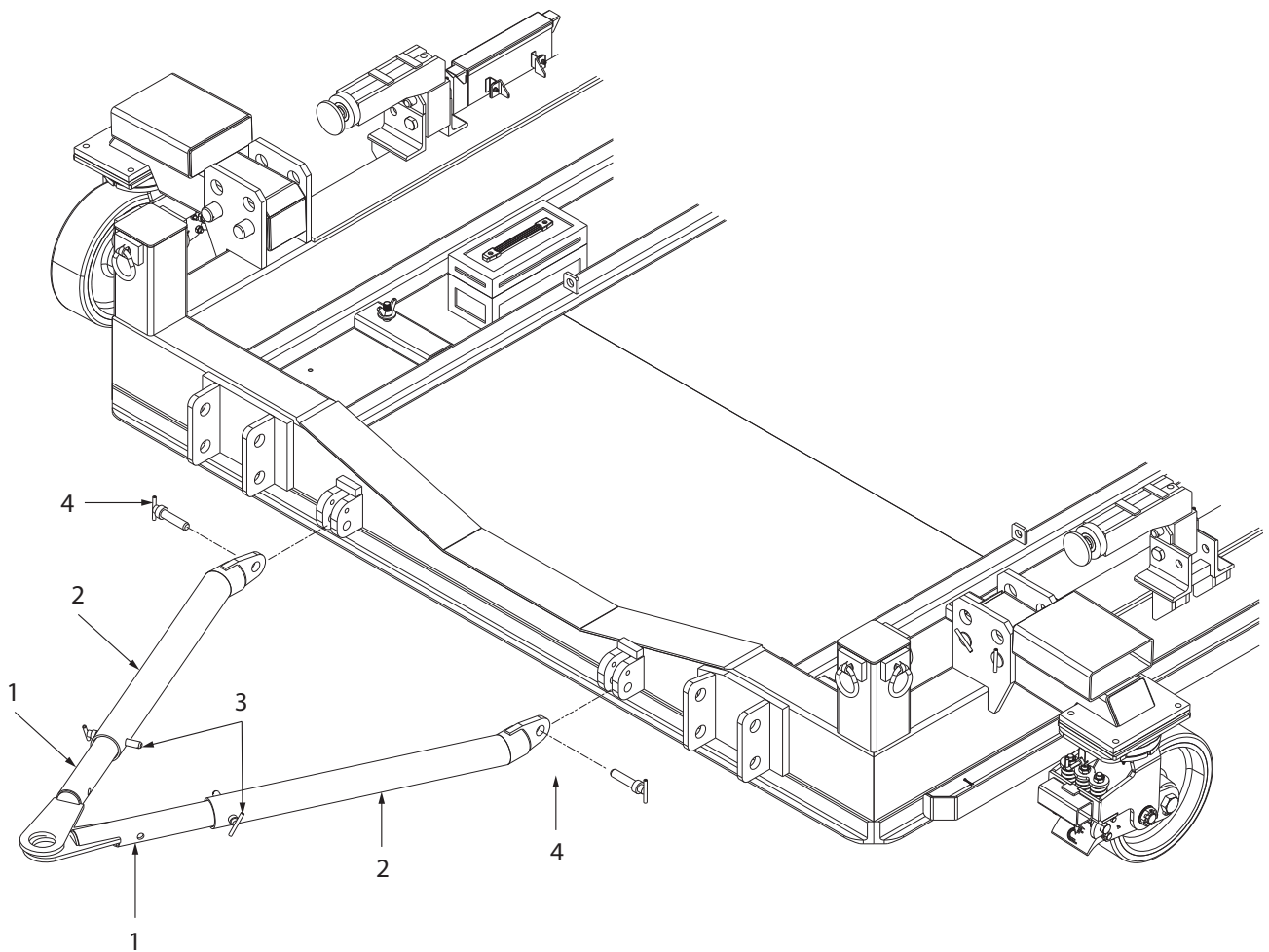


Figure 8.12-1 AGSE-E18423-S01 Telescoping Tow Bar Assemblies

IPB Figure 13 - AGSE-E18424-S01 Caster Mount Assy

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18424-S01	-	Caster Mount Assy (Figure 8.13-1)
1	AGSE-E18424-P01	1	Caster Mount
2	AGSE-E18424-P02	1	Spacer
5	Commercial	4	HHCS - 5/8"-11UNC x 3-1/2" Lg Gr 5- Zinc Plt
6	Commercial	4	HHN - 5/8"-11UNC
7	Commercial	4	SAE Flat Washer - 5/8"
8	Commercial	4	Lock Washer - 5/8"
9	AM-91750-124T	2	Safety Pin Assy
10	AM-2079-20 105-102	- 0	Caster Assy - 16" Dia. x 5" <i>Superseded by AM-2079-20 May 2022</i>
11	Commercial	2	HHCS - 5/8"-11UNC x 3" Lg - Gr 5 - Zinc Plt

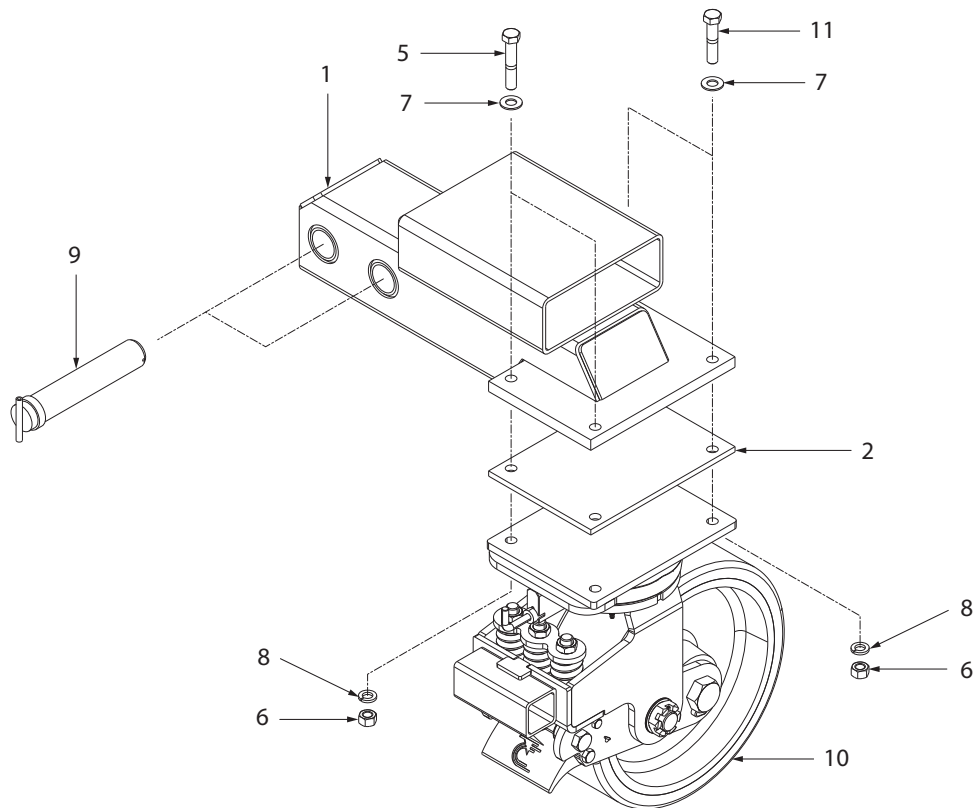


Figure 8.13-1 AGSE-E18424-S01 Caster Mount Assembly

IPB Figure 14 - AGSE-E16620-S01 Shock Mount Assy

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E16620-S01	-	Shock Mount Assy (Figure 8.14-1)
1	AGSE-E16620-P01	1	Shock Mount Base
2	AGSE-E16620-P02	1	Shock Mount Arm
3	AGSE-S00304-P03	4	Shock Mount
4	AM-91500-150T-H900	2	Safety Pin Assy
5	Commercial	16	Hex Jam Lock Nut - 1/2"-20 UNF - Zinc Plt
6	Commercial	32	Flat Washer SAE - 1/2" Nom ID - Zinc Plt
7	S00105-08F016A01	16	HHCS - 1/2"-20 UNF x 1" W/Nylon Patch - Zinc Plt

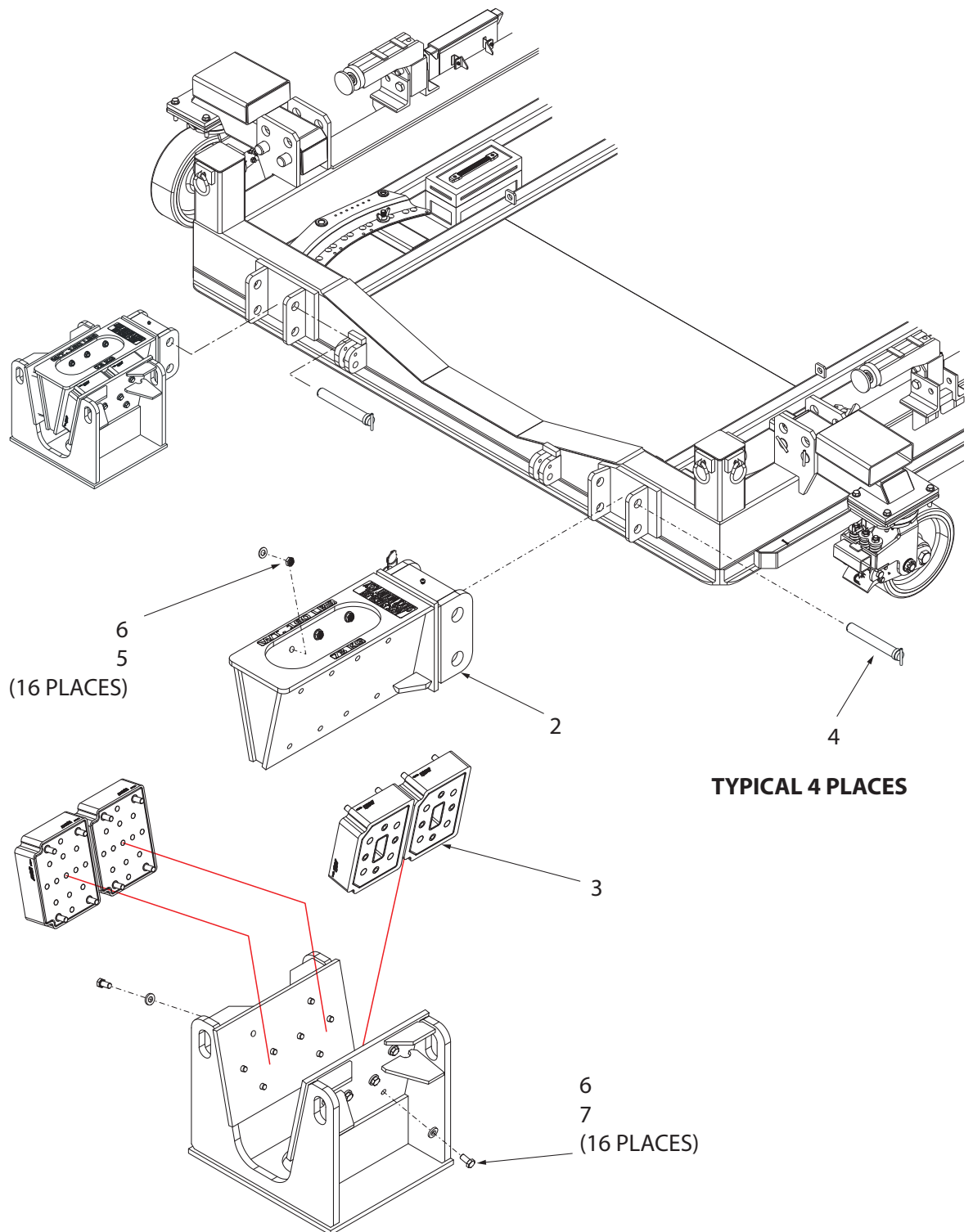


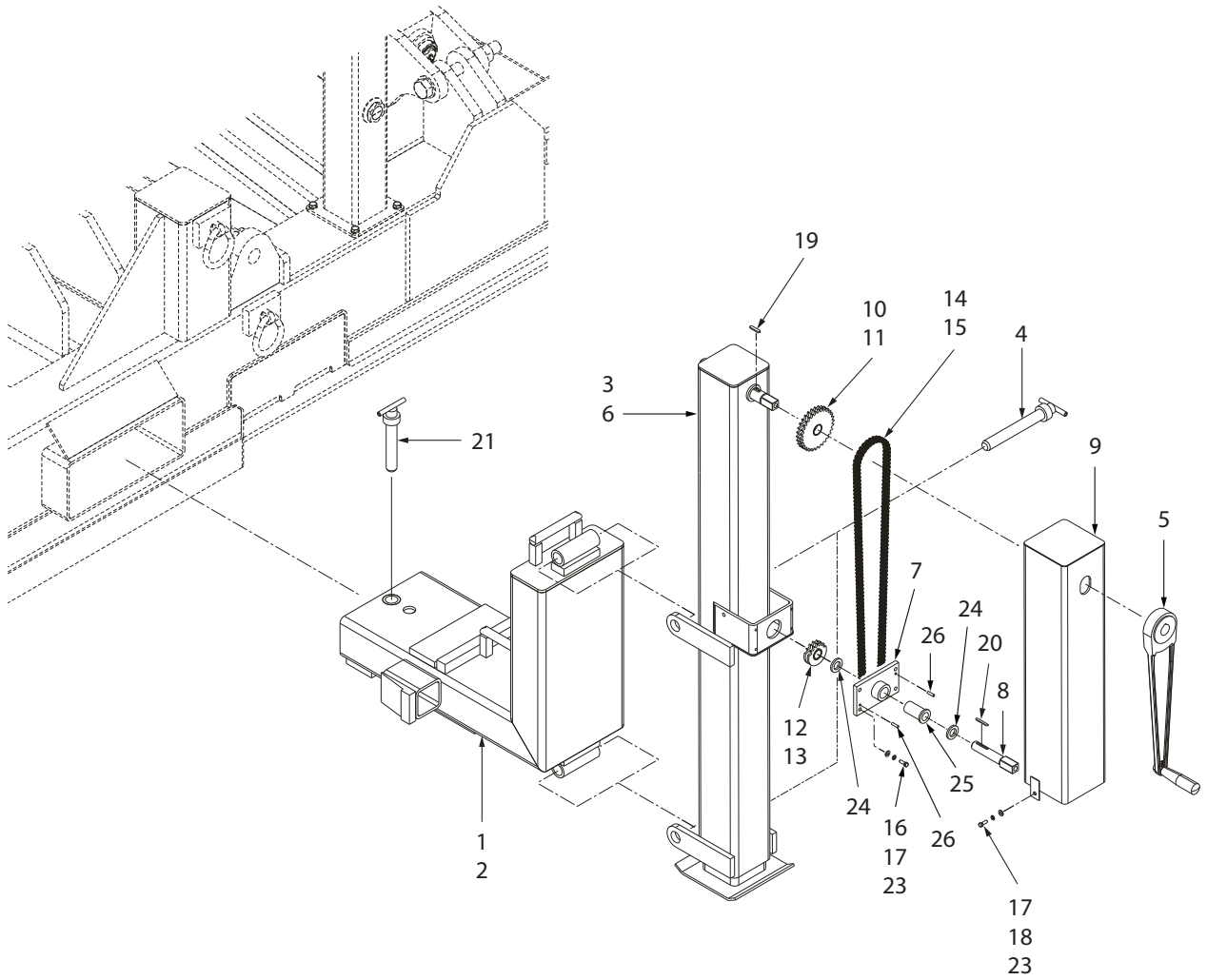
Figure 8.14-1 AGSE-E16620-S01 Shock Mount Assembly

IPB Figure 15 - AGSE-E18412 Jacking Leg Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18412-S01	-	Jacking Leg Assy - 48" Lift - LH (Figure 8.15-1)
	AGSE-E18412-S02	-	Jacking Leg Assy - 48" Lift - RH (Figure 8.15-1)
1	AGSE-E18412-P01	1	Leg Mount - LH (Used on AGSE-18412-S01)
2	AGSE-E18412-P02	1	Leg Mount - RH (Used on AGSE-18412-S02)
3	AGSE-E18412-S04	1	Jacking Leg Assembly
4	AM-91000-98T-H900	3	Safety Pin Assy
5	AGSE-E16621-S04	1	Steel Ratchet Handle Assy (Detail Part of Item 3)
6	AGSE-E18412-P03	1	Jacking Leg - Modified (Detail Part of Item 3)
7	AGSE-E16621-P03	1	Shaft Support (Detail Part of Item 3)
8	AGSE-E16621-P05	1	Sprocket Shaft (Detail Part of Item 3)
9	AGSE-E16621-P06	1	Chain Guard (Detail Part of Item 3)
10	#1610	1	Tapered Bushing - 1" Bore w/Kw (Detail Part of Item 3)
11	D35BTB35	1	Dbl Sprocket #35 - 35 Teeth (Detail Part of Item 3)
12	#1008	1	Tapered Bushing - 3/4" Bore w/ Kw (Detail Part of Item 3)
13	D35BTB19H	1	Dbl Sprocket #35 - 19 Teeth (Detail Part of Item 3)
14	6261K711	1	#35 Dbl Chain x 5 Ft Lg (Detail Part of Item 3)
15	6261K221	1	#35 Dbl Chain Connecting Link (Detail Part of Item 3)
16	Commercial	4	HHCS - 1/4"-20UNC x 3/4" Lg. - SS (Detail Part of Item 3)

IPB Figure 15 - AGSE-E18412 Jacking Leg Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
17	Commercial	8	Lock Washer - 1/4" ID - SS (Detail Part of Item 3)
18	91772A537	3	Phillips Hd Screw - 1/4"-20UNC x 1/2" Lg - SS (Detail Part of Item 3)
19	Commercial	1	Key Stock - 1/4" x 1/4" x 7/8" Lg (Detail Part of Item 3)
20	Commercial	1	Key Stock - 3/16" x 3/16" x 13/16" Lg (Detail Part of Item 3)
21	DELETED	1	Safety Pin Assy (Detail Part of Item 3)
23	Commercial	7	Flat Washer - 1/4" ID - SS
24	3088A514	2	Shim - Stl - 3/4" ID x 1-1/8" OD x 1/8" Thk (Detail Part of Item 3)
25	TB1220	1	Thrust Bearing - 3/4" ID x 1-1/4" OD x 1/8" Thk (Detail Part of Item 3)
26	Commercial	2	Roll Pin - 3/16" Dia. - 1/2" Lg. - SS (Detail Part of Item 3)



**TYPICAL INSTALLATION
(4 PLACES)**

Figure 8.15-1 AGSE-E18412 Jacking Leg Assembly

IPB Figure 16 - AGSE-C108-S01 Shock Mount Storage Assembly (Optional)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-C108-S01	-	Shock Mount Storage Assy (Figure 8.16-1)
1	AGSE-C10801-P01	1	Pallet Frame Weldment
2	AGSE-C10802-P01	2	Restraint
3	AGSE-C10802-P02	4	Spacer 1" OD x 3/16" W x 1-3/4" Lg - 304 SS
4	AGSE-C10803-S01	1	Storage Box Assy (See IPB Figure 17 for Details)
5	AGSE-C10810-P01	1	Upper Frame Weldment
6	AM-90500-48L	4	Safety Pin - 1/2" Dia. x 3" Grip
7	AGSE-E16620-S01	4	Shock Mount Assy (Reference)
8	2434K26	4	Rod Eye 1/2-13UNC x 6" LG - SS
9	9575T52 4 FT LONG	4	Frame Tie Down Strap
10	4384K4	4	Knob - .5-13 Thru 4 Lobe - SS
11	97245A422	4	Clevis Pin - 1/2" Dia. x 1-17/64" Grip
12	Commercial	4	Flat Washer - 1/2" Dia. - SS
13	98401A476	4	Cotter Pin - 1/8" x 1" Lg - SS

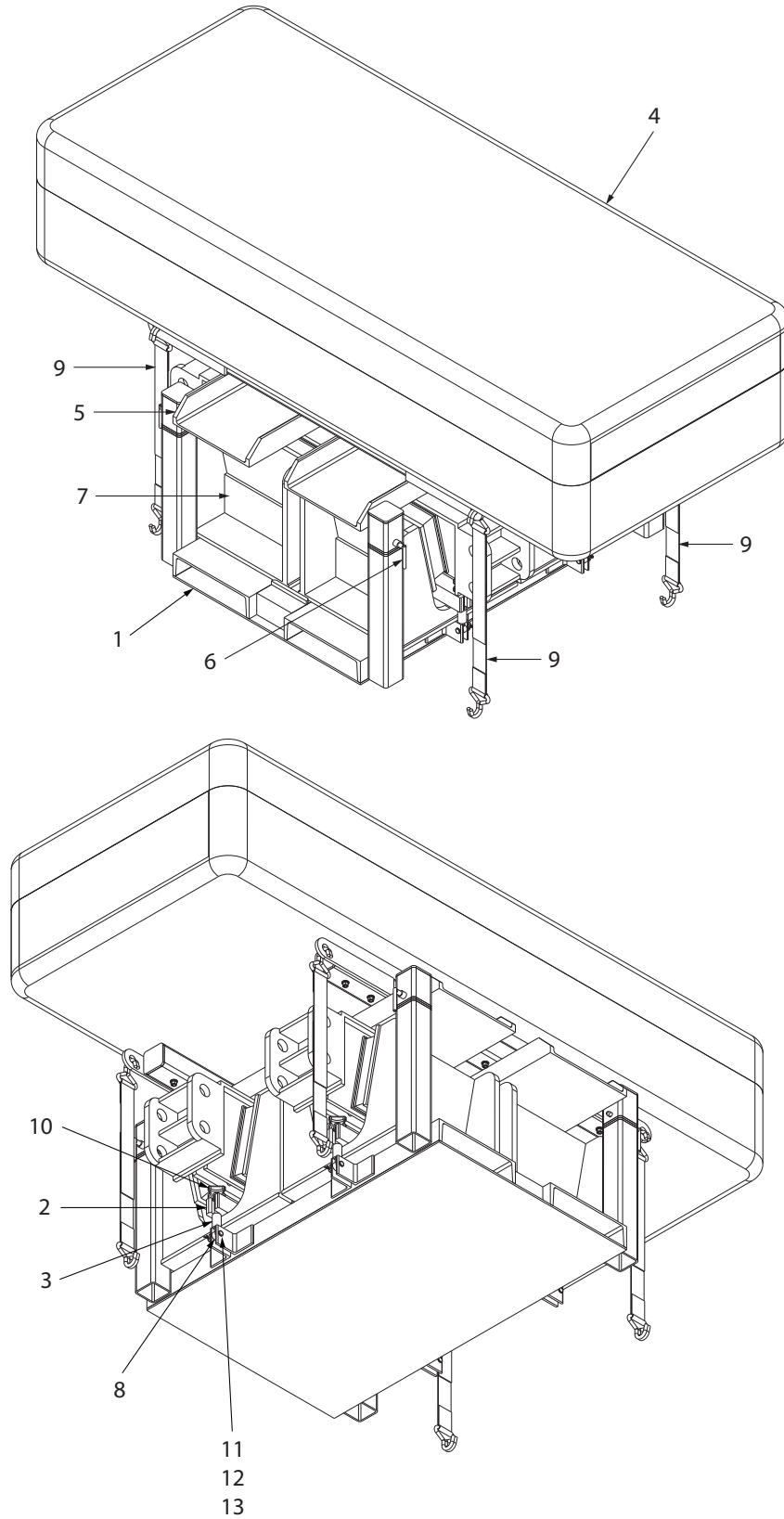


Figure 8.16-1

IPB Figure 17 - AGSE-C10803-S01 Storage Box Assembly (Optional)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-C10803-S01	-	Storage Box Assy (Figure 8.17-1)
1	AGSE-C10803-P01	1	Storage Box
2	AGSE-C10803-P02	4	Mount Plate - 1/4 x 2-1/4 x 6 6061-T6 Alum
3	AGSE-C10803-P03	3	Foam Rubber - 1" x 81-7/8" x 19-3/8"
4	AGSE-C10803-P04	1	Foam Rubber - 1" x 81-7/8" x 19-3/8"
5	AGSE-C10803-P05	1	Foam Rubber - 1" x 8" x 15"
6	DELETED		
7	AGSE-C10804-P02	1	Foam Rubber - 5" x 31-7/8" x 46-3/4"
8	AGSE-C10805-P01	1	Foam Pad - 7-3/4" x 16-7/8" x 19"
9	DELETED		
10	AGSE-C10807-P01	1	Foam Rubber - 7-7/8" x 11" x 13"
11	AGSE-C10808-P01	1	Base Plate
12	Commercial	8	HHB - 3/8"-16UNC x 1-3/4" Lg - Zinc Plt
13	Commercial	8	Lock Washer - 3/8" ID - Zinc Plt
14	Commercial	16	Flat Washer - 3/8" ID - Zinc Plt
15	Commercial	8	Hex Nut - 3/8"-16UNC
20	C10804-P03	2	Polyethylene Foam Rubber 1" x 2" x 12"

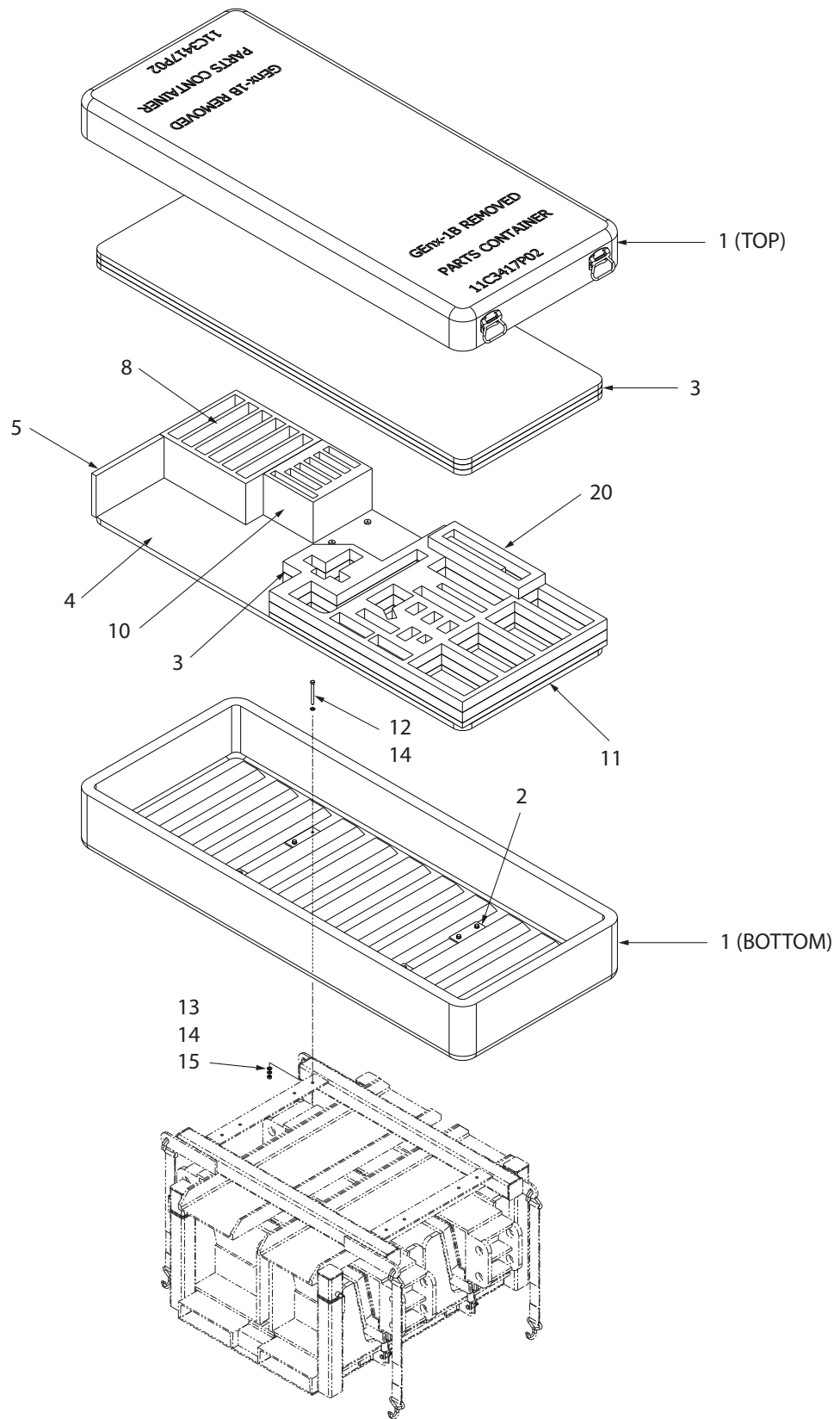


Figure 8.17-1

9.0 – Stencils, Decals, and Placards

9.1 General

Various stencils, decals, and placards are added to the equipment to provide warnings, cautions, and general information. These items should be reviewed and understood by maintenance and user personnel.

9.2 Stencils and Placards

ITEM	PART NUMBER	QTY	PART DESCRIPTION
1	AGSE-E18430-S01	1	Stencil Kit - AGSE-E184-G02 Base & Cradle
2	AGSE-E18430-S02	1	Stencil Kit - AGSE-E16650-S02 Air Ratchet Extension
3	AGSE-E18430-S03	2	Stencil Kit - AGSE-E10710-P03 Steering Bar
4	AGSE-E18430-S04	2	Stencil Kit - AGSE-E18423-S01 Tow Bar Assy
5	AGSE-E18430-S05	1	Stencil Kit - AGSE-E21523-S01 Pump Handle
6	AGSE-E18430-S06	4	Stencil Kit - AGSE-E18424-S01 Caster Mount Assy

10.0 – Recommended Spares

10.1 Critical Items

AGSE defines “critical” items as those items, if broken or missing, that would render the equipment inoperable or severely impair equipment operation. Since most of these items are also long leads, it is AGSE’s recommendation that such items be identified, purchased, and stocked by the customer. In the remote event of “critical” item failure, the equipment can be quickly repaired and placed back in service with minimal down time.

AGSE does not typically stock all components used with the equipment, so immediate shipment of “critical” items may not always be possible. AGSE will respond to customer requests for quotation on any spare parts, and expedite orders for spare parts as required. The customer should never assume immediate delivery is always possible.

It is the responsibility of the operator of the equipment to review the recommended spares list and balance costs against equipment down-time. The list can be adjusted by the operator based on the actual service life of components experienced during equipment usage.

PART NUMBER	QTY	PART DESCRIPTION
AGSE-S00304-P03	16	SHOCK MOUNT
AM-2079-20	4	CASTER ASSEMBLY 16” DIA x 5”
AM-91750-124T	2	SAFETY PIN ASSEMBLY
AM-91500-150T-H900	2	SAFETY PIN ASSEMBLY
PMP-10111	16	TIE-DOWN RING (10000 LBS CAP)
AGSE-E10710-P03	2	CASTER STEERING BAR
AM-91000-120T	4	SAFETY PIN
AGSE-E18401-P03	2	RETAINER PIN 13/8” DIA x 5/8” GRIP
811	4	COMPRESSION SPRING, 1.375” OD x 4.5” LG
AGSE-E10709-P03	8	PIVOT PIN
AM-91000-74L	4	SAFETY PIN 1” DIA x 4 5/8” GRIP NO COLLAR
AGSE-E21523-S01	1	PUMP HANDLE & SAFETY PIN ASSY
AGSE-E18407-P04	2	PIVOT PIN
AM-90750-48T	4	SAFETY PIN
CL-8-BLPT-4.0	1	T-HANDLE BALL LOCK PIN