AGSE-E215-DLH-G01

GEnx-2B Air-Freight Roll-Over Stand

For Air Transport in B747 Freighter

ORIGINAL MANUAL DATED 11/01/2011

LATEST MANUAL REVISION LEVEL . . . . . 10/11/2023 (REV U)

ADVANCED GROUND SYSTEMS ENGINEERING LLC
10805 Painter Ave., Santa Fe Springs, CA, 90670 • PHONE: 562-906-9300 • FAX: 562-906-9308 • E-MAIL: agse@agsecorp.com

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1.0 – Revisions

PAGE	REV	DESCRIPTION OF CHANGE	DATE
8.1	U	Removed Item 61 & 62	10/11/23
8.1	U	Updated Item 63-71 Part Number	10/11/23
8.5	U	Updated Item 7,8,9, 11, 12, 13, 17, & 18 Part Number	10/11/23
8.6	U	Updated Item 27, 33 & 34 Part Number	10/11/23
8.8	U	Updated Item 10-16, 19, 20 & 21	10/11/23
8.11	U	Updated Item 5, 9 & 10 Part Number	10/11/23
8.11	U	Removed Item 11	10/11/23
8.12	U	Updated Figure 8.4-1	10/11/23
8.13	U	Updated Item 5 & 8 Part Number	10/11/23
8.15	U	Updated Item 2 & 3 Part Number	10/11/23
8.16	U	Updated Item 9-14 Part Number	10/11/23
8.16	U	Updated Figure 8.7-1	10/11/23
8.17	U	Updated Item 5, 6 & 7 Part Number	10/11/23
8.19	U	Updated Item 5, 6 & 7 Part Number	10/11/23
8.19	U	Removed Item 9	10/11/23
8.21	U	Updated Item 12-16 Part Number	10/11/23
8.24	U	Removed Item 11	10/11/23
8.24	U	Updated Item 16 & 17 Part Number	10/11/23
8.25	U	Updated Item 18,19, 21, 25-35, 38 & 39 Part Number	10/11/23
8.26	U	Removed Item 44	10/11/23
8.26	U	Updated Item 45, 46, 48, 51, 54	10/11/23
8.28	U	Updated Item 4, 10, 20, 21, 22, 23 & 24 Part Number	10/11/23
8.30	U	Updated Item 2 & 3 Part Number	10/11/23
8.32	U	Updated IPB 15	10/11/23
8.33	U	Updated Figure 8.15-1	10/11/23
8.34	U	Updated Item 5 & 13 Part Number	10/11/23
8.38	U	Updated Item 13, 20, 21, 25, & 26 Part Number	10/11/23
8.38	U	Updated Item 17, 18 & 24	10/11/23
8.40	U	Updated Item 14, 15 & 16	10/11/23
8.40	U	Updated Item 5, 6, 7, 8, 10, 11, 12, 13, & 17 Part Number	10/11/23

2.0 Illustrations (For Reference Only)

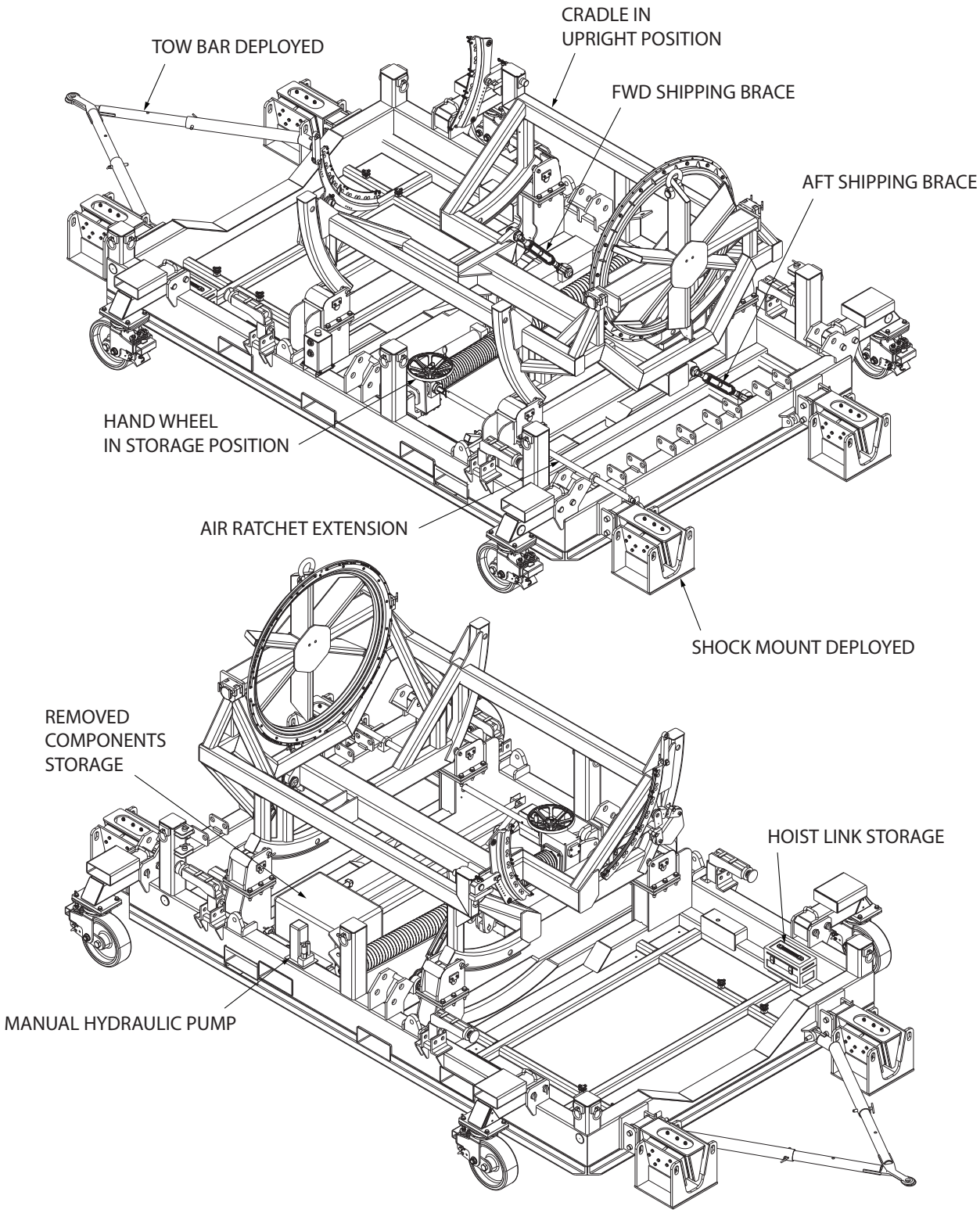


Figure 2.0-1 - AGSE-E215-DLH-G01 Ship Stand - Cradle in Upright Position

2.0 Illustrations (Continued)

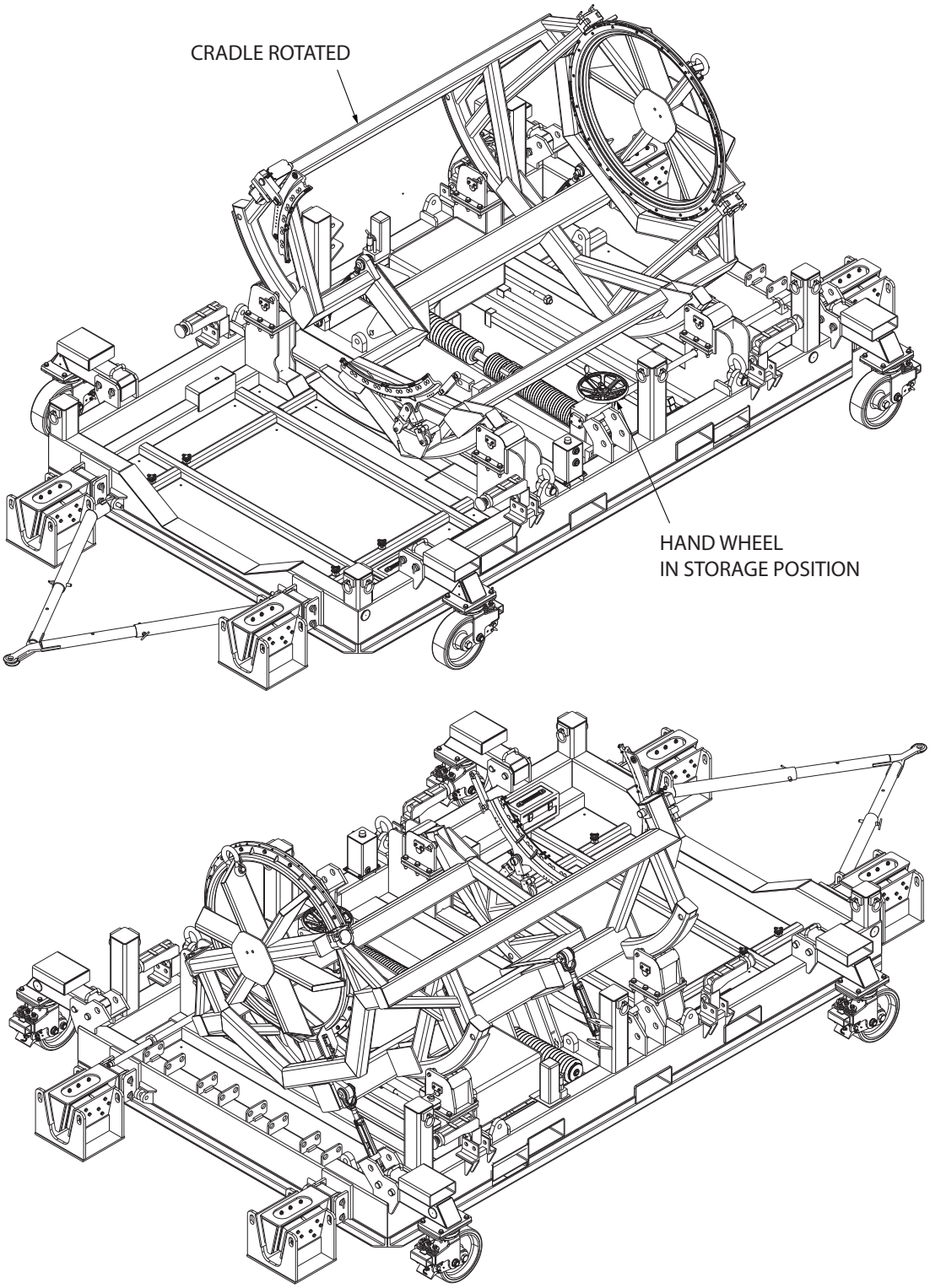


Figure 2.0-2 - AGSE-E215-DLH-G01 Ship Stand - Cradle Rotated

2.0 Illustrations (Continued)

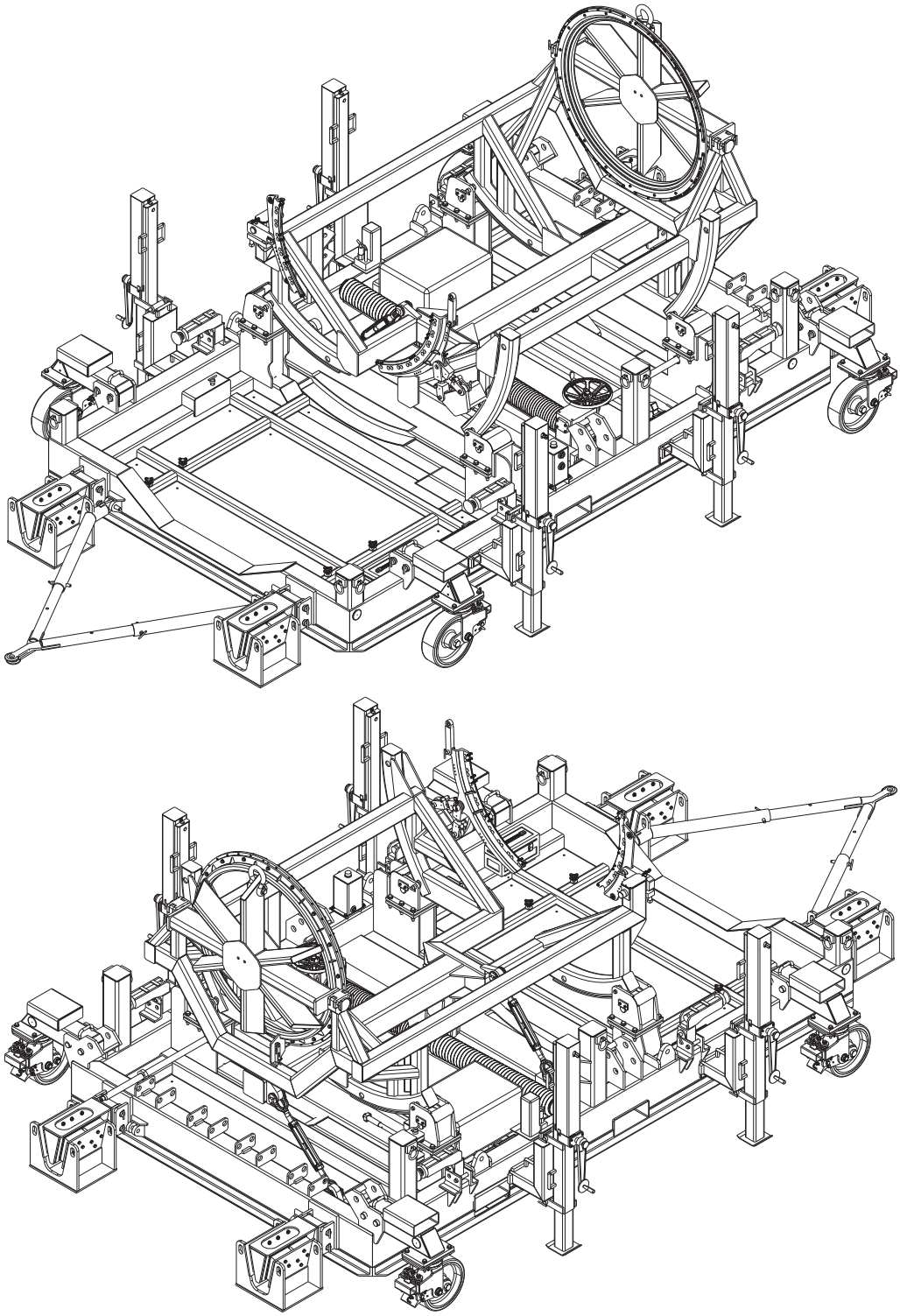


Figure 2.0-3 AGSE-E215-DLH-G01 Ship Stand with Optional Jacking Legs

2.0 Illustrations (Continued)

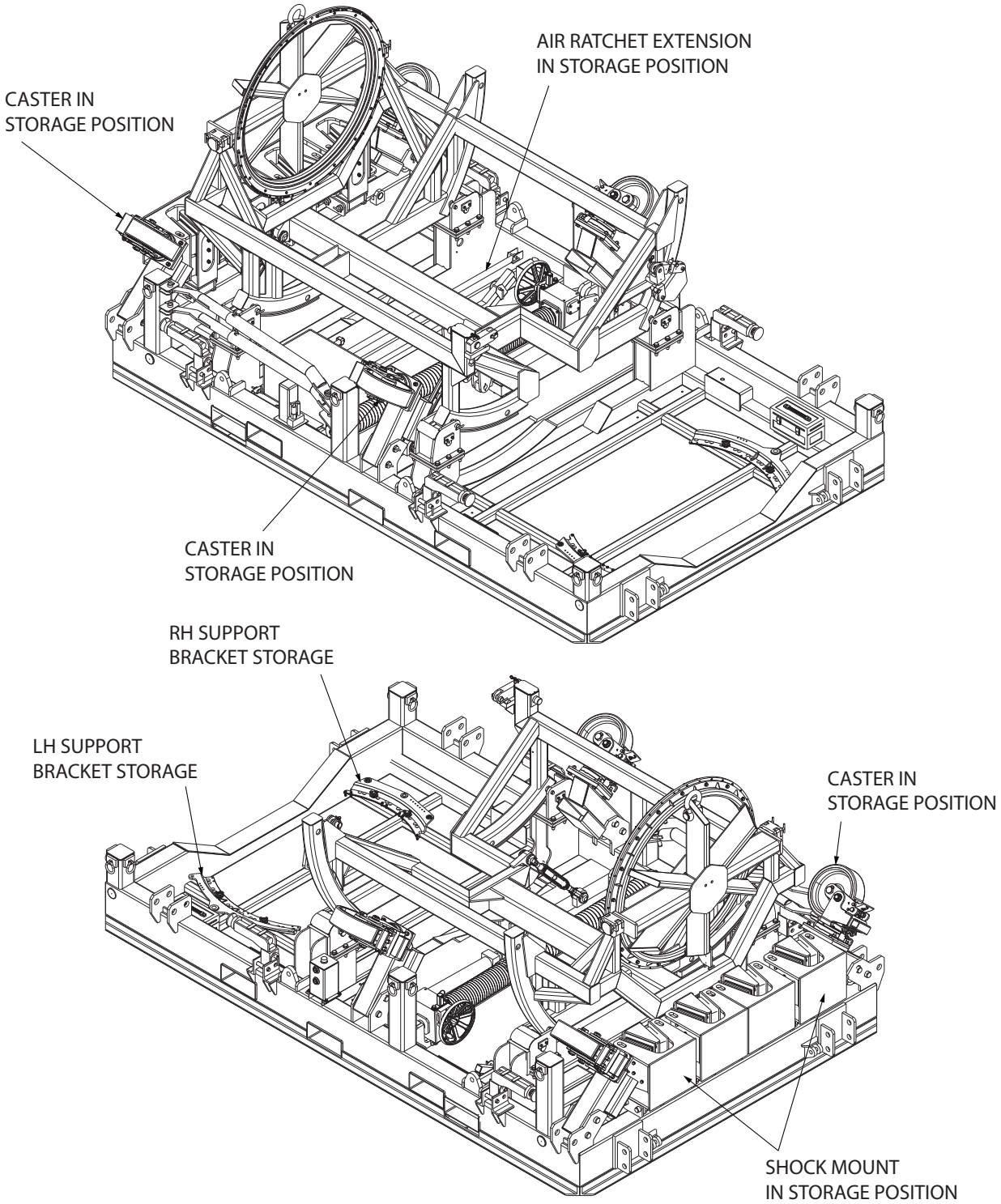


Figure 2.0-4 AGSE-E215-DLH-G01 Ship Stand with Accessories Stowed

3.0 – Specification

3.1 General

The AGSE-E215-DLH-G01 Basic Rollover Stand is specifically designed to be compliant with the General Electric Statement of Work 11C4319P01 - Rev C - 12 May 2009, in a height restricted air or truck/trailer shipping mode. The stand (with engine) is suitable for air transport on the main deck of B747 or B777 Freighter Aircraft only in axial orientation and must be secured to aircraft floor with straps in accordance with the Weights and Balance Manual. The stand includes a self-contained manual jackscrew for rotating the cradle and engine 32° CCW (ALF) to achieve the minimum height and width to pass through the large side cargo door.

3.2 Mobility

The stand may be forklifted from either side when empty, or with engine in the raised or lowered position. Stand with engine must be moved only by sling and/or shock absorbing forklift truck or pallet dolly-loader. Stand with engine is not to be moved if/when the engine/cradle is not secured by pins and shipping braces. (See Section 5.5 for complete instructions.)

WARNING

The stand with engine MUST NEVER BE MOVED without securing the cradle with safety 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. Proof load at 2x load is performed on all hoist points on every unit.

3.3.1 Base

Base features include: Fork lift access from right or left side and multiple tie-down rings for securing empty stand to truck and stand with engine to aircraft floor. Features also include sockets for jacking legs and brackets for installing casters, tow bar and shock mounts.

CAUTION

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

3.3.2 Cradle

Unit is capable of rotating the cradle a total of 32° CCW (ALF), which lowers the engine centerline a total of 10” 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 - Basic

	Without Engine	**With Engine**
Width*	125	128.5
Height (In.)	105	135.5 - Raised 120.5 - Rolled
Total Weight (Lbs)**	14,000	26,500
Length (Base only)	196	196

* No Casters - Add 4” with casters

** With Casters and Shock Mounts - Jacking Legs weight not included

3.6 Dimensions - With Shock Mounts

Width 125” (100” at shock mount bases)

Length 196” + 42” = 238”

3.7 Accessories

3.7.1 Caster and Tow Bar Kit (Figure 3.7-1)

Weight: Caster: 350 Lbs. each Weight: Tow Bar: 55 Lbs each.

Weight: Steering Bars (2): 21 Lbs. each

Description: The caster and tow bar set includes four (4) casters, two (2) caster steering bars and two (2) telescoping tow bars. Each caster has a 16” diameter wheel, face brake, 4 position swivel lock. The tow bar attaches to the AFT end of the stand.

This caster set has capacity to allow a stand and full engine, including inlet cowling to be locally towed, up to 3 MPH.

NOTE

The stand needs to be lifted up either with a forklift, the hydraulic jacking legs or optional jacking leg set for caster installation.

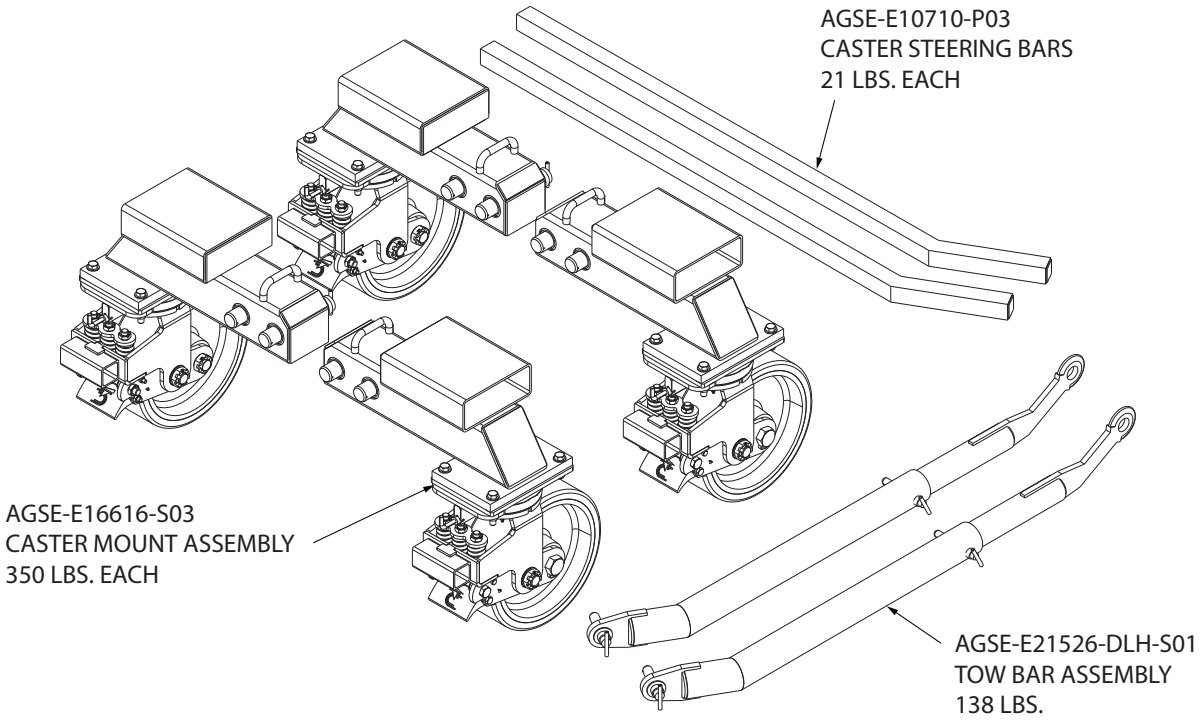


Figure 3.7-1 Casters, Caster Steering Bars and Tow Bars

3.7.2 Optional Jacking Leg Kit (Figure 3.7-2)

Weight: 260 Lbs. each Jacking Leg (150 Lbs.) and Adapter (110 Lbs.)

Description: The AGSE-E21521-DLH-S07 Jacking Leg Kit includes four (4) individual jacking leg assemblies with the capacity to lift a stand with complete engine including inlet cowl and plug-in adapters. This allows for the stand to be placed on, or removed from, a pallet loader or dolly. It also allows the stand to be lifted for the caster set (or jacking leg set) to be attached or removed. Each leg incorporates a self-contained, hand-powered jack with a 48" Stroke and a 7" x 7" foot pad. See Section 5.8 for Usage and Operation procedures.

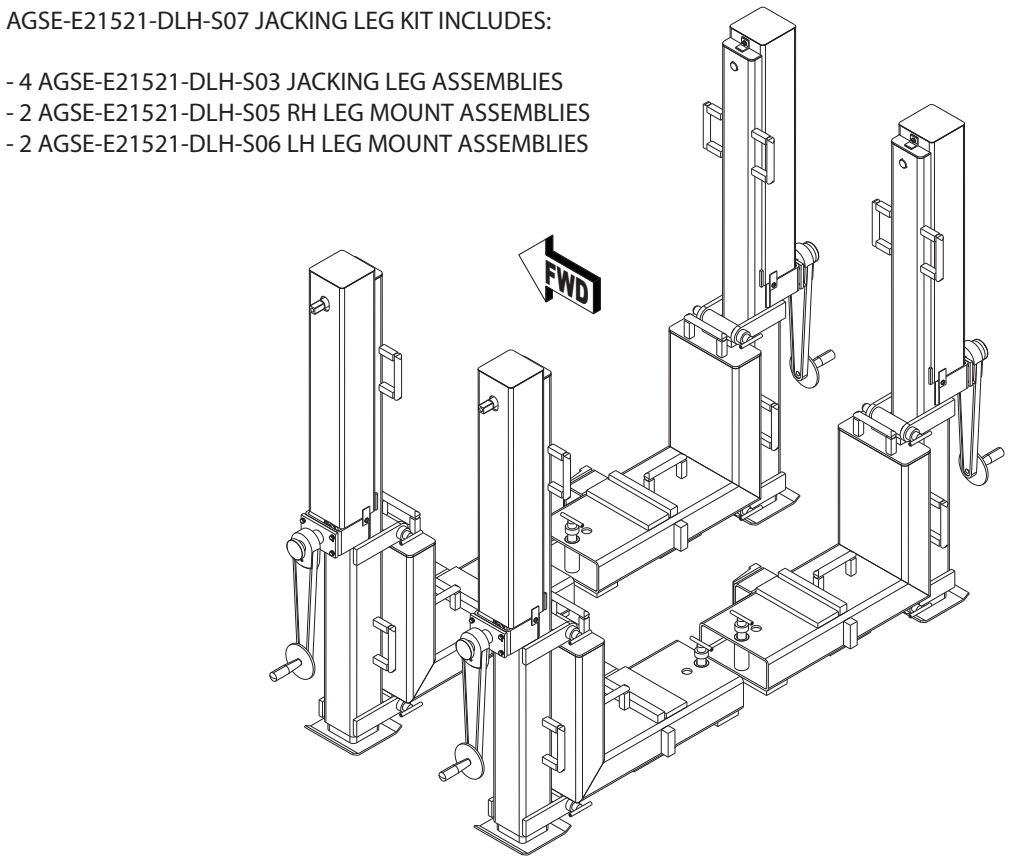


Figure 3.7-2 Optional AGSE-E21521-S07 Jacking Leg Kit

3.7.3 Shock Mount Kit (Figure 3.7-3)

Weight: 150 Lbs. each (estimated)

Description: The Shock Mount Kit includes four (4) individual pin-on shock mounts and is designed to protect the engine during transportation. The mounts attach to the stand frane base using pins for quick and easy installation and removal.

NOTE

The stand needs to be lifted up either with a forklift, hydraulic jacking legs or optional jacking leg set for shock mount installation. (Figure 3.7-3A)

Each mount assembly contains four (4) elastomer shock absorbing shock pads tuned to a frequency 7~10 Hz to protect the engine from damage during road transportation.

CAUTION

The engine MUST be shipped by truck with a trailer equipped with an "air-ride" type suspension system only.

Correct tie-down instructions for shipping stand with engine installed are provided on placards installed on each corner of the base assembly. (Figure 3.7-3B)

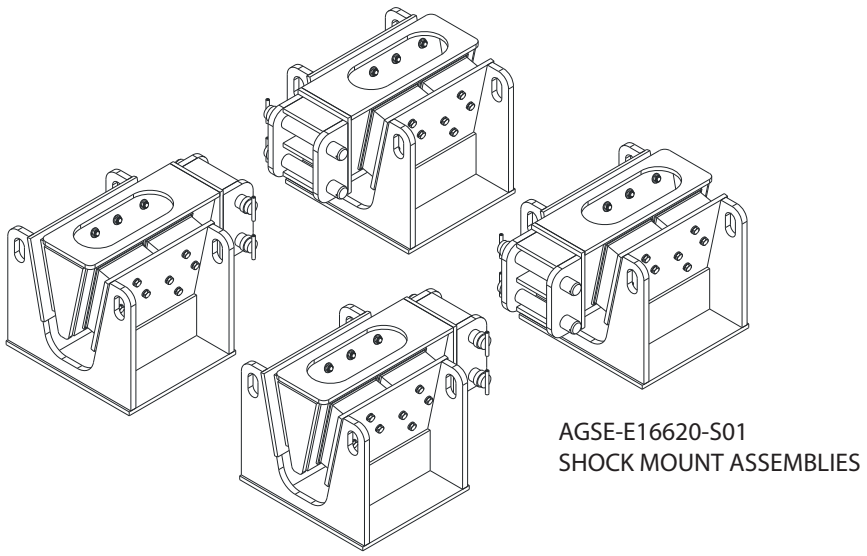


Figure 3.7-3 Shock Mount Assembly

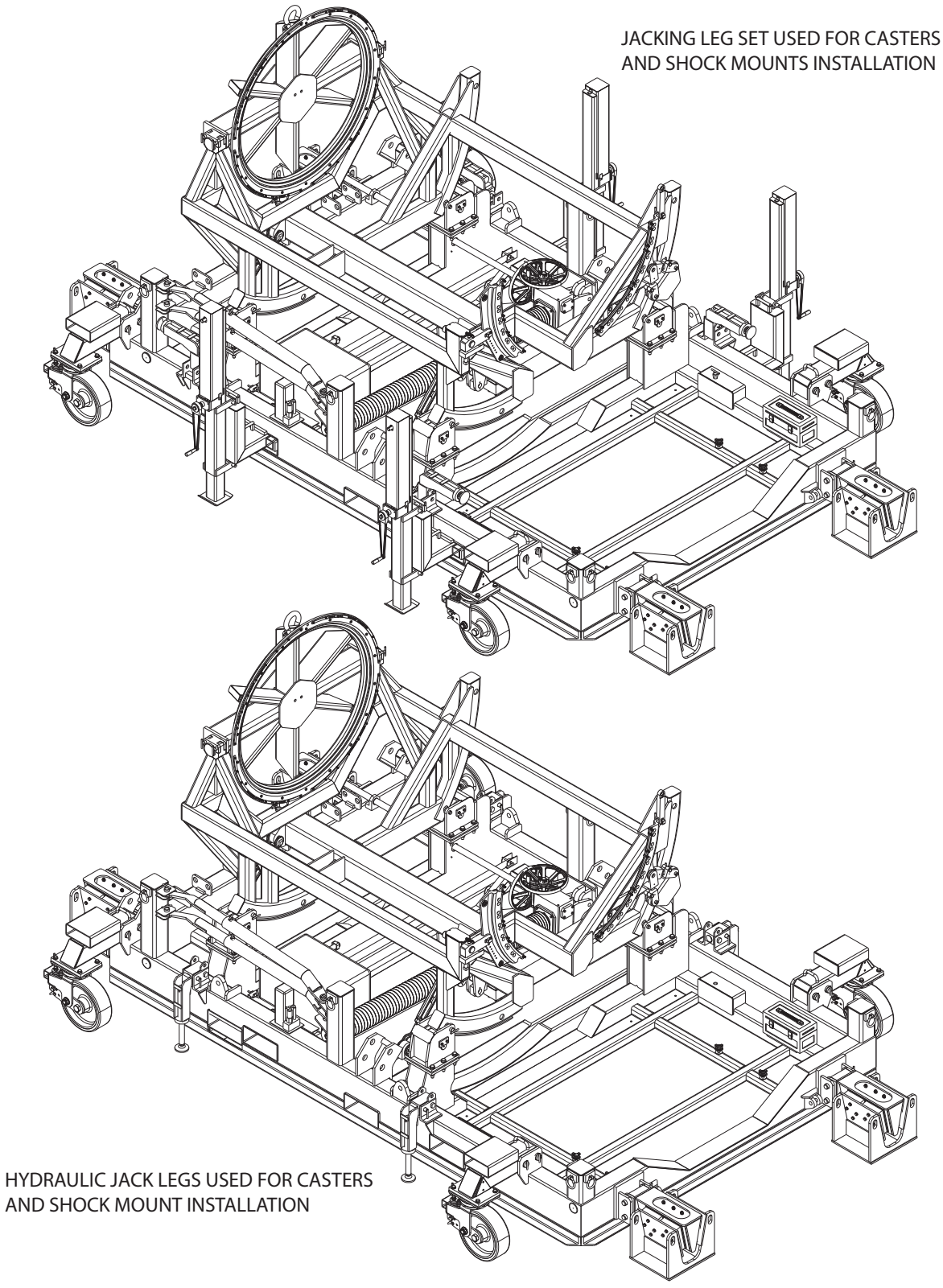
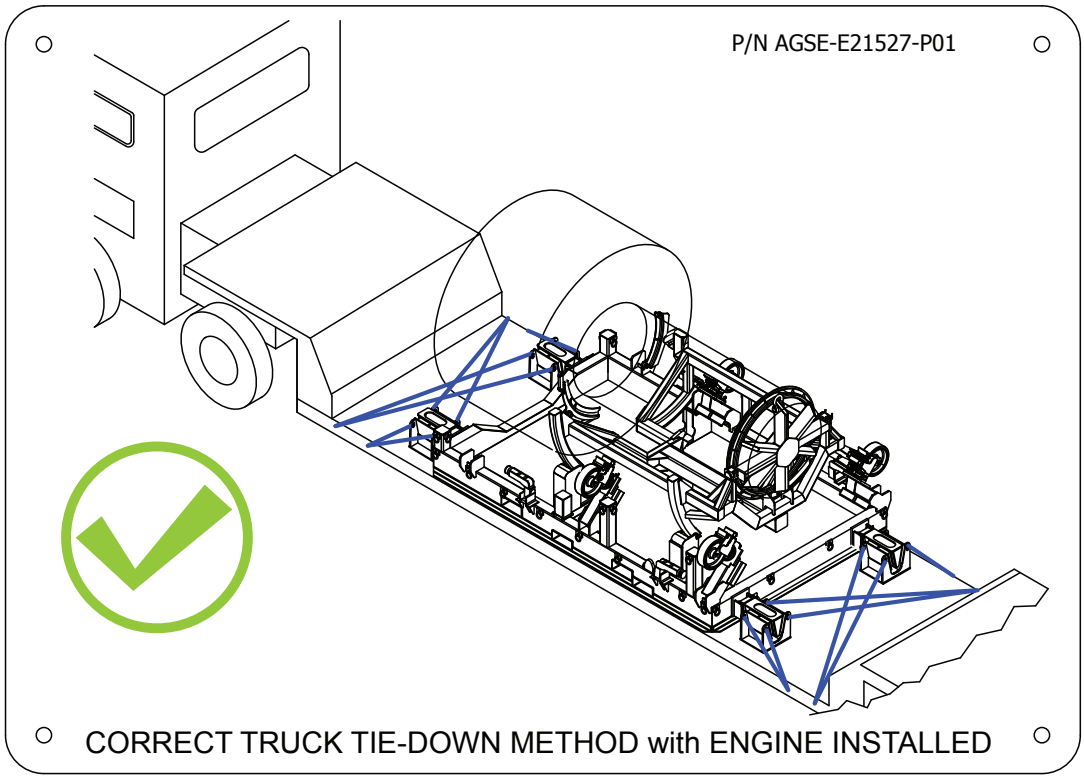
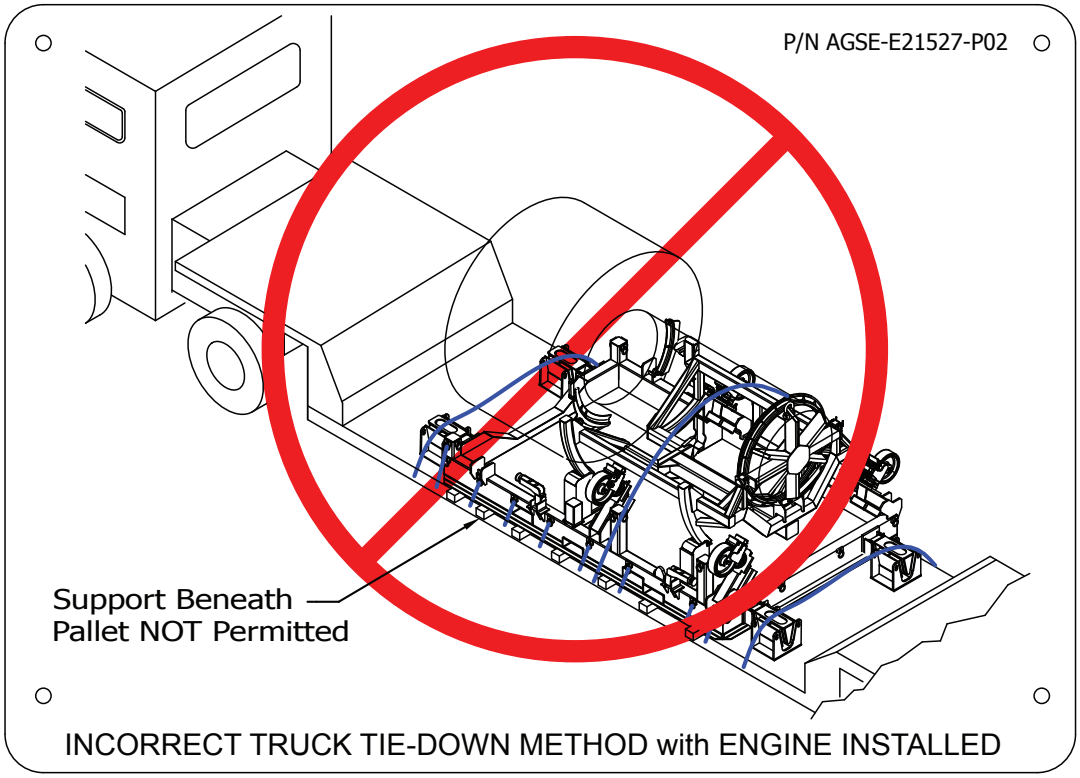


Figure 3.7-3A Casters and Shock Mounts Installation



AGSE-E21527-P01 PLACARD



AGSE-E21527-P01 PLACARD

Figure 3.7-3B Tie-Down Instruction Placards

4.0 – Maintenance and Inspection

4.1 General

Life expectancy of this equipment can be extended indefinitely, 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.

Damaged paint should be touched-up with Skydrol resistant high-grade enamel paint. Touch-up paint is available upon request from AGSE. 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 Corporation	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.

CAUTION

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

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 and structure 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).

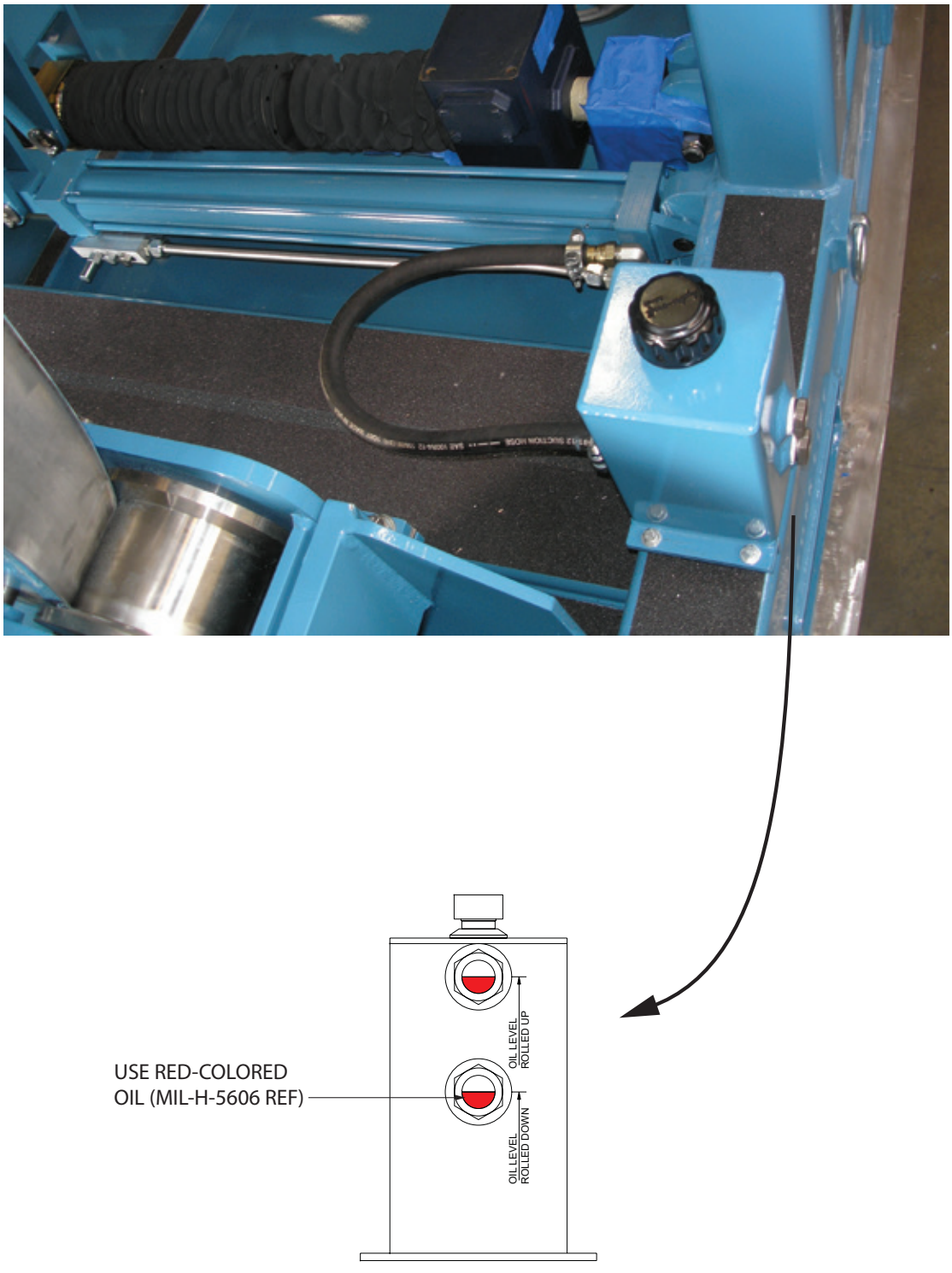


Figure 4.4-1 Fail Safe Cylinder

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. 10 - Item 11) of the cradle 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 and the two (2) pivot pins. 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 Figure 11 - Item 43) is seated in the hand wheel pressure plate (IPB Figure 11 - Item 40) located between the gear box and hand wheel. Two (2) compression springs (IPB Figure 11 - Item 41) 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.

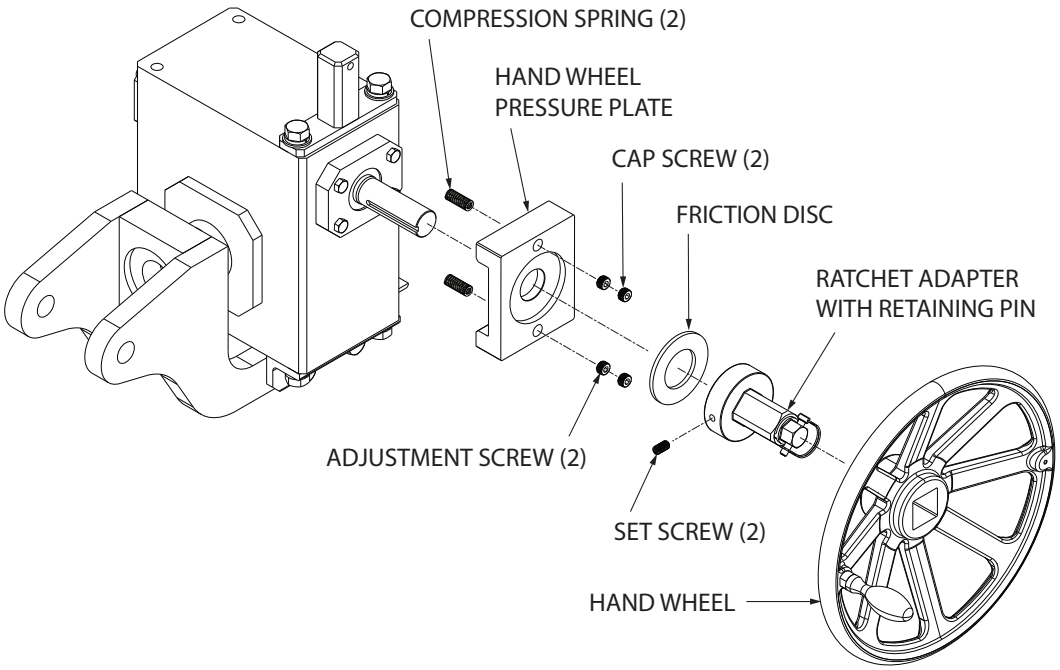


Figure 4.5-1

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 securing collar, hand wheel and friction disk. Inspect the friction disk surface for smoothness and replace as required or if the thickness is less than 0.063-inch (1.6 mm). Remove the compression spring cap screws, 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 Figure 11 - Item 51). Adjust the friction clutch as described in the previous paragraph.

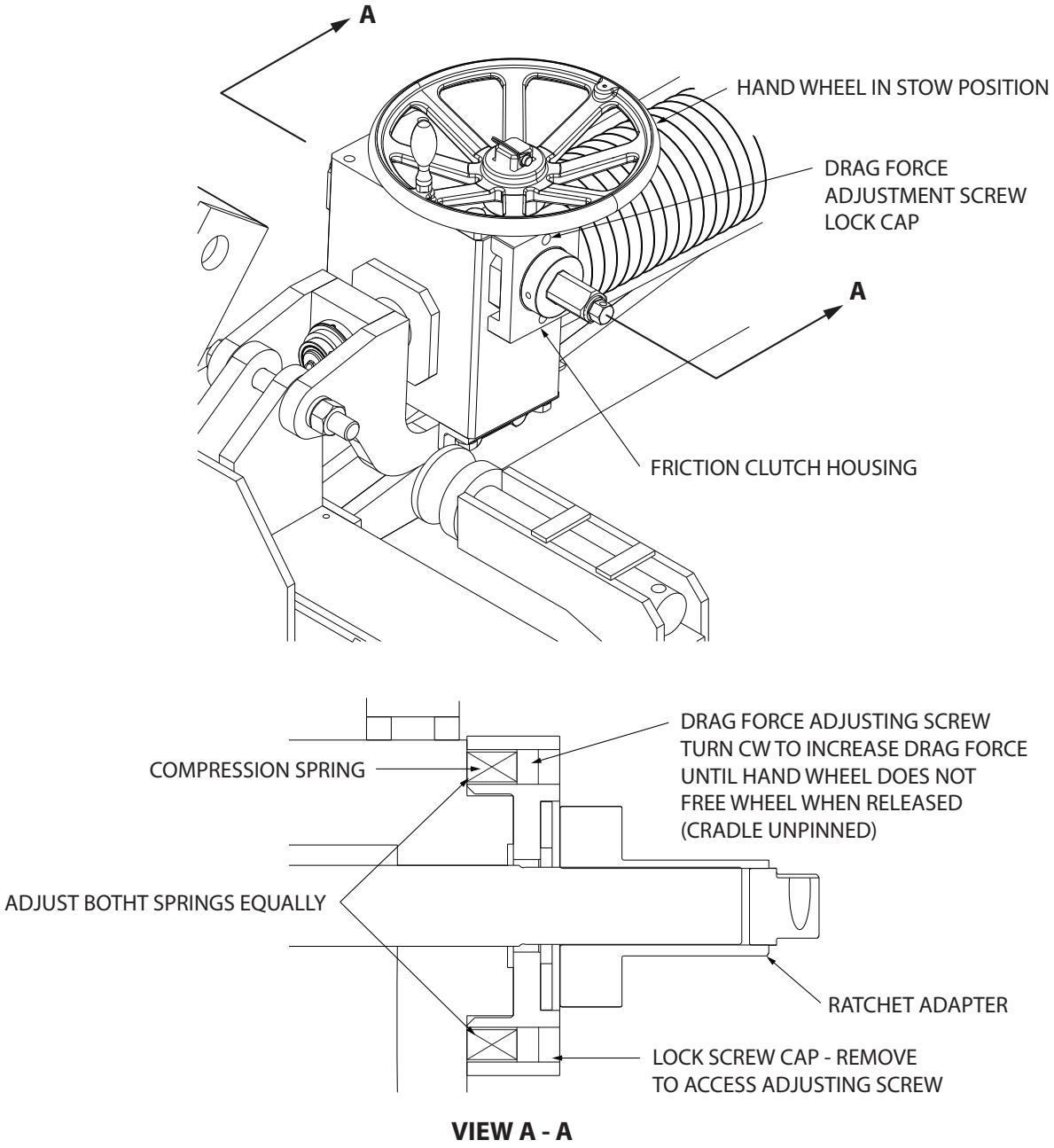
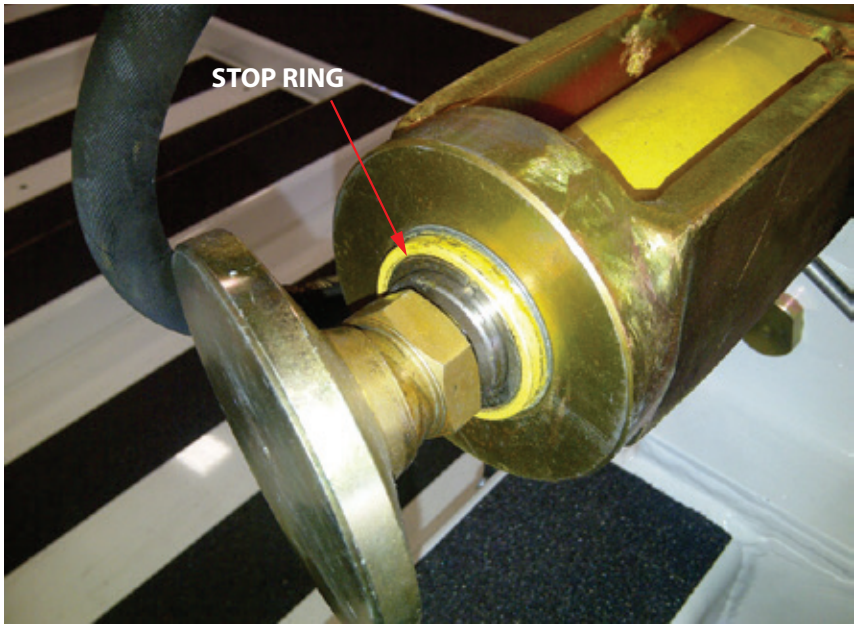


Figure 4.5-2

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 re-threaded 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.



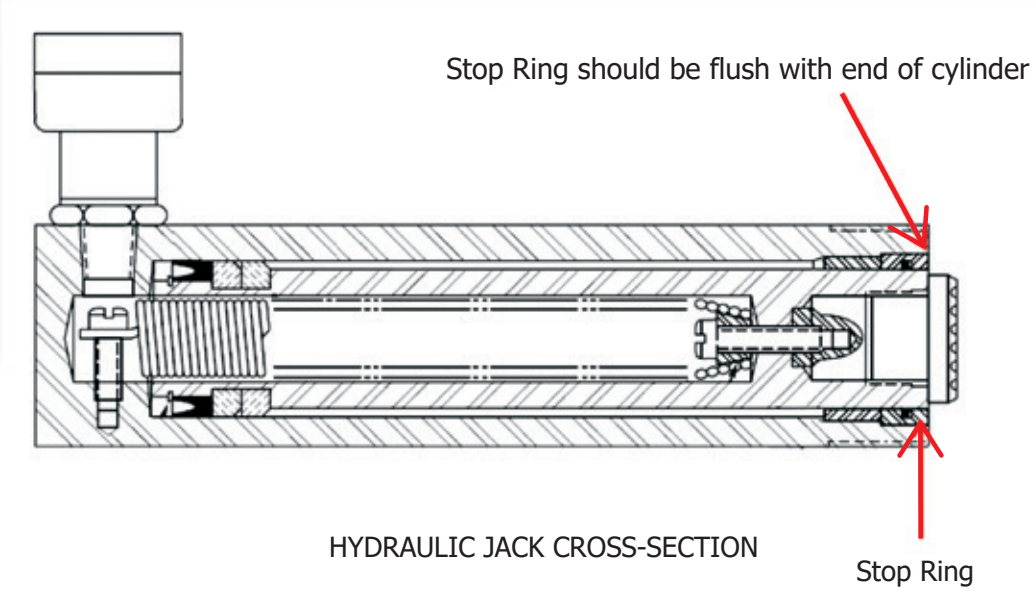


Figure 4.6-1 Hydraulic Jack Inspection

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, (16) 1/2” Lock washers 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.

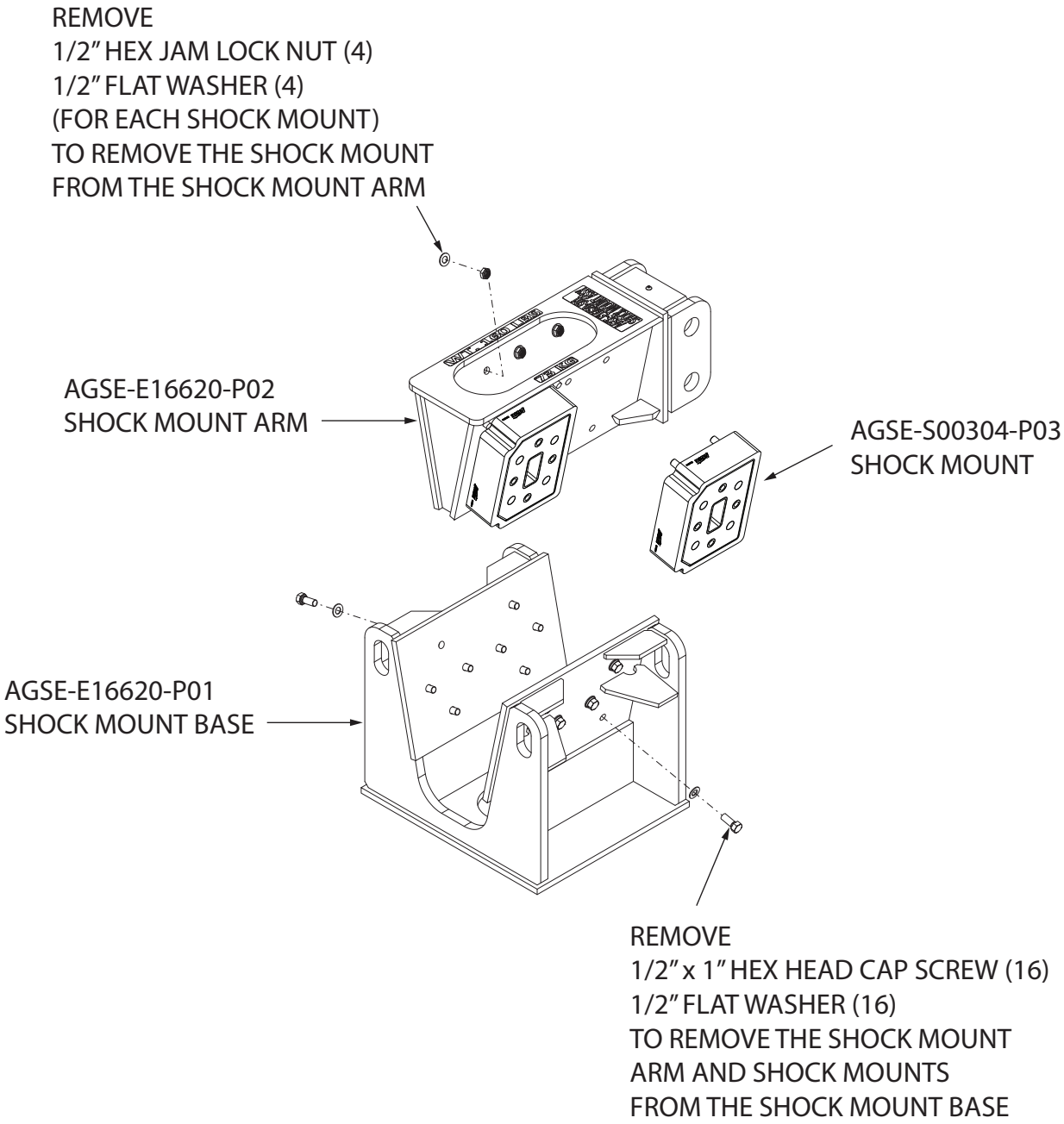


Figure 4.7-1 Shock Mount Replacement

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* - Shock isolator manufacturer recommends that isolators be changed every (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 hoist system or crane to minimize potential 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 fork lift. A safety zone must be established to avoid potential serious crushing injury. (See Section 5.5 for complete instructions.)**
3. **Be sure base-to-cradle lock 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 locking pins. (Figure 5.1-1).
2) Loosen and disconnect the forward and aft shipping braces. (Figure 5.1-1).
3) Turn the hand wheel (or the air ratchet) in the direction indicated by stencils to rotate cradle in direction required (AFT looking FWD): CCW to rotate and lower the cradle CCW and CW to rotate and raise the cradle CW. (Figure 5.1-1).
4) Install four (4) locking pins when holes in cradle roll frames align with roller supports. (Figure 5.1-2).
5) Re-install shipping braces. Tighten in tension mode. There should be NO GAPS between cradle and support rollers.

NOTE

To remove/install - Pins may require turning the rotation drive wheel to align individual pin holes.

CAUTION

Clearances between engine & stand are very close. Spotters are strongly recommended to watch and warn the operator of contact with engine and potential personnel injuries.

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.

WARNING

A safety zone must be established during cradle rotation to avoid potential crushing or pinching injury.

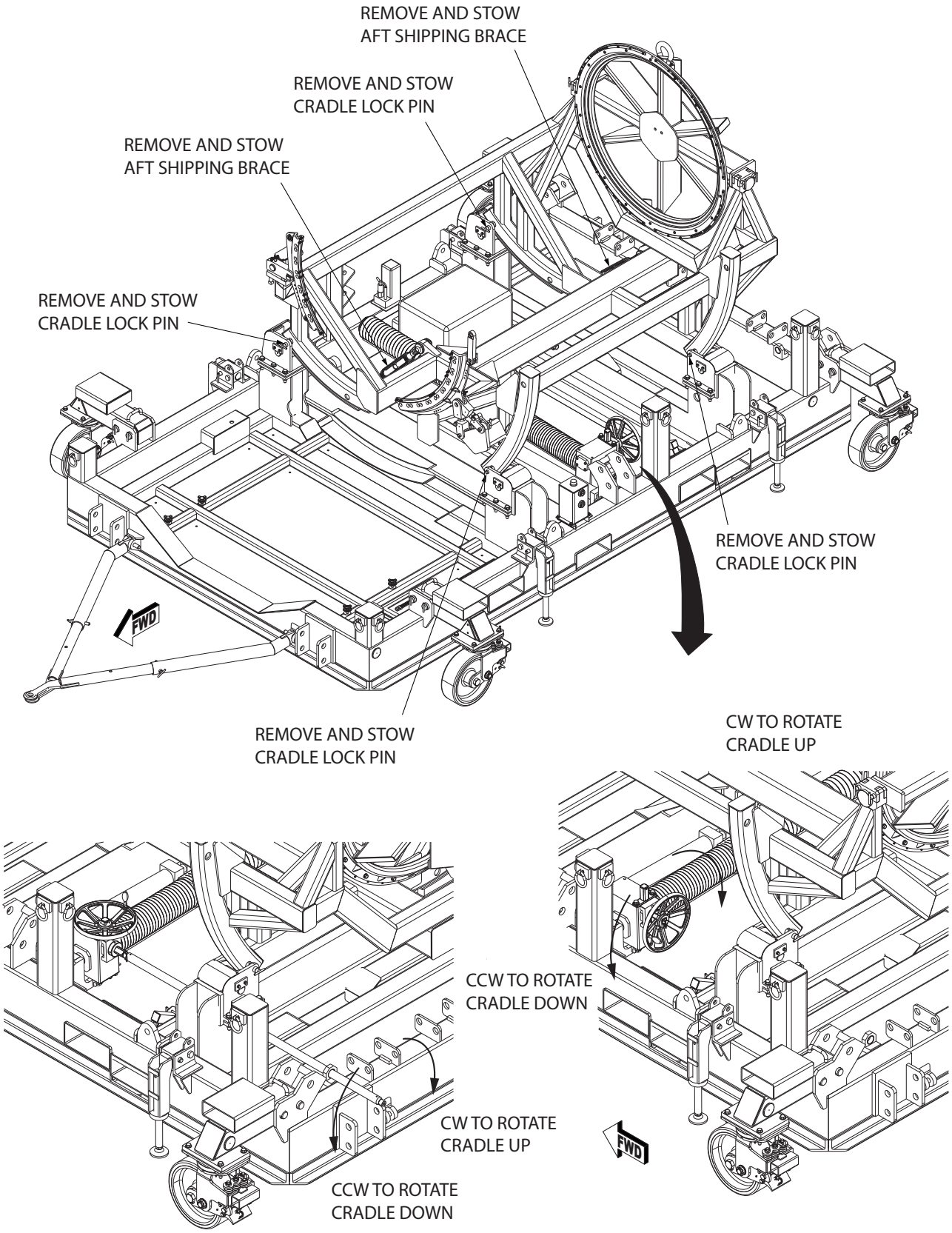


Figure 5.1-1 Rotation of Empty Cradle

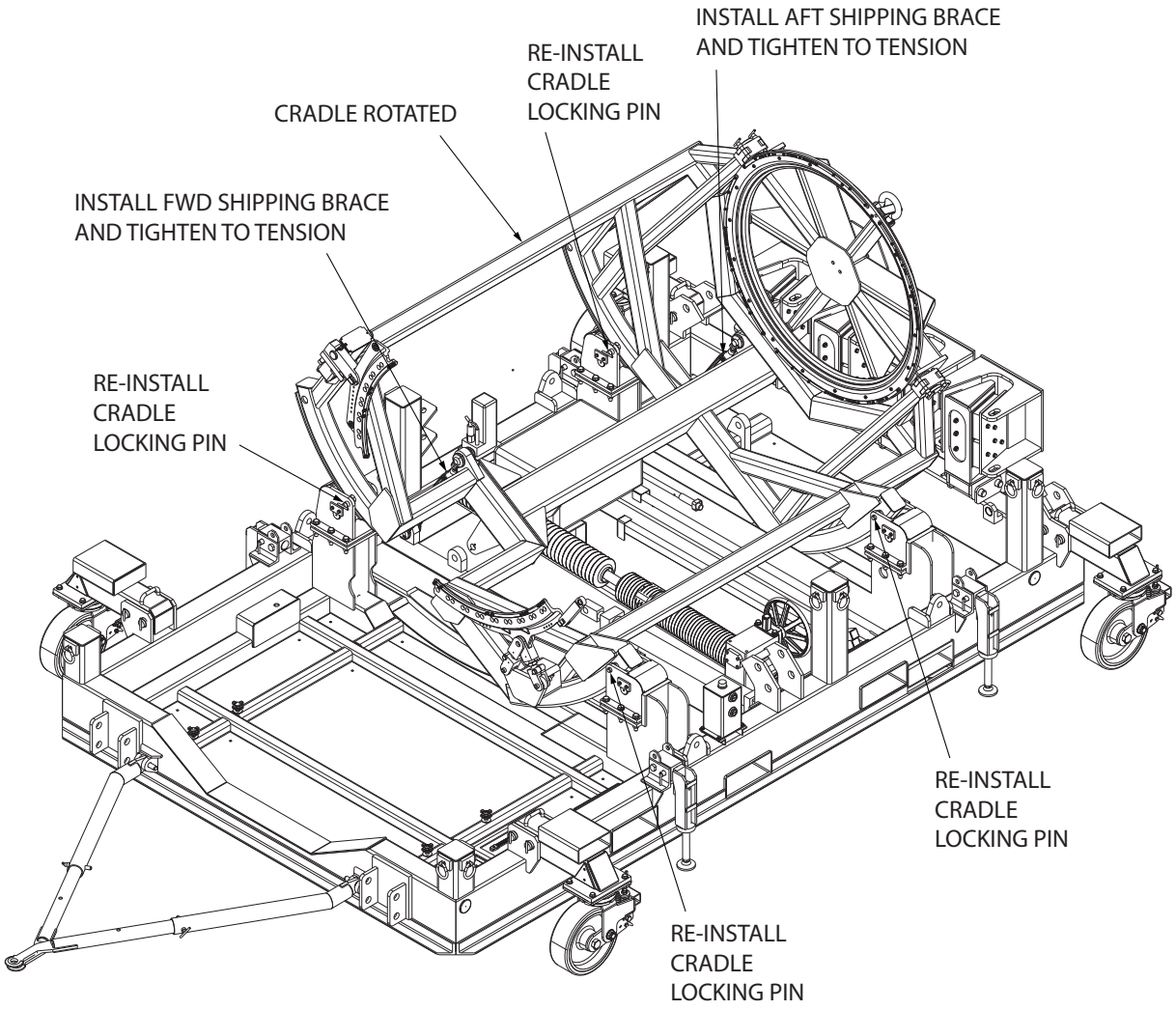


Figure 5.1-2 Rotation of Empty Cradle

5.2 Installing Engine onto Stand Using Overhead Hoist System

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 supports from storage positions on base. Remove AFT adapter ring from strongback.

e. If a bag is to be installed, locate bottom half on stand.

f. A minimum of four (4) spotters is recommended, one at each engine attach point to the cradle to guide engine and to prevent contact with cradle.

WARNING

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

1) Position stand centered and under engine by moving stand in from behind (See page 5.8 for special instructions). Remove eight (8) deflector and blank off panels (See Figure 5.2-1), and store in the designated container (See Figure 5.2-2). Remove one LH inside cover panel upper forward attaching screw, bag and attach to bracket located above the cover panel.

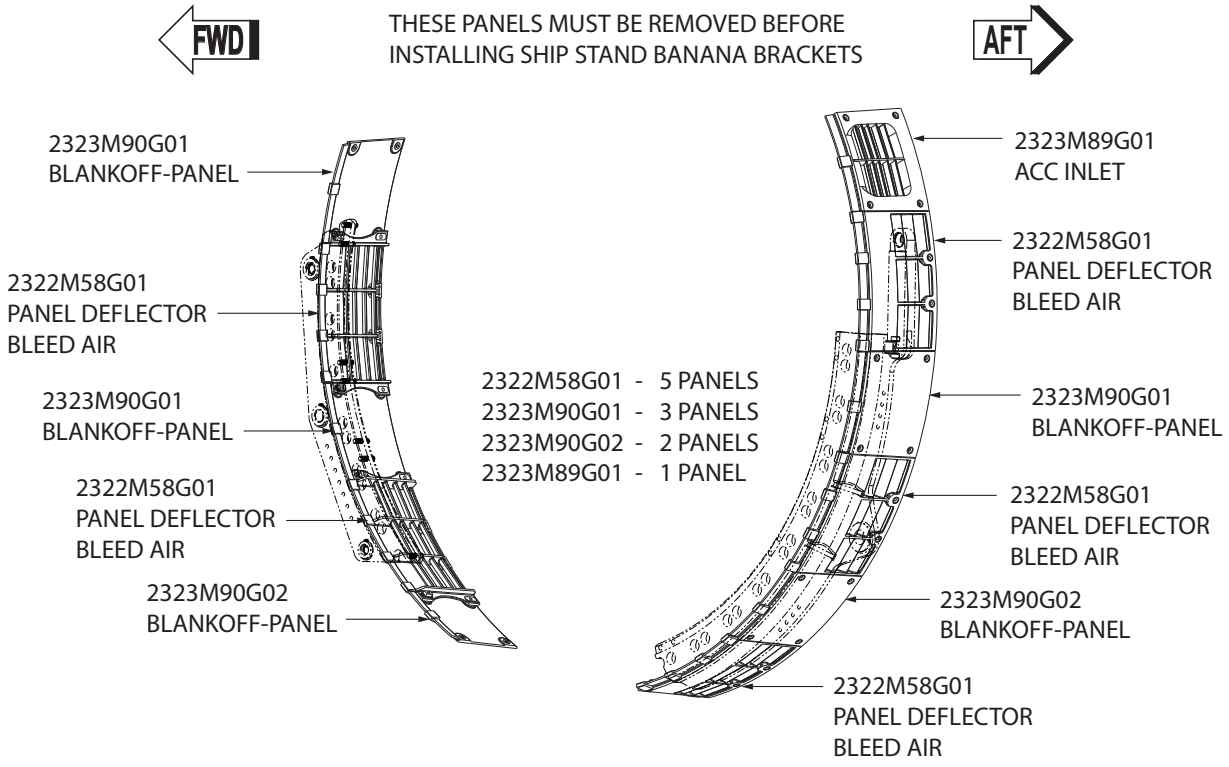
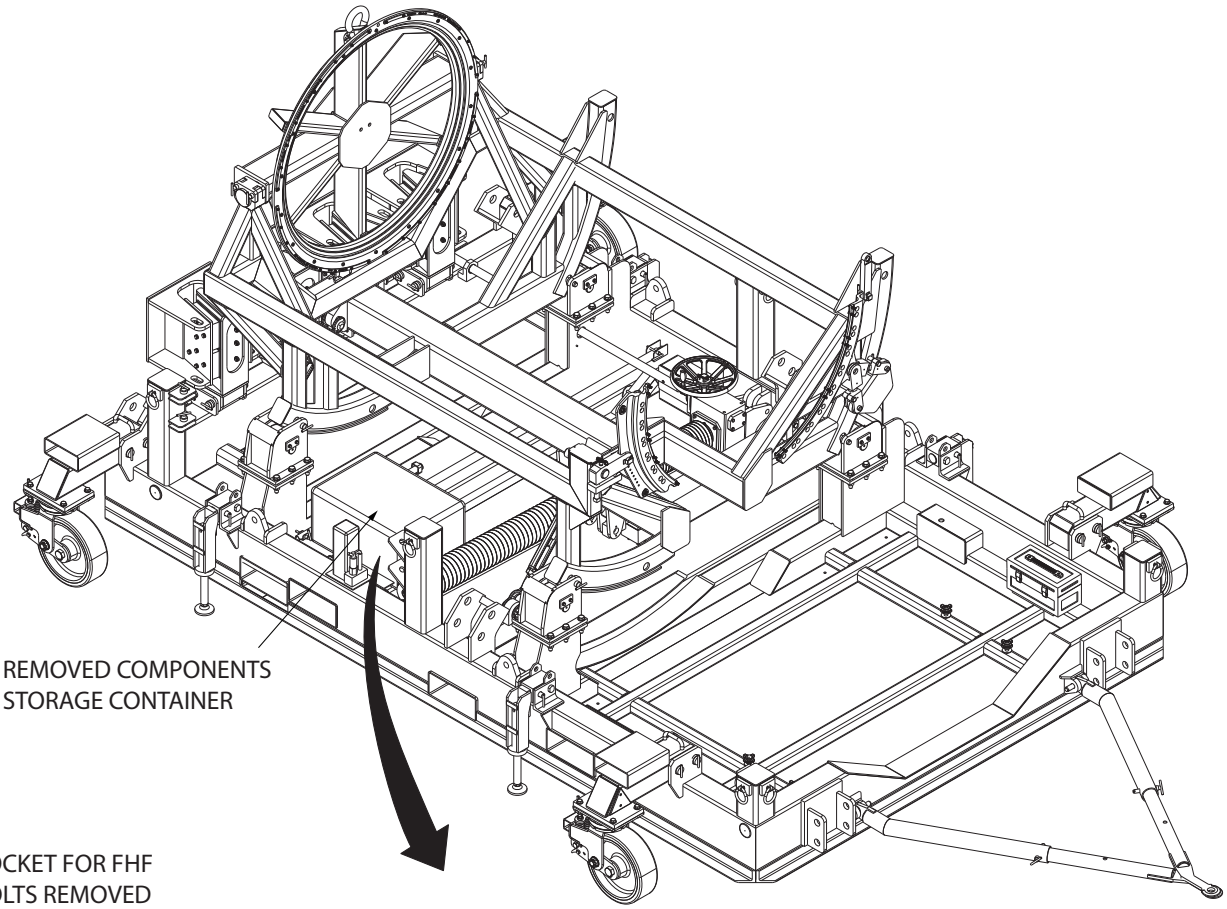
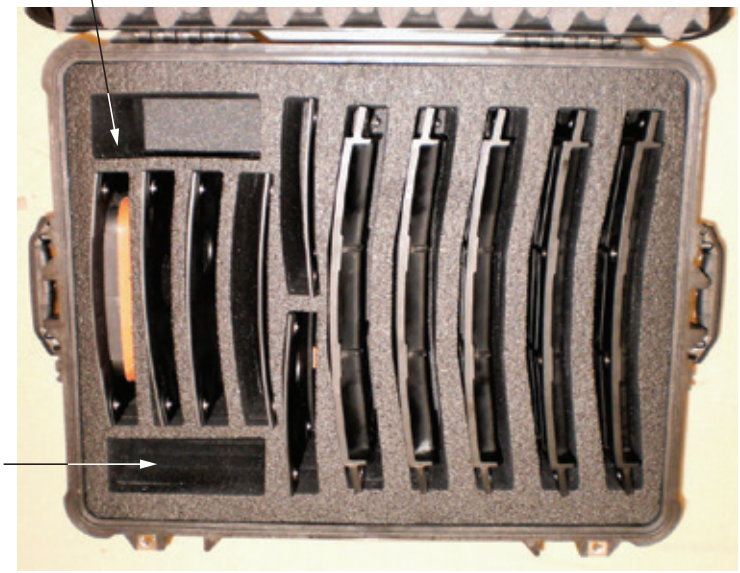


Figure 5.2-1 Panels To Be Removed



POCKET FOR FHF
BOLTS REMOVED
TO INSTALL BANANA BRACKETS



POCKET FOR PANEL
ATTACHING SCREWS

ELEVEN (11 PANELS)
FROM GEnx-2B
FAN HUB FRAME STORED

(5)	2322M58G01
(3)	2323M90G01
(2)	2323M90G02
(1)	2323M89G01

Figure 5.2-2

2) Remove the FWD LH and RH engine support brackets (IPB Figure 4 - Items 4 and 6) from the stand by removing the index pin (IPB Figure 3 - Item 5) and the T-handle ball lock pin (IPB Figure 3 - Item 10) for the RH support bracket and the adapter pin (IPB Figure 5 - Item 7), safety pin (IPB Figure 6 - Item 4) and ring-handle ball lock pin (IPB Figure 5 - Item 8) for the LH support bracket. (See Figure 5.2-3).

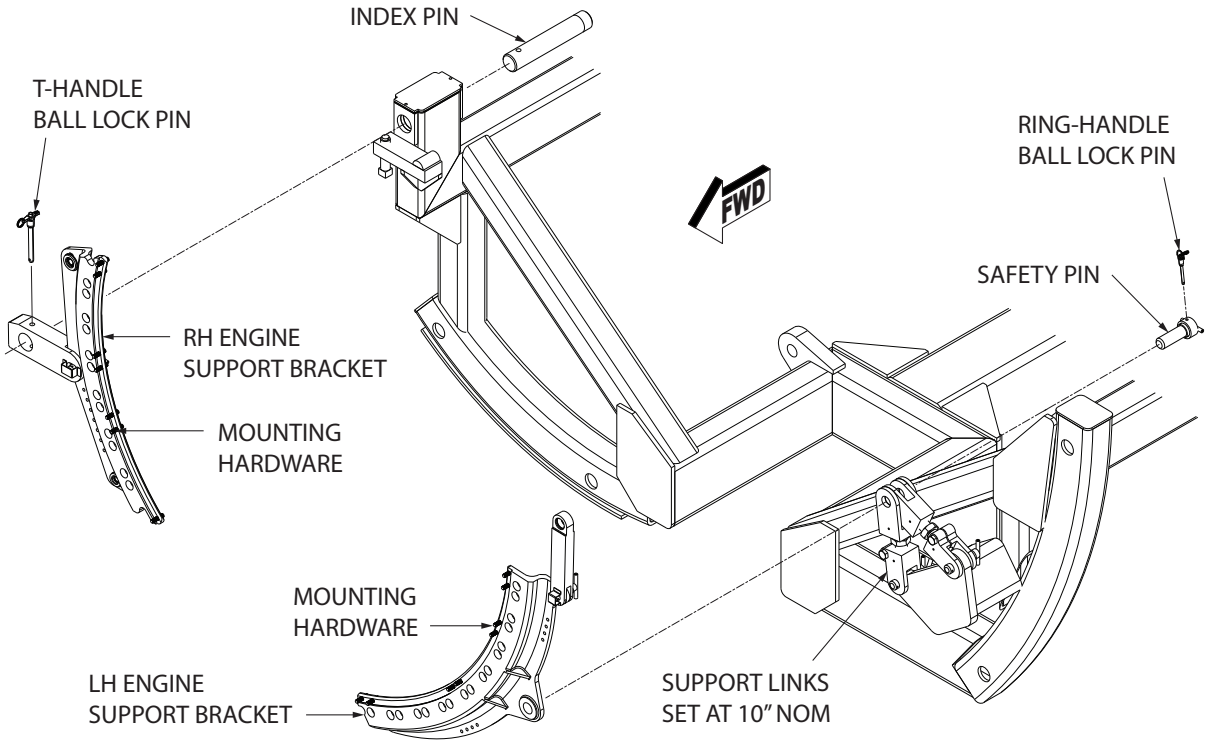


Figure 5.2-3

3) Remove the 15 indicated hardware bolts (IPB Figure 4 - Item 5) which are used to connect the fan cowl support bracket to the fan hub frame. There are tap holes in the brackets for storage of these bolts.

4) Install the FWD RH and LH engine support brackets to engine using the 15 bolts provided with the brackets. Torque these bolts to a value of 20 ft-lb. (Figure 5.2-4).

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.**

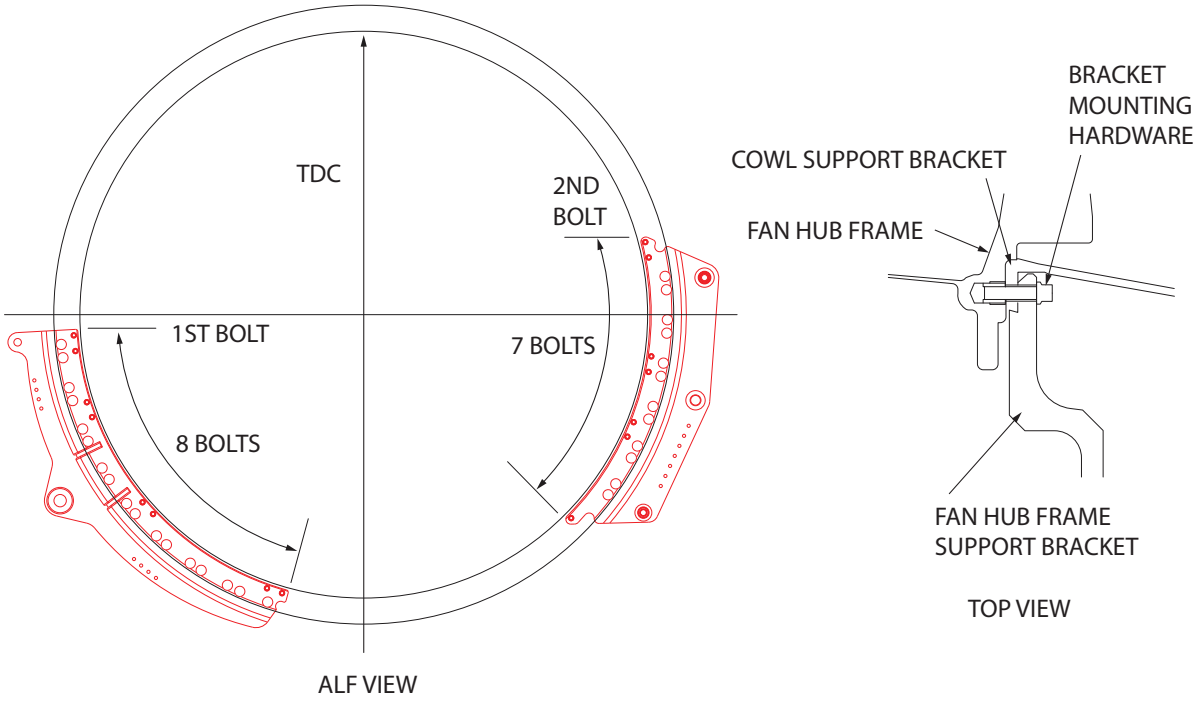


Figure 5.2-4

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 spacer ring (IPB Figure 8 - Item 2) with four (4) quarter backup ring segment (IPB Figure 8 - Item 3) to the AFT TRF flange of the engine using the 36 bolts and nuts provided (IPB Figure 3 - Items 5 and 6). Install the hardware in a criss-cross pattern to ensure even loading and pregressively torque the bolts to 8 - 10 ft-lbs (Figure 5.2-5).

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.**

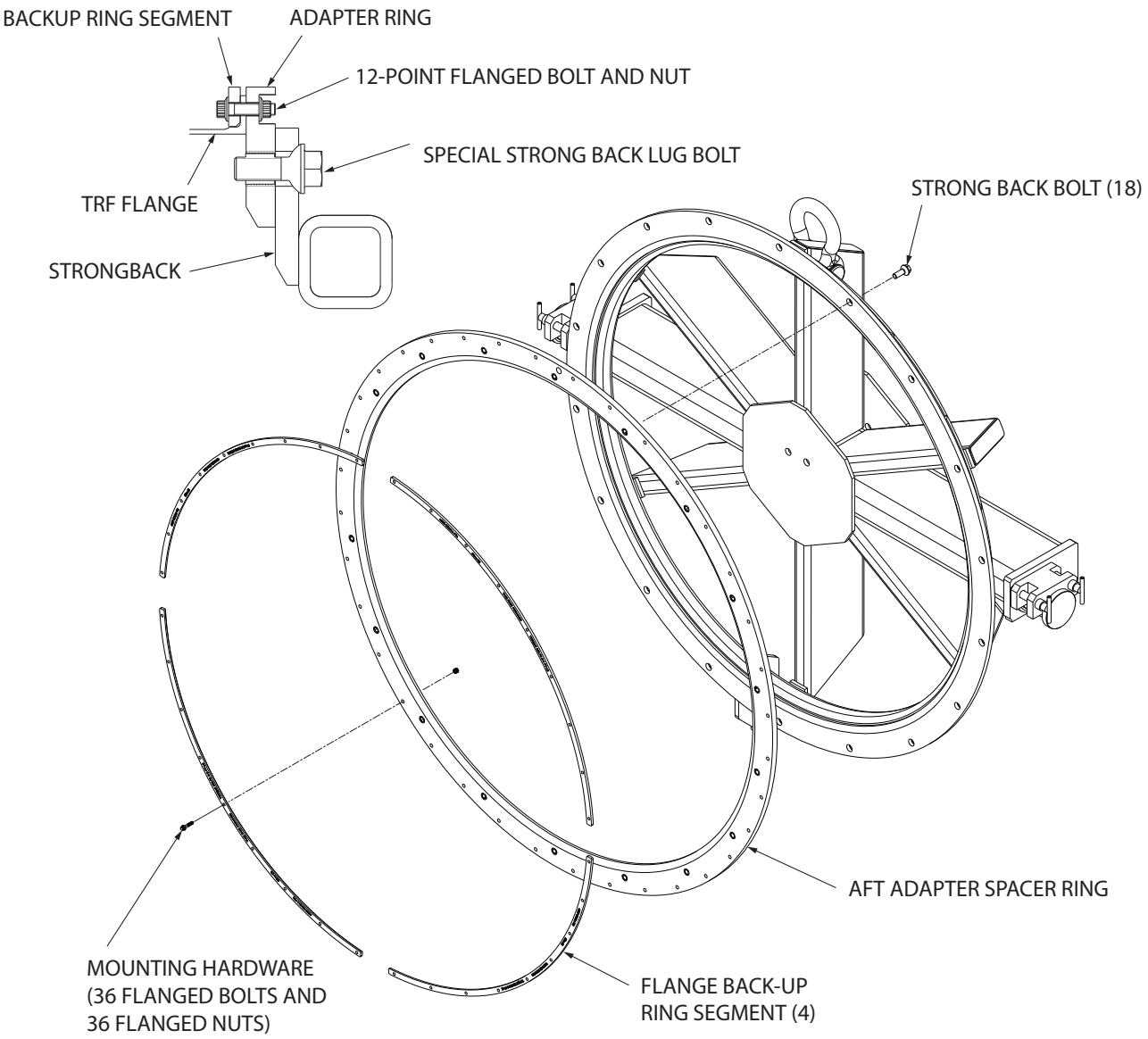


Figure 5.2-5

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 strong back pivots backward. In order to pivot the strong back, release the slide bolt latch (IPB Figure 3 - Item 16). (See Figure 5.2.6).

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.

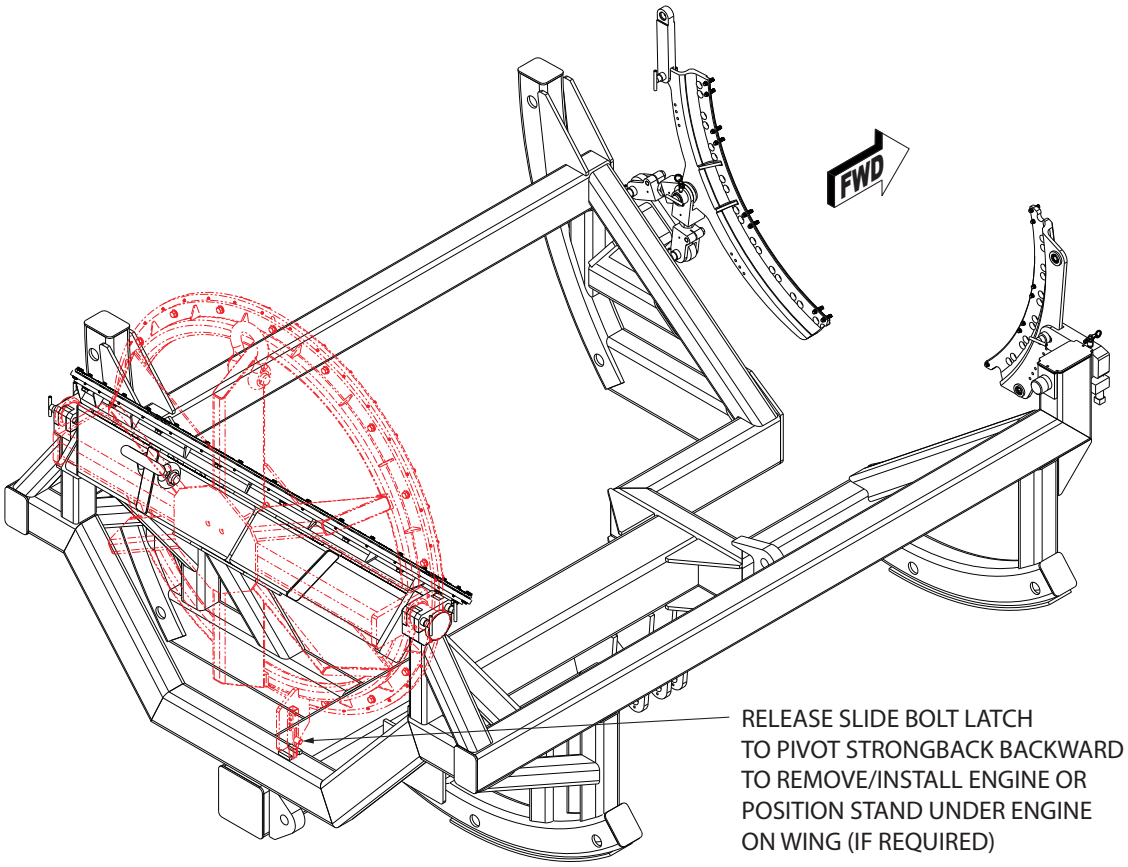


Figure 5.2-6

7) Disengage the slide bolt latch on the strong back (IPB Figure 3 - Item 16) before installing the “special bolts”.

8) Lower the engine and align the spacer ring bolt holes with those of the strong back. Install the 18 strong back special lug bolts in a criss-cross pattern to connect the spacer ring to the strong back 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. (Figure 5.2-7).

NOTE

The strong back must be initially sitting lower than the engine. DO NOT ATTEMPT TO DRAW THE ENGINE UPWARD TO THE STRONG BACK.

CAUTION

Use ONLY the special attaching bolts provided with the strong back. 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 8 - 9 ft-lbs torque in a criss-cross pattern to ensure even loading on the bolts.

9) Lower the FWD end into position and locate and install the FWD RH mount adapter.

10) Lower the FWD end of the engine and install the RH mount adapter on the cradle. Before connecting the LH links, the pin should be approximately centered in the slot and loose with the LH links stayed on the cradle.

11) Pin LH support links to cradle. Adjust links as required to install pins. Note there are witness holes in the connecting links for maximum extension. If the links must be adjusted beyond that maximum (approximately 11-1/2" between hole centers), lower engine until link lengths are within 10-1/2" between hole centers. Tighten clamping bolt on each length to secure the link length.

12) After the 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.

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 spacer ring (IPB Figure 8 - Item 2) and four (4) quarter backup rings (IPB Figure 8 - Item 3) to the engine AFT support flange. Install the 36 flanged bolts (IPB Figure 8 - Item 5) and 36 flanged nuts (IPB Figure 8 - Item 6) along with the quarter backup rings. The spacer ring's weight allows for it to be supported by two persons while the quarter backup ring bolts are installed. Install the bolts in a cris-cross pattern to ensure even loading and progressively torque the bolts to 8 -9 ft-lbs.

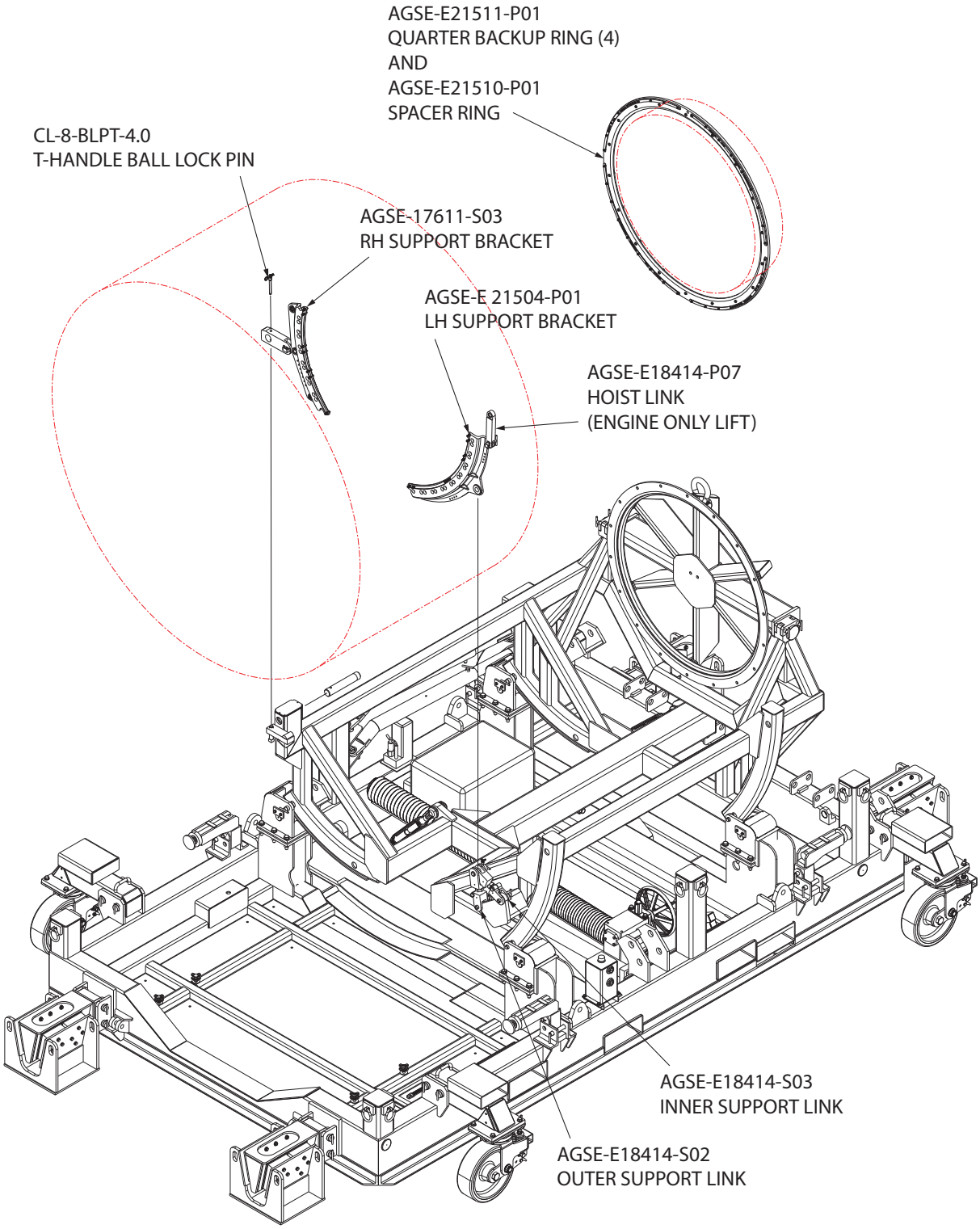


Figure 5.2-7 Engine Installation Onto Cradle

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 8 - Item 1). Move the engine to the center of the spacer ring (IPB Figure 8 - Item 2) with the strong back and align the mating surfaces with approximately 1/4 inch (1 cm) gap. Disengage the strong back latch (IPB Figure 3 - Item 16). Install the 18 strong back connecting bolts (IPB Figure 8 - Item 4) in a criss-cross pattern across the diameter to mate the spacer ring and the 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 the support bracket then slide the pin forward. Rotate and slide the index pin to install the ball lock pin (IPB Figure 2 - Item 10). 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 7) by holding the screw with a suitable wrench and rotating the jam nut (IPB Figure 2 - Item 12) 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 5 - Item 7) and remove the ball lock retainer pin (IPB Figure 5 - Item 8). 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 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 6) is then disconnected from the cradle by removing the ball lock pin (IPB Figure 3 - Item 10) and sliding the index pin (IPB Figure 3 - 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 8 - 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 8 - Item 4) connecting the strongback to the adapter ring (IPB Figure 8 - 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 8 - Item 2) and four (4) back-up segments (IPB Figure 8 - Item 3) are removed from the engine. Remove the 18 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 3 - Item 7) by holding the screw with a suitable wrench and rotating the jam nut (IPB Figure 3 - Item 12) 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 3 - Item 10). 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 (IPB Figure 5 - Item 2) until the link assemblies are free to rotate clear.

12. The RH FWD bracket (IPB Figure 4 - Item 6) is then disconnected from the cradle by removing the ball lock pin (IPB Figure 3 - Item 10) and sliding the index pin (IPB Figure 3 - 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 8 - Item 2) and four (4) backup segments (IPB Figure 8 - Item 3) are removed from the engine. Remove the 18 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 (Figures 5.4.1)

The stand can be fork lifted from either side of the stand. 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.

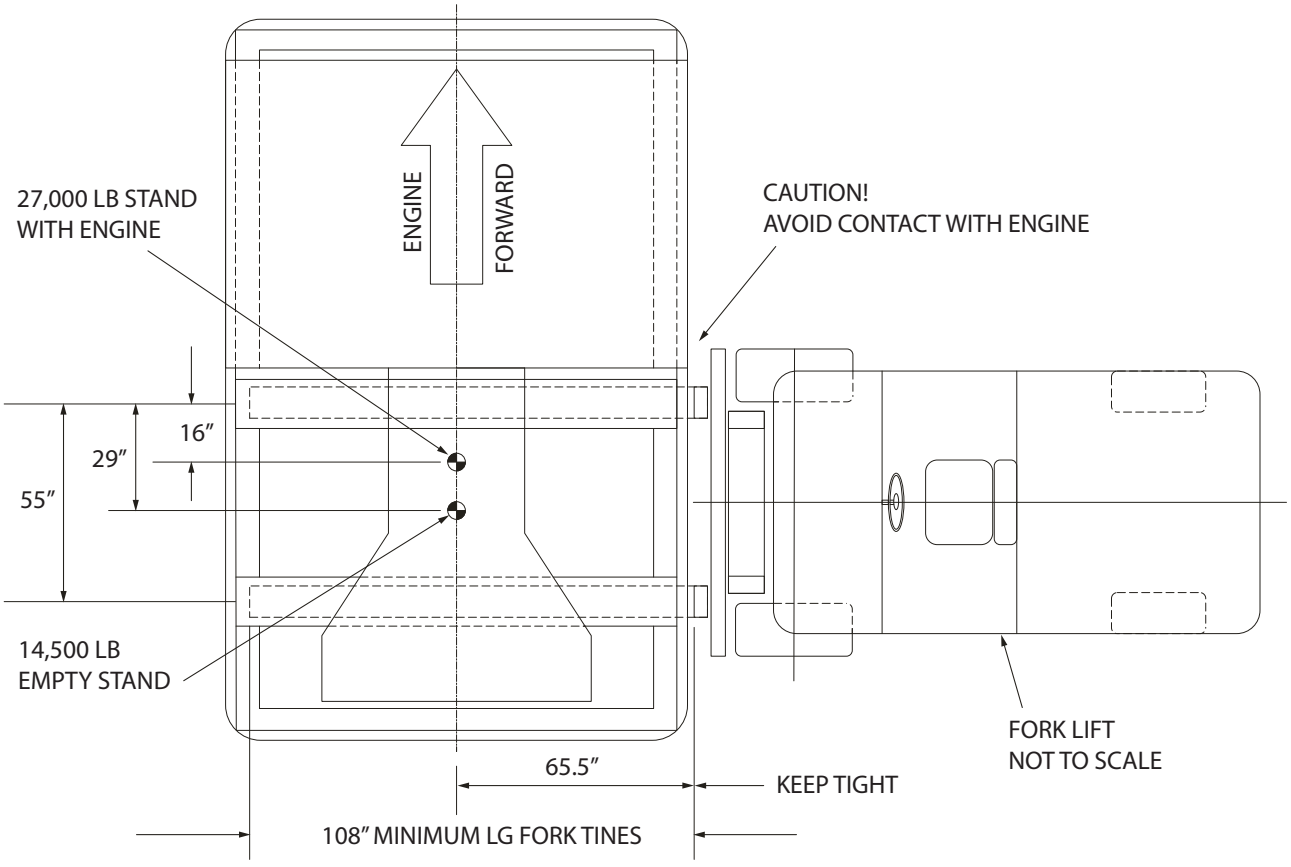


Figure 5.4.1

The stand with an engine is an especially large and heavy load with the majority of weight concentrated on the forward fork tines. 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:

- 108 inches minimum long fork tines on a 55-inch spread.
- Lifted load of 27,000 pounds.
- Load center is 16 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-E21521-DLH 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.**
- **Avoid contact of the engine with the fork lift.**
- **Engage fork tines as far as is possible.**
- **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 11C4484P02 - Ref. AGSE-L038), attached to the four (4) designated hoist points on the base. See AGSE-L018 and AGSE-L038 Stand Lift Fixture manuals for more information.

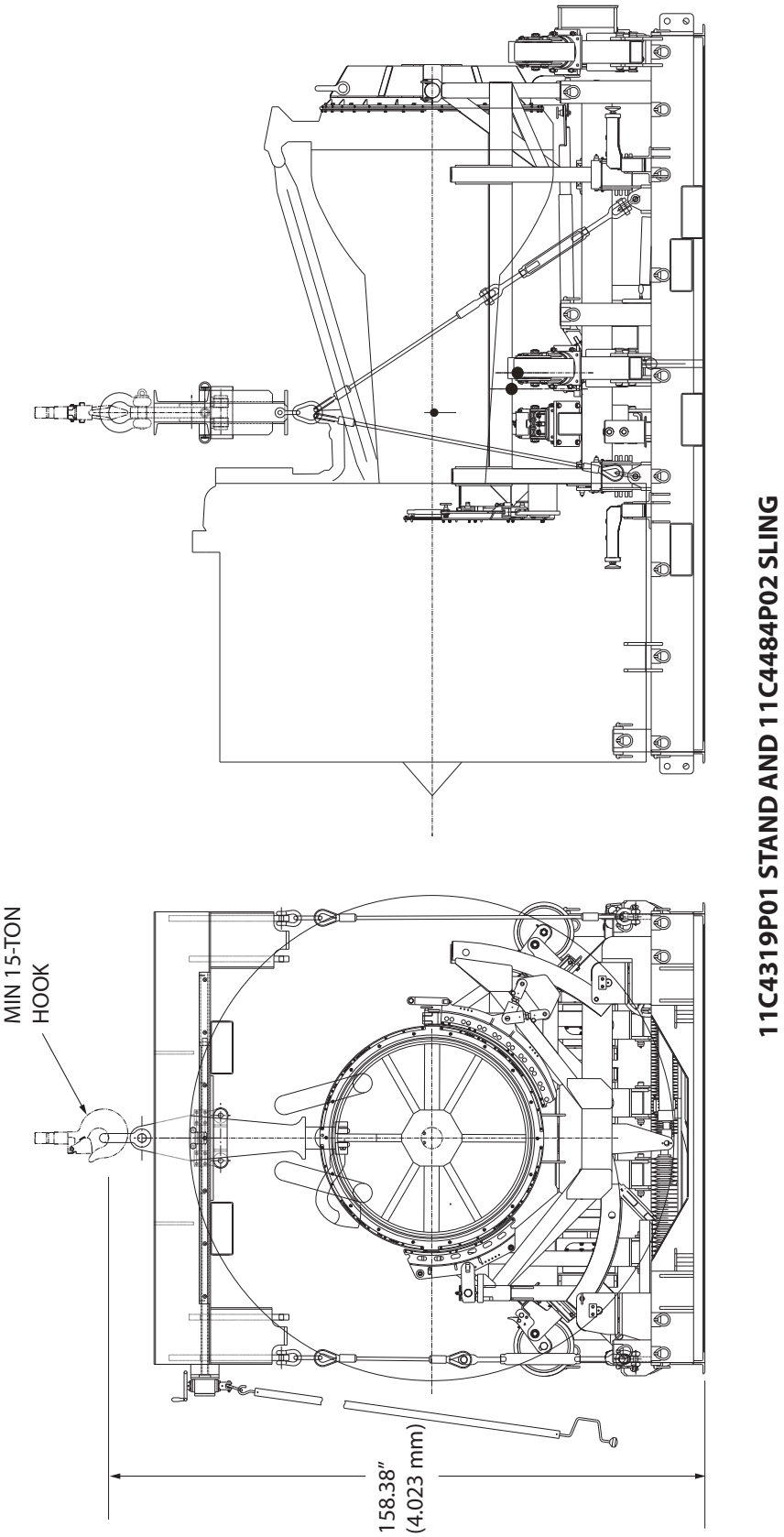
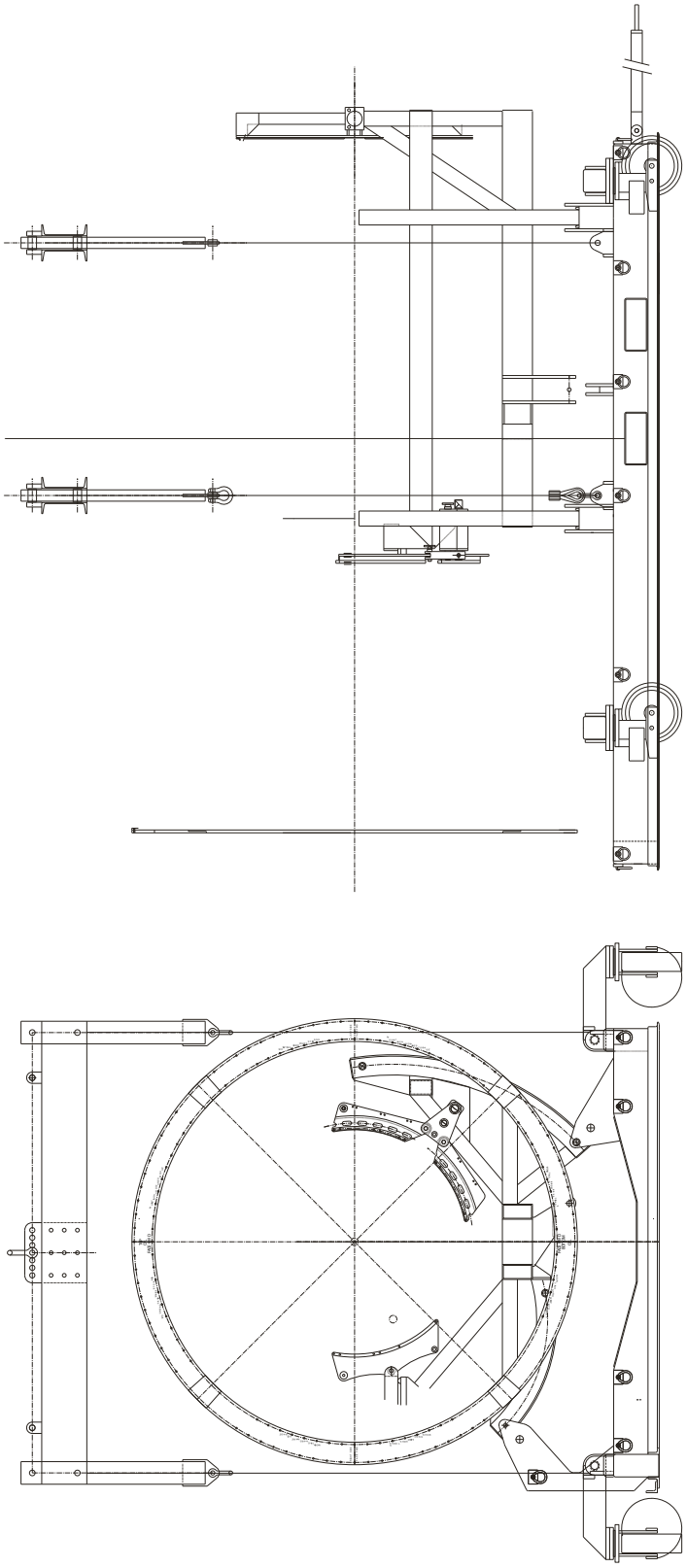

11C4319P01 STAND AND 11C4484P02 SLING
MIN 15-TON
HOOK
158.38"
(4.023 mm)

Figure 5.4.2



11C4319P02 STAND AND AGSE-L033-G01 LIFT BEAM

Figure 5.4-2A

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) Install protective covers, caps, etc. as required by GE's Engine Manual.
3) Rotate engine to transport position. (See Section 5.1)

CAUTION

Stand can be forklifted from either side of stand. A sling (AGSE-L018/11C4484P01 or AGSE-L038/11C4484P02) 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) Locate FWD caster mount assemblies (IPB Figure 2 - Item 17) from their storage location to their working position then secure with safety pins (IPB Figure 15- 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 15 - Item 9)
4) Install tow bar assembly (IPB Figure 1 - Item 2) at the AFT end of the stand using two (2) safety pins (IPB Figure 14 - Item 4)

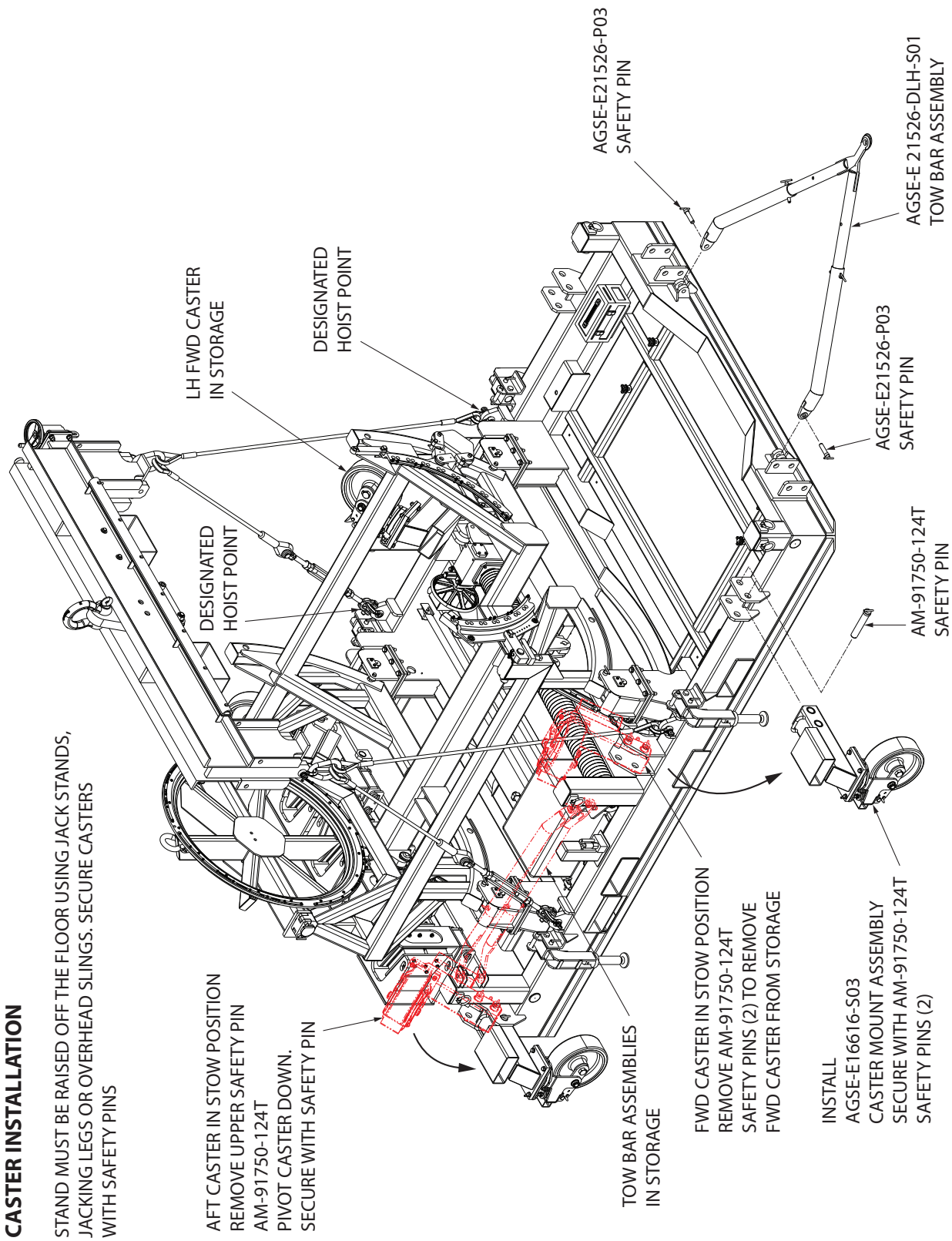


Figure 5.6-1 Casters and Tow Bars Installation

5.7 Caster Stowing Procedures

The weight of each of the four AGSE-E16616-S03 caster assemblies is 352 lbs., 160 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 manor.

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 1,000 lbs (455 kg) through the tube socket and connect to and overhead crane or forklift as shown in Figure 5.7-1.
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 5.7-2, 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 5.7-3.
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.**

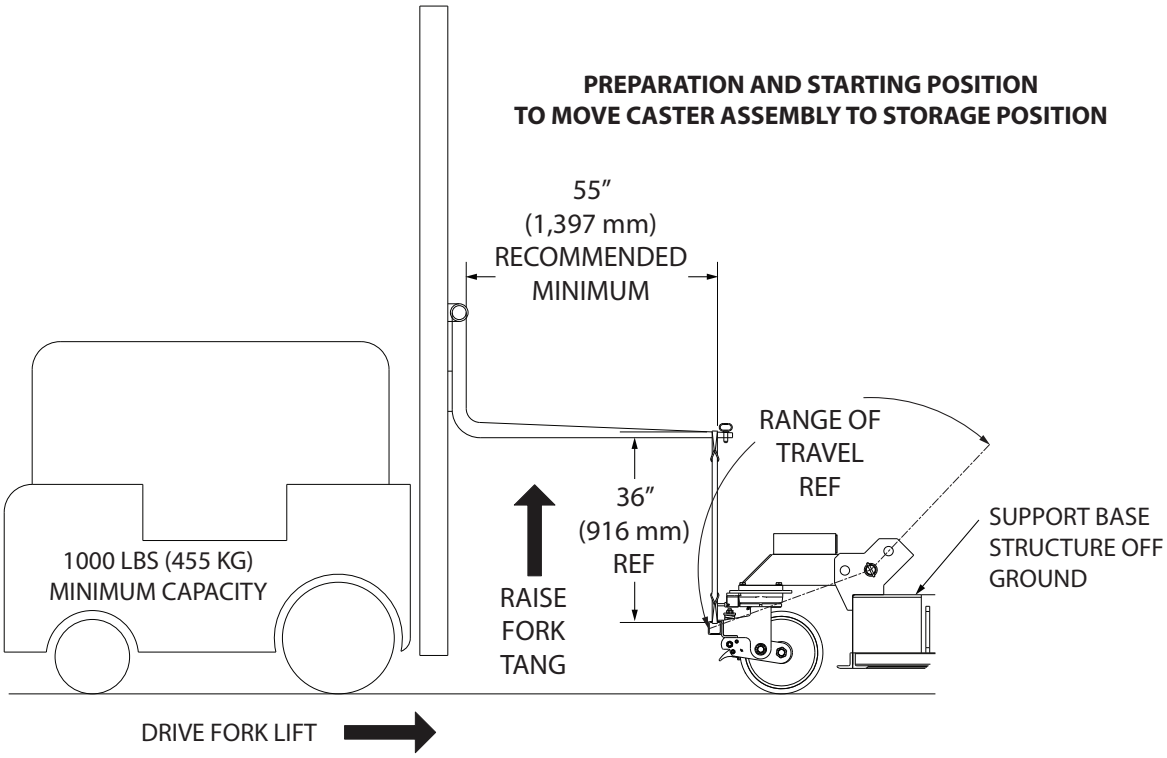


Figure 5.7-1

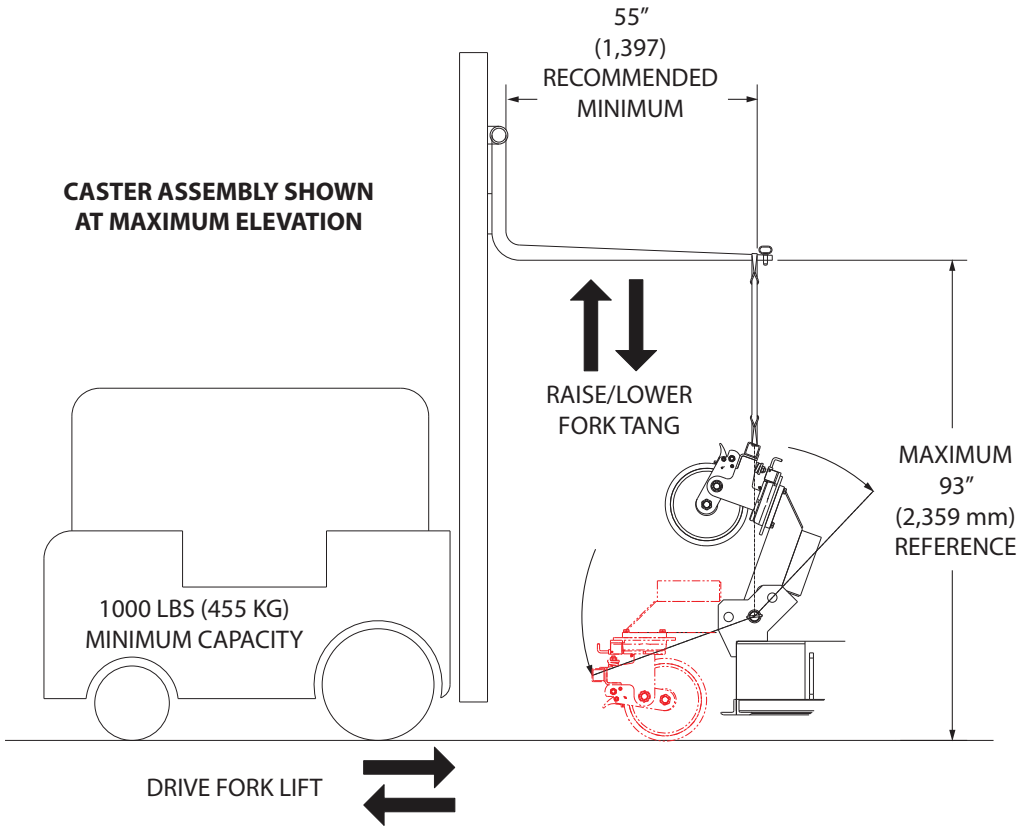


Figure 5.7-2

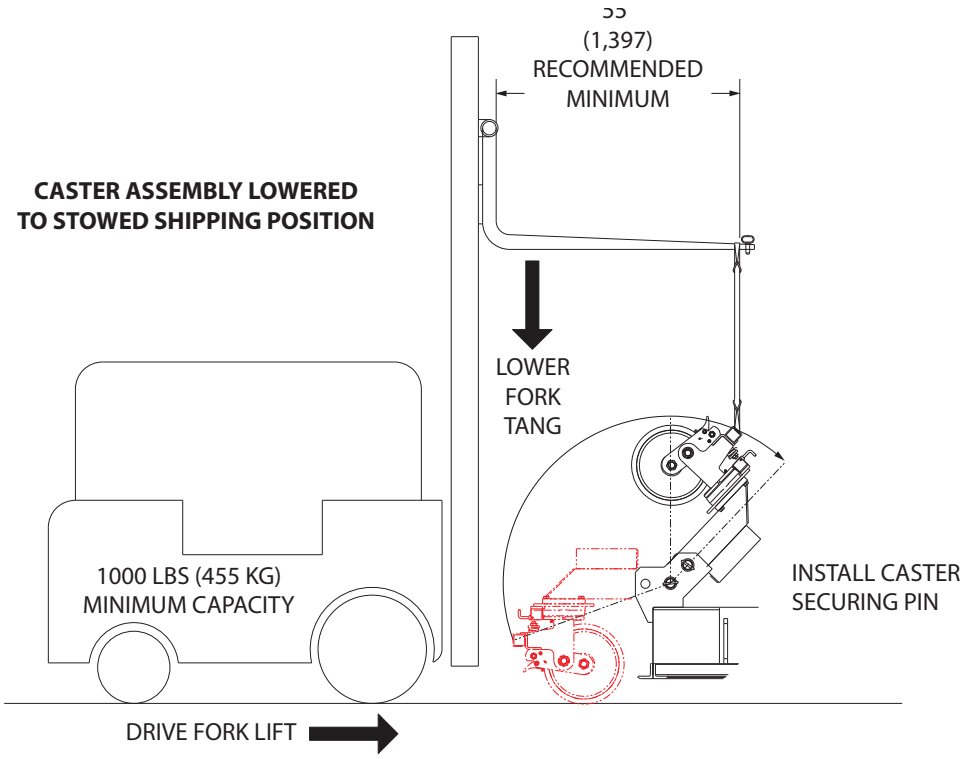


Figure 5.7-3

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.**

5.8 Hydraulic Jack Leg Usage and Operation

There are four (4) hydraulically operated jack legs located at the four corners of the base (Figure 5.7.1). These legs are used to 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 will raise the stand approximately 9.5” off the ground. It is recommended that the stand be raised slowly, alternating front to rear legs 3” at a time.

To deploy a jack leg, 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.

CAUTION

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

To lower the stand after the casters have been retracted, check the pressure release screw and see if it is closed, operate the pump to pressurize the system, open either the front or rear leg ball valve. Keep feet clear of the stand. Slowly open the pressure release screw, lower the stand evenly approximately 3 inches at a time, alternating front to rear.

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.

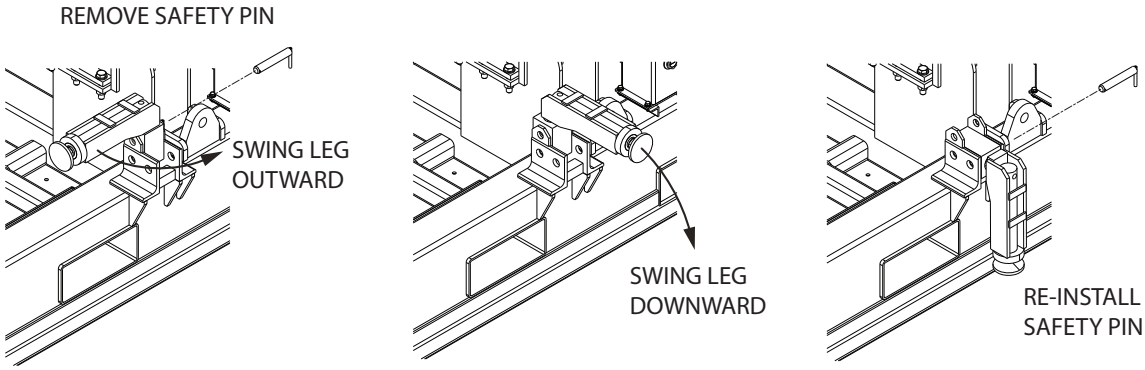


Figure 5.8-1

5.8.1 Hydraulic Installation Configuration 1 (Dual Selector Valves)

To extend the jack legs, remove the pump handle from the AFT base cross member 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 5.8.1-1).

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.

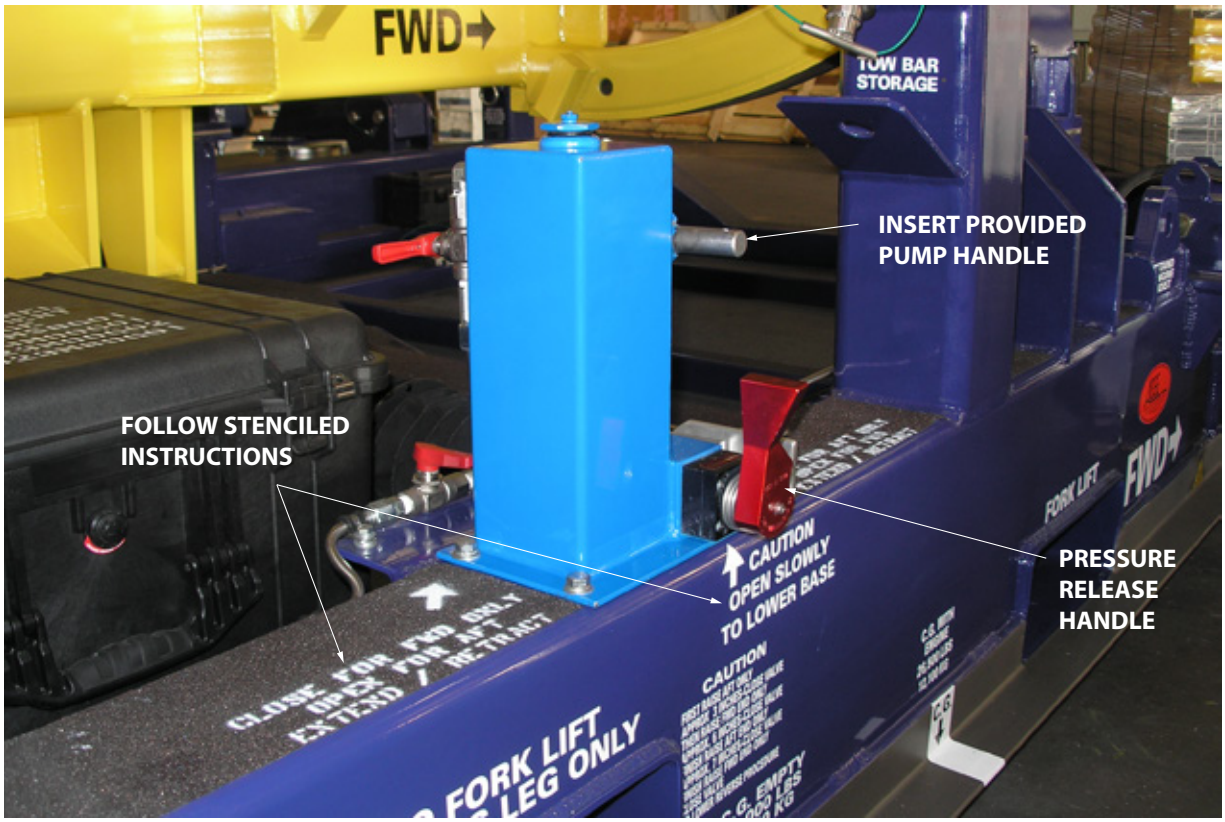


Figure 5.8.1-1 Hydraulic Jack Leg Installation - Configuration 1

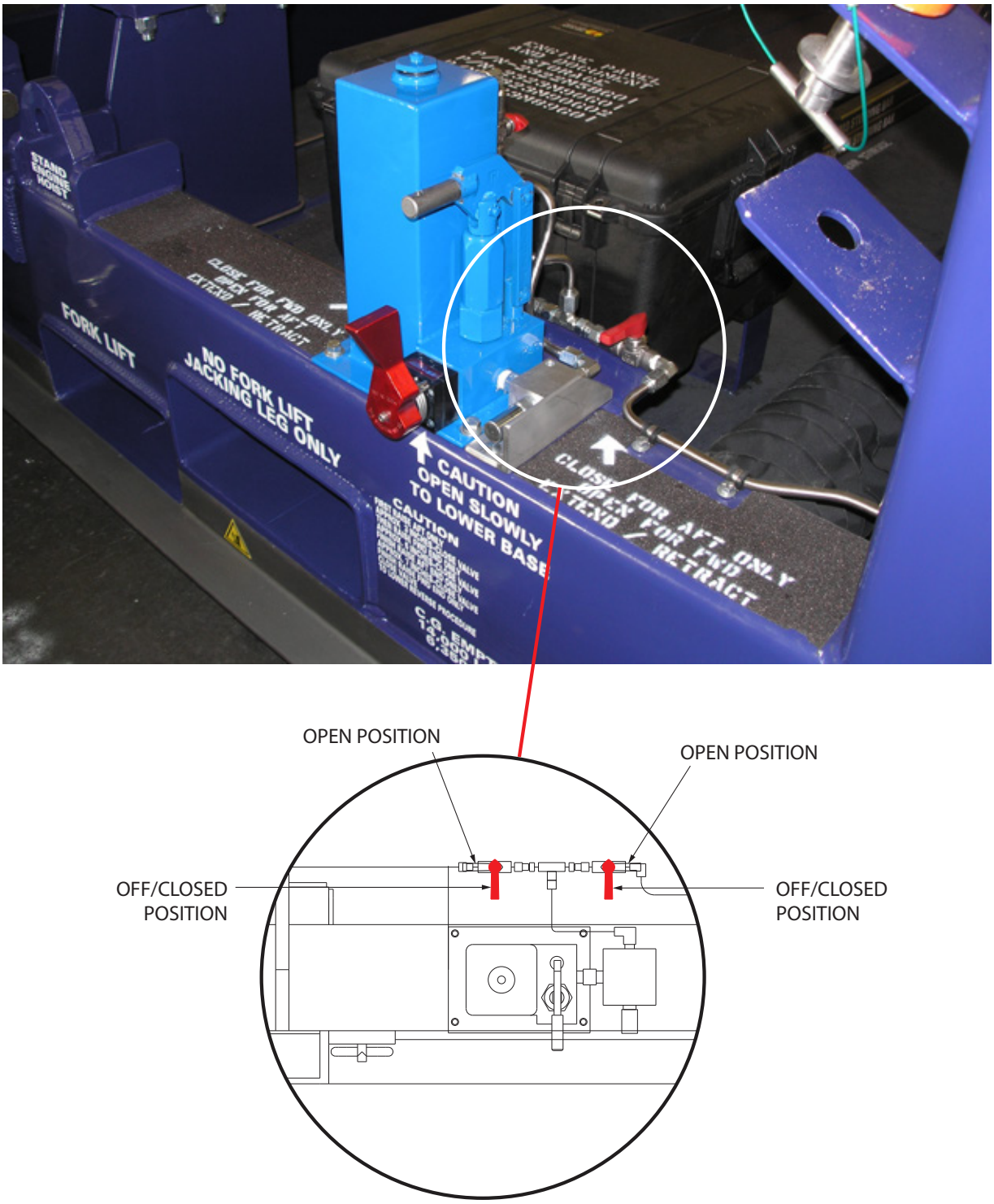


Figure 5.8.1-2 Hydraulic Jack Leg Valves - Configuration 1

WARNING

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

5.8.2 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 5.8.2-1). 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.

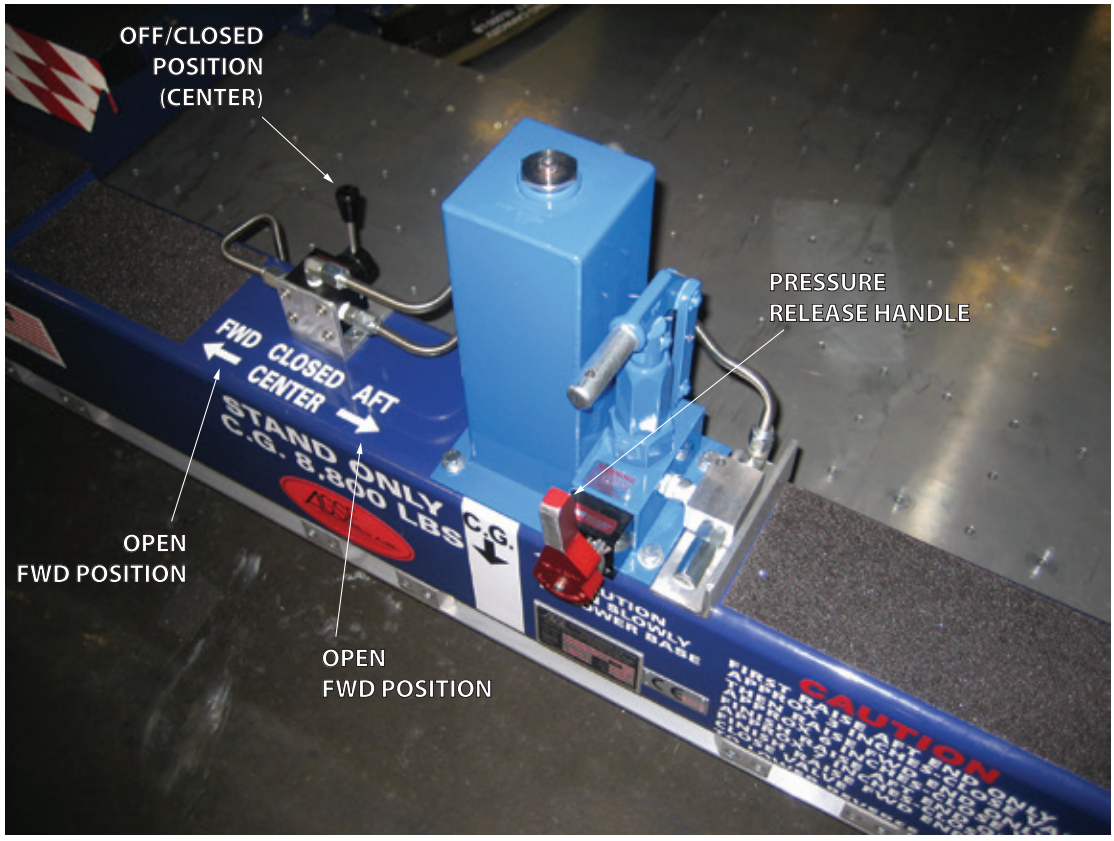


Figure 5.8.2-1 Hydraulic Jack Leg Valves - Configuration 2

5.9 Manual Jacking Leg Usage and Operation

5.9.1 Usage

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

1. Install casters.
2. Install shock mounts.
3. Lift stand 48”off the ground.

5.9.2 Operation

1. Install the two (2) AGSE-E21521-DLH-S05 RH and two (2) AGSE-E21521-DLH-S06 LH leg mount adapter assemblies in the jacking leg mounting sockets on the base. Secure using the AGSE-E16621-DLH-P07 safety pins and retainer clips. (Figure 5.9-1).

NOTE

There are RH and LH leg support assemblies with tapered spacer block facing AFT.

2. Install the four (4) AGSE-E21521-DLH-S03 jacking leg assemblies on the leg mount adapters using the provided AM-91000-98T-H900 safety pins.
3. Use the provided ratchet crank handle secured with hand know to raise or lower the stand. The top shaft position is for high speed (for no or low load) and the bottom shaft position is for low speed (for high load).

CAUTION

The maximum difference in jack 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 traveling past the end of the jack screw.

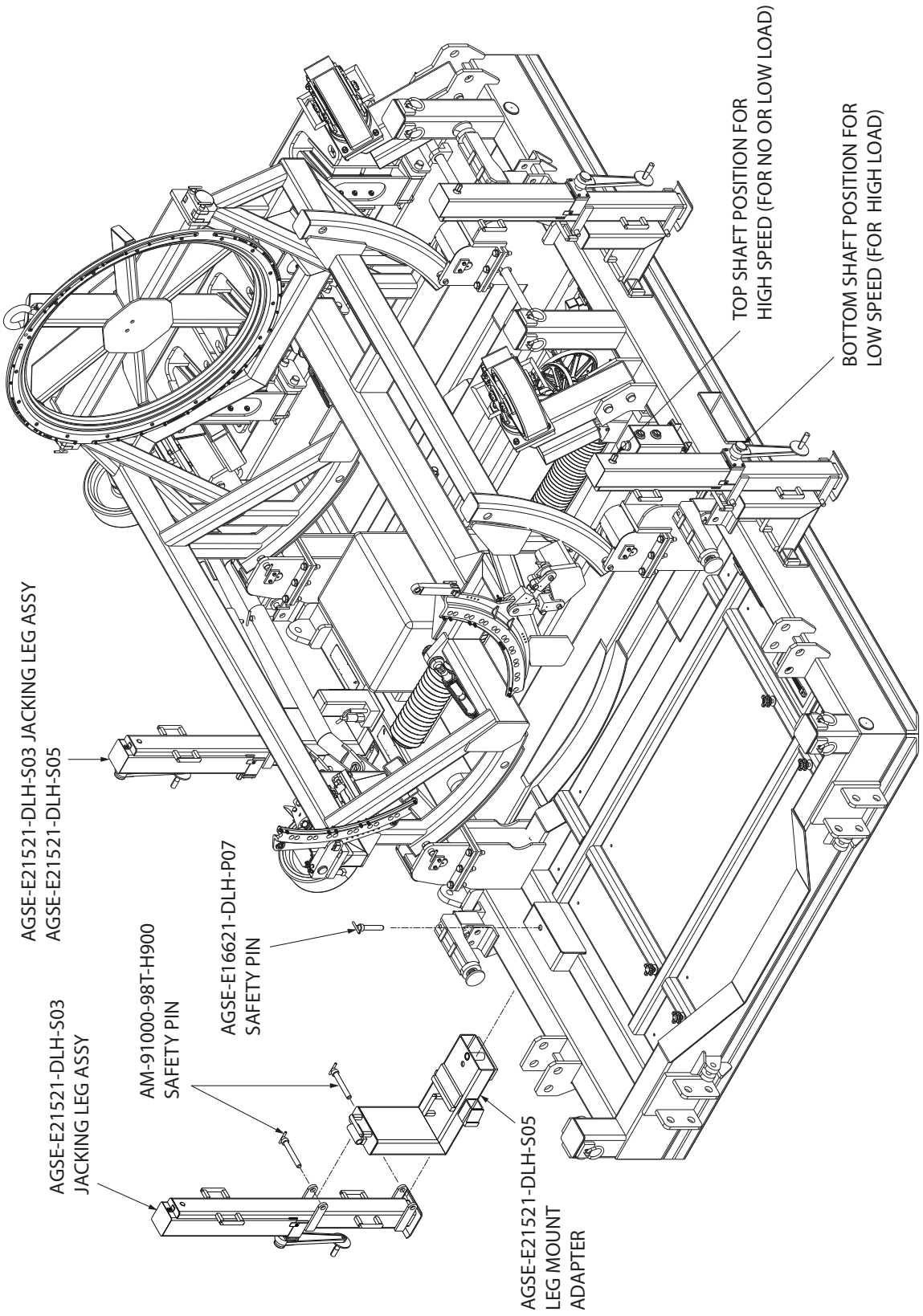

AGSE-E21521-DLH-S03 JACKING LEG ASSY
AGSE-E21521-DLH-S05
AGSE-E21521-DLH-S03
JACKING LEG ASSY
AM-91000-98T-H900
SAFETY PIN
AGSE-E16621-DLH-P07
SAFETY PIN
AGSE-E21521-DLH-S05
LEG MOUNT
ADAPTER
TOP SHAFT POSITION FOR
HIGH SPEED (FOR NO OR LOW LOAD)
BOTTOM SHAFT POSITION FOR
LOW SPEED (FOR HIGH LOAD)

Figure 5.9-1

5.10 Shock Mount Installation

5.10.1 Usage

The shock mounts are used when transporting the engine stand on non air-ride equipped tractor trailer. Only use 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.

5.10.2 Installation

1. Lift stand approximately 12,7 cm (5”) off the ground using jacking legs or a hoist system.
2. Remove shock mounts from their storage locations at the AFT end of the stand base by removing the AM-91500-150T-H900 safety pins.
3. Install the shock mounts on stand base and secure with the safety pins. (Figure 5.10-1).

CAUTION

Shock mounts must be replaced when any of the following conditions exist:

- **Date stamp is older than eight (5) years.**
- **Rubber mount is deteriorated**
- **Rubber is dis-bonded from mounting plate**
- **Mount does not move when empty.**

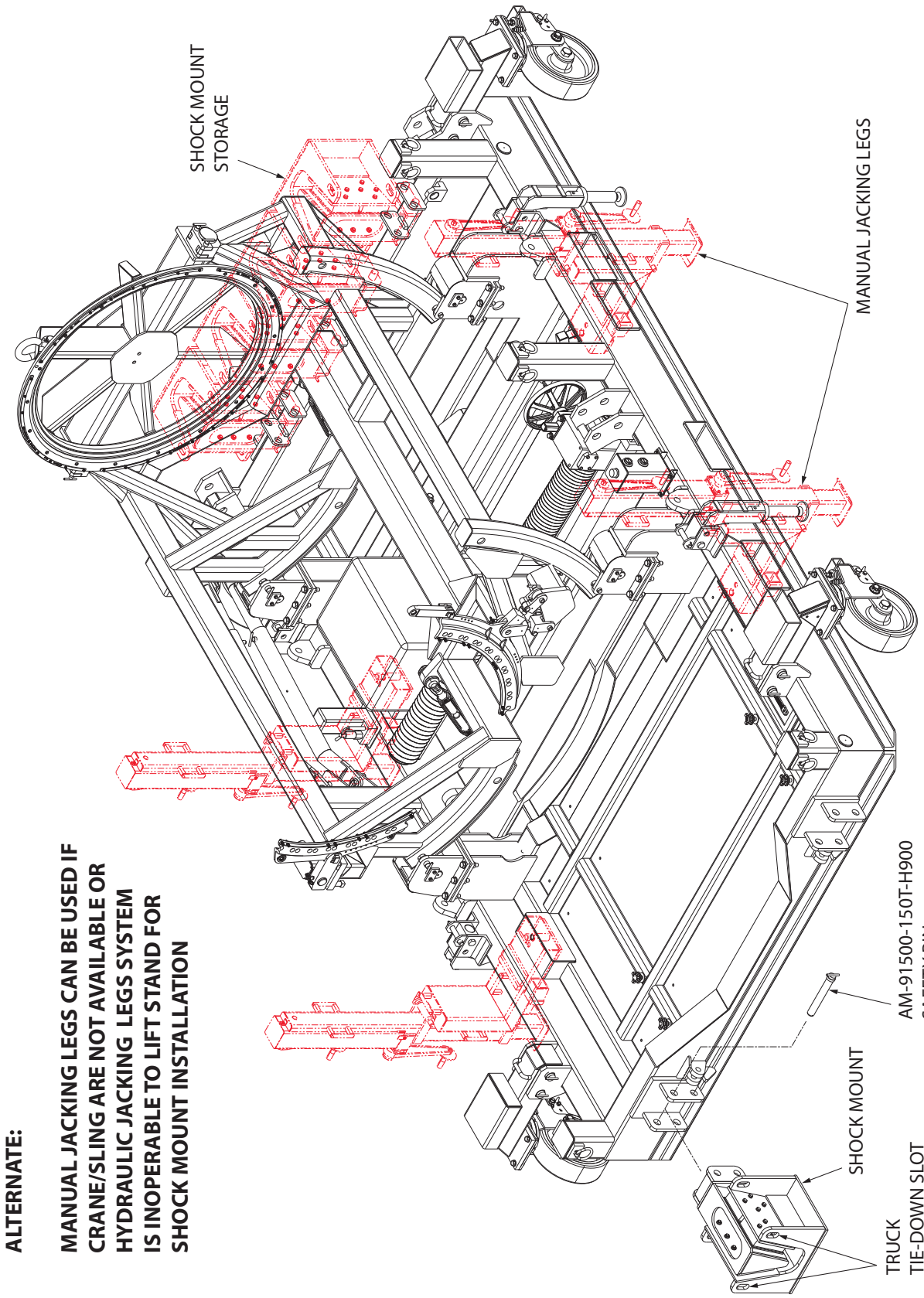


Figure 5.10-1 Shock Mount Installation

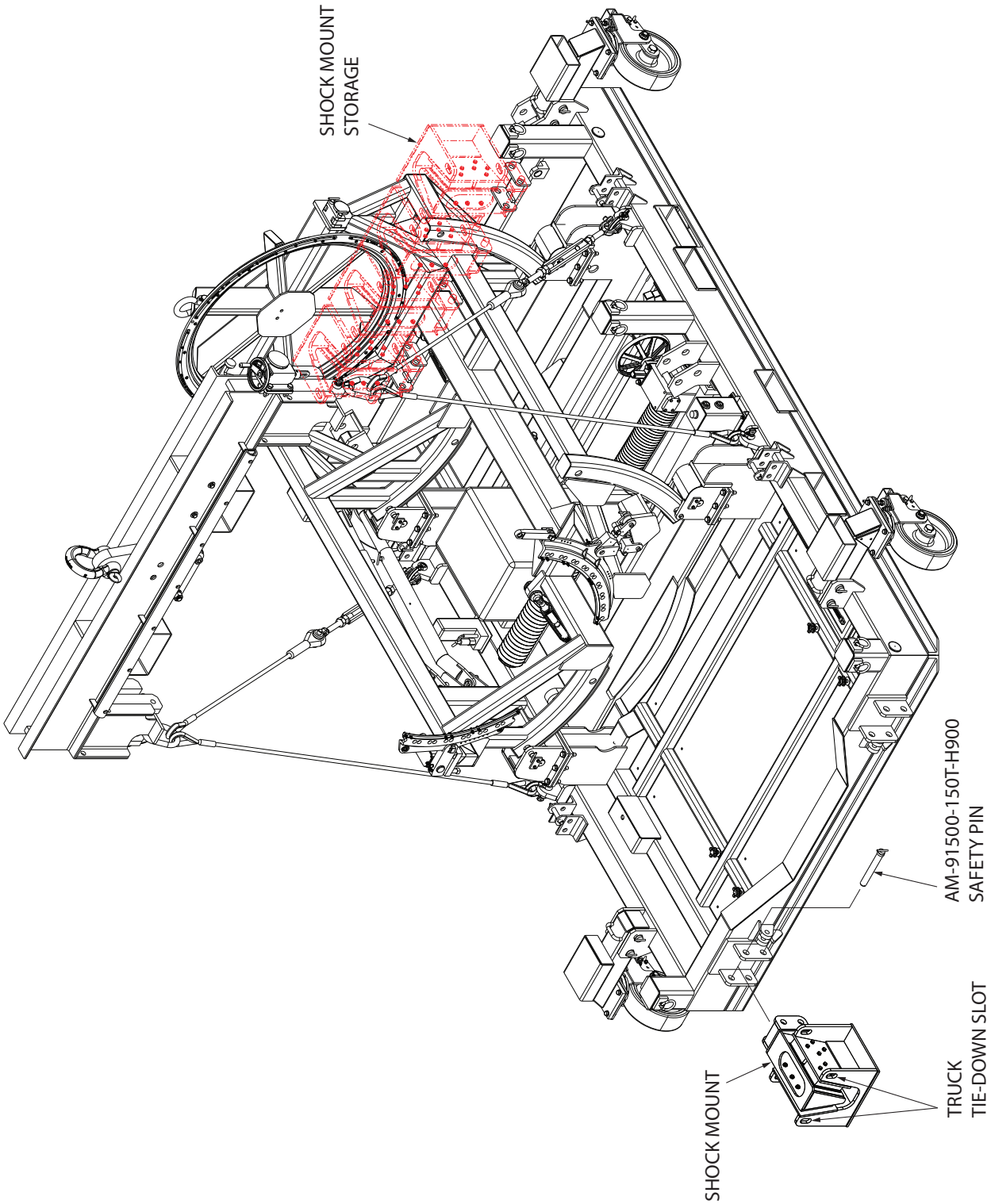


Figure 5.10-2 Shock Mount Installation Using a Sling

6.0 – SAFETY

6.1 Stress

Design stress safety factors are compliant with industry standards (ASME B30.9-1990).

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.

CAUTION

Any deficiency revealed through inspection must be reported to supervisory personnel. A determination must be made prior to resuming operation, as to whether the deficiency constitutes a safety hazard to personnel or equipment.

It is the operator's responsibility to report any deficiencies, unusual noises, or operating conditions to supervisory personnel. It is also the responsibility of the user of this equipment to discontinue use until they are assured that the deficiency has been corrected.

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. Also reference all warranties, service procedures and maintenance schedules from the vendor brochures, manuals and flyers listed at the end of this manual.

6.4 Risk Assessment

6.4.1 Limits of the Machinery

The AGSE-E215-DLH-G01 All-purpose Roll-Over Stand is a commercial product designed specifically only to store and/or transport the GEnx-2B 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-2B All-purpose Roll-Over 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-E215-DLH-G01 All-Purpose Roll-Over 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 within 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.

CE

ADVANCED GROUND SYSTEMS ENGINEERING LLC

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-2B
Model:	AGSE-E215
Part Number:	AGSE-E215-DLH-G01
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, 11C4319P01, GEnx-2B 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 it's 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 manufacturers 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 the voiding of the warranty.

8.0 – Parts Breakdown

8.1 General

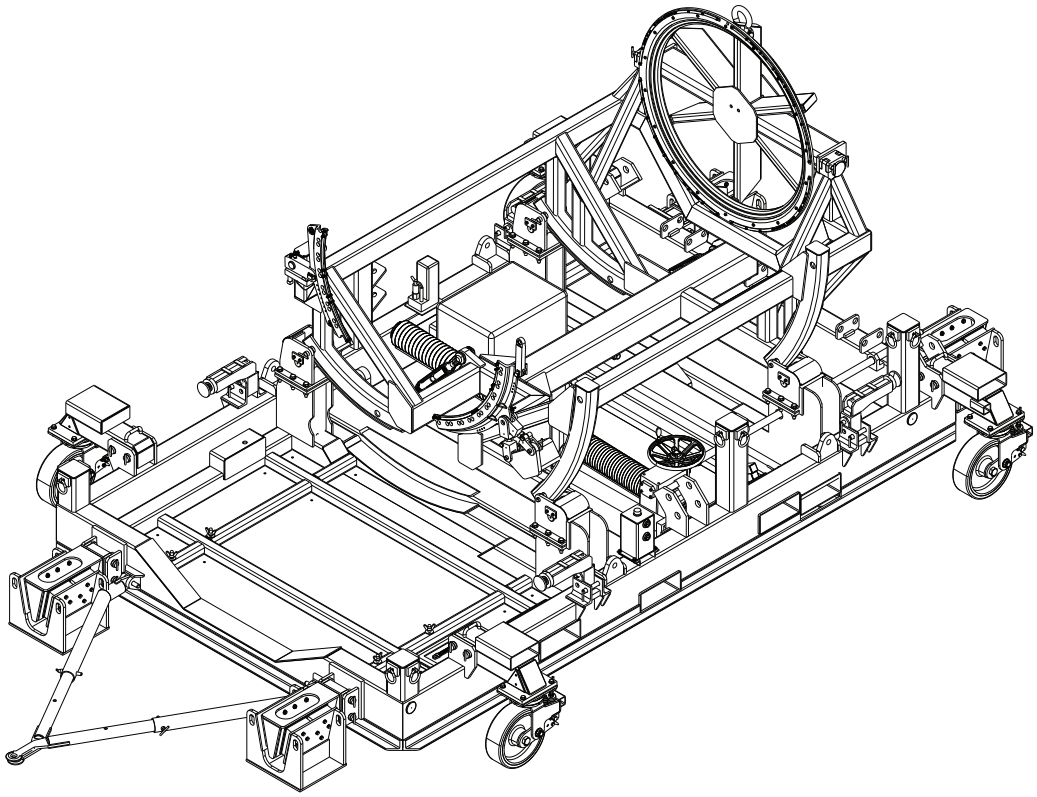
The following pages can be used in the identification of components used in the product described in this manual. Parts Lists are broken down by “ITEM”, “PART NUMBER”, “QTY”, and “DESCRIPTION”.

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.

Purchased parts will reflect a valid part number and source from which the product may be purchased. AGSE does not guarantee availability of purchased parts indefinitely.

8.2 Illustrated Parts Breakdown



AGSE-E215-DLH-G01 Rollover Engine Ship Stand

IPB Figure 1 - AGSE-E215-DLH-G01
Rollover Engine Ship Stand Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E215-DLH-G01	-	Roll-over Engine Ship Stand Assy (Figure 8.1-1)
1	AGSE-E215-G01	1	Rollover Engine Stand (See IPB Figure 2 for Details)
2	AGSE-E21526-DLH-S01	1	Tow Bar Assy (See IPB Figure 14 for Details)
3	AGSE-E21522-DLH-S01	1	Jack Leg Hydraulic System (See IPB Figure 18 for Details)
4	AGSE-E21504-DLH-P01	1	Placard - AFT Valve Positioning Raise/Lower
5	AGSE-E21505-DLH-P01	1	Placard - Before Rolling Engine and Cradle
6	AGSE-E21506-DLH-P01	1	Placard - FWD Valve Positioning Raise/Lower
7	AGSE-E21507-DLH-P01	1	Placard - Jacking Leg Raising/Lowering Procedure
8	AGSE-E21508-DLH-P01	1	Placard - Caution - Open to Lower Base
9	AGSE-E21509-DLH-P01	1	Placard - Rapid Retract Cylinders
10	AGSE-E21510-DLH-P01	2	Placard - Fork Tine Length
11	AGSE-E21502-DLH-P01	2	Tow Bar Stop Block
12	AGSE-E21512-DLH-P01	2	Placard - Rapid Retract Cylinders (German)
13	AGSE-E21513-DLH-P01	2	Placard - Fork Tine Length (German)
63	AGSE-S00135-N8A05	6	Washer, Locking
64	AGSE-S00131-N8A05	6	Washer
65	AGSE-S00102-N8C008A05	6	#8-32 RHPMS - 1/2” Lg - SS
66	AGSE-S00102-03C008A05	4	#10-32 RHPMS - 1/2” Lg - SS
67	AGSE-S00131-03A05	4	Washer
68	AGSE-S00135-03A05	4	Washer, Locking
69	AGSE-S00111-P02	2	Reflector
70	AGSE-S00211-P03	2	Reflector - 2020 Tri-Angle Reflex
71	AGSE-S00111-P01	4	Reflector

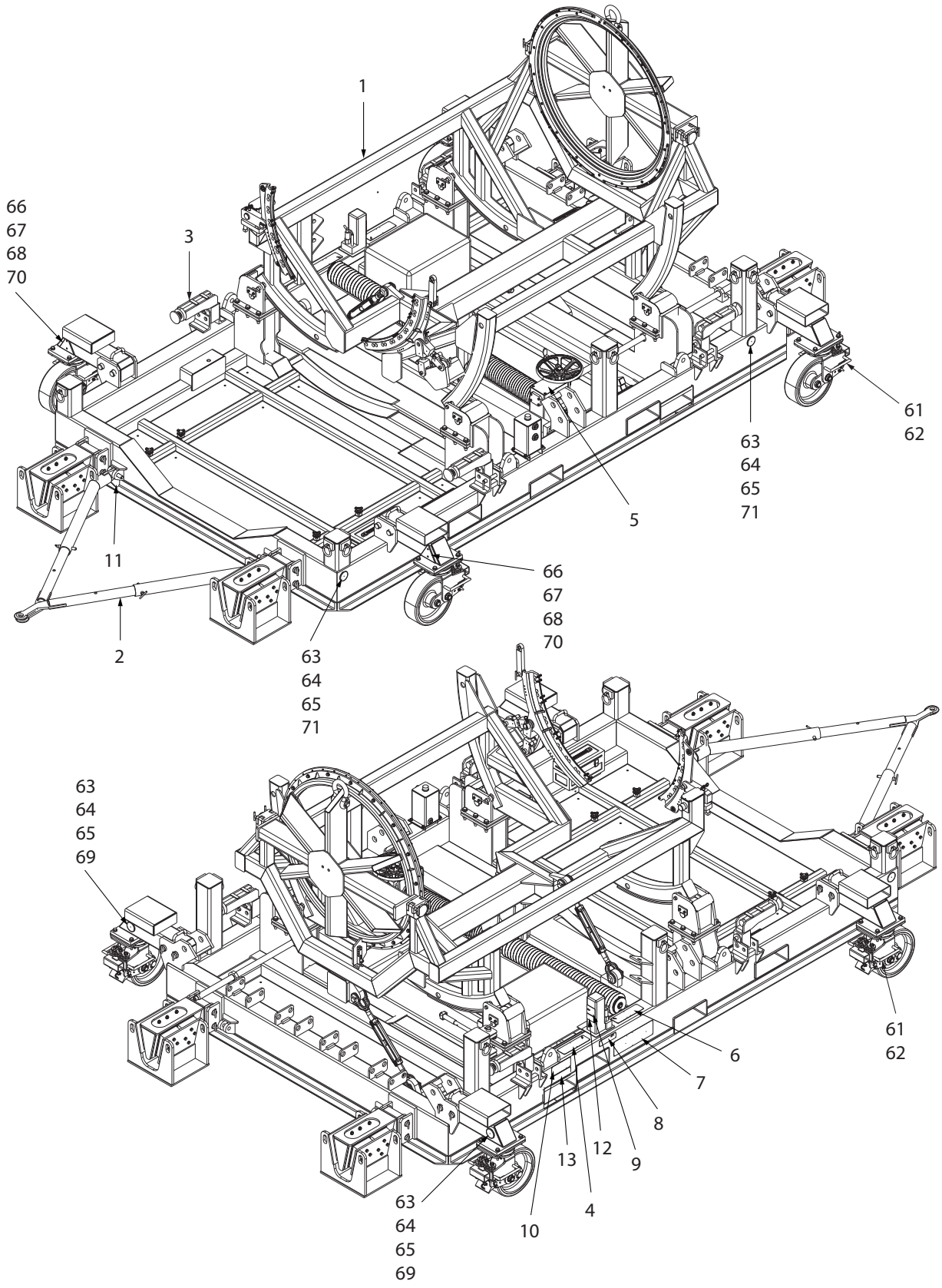

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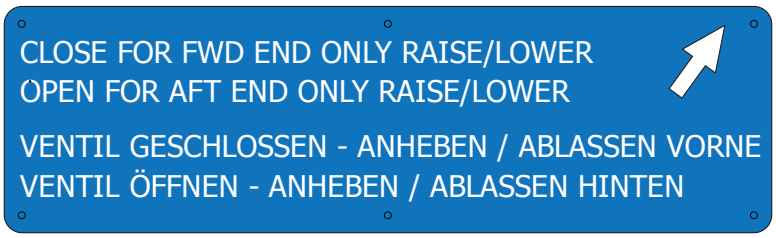
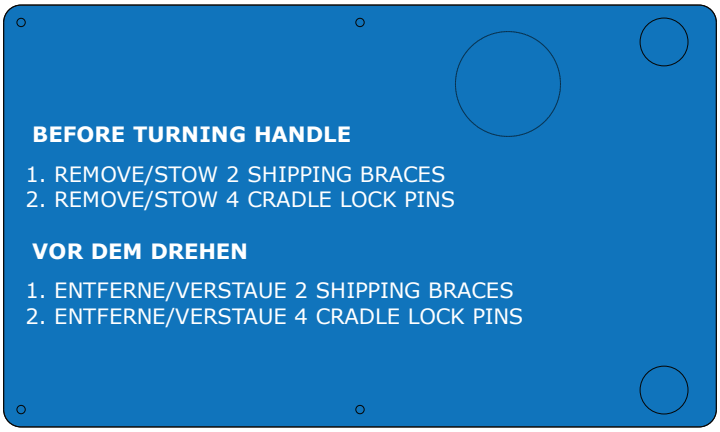
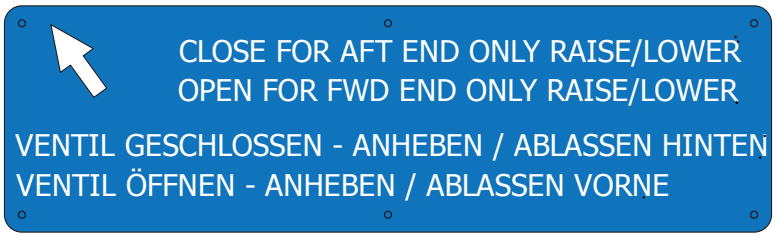
Figure 8.1-1



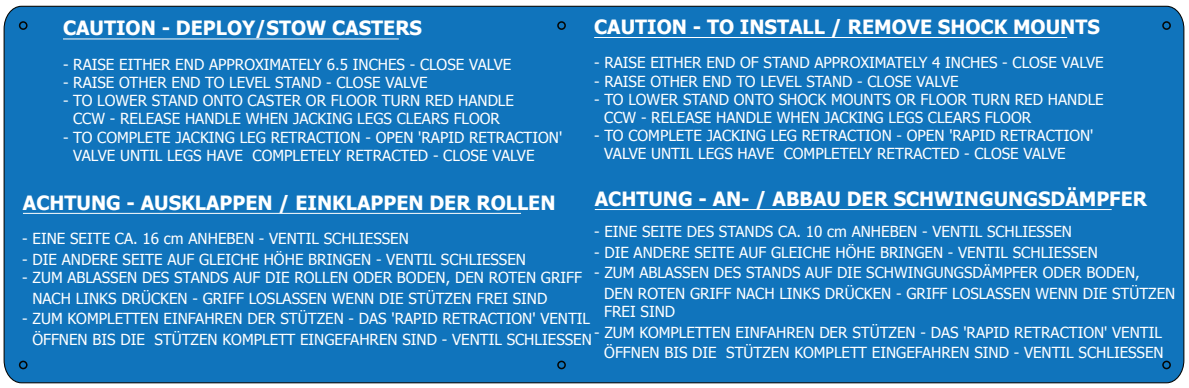
ITEM 4 - AGSE-E21504-DLH-P01



ITEM 5 - AGSE-E21505-DLH-P01



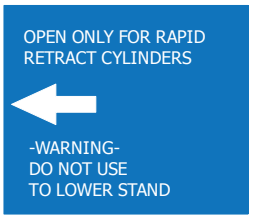
ITEM 6 - AGSE-E21506-DLH-P01



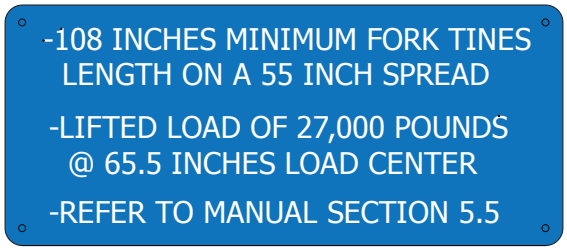
ITEM 7 - AGSE-E21507-DLH-P01

Figure 8.1-2

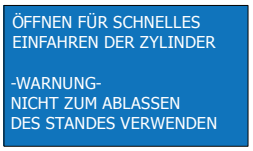
ITEM 8 - AGSE-21508-DLH-P01



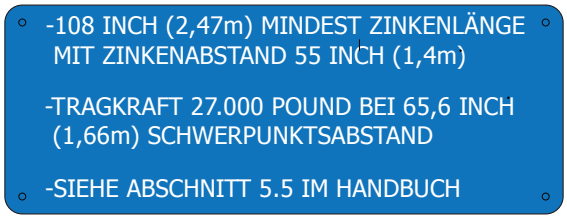
ITEM 9 - AGSE-21509-DLH-P01



ITEM 10 - AGSE-21510-DLH-P01



ITEM 12 - AGSE-21512-DLH-P01



ITEM 13 - AGSE-21513-DLH-P01

Figure 8.1-3

IPB Figure 2 - AGSE-E215-G01
Rollover Engine Ship Stand Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E215-G01	-	Roll-over Engine Ship Stand Assy (Figure 8.2-1)
1	AGSE-E21501-S01	1	Base Assy (See IPB Figure 9 for Details)
2	AGSE-E21507-S01	1	Cradle Assy (See IPB Figure 3 for Details)
3	AGSE-E16626-S04	1	Cradle Jack Assy (See IPB Figure 11 for Details)
4	AGSE-E21513-S01	1	Fail Safe Cylinder Assy (See IPB Figure 12 for Details)
5	AGSE-E21514-S01	REF	Reservoir Assy - 1 Gal Cap (Ref IPB Figure 12 - Item 6)
6	AGSE-E21517-P02	4	Handknob - Modified
7	AGSE-S00235-P01	2	Turnbuckle
8	AGSE-S00195-P01	1	Hex L-Key
9	AGSE-S00188-P01	1	Wrench
10	ADV004SC-10	1	Storage Case
11	AGSE-S00104-04C012A01	7	Screw, Hex Head
12	AGSE-S00135-04A17	7	Washer, Locking
13	AGSE-S00134-04D032T03A01	7	Washer, Oversized
14	AGSE-E21522-DLH-S01	1	Jacking Leg Hyd System Installation
16	AGSE-E16620-S01	4	Shock Mount Assy (See IPB Figure 16 for Details)
17	AGSE-E16616-S03	4	Caster Mount Assy (See IPB Figure 15 for Details)
18	AGSE-E10709-S01	4	Jack Leg Assy
20	AGSE-E21523-S01	1	Pump Handle and Safety Pin Assy

IPB Figure 2 - AGSE-E215-G01
Rollover Engine Ship Stand Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
21	AGSE-E10710-P03	2	Caster Steering Bar
22	AM-90375-38L	1	Safety Pin Assy (Caster Steering Bar)
23	AFP14487-1620	1	Container Case
24	AM-91000-25T	4	Safety Pin (Tow Bar Stow)
25	AGSE-E21527-P02	4	Placard “INCORRECT TIE-DWN VERSION”
26	AGSE-E21527-P01	4	Placard “CORRECT TIE-DWN VERSION”
27	AGSE-S00125-P01	32	Drive Screw
30	AM-91000-74L	4	Safety Pin - 1” Dia. x 4-5/8” Grip
32	AGSE-E21517-P01	2	Connecting Pin
33	AGSE-S00104-06C016A01	4	Screw, Hex Head
34	AGSE-S00135-06A17	4	Washer, Locking

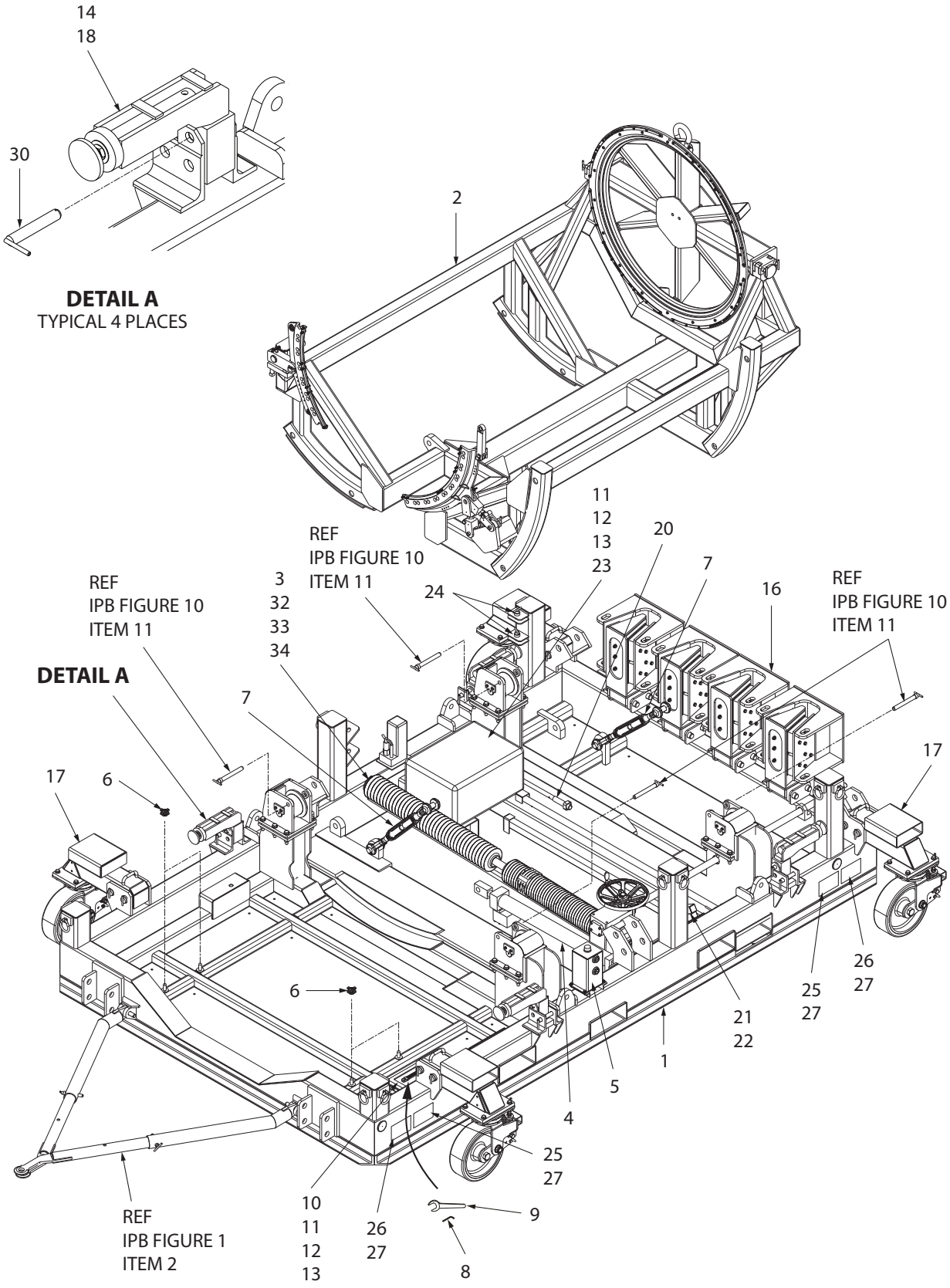


Figure 8.2-1 AGSE-E215-DLH-G01 Roll-Over Ship Stand

IPB Figure 3 - AGSE-E21507-S01
Cradle Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21507-S01	-	Cradle Assy (Figure 8.3-1)
1	AGSE-E21507-P01	1	Cradle Weldment
2	AGSE-E21508-S01	1	Strong Back Assy - GEnx-2B (See IPB Figure 8 for Details)
3	AGSE-E21518-S01	1	FWD Engine Support Assy (See IPB Figure 4 For Details)
4	AGSE-E18407-P03	2	Cap
5	AGSE-E18411-P02	1	Index Pin
6	AGSE-E10805-P03	1	Cap
7	AGSE-E10805-P06	1	Set Screw - Modified
8	AM-90750-48T	4	Safety Pin
9	AGSE-E10805-P05	2	Shaft Collar - 2” Bore
	6435K470	0	*Superseded by AGSE-E10805-P05, April 2022*
10	AGSE-S00202-P03	1	T-Handle Ball Lock Pin
11	AGSE-S00135-16A05	1	Washer, Locking
12	AGSE-S00139-16CA05	1	Nut
13	AGSE-S00104-04C012A05	2	Screw, Hex Head
14	AGSE-S00131-04A05	2	Washer
15	AGSE-S00135-04A05	2	Washer, Locking
16	AGSE-S00287-P02	1	Latch
17	AGSE-S00114-03F010A05	3	Screw, Socket Head
18	AGSE-E18429-P01	2	Pivot Stop
19	AGSE-S00104-04C028A05	4	Screw, Hex Head
20	AGSE-S00131-08A17	4	Washer
21	AGSE-S00153-04CA05	4	Nut

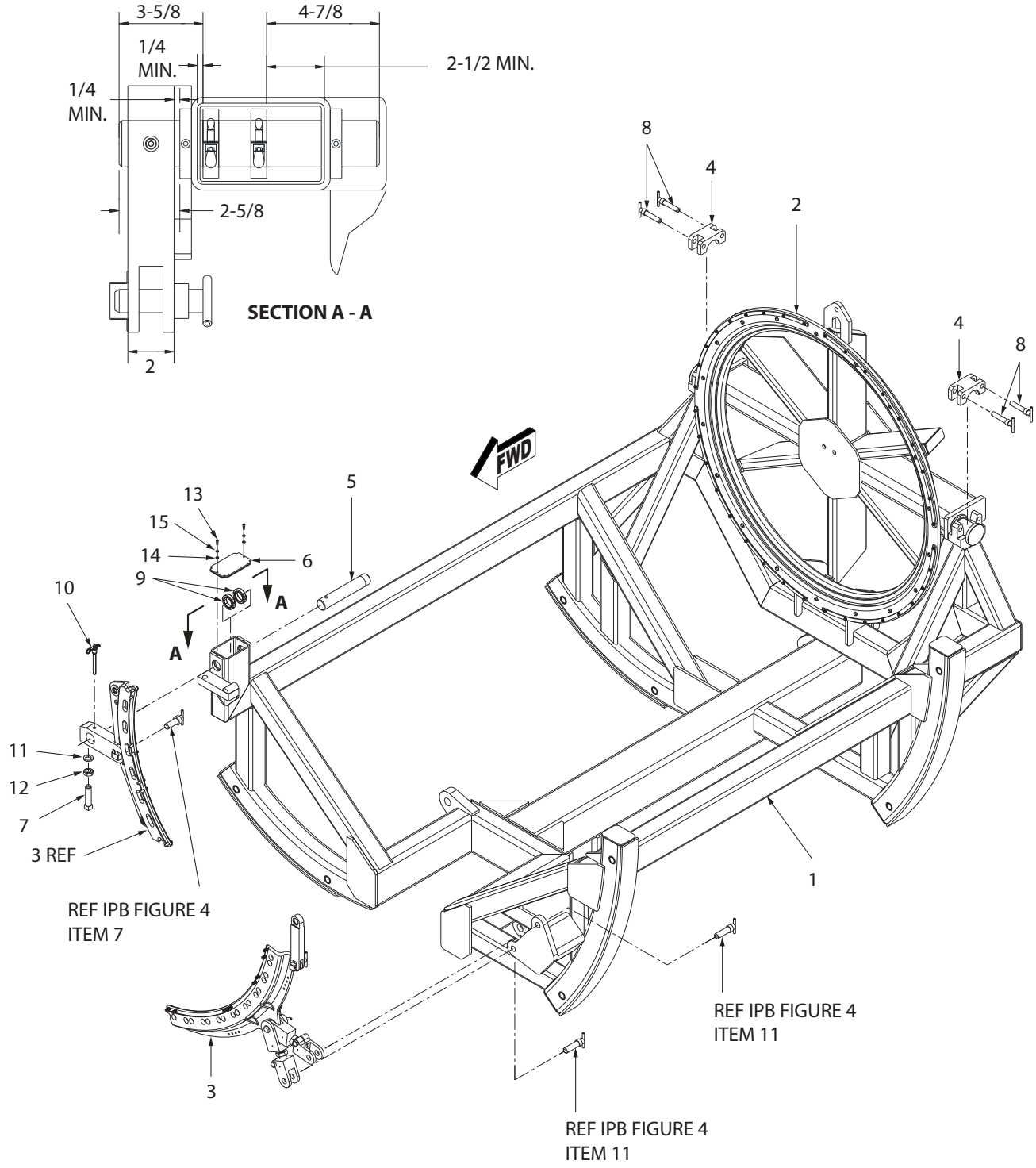


Figure 8.3-1 AGSE-E21507-S01 Cradle Assembly

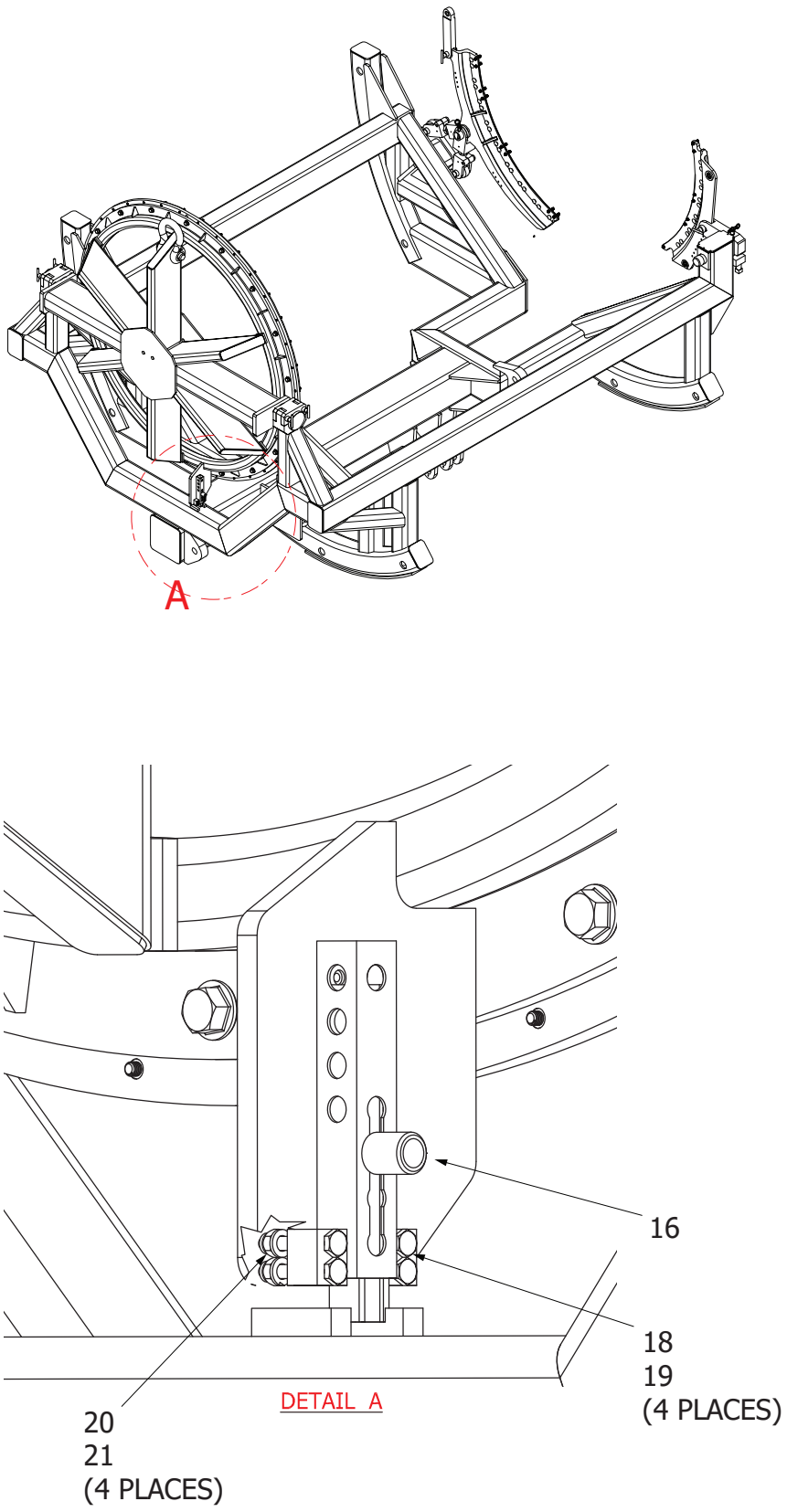


Figure 8.3-2 AGSE-E21507-S01 Cradle Assembly

IPB Figure 4 - AGSE-E21518-S01
FWD Engine Support Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21518-S01	-	FWD Engine Support Assy (Figure 8.4-1)
1	AGSE-E18414-S02	1	Outer Support Link Assy (See IPB Figure 4 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-E21504-P01	1	Support Bracket - LH
5	AGSE-S00155-06F020A35	15	Screw, 12 Point
6	AGSE-E17611-S03	1	Support Bracket Assy - RH
7	AM-91000-32-H1025	1	Safety Pin Assy
8	AGSE-E18411-P01	1	Bracket Support
9	AGSE-S00126-12C16S40A33	2	Shoulder Bolt
10	AGSE-S00153-12CA03	2	Nut - Locking

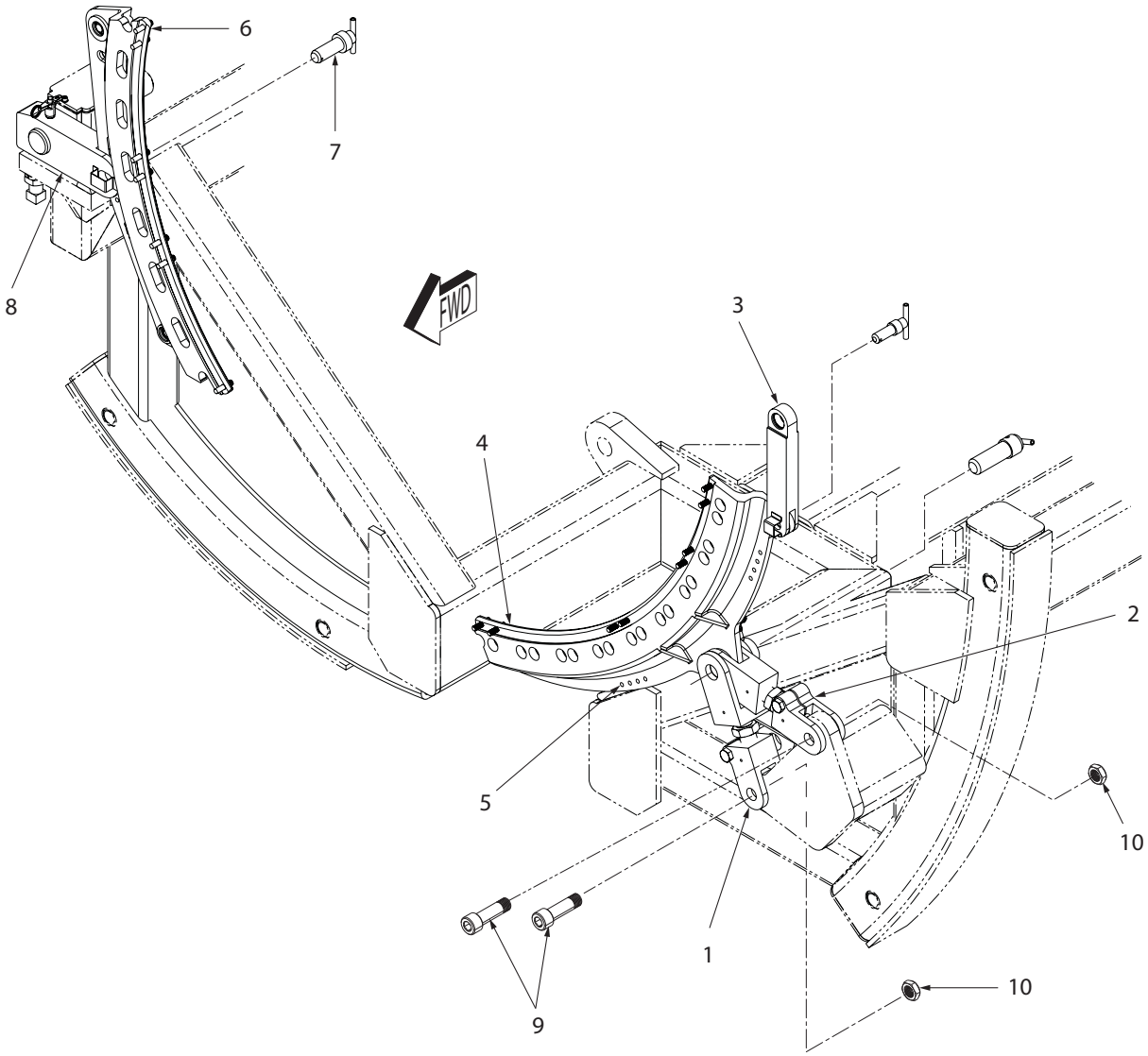


Figure 8.4-1 AGSE-E21518-S01 FWD Engine Support Assembly

IPB Figure 5 - AGSE-E18414-S02 and -S03 Support Link Assemblies

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E18414-S02	-	Outer Support Link Assy (Figure 8.5-1)
	AGSE-E18414-S03	-	Inner Support Link Assy (Figure 8.5-1)
1	AGSE-18414-P01	1	Clamping Clevis (Used on AGSE-E18414-S03)
2	AGSE-E18414-P03	2	Adjusting Screw
3	AGSE-E18414-P04	1	Outer Clevis (Used on AGSE-E18414-S02)
4	AGSE-18414-P05	1	Inner Clevis (Used on AGSE-E18414-S03)
5	AGSE-S00104-10F040A01	2	Screw, Hex Head
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	AGSE-S00200-P06	1	Ring Handle Ball Lock Pin (Used on AGSE-E18414-S02)

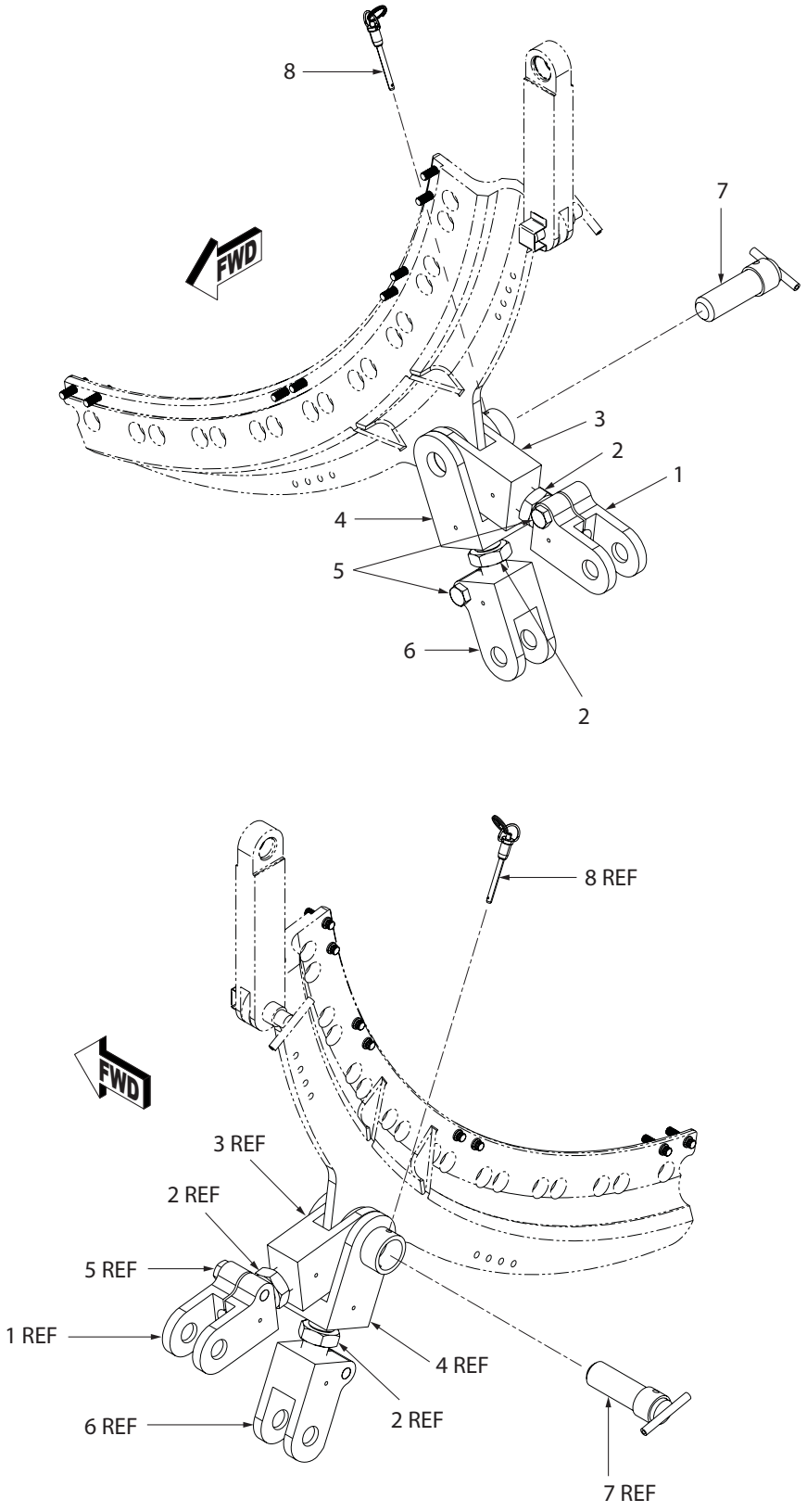


Figure 8.5-1 Outer and Inner Support Link Assemblies

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	AGSE-S00275-P01	1	Self-Lubricating Bearing
3	AGSE-S00274-P01	1	Internal Snap Ring
4	AM-90750-20-H900	1	Safety Pin Assy

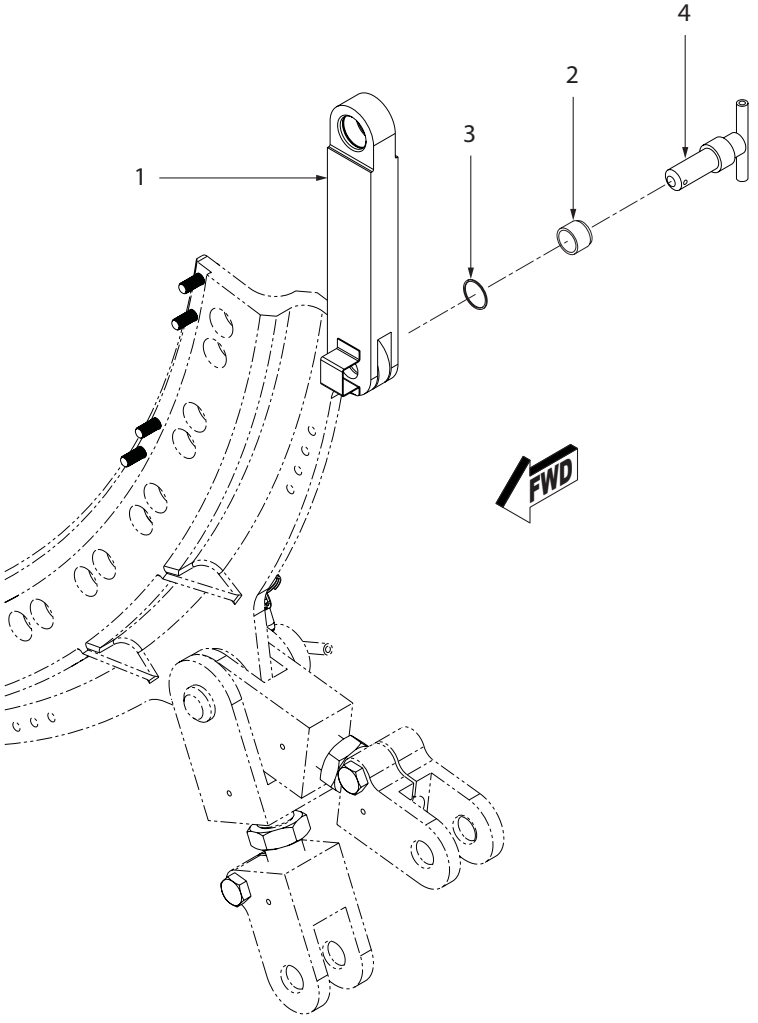


Figure 8.6-1 Hoist Link Assembly

IPB Figure 7 - AGSE-E17611-S03
RH Support Bracket Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E17611-S03	-	RH Support Bracket Assy (Figure 8.7-1)
1	AGSE-E17614-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	AGSE-S00221-P01	2	Retaining Ring
7	AGSE-S00221-P02	1	Retaining Ring
8	AGSE-S00275-P01	1	Self-Lubricating Bearing
9	AGSE-S00274-P01	1	Snap Ring
11	AGSE-S00184-P01	1	Plain Spherical Bearing
12	AGSE-S00274-P02	1	Snap Ring
13	AGSE-E17630-P02	1	2B Tag
14	AGSE-S00125-P01	4	Drive Screw

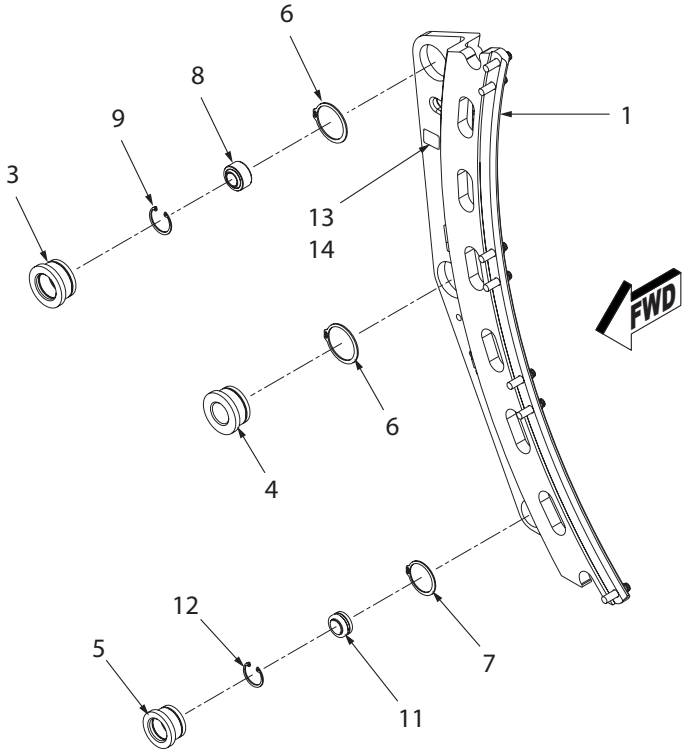


Figure 8.7-1 AGSE-E17611-S03 RH Support Bracket Assembly

IPB Figure 8 - AGSE-E21508-S01
Strong Back Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21508-S01	-	Strong Back Assy (Figure 8.8-1)
1	AGSE-E21509-P01	1	Strong Back Weldment
2	AGSE-E21510-P01	1	Spacer Ring
3	AGSE-E21511-P01	4	Quarter Backup Ring
4	AGSE-E21512-P01	18	Strong Back Bolt - 1/2”-20 UNF - 304 SS
5	AGSE-S00155-04F016A21	36	Screw, 12 Point
6	AGSE-S00145-04FA21	36	Nut, 12 Point
7	AGSE-S00176-P06	1	Shackle Pins

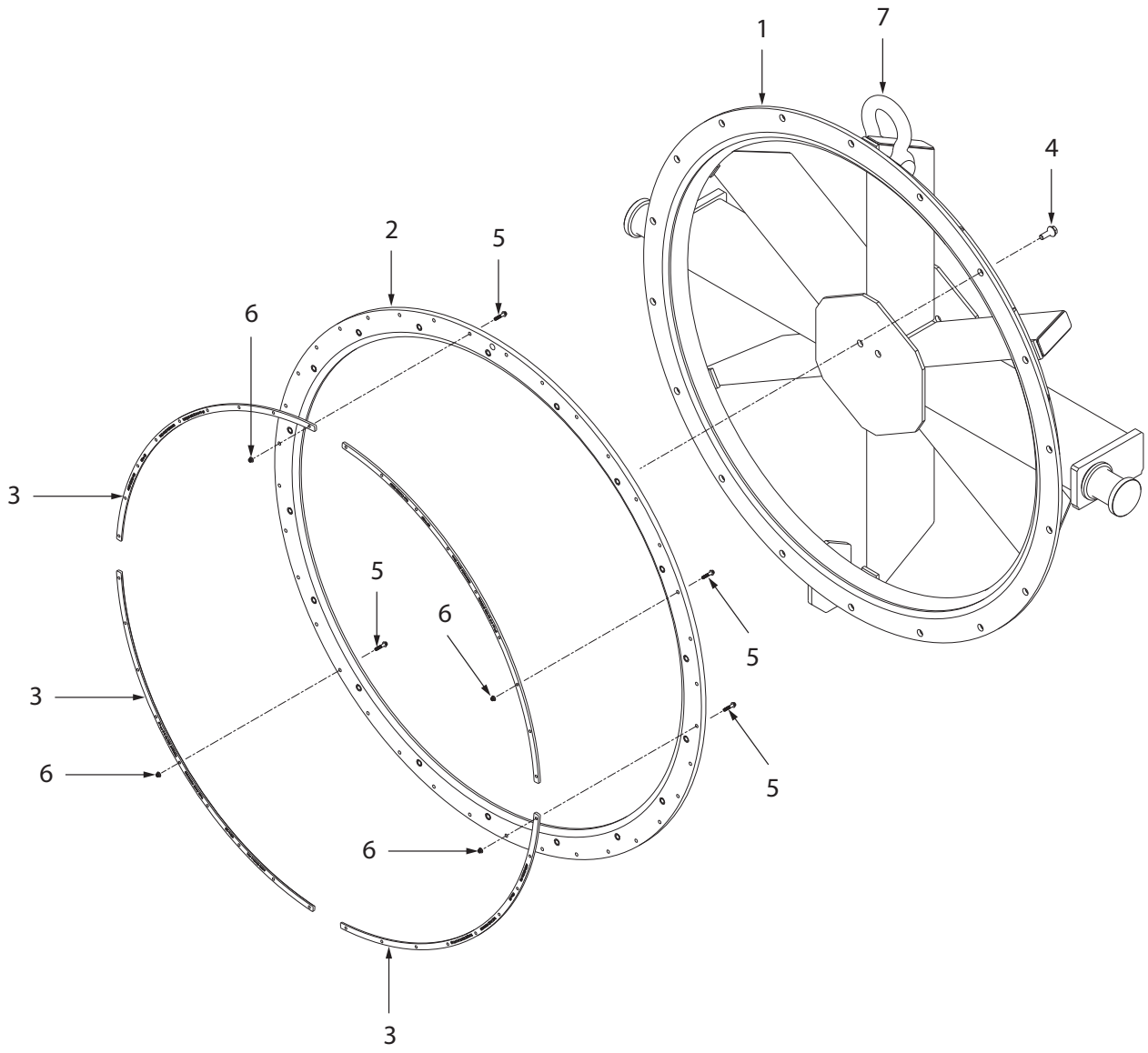


Figure 8.8-1 AGSE-E21508-S01 Strong Back Assembly

IPB Figure 9 - AGSE-E21501-S01
Base Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21501-S01	-	Base Assy (Figure 8.9-1)
1	AGSE-E21501-P01	1	Base Weldment
2	AGSE-E21502-S01	2	Roller Mount Assy - RH (See IPB Figure 10 For Details)
3	AGSE-E21502-S02	2	Roller Mount Assy - LH (See IPB Figure 10 For Details)
4*	AGSE-E21502-S03	4	Shim Set
5	AGSE-S00104-12C056A01	24	Screw, Hex Head
6	AGSE-S00131-12A17	48	Washer
7	AGSE-S00150-12CA03	24	Nut, Locking
8	AGSE-S00241-P02	13	Tie-down Ring

* SHIM AS REQUIRED

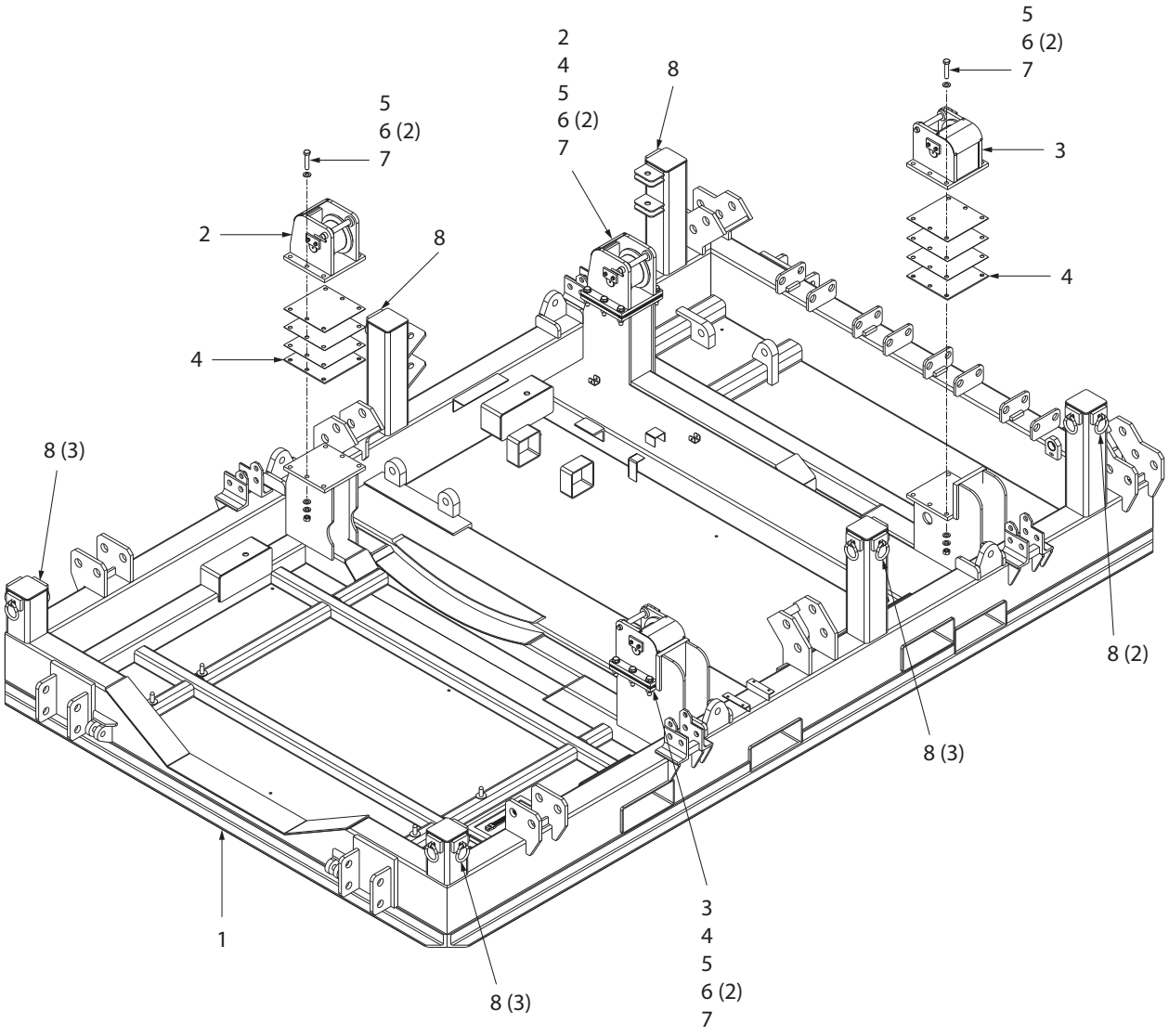


Figure 8.9-1 AGSE-E21501-S01 Base Assembly

IPB Figure 10 - AGSE-E21502-S01/S02 Roller Mount Assemblies

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21502-S01	-	Roller Mount Assy - RH (Figures 8.10-1 and 8.10-2)
	AGSE-E21502-S02	-	Roller Mount Assy - LH (Figures 8.10-1 and 8.10-2)
1	AGSE-E21519-P01	1	Roller Mount -RH (Used on AGSE-E21502-S01)
2	AGSE-E21519-P02	1	Roller Mount - LH (Used on AGSE-E21502-S02)
3	AGSE-E16602-S01	1	Support Roller Assy
4	AGSE-E16602-S02	1	Roller Shaft Assy
5	AGSE-E16602-P05	2	Shaft Keeper
9	AGSE-E21520-P01	1	Roller Guard (Used on AGSE-E21502-S01)
10	AGSE-E21520-P02	1	Roller Guard (Used on AGSE-E21502-S02)
11	AM-91000-120T	1	Safety Pin
12	AGSE-S00104-06C016A01	4	Screw, Hex Head
13	AGSE-S00131-06A17	4	Washer
14	AGSE-S00104-04C008A05	4	Screw, Hex Head
15	AGSE-S00131-04A05	4	Washer
16	AGSE-S00135-04A05	4	Washer, Locking

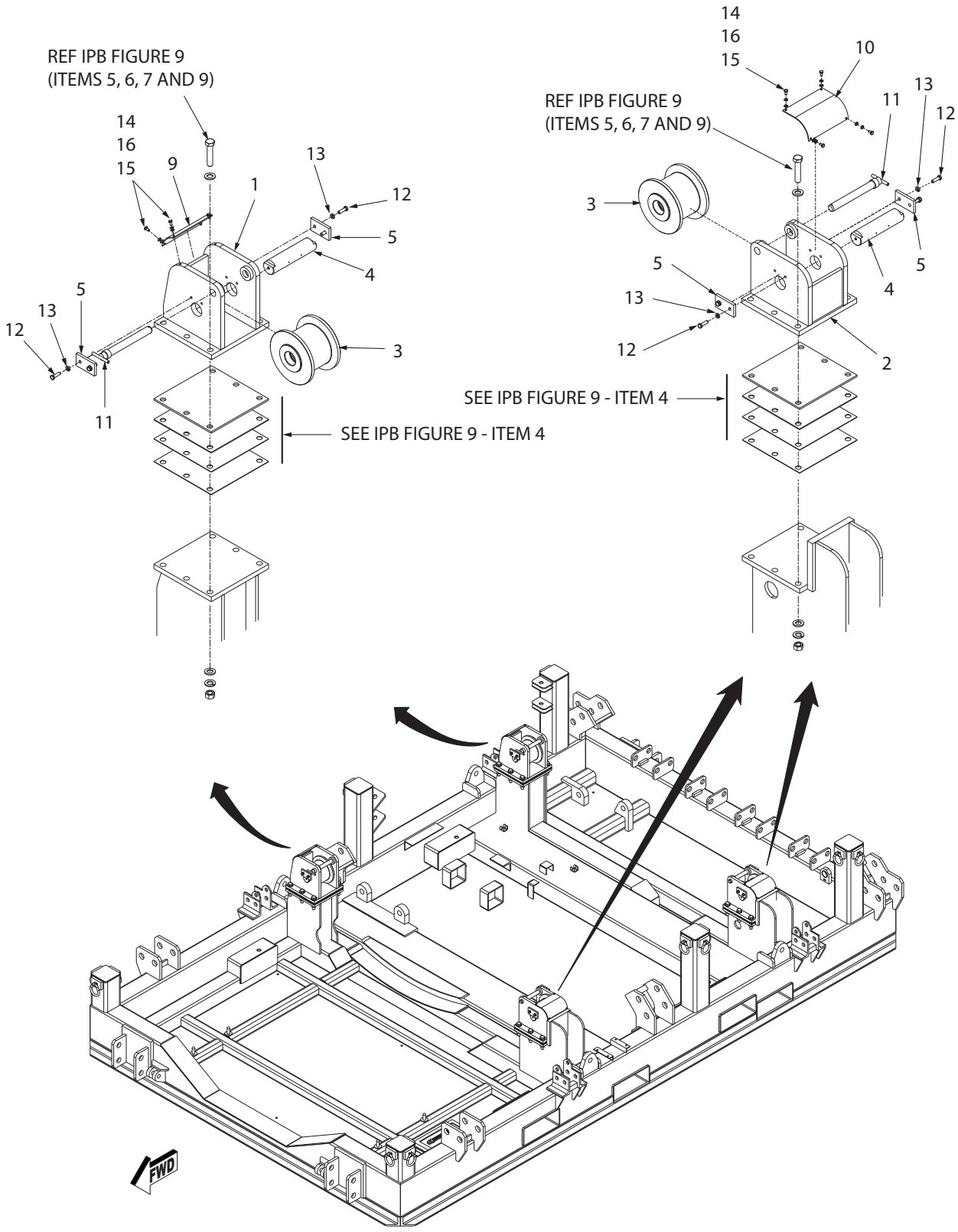
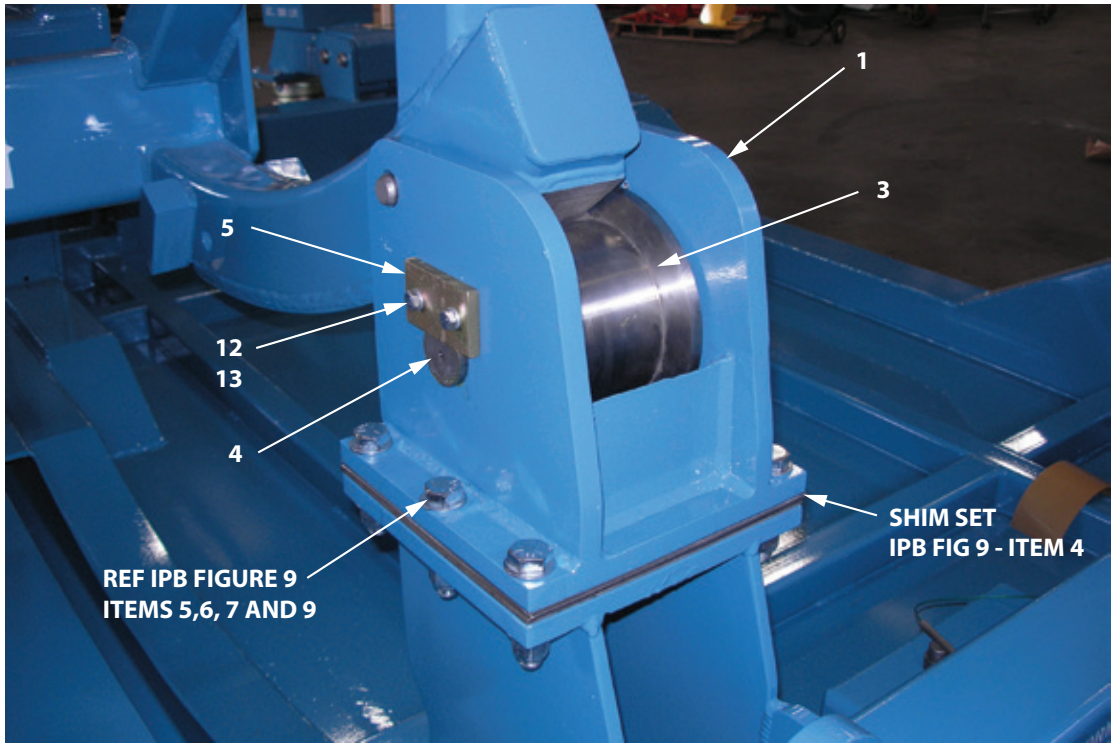
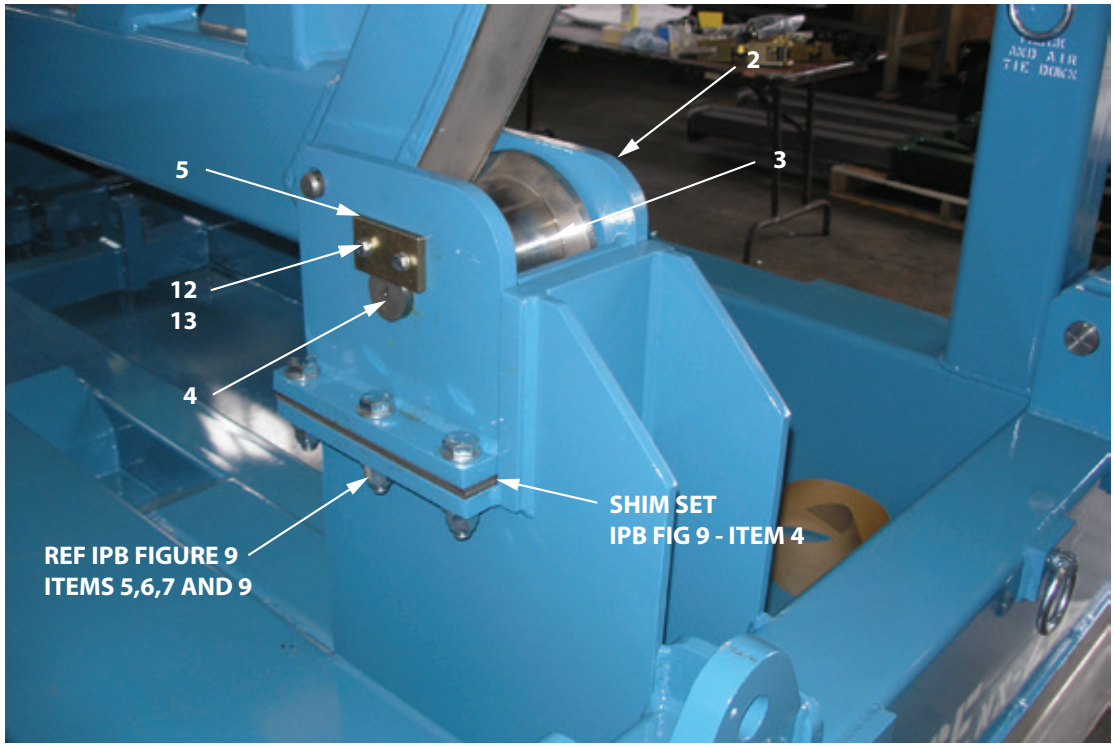


Figure 8.10-1 AGSE-E21502-S01/S02 Roller Mount Assemblies



ITEM 1 - RH ROLLER MOUNT



ITEM 2 - LH ROLLER MOUNT

Figure 8.10-2 Roller Mounts

IPB Figure 11 - AGSE-E16626-S04
Cradle Jack Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E16626-S04	-	Cradle Jack Assy (Figure 8.11-1)
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	2	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	Hand Wheel Pressure Plate
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 - 2.004” OD - 1.504” 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” 842 Single Reduction Hollow Shaft Worm Gear - 40:1 - Assembly PSTN #2 1.688” Bore
17	AGSE-S00187-P01	3	Clamp

IPB Figure 11 - AGSE-E16626-S04
Cradle Jack Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
18	AGSE-S00187-P02	1	Clamp
19	AGSE-E16652-S01	1	Special Nut Assy (for the Ball Screw)
20	9421T21	1	316 SS One-Piece Clamp-on Shaft Collar 1-1/4” Bore - 2-1/16” OD - 1/2” Width
21	9573K16	2	Die Spring - 1/2” OD x 1-1/4” Lg
22	HGF-40	1	Grease Fitting - SS - 1/8” NPT 90^{o}
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	AGSE-S00311-P01	1	Bellows
26	AGSE-S00311-P02	1	Bellows
27	AGSE-S00104-06C016A01	2	Screw, Hex Head
28	AGSE-S00135-06A17	2	Lock Washer - 3/8”
29	AGSE-S00131-06A17	2	Washer - 3/8”
30	AGSE-S00150-06CA01	2	Nut
31	AGSE-S00104-10C024A01	4	Screw, Hex Head
32	AGSE-S00104-10C032A01	4	Screw, Hex Head
33	AGSE-S00135-10A17	8	Washer, Locking
34	AGSE-S00122-14C040A27	4	Screw, Socket Head
35	AGSE-S00136-M14A05	4	Washer, Locking
36	Commercial	1	3/8” Sq Key x 7-9/16” Lg - Plt Key Stock
37	Commercial	1	1/4” Sq key x 2-1/2” Lg - Plt Key Stock
38	AGSE-S00104-16C120A01	1	Screw, Hex Head
39	AGSE-S00153-16CA01	1	Nut, Locking
40	AGSE-E16626-P10	1	Brake Plate

IPB Figure 11 - AGSE-E16626-S04
Cradle Jack Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
41	96235K7	4	Die Spring Screw Cap - 9/16”-18 UNF 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	AGSE-S00131-10A17	2	Washer
46	AGSE-S00104-10C020A01	2	Screw, Hex Head
47	AGSE-E16648-P01	1	Handwheel/Ratchet Adapter
48	AGSE-S00121-06CA12A28	2	Set Screw
49	AGSE-E16648-P02	1	Handwheel
50	AGSE-E16648-P03	1	Handwheel Storage Bracket
51	AGSE-S00172-P03	2	Retainer Pin
52	AGSE-E16650-S02	1	Air Ratchet Extension
54	AGSES00131-16A17	2	Washer

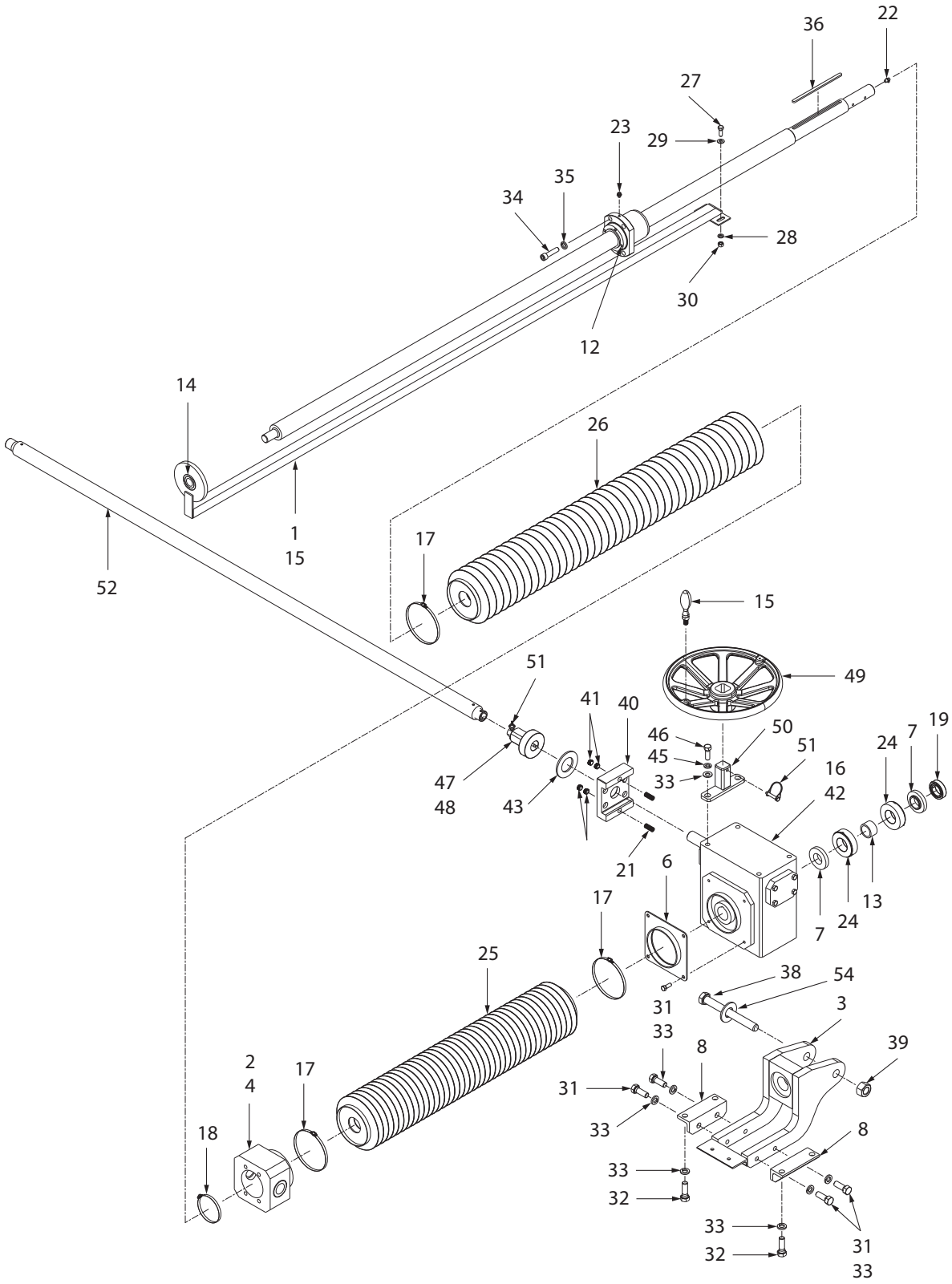


Figure 8.11-1 AGSE-E16626-S04 Cradle Jack Assembly

IPB Figure 12 - AGSE-E21513-S01
Fail Safe Cylinder Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21513-S01	-	Fail Safe Cylinder Assy (Figure 8.12-1)
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	AGSE-S00276-P01	1	Check Valve
5	2-021 NBR	1	O-Ring - Nitrile
6	AGSE-E21514-S01	1	Reservoir Assy (See IPB Figure 13 for Details)
7	881-12	1	Hose - 3/4” ID - 300PSI WP x 36” Lg
8	0188-12-12	1	Hose Fit’g - Male - 3/4” NPT
9	0688-12-12	1	Hose Fit’g - Fem - 12 JIC - 37^{O} Swivel
10	AGSE-S00269-P12	2	Hose Clamp
11	12 C50X-S	1	Elbow - Straight Thrd - 12 SAE Male x JIC - 37^{O} Flare
12	12G5G5JG5-S	1	Tee - Straight Thrd - 12SAE
13	12 A0EG5-S	2	Elbow - Male - 12 SAE Male x 12 SAE Fem
14	12 F50HA0-S	1	Union - SAE
15	SCD-1039	1	Cylinder Specification Drawing
16	69094	1	Knuckle - 1-1/4”-12 UNF
17	12F5BU-S	1	Connector - Straight Thrd - 12 SAE x 12 JIC
18	Commercial	1	Tubing - 3/4” OD x .083wlx - 48” Lg SS304 Annealed
19	AGSE-E21515-P02	1	Connecting Pin
20	AGSE-S00104-06C036A01	4	Screw, Hex Head
21	AGSE-S00104-06C20A01	4	Screw, Hex Head
22	AGSE-S00104-06C016A01	2	Screw, Hex Head
23	AGSE-S00135-06A17	8	Washer, Locking
24	AGSE-S00150-06CA01	4	Nut
25	8 P50N-S	1	Plug - 8 SAE

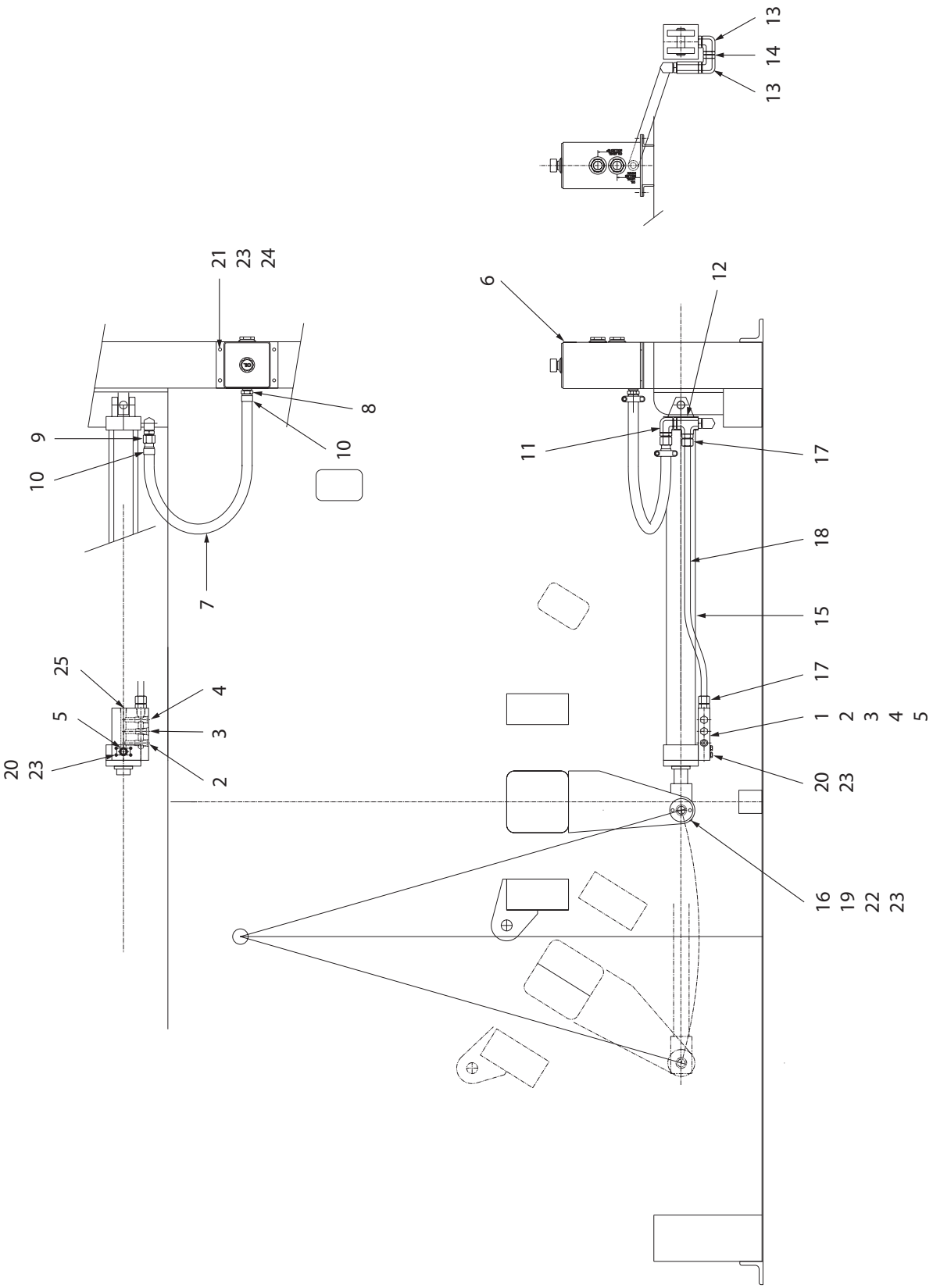


Figure 8.12-1 Fail Safe Cylinder Assembly

IPB Figure 13 - AGSE-E21514-S01 Reservoir Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21514-S01	-	Reservoir Assy (Figure 8.13-1)
1	AGSE-E21515-P01	1	Reservoir Weldment
2	AGSE-S00269-P05	1	Cap - Filler Breather - 3/4” NPT
3	AGSE-S00269-P04	2	Oil Level Sight Plus - 1” NPT

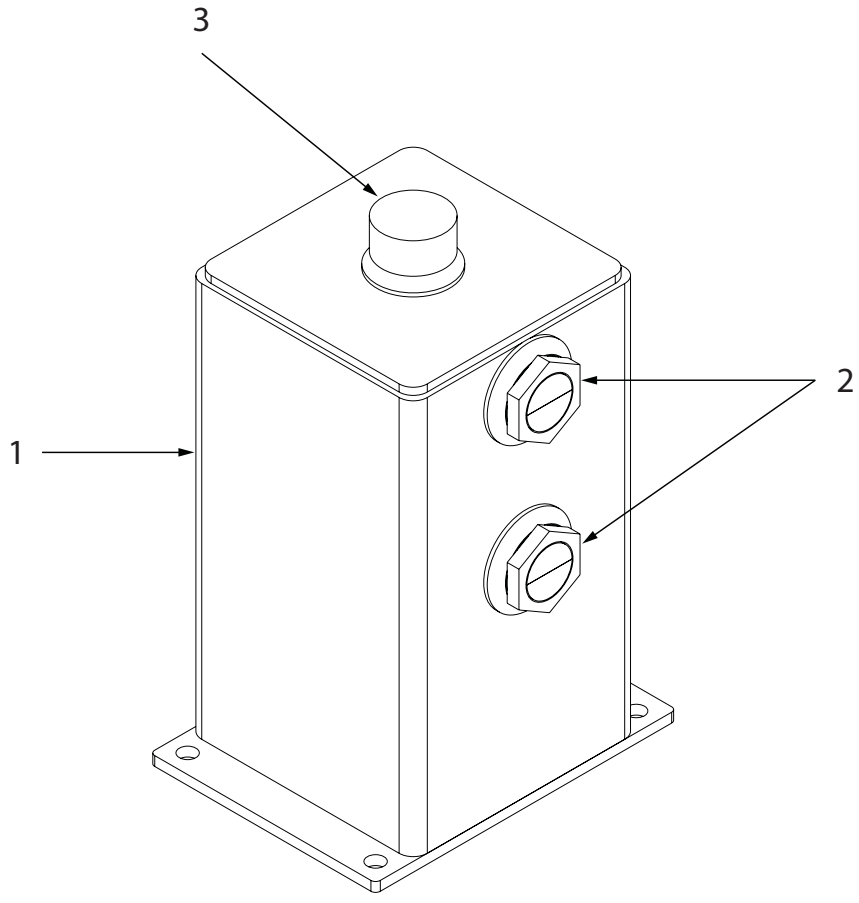


Figure 8.13-1 AGSE-E21514-S01 Reservoir Assembly

IPB Figure 14 - AGSE-E21526-DLH-S01
Telescoping Tow Bar Assy

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21526-DLH-S01	-	Telescoping Tow Bar Assy (Figure 8.14-1)
1	AGSE-E21526-DLH-P02	1	Tow Bar Outer Tube Weldment Assy
2	AGSE-E21526-DLH-P01	1	Tow Bar Inner Tube Weldment Assy
3	AM-90750-64T	1	Safety Pin
4	AGSE-E21526-P03	1	Modified Safety Pin with Washer

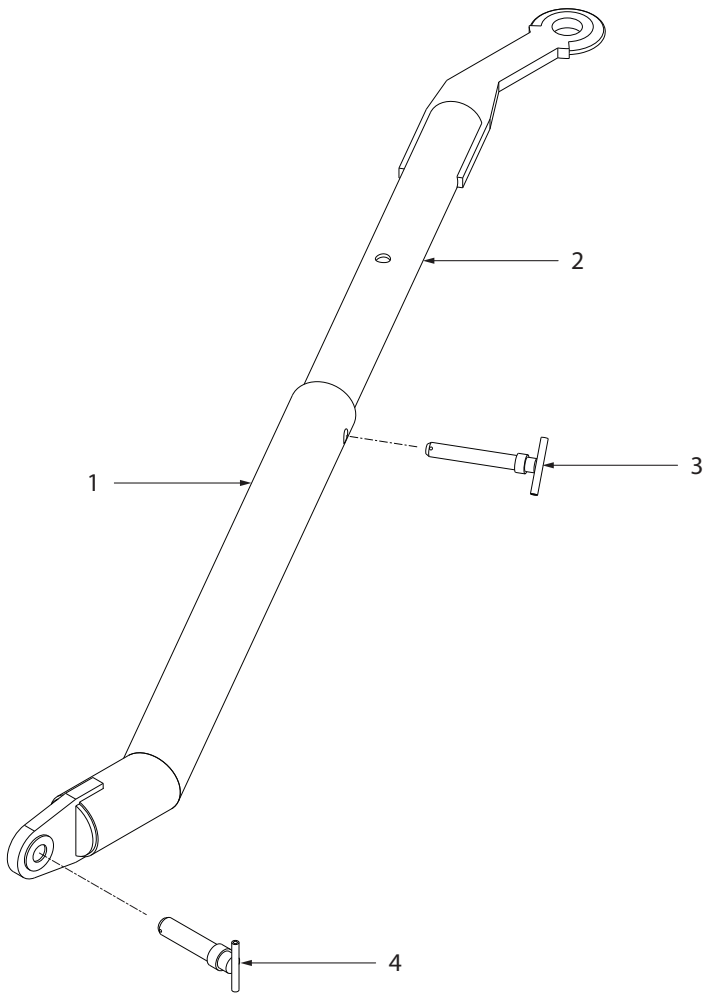


Figure 8.14-1 AGSE-E21526-S01 Tow Bar Assembly

IPB Figure 15 - AGSE-E16616-S03
Caster Mount Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E16616-S03	-	Caster Mount Assy (Figure 8.15-1)
1	AGSE-E16616-P03	1	Caster with Handles
2	AGSE-E16616-P02	1	Caster Mount
3	AGSE-S00104-10C048A01	2	Screw, Hex Head
4	AGSE-S00104-10C040A01	2	Screw, Hex Head
5	AGSE-S00150-10CA01	4	Nut, Hex
6	AGSE-S00131-10A17	4	Washer, Locking
7	AM-91750-124T	2	Safety Pin Assy
8	AGSE-S00104-10C040A01	2	Screw, Hex Head

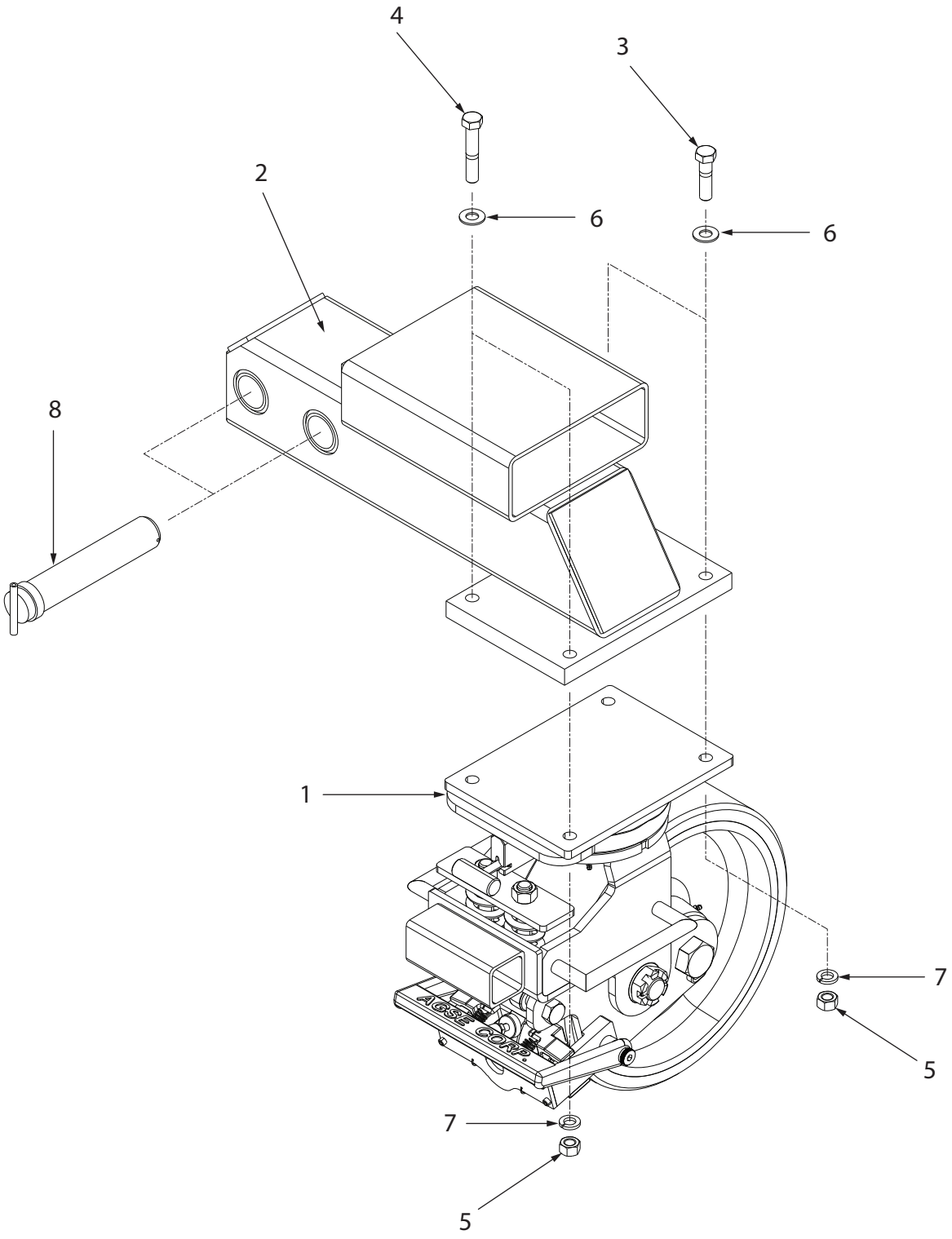


Figure 8.15-1 AGSE-E16616-S03 Caster Mount Assembly

IPB Figure 16 - AGSE-E16620-S01
Shock Mount Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E16620-S01	-	Shock Mount Assy (Figure 8.16-1)
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	AGSE-S00140-08FA01	16	Nut
6	AGSE-S00131-08A17	32	Flat Washer SAE - 1/2” Nom ID - Zinc Plt
7	AGSE-S00105-08F016A01	16	HHCS W/Nylon Patch - 1/2”-20 UNF x 1” - Zinc Plt
10	AGSE-E16620-30	1	Stencil - WT. 160 LBS
11	AGSE-E16620-31	1	Stencil - 73 KG
12	AGSE-E16620-32	1	Stencil - AGSE-E16620-S01 Shock Mount Assy
13	AGSE-S00115-04C008A05	1	Screw, Button Head

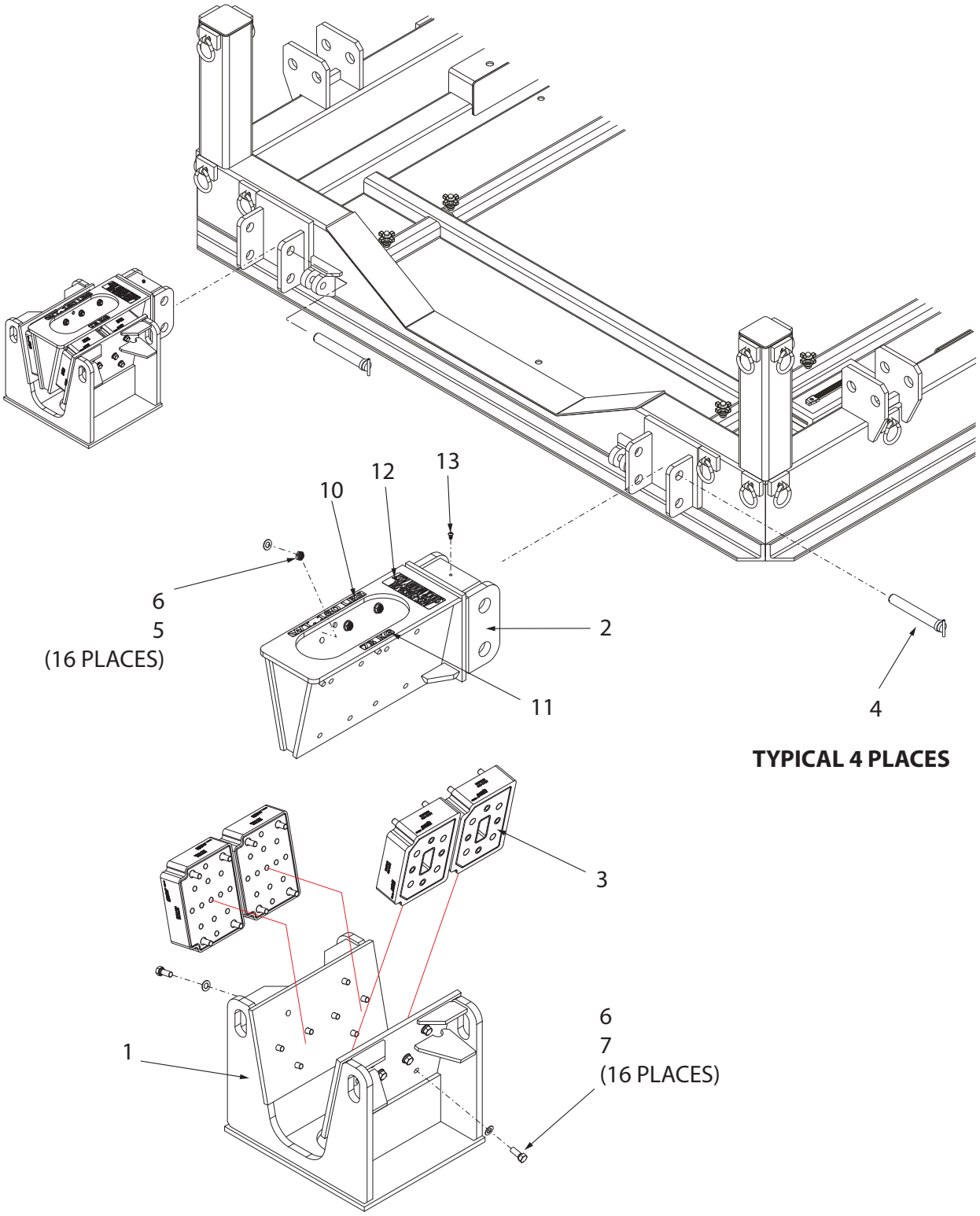


Figure 8.16-1 AGSE-E16620-S01 Shock Mount Assembly

IPB Figure 17 - AGSE-E21521-DLH-S07
Optional Jacking Leg Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21521-DLH-S07	-	Optional Jacking Leg Assembly (Figure 8.17-1)
1	AGSE-E21521-DLH-S03	4	DLH Jacking Leg Assy - 48” Lift (See IPB Figure 17B for Details)
2	AGSE-E21521-DLH-S05	2	Leg Mount Adapter Assy - RH (See IPB Figure 17A for Details)
3	AGSE-E21521-DLH-S06	2	Leg Mount Adapter Assy - LH (See IPB Figure 17A for Details)

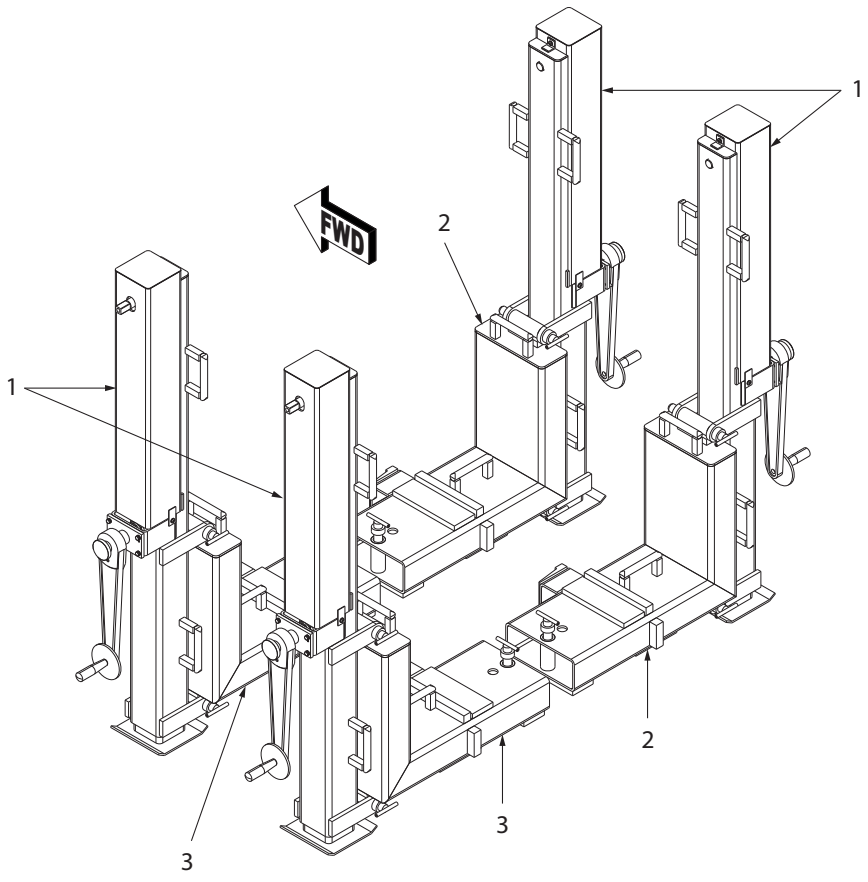


Figure 8.17-1

IPB Figure 17A - AGSE-E21521-DLH-S05/S06
Leg Mount Adapter Assemblies

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21521-DLH-S05	-	Leg Mount Adapter Assy - RH (See IPB Figure 17B for Details)
	AGSE-E21521-DLH-S06	-	Leg Mount Adapter Assy - LH (See IPB Figure 17B for Details)
1	AGSE-E18412-P01	1	Leg Mount - LH (Used on AGSE-E21521-DLH-S06)
2	AGSE-E18412-P02	1	Leg Mount - RH (Used on AGSE-E21521-DLH-S05)
4	AM-91000-98T-H900	2	Safety Pin Assy
5	AGSE-E16621-DLH-P07	1	Safety Pin Modified

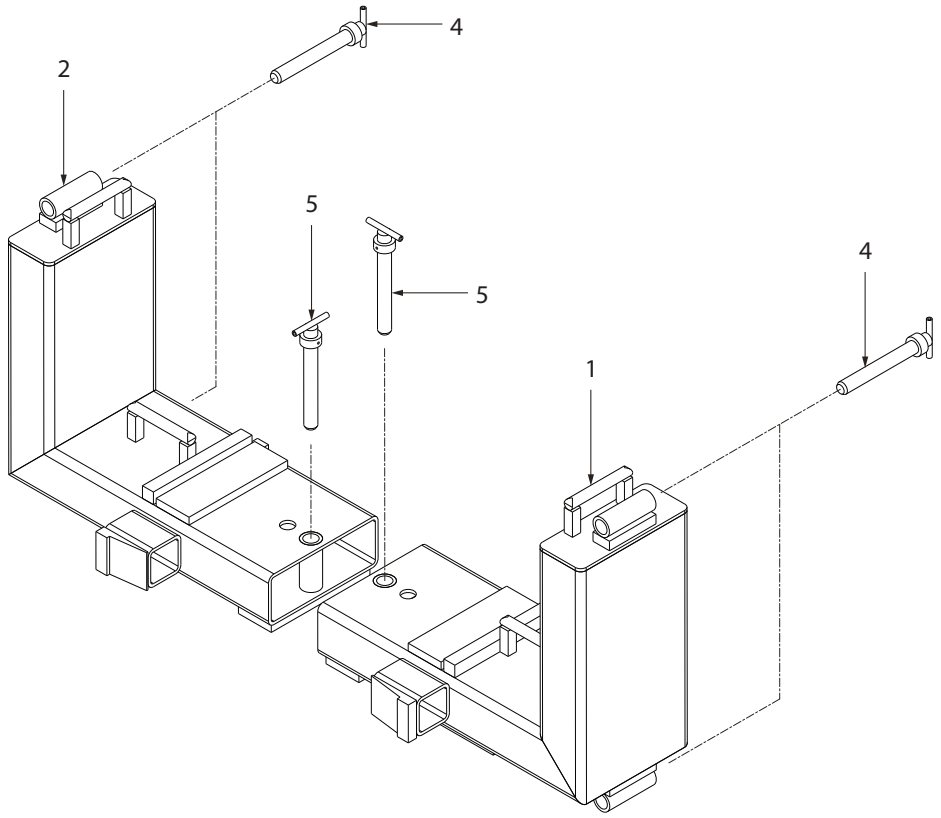


Figure 8.17A-1

IPB Figure 17B - AGSE-E21521-DLH-S03
DLH Jacking Leg Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21521-DLH-S03	-	DLH Jacking Leg Assembly (Figure 8.17B-1)
6	AGSE-E16621-DLH-S04	1	Steel Ratchet Handle Assy
7	AGSE-E21521-DLH-P01	1	Jacking Leg - Modified
8	AGSE-E16621-P03	1	Shaft Support
9	AGSE-E16621-DLH-P05	1	Sprocket Shaft
10	AGSE-E16621-P06	1	Chain Guard
11	1610-1	1	Tapered Bushing - 1” Bore w/ KW
12	D35BTB35	1	Dbl Sprocket #35 - 35 Teeth
13	AGSE-S00297-P02	1	Tapered Bushing - 3/4” Bore w/ KW
14	D35B19H	1	Dbl Sprocket #35 - 19 Teeth
15	6261K711	1	#35 Dbl Chain x 5 Ft Lg
16	6261K211	1	#35 Dbl Chain Connecting Link
17	AGSE-S00104-04C012A05	4	Screw, Hex Head
18	AGSE-S00135-04A05	7	Washer, Locking
20	AGSE-S00372-P02	1	Key Stock - 1/4” x 1/4” x 7/8” Lg
21	AGSE-S00372-P01	1	Key Stock - 3/16” x 3/16” x 13/16” Lg
23	AGSE-E16621-DLH-P08	1	Hand Knob - Modified
24	AGSE-S00131-04A05	7	Washer
25	AGSE-S00371-P01	2	Shim - Steel - 3/4” ID x 1-1/8” OD x 1/8” Thk
26	AGSE-S00370-P01	1	Thrust Bearing - 3/4” ID x 1-1/4” OD x 1/8” Thk
27	92373A245	2	Roll Pin - 3/16” Dia. x 1/2” Lg - SS
29	FB1620-6	2	Bronze Bearing - 1” ID x 1-1/4” OD x 3/4” Lg
30	AGSE-E16621-DLH-P09	1	Jacking Leg Drive Shaft
31	AGSE-E16621-S04-21	2	Mech Tube - 1-3/4” OD x 5/16 WL x 7/8” Lg - 1018 DOM
32	AGSE-S00102-04C008A05	3	PHS - 1/4”-20UNC x 1/2” Lg - SS

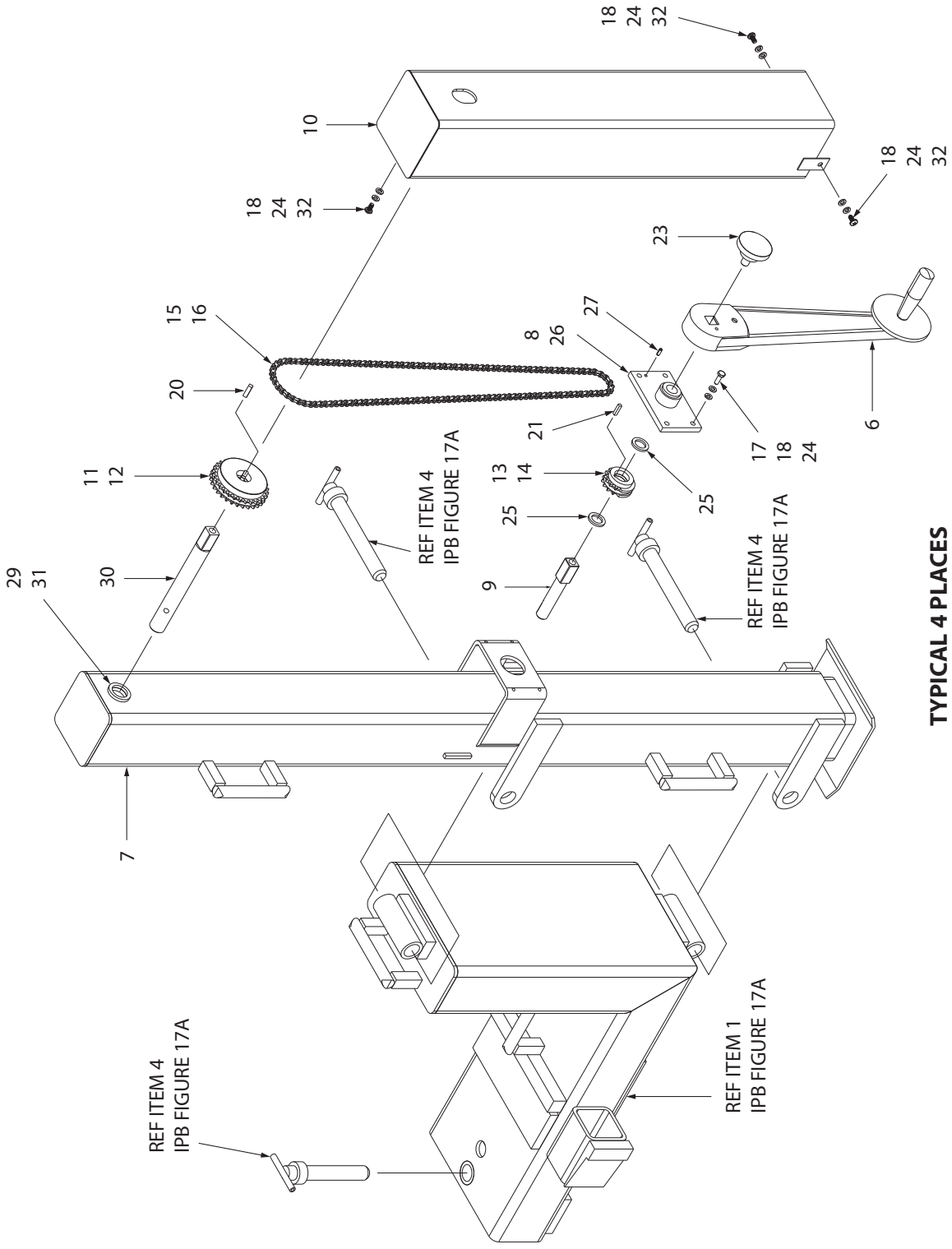


Figure 8.17B-1 AGSE-E21521--DLH-S03 Jacking Leg Assembly

IPB Figure 18 - AGSE-E21522-DLH-S01
Jack Leg Hydraulic Installation

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E21522-DLH-S01	-	Jack Leg Hyd System Installation (Figure 8.18-1)
1	100966	1	Pump w/ Self-Centering Valve
3	FDBA-LAN-GAB	1	Flow Control Valve w/ Body
4	6F6X-S	2	Swivel Nut End/Male Pipe
5	AGSE-S00264-P04	1	Male Elbow
6	AGSE-S00259-P06	1	Male Connector
7	AGSE-S00259-P05	4	Male Connector - 3/8” x 3/8”
8	AGSE-S00269-P09	2	1/4 NPT Ball Valve
9	23930-6-6	4	3/8 90° Swivel Hose Fitting
10	AGSE-S00269-P04	1	Elbow
11	AGSE-S00259-P02	1	Hex Pipe Nipple - 3/8” NPT
12	AGSE-S00269-P14	4	Hose Fitting Male - 3/8”
13	AGSE-S00266-P02	3	3/8T Tee Fitting
14	AGSE-S00104-06C016A05	4	Screw, Hex Head
15	AGSE-S00135-06A05	4	Washer, Locking
16	AGSE-S00104-04C016A05	12	Screw, Hex Head
17	AGSE-S00208-P02	4	10” Stroke Hyd. Cylinder
18	3225T23	40	Cushioned Tube Clamp - SS
19	302-6	4	Hose - 3/8” ID x 24” Hose

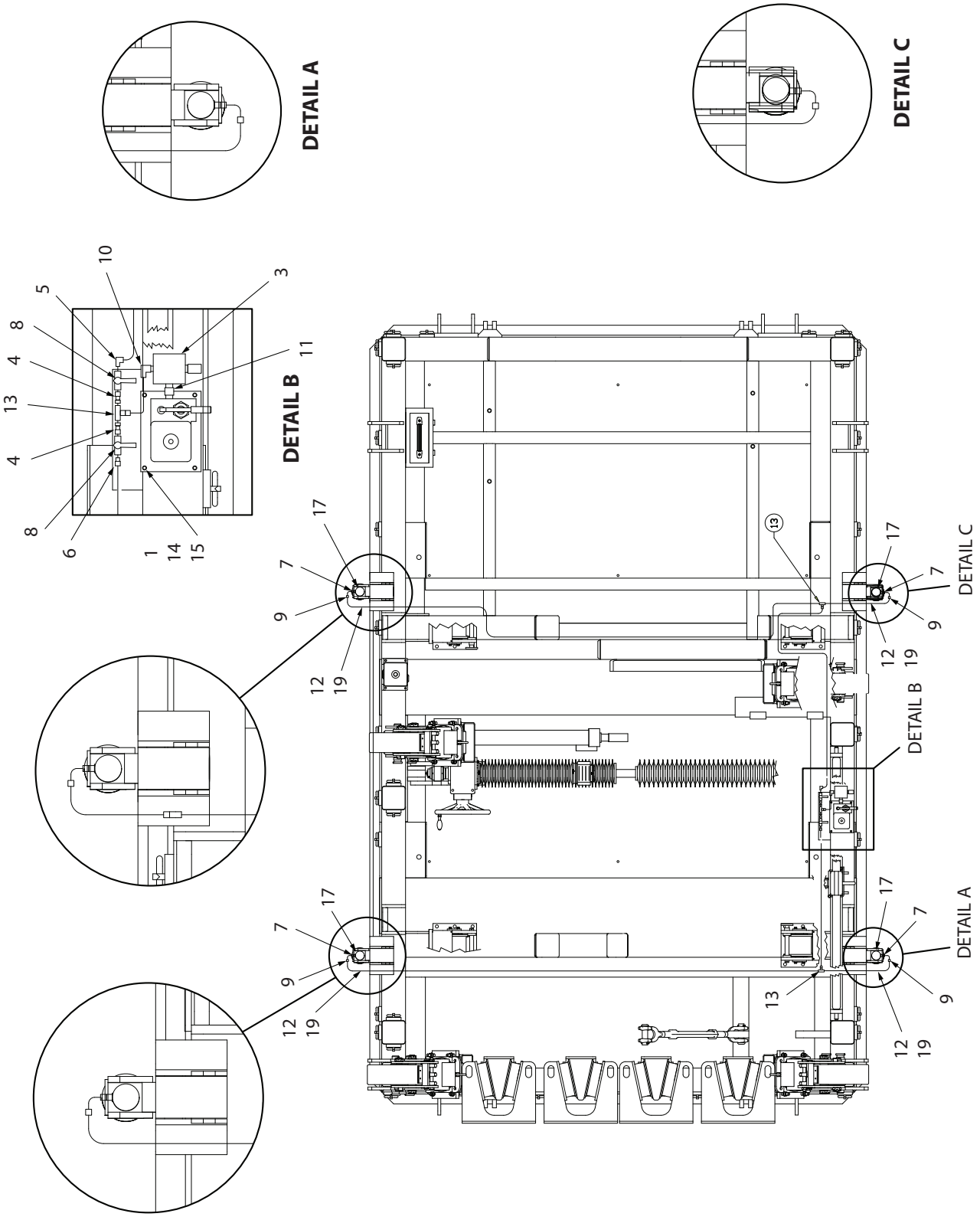


Figure 8.18-1 Jack Leg Hydraulic Installation

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

9.2.1 Stencils

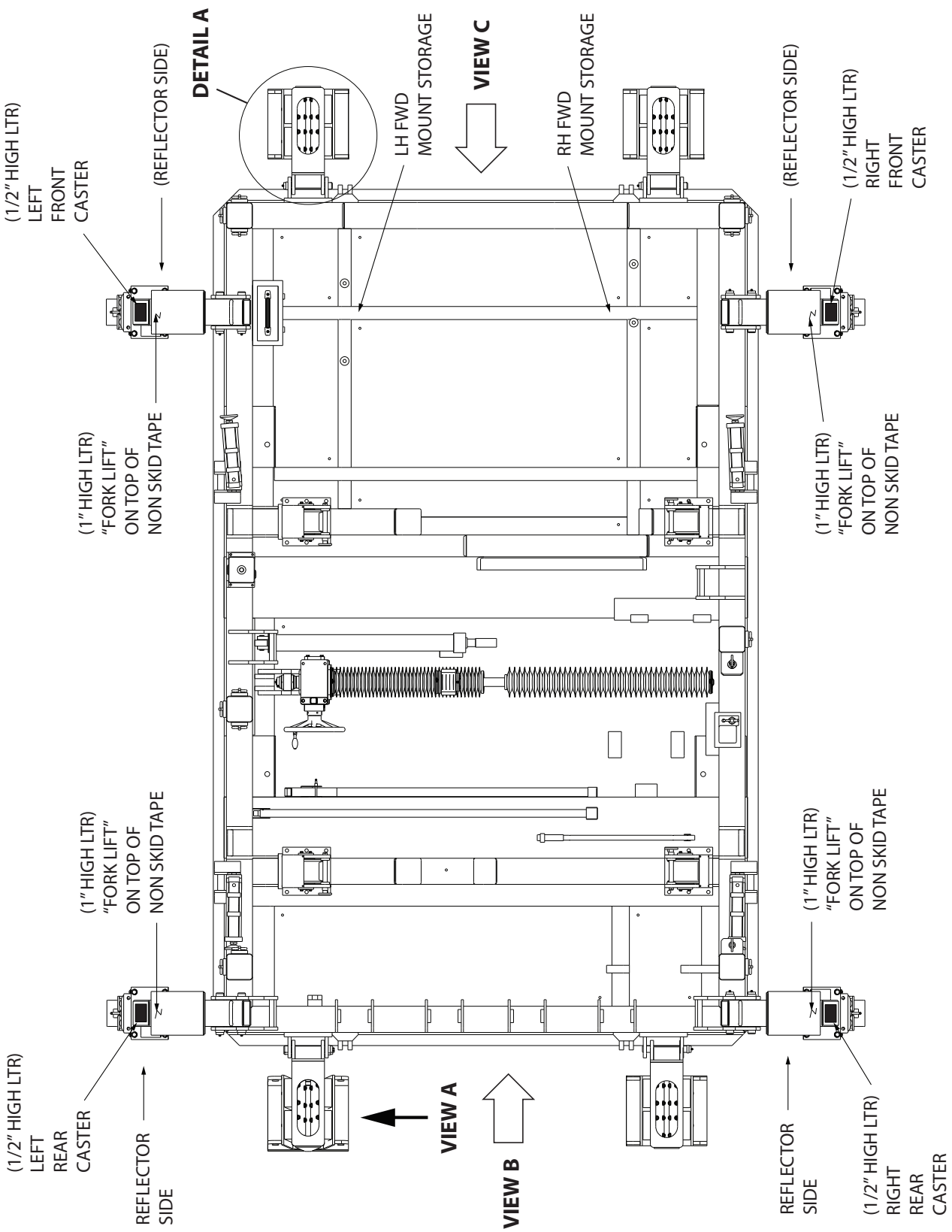


Figure 9.2.1-1 AGSE-E215-DLH-G01 Shock Mount and Caster Stencils

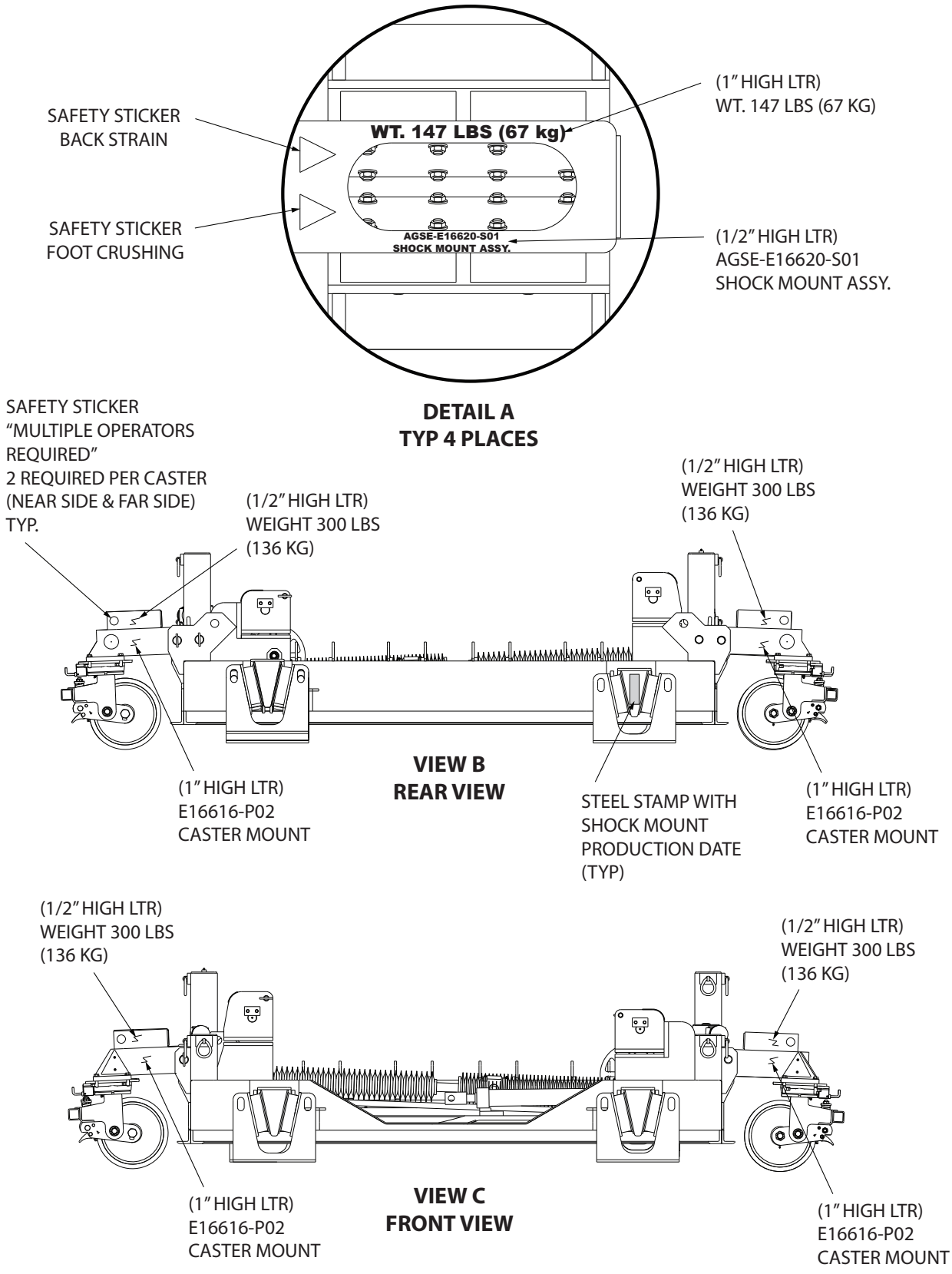


Figure 9.2.1-2 AGSE-E215-DLH-G01 Shock Mount and Caster Stencils

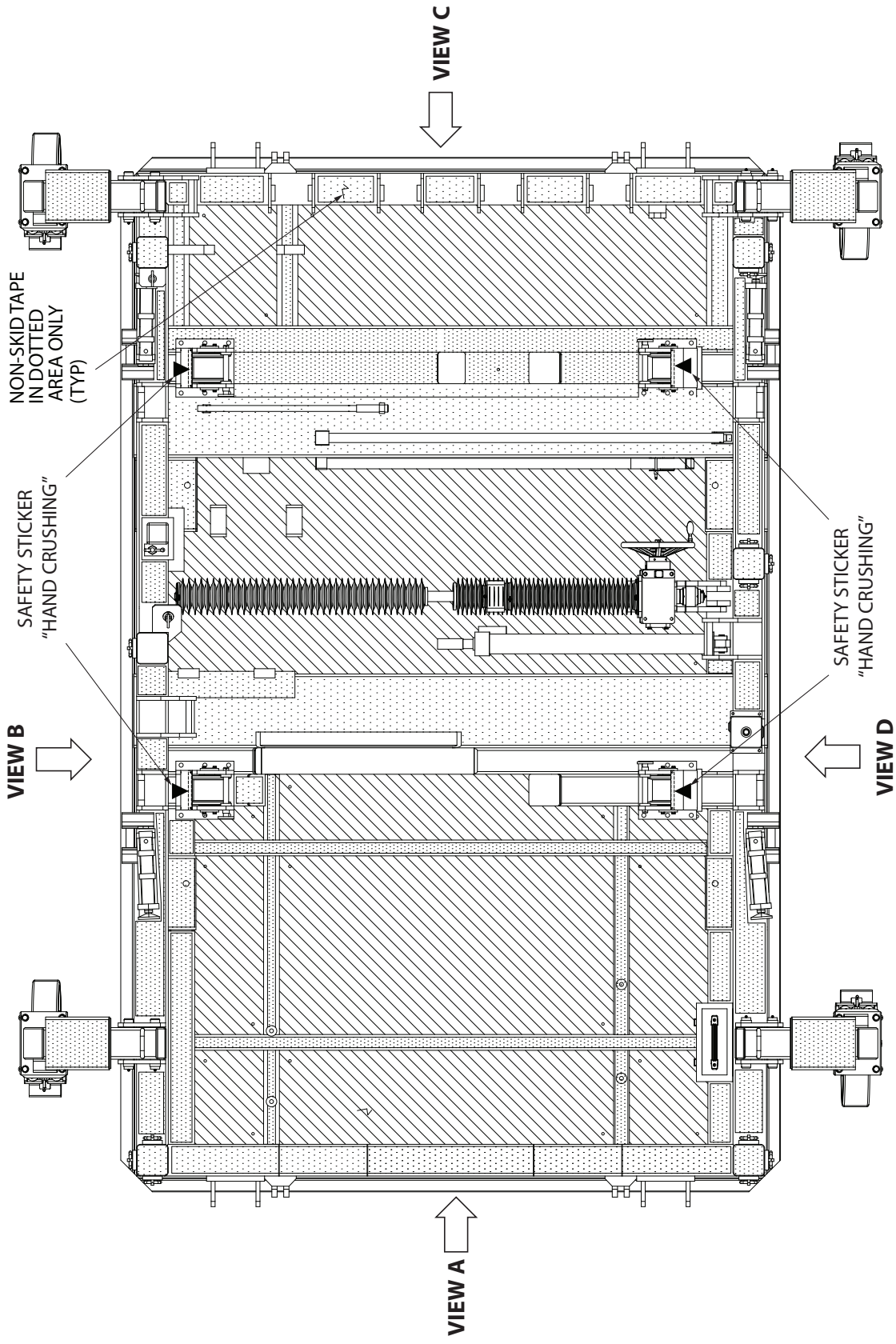
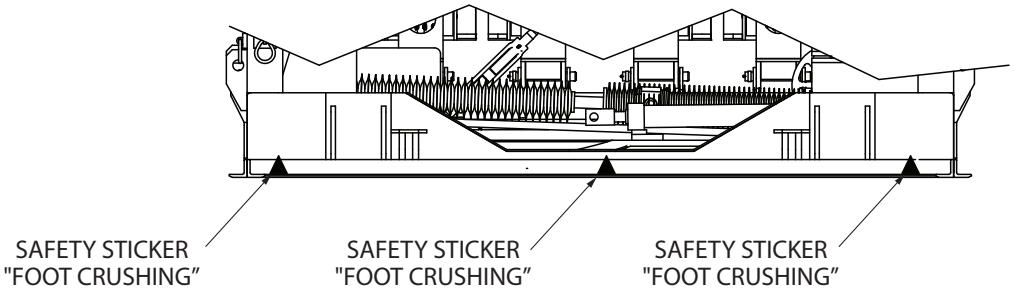
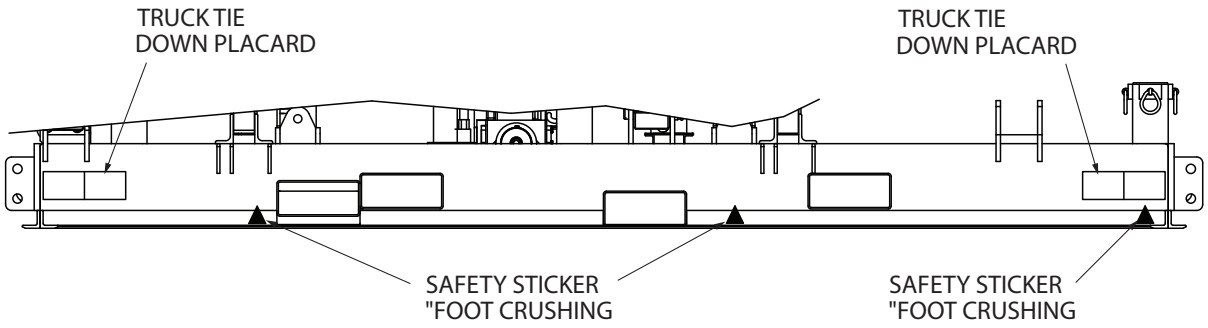


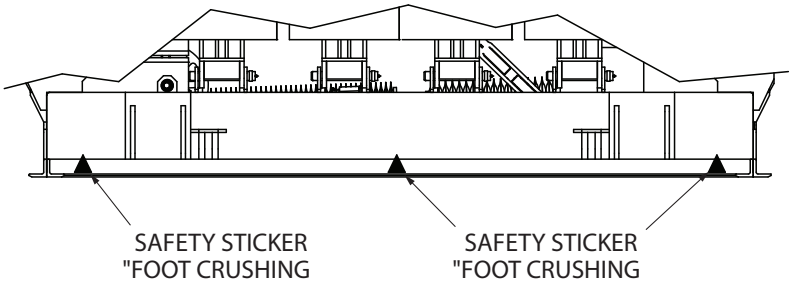
Figure 9.2.1-2A Base Non-Skid Tape and Paint, Placard and Safety Sicker Loacations



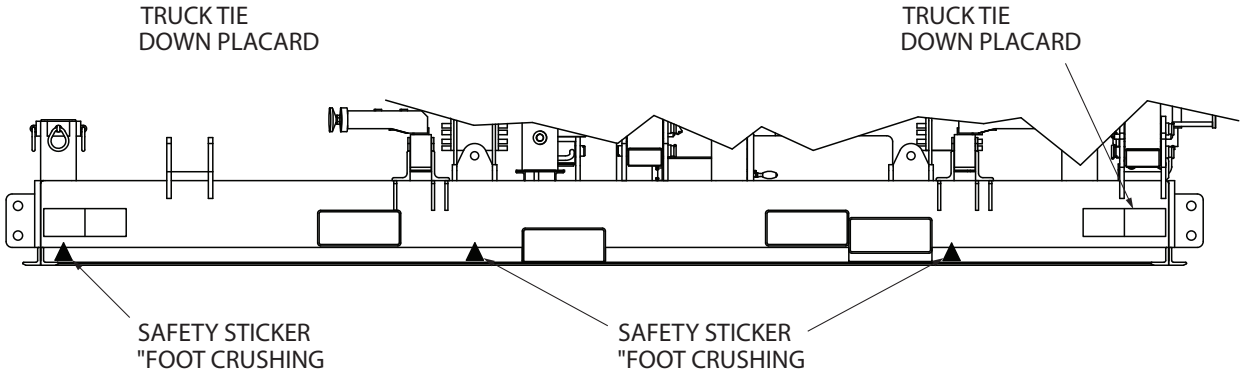
VIEW A



VIEW B



VIEW C



VIEW D

Figure 9.2.1-2B Base Non-Skid Tape and Paint, Placard and Safety Sicker Loacations

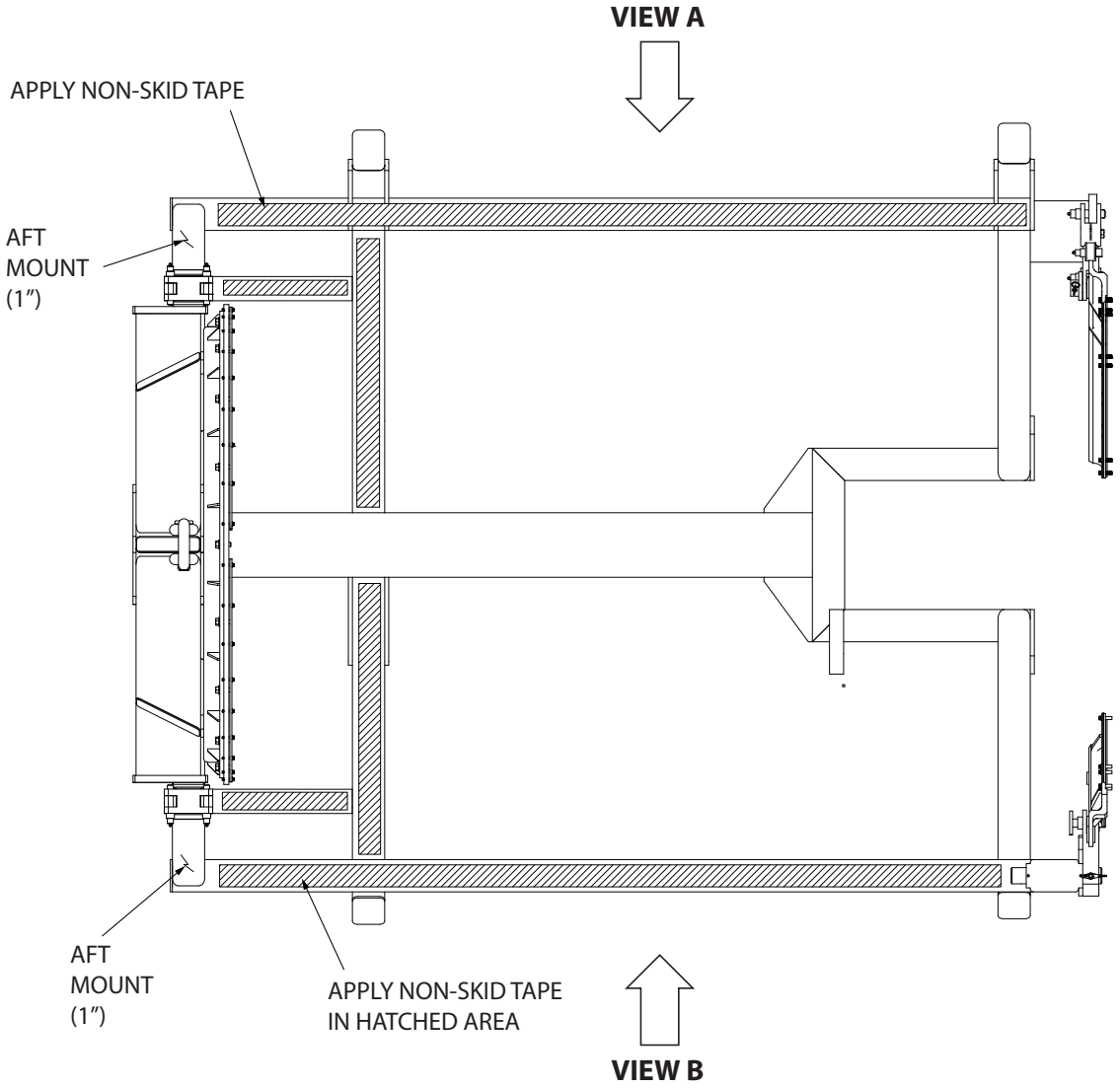


Figure 9.2.1-3 AGSE-E215-DLH-G01 Cradle Stencils

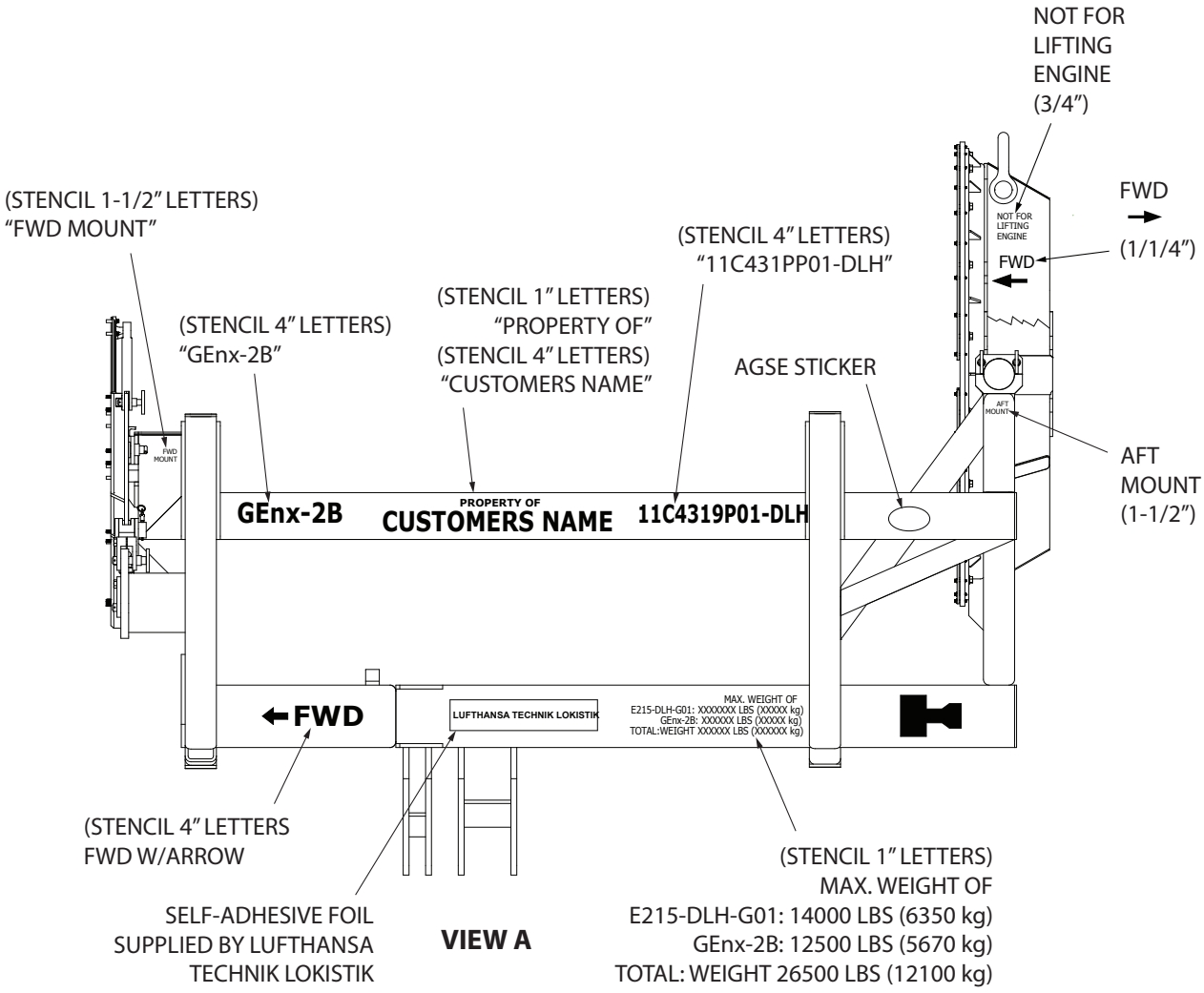


Figure 9.2.1-4 AGSE-E215-DLH-G01 Cradle Stencils

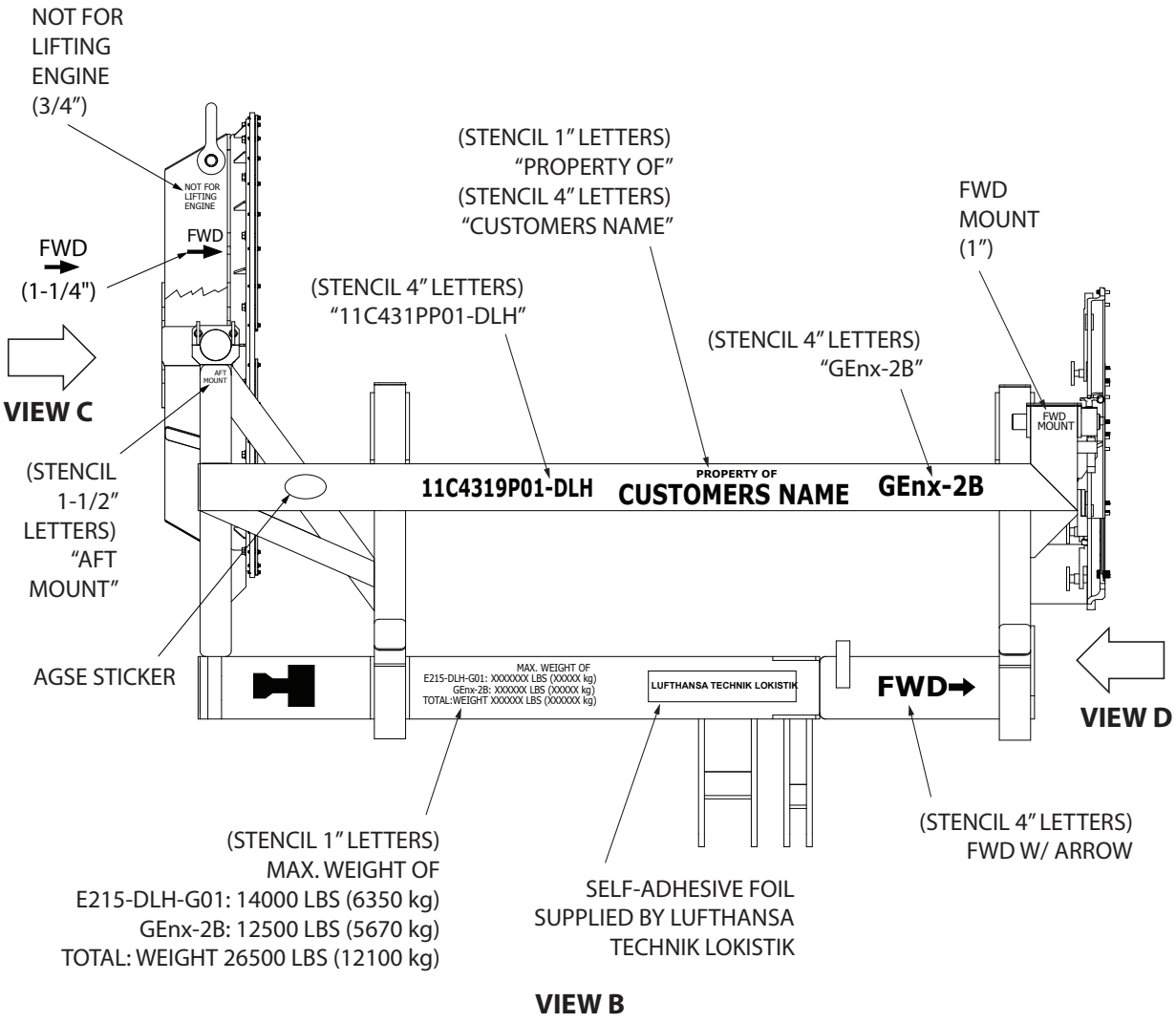


Figure 9.2.1-5 AGSE-E215-DLH-G01 Cradle Stencils

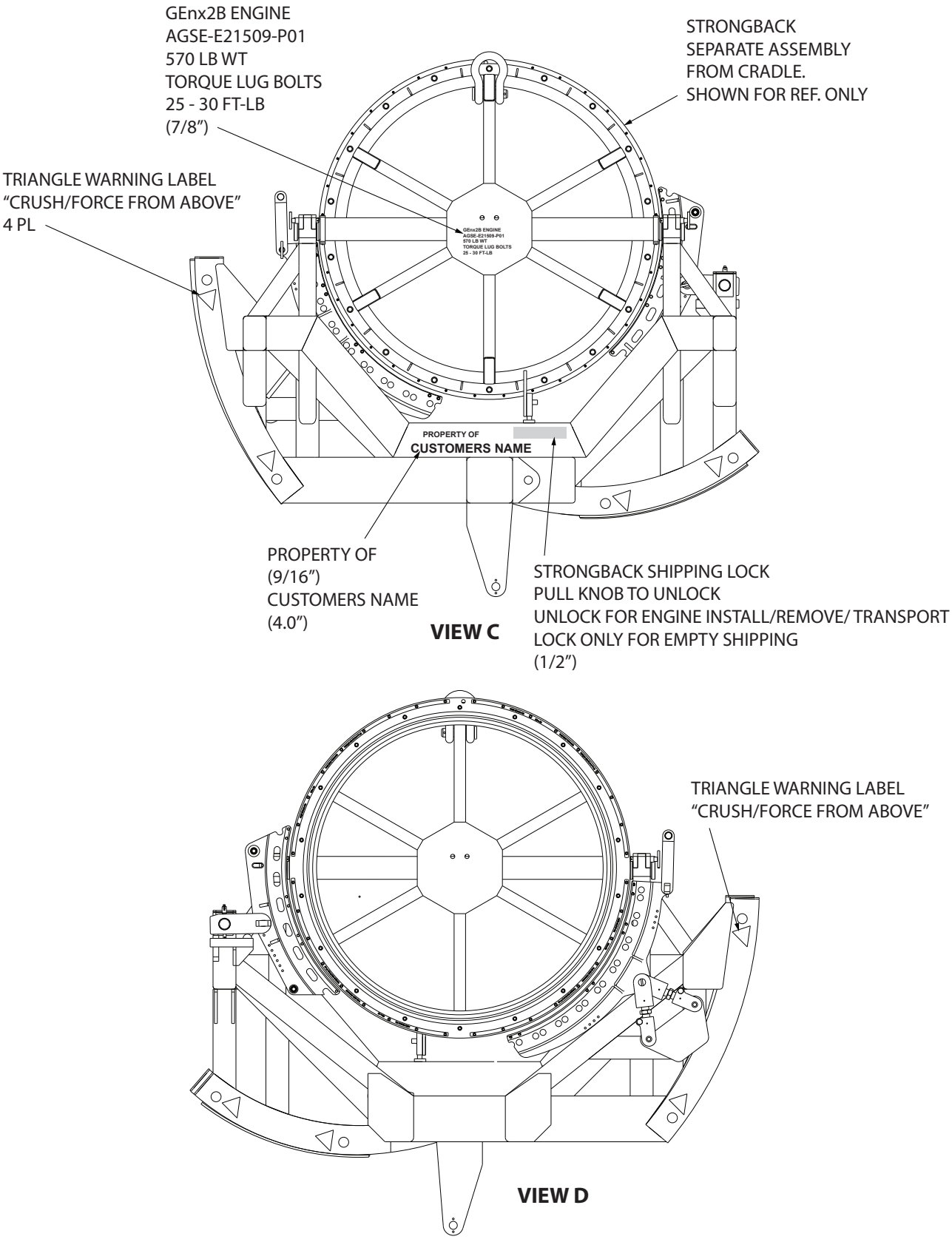


Figure 9.2.1-6 AGSE-E215-DLH-G01 Cradle Stencils

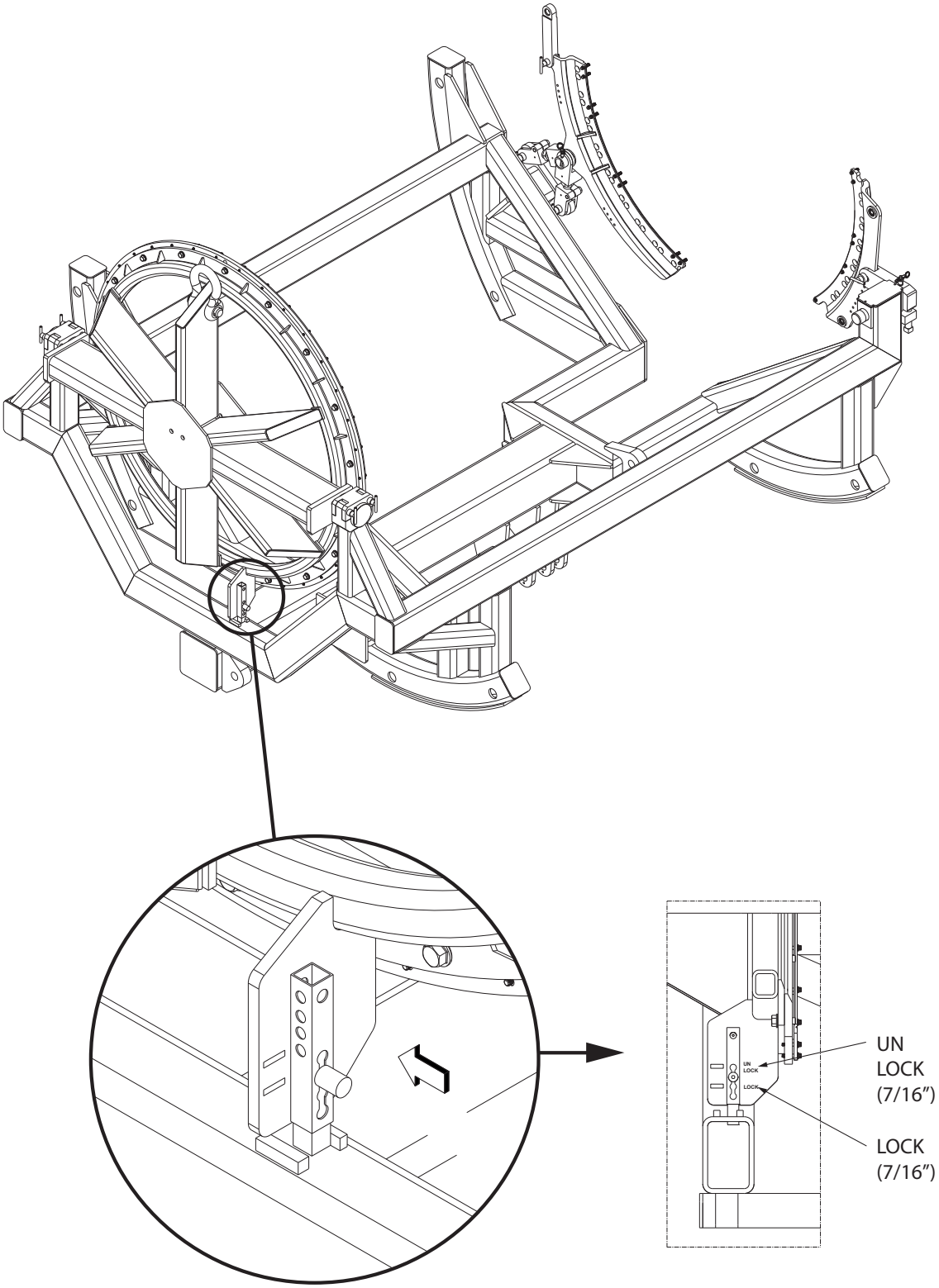


Figure 9.2.1-7 AGSE-E215-DLH-G01 Cradle Stencils

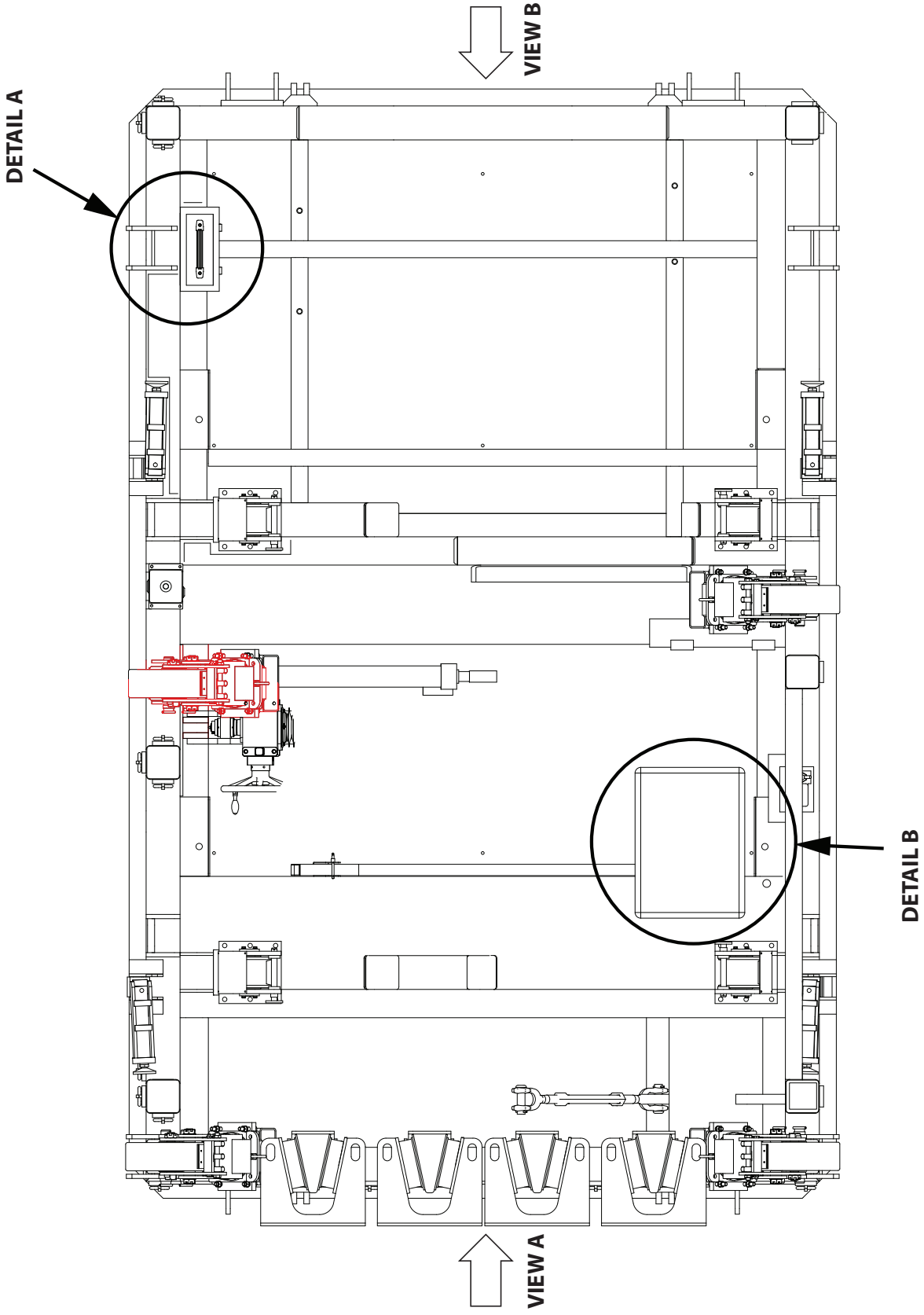


Figure 9.2.1-8 AGSE-E215-DLH-G01 Base Stencils

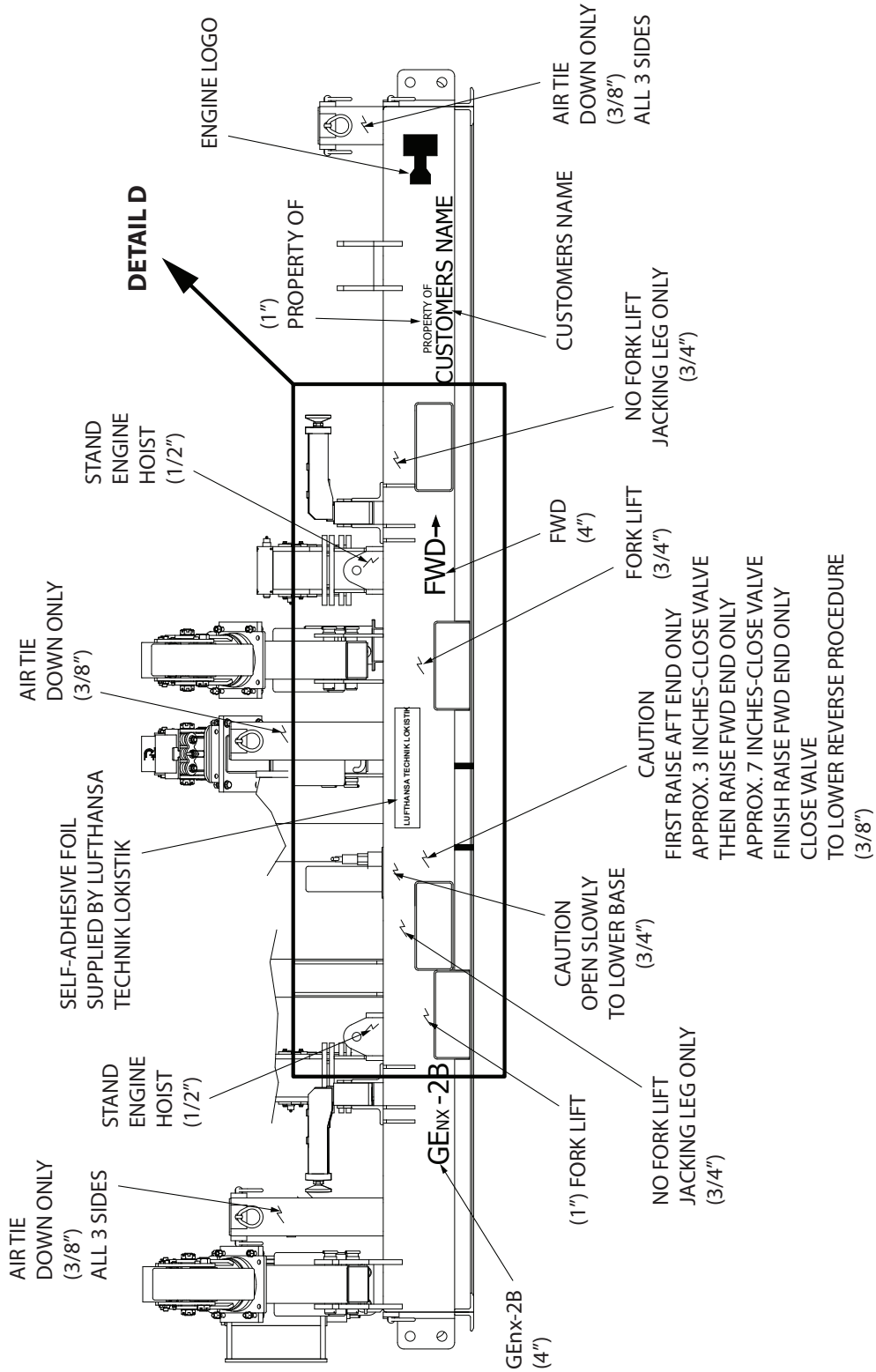
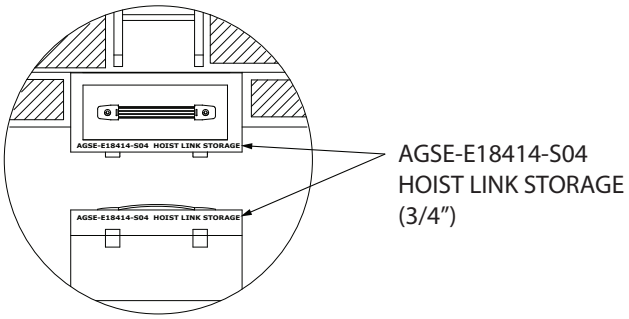
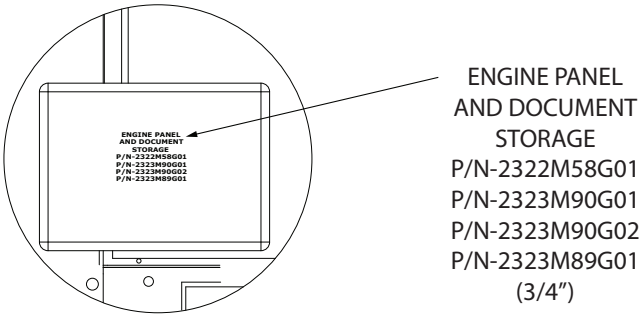


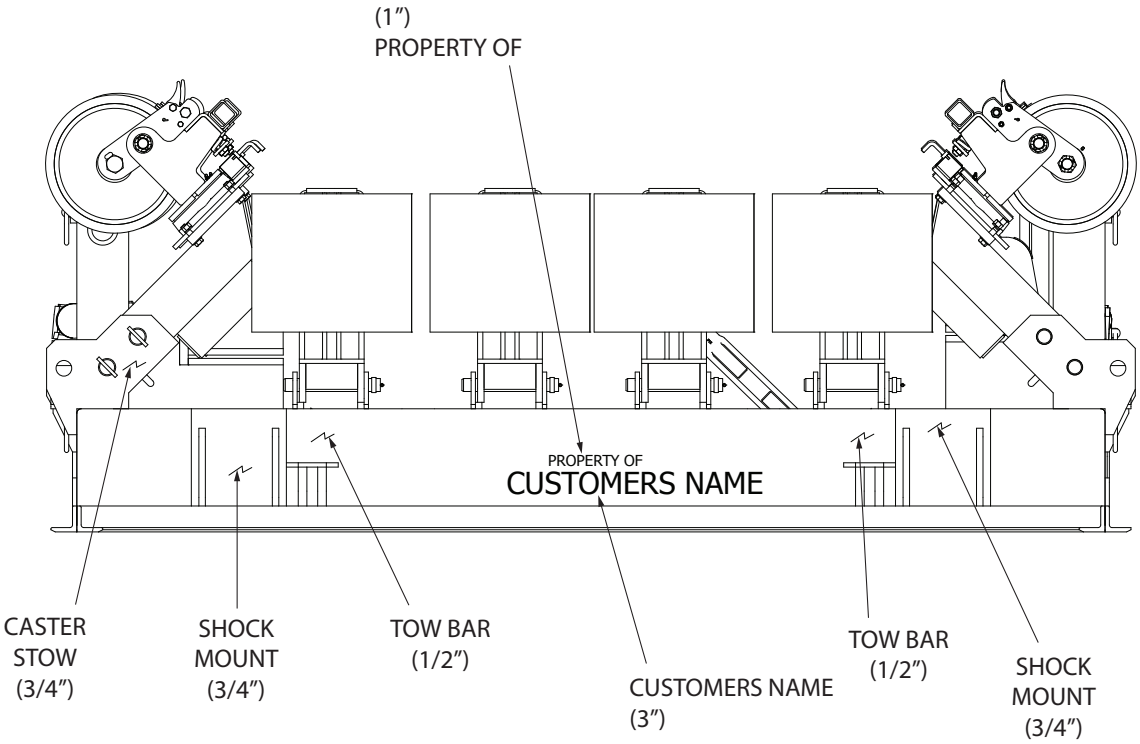
Figure 9.2.1-9 AGSE-E215-DLH-G01 Base Stencils



DETAIL A

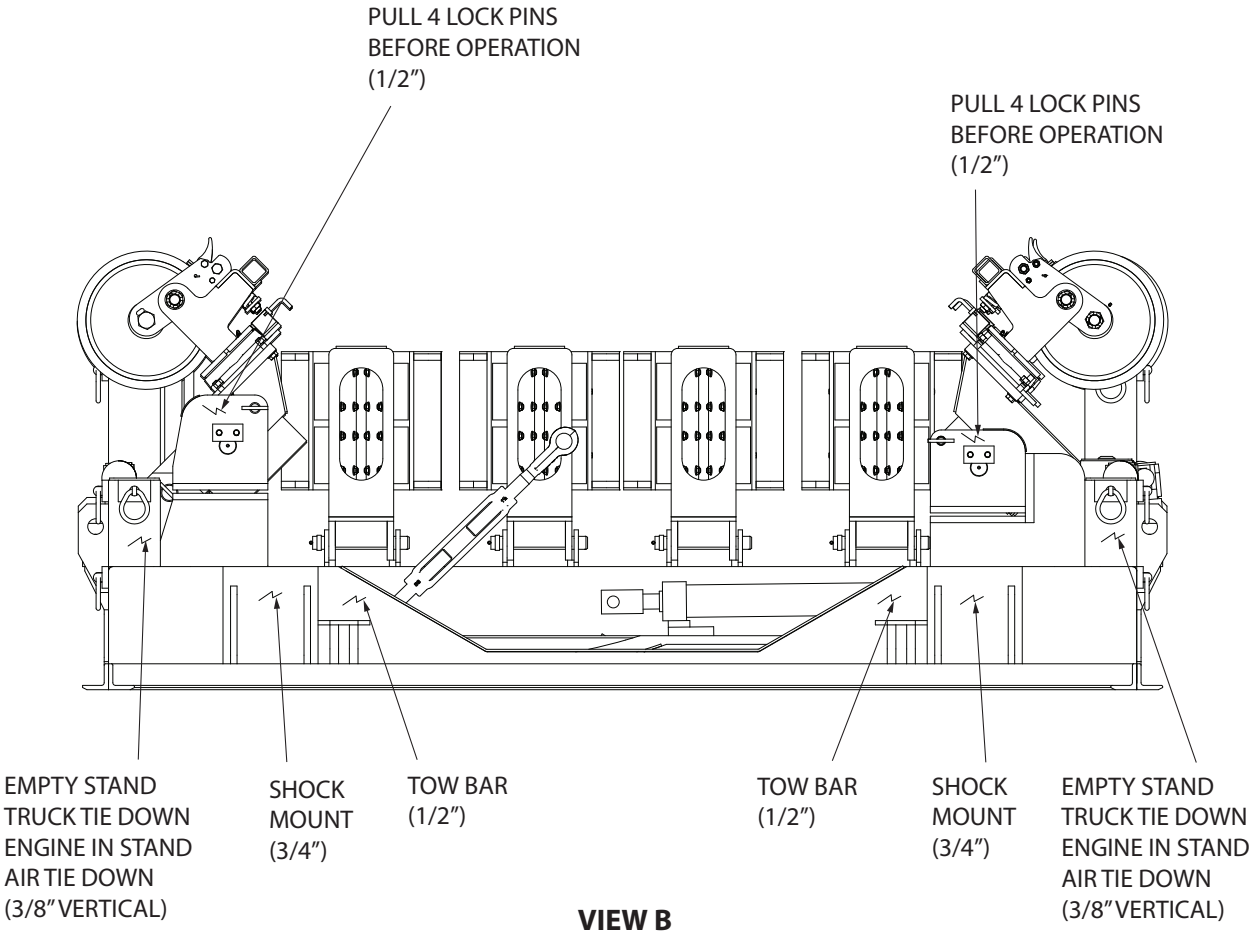


DETAIL B

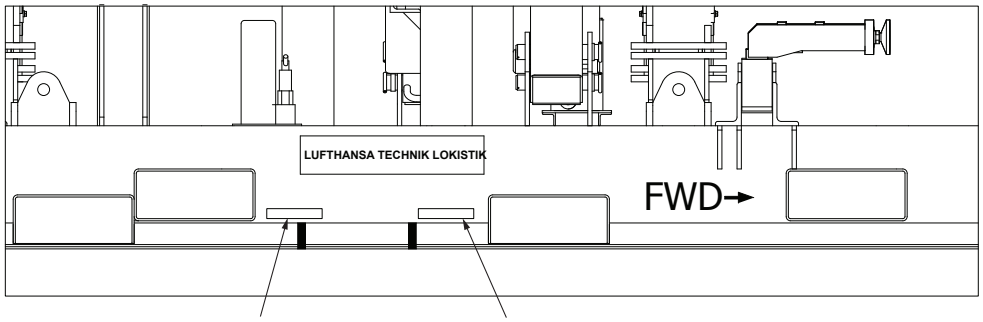


VIEW A

Figure 9.2.1-10 AGSE-E215-DLH-G01 Base Stencils



VIEW B



DETAIL D

Figure 9.2.1-11 AGSE-E215-DLH-G01 Base Stencils

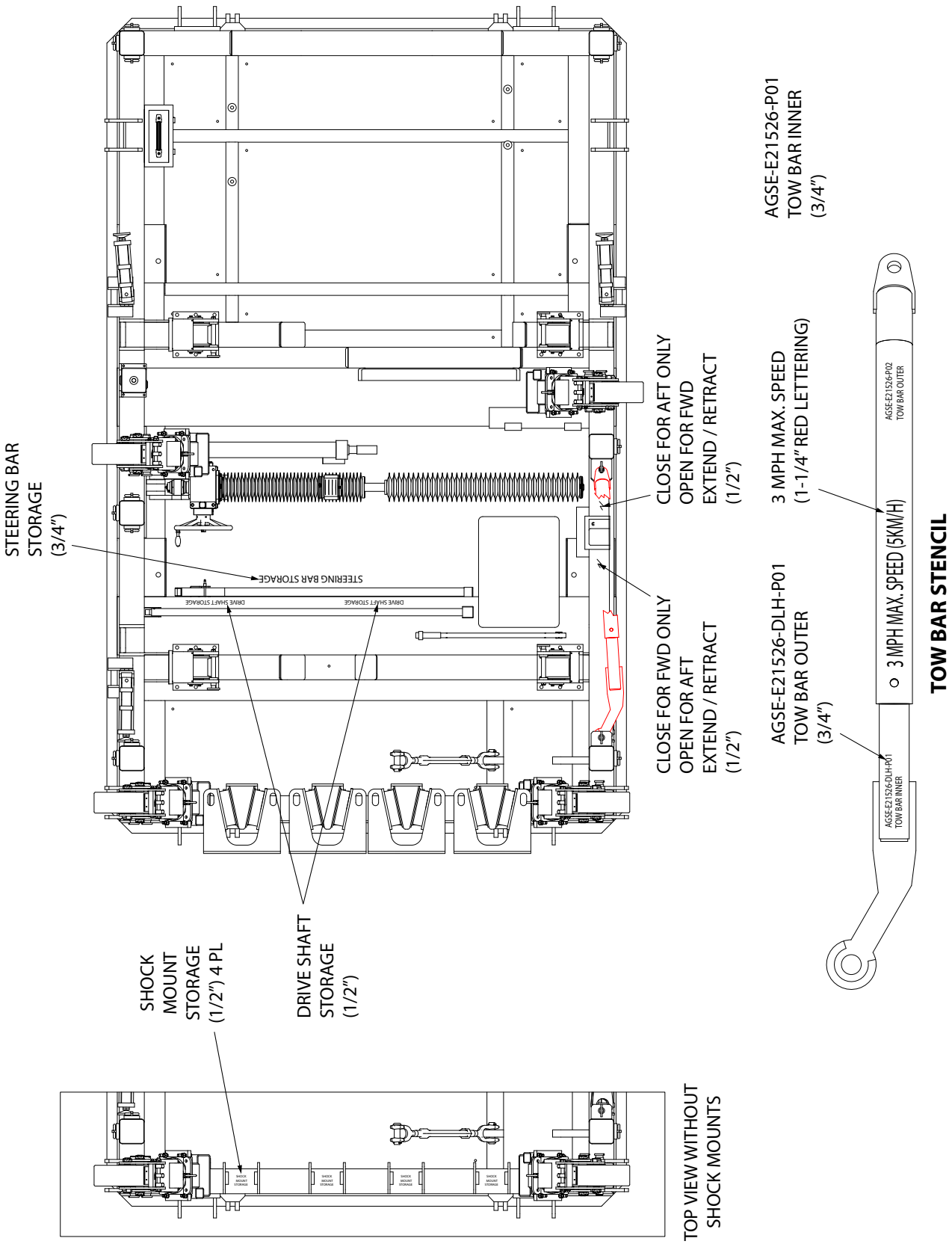
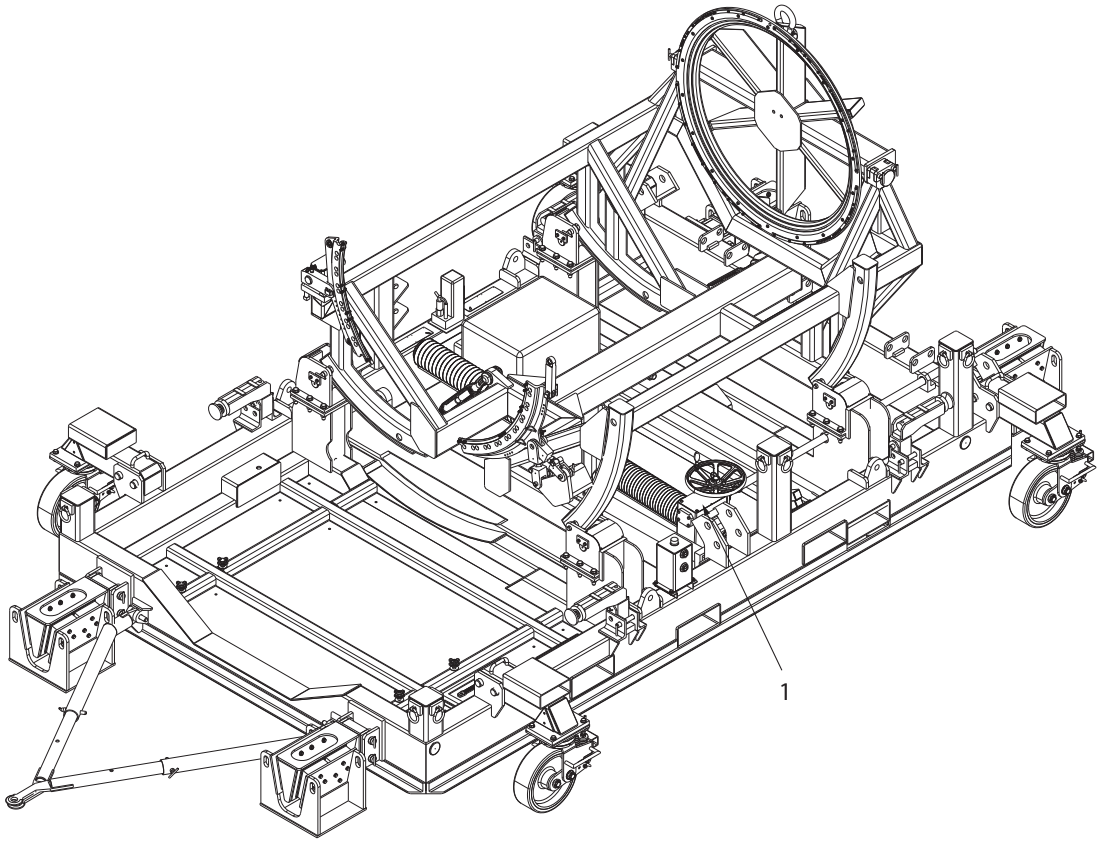
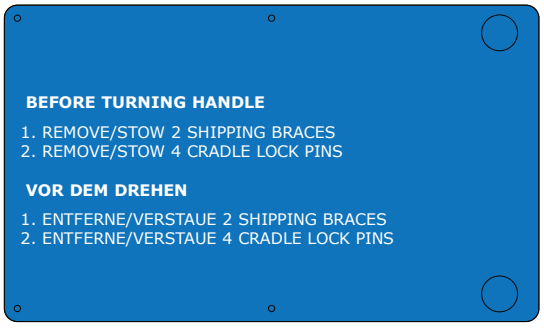


Figure 9.2.1-12 AGSE-E215-DLH-G01 Base Stencils on top of Skid Tape & Skid Paint

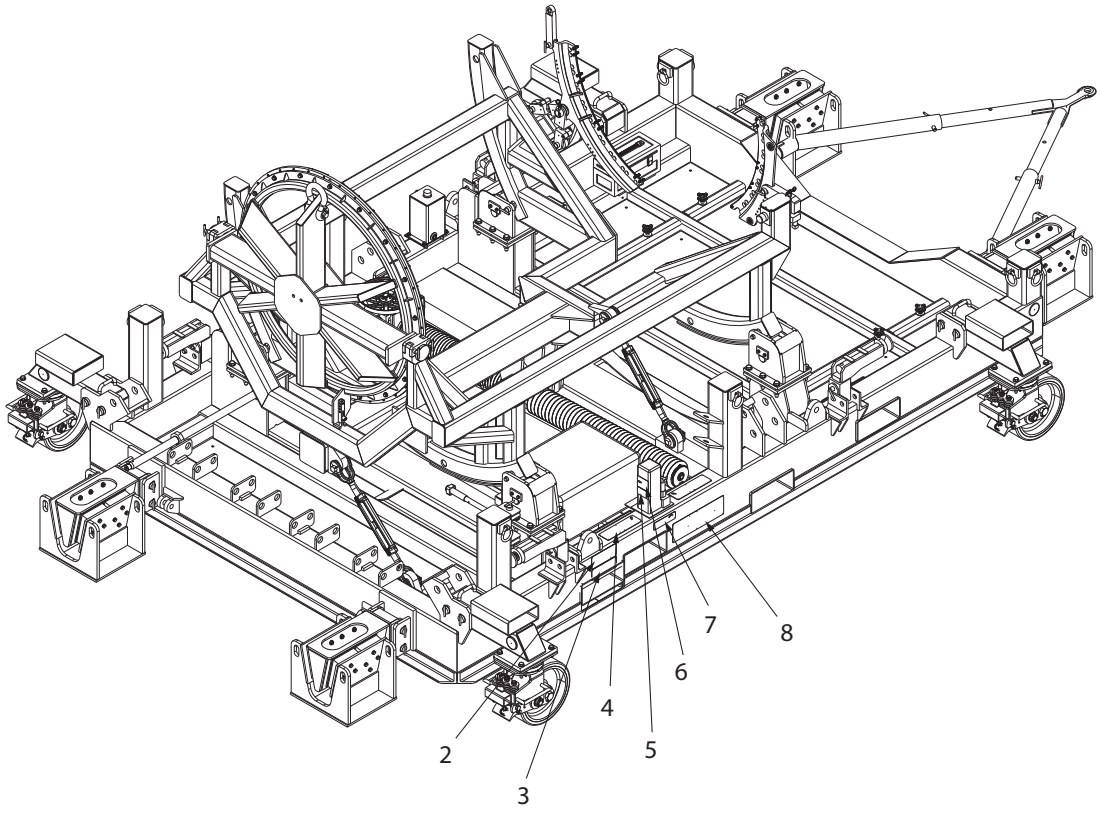
9.2.1 Placards





1

Figure 9.2.2-1



-108 INCHES MINIMUM FORK TINES LENGTH ON A 55 INCH SPREAD

-LIFTED LOAD OF 27,000 POUNDS @ 65.5 INCHES LOAD CENTER

-REFER TO MANUAL SECTION 5.5

2

-108 INCH (2,47m) MINDEST ZINKENLÄNGE MIT ZINKENABSTAND 55 INCH (1,4m)

-TRAGKRAFT 27.000 POUND BEI 65,6 INCH (1,66m) SCHWERPUNKTSABSTAND

-SIEHE ABSCHNITT 5.5 IM HANDBUCH

3

CLOSE FOR FWD END ONLY RAISE/LOWER
OPEN FOR AFT END ONLY RAISE/LOWER

VENTIL GESCHLOSSEN - ANHEBEN / ABLASSEN VORNE
VENTIL ÖFFNEN - ANHEBEN / ABLASSEN HINTEN

4

ÖFFNEN FÜR SCHNELLES EINFAHREN DER ZYLINDER

-WARNUNG-
NICHT ZUM ABLASSEN DES STANDES VERWENDEN

5

OPEN ONLY FOR RAPID RETRACT CYLINDERS

-WARNING-
DO NOT USE TO LOWER STAND

6

CAUTION:
OPEN TO LOWER BASE

VORSICHT:
ZUM ABLASSEN DES STANDS, VENTIL ÖFFNEN

7

Figure 9.2.2-2

CAUTION - DEPLOY/STOW CASTERS

- RAISE EITHER END APPROXIMATELY 6.5 INCHES - CLOSE VALVE
- RAISE OTHER END TO LEVEL STAND - CLOSE VALVE
- TO LOWER STAND ONTO CASTER OR FLOOR TURN RED HANDLE CCW - RELEASE HANDLE WHEN JACKING LEGS CLEARS FLOOR
- TO COMPLETE JACKING LEG RETRACTION - OPEN 'RAPID RETRACTION' VALVE UNTIL LEGS HAVE COMPLETELY RETRACTED - CLOSE VALVE

ACHTUNG - AUSKLAPPEN / EINKLAPPEN DER ROLLEN

- EINE SEITE CA. 16 cm ANHEBEN - VENTIL SCHLIESSEN
- DIE ANDERE SEITE AUF GLEICHE HÖHE BRINGEN - VENTIL SCHLIESSEN
- ZUM ABLASSEN DES STANDS AUF DIE ROLLEN ODER BODEN, DEN ROTEN GRIFF NACH LINKS DRÜCKEN - GRIFF LOSLASSEN WENN DIE STÜTZEN FREI SIND
- ZUM KOMPLETTEN EINFAHREN DER STÜTZEN - DAS 'RAPID RETRACTION' VENTIL ÖFFNEN BIS DIE STÜTZEN KOMPLETT EINGEFAHREN SIND - VENTIL SCHLIESSEN

CAUTION - TO INSTALL / REMOVE SHOCK MOUNTS

- RAISE EITHER END OF STAND APPROXIMATELY 4 INCHES - CLOSE VALVE
- RAISE OTHER END TO LEVEL STAND - CLOSE VALVE
- TO LOWER STAND ONTO SHOCK MOUNTS OR FLOOR TURN RED HANDLE CCW - RELEASE HANDLE WHEN JACKING LEGS CLEARS FLOOR
- TO COMPLETE JACKING LEG RETRACTION - OPEN 'RAPID RETRACTION' VALVE UNTIL LEGS HAVE COMPLETELY RETRACTED - CLOSE VALVE

ACHTUNG - AN- / ABBAU DER SCHWINGUNGSDÄMPFER

- EINE SEITE DES STANDS CA. 10 cm ANHEBEN - VENTIL SCHLIESSEN
- DIE ANDERE SEITE AUF GLEICHE HÖHE BRINGEN - VENTIL SCHLIESSEN
- ZUM ABLASSEN DES STANDS AUF DIE SCHWINGUNGSDÄMPFER ODER BODEN, DEN ROTEN GRIFF NACH LINKS DRÜCKEN - GRIFF LOSLASSEN WENN DIE STÜTZEN FREI SIND
- ZUM KOMPLETTEN EINFAHREN DER STÜTZEN - DAS 'RAPID RETRACTION' VENTIL ÖFFNEN BIS DIE STÜTZEN KOMPLETT EINGEFAHREN SIND - VENTIL SCHLIESSEN

8

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	DESCRIPTION
No Recommended Spare Parts at this time		