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# AGSE-L034-G01

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## Engine Install/Remove Sling CF34-10A Engine

ORIGINAL MANUAL DATED..... 07/08/2014

LATEST MANUAL REVISION LEVEL..... 05/11/2023 (REV B)

**ADVANCED GROUND SYSTEMS ENGINEERING LLC.**

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# Notice

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

The alteration, modification, reengineering, or reproduction of AGSE equipment and/or parts is not permitted without prior written authorization from AGSE.

These modifications include but are not limited to:

- Structural changes to AGSE-supplied parts
- Substitution of AGSE-supplied parts, including hardware, with an alternate source or supplier
- Reverse engineering of AGSE equipment and parts.

Requests for modifications should be submitted to AGSE for review – please send modification requests to [support@agsecorp.com](mailto:support@agsecorp.com).

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

<b>NOTE</b>
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**Modifications executed without prior authorization by AGSE may result in a non-compliant product that is unsafe for operation.**

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

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# 1.0 – Revisions

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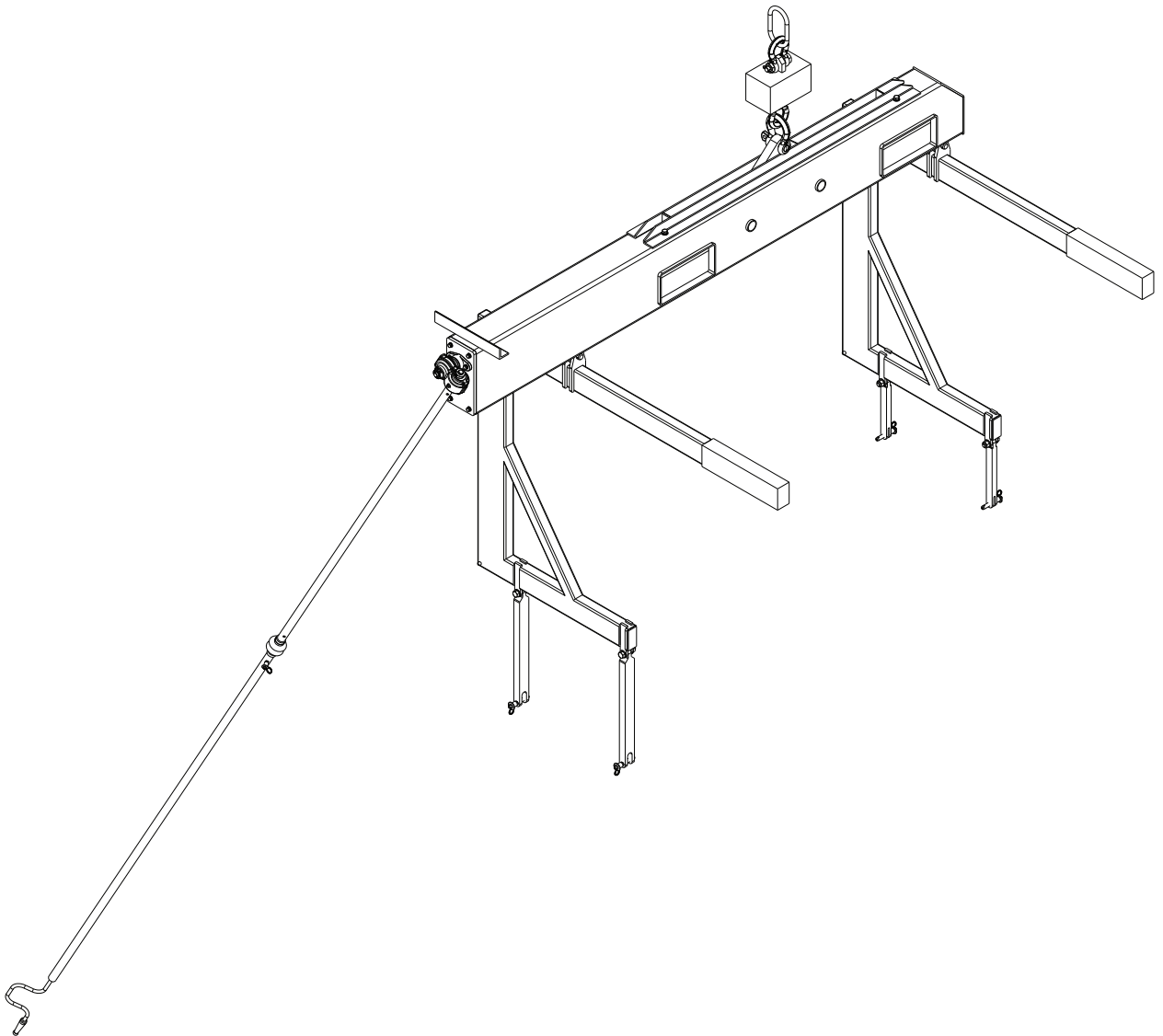
The following is an itemized record of all changes from previous revision.

<b>PAGE</b>	<b>REV</b>	<b>DESCRIPTION OF CHANGE</b>	<b>DATE</b>
A	B	Added Notice	05/11/2023
6.1	B	Updated EC Declaration	05/11/2023
7.0	B	Revised Sec. 7.0	05/11/2023
8.0	B	Revised Sec. 8.0	05/11/2023
8.2	B	Updated Item 27 & 34 Description	05/11/2023
8.2	B	Removed Item 29	05/11/2023
8.3 - 8.5	B	Updated Figure 8.1-1 - 8.1-2	05/11/2023
8.6	B	Added IPB Figure 2	05/11/2023
8.7 - 8.8	B	Added IPB Figure 3	05/11/2023
10-11	B	Removed Section 10 & 11	05/11/2023

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## 2.0 Illustrations

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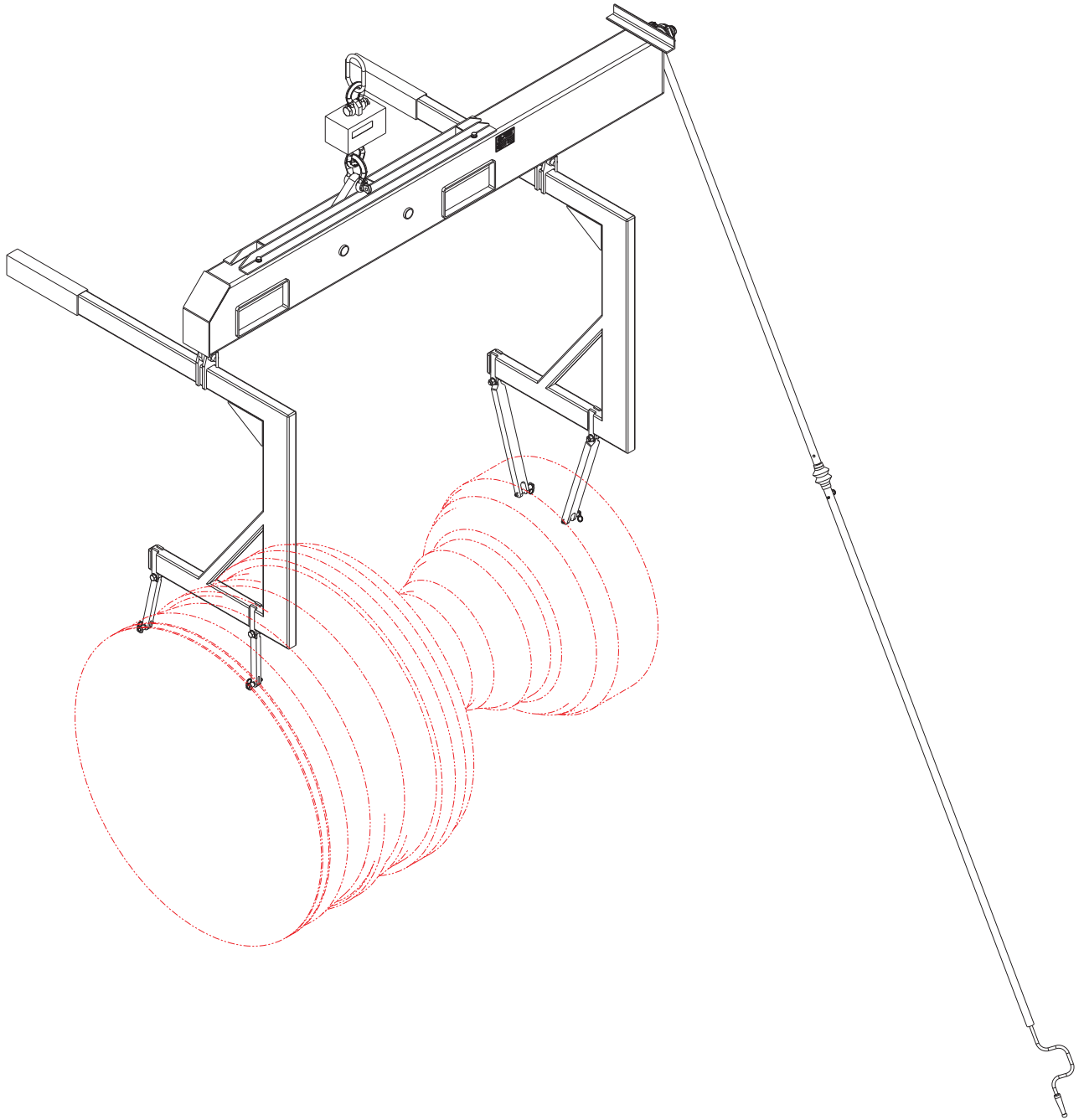


*Figure 2.0-1 AGSE-L034-G01 Engine Install/Remove Sling*

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## 2.0 Illustrations

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*Figure 2.0-2 AGSE-L034-G01 with CF34-10A Engine*

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## 3.0 – Specification

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### 3.1 General Application

The AGSE-L034-G01 engine sling is designed to install and remove the General Electric CF34-10A engine.

### 3.2 Design

The AGSE-L034-G01 CF34-10A engine install/remove sling consists of a spreader beam and two (2) C-shaped lifting frames with a lifting capacity of 7,000 Lbs (3,182 Kg).

### 3.3 Fabrication and Finish

The engine sling 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.

### 3.4 Characteristics

<b>Length</b>	111.7868” (283.938 cm)
<b>Width</b>	48.8750” (124.143 cm)
<b>Height (Fully Deployed)</b>	111.5870” (283.431 cm)
<b>Height (Without Lifting Frames)</b>	42.8225” (108.769 cm)
<b>Weight</b>	889 Lbs (403.24 Kg)

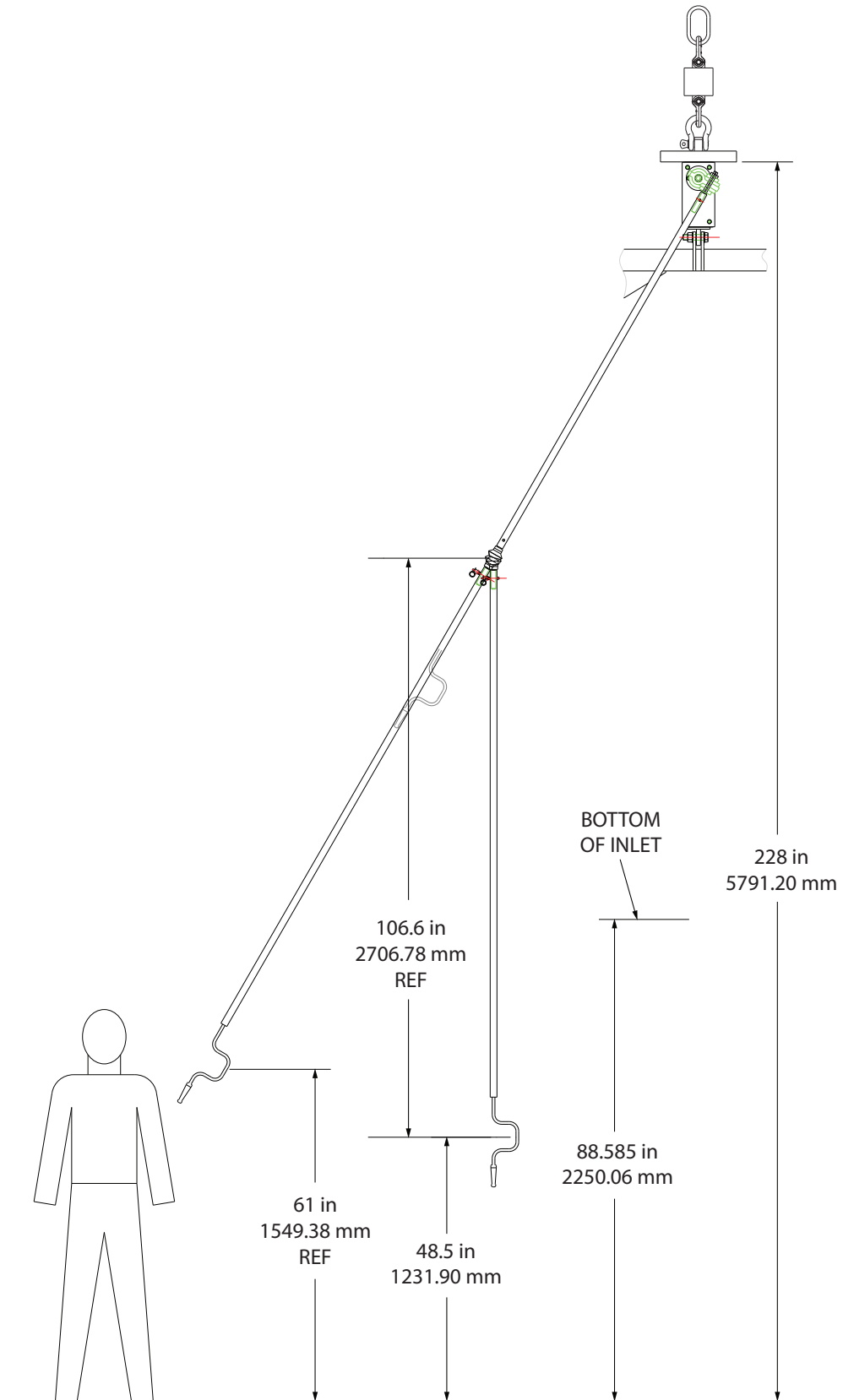


Figure 3.4-1



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# 4.0 – Maintenance and Inspection

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## 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, the 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

The beam should be cleaned with a soap and water solution and rinsed thoroughly. Damaged paint should be touched-up with paint provided by AGSE or other Skydrol resistant high-grade enamel paint. Superficial scratches are expected during normal usage and will not affect function.

## 4.3 Scheduled Service

~ No scheduled service is required ~

## 4.4 Scheduled Inspection

### CAUTION

**Prior to each use, the beam 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.**

Annual inspections of machined surfaces, pins, fasteners, and structure are recommended. The machined surfaces 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 sling structure is to be visually inspected for damage, weld cracks, or corrosion. The cables are to be inspected for kinking, corrosion, fraying, wear or strand breakage. The sling should be periodically proofload tested to the requirements shown in this manual. The testing interval is generally determined by each customer and depends on usage frequency.

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# 5.0 – Operation

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## 5.1 Deployment and Usage (Illustration Figure 5.1-1)

- 1) Inspect all the sling components for obvious damage.
- 2) Remove the AGSE-L03401-P01 lift beam out of its shipping/storage container and lift it to a workable height using a crane or hoist system to install the lifting frames.

### **WARNING**

**Care must be taken when working near suspended loads. Personnel should never stand beneath the suspended load.**

- 3) Attach the two (2) AGSE-L03405-P01 lifting frames to the lift beam using two (2) AM-91000-30T safety pins.

### **NOTE**

**For LH configuration, see Illustration Figure 5.1.1. For RH configuration, see Illustration Figure 5.1-2.**

### **NOTE**

**The part numbers are engraved on the AFT and FWD links. This will help identify the AFT or FWD lifting frames. For additional details, see IPB Figure 1.**

- 4) Lift the sling higher and position the sling above the engine.
- 5) Slowly lower the sling and attach the FWD links to the fan case flange and the AFT links to the AFT end of the engine.
- 6) Secure the FWD links with two (2) CL9-BLPB-2.25-S ball lock pins.
- 7) Secure the AFT link with two (2) CL9-BLPB-1.25-S ball lock pins.

## 5.2 Disassembly and Storage

- 1) Remove the sling from the engine by removing the two (2) CL9-BLPB-1.25-S ball lock pins for the AFT lifting frame and two (2) CL9-BLPB-2.25-S ball lock pins for the FWD lifting frame.
- 2) Lift the sling above the engine and then move away from the engine.
- 3) Lower the sling until the lifting frames can safely and comfortably be reached.
- 4) Remove the FWD and AFT lifting frames from the lift beam by removing the two (2) AM-91000-30T safety pins. Store the lifting frames and the safety pins.

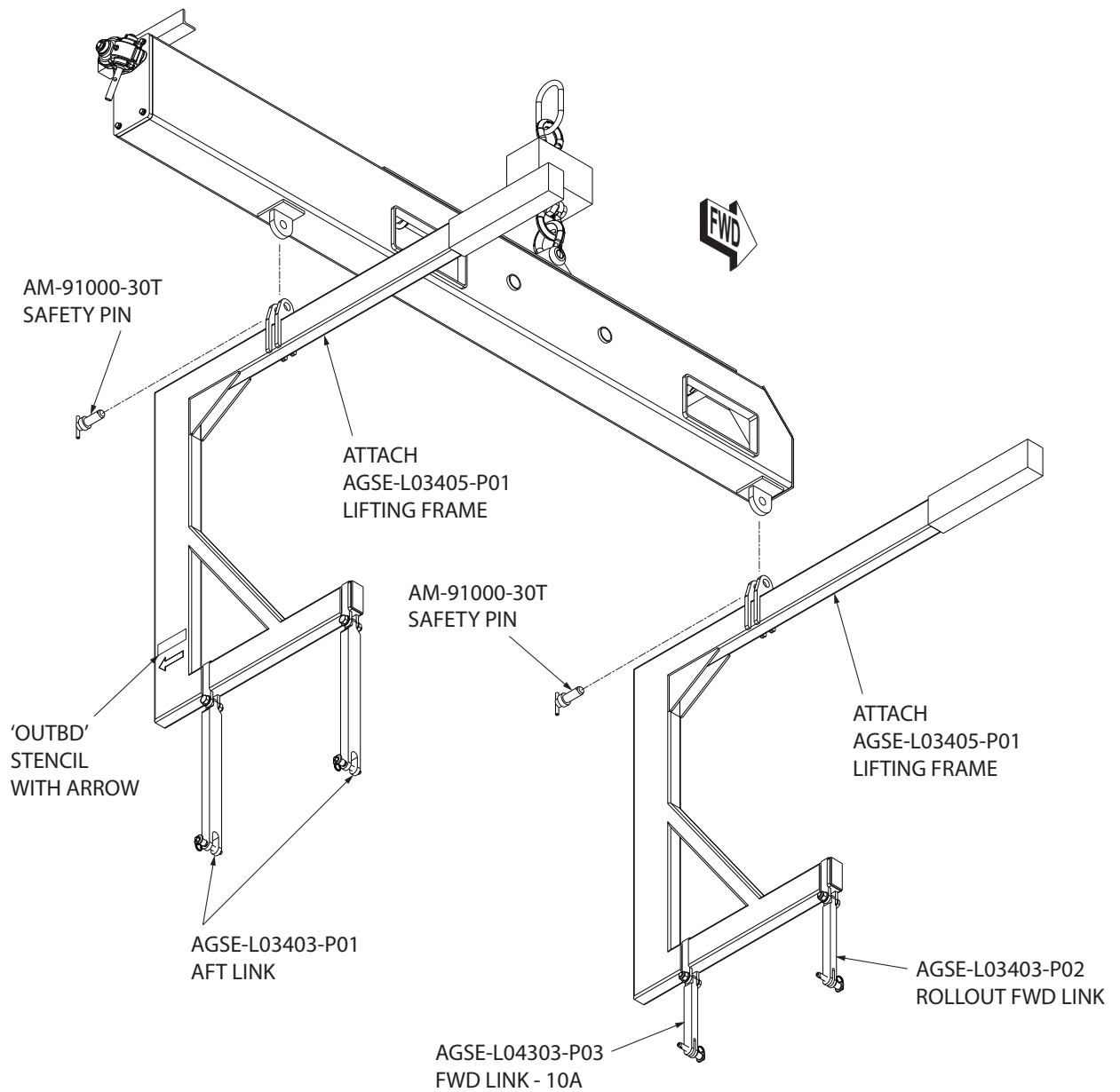


Figure 5.1-1 LH Configuration

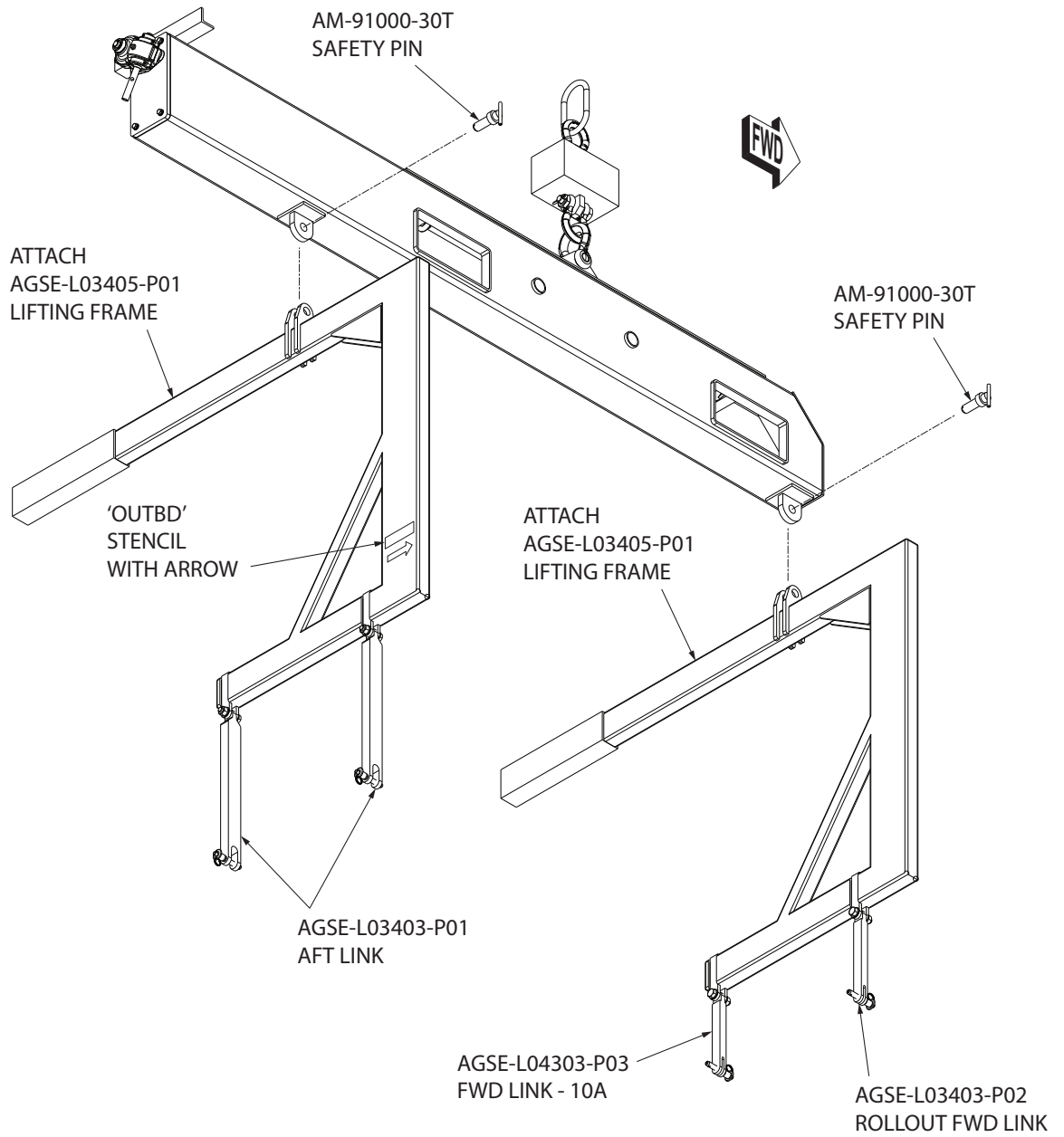


Figure 5.1-2 RH Configuration

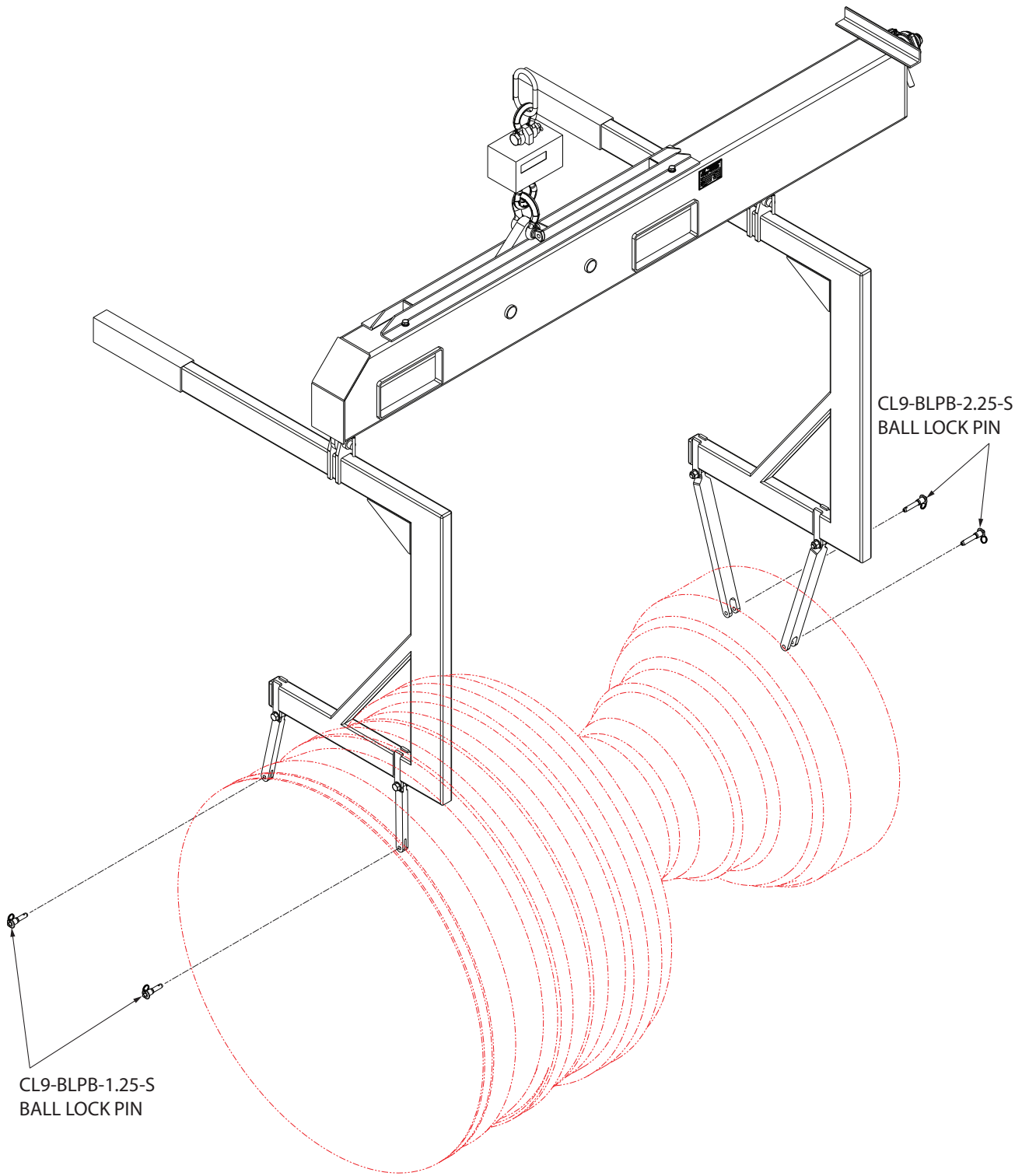


Figure 5.2-1

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# 6.0 – SAFETY

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## 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 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.

## 6.4 Risk Assessment

### 6.4.1 Limits of the Machinery

The AGSE-L034-G01 CF34-10A Engine Sling is a commercial product designed specifically only to lift the General Electric CF34-10A. 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 CF34-10A Engine Sling 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 CF34-10A Engine Sling can be with medium risk of injury and is considered safe to use under supervision. Low residual risks include potential pinch points during positioning 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.





## ***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 Sling, CF34-10A  
Model: AGSE-L034  
Part Number: AGSE-L034-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:

- 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  
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# 7.0 - Warranty

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## 7.1 Statement of Warranty

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

### **CAUTION**

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

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# 8.0 - Parts Breakdown

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## 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,” “DESCRIPTION,” “SPARES,” and “RECOMMENDED REPLACEMENT.” The number in SPARES column represents the recommended quantity on hand in case of loss or damage. The number in RECOMMENDED REPLACEMENT column represents the recommended part life cycle.

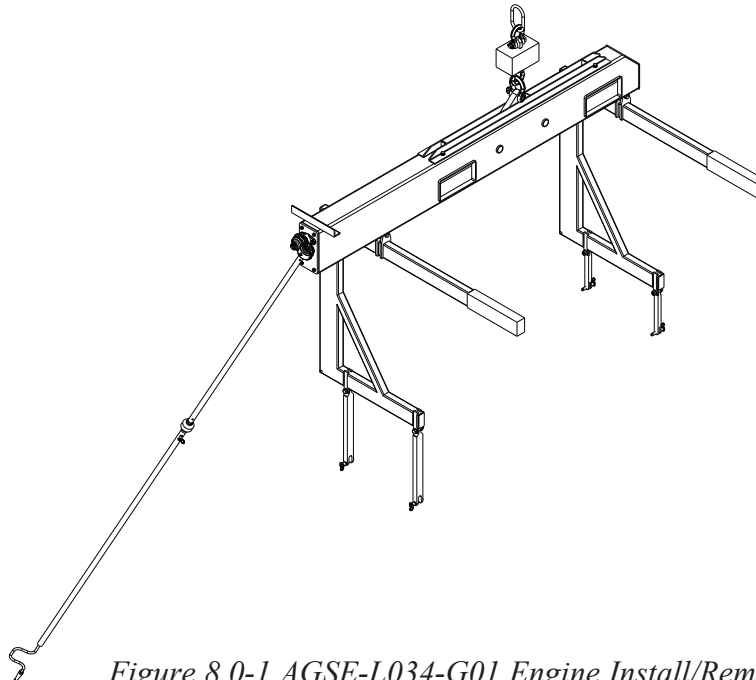
### NOTICE

**“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.**

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 spare parts 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.

## 8.2 Illustrated Parts Breakdown



*Figure 8.0-1 AGSE-L034-G01 Engine Install/Remove Sling*

## IPB Figure 1 - AGSE-L034-G01 Engine Install/Remove Sling Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION	SPARES	RECOMMENDED REPLACEMENT
	AGSE-L034-G01	-	Engine Install/Remove Sling Assy (Illustration Figures 8.1-1 and 8.1-2)	-	-
1	AGSE-L03401-P01	1	Lift Beam Weldment	-	-
2	AGSE-L03401-P02	1	End Plate AFT	-	-
3	AGSE-L03401-P03	2	Bearing Block	-	-
4	AGSE-L03401-P04	1	Extension Shaft	-	-
5	AGSE-L03401-P05	1	Trolley Shaft	-	-
6	AGSE-L03402-P01	1	Trolley Lift Plate	-	-
7	AGSE-L03402-P04	1	Nut	-	-
8	AGSE-L03403-P01	2	AFT Link	-	-
9	AGSE-L03403-P02	1	FWD Link - Rollout	-	-
10	AGSE-L03403-P03	1	FWD Link - 10A	-	-
11	AGSE-L03405-P01	2	Lifting Frame Weldment	-	-
12	RCJT-3/4	3	Bolt Flange Bearing 3/4" Dia. Bore 2	-	-
13	AM-1001-80-401	1	Shaft Coupling	-	-
14	Commercial	2	Set Screw - Cup Point Socket 5/16"-18UNC x 3/8"	-	-
15	Commercial	1	Roll Pin - 5/16" Dia. x 1-3/4" Zinc Plt	-	-
16	Commercial	10	HHCS - 3/8"-16UNC x 1-1/4" Zinc Plt	-	-
17	Commercial	10	Flat Washer - 3/8" Dia. - Zinc Plt	-	-
18	Commercial	12	Lock Washer - 3/8" Dia. - Zinc Plt	-	-
19	Commercial	4	Flat Washer - SAE - 3/4" Dia. Zinc Plt	-	-
20	Commercial	4	Cotter Pin - 1/8" Dia. x 1-1/4" Steel	-	-
21	12NBF-1628YJ	4	Airframe Bearing 3/4" ID x 1-3/4" OD	-	-

## IPB Figure 1 - AGSE-L034-G01 Engine Install/Remove Sling Assembly (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION	SPARES	RECOMMENDED REPLACEMENT
22	G-209-1	1	Anchor Shackle - 8-1/2" Ton	-	-
23	C-2130	2	Load Cell Shackle	-	-
24	31195T32	1	Oblong Link Size 5/8 x 3" Width x 6" Depth	-	-
25	3550-2	1	Digital Meter	-	-
26	0271-0200	1	Gear Box	-	-
27	Commercial	4	SHCS - 1/2"-13 UNC x 2" Zinc Plt	-	-
28	Commercial	4	Lock Washer - 1/2" Dia.	-	-
30	9961K22	2	Set Collar - 3/4" Dia.	-	-
31	CL-9-BLPB-1.25-S	2	Ball Lock Pin - 9/16" Dia.	-	-
32	CL-8-BLPB-2.25-S	2	Ball Lock Pin - 1/2" Dia.	-	-
33	AM-91000-30T	2	Safety Pin	-	-
34	Commercial	4	Bolt - 5/8"-11UNC x 2-3/4" Gr 5 - Zinc Plt	-	-
35	Commercial	8	Flat Washer - 5/8" Dia. - Zinc Plt	-	-
36	Commercial	4	Lock Nut - 5/8"-11UNC - Zinc Plt	-	-
37	Commercial	2	Bolt - 3/8"-16UNC x 3-3/4" Lg Gr 5 - Zinc Plt	-	-
38	Commercial	2	Lock Nut - 3/8"-16UNC - Zinc Plt	-	-
39	Commercial	4	Flat Washer - 3/8" Dia. - Zinc Plt	-	-
40	AGSE-L03404-S02	1	Drive Shaft	-	-
41	AGSE-L03404-S01	1	Drive Shaft Extension	-	-
42	10C1288-P06	1	Adapter Shaft	-	-
43	AM-2207	1	AGSE Name Plate	-	-
44	1361T17	1	Dynamometer - 10,000 Lbs (Alt for Items 23 and 25)	-	-

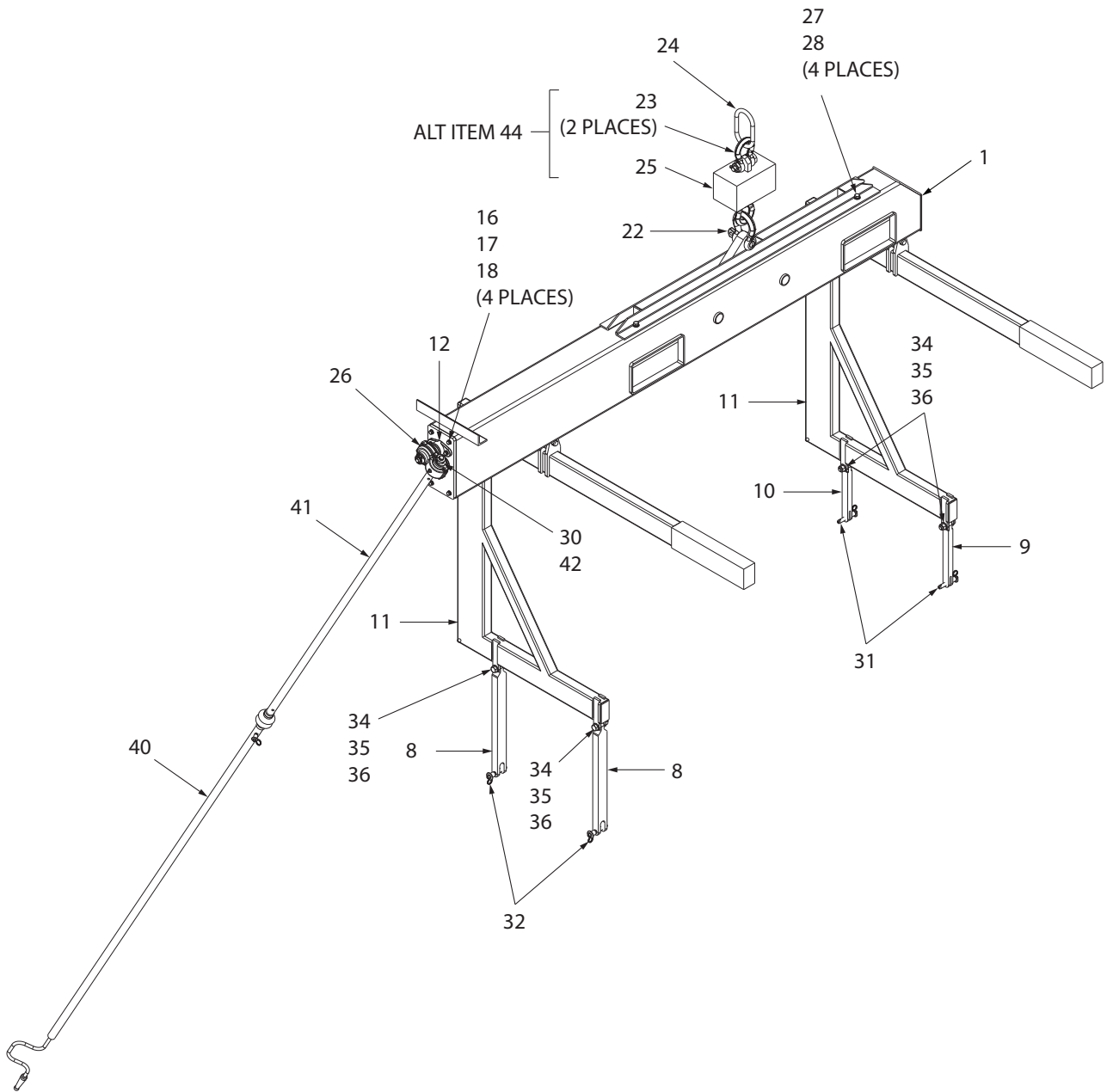


Figure 8.1-1 AGSE-L034-G01 Sling Assembly - LH Configuration

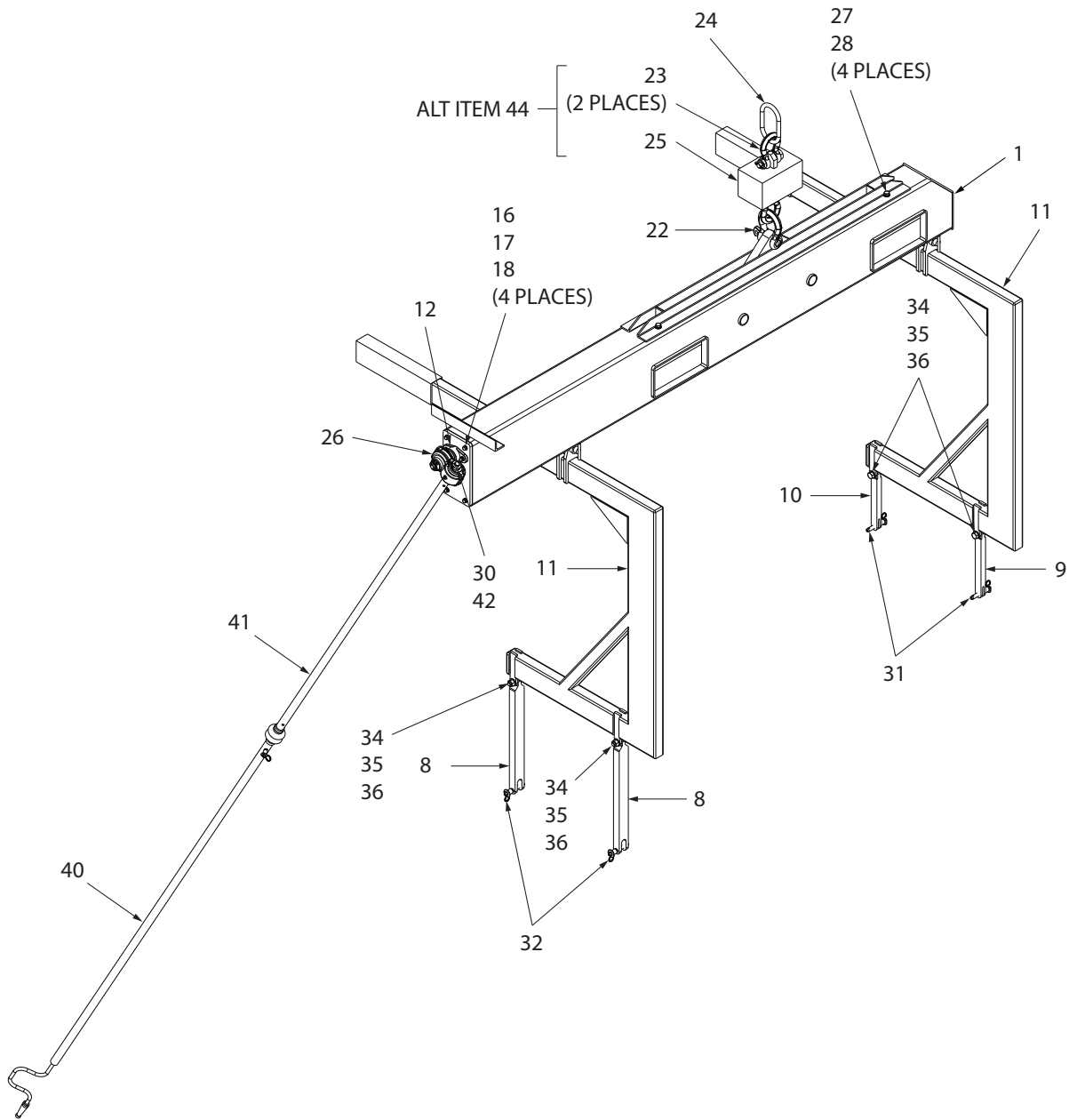


Figure 8.1-2 AGSE-L034-G01 Sling Assembly - RH Configuration

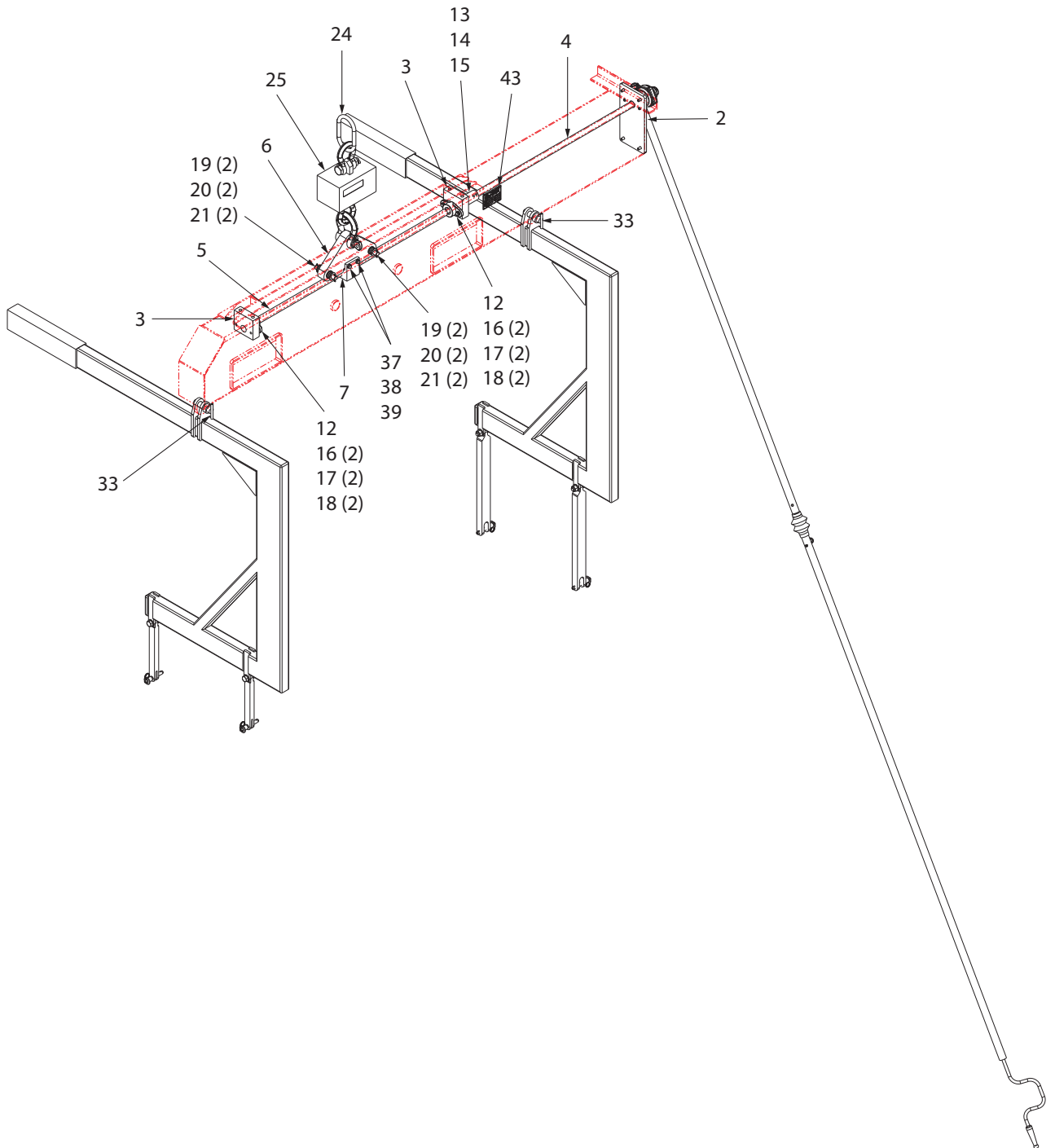
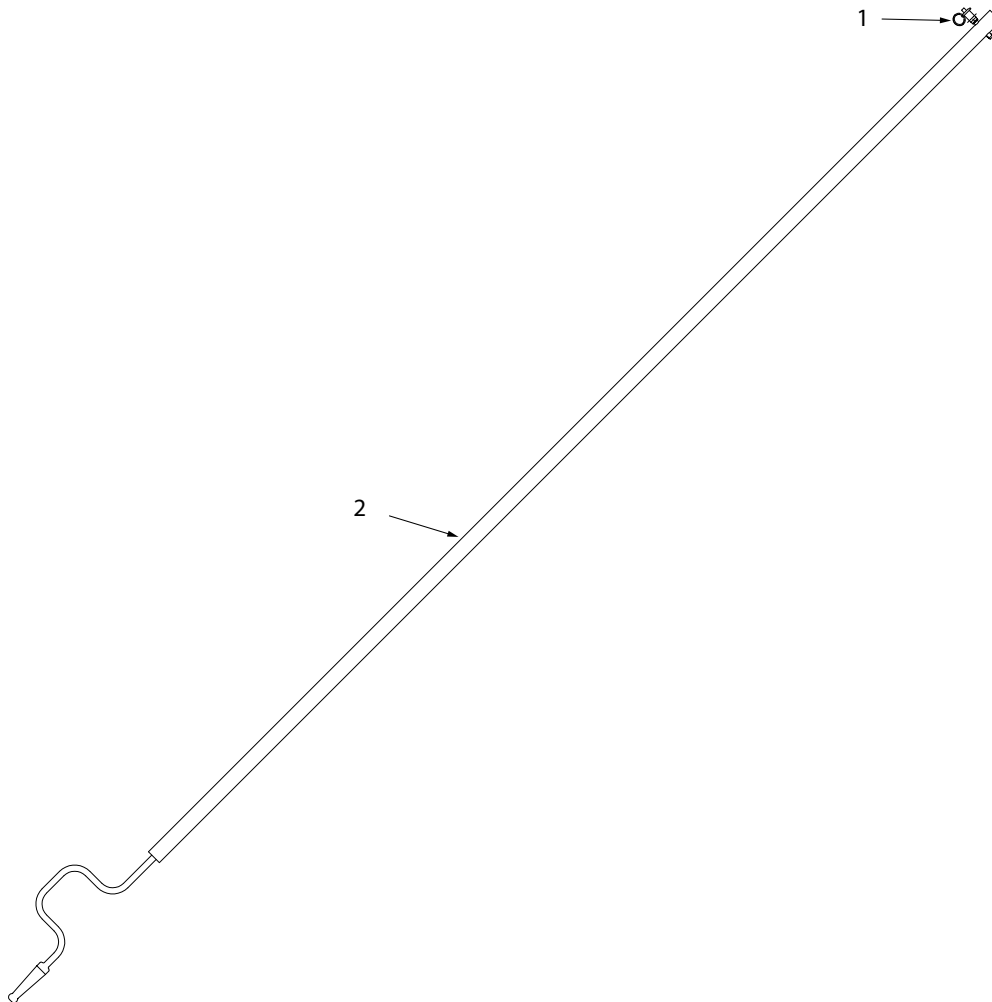


Figure 8.1-3 AGSE-L034-G01 Sling Assembly

## IPB Figure 2 - AGSE-L03404-S02 Drive Shaft

ITEM	PART NUMBER	QTY	PART DESCRIPTION	SPARES	RECOMMENDED REPLACEMENT
	AGSE-L03404-S02	-	Drive shaft (Illustration Figures 8.2-1)	-	-
1	CL-6-BLPB-1.50-S	1	Ball Lock Pin 3/8" Dia. x 1-1/2" - S.S	-	-
2	L03404-P02	1	Tube	-	-



*Figure 8.2-1 AGSE-L03404-S02 Drive Shaft*



## IPB Figure 3 - AGSE-L03404-S01 Drive Shaft Extension

ITEM	PART NUMBER	QTY	PART DESCRIPTION	SPARES	RECOMMENDED REPLACEMENT
	AGSE-L03404-S01	-	Drive Shaft Extension (Illustration Figures 8.3-1)	-	-
1	J150B	1	U-Joint - 3/4" Ø Bore 3/8" Dia. x 1-1/2" - S.S	-	-
2	UB150	1	U-Joint Boot Kit	-	-
3	Commercial	2	Dowel Pin - 3/8" Dia x 1-3/8" Lg	-	-
4	CL-6-BLPB-1.50-S	1	Ball Lock Pin 3/8" Dia. x 1-1/2" - S.S	-	-
5	L03404-P01	1	Tube	-	-
6	L03404-P03	2	U-Joint Shaft	-	-

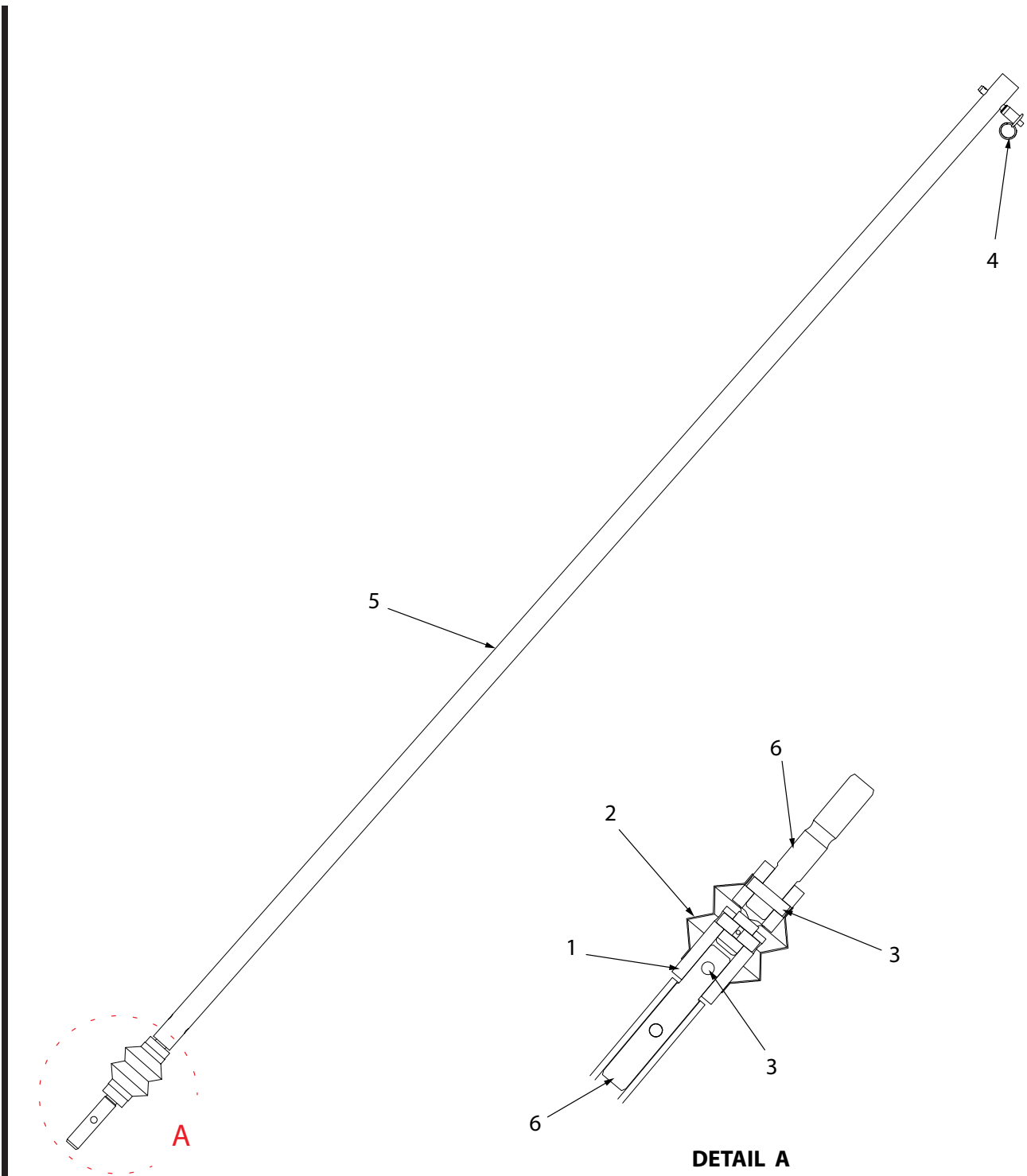


Figure 8.3-1 AGSE-L03404-S01 Drice Shaft Extension

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# 9.0 – Stencils, Decals, and Placards

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## 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.