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AGSE-E177-G01 (11C4490P02)

Fan Case Separate/Mate and Transfer System

For GENx-1B Fan Stator Assembly

ORIGINAL MANUAL DATED 10/03/2011
LATEST MANUAL REVISION LEVEL07/01/2019 (REV. B)

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1.0 – Revisions

PAGE	REV	DESCRIPTION OF CHANGE	DATE
A	A	Revised Part Number	11/14/2013
3.0	A	Revised NOTE contents (Part Number Corrections)	11/14/2013
5.0	A	Revised Note contents (Part Number Corrections)	11/14/2013
5.1	A	Revised Illustration	11/14/2013
5.3	A	Revised Illustration	11/14/2013
5.4	A	Revised 5.2 Section Title and NOTICE contents	11/14/2013
Title	B	Updated Logo, Removed Job and Computer File	07/01/2019
All	B	Part Number Change - AGSE-E177-G04 to G01	07/01/2019
1.0	B	Updated Index	07/01/2019
7.0	B	Removed Reference to Section 11.0	07/01/2019
8.0	B	Removed Reference to Section 11.0 and MFG	07/01/2019
8.1-8.7	B	Removed all MFG	07/01/2019
10.0	B	Added Table for Spare Parts List	07/01/2019
11.0	B	Deleted Section 11.0	07/01/2019

2.0 – Illustrations

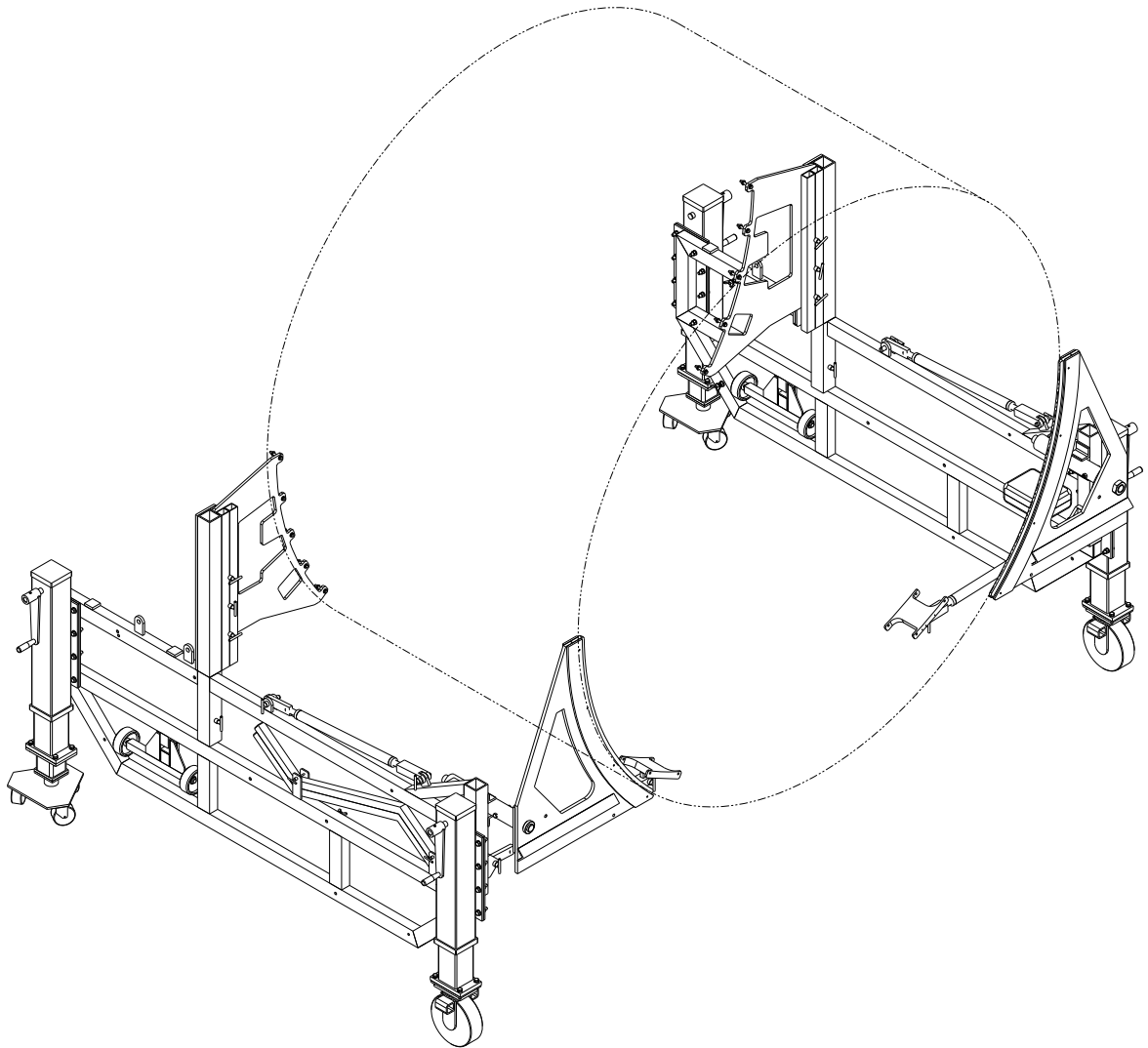


Figure 2.0-1 GENx-1B AGSE-E177-G01 (11C4490P02) Fan Module Transfer Dolly

2.0 – Illustrations (Continued)

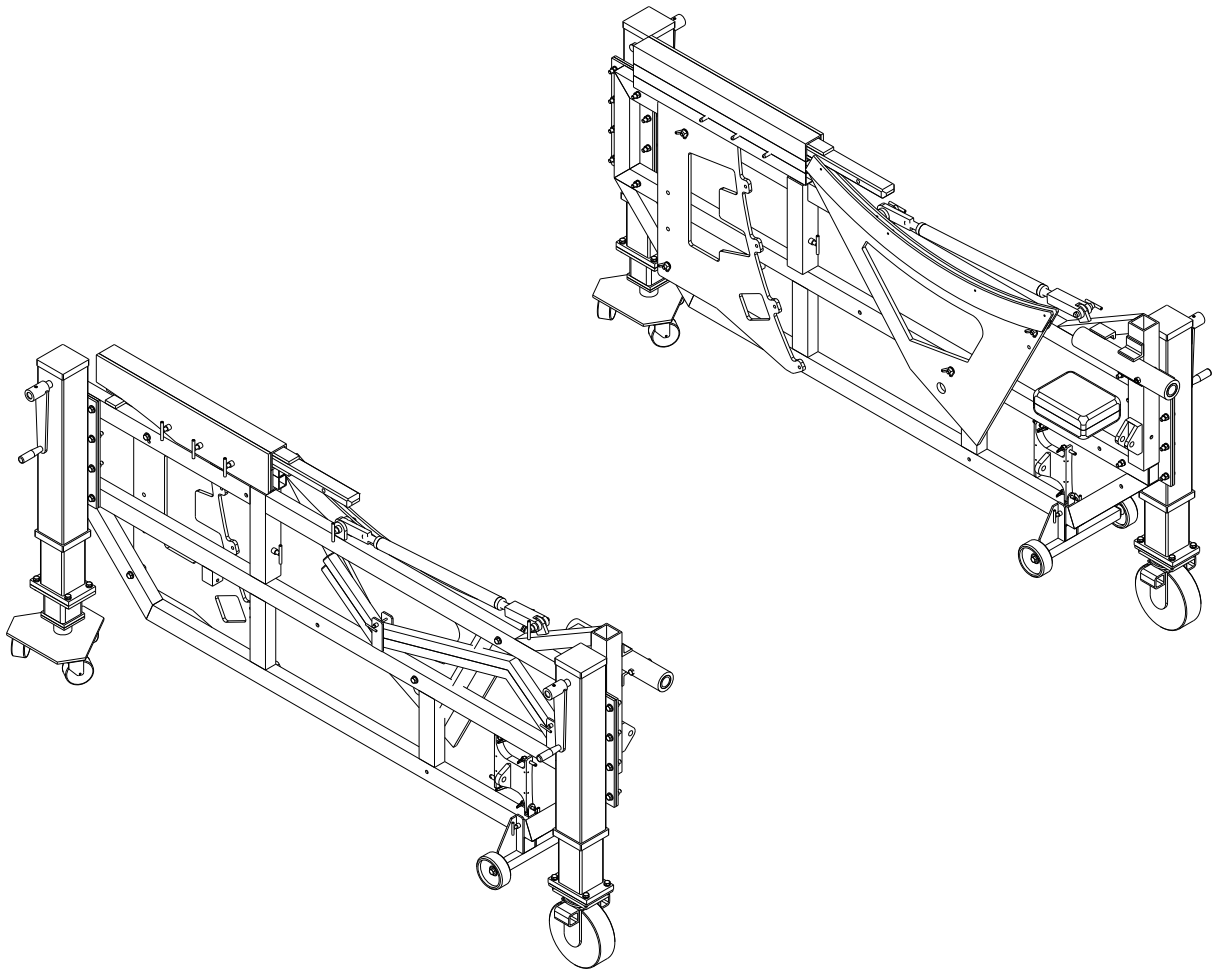
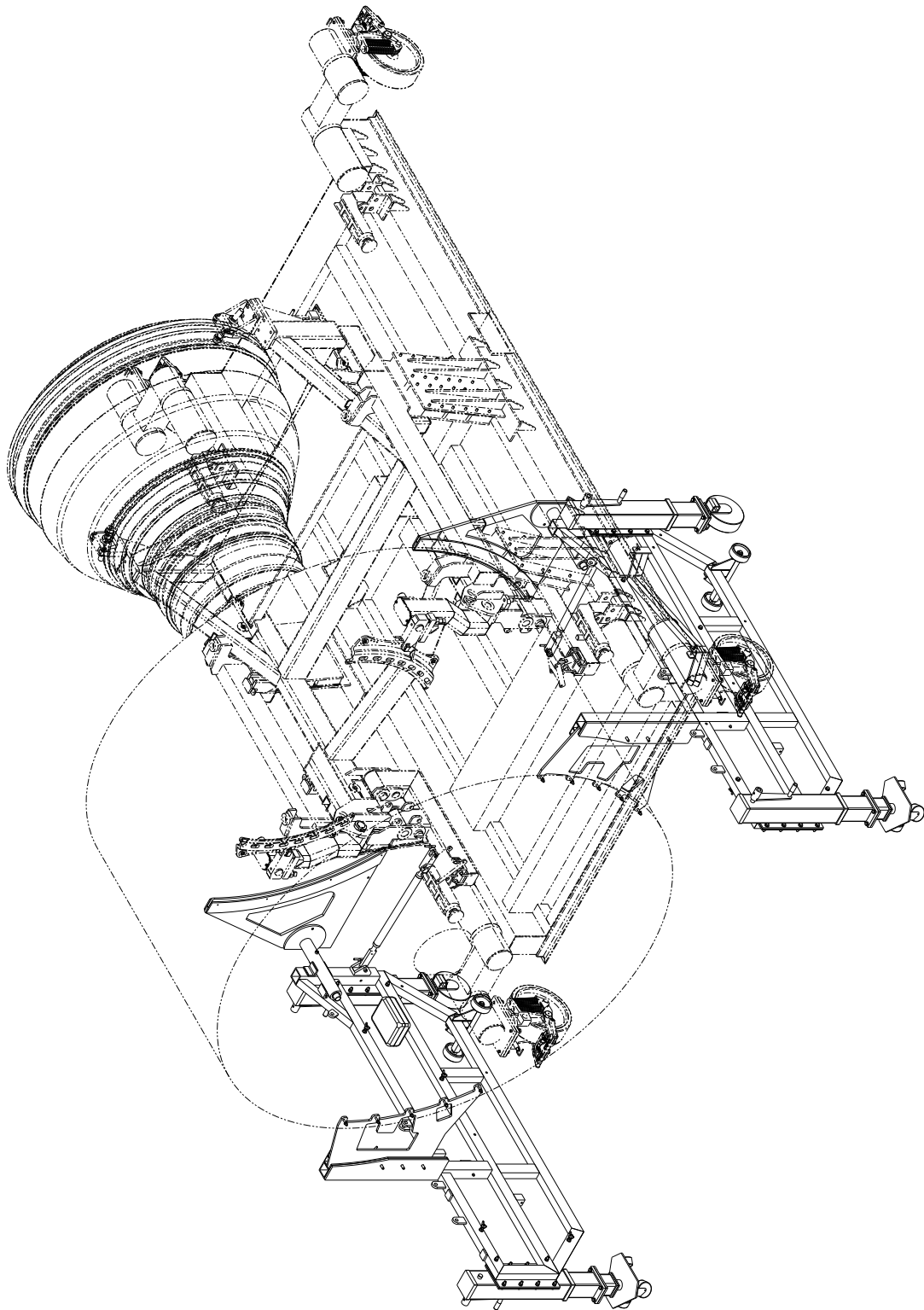


Figure 2.0-2 AGSE-E177-G01 (11C4490P02) Dolly stowed for Shipping and/or Storage

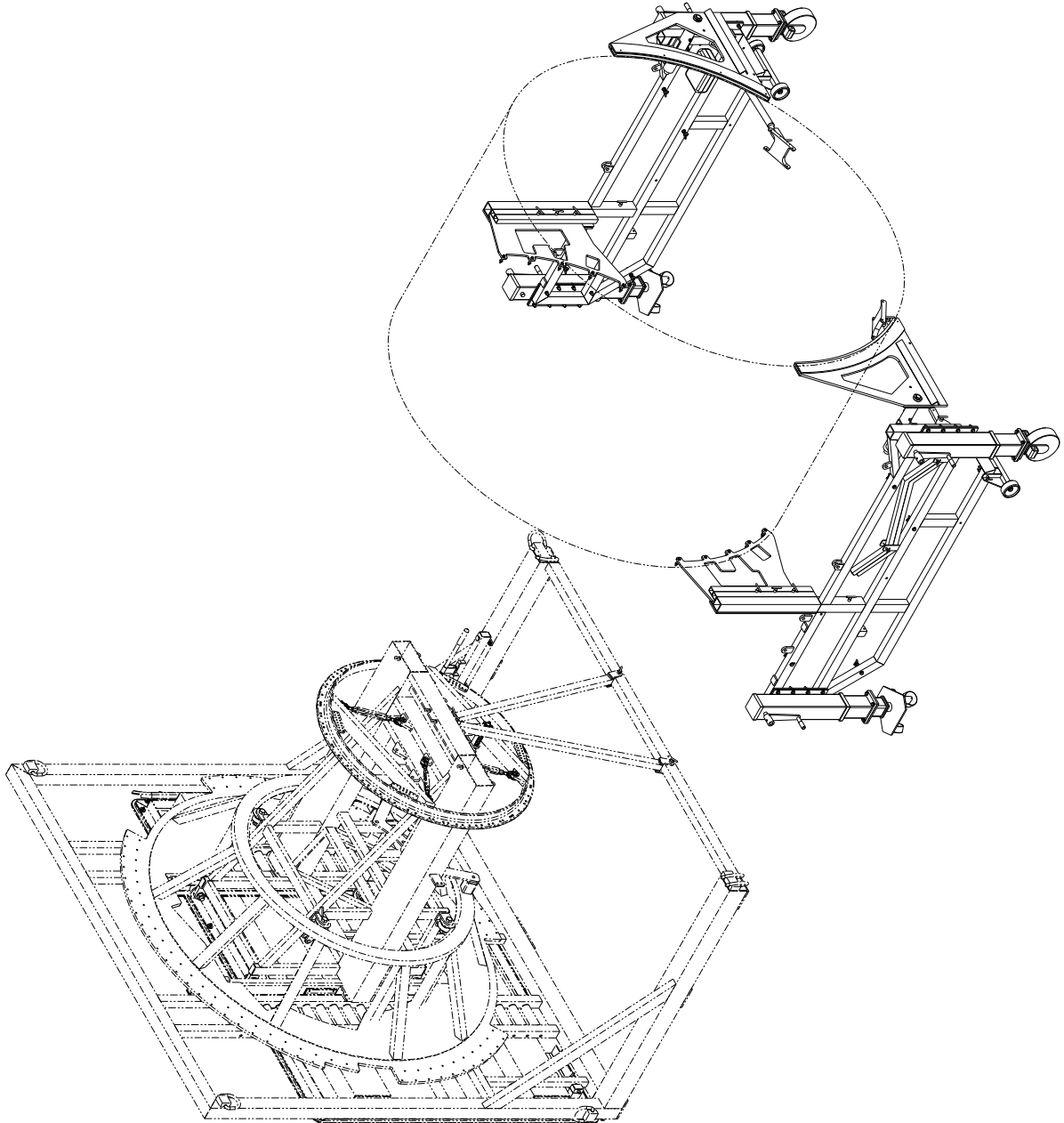
2.0 – Illustrations (Continued)



*Figure 2.0-3 AGSE-E177-G01 (11C4490P02) Dolly with
AGSE-E175-G04 (11C4487P02) Engine Stand*

AGSE-E177-G01 (11C4490P02) Fan Module Transfer Dolly

2.0 – Illustrations (Continued)



*Figure 2.0-4 AGSE-E177-G01 (11C4490P02) Dolly with AGSE-C084-G01
(11C4572P01) Fan Shipping Fixture*

AGSE-E177-G01 (11C4490P02) Fan Module Transfer Dolly

3.0 – Specification

3.1 General

The AGSE-E177-G01 (11C4490P02) Fan Transfer Dolly is designed to support the GENx-1B fan stator assembly during quick engine change separation/mate procedure. The dolly attaches to the fan stator case at designated ground handling points. The dolly is equipped with jacking caster legs for alignment during the procedure. The fan stator case provides the center connecting structure support for the side frame assemblies. The dolly separates for storage in a reusable container. The dolly must be moved manually during the procedure.

3.2 Mobility

The dolly has jacking caster legs but has no tow bar and must be manually moved when required. Support wheels can be mounted on the side frames for stability.

3.3 Design

The dolly consists of welded tubular aluminum frames supported by jacking caster legs and aluminum plates drilled to match the fan stator ground handling points. The aluminum plates attach to the frames forming a left and right side support for the fan stator assembly. The AGSE-E177-G01 (11C4490P02) dolly is compatible with the AGSE-E176-G04 (11C3443P03), AGSE-E175-G04 (11C4487P02) engine transport stands and AGSE-C069-G02 (11C3004P02), AGSE-C084-G01 (11C4572P01) fan module shipping stands.

NOTE

If the AGSE-E175-G04 (11C4487P02) or AGSE-E176-G04 (11C3443P03) transport stand is used, an AGSE-C069-G02 (11C3004P02) or AGSE-C084-G01 (11C4572P01) fan stator module shipping fixture is needed to perform the fan transfer operation.

3.4 Fabrication and Finish

The dolly is fabricated from aluminum structural shapes conforming to ASME 6061-T6 materials. All bolted connections use 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.

4.0 – Maintenance and Inspection

4.1 General

Life expectancy of this unit can be extended indefinitely, when 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 stand should be inspected for obvious signs of abuse or shipping damage. Observed damage should require complete inspection of the affected area to ensure stand integrity is not compromised.

4.2 Cleaning and Painting

The stand 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

All zerk fittings on the stand should be lubricated every 90 days with the following extreme pressure grease or equivalent grease:

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

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

4.4 Scheduled Inspection

CAUTION

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

Annual inspections of machined surfaces, pins, fasteners, and structure are recommended. The machined surfaces (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 stand structure is to be visually inspected for damage, weld cracks, or corrosion.

5.0 – Operation

The assumption is the engine fan stator is to be removed from an AGSE-E175-G01 (11C4487P02) engine transport stand. The fan stator has been prepared for removal. The inlet cowl may or may not remain attached. The engine fan stator may also be removed from an AGSE-E176-G04 (11C3443P03).

CAUTION

The support wheels are to remain installed while the individual frames are moved independently due to tipping hazard. They are removed during the installation and operation of the stand as stated below.

5.1 - Fan Stator Removal from AGSE-E175-G01 (11C4487P02) Engine Transport Stand

1. Remove AGSE-E177-P01 and AGSE-E177-P02 side frames from container. Position frames as stenciled on indicated sides of fan stator.
2. Remove the AGSE-E17706-P03 LH and AGSE-E17706-P04 RH FWD support post from the storage position by removing six (6) AM-90500-60T safety pins then install them on the side frames. Secure with two (2) AM-90500-48T safety pins.
3. Remove the two (2) AGSE-E17706-P02 FWD support plates from the storage position by removing four (4) wing nuts and four (4) flat washers.
4. Install the FWD support plates on the FWD support posts and secure using six (6) AM-90500-60T safety pins (Figure 5.1-2).
5. Use the jack legs to align and stabilize the dolly during installation and mounting of the fan case with the transportation stand. The support wheels are to remain in position while the stands are being installed to the fan case.
6. Push dolly forward until the fan forward flange touches the mounting plates. Adjust casters to align the frames and the fan stator.
7. Attach the fan stator to the FWD mounting plates with hardware provided, insert bolts through mounting plates.
8. Remove the AGSE-V087-G01 support bracket set (AGSE-V087-P01 - LH and AGSE-V087-P02 - RH) from storage position and install on the fan case flange using eight (8) AGSE-V087-S04 pins.
9. Remove the two (2) AGSE-E17710-S01 AFT brace assemblies from the storage position by removing two (2) AM-90750-38T and two (2) AM-90750-32T safety pins.
10. Install the brace assemblies on the side frames using two (2) AM-90750-38T safety pins.
11. Remove the AGSE-E17708-S01 LH and AGSE-E17708-S02 RH AFT support assemblies from the storage position and install on the side frames. Secure with two (2) lock collars (Ruland P/N TCL-24-12-SS or McMaster-Carr P/N 6438K94) (Figure 5-1-3).

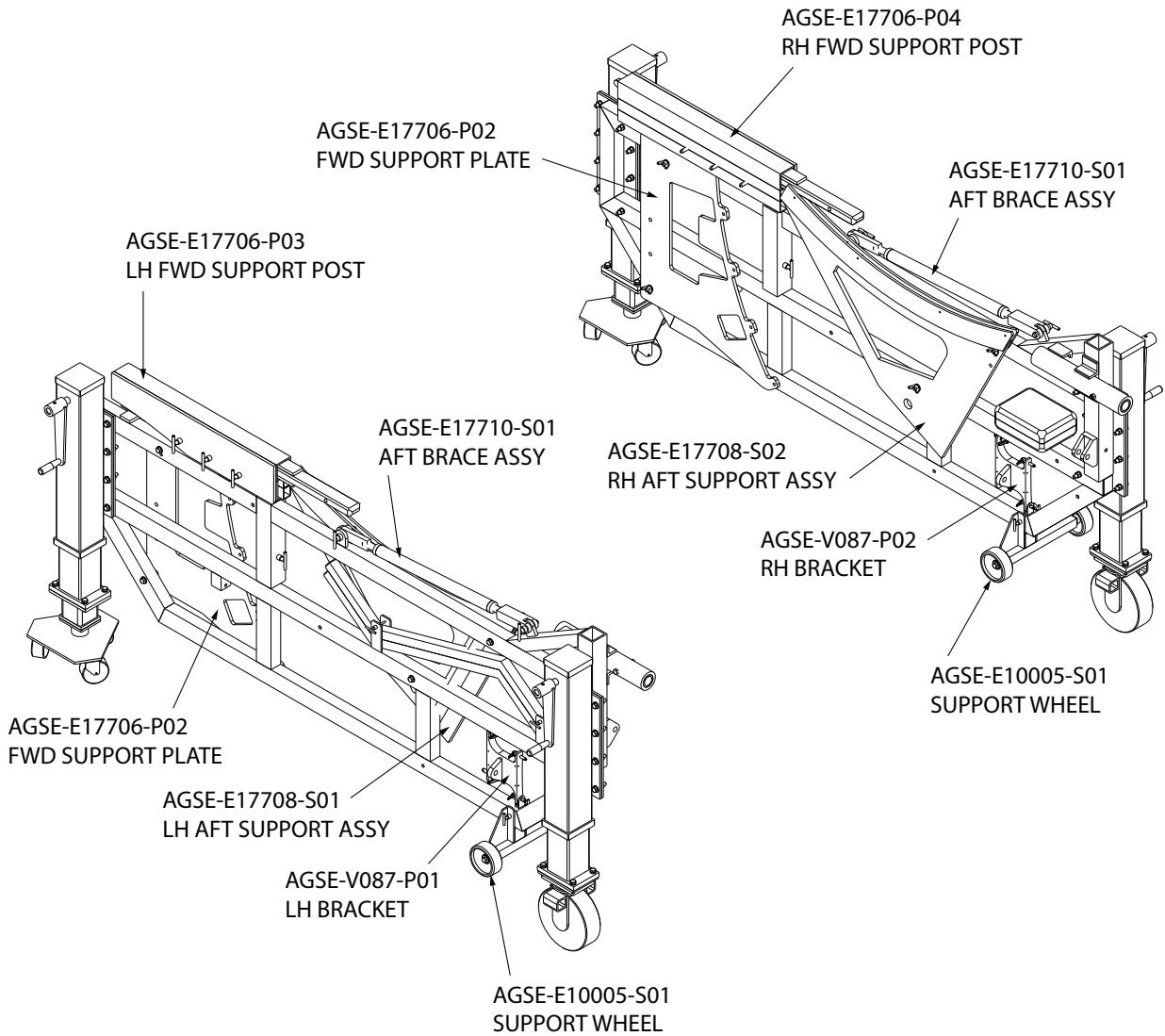


Figure 5.1-1 AGSE-E177-G01 (11C4490P02) Dolly Components Storage

12. Align the side frames to align the groove plates to the fan case groove.
13. Adjust the AFT braces to align with the AGSE-V087-G01 support bracket set. Attach and secure with two (2) AM-90750-32T safety pins.
14. Attach the AGSE-E17711-S01 cable assembly to the fan case.
15. Separate fan stator from engine.

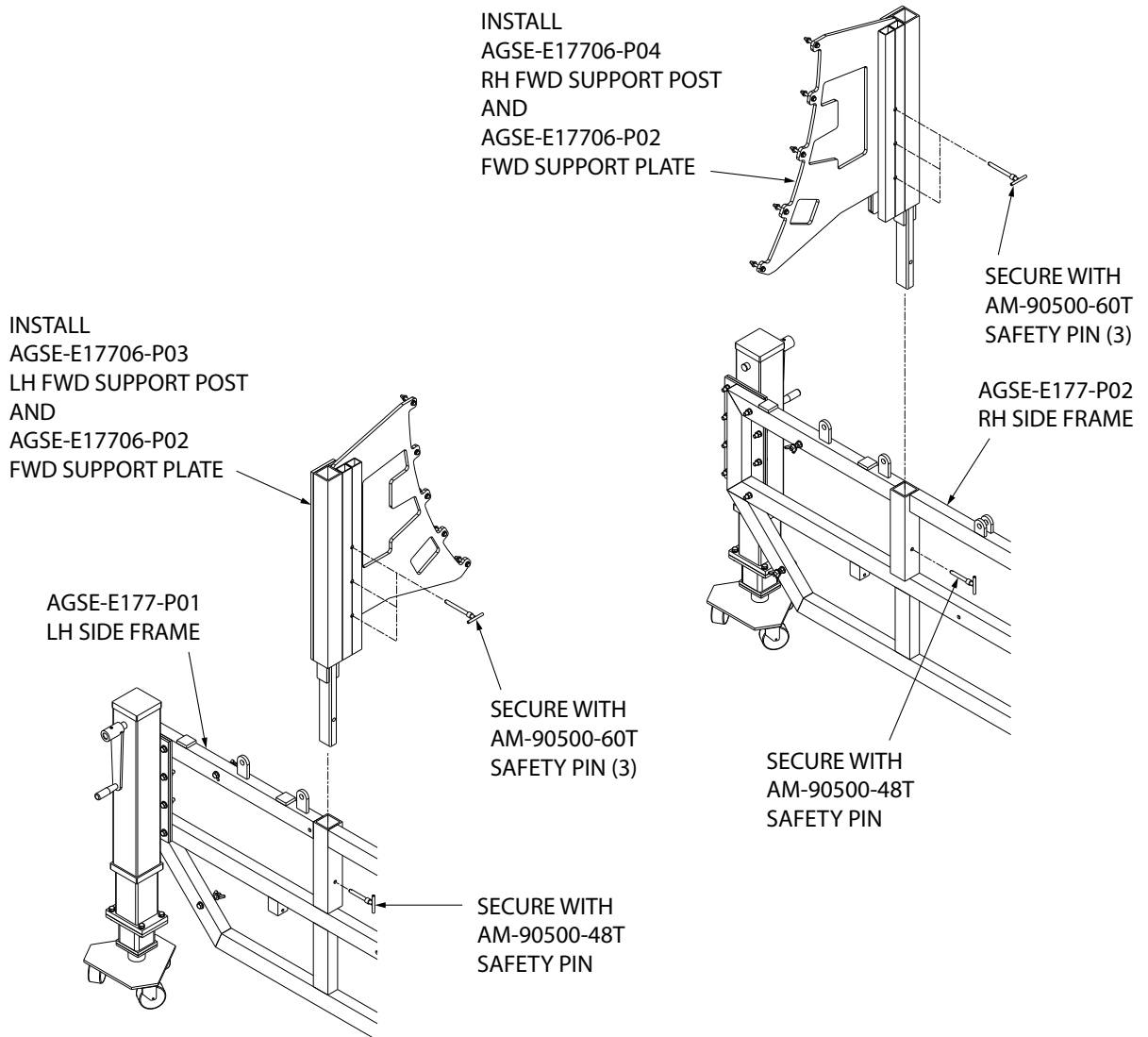


Figure 5.1-2 FWD Support Posts and Support Plates Installation

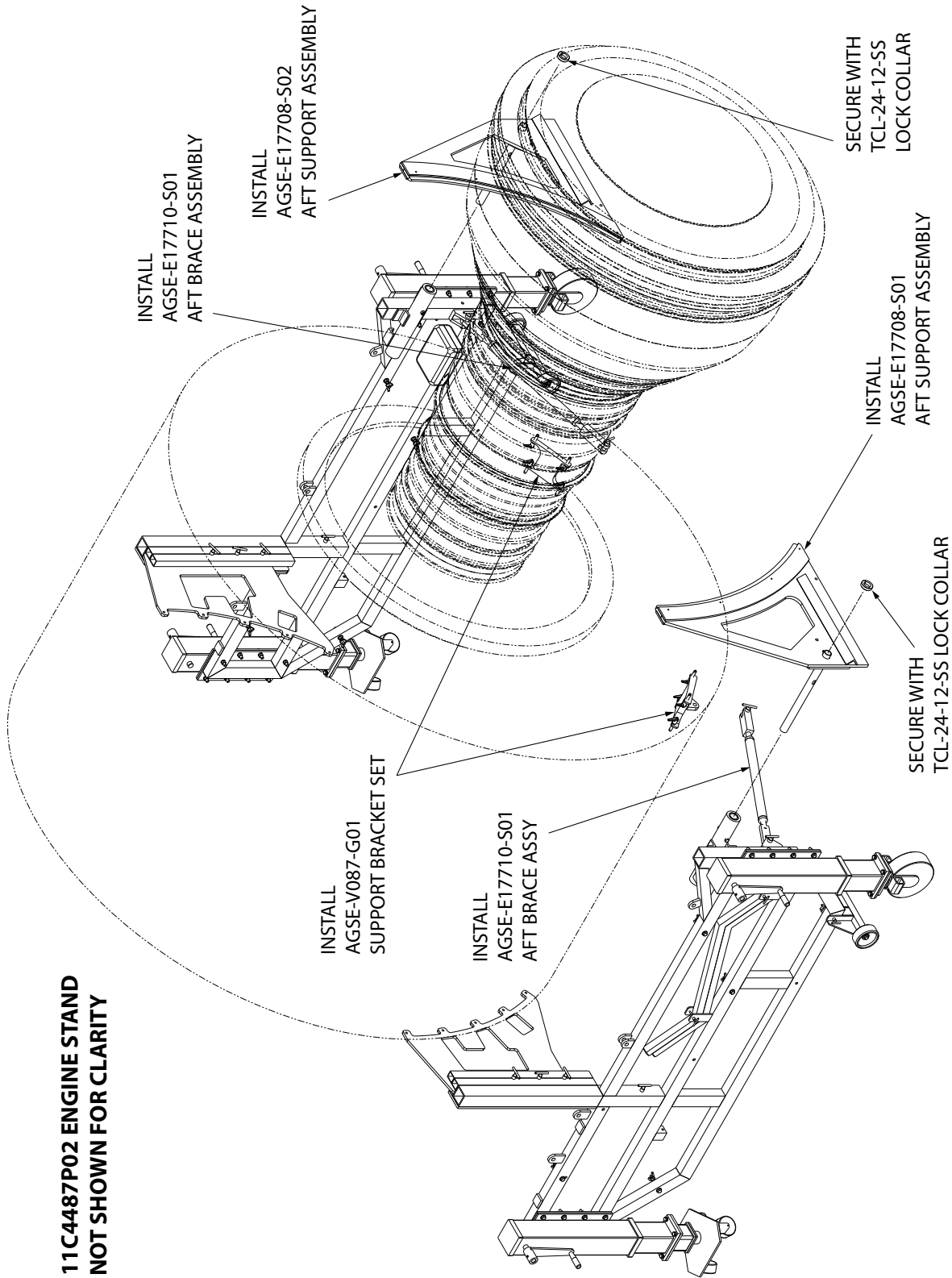


Figure 5.1-3 AFT Braces and AFT Support Assemblies Installation

5.2 - Fan Stator Installation on AGSE-C084-G01 (11C4572P01) or AGSE-C069-G01 (11C3004P02) Fan Module Shipping Stand

NOTICE

The AGSE-C084-G01 (11C4572P01) Fan Module Shipping Stand must be in the raised and rotated position for the fan transfer operation from the AGSE-E177-G01 (11C4490P02) Fan Transfer Dolly.

1. Align AGSE-E177-G01 (11C4490P02) dolly with fan case FWD flange facing the AGSE-C084-G01 (11C4572P01) stand mounting plate.
2. Install guide pins in threaded holes on the mounting plate.
3. Push dolly forward until flange contacts mounting plate. Adjust caster legs as required to align with guide pins.
4. Attach fan stator case to mounting plate with hardware provide with bolts inserted through mounting plate.
5. Separate dolly side frames from support plates and move clear. Remove AGSE-E17708-S01 and AGSE-E17708-S02 AFT support assemblies from fan module and stow on side frames.
6. Stow dolly side frames in container.
7. See AGSE-C084-G01 (11C4572P01) Operation Manual for further instructions.

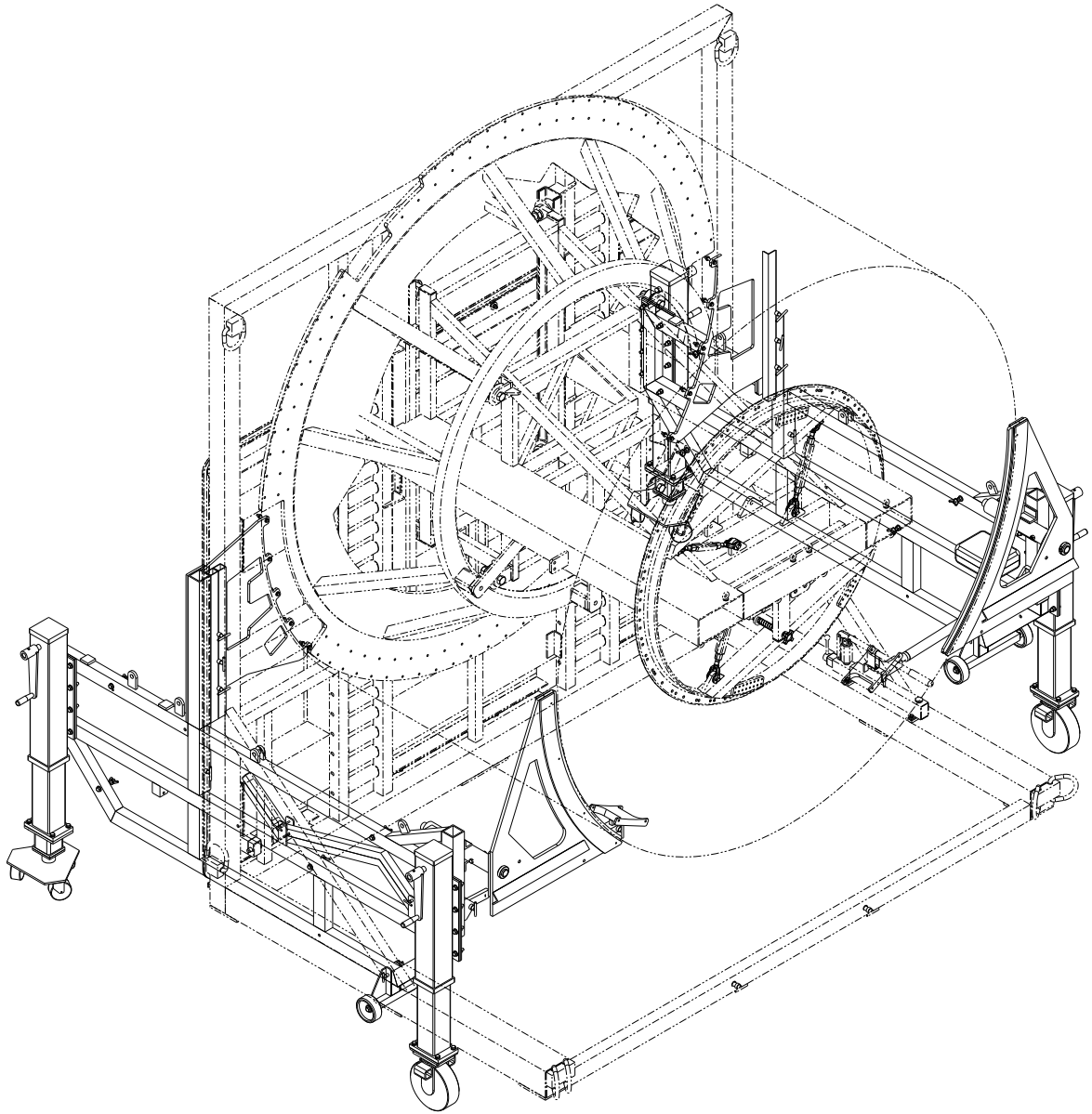


Figure 5.2-1

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.

6.4 Risk Assessment

6.4.1 Limits of the Machinery

The AGSE-E177-G01 (11C4490P02) GENx-1B Fan Module Transfer Dolly is a commercial product designed specifically only to support the General Electric GENx-1B fan stator assembly during quick engine change separation/mate procedure. The equipment is to be used only by trained mechanics free from physical impairment and who are familiar with this or similar fixture. The equipment is not to be used or made available to the general public.

6.4.2 Risk Assessment and Residual Risk

The risk evaluation performed was based on objective observation based on the experience of AGSE with similar equipment. Necessary Warning and Caution Notes have been incorporated into the Operation Section of the GENx-1B Fan Module Transfer Dolly 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 GENx-1B Fan Module Transfer Dolly 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 withi European Standard EN 1050 and is considered to be safe for its intended use. Reports on risk analysis and evaluation according to 2006/42/EC Machinery Directive (17 May 2006) are available upon request.



EC DECLARATION OF CONFORMITY

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

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

Machinery covered by this Declaration:

Description: GENx-1B/-2B Fan Module Transfer Dolly
Model: AGSE-E177
Part Numbers: AGSE-E177-G01 (11C4490P02)
AGSE-E177-G03 (11C4348P01)

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:

- General Electric Aircraft Engines, Ground Support Equipment Statement of Work, 11C4490P01, P02 Transfer Dolly GENx Fan Stator Module, REV. B, dated 10/5/07, 11C4348P01, Transfer Dolly GENx Fan Stator Module, REV. C, dated 3/3/08.
- AGSE Quality System Procedure Number QSP-006
- Aerospace Recommended Practice Standard, SAE ARP 1840, Revision B, 02/2007.

Place: Santa Fe Springs, California, USA

Date: July 1, 2019

Signed:

Stevan Case



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7.0 – Warranty

7.1 Statement of Warranty

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

NOTICE

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 List are broken down by “ITEM,” “PART NUMBER,” “QTY,” and “DESCRIPTION.”

NOTICE

**“ITEM” numbers are for reference to the parts list 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

IPB Figure 1 - AGSE-E177-G01 Fan Case Separate/Mate Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E177-G01	-	GEnx-1B Fan Case Separate/Mate Assy (Figure 8.1-1)
1	AGSE-E17701-P01	1	Side Frame Weldment - LH
2	AGSE-E17701-P02	1	Side Frame Weldment - RH
4	AGSE-E17706-P02	2	FWD Support Plate
6	AGSE-E17706-P03	1	FWD Support Post - LH
7	AGSE-E17706-P04	1	FWD Support Post - RH
8	AGSE-E17708-S01	1	AFT Support Assy - LH (See IPB Figure 2 for Details)
9	AGSE-E17708-S02	1	AFT Support Assy - RH (See IPB Figure 2 for Details)
10	AGSE-E17711-S01	1	Cable Assy (See IPB Figure 3 for Details)
11	Commercial	10	HHCS - 3/8"UNC x 2-1/2" Lg - SS
12	AGSE-E17710-S01	2	AFT Brace Assy (See IPB Figure 4 for Details)
13	Commercial	20	Flat Washer - 3/8" Nom ID - SS
14	#B2-53	4	Handle
15	AGSE-E10001-P03	4	FWD Jack Leg (Modified)
16	AGSE-E10001-P06	4	Crank
17	AGSE-E10004-P01	2	Steering Bar
18	AGSE-E10005-S01	2	Support Wheel Assy (See IPB Figure 5 for Details)
19	AGSE-C06603-P03	2	Caster Adapter
20	AGSE-C06603-P04	2	Modified Caster
21	83485T12	2	Dual Plate Swivel Caster - 2000 Lb Cap
22	98296A950	4	Roll Pin - 3/8" Dia x 1-3/4" Lg - Steel
23	AM-90500-60T	6	Safety Pin - 1/2" Dia x 3-3/4" Lg Grip - T-Handle

**IPB Figure 1 - AGSE-E177-G01
Fan Case Separate/Mate Assembly (Continued)**

ITEM	PART NUMBER	QTY	PART DESCRIPTION
24	AM-90500-48T	2	Safety Pin - 1/2" Dia x 3" Lg Grip - T-Handle
25	Commercial	10	Hex Nut - 3/8"-16UNC - SS
26	AM-90375-34T	2	Safety Pin - 3/8" Dia x 2-1/8" Lg Grip - T-Handle
27	BMB-107-4HP	1	Storage Container - 10 x 7.5 x3.75
28	Commercial	4	Thin Lock Nut - 1/2"-13UNC
29	Commercial	2	Lock Nut - 1/2"-13UNC
30	Commercial	2	HHCS - 1/2"-13UNC x 3-3/4" Lg - Gr 5 - Zinc Plt
31	Commercial	8	HHCS - 1/2"-13UNC x 4" Lg - Gr 5 - Zinc Plt
32	Commercial	32	HHCS - 1/2"-13UNC x 2" Lg - Gr 5 - Zinc Plt
33	Commercial	8	HHCS - 1/2"-13UNC x 1-3/4" Lg - Gr 5 - Zinc Plt
34	Commercial	8	HHCS - 1/2"-13UNC x 1" Lg - Gr 5 - Zinc Plt
35	Commercial	100	Flat Washer - 1/2" Nom ID - Zinc Plt
36	Commercial	78	Lock Washer - 1/2" Nom ID - Zinc Plt
37	Commercial	62	Hex Nut - 1/2"-13UNC - Zinc Plt
38	Commercial	2	HHCS - 1/3"-20UNC x 3/4" Lg - Zinc Plt
39	Commercial	2	Fender Washer - 1/4" ID
40	Commercial	2	Split Lock Washer - 1/4"-20UNC - Zinc Plt
41	AGSE-V087-G01	1	Support Bracket Set

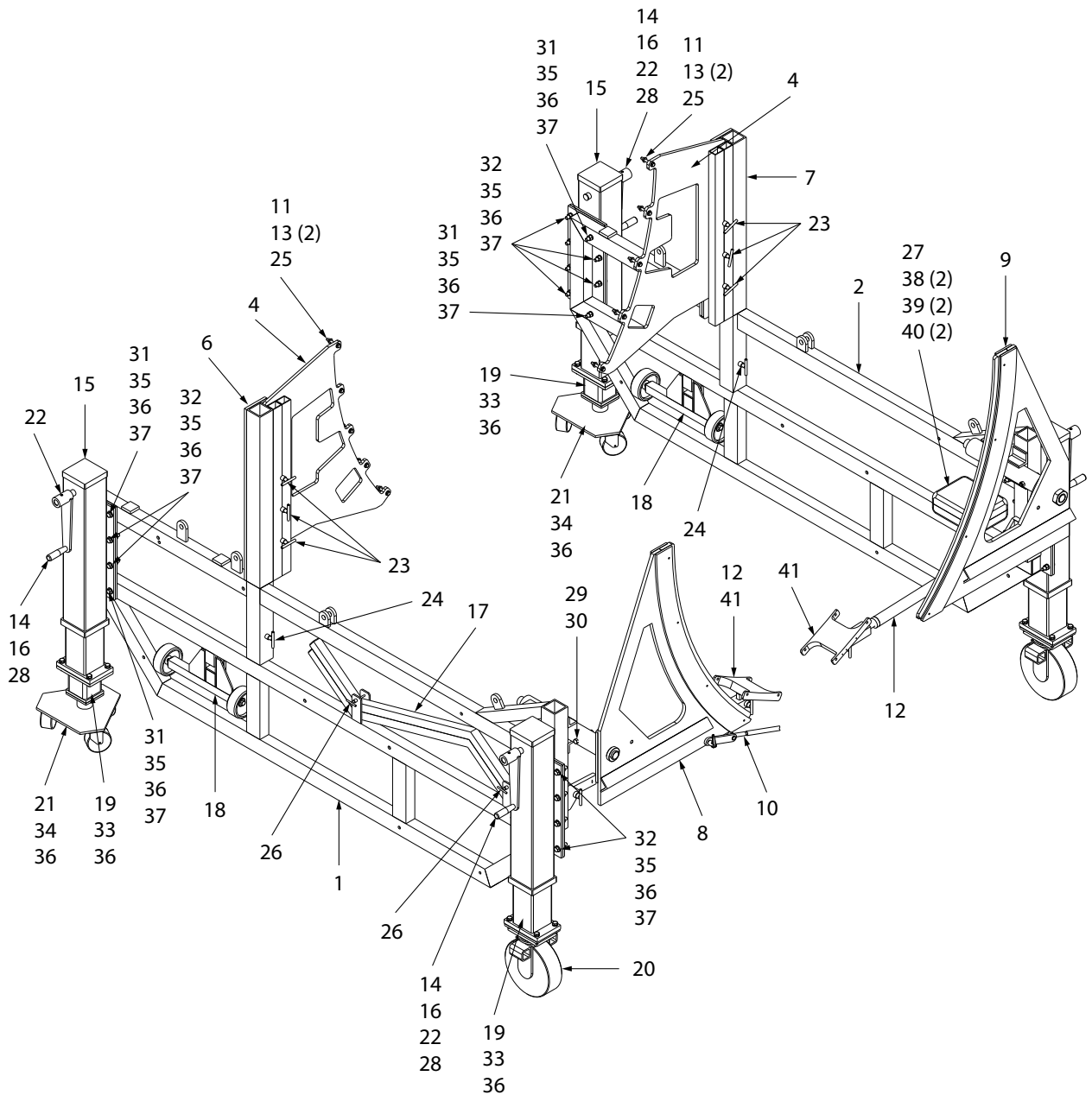


Figure 8.1-1

IPB Figure 2 - AGSE-E17708-S01/S02 AFT Support Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E17708-S01	-	AFT Support Assy (Figure 8.2-1)
	AGSE-E17708-S02	-	AFT Support Assy (Figure 8.2-1)
1	AGSE-E17708-P01	1	Support Plate Weldment (Used on AGSE-E17708-S01)
2	AGSE-E17708-P02	1	Support Plate Weldment (Used on AGSE-E17708-S02)
3	AGSE-E17708-P04	1	Groove Plate (UHMW) (Used on AGSE-E17708-S01)
4	AGSE-E17708-P05	1	Groove Plate (UHMW) (Used on AGSE-E17708-S02)
5	AGSE-E17708-P06	1	Pivot Support
6	TCL-24-12-SS	1	Lock Collar
7	90692A744	4	Long Roll Pin - 1/4" Dia. x 1-1/4" Lg

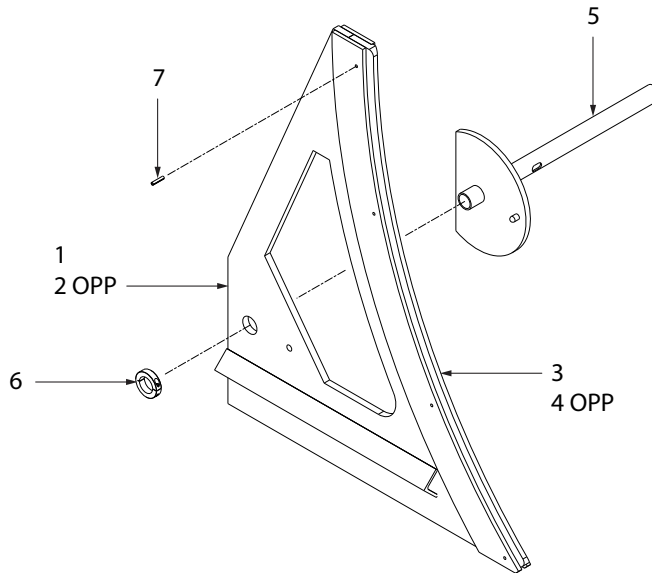


Figure 8.2-1

IPB Figure 3 - AGSE-E17711-S01 Cable Assembly (GEnx-1B)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E17711-S01	-	Cable Assy (Figure 8.3-1)
1	AGSE-E17711-P01	1	Cable Assy (BC Wire - SA154-5/16 Pin Eye - 304 SS Cable Assy - 94-7/8" Lg)
2	AGSE-E17711-P02	2	Connector Link
3	Commercial	2	Flat Washer - 1/2" ID - Zinc Plt
4	97245A424	2	Clevis Pin - 1/2" x 1-1/2" Lg - Zinc Plt
5	98338A180	2	Cotter Pin - 5/31" x 1" - Zinc Plt
6	90302A411	2	Ball Lock Pin

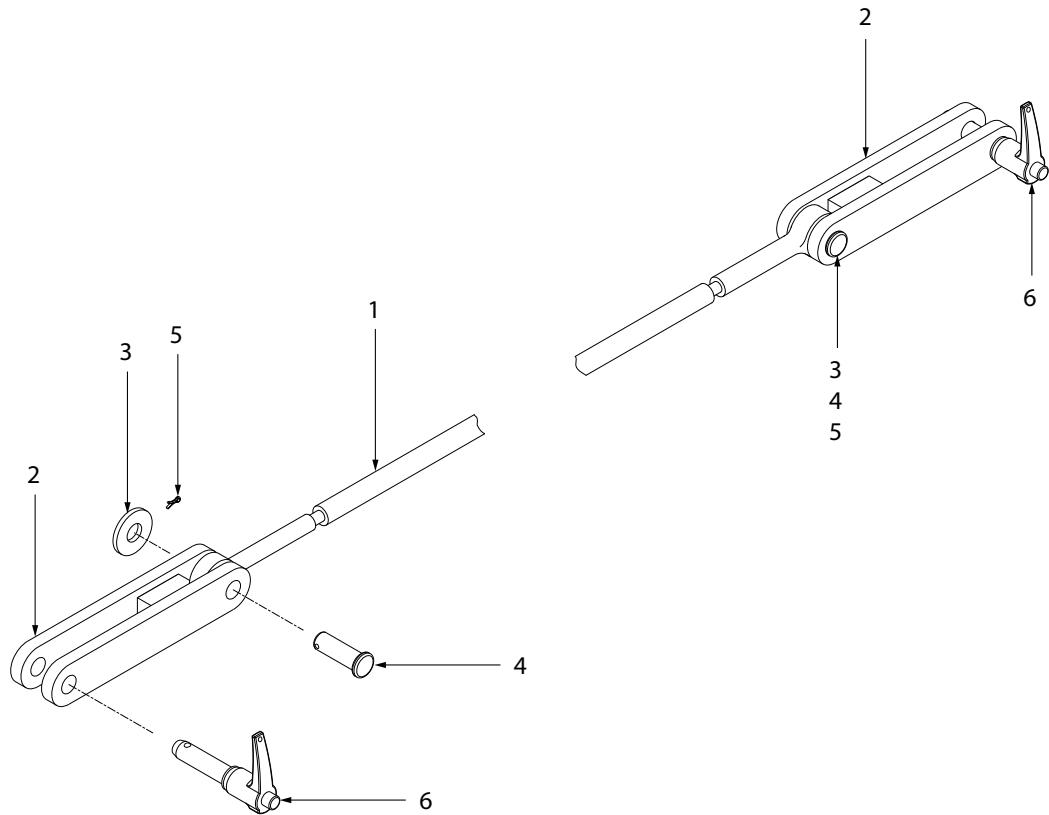


Figure 8.3-1

IPB Figure 4 - AGSE-E17710-S01 AFT Brace Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E17710-S01	-	AFT Brace Assy (Figure 8.4-1)
1	AGSE-E17710-P01	1	Body
2	AGSE-E17710-P05	1	Clevis End
3	AGSE-E17710-P03	1	Tab End
4	AM-90750-32T	1	Safety Pin Assy
5	94846A550	1	Hex Jam Nut - 1"-8UNC - RH
6	99612A182	1	Hex Jam Nut - 1"-8UNC - LH
7	AM-90750-38T	1	Safety Pin Assy

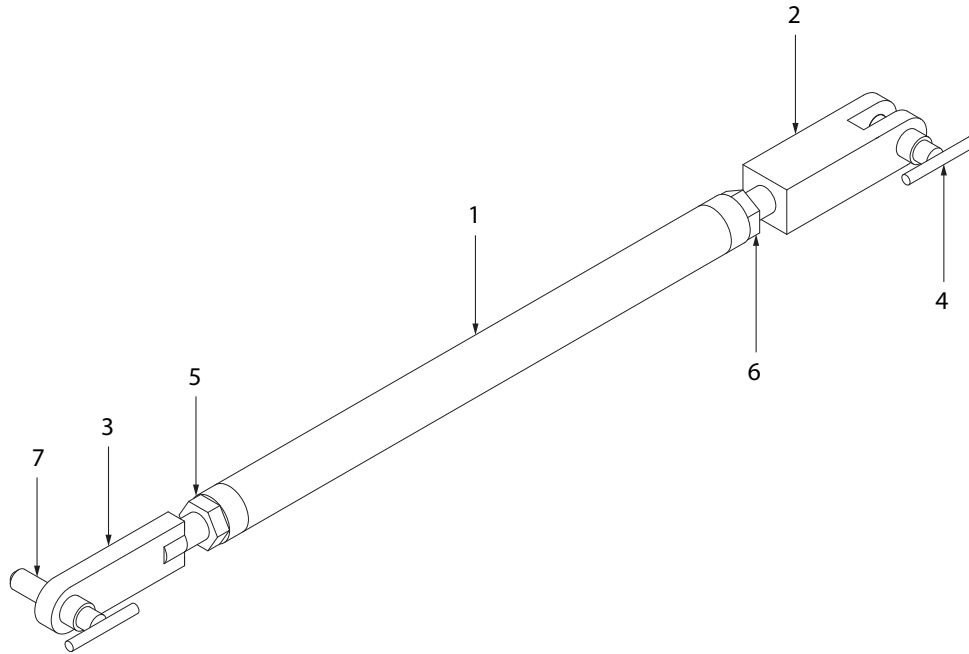


Figure 8.4-1

IPB Figure 5 - AGSE-E10005-S01 Support Wheel Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-E10005-S01	-	Support Wheel Assy (Figure 8.5-1)
1	AGSE-E10005-P01	1	Support Wheel Bracket
2	2351T93	2	Wheel - 5" OD x .5" Bore (Alternate Designers Hardware P/N WSR50114B4)
3	AM-90375-44T	2	Safety Pin Assy

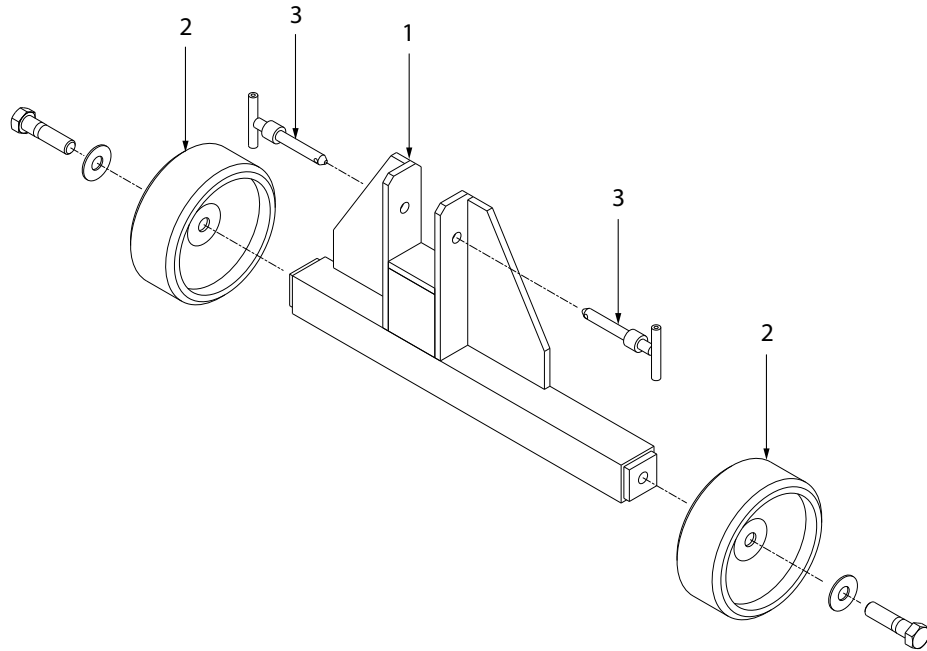


Figure 8.5-1

9.0 – Stencils, Decals, and Placards

9.1 General

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

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		