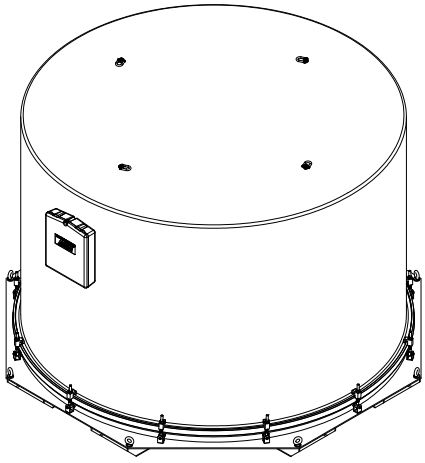
AGSE-C026-G01

MODULE 1
FAN & BOOSTER
SHIPPING CONTAINER

For CFM56-7B Engines



ORIGINAL MANUAL DATED 9/12/2023

LATEST MANUAL REVISION LEVEL . . . . . 9/12/2023 (REV NC)

ADVANCED GROUND SYSTEMS ENGINEERING LLC
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NOTICE

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**.

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

NOTE

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.

INDEX

1.0 – Revisions

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

PAGE	REV	DESCRIPTION OF CHANGE	DATE
		NEW	9/12/2023

2.0 – Illustration

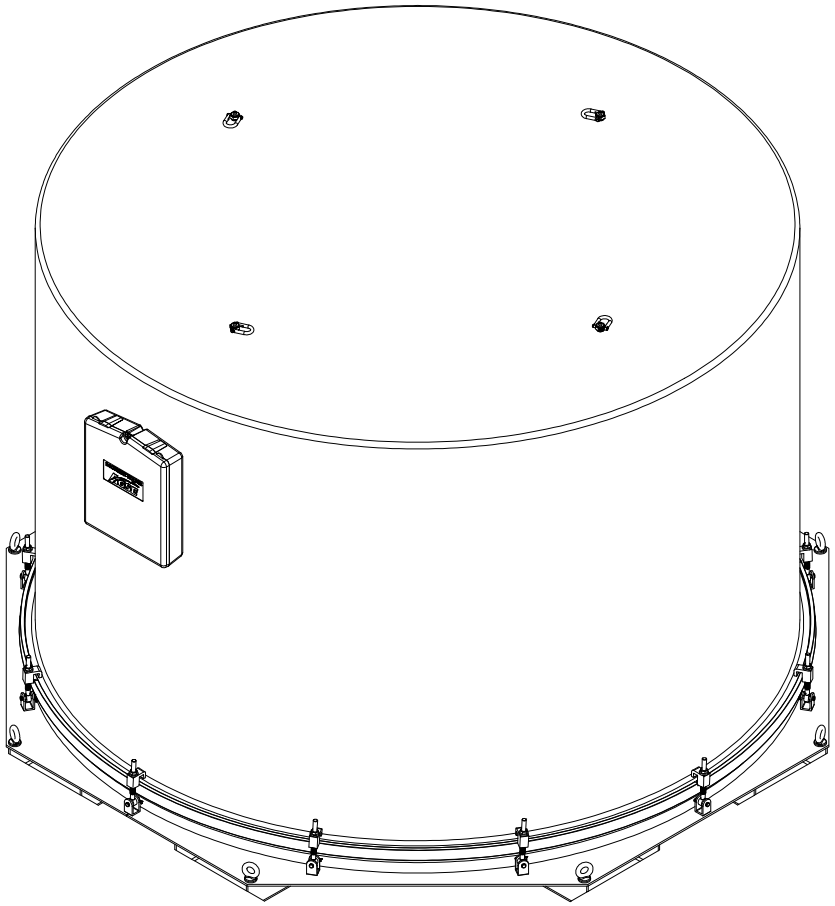


Figure 2.0-1 AGSE-C026-G01 Fan and Booster Container Assembly

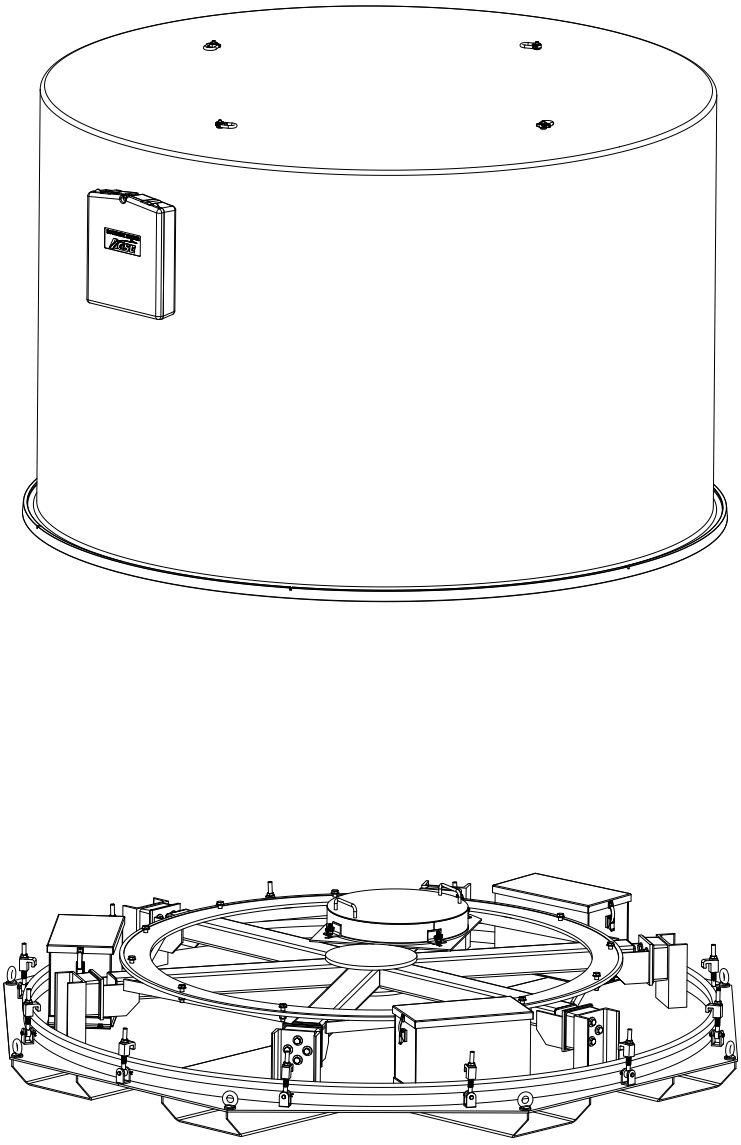


Figure 2.0-2 AGSE-C026-G01 Fan and Booster Container Assembly

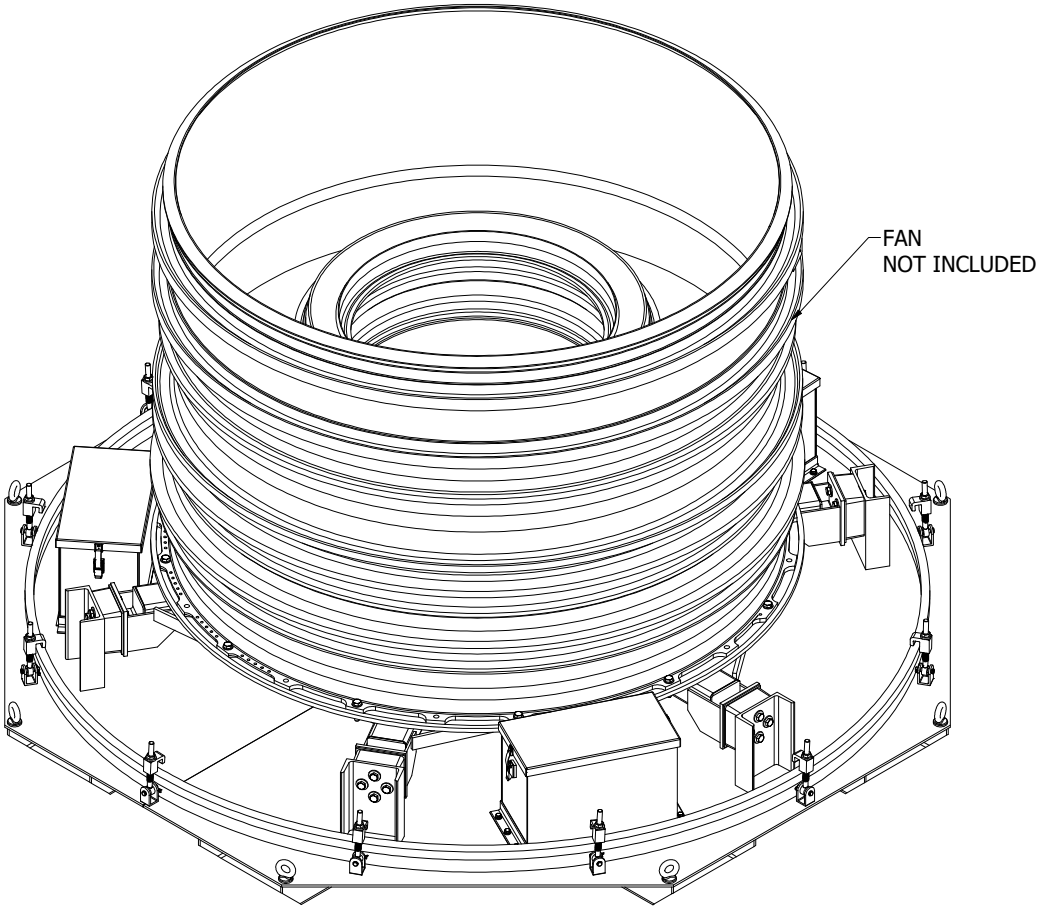


Figure 2.0-3 AGSE-C026-G01 Loaded View

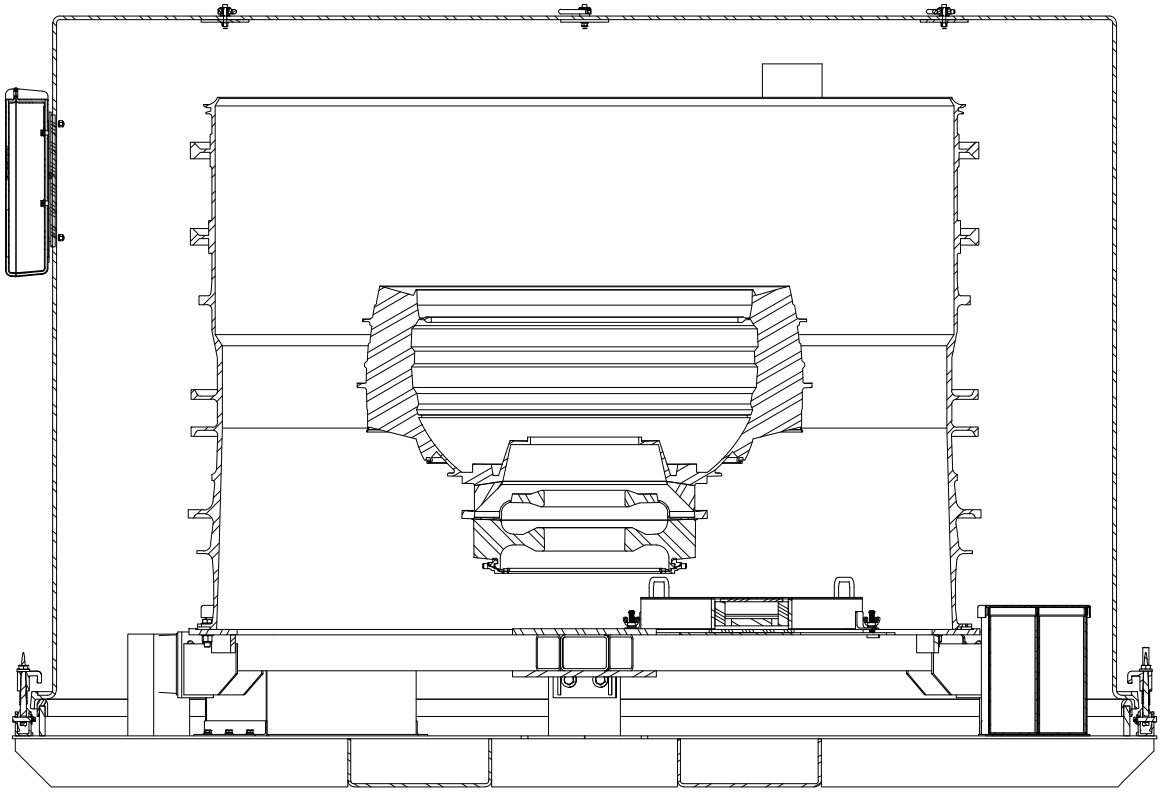


Figure 2.0-4 AGSE-C026-G01 Container Cut-Section

3.0 – Specification

3.1 General

The AGSE-C026 Module 1 Fan & Booster Shipping Container is designed to transport and/or store the CFM International CFM56-7B Engine Fan & Booster. The cover is made of fiberglass and fastens to the welded steel base with standard clamp assemblies. The container has integral shock mounts to protect the Fan & Booster from shipping vibrations and rough handling. The Fan & Booster is shipped with the axis vertical and the forward end down. A container for loose bolts is included inside the base and a document container is provided on the outside of the cover.

3.2 Mobility

The shipping container is skid mounted and can be lifted by a forklift from all four sides at the base. The fork pockets are 3.75 x 11.5 (inside dimensions).

3.3 Design

The shipping container consists of a welded steel shock mounted support base with a mounting plate that centers the fan & booster. The fan & booster is supported and centered on a restraint bracket. The cover is fiberglass. A rubber gasket on the base and rain lip on the cover protects the interior from moisture. A storage box is attached to the base and is used to store the various fasteners.

3.4 Fabrication and Finish

The system 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 Characteristics

Empty Container

Height (IN.)	65.25
Diameter (IN.)	95.5
Weight (Lbs.)	1,700

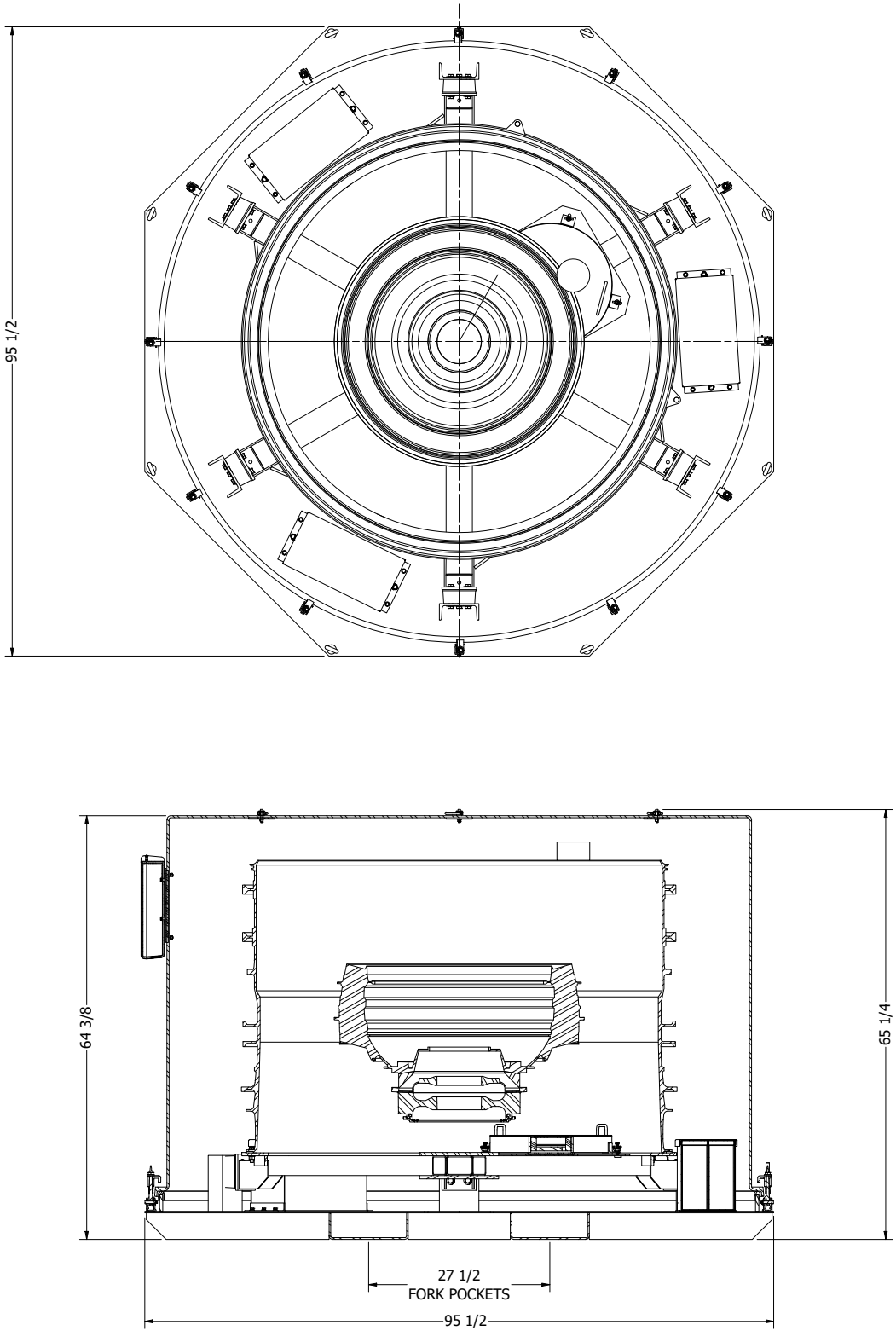


Figure 3.5-1. AGSE-C026-G01- Dimensions

4.0 – Maintenance and Inspection

4.1 General

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

4.2 Cleaning and Painting

This equipment should be cleaned periodically with a soap and water solution and rinsed thoroughly. Damaged paint should be touched-up with Skydrol resistant high-grade enamel paint. Superficial scratches are expected during normal usage and will not affect function.

4.3 Scheduled Service

All 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 structure and shock mounts are recommended. The machined surfaces (pivot, axles, mounts) 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 must be tightened. The structure is to be visually inspected for damage, weld cracks, or corrosion.

Regular inspection of the Fan Blade Retaining Flange, Ring Cover and Components Shipping Container should also specifically include:

- a check of pins and latches
- a check of cushion material for tears
- a check of cover seal for damage
- a check of all fiberglass areas for cracks, tears, chips

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

5.0 – Operation

WARNING

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

5.1 Positioning and Set - Up

1. Position the AGSE-C026-G01 Fan & Booster Shipping Container close to the engine to minimize moving between engine and container.
2. Release the cover clamps (12), remove cover (approx. 363 lbs.) using hoisting system by the four (4) designated hoist rings on the top of the cover. (Figure 5.1-1)

5.2 Removal of Engine Parts

Removal sequence of engine parts should be done in accordance with CFM International engine maintenance manual. Other tools are required to protect the inner fan case surface and to provide access to QEC joint hardware after the blades have been removed.

5.3 Part Container Arrangement

This section describes where the removed engine components are to be placed in the container.

1. Place the fan blade retainer ring and the fan restraining ring under the ring cover located near the center of the container base loosen four (4) wing nuts securing the cover in place, following Figure 5.3-1 place retainer ring and restraining ring in appropriate order using the included retainer divider, reinstall cover and secure with hardware (once fan & booster are secured, ring cover is unaccessible).
2. Open three (3) blade platform storage boxes around the base by unlatching the cover pad exposing the (8) storage locations for the twenty four (24) fan blade platforms, store fan blade platforms and secure cover pad with draw latch.(Figure 5.3-2).
3. Remove twelve (12) hex head screws, twenty four (24) washers, and twelve (12) lock nuts located on the fan & booster support ring see Figure 5.3-2, Using overhead hoist center and align fan & booster mounting holes with base support ring.
4. Reinstall twelve (12) hex head screws, twenty four (24) washers and twelve (12) lock nuts to secure fan & booster to container base.

CAUTION

Remove all pooling water on cover before lifting cover exces weight can cause bowing and may damage cover.

5.4 Shipping Preparation of the AGSE-C026-G01 container:

1. Check all clamps on fan blade platforms storage boxes.
2. Install cover using a hoisting system by the four (4) hoist rings on top of the cover and secure by tightening the hex nuts on the twelve (12) container clamps. (Figure 5.1-1)
3. The fan & booster container is now ready for shipping.

CAUTION

Do not over tighten the clamps - May damage cover sealing edge.

5.5 Fan & Booster Removal From Container

1) Remove container cover assembly by loosening eight (12) hex nuts of the container clamps. The cover can be lifted using a hoisting system by the four (4) hoist rings on top of the cover. (See Fig. 5.1-1).Set the cover aside.
2) Remove twelve (12) hex head screws, twenty four (24) washers and twelve (12) lock nuts that secure fan & booster to container base.
3) Using a hoisting system remove fan & booster from container.
4) Install twelve (12) hex head screws, twenty four (24) washers and twelve (12) lock nuts on the fan & booster support ring for storage. (Figure 5.3-2).
5) Open the blade platform storage boxes (3) by unlatching the cover pad. Each box comprises of 8 compartments to store the fan blade platforms. Secure cover pad with draw latch once the contents are retrieved.(Figure 5.3-2).
6) Loosen four (4) wing nuts securing the retainer flange and ring cover in place, return divider to its storage location, reinstall ring cover and secure with hardware.
7) Install the container cover and secure by tightening the hex nuts on the twelve (12) container clamps. (Figure 5.1-1)
8) The fan booster container is now ready for storage.

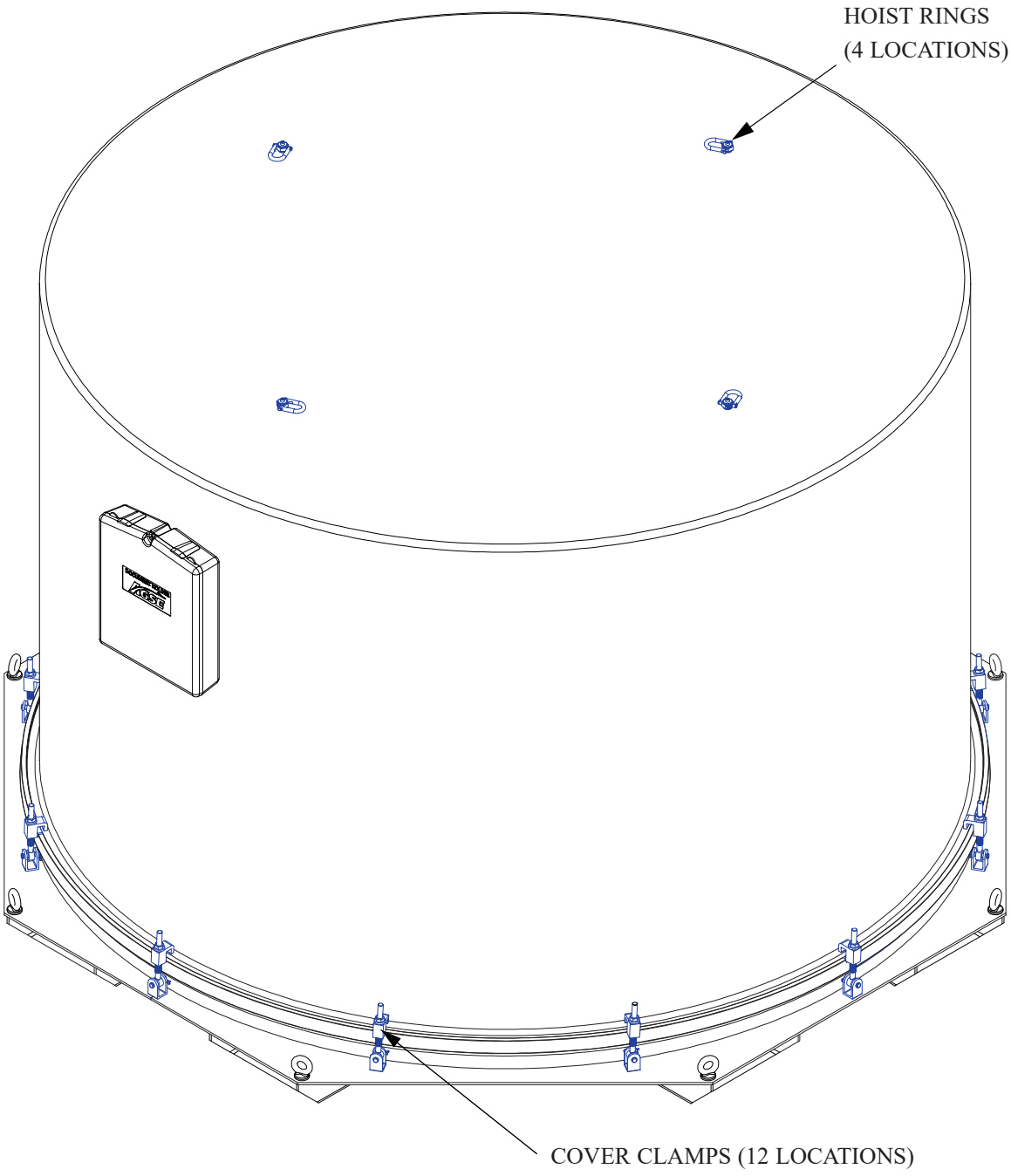


Figure 5.1-1. AGSE-C026-G01- FAN AND BOOSTER CONTAINER

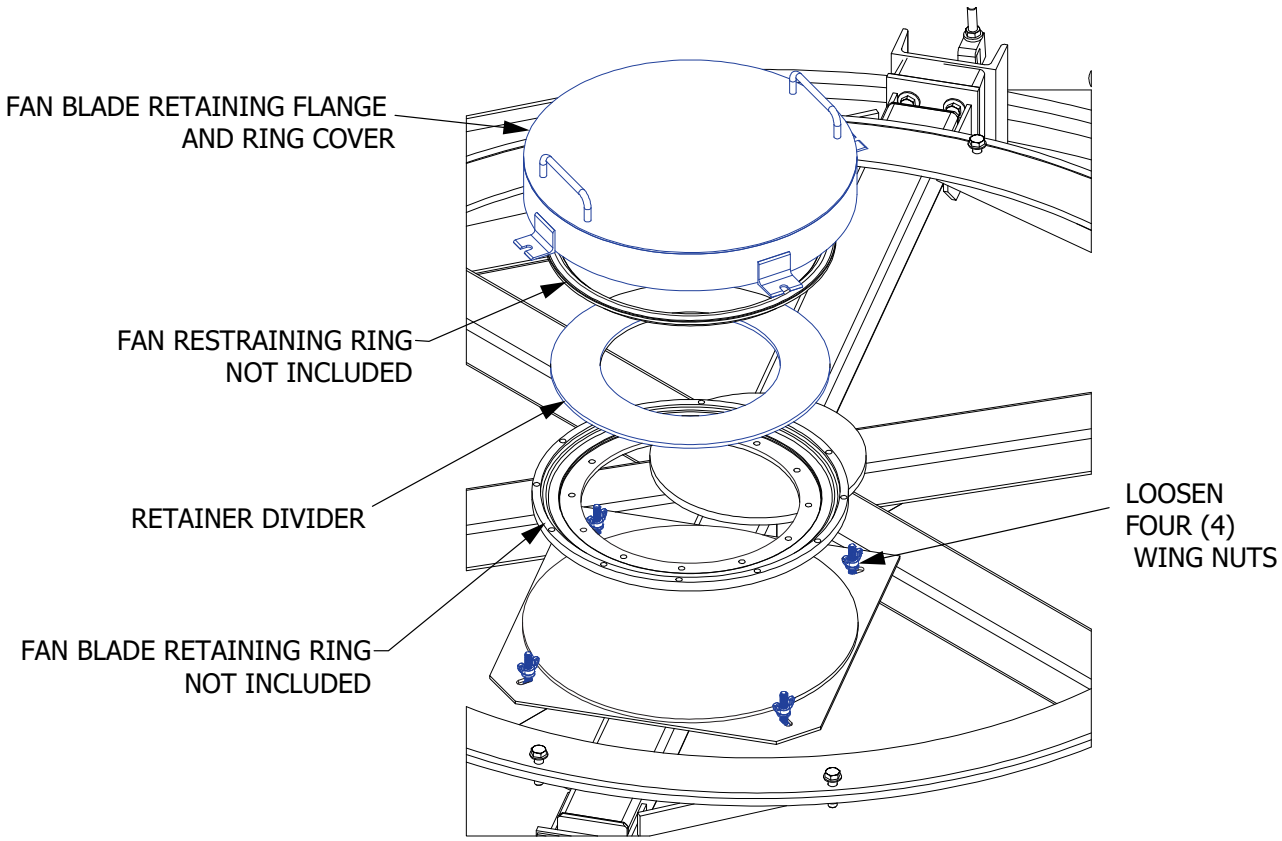


Figure 5.3-1. Retaining Flange & Ring Cover

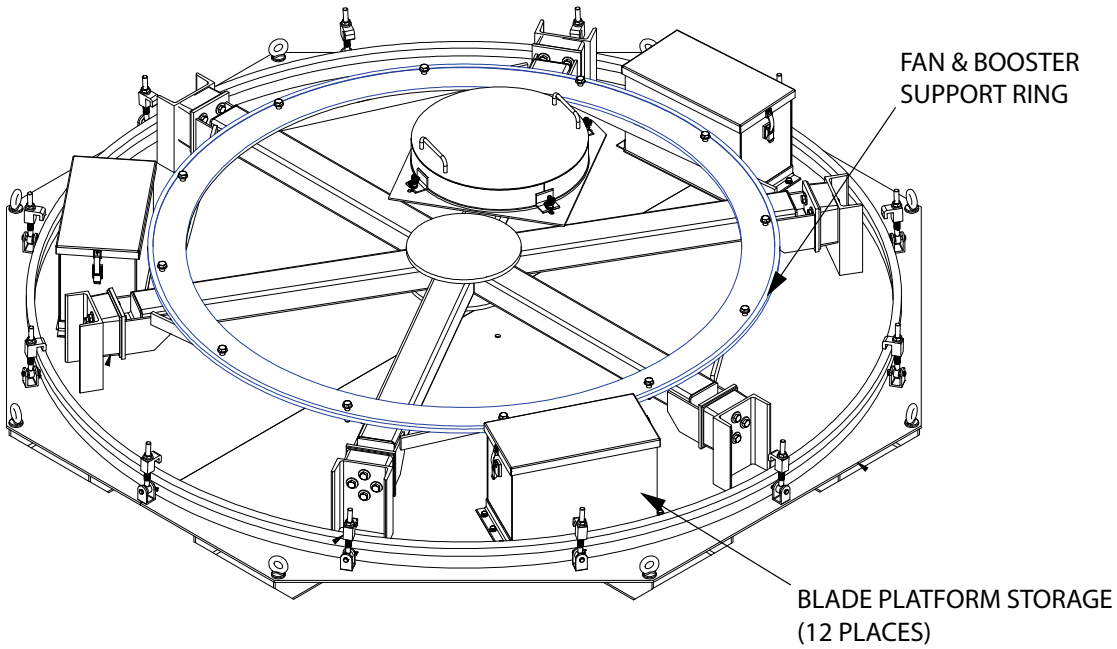


Figure 5.3-2. Aft Bracket Removal.

6.0 – SAFETY

6.1 Stress

Design stress safety factors are compliant with industry standards.

6.2 General

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

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

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.

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.

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

NOTICE

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

8.2 Illustrated Parts Breakdown

IPB Figure 1 – AGSE-C026-G01
Fan & Booster Container

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-C026-G01	-	Fan & Booster Container (Figure 8.1-1 - 8.1-3)
1	AGSE-C02601-P01	1	Fan & Booster Support Ring
2	AGSE-C02603-P01	1	Base Weldement
3	AGSE-S00304-P07	6	Shock Mount
4	AGSE-S00284-P03	1	Edge Bumper
5	AGSE-C02604-S03	3	Blade Platform Storage
6	AGSE-S00132-06NA17	4	Washer
7	AGSE-S00135-06A17	4	Washer, Locking
8	AM-2177-600	12	Clamp Assembly
9	AGSE-S00105-08F016A01	48	Screw, Hex Head
10	AGSE-S00132-08RA17	48	Washer
11	AGSE-S00131-05A17	27	Washer
12	AGSE-S00135-05A17	18	Washer, Locking
13	AGSE-S00150-05CA01	9	Nut
14	AGSE-S00104-05C020A01	9	Screw, Hex Head
15	AGSE-S00104-05C008A01	9	Screw, Hex Head
16	AGSE-S00132-08NA05	24	Washer
17	AGSE-S00153-08CA06	12	Nut
18	AGSE-S00104-08C032A06	12	Screw, Hex Head
19	AGSE-C02604-P09	1	Retainer Divider

IPB Figure 1 – AGSE-C026-G01
Fan & Booster Container (Continued)

ITEM	PART NUMBER	QTY	PART DESCRIPTION
20	AGSE-C02604-P10	1	Blade Retainer Ring Pad
21	AGSE-C02604-P11	4	Cover Retainer Screw
22	AGSE-S00170-078D007A17	4	Slotted Spring Pin
23	AGSE-S00147-06CA17	4	Nut, Wing
24	AGSE-C02602-S01	1	Fan Blade Retainer & Ring Cover
25	AGSE-C02605-S01	1	Container Cover

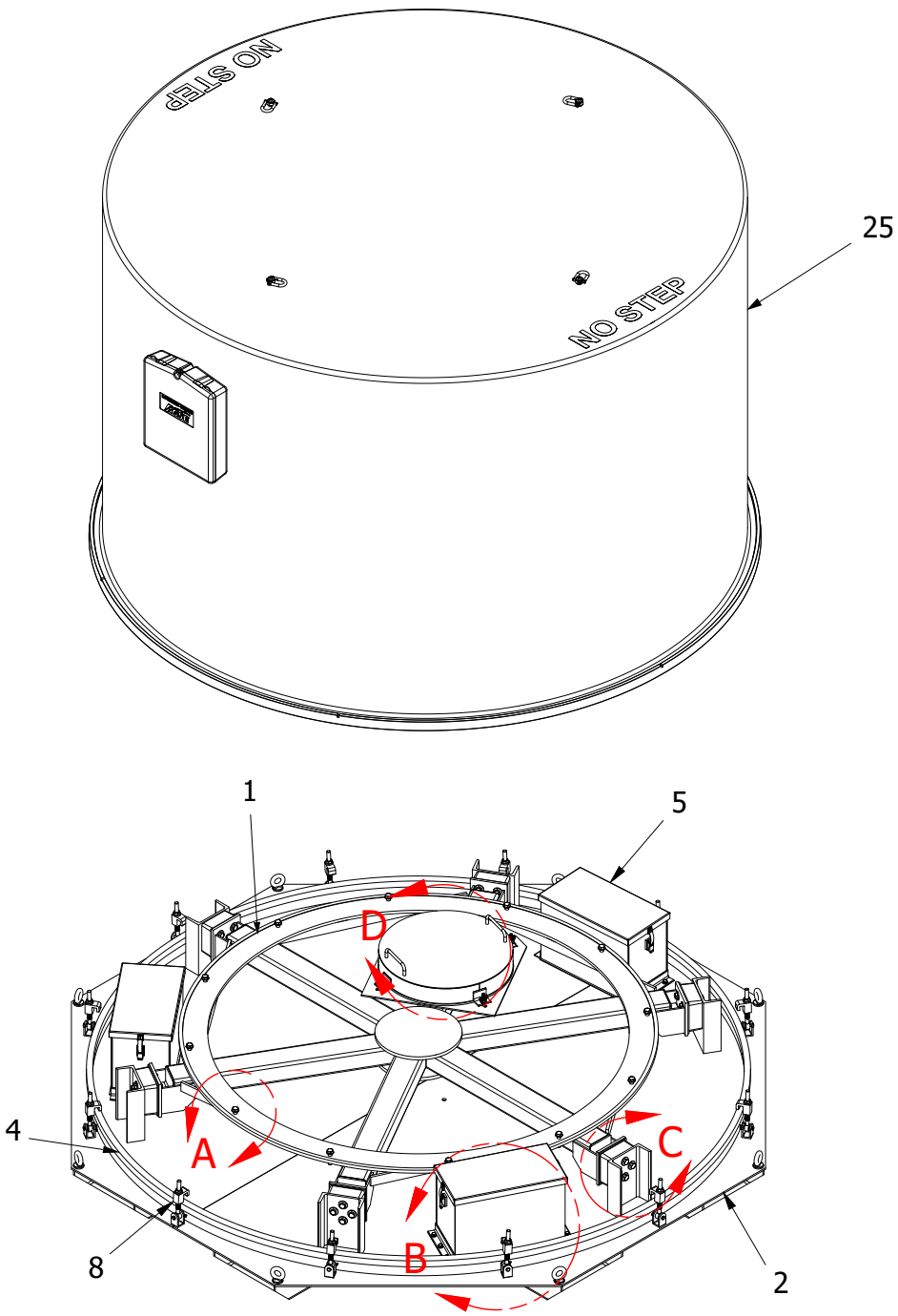
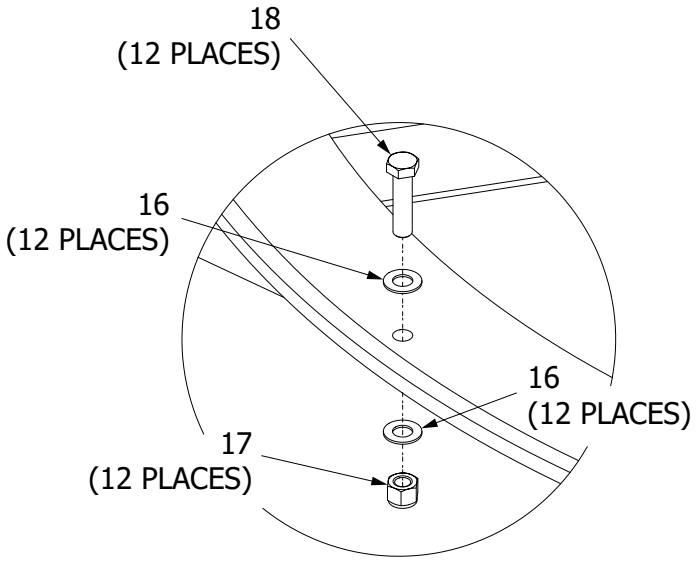
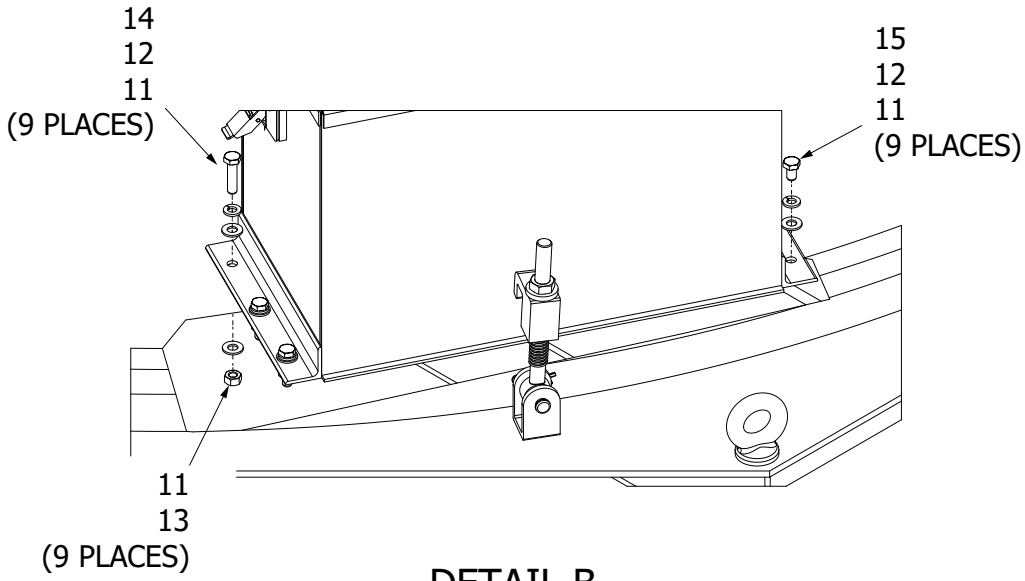


Figure 8.1-1 Fan & Booster Container

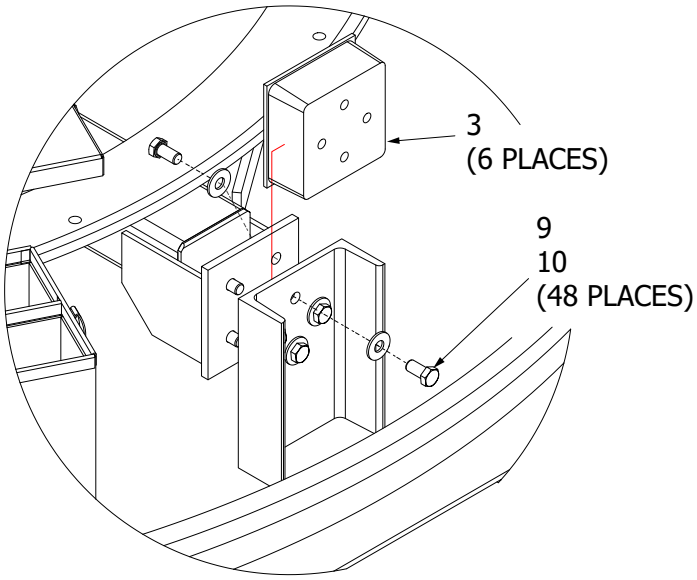


DETAIL A

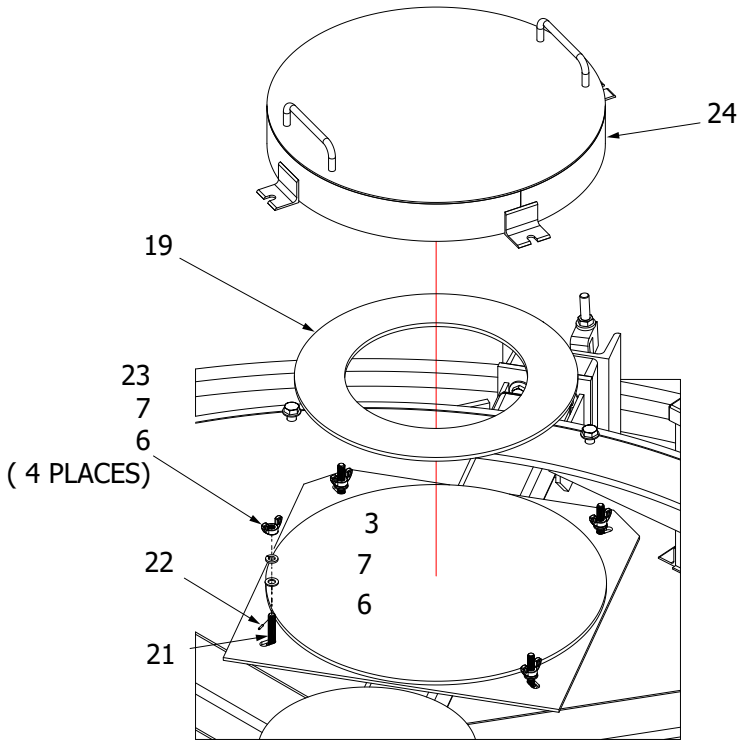


DETAIL B

Figure 8.1-2 Fan & Booster Container



DETAIL C



DETAIL D

Figure 8.1-3 Fan & Booster Container

IPB Figure 2 – AGSE-C02604
Fan Blade Platform Storage Box

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-C02604	-	Fan & Booster Container (Figure 8.2-1)
1	AGSE-C02604-P06	16	Side Wall Pad
2	AGSE-C02604-P07	16	Divider Pad
3	AGSE-S00284-P02	2	Rubber Trim
4	AGSE-C02604-P08	8	Bottom Pad
5	AGSE-S00319-P02	2	Draw Latch
6	AGSE-S00115-N06C004A07	6	Screw, Hex Head
7	AGSE-S00135-N06A05	6	Washer, Locking
8	AGSE-S00367-N6CA19	2	Nut
9	AGSE-C02604-P03	1	Box Weldment
10	AGSE-C02604-P04	1	Cover
11	AGSE-C02604-P05	1	Cover Pad

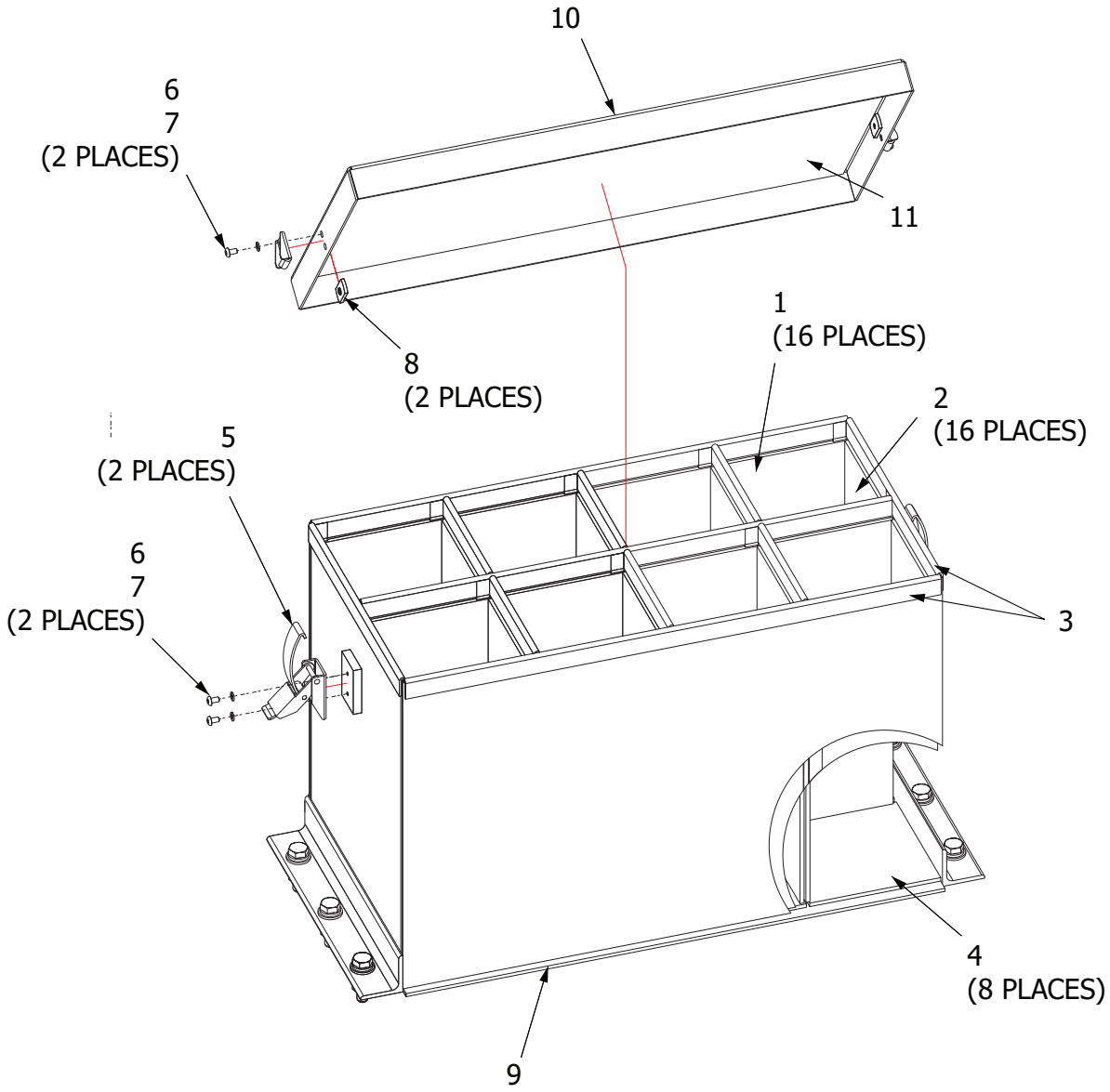


Figure 8.2-1 Fan Blade Platform Storage Box

IPB Figure 3 – AGSE-C02605 Cover Assembly

ITEM	PART NUMBER	QTY	PART DESCRIPTION
	AGSE-C02604	-	Cover Assembly Fan & Booster Container (Figure 8.3-1)
1	AM-2179-104	1	Cover
2	AGSE-S00211-P05	4	Hoist Ring
3	AGSE-S00118-04C028A06	4	Screw, Socket Head
4	AGSE-C02605-P04	4	Lift Stiffener
5	AGSE-S00131-04A17	8	Washer
6	AGSE-S00153-04CA01	8	Nut, Locking
7	AGSE-V16402-P01	1	Bracket Adapter, Document Holder
8	AGSE-V164-S01	1	Document Box
9	AGSE-C02605-P03	1	Document Box Pad
10	AGSE-S00368-P01	4	Washer, Sealing
11	AGSE-S00114-04C020A07	4	Screw, Flat Head
12	AGSE-S00135-04A17	4	Washer, Locking
13	AGSE-S00104-04F012A01	4	Screw, Hex Head

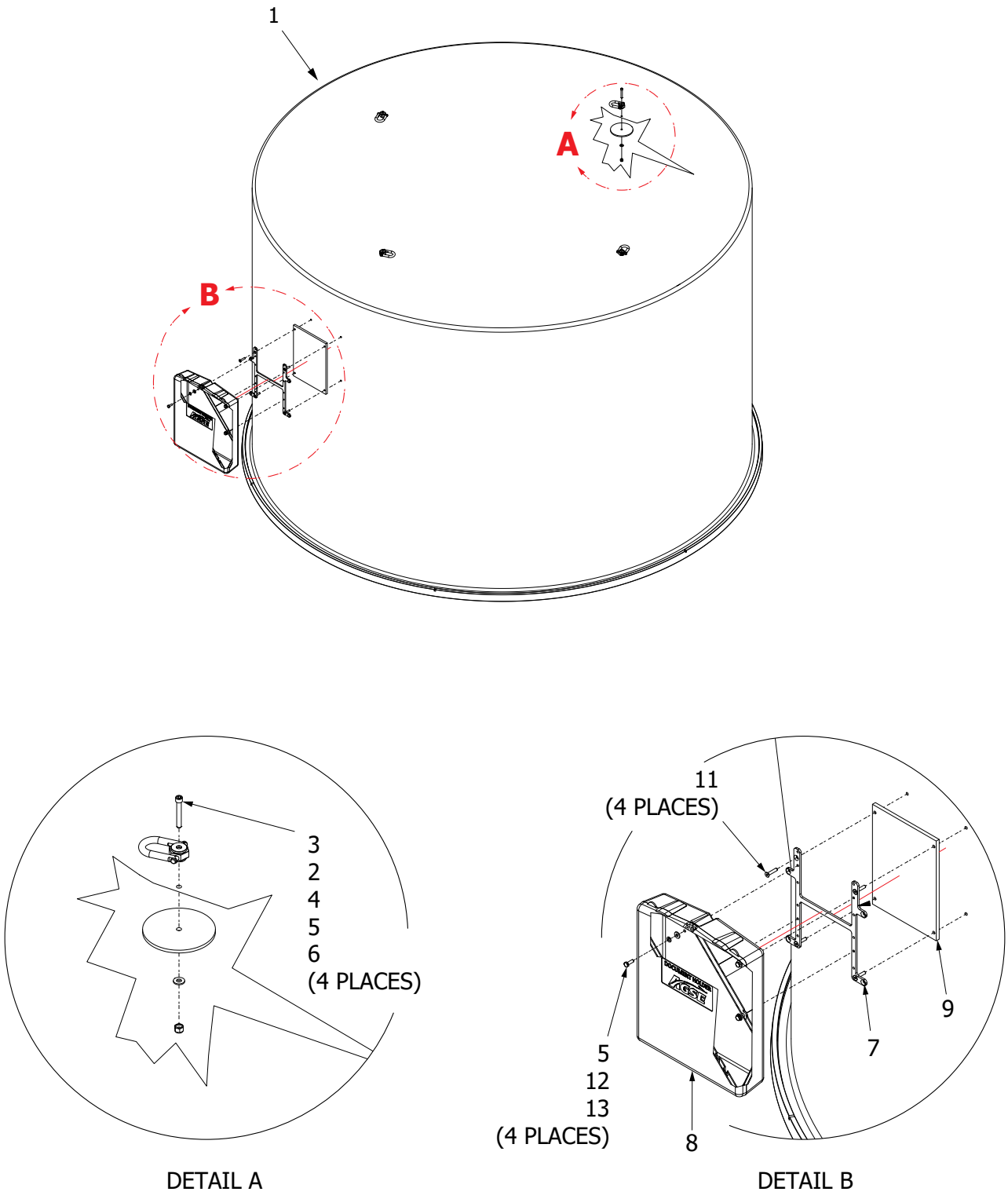


Figure 8.3-1 Cover Assembly

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.

9.1 Stencils and Placards

ITEM	PART NUMBER	PART DESCRIPTION
	AGSE-C02606	Stencil Kit (Figure 9.1-1 - 9.1-3)
1	AGSE-C02606-P03	MADE IN THE USA
2	AGSE-C02606-P01	NO STEP
3	AGSE-C02606-01	MADE IN THE USA
4	AGSE-C02606-02	THIS END UP
5	AGSE-C02606-03	ARROW
6	AGSE-C02606-04	FOR REMOVING COVER ONLY
7	AGSE-C02606-05	CUSTOMER'S NAME/LOGO
8	AGSE-C02606-06	SERIAL NUMBER
9	AGSE-C02606-07	CONTAINER INFORMATION
10	AGSE-C02606-08	HANDLE WITH CARE REUSABLE CONTAINER
11	AGSE-C02606-09	CUP AND UMBRELLA
12	AM-2207	AGSE PLACARD
13	AGSE-S00302-P01	CE PLACARD
14	AGSE-S00125-P01	Screw, Drive

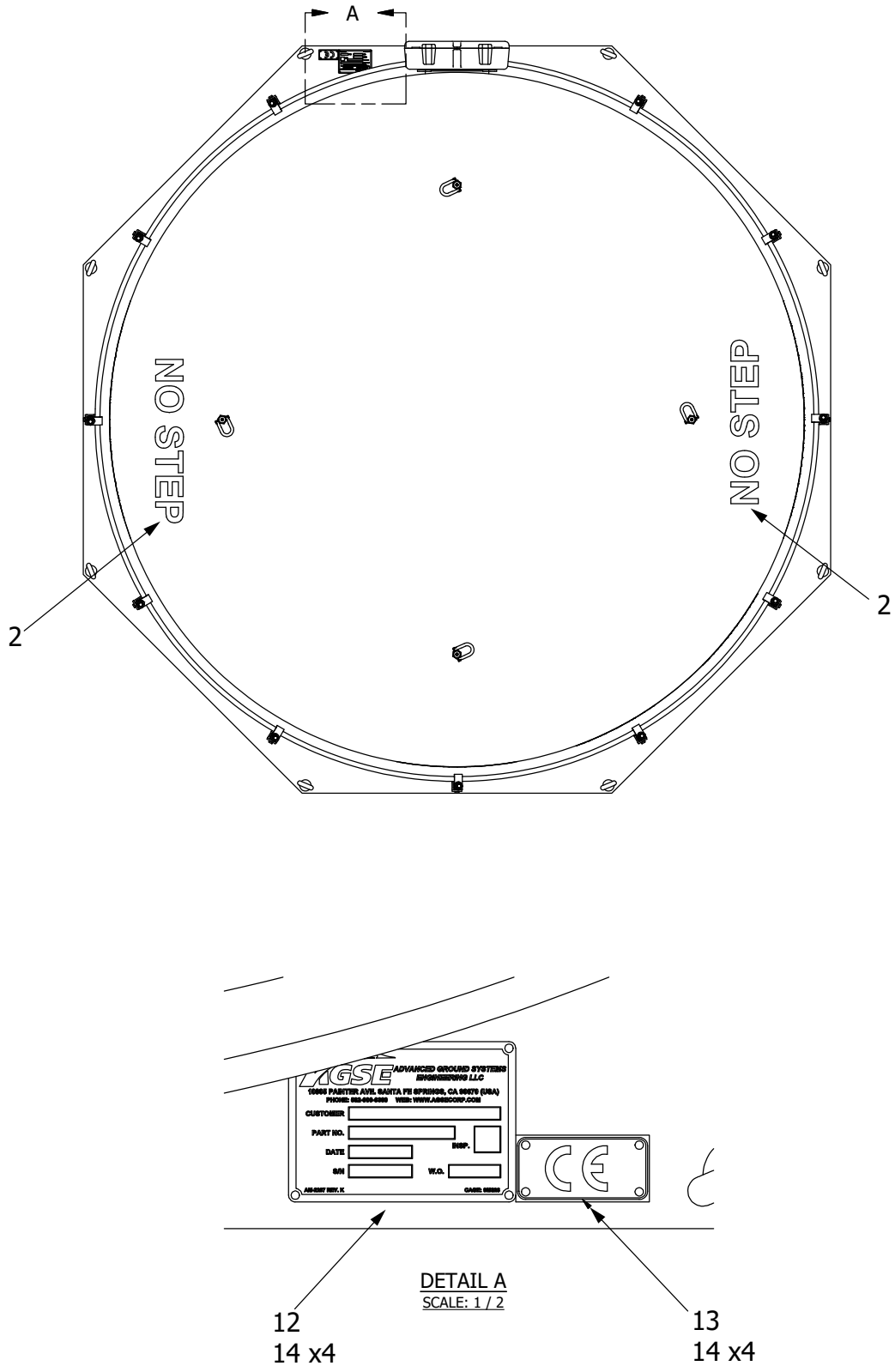
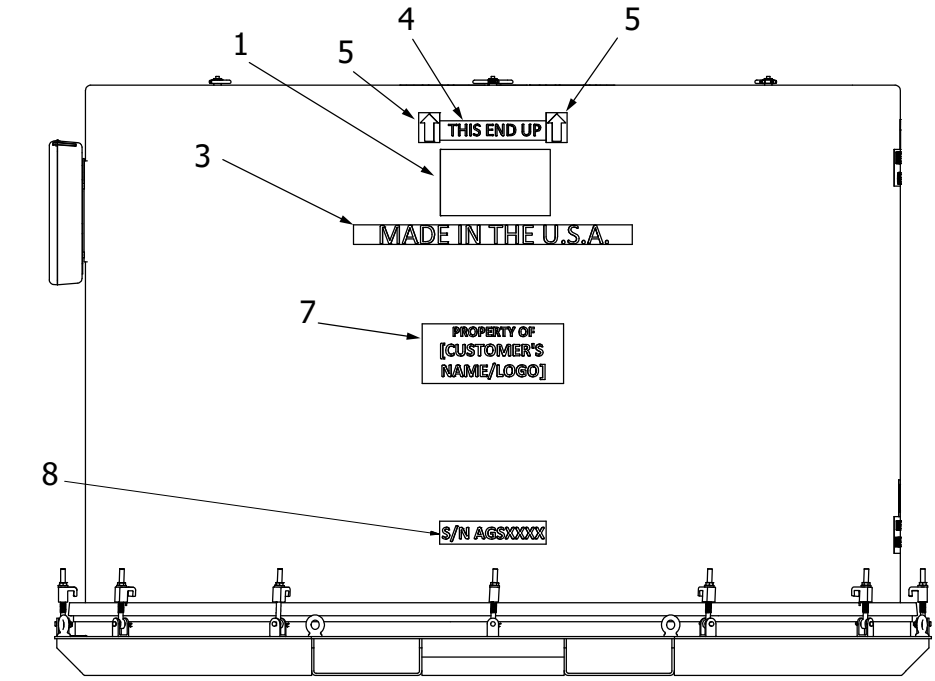


Figure 9.1-1 Fan Blade Platform Storage Box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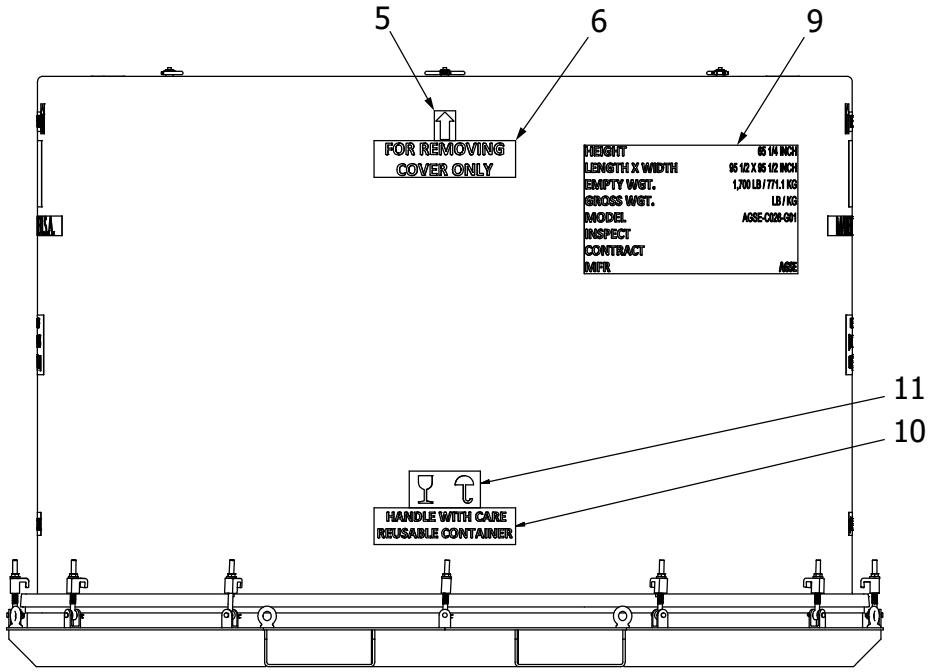
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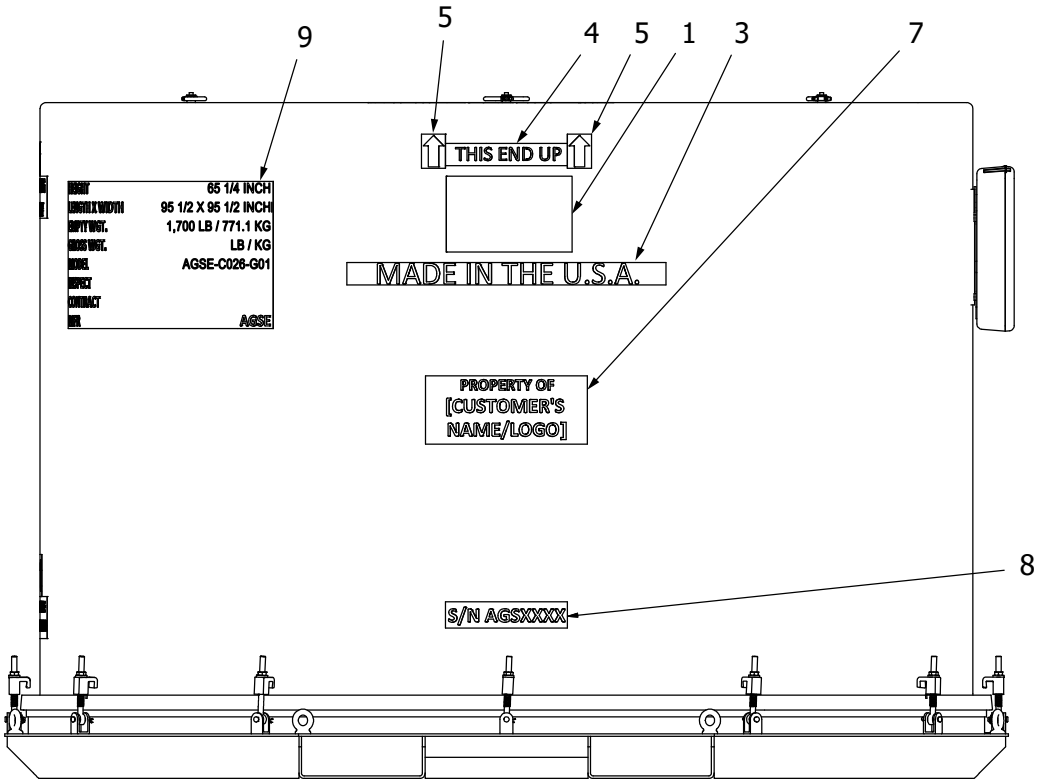
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