



SkyView HDX

Autopilot Servo Installation & Maintenance Manual

Cessna Model 172 F-S

Includes Instructions for Continued Airworthiness (ICA)

STC SA02594SE

103526-000

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Revision History

REV	DYNON SUBMITTAL	FAA ACCEPTANCE	DESCRIPTION OF CHANGES
A	8/31/2018 ECO 312857	Accepted by Seattle ACO	Initial Submission
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Table of Contents

1	Introduction	1
1.1	Document Control	1
1.2	Using this Manual.....	1
1.3	Intended Audience	1
1.4	Manual Iconography.....	2
1.5	Reference Documents.....	2
1.6	Mechanical Drawings	2
1.7	Product Delivery.....	2
1.8	Product Registration.....	3
1.9	Installation Record	3
2	Airworthiness Limitations.....	4
3	Installation Compliance	5
3.1	Pre-installation Information.....	5
4	Materials.....	6
4.1	Roll Servo Installation Materials	6
4.2	Pitch Servo Installation Materials.....	7
5	Roll Servo Mounting Bracketry Installation.....	9
5.1	Location and Access	9
5.2	Bracket Positioning and Temporary Installation.....	9
6	Pitch Servo Mounting Bracketry Installation	11
6.1	Location and Access	11
6.2	Base Bracket and Angle Brace Positioning and Temporary Installation.....	11
6.3	Vertical Bracket Positioning and Temporary Installation	12
6.4	Mounting Bracket Final Assembly	12
6.5	Sway Brace Final Assembly	13
7	Servo Electrical Wiring.....	14
7.1	Wire Harness Preparation	14
7.2	Wire Harness Routing	14
7.3	Electrical Connection.....	15
8	Continued Airworthiness.....	16

8.1	Roll Servo Removal and Installation	16
8.2	Pitch Servo Removal and Installation	19
8.3	Servo Calibration Procedure	21
8.4	Servo Test Procedure	21
9	Figures.....	22
9.1	Roll Servo Parts and Assemblies	22
9.2	Roll Servo Installation.....	26
9.3	Pitch Servo Parts and Assemblies.....	34
9.4	Pitch Servo Installation	38

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1 Introduction

This document provides installation and configuration information for SkyView HDX autopilot servos and bracketry in Cessna 172 Model F–S airplanes. It also provides Instructions for Continued Airworthiness (ICA) for use by authorized personnel to service and maintain the servos according to Federal Aviation Regulation (FAR) 14 CFR § 23.1529 and 14 CFR 23 Appendix G.

This document does not provide ICA for the SkyView HDX system or the EFIS-D10A Standby Flight Display. That information is provided in the *SkyView HDX General Maintenance Manual* document and the *EFIS-D10A Installation & Maintenance Manual* document at dynoncertified.com/docs.

1.1 Document Control

This document is released, archived, and controlled according to the Dynon Avionics document control system. To revise this document, a letter is submitted to the FAA with the revision. The FAA then accepts and approves any revision to Section 2: [Airworthiness Limitations](#). After FAA acceptance/approval, Dynon posts the revised document for customer use at dynoncertified.com/docs, and STC owners and installers are notified of the new revision via an official Dynon Marketing email release.

1.2 Using this Manual

To save paper, Dynon Avionics does not provide a printed version of this manual. However, Dynon grants permission to third parties to print this manual, as necessary. The most recent PDF version is available for download at dynoncertified.com/docs. This manual is updated periodically. It is important to use the most recent version when servicing SkyView components.

Dynon suggests keeping a PDF version of the manual on a smartphone, tablet, or laptop computer while servicing SkyView components. Using the manual electronically allows quick navigation of the document, figures to be viewed in color, and keyword searches.

1.3 Intended Audience

This document is intended for FAA-certified Airframe and Powerplant Technicians. It assumes technicians have the typical aircraft knowledge and training required to perform the procedures in this manual.

1.4 Manual Iconography

This manual uses the following iconography:



Alerts reader to critical guidance that if not followed could result in an unsafe condition.



Alerts reader to FAA regulatory information.



Alerts reader to important installation and/or maintenance information.



Alerts reader to helpful tips or suggestions.

1.5 Reference Documents

The following documents are referenced in or supplement this manual:

- 103261-000 SkyView HDX System Installation Manual, *current revision*
- 103914-000 EFIS-D10A Installation & Maintenance Manual, *current revision*
- 103221-000 SkyView HDX General Maintenance Manual, *current revision*
- 103488-000 SkyView HDX Wiring Diagram - Single Engine, *current revision*
- 103272-000 SkyView HDX Airplane Flight Manual Supplement, *current revision*
- 103777-000 SkyView HDX System Equipment Installation Record, *current revision*
- 103000-000 Dynon Servo Shear Screw Replacement Kit Instructions, *current revision*
- FAR 23.1311-1C - Installation of Electronic Display in Part 23 Airplanes
- AC 43.13-1B - Acceptable Methods, Techniques, and Practices - Aircraft Inspection
- AC 43.13-2B - Acceptable Methods, Techniques, and Practices - Aircraft Alterations

1.6 Mechanical Drawings

All mechanical drawings included in this manual are for *reference purposes only*. They should not be scaled or copied and used as templates or patterns.

1.7 Product Delivery

Upon delivery, visually inspect all SkyView Autopilot components, brackets, fasteners, cable harnesses, and accessories for damage that may have occurred during shipping. If damage has occurred, contact Dynon Technical Support.

1.8 Product Registration

Register SkyView components at dynoncertified.com/register. Product registration verifies ownership, expedites warranty claims, and allows Dynon Avionics to send notification when product Service Bulletins and Technical Advisories are published. This site also allows owners and installers to register to receive news and product announcements from Dynon. Dynon will not share contact information with third-parties or send announcements without explicit consent.

1.9 Installation Record

The mechanic or facility performing the installation should record where the equipment has been installed in the airplane. This documentation should be entered into airplane's permanent record. Dynon provides a document template to record this information. Download the *SkyView HDX Equipment Installation Record* document at dynoncertified.com/docs.

2 Airworthiness Limitations

For any Airworthiness Limitations associated with the installation of SkyView Autopilot servos, see the *SkyView HDX General Maintenance Manual* document at dynoncertified.com/docs. It is the principal ICA document for the SkyView HDX system.

3 Installation Compliance

Airplanes on the AML meet a minimum required configuration for applicability of the STC. However, some airplanes may have been modified, and consequently, it may be difficult to use the information in this manual to completely substantiate the installation in compliance with the STC. It is the installer's responsibility to make the final determination of applicability for each individual airplane.

Prior to completing the installation, and before returning the airplane to service, the installer must complete and submit a completed Form FAA 337 - Major Repair & Alteration (Airframe, Powerplant, Propeller, or Appliance) to the appropriate FAA Flight Standards District Office. The form must include the following:

- Description of the SkyView Autopilot installation.
- Description of how the SkyView Autopilot interfaces with existing equipment and systems.
- Appropriately approved or acceptable data that demonstrates compliance.

Refer to AC 43.9-1G - Instructions for Completion of FAA Form 337 for additional information.

3.1 Pre-installation Information

Read and understand the following before proceeding with installation activities.



Always install avionics equipment in compliance with regulatory requirements found in FAR Part 23 - Airworthiness Standards: Normal Category Airplanes, Subpart G -Flightcrew Interface And Other Information.

Always install avionics equipment in accordance with the guidance and approved engineering methods outlined the following FAA documents:



- FAR 23.1311-1C - Installation of Electronic Display in Part 23 Airplanes
- AC 43.13-1B Acceptable Methods, Techniques, and Practices - Aircraft Inspection
- AC 43.13-2B Acceptable Methods, Techniques, and Practices - Aircraft Alterations



The certified mechanic who will authorize the airplane's return to service should agree with the installation plan (i.e., methods, component locations, wiring harness routing, etc.) before installation activities begin. This will help avoid potential rework should any part of the installation be found non-compliant.

4 Materials

This section provides information about the materials used in installation of Roll and Pitch servos in unmodified Cessna 172 Model F–S airplanes.

4.1 Roll Servo Installation Materials

The materials identified in [Table 1](#) are required to install the Roll servo. Item numbers are used as figure call-outs in [Section 9.1 Roll Servo Parts and Assemblies](#) and [Section 9.2 Roll Servo Installation](#).

Table 1: Roll Servo Installation Materials

ITEM	DYNON PART	DESCRIPTION	QTY
1	503406-000	SV42C SERVO ASSEMBLY	1
1-1		SERVO SHEAR SCREW	1
1-2		AN310-5 NUT CASTLE 5/16"-24	1
1-3		WASHER WAVE STL 5/16"	1
1-4		WASHER FLAT NYLON 5/16"	1
1-5		SERVO CAPSTAN	1
1-6		PHIL PAN HD SCREW #6-32 X 1/4"	4
1-7		MS35333-37 WASHER STAR STL #6	4
1-8		MS24665-210 COTTER PIN	1
1-9		BRIDLE CABLE GUARD	1
2	503508-000	SERVO MOUNTING KIT C172	*
2-1	503107-000 or -001	ROLL SERVO UPPER BRACKET C172	1
2-2	503108-000 or -001	ROLL SERVO LOWER BRACKET C172	1
3	103664-000	ROLL SERVO HARDWARE KIT C172	1
3-1		AN525-832R8 SCREW WASHER HEAD #8-32	10
3-2		AN960-08 WASHER FLAT STL #8	10
3-3		AN365-832A NUT LOCK STL #8-32	10
3-4		AN3H-3A BOLT HEX #10-32 DRILLED HEAD	4
3-5		MS35333-39 WASHER LOCK STAR INT STL #10	8
3-6		AN960-10 WASHER FLAT STL #10	8
4	503674-000	SERVO CAPSTAN ACCESSORY KIT 1/8"	1
4-1		AN365-1032A NUT LOCK STL #10-32	4
4-2		AN960-10-3 WASHER FLAT STL #10	4
4-3		AN3H-6A BOLT HEX #10-32 DRILLED HEAD	4
4-4		BRIDLE CABLE 1/16" DIA	1
4-5		SWAGE STOP FOR CABLE 1/16" DIA	2
4-6		BRIDLE CABLE CLAMP 1/8" 1/16" DIA	4

* Kit shared with pitch servo assembly.

4.2 Pitch Servo Installation Materials

The materials identified in [Table 2](#) are required to install a Pitch servo. Item numbers are used as figure call-outs in [Section 9.3 Pitch Servo Parts and Assemblies](#) and [Section 9.4 Pitch Servo Installation](#).

Table 2: Pitch Servo Installation Materials

ITEM	DYNON PART	DESCRIPTION	QTY
1	503406-000	SV42C SERVO ASSEMBLY	1
1-1		SERVO SHEAR SCREW	1
1-2		AN310-5 NUT CASTLE 5/16"-24	1
1-3		WASHER WAVE STL 5/16"	1
1-4		WASHER FLAT NYLON 5/16"	1
1-5		SERVO CAPSTAN	1
1-6		PHIL PAN HD SCREW #6-32 X 1/4"	4
1-7		MS35333-37 WASHER STAR STL #6	4
1-8		MS24665-210 COTTER PIN	1
1-9		BRIDLE CABLE GUARD	1
2	503508-000	SERVO MOUNTING KIT C172	*
2-3	503588-000	PITCH SERVO BASE BRACKET C172	1
2-4	503590-000	PITCH SERVO ANGLE BRACE C172	2
2-5	503589-000	PITCH SERVO VERTICAL BRACKET C172	1
2-6	503105-000	PITCH SERVO PULLEY BRACKET C172	1
2-7		MS20219-2 PULLEY PHENOLIC 1.75" OD BORE 0.25" ID	1
2-8	503329-000 or -001	PITCH SERVO LONG SWAY BRACE C172	1
2-9	503330-000	PITCH SERVO SMALL SWAY BRACE C172	1
3	103667-000	PITCH SERVO HARDWARE KIT C172	1
3-1		AN525-832R8 SCREW WASHER HEAD #8-32	29
3-2		AN960-08 WASHER FLAT STL #8	29
3-3		AN365-832A NUT LOCK STL #8-32	28
3-4		AN3H-3A BOLT HEX #10-32 DRILLED HEAD	4
3-5		MS35333-39 WASHER LOCK STAR INT STL #10	8
3-6		AN960-10 WASHER FLAT STL #10	8
3-7		AN4-11A BOLT HEX 1/4-28 1-5/32"	1
3-8		AN960-416 WASHER FLAT STL 1/4"	2
3-9		AN365-428A NUT LOCK STL #1/4-28	1
3-10		CCP-42 RIVET CHERRY N	4

ITEM	DYNON PART	DESCRIPTION	QTY
3-11		MS20426AD3-4 RIVET ALUM 100° COUNTERSUNK	2
4	503674-000	SERVO CAPSTAN ACCESSORY KIT 1/8"	1
4-1		AN365-1032A NUT LOCK STL #10-32	4
4-2		AN960-10-3 WASHER FLAT STL #10	4
4-3		AN3H-6A BOLT HEX #10-32 DRILLED HEAD	4
4-4		BRIDLE CABLE 1/16" DIA	1
4-5		SWAGE STOP FOR CABLE 1/16" DIA	2
4-6		BRIDLE CABLE CLAMP 1/8" 1/16" DIA	4

* Kit shared with roll servo assembly.

5 Roll Servo Mounting Bracketry Installation

This section details how to assemble and temporarily install the Roll Servo mounting bracketry. Refer to Section 8 [Continued Airworthiness](#) to remove or install a roll servo after bracket installation is complete. Refer to Section 7 [Servo Electrical Wiring](#) for roll servo wiring information.



Before installing a Roll Servo, verify the aileron control cables are rigged and tensioned to the airplane manufacturer's specifications.



Installers should consider printing the figures in Section 9.2 and keeping them on-hand as they perform the installation.

There are two different sets of Roll Servo brackets for Cessna 172 Model Series F–S airplanes:

- Upper Bracket 503107-000 and Lower Bracket 503108-000
- Upper Bracket 503107-001 and Lower Bracket 503108-001

The -000 brackets attach the Roll Servo to the Left-Hand Direct (i.e. control) cable and the -001 brackets attach the Roll Servo to the Carry-Thru (i.e. balance) cable.

5.1 Location and Access

The Roll Servo is located in the left wing between the ribs at Wing Stations 100.00 and 118.00 (WS100.00 and WS118.00), aft of the rear spar (see [Figure 5](#) and [Figure 6](#)). The location is accessed through inspection hole 520AB (Cessna Identification #) on the underside of the left wing, outboard of the flap and just forward of the aileron (see [Figure 5](#)). The aileron cables are accessed through inspection hole 510NB (Cessna Identification #) on the underside of the left wing, and just forward of the left flap (see [Figure 5](#)). The flaps need lowering to reach this inspection hole.

5.2 Bracket Positioning and Temporary Installation

Complete the following to prepare the airplane for temporary installation of Roll Servo Brackets:

1. Locate three (3) rivets that attach upper wing skin to rear spar, immediately outboard of WS100.00 rib (see [Figure 7](#)).
2. Drill out and remove three (3) rivets. Pilot drill (#30) holes.
3. Pilot drill (#30) two (2) new holes equally spaced between rivet holes (see [Figure 7](#))
4. Locate three (3) rivets that attach lower wing skin to rear spar, immediately outboard of WS100.00 rib (see [Figure 8](#)).
5. Drill out and remove three (3) rivets. Pilot drill (#30) holes.
6. Pilot drill (#30) two (2) new holes equally spaced between rivet holes (see [Figure 8](#))

Complete the following to position and temporarily install Upper and Lower Roll Servo Brackets:

1. Attach upper and lower brackets to roll servo (see [Figure 4](#)). Do not fully tighten fasteners yet. Make sure upper bracket is in lowest (retracted) position allowed by its mounting slots.
2. Using [Figure 9](#) and [Figure 10](#) as guidance:
 - Insert servo/bracket assembly into wing through inspection hole 520AB.
 - Raise upper bracket until bracket contacts upper rear spar flange.
 - Position assembly by sliding it inboard so that roll servo brackets contact flange of the inboard WS100.00 rib.
3. Make sure there is clearance to prevent brackets from chafing spar flange bend (see [Figure 11](#)).
4. Make sure aileron cables do not interfere with roll servo or brackets.
5. Temporarily tighten servo bolts.
6. From outside airplane, use holes in wing skins as guides to match drill (#30) holes through upper and lower brackets, installing cleco-type fasteners as you proceed.
7. Use #21 drill to finalize holes in brackets and wing skins, removing cleco-type fasteners as you proceed. Deburr all holes.
8. Remove roll servo/bracket assembly from wing.



Mark edge of servo on upper bracket to simplify re-installation.

9. Install roll servo (see Section [8.1.3 Roll Servo Installation](#)).

6 Pitch Servo Mounting Bracketry Installation

This section details how to assemble and install the Pitch Servo mounting bracketry. Refer to Section 8 [Continued Airworthiness](#) to remove or install a Pitch Servo after bracket installation is complete. Refer to Section 7 [Servo Electrical Wiring](#) for Pitch Servo wiring information.



Before installing a Pitch Servo, verify that the elevator control cables are rigged and tensioned to the airplane manufacturer's specifications.



Installers should consider printing the figures in Section 9.4 and keeping them on-hand as they perform the installation.

6.1 Location and Access

The Pitch Servo is installed underneath the floor of the Aft Baggage Area (see [Figure 18](#)), immediately behind bulkhead at Fuselage Station 108.00 (FS108.00). Remove the floor of the Aft Baggage Area to access the Pitch Servo installation location.

6.2 Base Bracket and Angle Brace Positioning and Temporary Installation

Complete the following to position and temporarily install the Pitch Servo Base Bracket and Pitch Servo Angle Braces:

1. Position base bracket into airplane (see [Figure 19](#) and [Figure 20](#)).
2. Align base bracket longitudinally so that right-side forward edge of bracket is spaced 0.10" (min.) and 0.25" (max.) behind FS108.00 bulkhead (see [Figure 19](#)).
3. Align base bracket perpendicular to the FS108.00 bulkhead.
4. Position left and right angle braces against FS108.00 bulkhead and against base bracket flanges (see [Figure 19](#) and [Figure 20](#)).
5. Align base bracket laterally as required to prevent base bracket and left and right angle braces from contacting cable pulley brackets attached to FS108.00 bulkhead (see [Figure 19](#)).
6. Use base bracket pilot holes as guide to match drill (#40) pilot holes through airplane skin, installing cleco-style fasteners as you proceed.
7. Use angle braces pilot holes as guide to match drill (#40) pilot holes through FS108.00 bulkhead, cleco-style fasteners as you proceed.

6.3 Vertical Bracket Positioning and Temporary Installation

Complete the following to assemble, position, and temporarily install the Pitch Servo Vertical Bracket Assembly:

1. Temporarily attach pitch servo, idler pulley, and pulley guard to vertical bracket (see [Figure 21](#)).
2. Position vertical bracket assembly so that lower flange of vertical bracket rests on base bracket (see [Figure 22](#)).
3. Longitudinally position assembly on pitch servo base bracket so that forward edge of servo capstan maintains a minimum of 0.25" longitudinal spacing from elevator control cable pulleys mounted to FS108.00 bulkhead (see [Figure 22](#) and [Figure 23](#)).
4. Laterally position assembly on pitch servo base bracket as required to align idler pulley with lower elevator control cable (see [Figure 22](#) and [Figure 23](#)). Ensure no components interfere with elevator and elevator trim control cables.
5. Once positioned, use vertical bracket pilot holes as guide to match drill (#40) pilot holes through base bracket, installing cleco-style fasteners as you proceed.



Match drill a minimum of two pilot holes to position the Pitch Servo Vertical Bracket Assembly.

6.4 Mounting Bracket Final Assembly

Complete the following to permanently attach the Pitch Servo Vertical Bracket Assembly to the Base Bracket to make the Pitch Servo Bracket Assembly:

1. Loosen vertical bracket assembly from base bracket, and then remove vertical bracket assembly from airplane.
2. Disassemble vertical bracket assembly.
3. Loosen base bracket and angle braces from airplane skin and FS108.00 bulkhead, and then remove base bracket and angle braces from airplane.
4. On a bench, attach vertical bracket to base bracket with cleco-style fasteners.
5. Use #21 drill to finalize holes in vertical bracket and base bracket, removing cleco-style fasteners as you proceed. Deburr all holes.
6. Permanently secure vertical bracket to base bracket using screws, washers, and nuts (see [Figure 24](#)).
7. Permanently secure idler pulley and pulley guard to vertical bracket (see [Figure 21](#)).

Complete the following to permanently install the Pitch Servo Bracket Assembly in the airplane:

1. Position pitch servo bracket assembly in airplane, and then attach with cleco-style fasteners
2. Position left and right-angle braces against base bracket flanges and FS108.00 bulkhead, and then attach with cleco-style fasteners.
3. Use #21 drill to finalize holes in base bracket flanges, angle brace lower flanges, and airplane skin, removing cleco-style fasteners as you proceed. Deburr all holes.
4. Use #30 drill to finalize holes in angle brace upper flanges and FS180.00 bulkhead, removing cleco-style fasteners as you proceed. Deburr all holes.
5. Re-position pitch servo bracket assembly in airplane, and then attach with cleco-style fasteners in every other hole.
6. Secure angle braces to FS180.00 bulkhead with (4) CCP-42 rivets. Rivet left angle brace from front of FS180.00 bulkhead and right-angle brace from rear of FS180.00 bulkhead.
7. Permanently secure pitch servo bracket assembly to airplane skin using screws, washers, and nuts (see [Figure 25](#)).

6.5 Sway Brace Final Assembly

Complete the following to permanently install the Pitch Servo Sway Braces:

1. Temporarily install pitch servo to pitch servo bracket assembly with (3) AN3 bolts (see [Figure 21](#)).
2. Temporarily install short sway brace to pitch servo with (1) AN3 bolt (see [Figure 26](#)).
3. Position long sway brace between FS180.00 bulkhead rib and short sway brace (see [Figure 27](#)). This determines final length of long sway brace.
4. Mark and trim long sway brace (see [Figure 27](#)).
5. Temporarily fasten long sway brace to short sway brace with (1) AN3 bolt (see [Figure 26](#)).
6. Drill (#40) two pilot holes through FS180.00 bulkhead rib flange and long sway brace (see [Figure 27](#)), installing cleco-style fasteners as you proceed.
7. Use a #30 drill to finalize holes in FS180.00 bulkhead rib flange and long sway brace, removing cleco-style fasteners as you proceed. Deburr and dimple all holes.
8. Loosen long sway brace from short sway brace. Short sway brace remains on servo.
9. Permanently secure long sway brace to FS180.00 bulkhead rib flange with (2) MS20426AD3-4 rivets.
10. Loosen pitch servo from bracket assembly and remove from airplane.
11. Install pitch servo (see Section [8.2.3 Pitch Servo Installation](#)).

7 Servo Electrical Wiring

This section provides details about the electrical installation of autopilot servos.

Dynon Avionics offers a wire harness kit (SV-NET-SERVO) to simplify the process of electrically connecting autopilot servos to the SkyView HDX Network and airplane power. Contact Dynon Sales for more information.



If your SkyView HDX System installation requires customized wire harnesses, refer to the *Skyview HDX Electrical Schematic Diagram* and *SkyView HDX Wiring Harness Reference* documents at dynoncertified.com/docs for additional electrical connection information.

7.1 Wire Harness Preparation

Table 3 provides wire/pin connection information for preparing an autopilot servo wire harness.

Table 3: Autopilot Servo Harness, Pin/Wire Connections

D9 Harness Pin #	D9 Harness Wire Function	D9 Harness Wire Color	Connection / Notes
1	SkyView Network Data 1A	Green	SkyView Network D9 Connector, Pin 1
2	Ground	Black	Common Airframe Ground
3	Autopilot Disconnect	Yellow	A/P DISC Button
4	SkyView Network Data 2B	White w/ Blue	SkyView Network D9 Connector, Pin 4
5	None	No Wire	No Connection
6	SkyView Network Data 1B	Blue	SkyView Network D9 Connector, Pin 6
7	Power	Red	Electrical Bus Use 10A Circuit Breaker / Fuse
8	SkyView Network Data 2A	White w/ Green	SkyView Network D9 Connector, Pin 8
9	None	No Wire	No Connection

To prepare an autopilot servo wire harness:

1. Connect included D9M connector to servo wires; connect included D9F connector to one end of wire bundle. Close connector shells.
2. Connect D9M and D9F connectors together.

7.2 Wire Harness Routing

Route Roll Servo harness wires through left wing, into cabin, and toward instrument panel. Route Pitch Servo harness wires through fuselage, under cabin floor, and toward instrument panel. Wires connect as follows:

- Green (pin 1), white/blue (pin 4), blue (pin 6), and white/green (pin 8) wires to a SkyView HDX Network device or hub.
- Red (pin 7) wire to Autopilot Power (A/P POWER) switch on instrument panel.

- Black (pin 2) wire to common airframe ground.
- Yellow (pin 3) wire to Autopilot Disconnect (A/P DISC) button on instrument panel or yoke.



Secure wires to ensure they do not chafe or interfere with the airplane's flight controls or other moving components.

7.3 Electrical Connection

To connect an autopilot servo to the airplane's electrical system:

1. Make sure airplane power is disconnected.
2. Install dedicated 10A circuit breaker or replaceable fuse and connect to electrical bus. See airplane manufacturer's documentation for guidance on connecting circuit breakers and replaceable fuses.
3. Install A/P POWER switch on instrument panel.



Power for all autopilot servos must be controlled by a switch prominently mounted on the instrument panel. This provides the pilot the ability to quickly turn off power to the servos should it be necessary.

4. Connect red (pin 7) wire to A/P POWER switch; connect black (pin 2) wire to common airframe ground. Use insulated connectors.



Ground connection must be common with all devices that interface with the SkyView HDX System.

To connect an autopilot servo to the SkyView HDX Network:

1. Make sure airplane power is disconnected.
2. Terminate green (pin 1), white/blue (pin 4), blue (pin 6), and white/green (pin 8) wires to same pins on included D9F connector. Close connector shell.
3. Connect D9F connector on harness to SkyView HDX Network hub.

To connect an autopilot servo to an A/P DISC button:

1. Make sure airplane power is disconnected.
2. Connect yellow (pin 3) wire to A/P DISC button. Use insulated connectors or splices.

8 Continued Airworthiness

This section provides detailed Continued Airworthiness information for SkyView HDX autopilot servos.

8.1 Roll Servo Removal and Installation

This section details how to remove and install a Roll Servo.



Before installing a Roll Servo, verify the aileron control cables are rigged and tensioned to the airplane manufacturer's specifications.



Installers should consider printing the figures in Section 9.2 and keeping them on-hand as they perform removal and installation.

8.1.1 Location and Access

The Roll Servo is located in the left wing between ribs at Wing Stations 100.00 and 118.00 (WS100.00 and WS118.00), behind the rear spar (see [Figure 5](#) and [Figure 6](#)). The Roll Servo location is accessed through inspection hole 520AB (Cessna Identification #) on the underside of the left wing, outboard of the flap and just forward of the aileron (see [Figure 5](#)). The aileron cables are accessed through inspection hole 510NB (Cessna Identification #) on the underside of the left wing, and just forward of the left flap (see [Figure 5](#)). The flaps need lowering to reach this inspection hole.

8.1.2 Roll Servo Removal

Complete the following to remove a Roll Servo:

1. Lower airplane flaps.
2. Remove access covers 520AB and 510NB (see [Figure 5](#)).
3. Disconnect D9M and D9F connectors from autopilot servo wire harness.
4. Mark location of bridle clamps on cables to simplify re-installation.
5. Remove cable clamps that connect bridle cables to aileron control cable.
6. Remove fasteners that secure brackets to rear spar flanges and airplane skins (see [Figure 11](#)).
7. Remove roll servo/bracket assembly from airplane (see [Figure 9](#) (reverse order)).



Mark edge of servo on upper bracket to simplify re-installation.

8. Cut safety wire and remove roll servo from upper and lower brackets (see [Figure 4](#)).

8.1.3 Roll Servo Installation

Complete the following to install the Roll Servo:



Before installing a Roll Servo, verify the aileron control cables are rigged and tensioned to the airplane manufacturer's specifications.

1. Attach upper and lower brackets to roll servo (see [Figure 4](#)). Attach upper bracket to roll servo using marks made during temporary installation or removal.
2. Torque bolts that secure roll servo to brackets to 20–25 inch-pounds, and then safety wire bolts.
3. Insert roll servo/bracket assembly into left wing through access hole 520AB (see [Figure 9](#)).
4. Verify aileron cables do not interfere with roll servo or brackets.



If -000 brackets are installed, verify that forward aileron cable is aligned with center of servo capstan.

If -001 brackets are installed, verify that rear aileron cable is aligned with center of servo capstan.

5. Align lower bracket holes with common holes in lower rear spar flange and airplane skin, and then temporarily fasten lower bracket to lower rear spar flange and airplane skin using screws, washers, and nuts (see [Figure 11](#)).
6. Align upper bracket holes with common holes in upper rear spar flange and airplane skin, and then permanently secure upper bracket to upper rear spar flange and airplane skin using screws, washers, and nuts (see [Figure 11](#)). Do not fully tighten fasteners yet.
7. Permanently secure lower bracket to lower rear spar flange and airplane skin using screws, washers, and nuts (see [Figure 11](#)).
8. Re-connect D9M and D9F wire harness connectors, and if needed, re-secure harness to airframe.
9. Center ailerons using control yoke.
10. Rotate capstan until swage hole points to 6 o'clock (see [Figure 12](#)).
11. Once swage hole is located, pass one end of cable underneath a cable guard flange so that cable sits in the center groove (see [Figure 12](#)).
12. Set cable swage into swage hole and pass the other end of the bridle cable under the opposite cable guard flange (see [Figure 12](#) and [Figure 13](#)).
13. Following grooves, feed both cable ends around capstan and underneath next set of cable guard flanges (see [Figure 12](#) and [Figure 13](#)). Capstan may need to be rotated to expose swage hole if it is underneath a cable guard flange.



DO NOT bend cable guard flanges away from capstan. They are intended to keep bridle cable from jumping grooves.

14. Ensure aileron cables are clean and free of dirt and grease before installing cable clamps.
15. Perform one of the following:
 - If this is a new installation, attach clamps to cables and position as shown in [Figure 13](#). The grooves in cable clamps are designed to work with included bridle cable diameter of 1/16" (small groove) and aircraft control cable diameter of 1/8" (large grooves).
 - If this is a re-installation, attach clamps at locations marked during removal. The bridle cable should have 1" of cable protruding from ends of clamps.
16. Tighten bridle cables to match tension of aileron control cable to which it attaches without increasing manufacturer-specified tension for aileron control cable.
17. Secure bridle cable clamp bolts and torque to 35–40 inch-pounds.
18. Verify full travel of ailerons using control yoke:
 - Make sure bridle cable clamps do not contact any part of the structure during entire travel in either direction.
 - Make sure capstan does not rotate more than 150 degrees in either direction from neutral.
19. Install stop-swages to bridal cables about 1" beyond bridal cable clamps, and then trim bridal cables beyond installed stop-swages.
20. Replace access covers.
21. If introducing a roll servo with a new serial number to the SkyView HDX Network, refer to the *SkyView HDX System General Installation Manual* for information about device configuration.
22. Refer to Section [8.3 Servo Calibration Procedure](#) to recalibrate the roll servo.

8.2 Pitch Servo Removal and Installation

This section details how to remove and install a Pitch Servo.



Before installing a Pitch Servo, verify that the elevator control cables are rigged and tensioned to the airplane manufacturer's specifications.



Installers should consider printing the figures in Section 9.4 and keeping them on-hand as they perform removal and installation.

8.2.1 Location and Access

The Pitch Servo is installed underneath the floor of the Aft Baggage Area (see [Figure 18](#)), immediately behind bulkhead at Fuselage Station 108.00 (FS108.00). Remove the floor of the Aft Baggage Area to access the Pitch Servo installation location.

8.2.2 Pitch Servo Removal

Complete the following to remove a Pitch Servo:

1. Remove baggage area cargo shelf and equipment shelf.
2. Disconnect D9M and D9F connectors from autopilot servo wire harness.
3. Mark location of bridle clamps on cable to simplify re-installation.
4. Remove cable clamps that connect bridle cables to elevator control cable.
5. Remove and store fastener that secures long sway brace to short sway brace (see [Figure 26](#)).
6. Remove pitch servo assembly from vertical bracket assembly (see [Figure 21](#)).

8.2.3 Pitch Servo Installation

Complete the following to install the Pitch Servo:



Before installing a Pitch Servo, verify the elevator control cables are rigged and tensioned to the airplane manufacturer's specifications.

1. Attach pitch servo to vertical bracket assembly (see [Figure 21](#)).
2. Torque bolts that secure pitch servo to bracket to 20–25 inch-pounds, and then safety wire bolts using small holes in bracket.
3. Re-connect D9M and D9F wire harness connectors, and if needed, re-secure harness to airframe.
4. Secure elevator in neutral position.
5. Rotate capstan until swage hole points to 3 o'clock (see [Figure 28](#)).
6. Once swage hole is located, pass one end of cable underneath a cable guard flange so that cable sits in the center groove (see [Figure 28](#)).

7. Set cable swage into swage hole and pass the other end of the bridle cable under opposite cable guard flange (see [Figure 28](#) and [Figure 29](#)).
8. Following grooves, feed both cable ends around capstan and underneath next set of cable guard flanges (see [Figure 28](#) and [Figure 29](#)). Wrap cable 1.5 times. Capstan may need to be rotated to expose swage hole if it is underneath a cable guard flange.



DO NOT bend cable guard flanges away from capstan. They are intended to keep bridle cable from jumping grooves.

9. Make sure elevator cables are clean and free of dirt and grease before installing cable clamps.
10. Perform one of the following:
 - If this is a new installation, attach clamps to cables and position as shown in [Figure 29](#). The grooves in cable clamps are designed to work with included bridle cable diameter of 1/16" (small groove) and aircraft control cable diameter of 1/8" (large grooves).
 - If this is a re-installation, attach clamps at locations marked during removal. The bridle cable should have 1" of cable protruding from ends of clamps.
11. Tighten bridle cables to match tension of elevator control cable to which it attaches without increasing manufacturer-specified tension for elevator control cable.
12. Secure bridle cable clamp bolts and torque to 35–40 inch-pounds.
13. Verify full travel of ailerons using control yoke:
 - Make sure bridle cable clamps do not contact any part of the structure during entire travel in either direction.
 - Make sure capstan does not rotate more than 150 degrees in either direction from neutral.
14. Install stop-swages to bridle cables about 1" beyond bridle cable clamps, and then trim bridle cables beyond installed stop-swages.
15. Replace floor in Aft Baggage Area.
16. If introducing a pitch servo with a new serial number to the SkyView HDX Network, refer to the *SkyView HDX System General Installation Manual* for information about device configuration.
17. Refer to Section [8.3 Servo Calibration Procedure](#) to recalibrate the pitch servo.

8.3 Servo Calibration Procedure

Servo calibration cannot be performed without an SV-ADAHRS-200 module installed and configured in the SkyView HDX System and Network. V-speeds must also be correctly entered in the SkyView HDX System.

The servo calibration procedure identifies the orientation and range of motion of each servo and must be performed before the servo test procedure. The SkyView HDX System uses this procedure to automatically differentiate between the pitch and roll servos.

To make servos visible on a SkyView HDX display unit, configure the SkyView HDX Network (SYSTEM SETUP > NETWORK SETUP > CONFIGURE).

To calibrate the servos, enter the Servo Calibration Wizard (SETUP MENU > HARDWARE CALIBRATION > AP SERVO CALIBRATION > CALIBRATION) and follow the onscreen instructions to calibrate the servo(s). If the servo calibration procedure is successful, the SkyView HDX System will automatically instruct you to run the servo test procedure.

During AP SERVO CALIBRATION, the SkyView HDX System checks the status of the A/P DISC button. If the SkyView HDX System detects that the button is pressed (the input is grounded) upon entering AP SERVO CALIBRATION, the A/P DISC button is assumed to be stuck (or incorrectly installed), resulting in the following message being displayed, and the AP SERVO CALIBRATION is aborted:

"The servo disconnect switch appears to be pressed and may be installed incorrectly. The servo disconnect switch should be a type Momentary, Push Button Normal Open (PBNO). Press cancel below to return to the servo calibration menu."

8.4 Servo Test Procedure

The servo test procedure requires a successful servo calibration. The servo test procedure verifies that each servo is configured properly by moving the control surfaces while the installer verifies the correct movement. You may run this procedure on its own at any time after a successful servo calibration. SkyView will not display AP status on the Top Bar until after this test procedure is successfully completed.

To run this procedure on its own (after a successful servo calibration procedure), enter the Servo Test Wizard (SETUP MENU > HARDWARE CALIBRATION > AP SERVO CALIBRATION > TEST) and follow the onscreen instructions to test the servo(s).

9 Figures

9.1 Roll Servo Parts and Assemblies

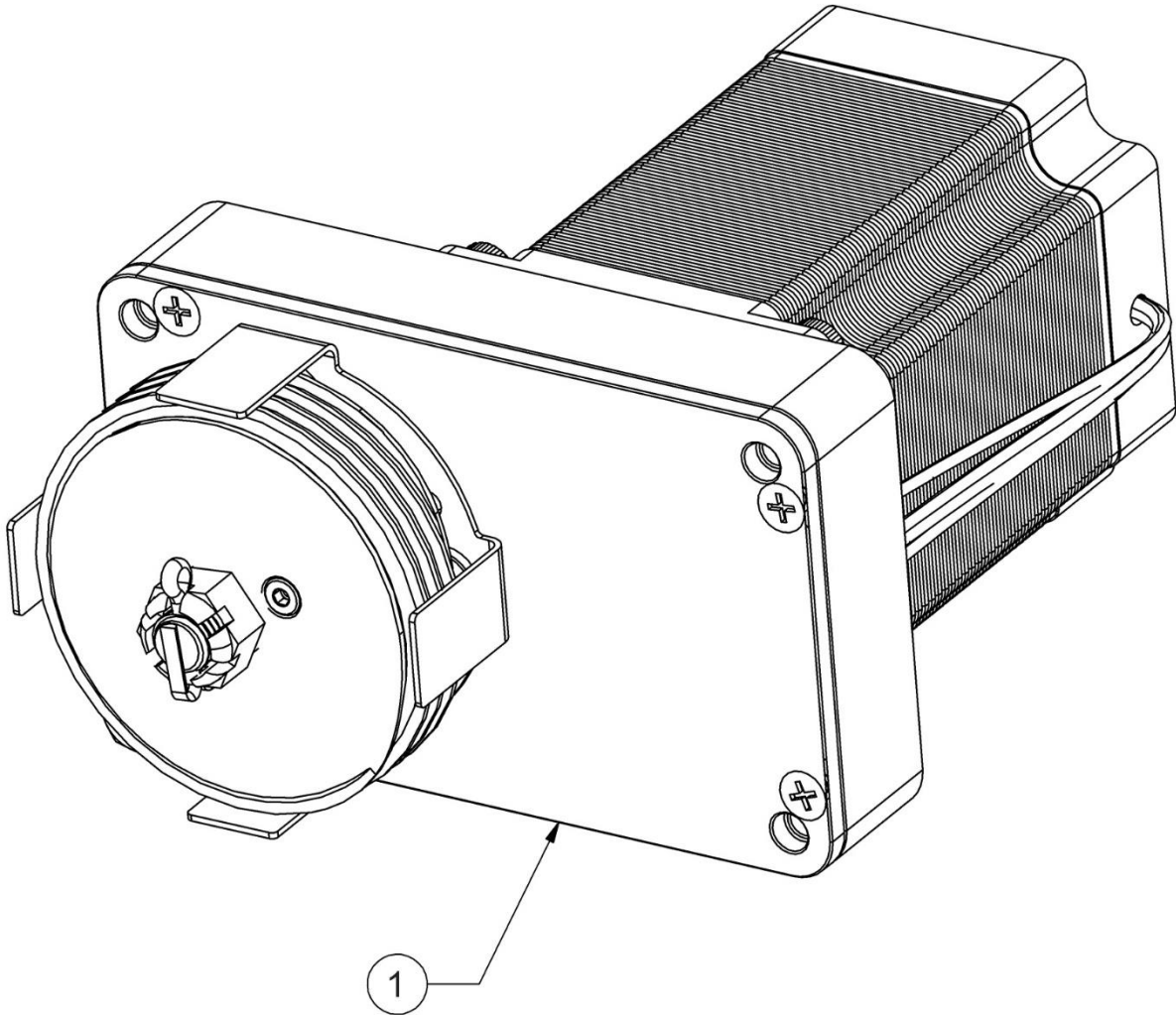


Figure 1: Roll Servo (SV42C)

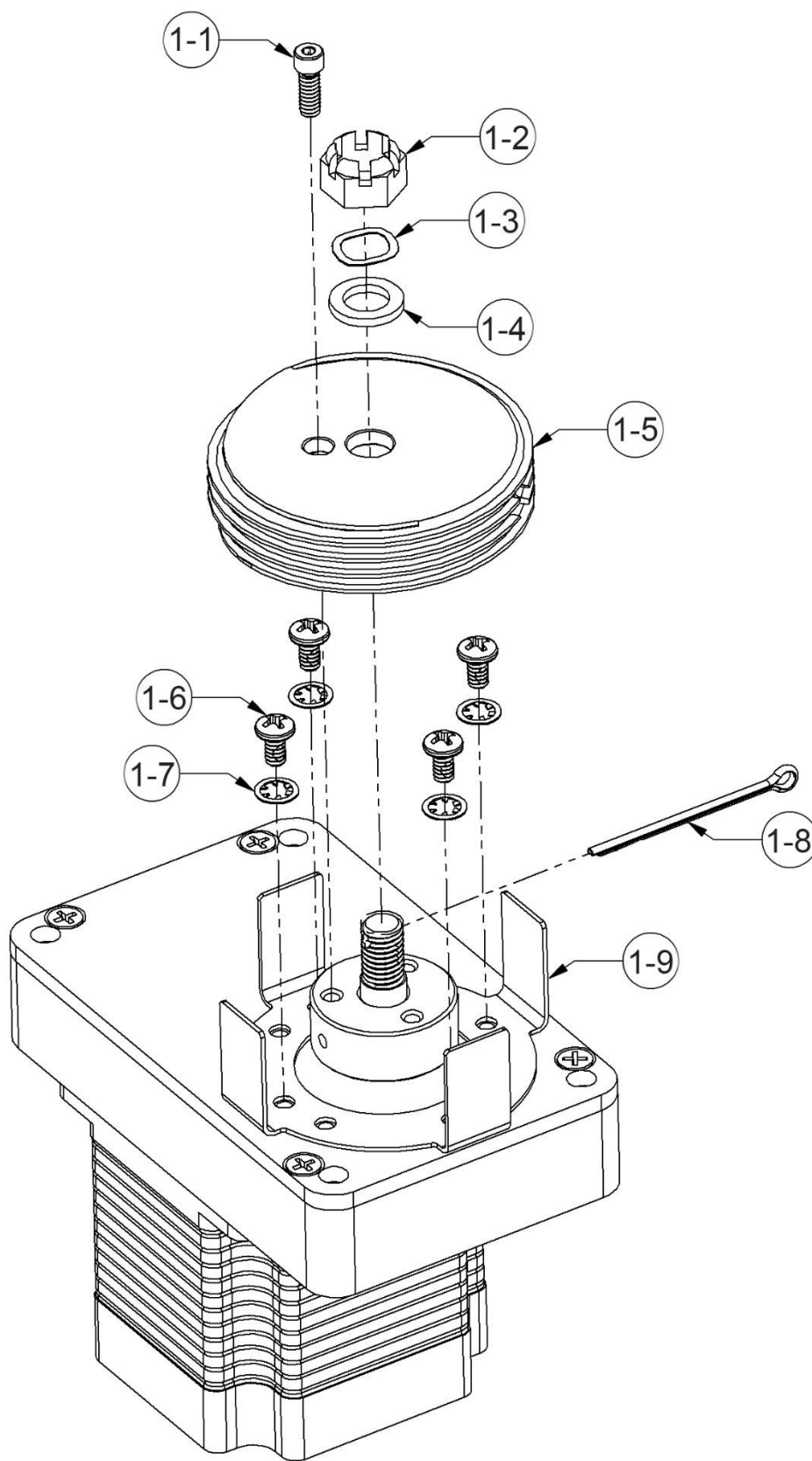


Figure 2: Roll Servo (SV42C), Exploded View

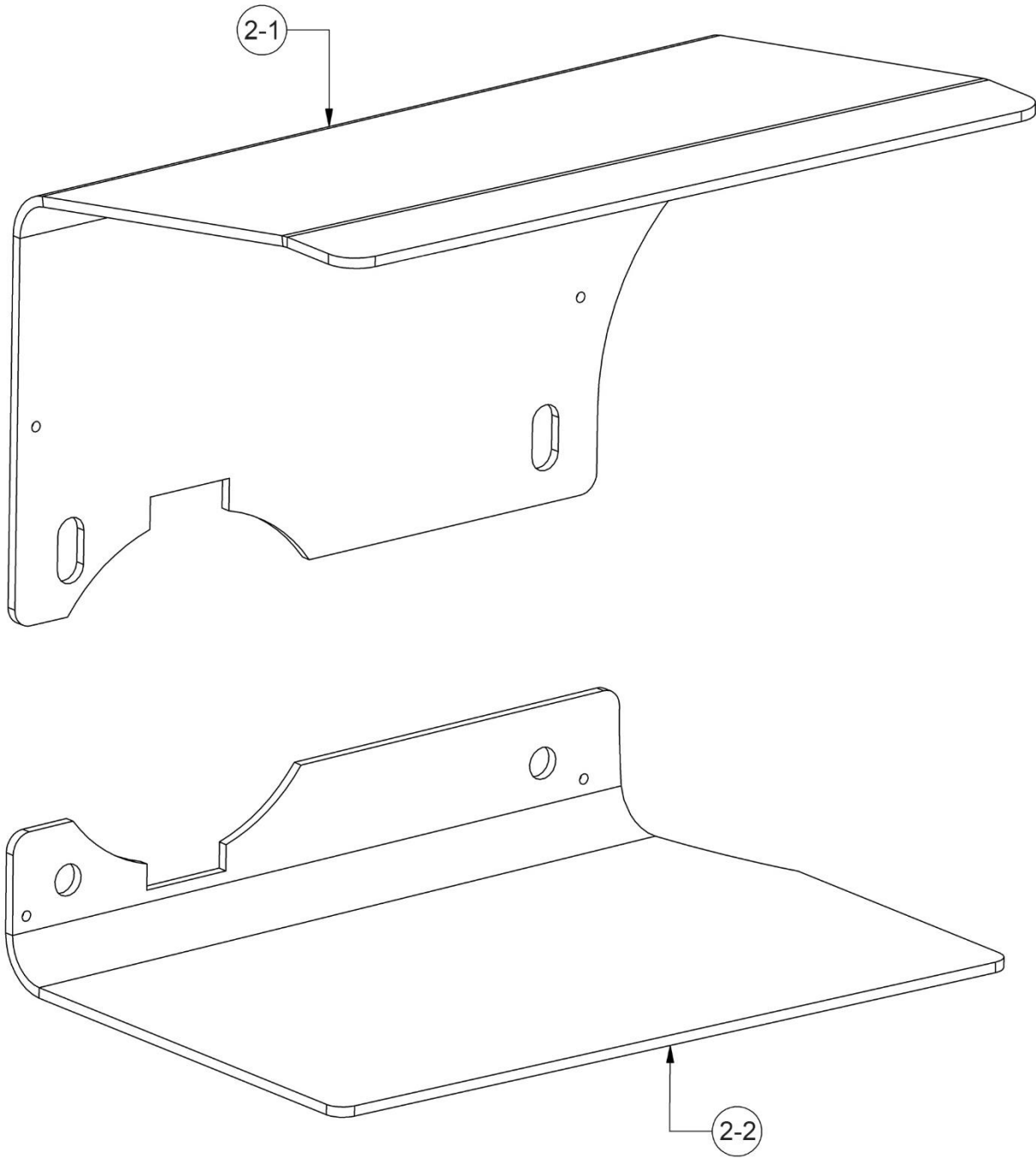


Figure 3: Roll Servo Bracketry

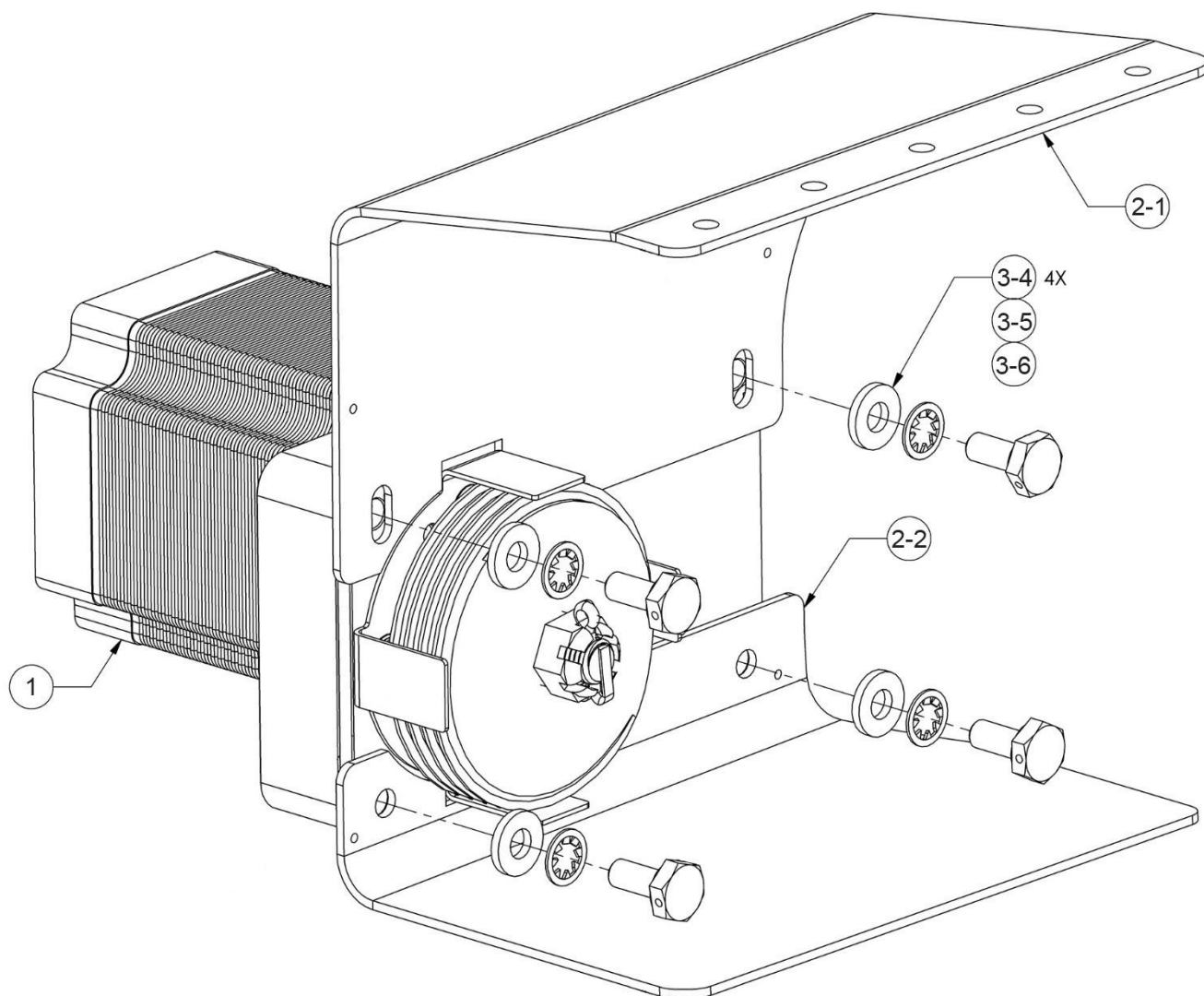


Figure 4: Roll Servo and Brackets Assembled

9.2 Roll Servo Installation

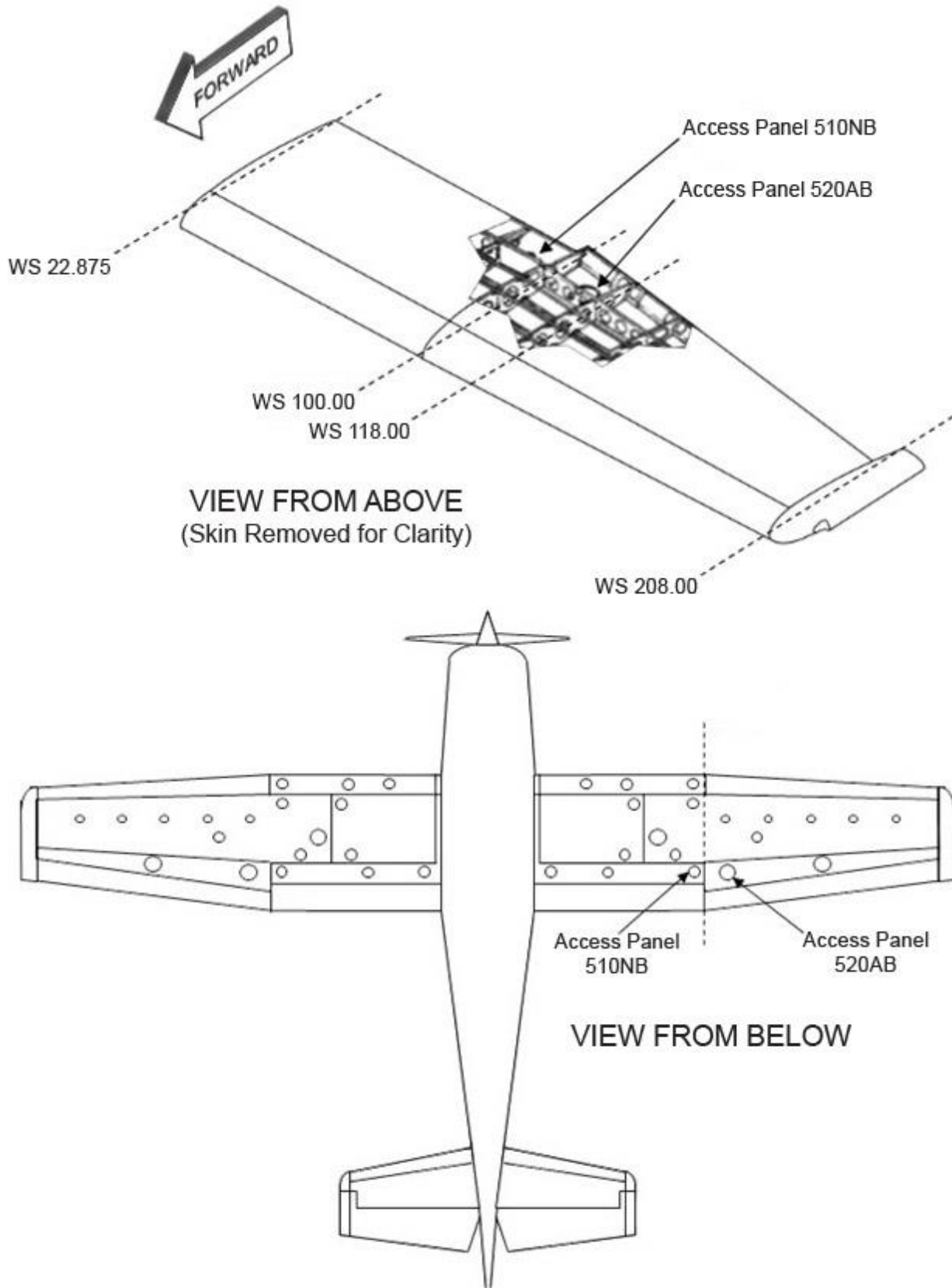


Figure 5: Roll Servo Installation Access

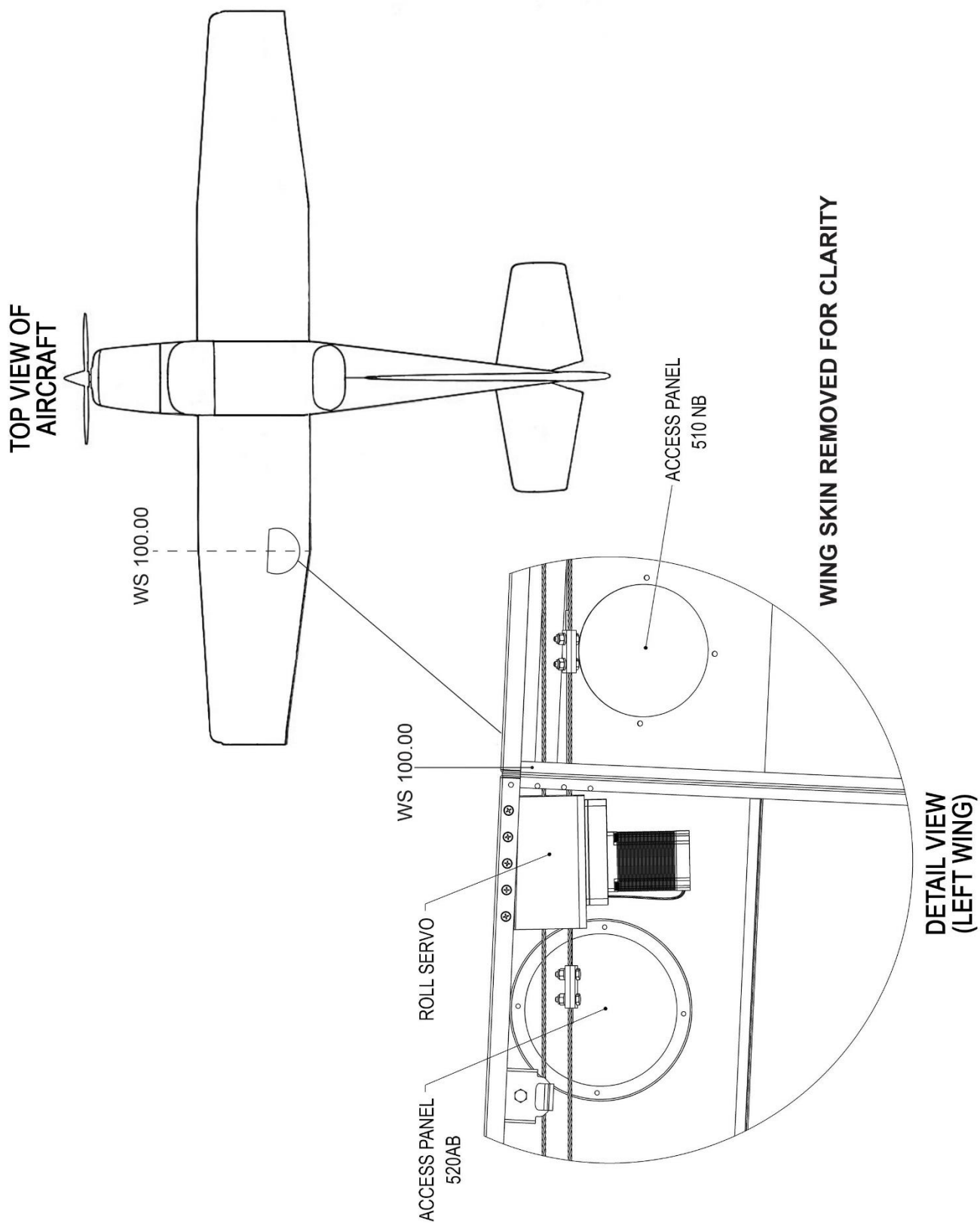


Figure 6: Location of Roll Servo/Bracket Assembly

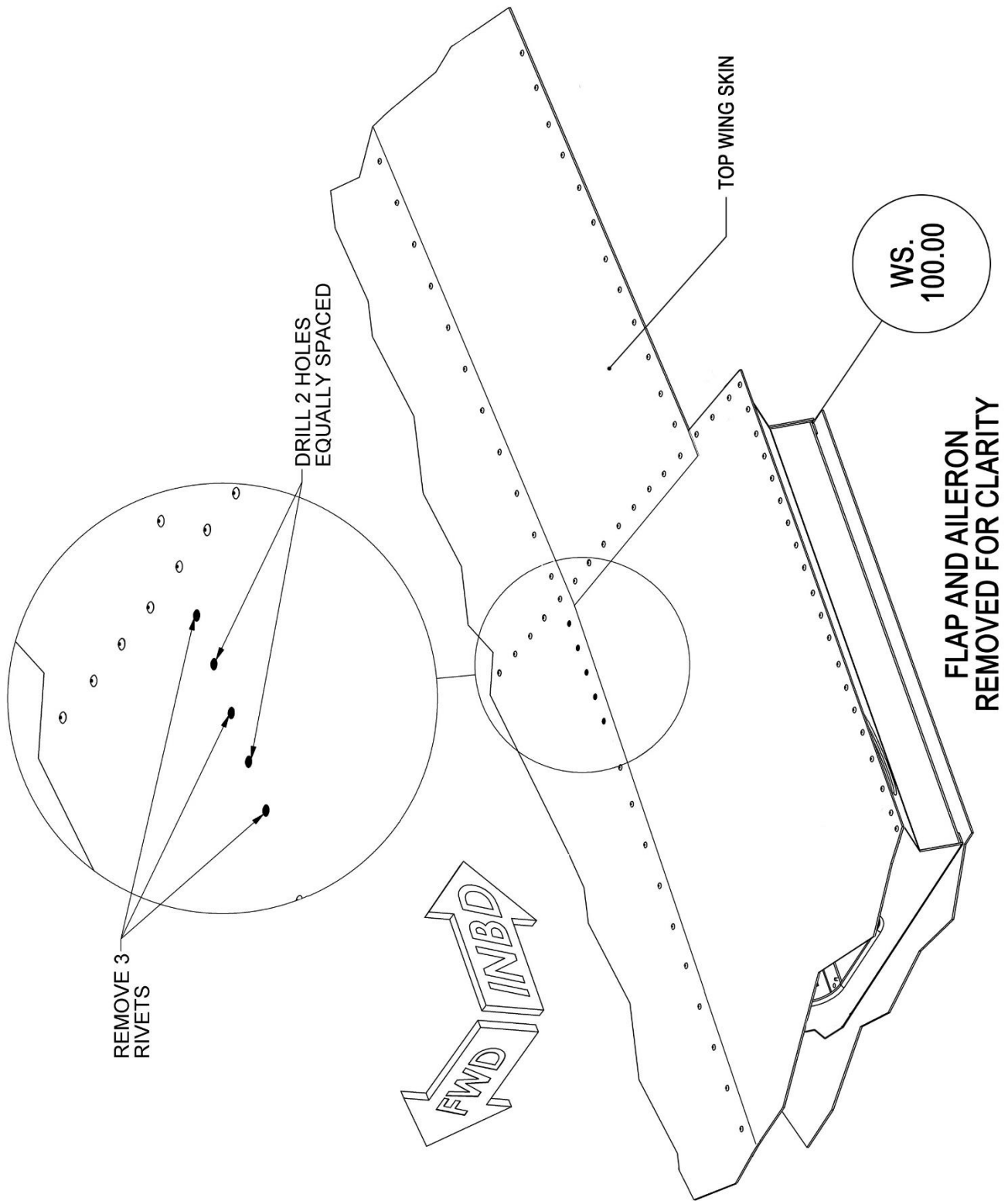


Figure 7: Roll Server Installation, Upper Wing Skin Preparation

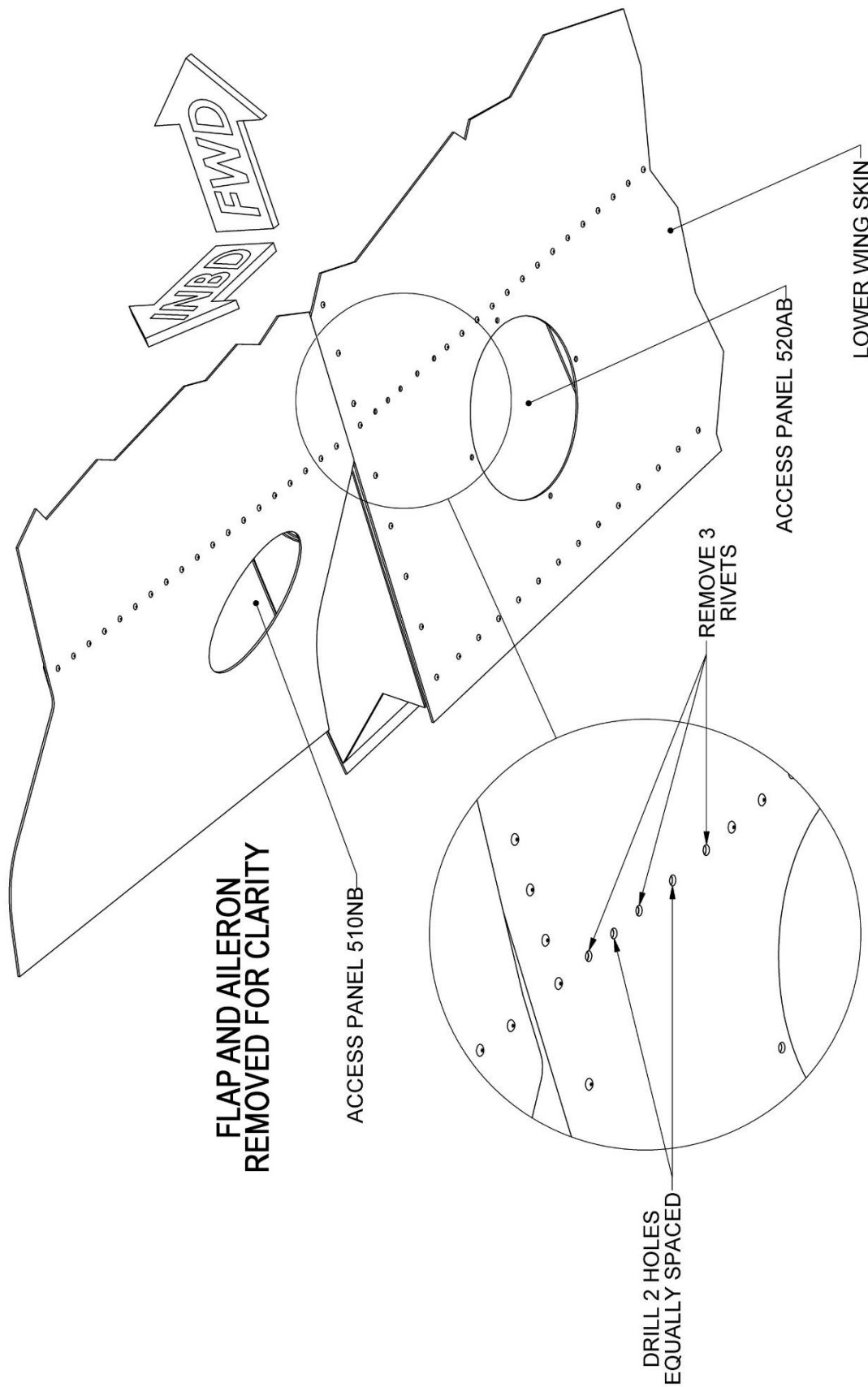


Figure 8: Roll Server Installation, Lower Wing Skin Preparation

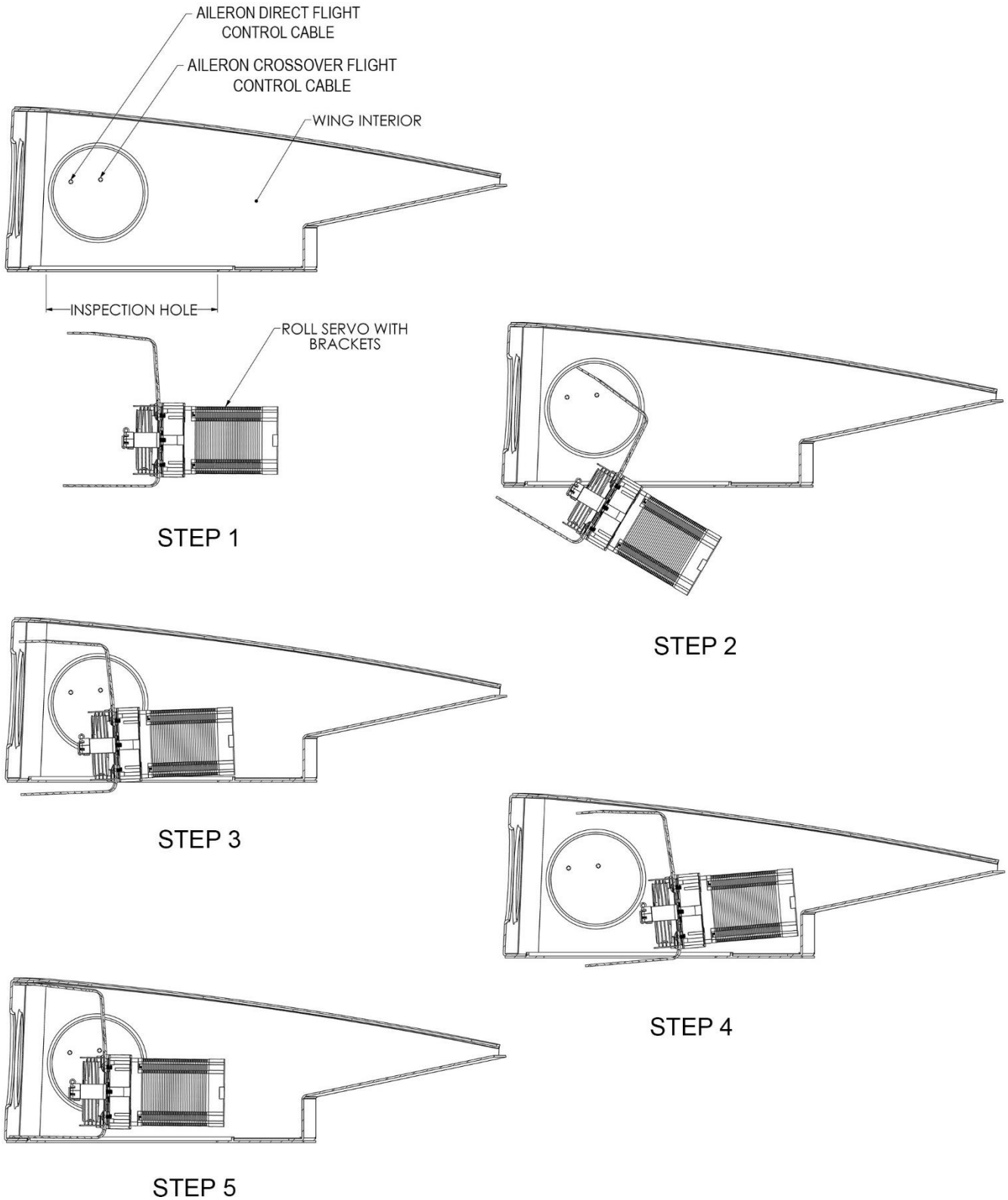
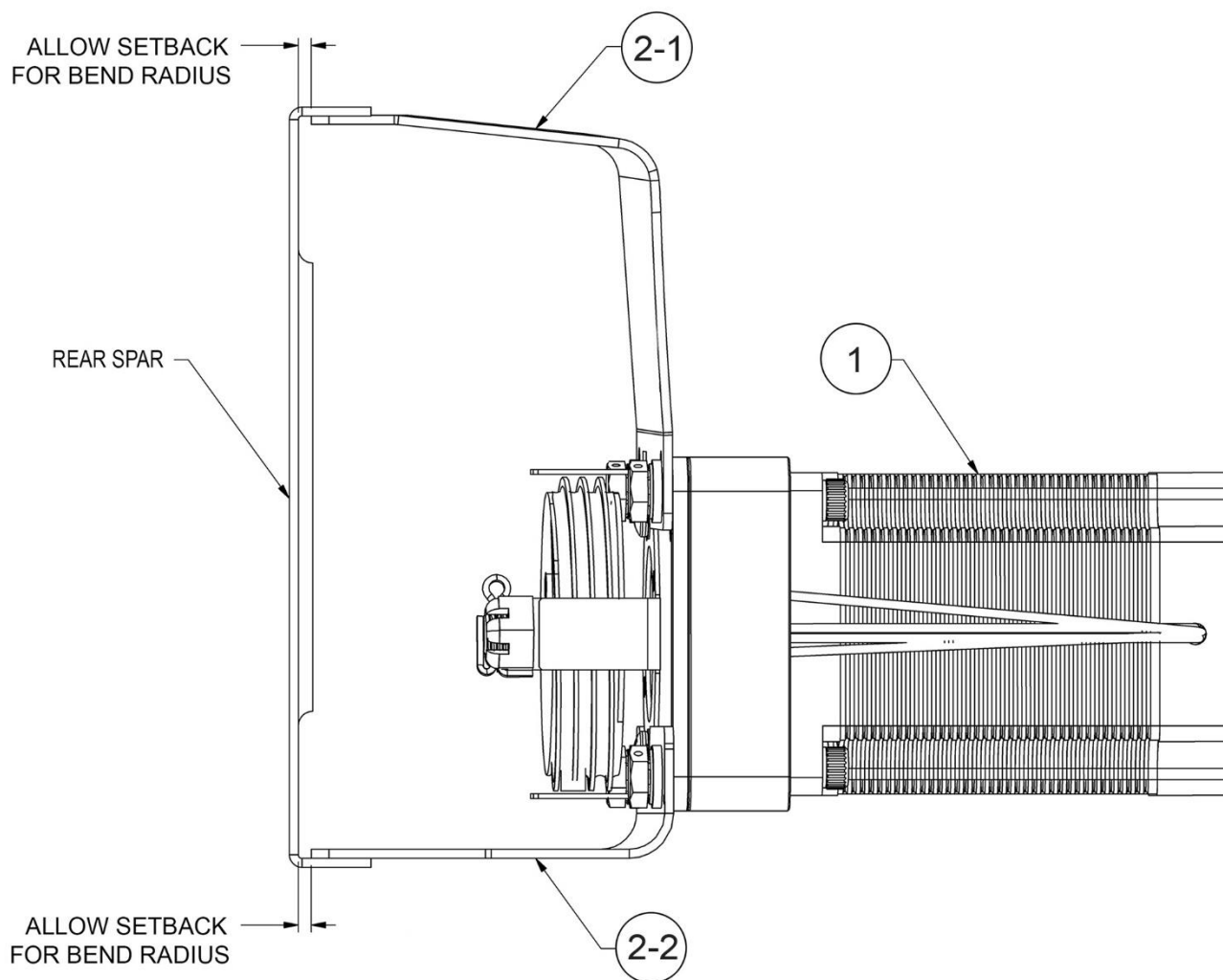


Figure 9: Roll Servo/Bracket Assembly Installation Steps



503107-000 and 503108-000 BRACKETS SHOWN

Figure 10: Roll Servo/Bracket Assembly Installation, Left View

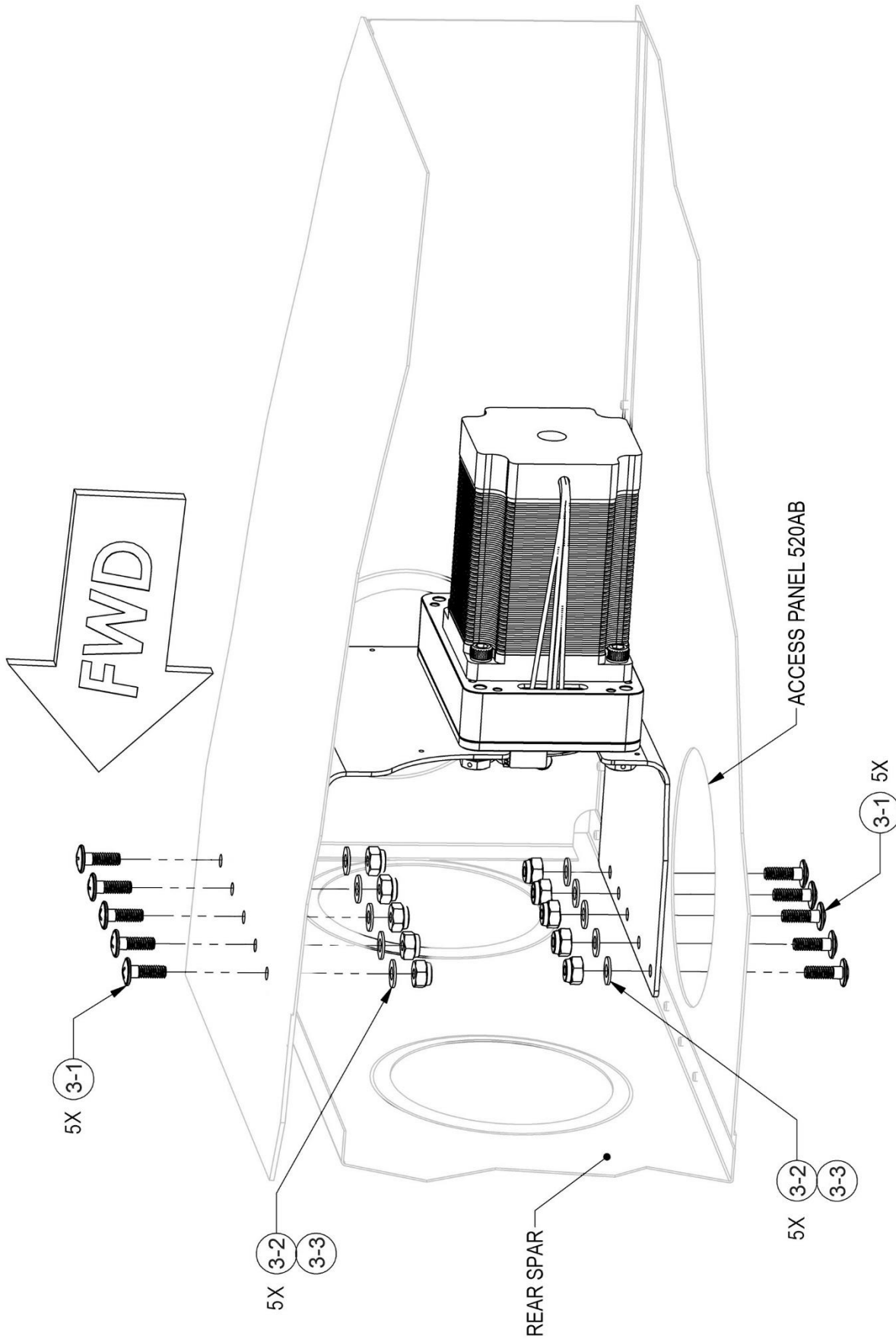


Figure 11: Roll Servo/Bracket Assembly Final Installation

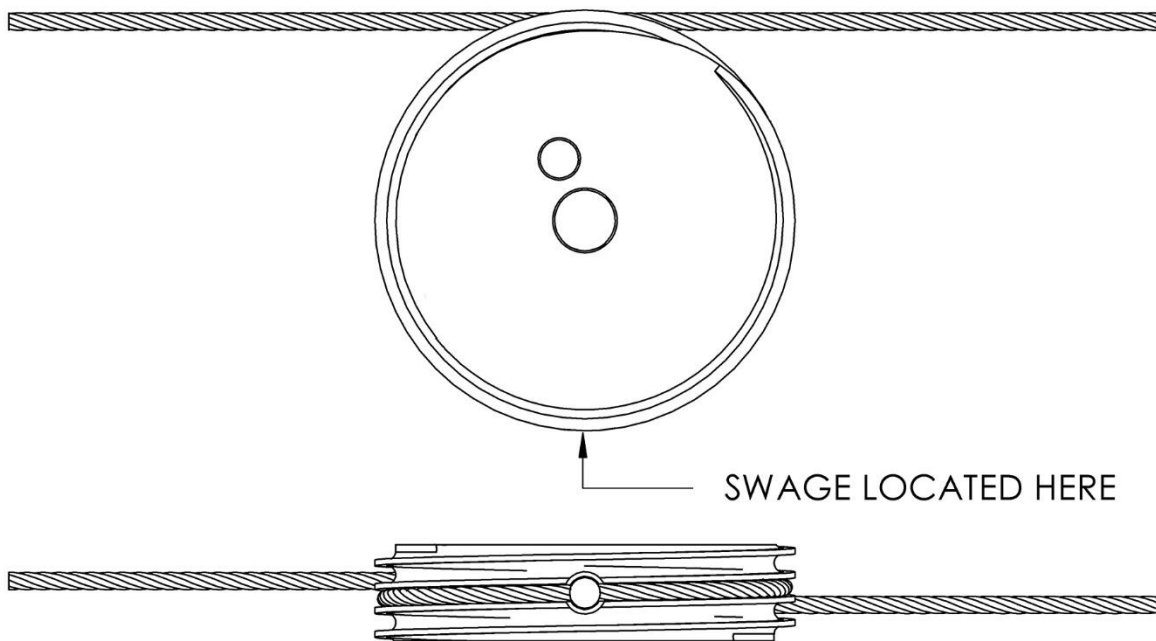


Figure 12: Roll Servo Capstan and Bridle Cable Orientation

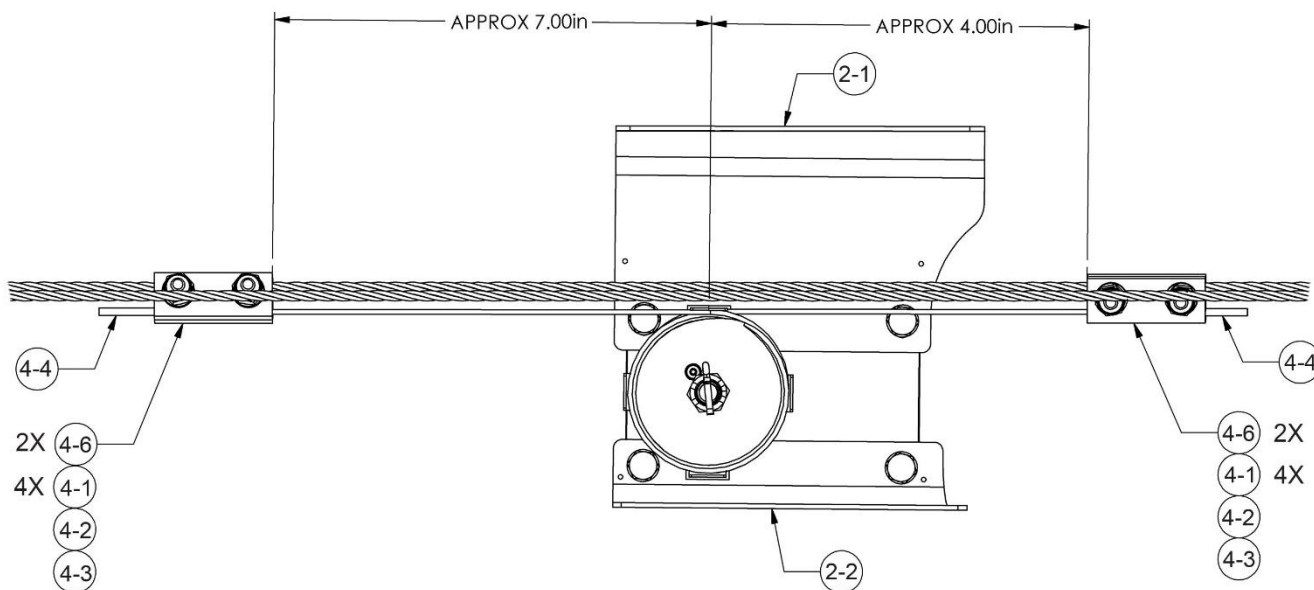


Figure 13: Locations of Roll Servo Bridal Cable Clamps

9.3 Pitch Servo Parts and Assemblies

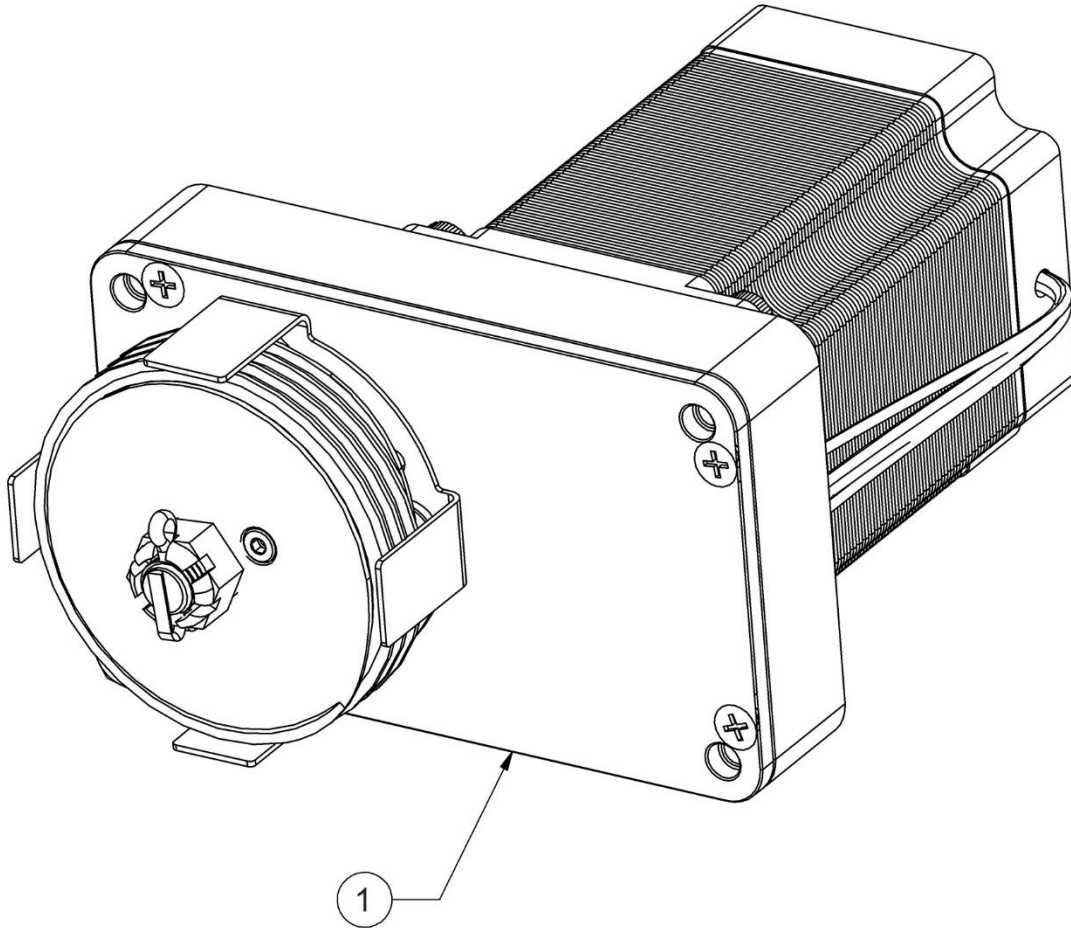


Figure 14: Pitch Servo (SV42C)

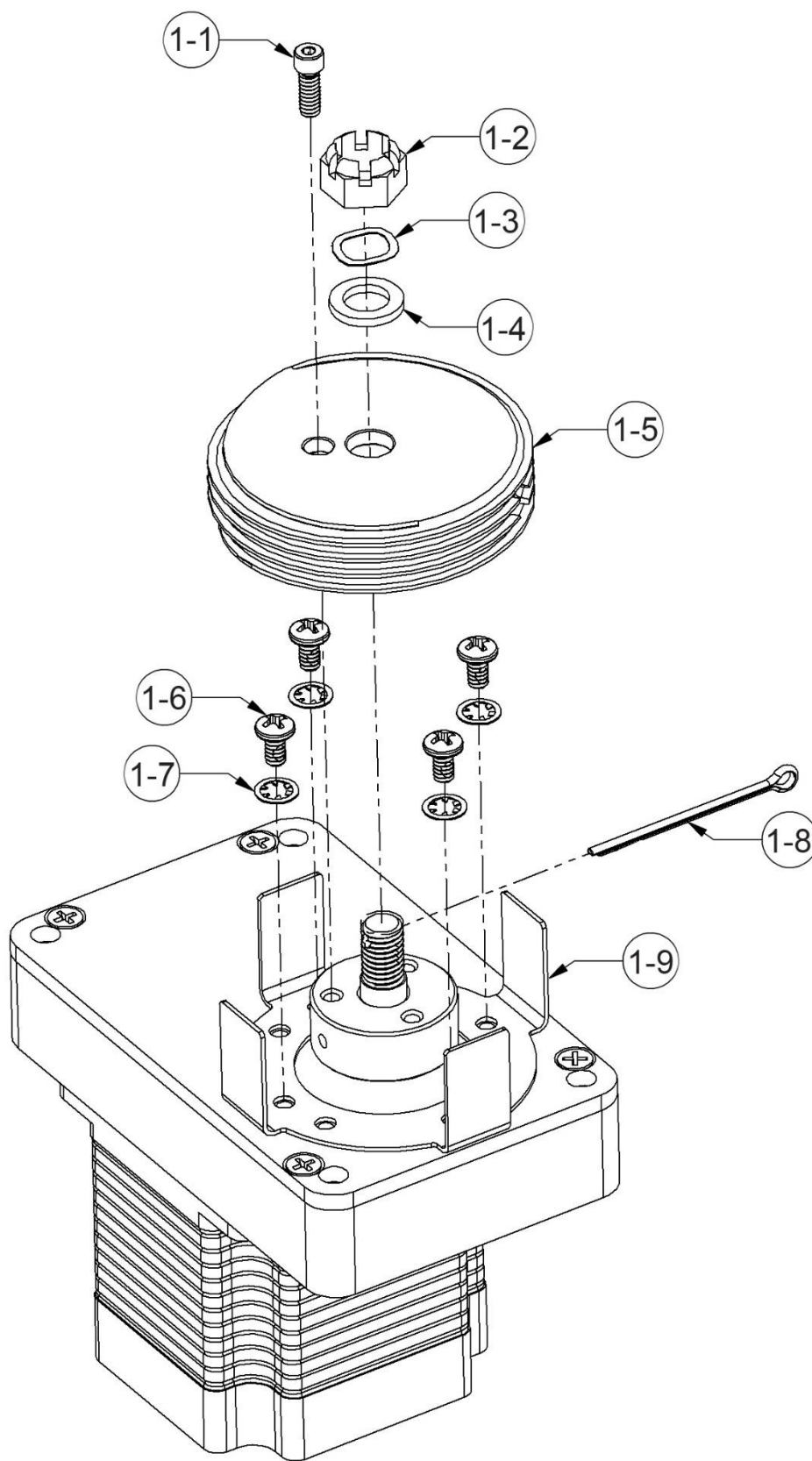


Figure 15: Pitch Servo (SV42C), Exploded View

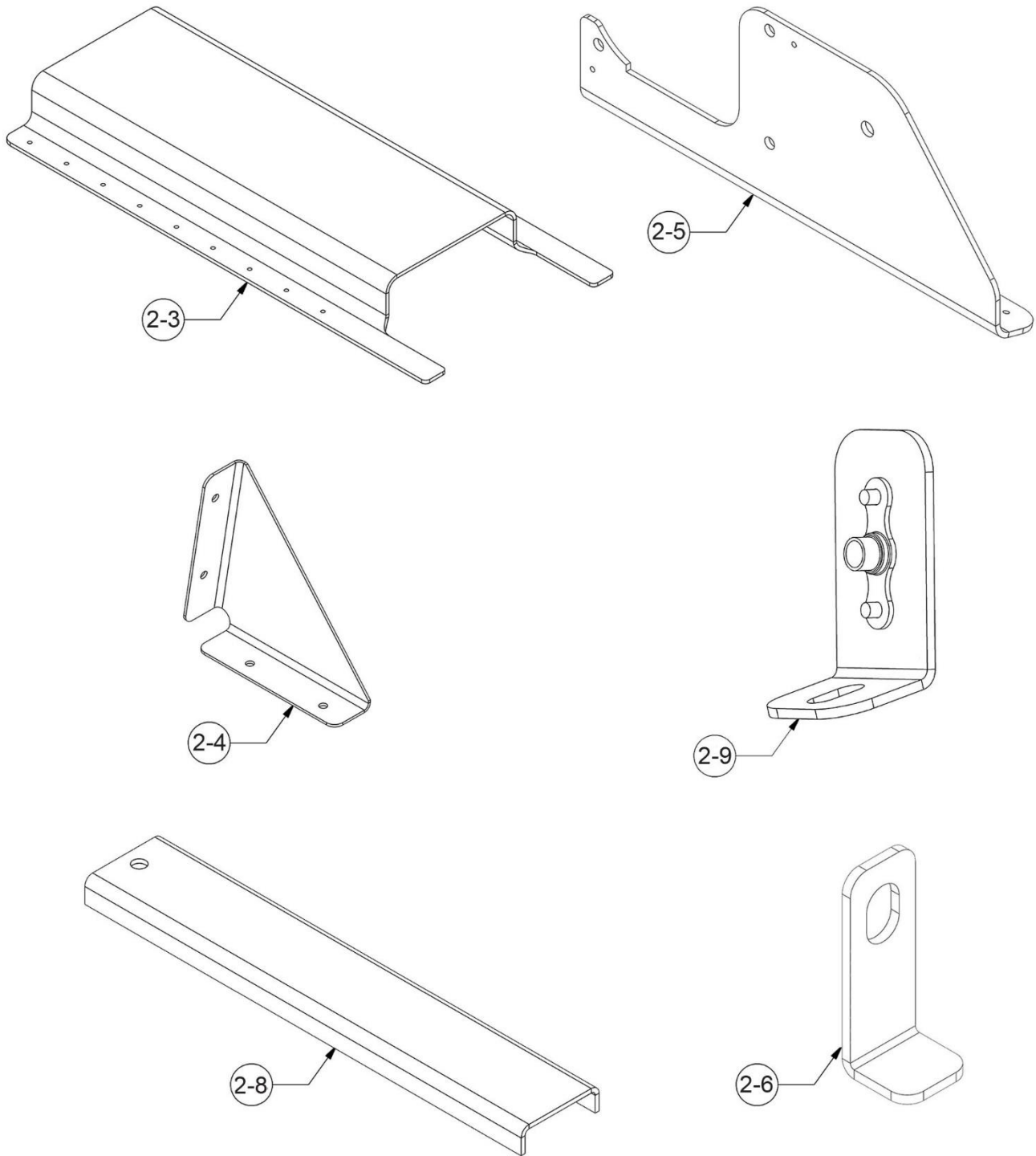


Figure 16: Pitch Servo Bracketry

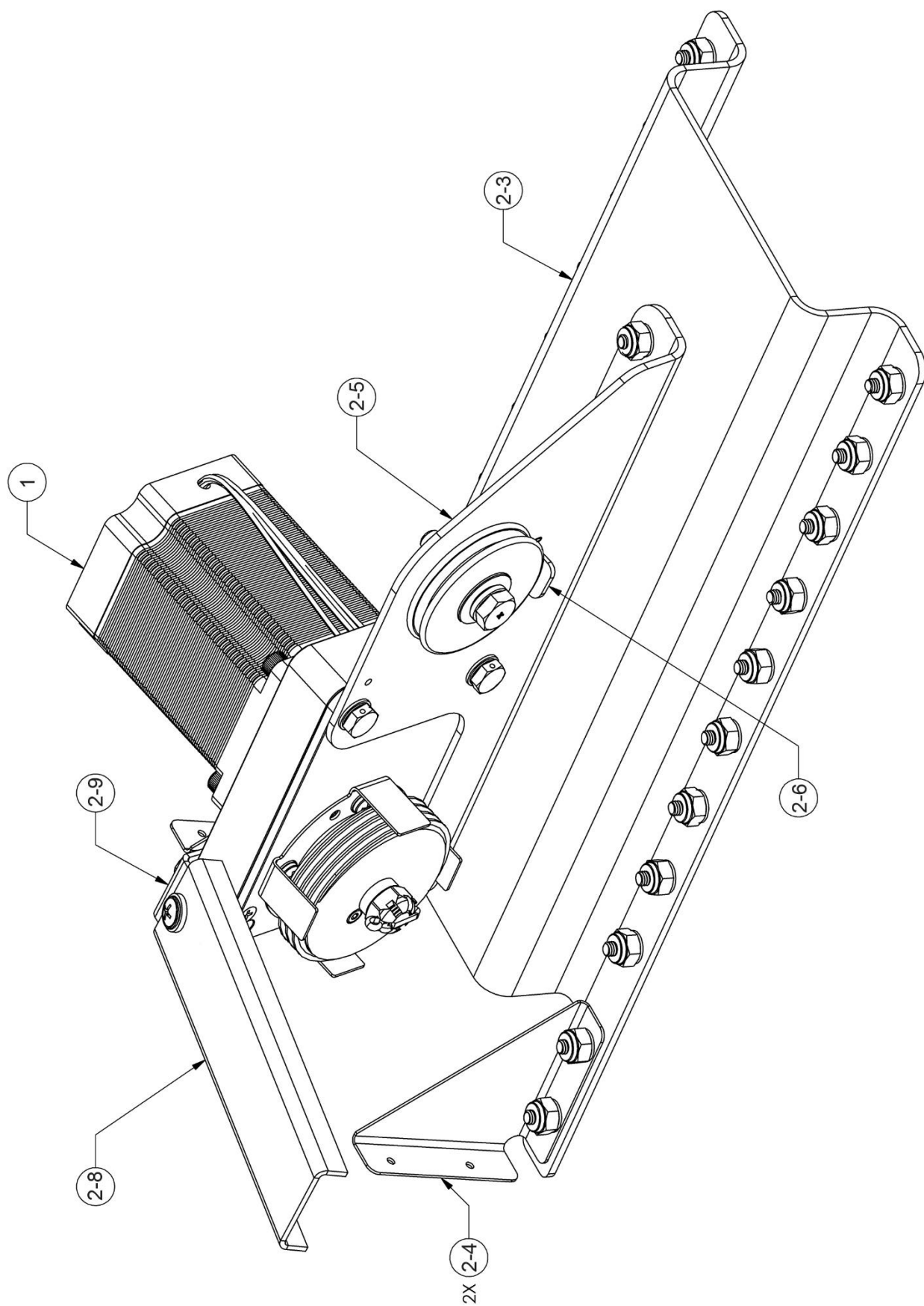


Figure 17: Pitch Servo and Bracketry Assembled

9.4 Pitch Servo Installation

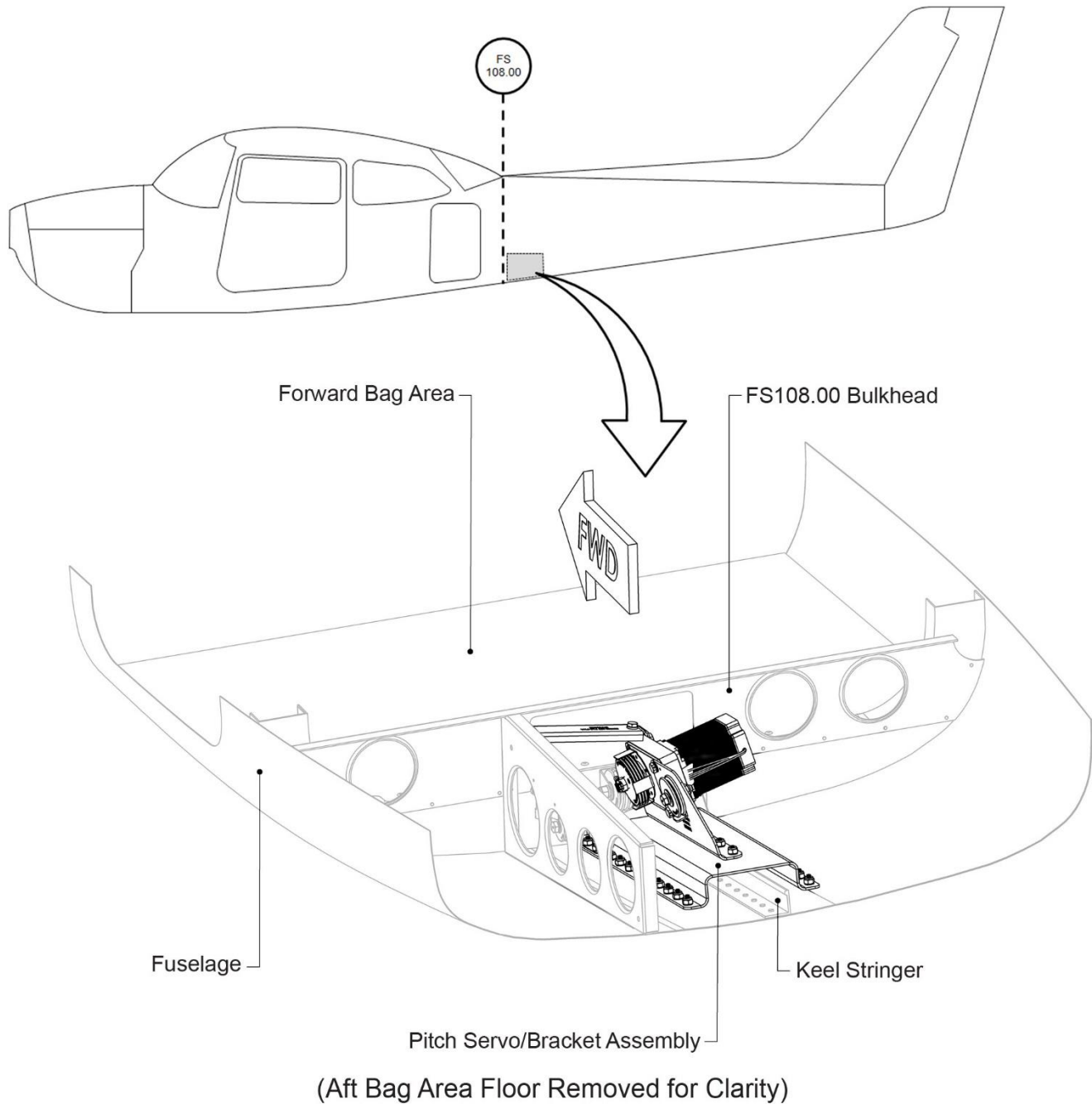


Figure 18: Location of Pitch Servo/Bracket Assembly

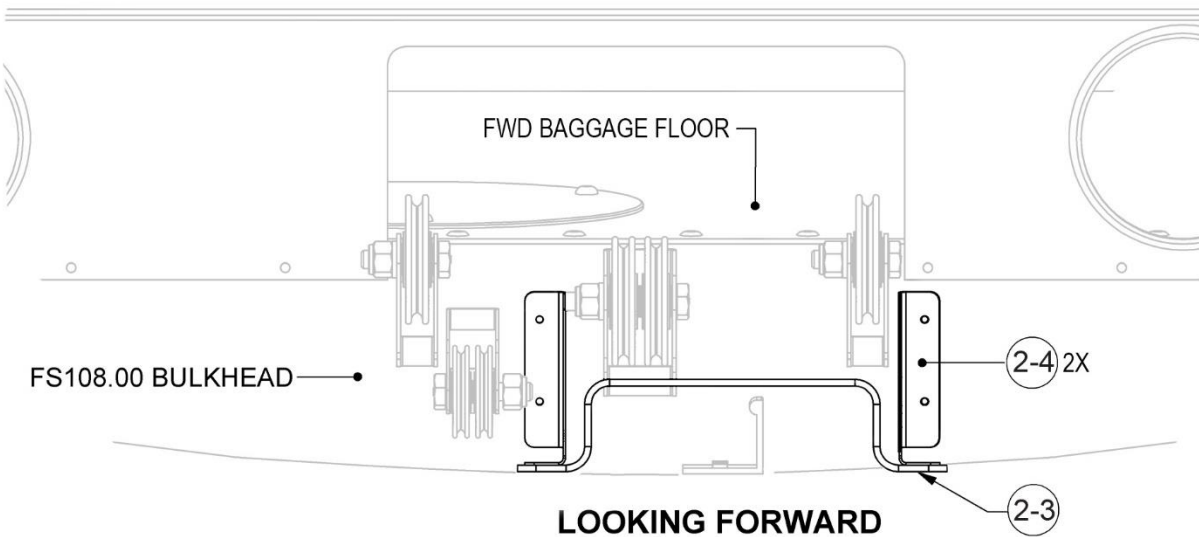
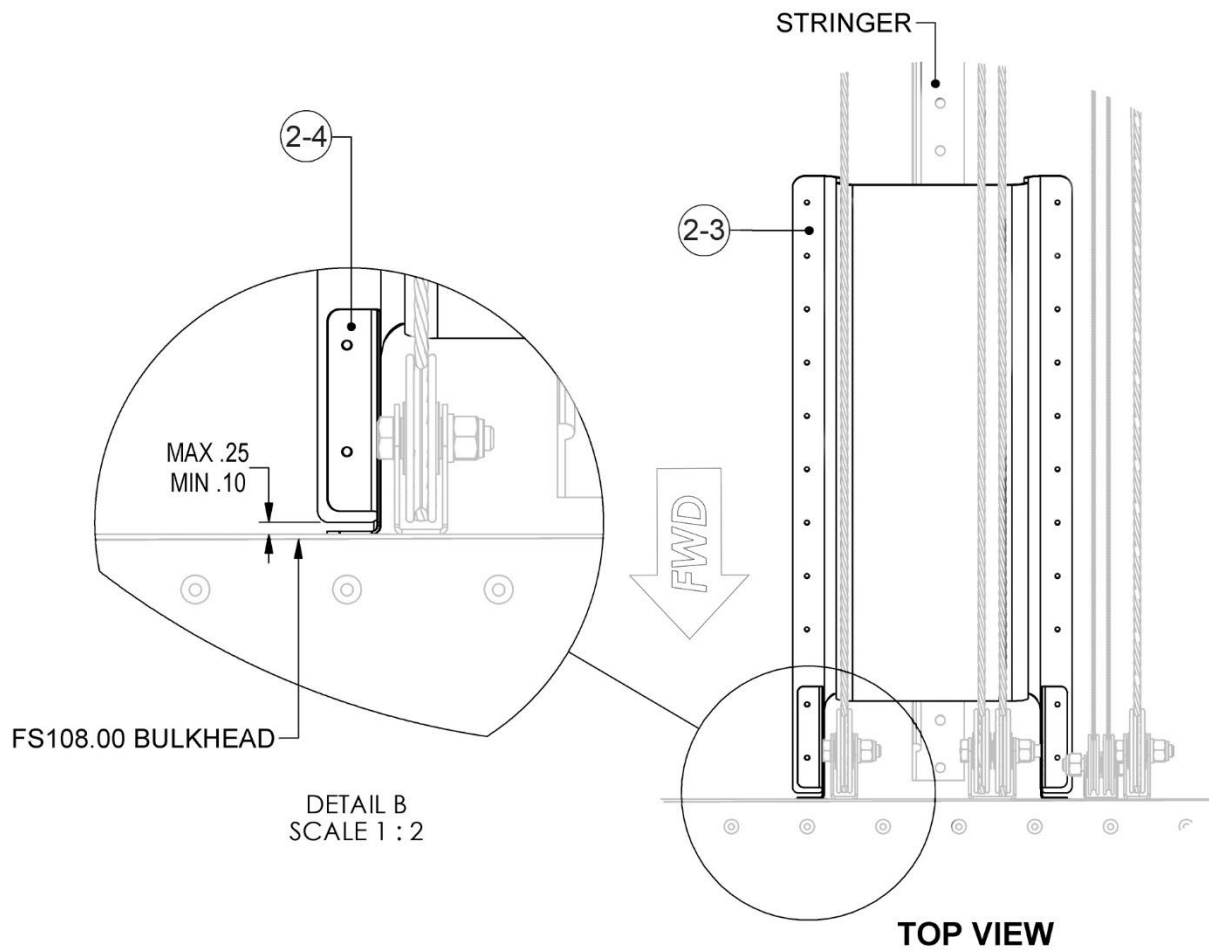


Figure 19 Location of Pitch Servo Base Bracket and Angle Braces

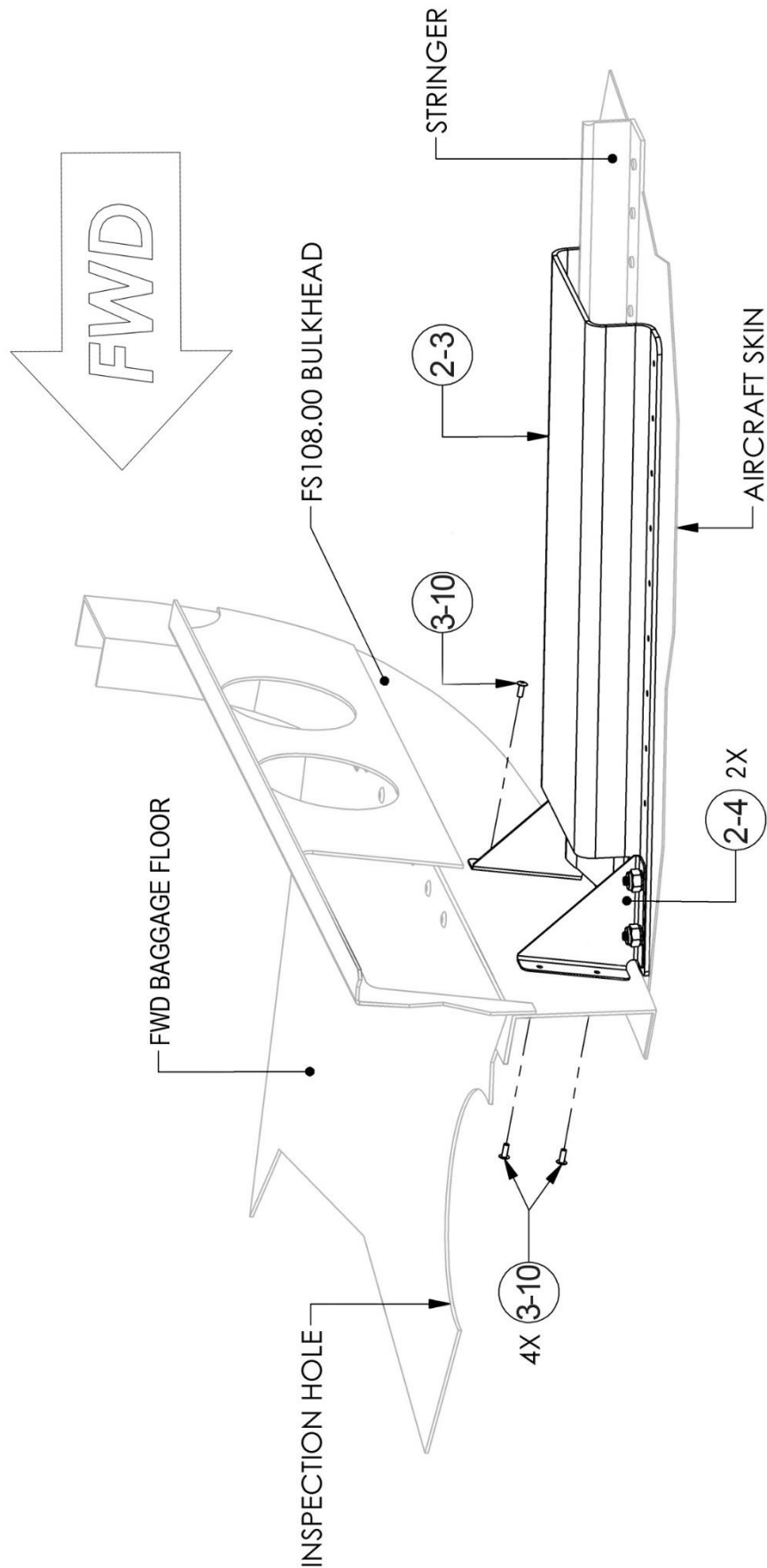


Figure 20: Pitch Servo Angle Brace Installation

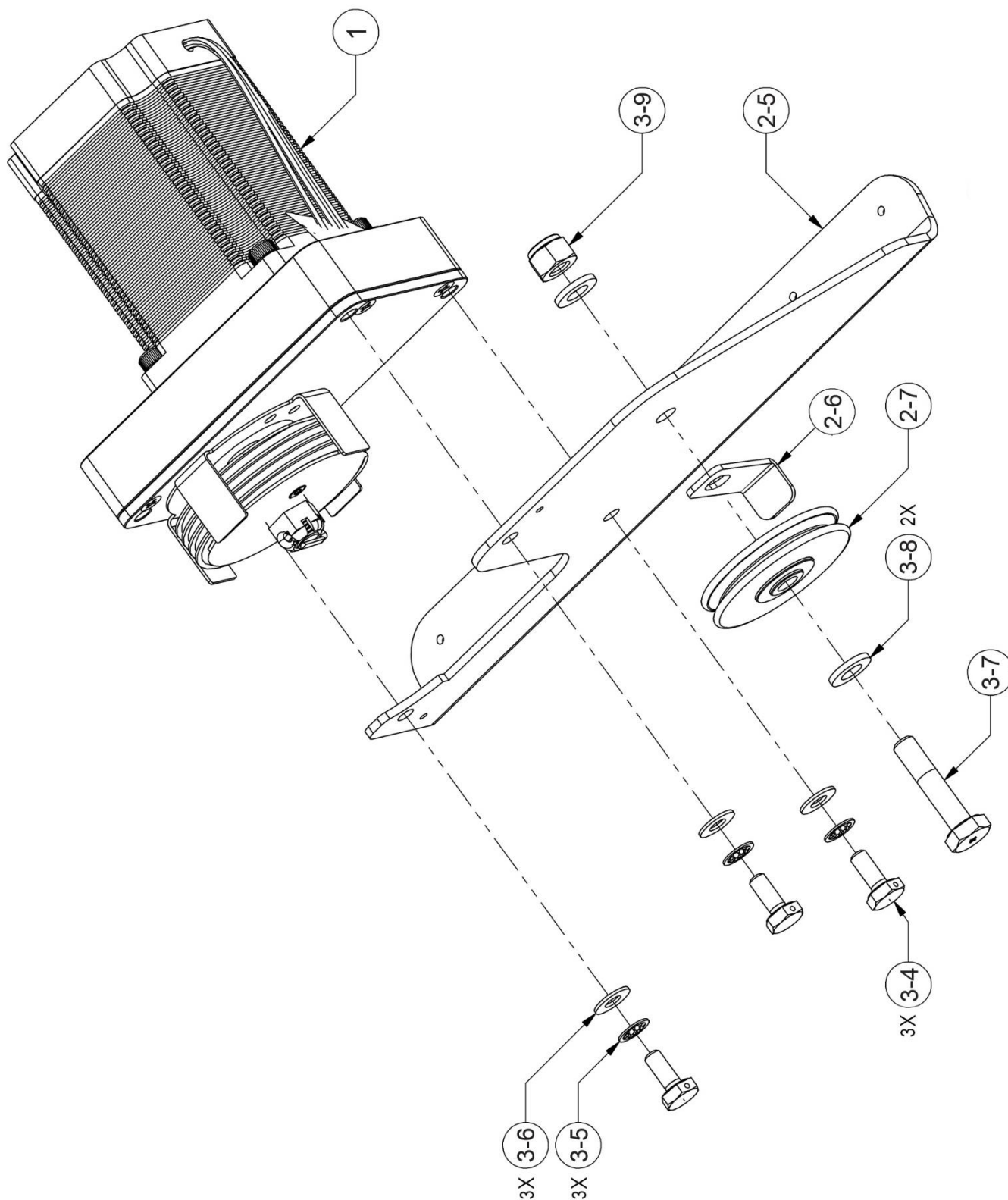


Figure 21: Pitch Servo Vertical Bracket Assembly

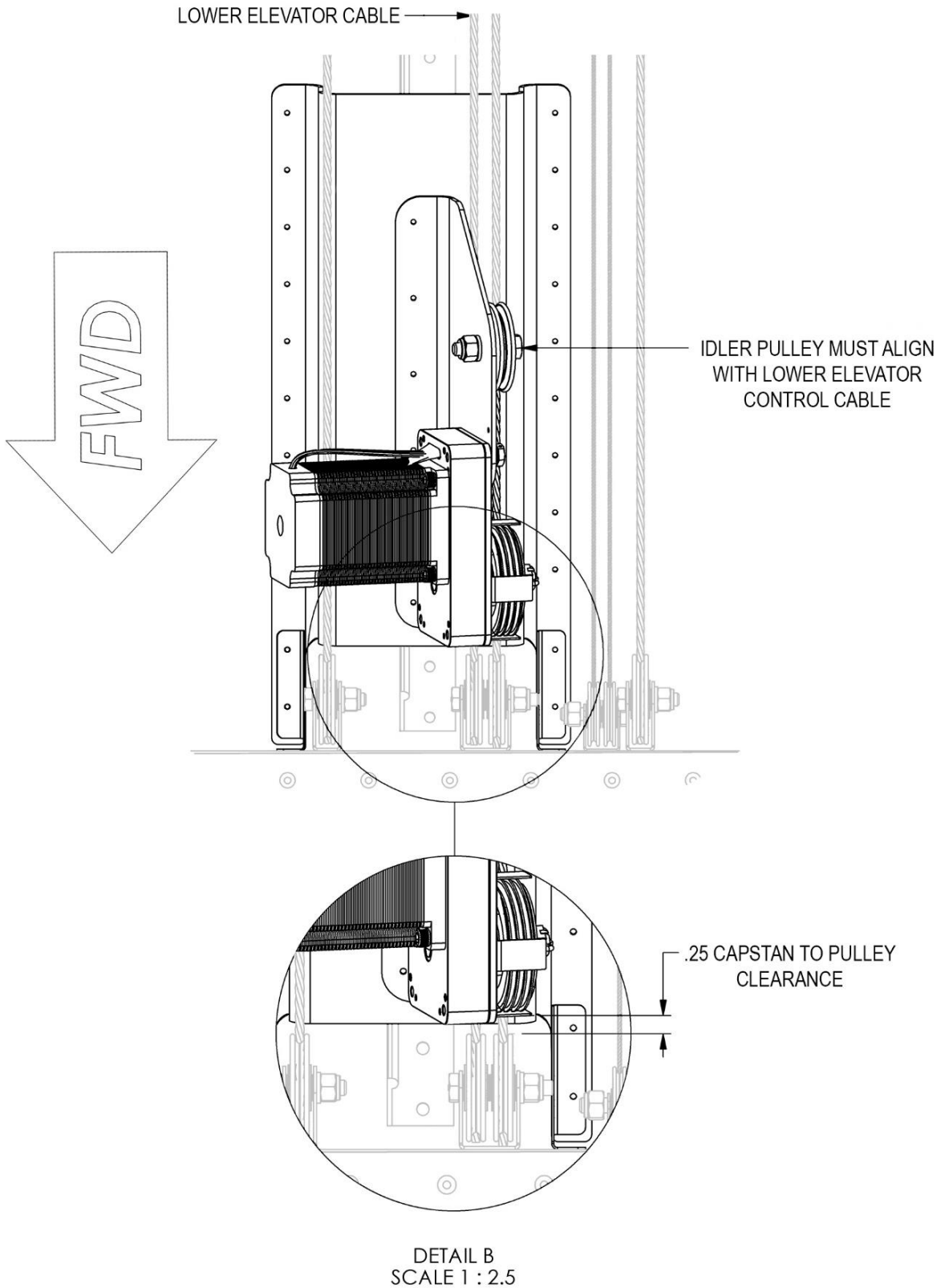


Figure 22: Location of Pitch Servo Vertical Bracket Assembly

LOOKING FORWARD

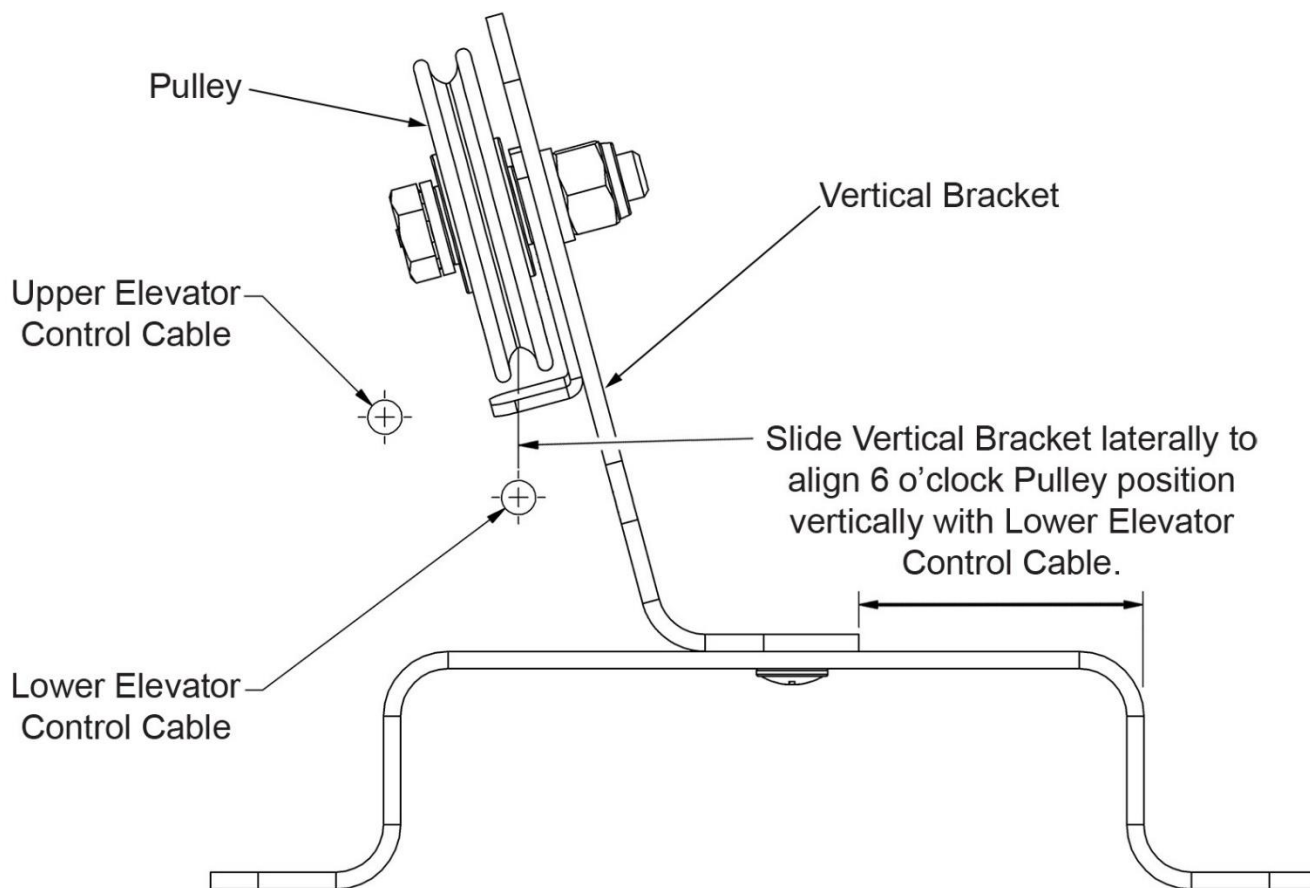


Figure 23: Pitch Servo Vertical Bracket Assembly Alignment

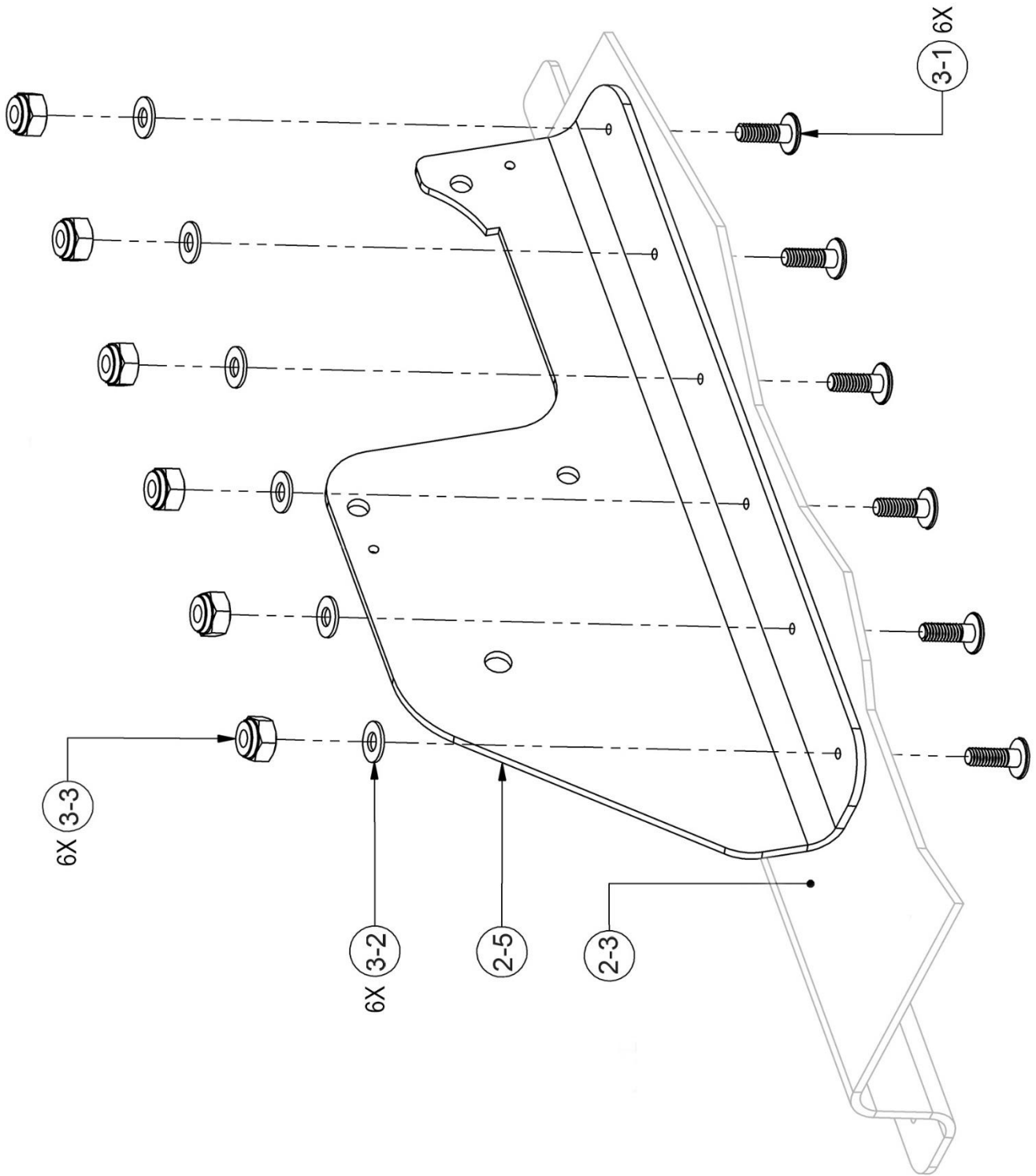


Figure 24: Pitch Servo Vertical Bracket Attachment

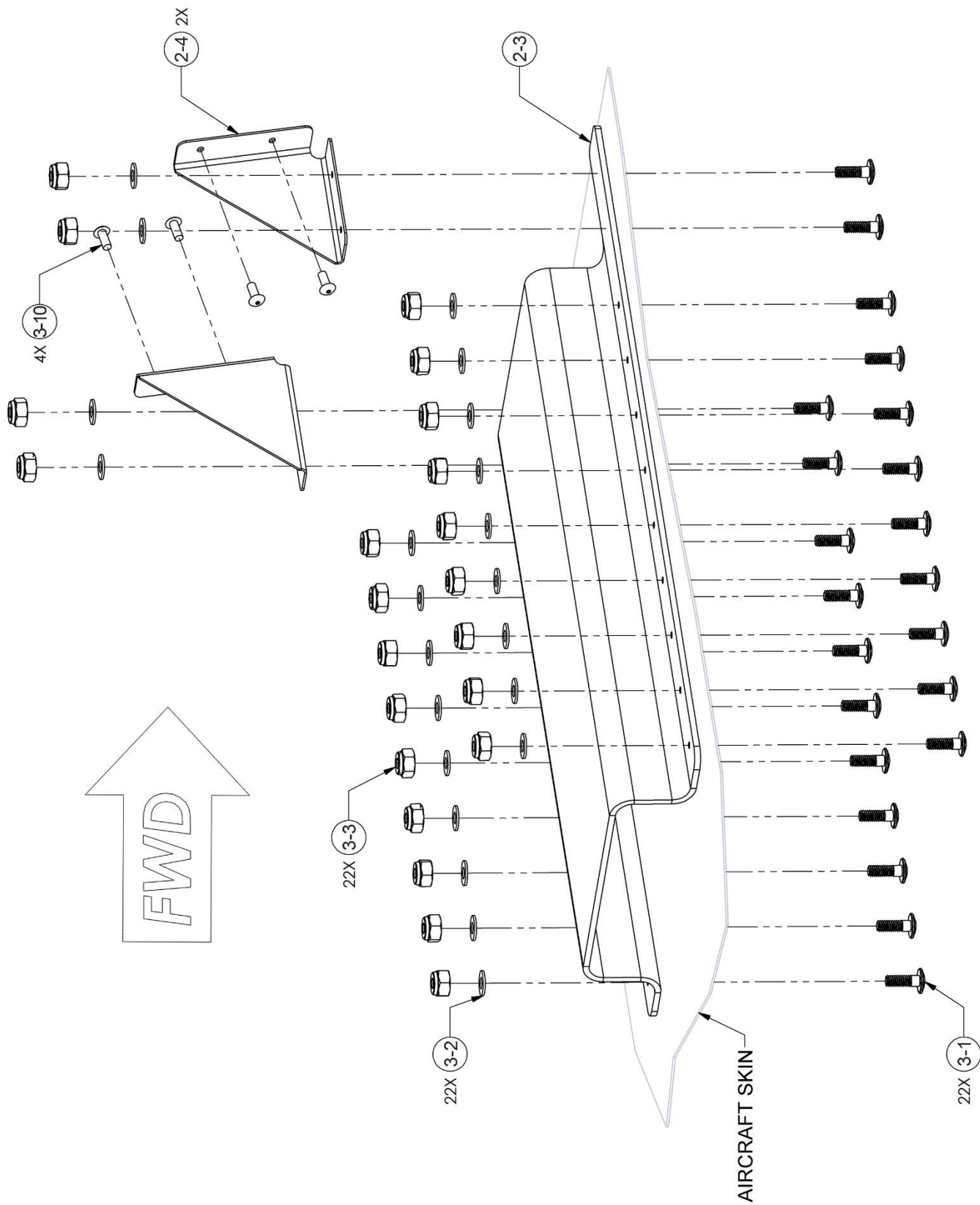


Figure 25: Pitch Servo Base Bracket Final Installation

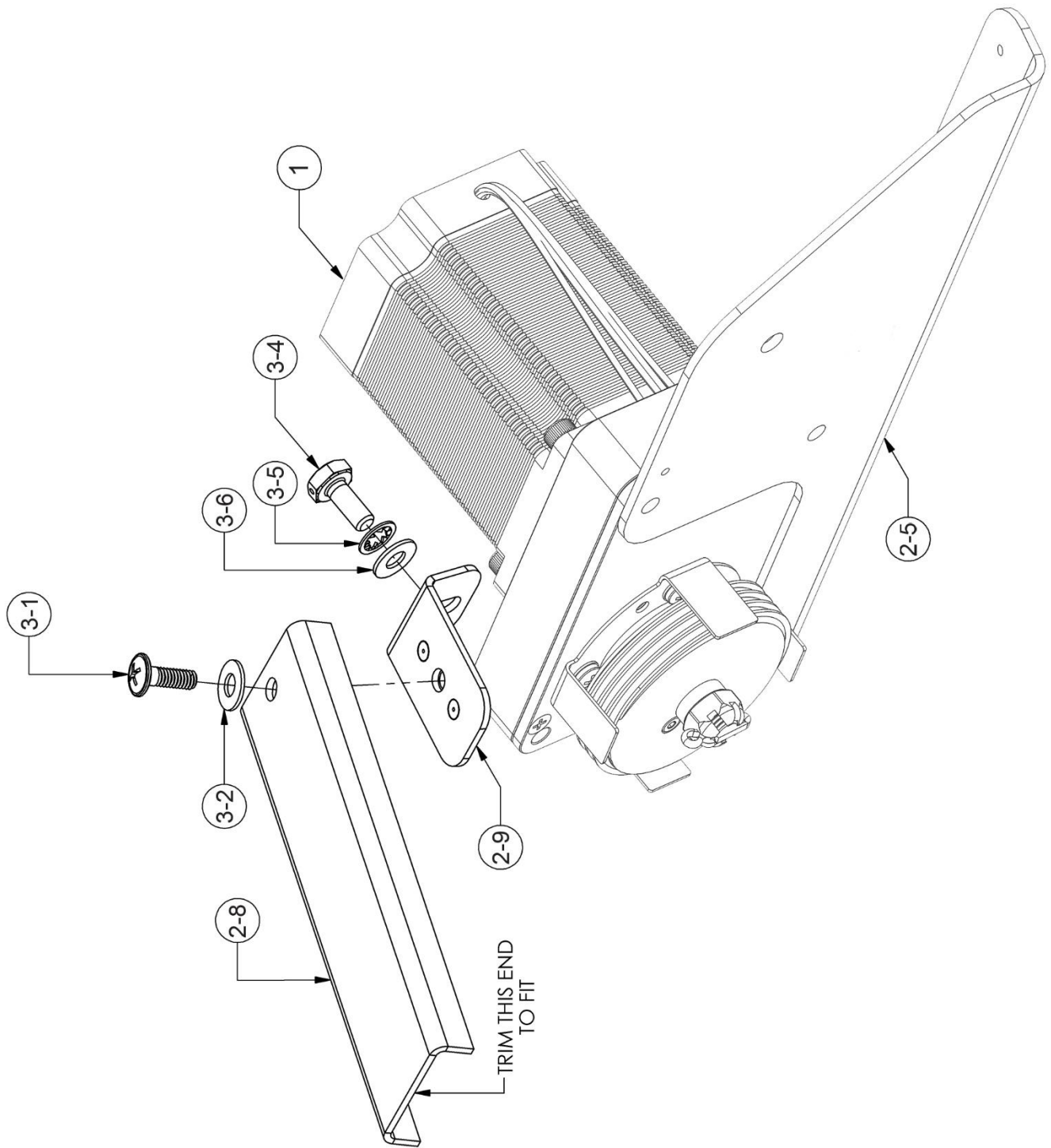


Figure 26: Pitch Servo Sway Brace Components

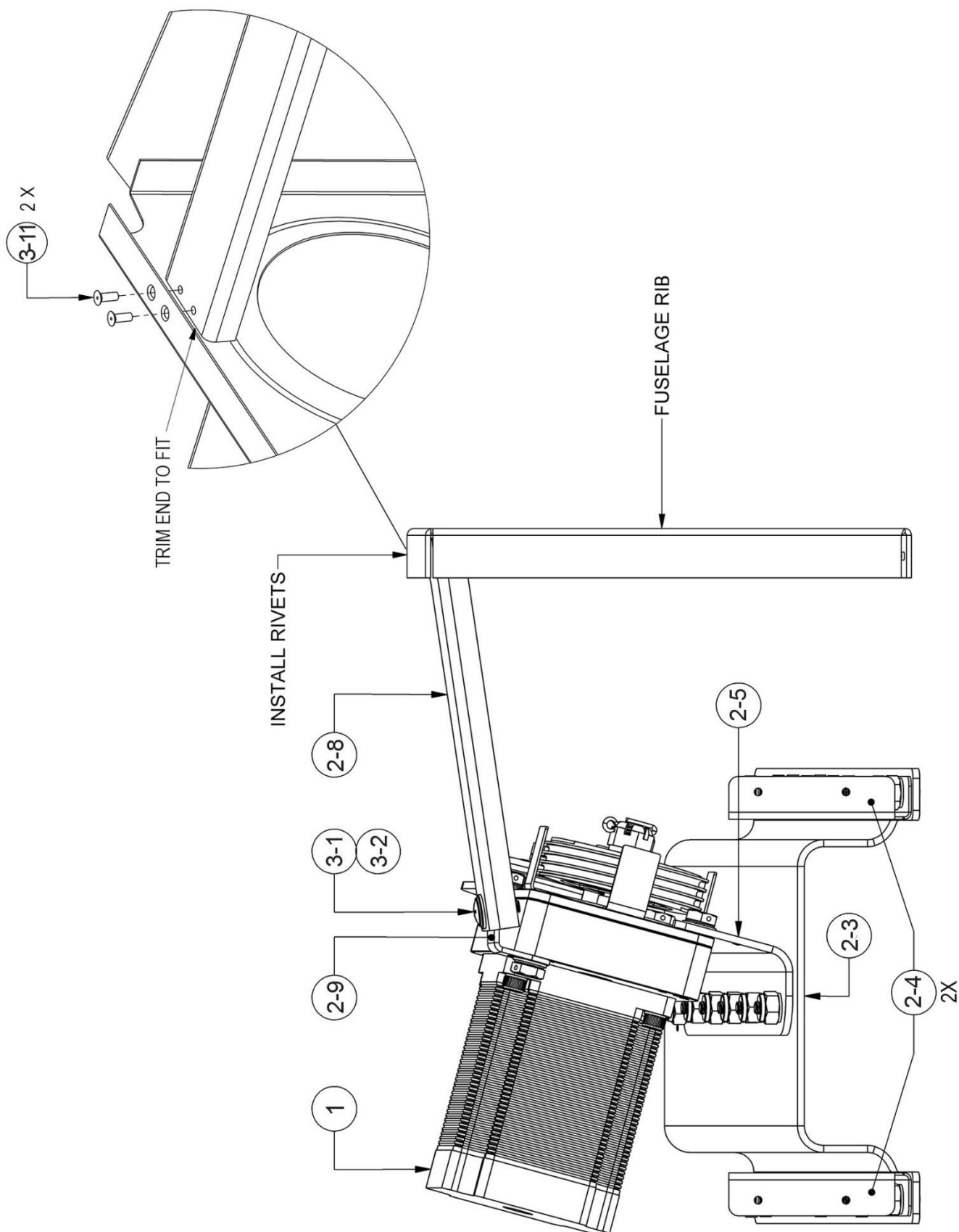


Figure 27: Pitch Servo Sway Brace Installation

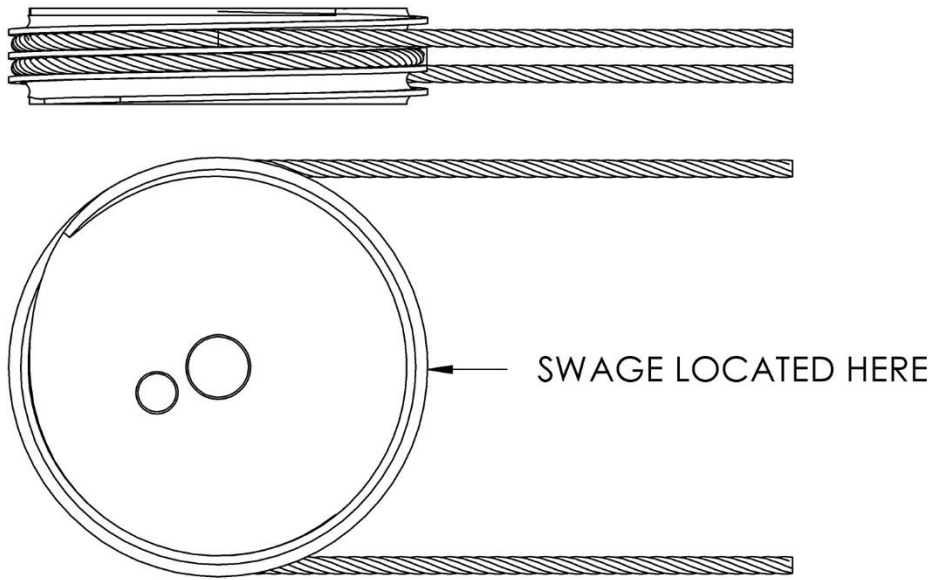


Figure 28: Pitch Servo Capstan and Bridle Cable Orientation

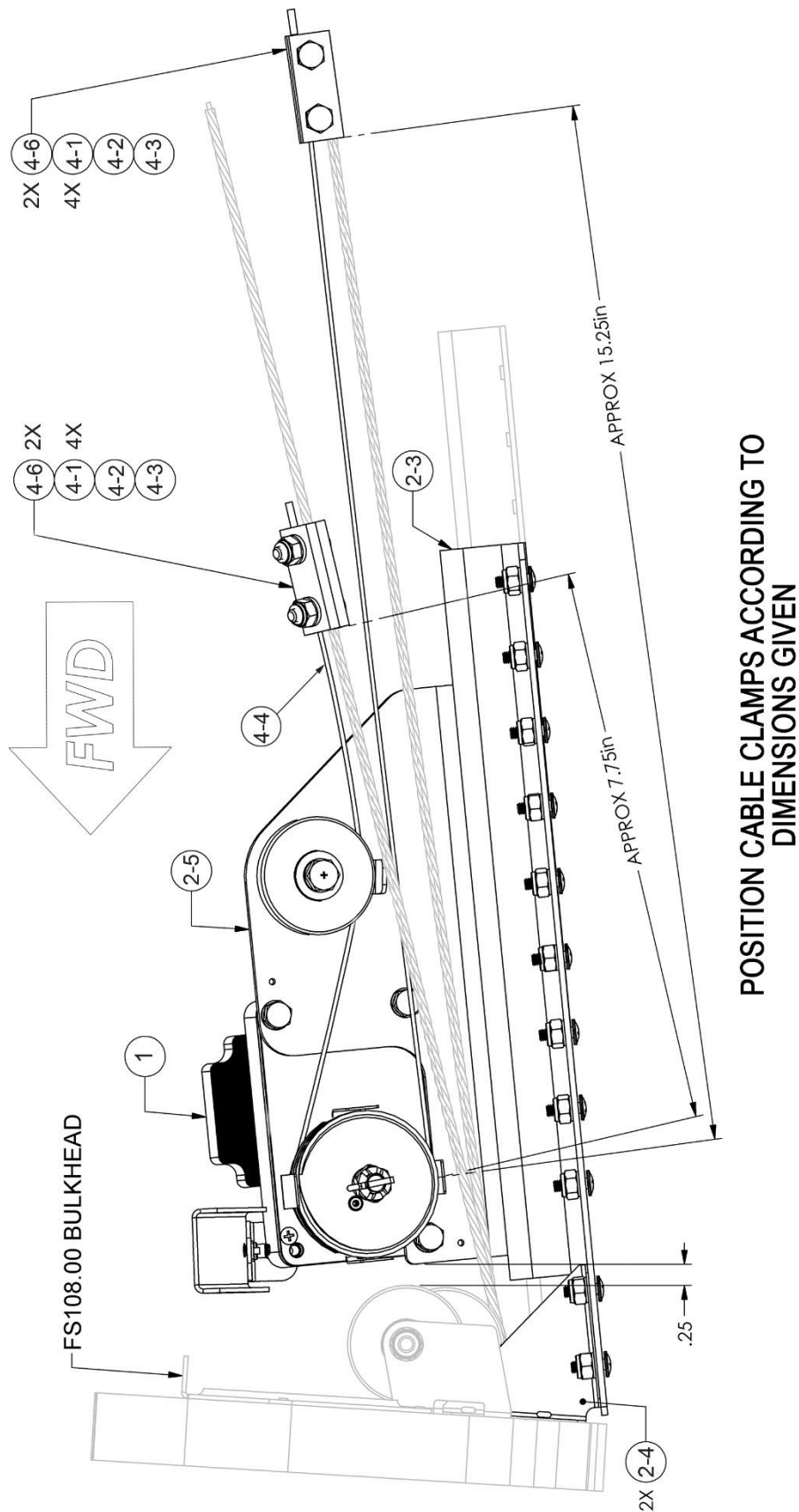


Figure 29: Pitch Servo Bridal Cable Clamp Locations