



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
B	2/15/2019 ECO 317851	N/A – Cosmetic Change Only	Improved organization and illustrations.
C	10/25/2019 ECO 337637	Accepted as Minor Change by Seattle ACO on 3/29/2019	• Re-titled doc to include Maintenance. • Applied new document template, including adding new Section 1: Introduction, to clarify use of document. This content is boilerplate. All subsequent sections renumbered • Removed part numbers of non-purchasable parts. • Updated cable clamp material type (polyethylene for aluminum) in Section 2: Materials. • Updated illustrations in Section 7: Figures for better readability/usability. • Updated format and language of Mounting Bracketry Installation sections for clarity and readability/usability. • Updated format and language of Electrical Installation section for better readability/usability.
D	6/23/2020 ECO 349445	Accepted as Minor Change by Seattle ACO on 6/23/2020	Updated due to online version of document having incorrect torque values listed in Sec 6.1.3 step 17 and Sec 6.2.3 step 12.
E	4/21/2022 ECO 379164	Accepted as Minor Change by Seattle ACO on 1/18/2022	• Updated Cover Page to include STC # and footer per FAA requests in like documents. • Revised Contact Information section and links within doc with current URL addresses. • Updated Introduction section to include information requested by FAA in like documents. • Added Section 2: Airworthiness Limitations and Section 3: Installation Compliance sections per FAA requests in like documents. Subsequent sections renumbered.
F	10/19/2023 ECO 384426	Accepted as Minor Change by Anchorage ACO on 9/28/2023	Document updated and reorganized to current doc standard, including: • Replacing 'mechanic' with 'technician' throughout document. This change not tracked. • Updating boilerplate content in Section 1: Introduction. • Adding Section 3: Basic Control and Operation, which is boilerplate content. • Adding Section 5: Control Cable Verification. • Reformatting Table 1 & 2 in Section 6: Materials and updating Table 1 with new cable guard and bridle cable parts. • Reformatting, reorganizing, and updating Section 7: Initial Servo and Bracketry Installation and adding new steps and drawing for installing new cable guard and bridle cable parts. • Updating boilerplate content in Section 8: Servo Electrical Connection. • Adding Section 9: Electric Trim Control, which is boilerplate content. • Adding Section 10: Servo Troubleshooting, which is boilerplate content. • Adding Section 11: Servo Maintenance, which is mostly boilerplate content. • Adding Section 11.8: Roll Servo Removal and Replacement • Adding Section 11.9: Pitch Servo Removal and Replacement • Adding Section 12: Appendix 1: Servo Capstan Removal / Installation.
G	1/17/2025 395947	Updated per Minor Change Agreement	Fixed part number typo in Table 2.

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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. That information is provided in the *SkyView HDX General 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*
- 104003-000 D30 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 technician 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.

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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.

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3 Basic Control and Operation

Pilots interact with all Autopilot functions through a SkyView HDX display unit. No special operating procedures are required for using the Autopilot. Control descriptions and detailed operating procedures are found in the *SkyView HDX Airplane Flight Manual Supplement* document at dynoncertified.com/docs.

Operating limitations for the Autopilot are listed in the *SkyView HDX Airplane Flight Manual Supplement* document at dynoncertified.com/docs.

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4 Installation Compliance

If the airplane receiving the installation has been modified, it may be difficult to use the information in this manual to completely substantiate the installation in compliance with STC SA02594SE. Therefore, 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 Aircraft Registration Branch. The form must include the following:

- Description of the autopilot servo installation.
- Description of how the autopilot servos interface 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.

4.1 Pre-installation Information

Read and understand the following before proceeding with installation activities.

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



- AC 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 technician 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.

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5 Control Cable Verification

The SkyView Autopilot system for Cessna 172 airplanes is designed to attach to the airplane's original control cables. It is important for installers to verify the condition, rigging, tension, and diameter of the control cables before starting installation activities. The diameter of control cables should be measured in the vicinities where the autopilot servos will be installed.



DO NOT connect an autopilot system to improperly rigged and tensioned control cables. This includes control cables that are frayed or do not meet manufacturers' specifications.

To inspect the aileron crossover cable, installers need to access the area between WS100.00 and WS118.00 (see [Figure 1](#) for exact location) in accordance with the manufacturer's service manual. To inspect the lower elevator control cable, installers need to access the area behind the baggage area near FS207 (see [Figure 14](#) for exact location) in accordance with the manufacturer's service manual.

Dynon's bridle cable clamps are designed to meet the requirements below for wire rope as specified by MIL-DTL-83420.

CONTROL CABLE	NOMINAL DIAMETER	MINIMUM DIAMETER	MAXIMUM DIAMETER
Aileron	1/8"	0.125"	0.139"
Elevator	1/8"	0.125"	0.139"



If the airplane's original control cables are outside this specification, contact Dynon Technical Support for a resolution.

Out-of-specification control cables can cause cable clamps to slip under load.

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6 Materials

The materials identified in [Table 1](#) are provided to install the roll servo. ITEM numbers are also used to call-out parts in the document's figures.

Table 1: Roll Servo Installation Materials

ITEM	DYNON P/N	DESCRIPTION	QTY
1	503406-000	SV42 SERVO ASSEMBLY: CESSNA 172	
1-1		SV42 SERVO	1
1-2		SERVO CAPSTAN 1.0" D	1
1-3		CASTLE NUT 5/16-24	1
1-4		WAVE WASHER 5/16"	1
1-5		NYLON WASHER 5/16"	1
1-6		CABLE GUARD	1
1-7		PHILIPS PAN HEAD SCREW #6-32 X 1/4", NYLOK	4
1-8		INTERNAL TOOTH LOCK WASHER #6	4
2	503508-000	ROLL SERVO MOUNTING KIT: CESSNA 172	1
2-1	503107-001	UPPER BRACKET	1
2-2	503108-001	LOWER BRACKET	1
2-3	504648-000	CABLE GUARD BRACKET	1
2-4	504649-000	CABLE GUARD	1
3	103664-000	ROLL SERVO HARDWARE KIT: CESSNA 172	1
3-1		AN3H-3A HEX BOLT #10-32, 15/32" L, DRILLED HEAD	4
3-2		MS35333-39 INT TOOTH STAR WASHER #10	6
3-3		AN960-10 FLAT WASHER #10	8
3-4		AN525-832R8 WASH HEAD SCREW #8-32	10
3-5		AN960-08 FLAT WASHER #8	10
3-6		AN365-832A LOCK NUT LOCK #8-32	10

ITEM	DYNON P/N	DESCRIPTION	QTY
3-7		AN3-4A HEX BOLT #10-32, 17/32" L	2
3-8		AN3-3A HEX BOLT #10-32, 15/32" L	2
3-9		MS24665-210 COTTER PIN 5/64" X 3/4"	1
4	504807-000	ROLL SERVO CAPSTAN ACCESSORY KIT: CESSNA 172	1
4-1		AN3-6A HEX BOLT #10-32, 25/32" L	6
4-2		AN960 FLAT WASHER #10	6
4-3		AN365-10 LOCK NUT #10-32	6
4-4		BRIDLE CABLE CLAMP 1/8", 1/16"	4
4-5	504661-000*	BRIDLE CABLE, INBOARD	1
4-6	504660-000*	BRIDLE CABLE, OUTBOARD	1
4-7		TURNBUCKLE BARREL	1
4-8		TURNBUCKLE SAFETY CLIP	2
4-9		ST2-2 STOP SWAGE, 1/16" CABLE	2

Items without Dynon part numbers are parts packaged in a kit.

* Packaged in a kit, but item also sold separately.

The materials identified in [Table 2](#) are provided to install the pitch servo. ITEM numbers are also used to call-out parts in the document's figures.

Table 2: Pitch Servo Installation Materials

ITEM	DYNON P/N	DESCRIPTION	QTY
5	503406-000	SV42 SERVO ASSEMBLY: CESSNA 172	
5-1		SV42 SERVO	1
5-2		SERVO CAPSTAN 1.0" D	1
5-3		CASTLE NUT 5/16-24	1
5-4		WAVE WASHER 5/16"	1
5-5		NYLON WASHER 5/16"	1
5-6		CABLE GUARD	1
5-7		PHILIPS PAN HEAD SCREW #6-32 X 1/4", NYLOK	4
5-8		INTERNAL TOOTH LOCK WASHER #6	4
6	503508-000	PITCH SERVO MOUNTING KIT: CESSNA 172	1
6-1	503588-000	BASE BRACKET	1
6-2	503589-000	VERTICAL BRACKET	1
6-3	503590-000	ANGLE BRACKET	2
6-4	503329-001	LONG BRACE	1
6-5	503330-000	SHORT BRACE	1
6-6	503105-000	PULLEY GUARD	1
6-7	103204-000	MS20219-2 PULLEY, 1-3/4" OD, 1/4" ID	1
7	103667-000	PITCH SERVO HARDWARE KIT: CESSNA 172	1
7-1		AN3H-3A HEX BOLT #10-32, 15/32" L, DRILLED HEAD	4
7-2		MS35333-39 INT TOOTH STAR WASHER #10	4
7-3		AN960-10 FLAT WASHER #10	4
7-4		AN4-11A HEX BOLT #1/4-28, 1-5/32" L,	1
7-5		AN960-416 FLAT WASHER 1/4"	2

ITEM	DYNON P/N	DESCRIPTION	QTY
7-6		AN365-428 LOCK NUT #1/4-28	1
7-7		AN525-832R8 PHIL WASH HEAD SCREW #8-32, 1/2" L	29
7-8		AN960-08 FLAT WASHER #8	29
7-9		AN365-832A LOCK NUT #8-32	28
7-10		CCP-42 CHERRY RIVET, N	4
7-11		FLUSH MOUNT RIVET	2
7-12		MS24665-210 COTTER PIN 5/64" X 3/4"	1
8	503674-000	PITCH SERVO CAPSTAN ACCESSORY KIT: CESSNA 172	1
8-1		AN3-6A HEX BOLT #10-32, 25/32" L	6
8-2		AN960 FLAT WASHER #10	6
8-3		AN365-10 LOCK NUT #10-32	6
8-4		BRIDLE CABLE CLAMP, 1/8", 1/16"	4
8-5		BRIDLE CABLE, 1/16"	1
8-6		ST2-2 STOP SWAGE, 1/16" CABLE	2

Items without Dynon part numbers are parts packaged in a kit.

7 Initial Servo and Bracketry Installation

This section provides instructions for installing the roll and pitch servos and bracketry, and then connecting the servos to the aileron and elevator control tubes. These instructions assume that the areas affected by these installations are unmodified from the factory-delivered configuration.

7.1 Additional Tools

The following non-typical tools are needed to complete the installation:

- Angle Drill,
- Nutplate Drill Fixture,
- Cutters for 1/16" diameter wire rope,
- Swage compression tool appropriate for ST2-2 stop swages,
- Calibrated tensiometer.

7.2 Roll Servo Installation

The roll servo and bracketry are installed between WS100 and WS118 (see [Figure 1](#)). To install the roll servo, installers need to access this area in accordance with the manufacturer's service manual. (See [Figure 2](#) for an example of a complete installation.)



Remove any previously installed autopilot equipment, including rivets and other hardware, that may interfere with the new servo installation.



Make sure all flight control cables are rigged and tensioned in accordance with manufacturer's instructions.



Always disconnect aircraft battery before starting installation activities.



Always deburr drilled holes.



Unless otherwise specified, torque all fasteners per specifications in AC 43.13-1B, Table 7-1. Include specified friction drag value when torquing screws.

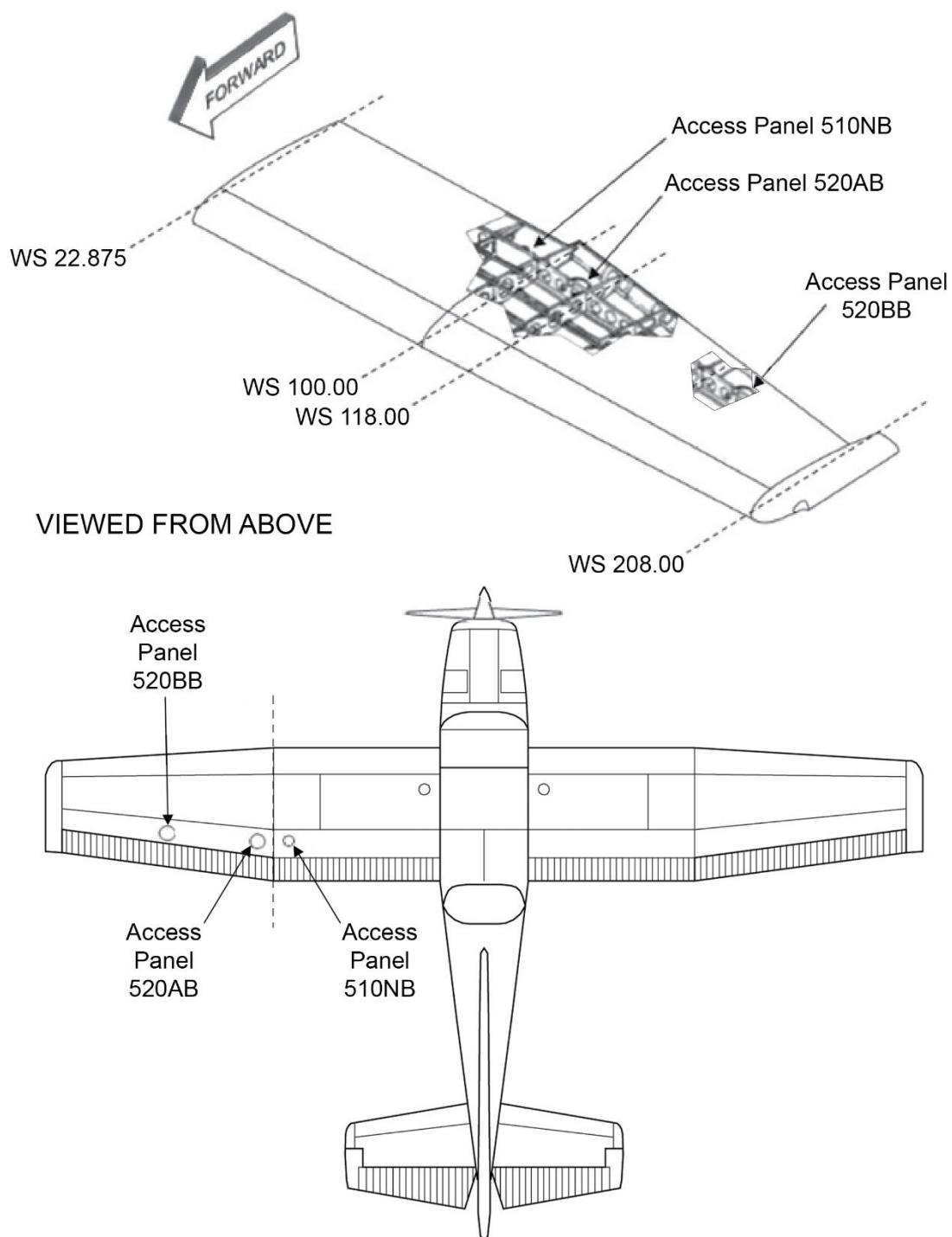


Figure 1: Roll Servo Location

TOP WING SKIN AND SOME STRUCTURE REMOVED FOR CLARI-

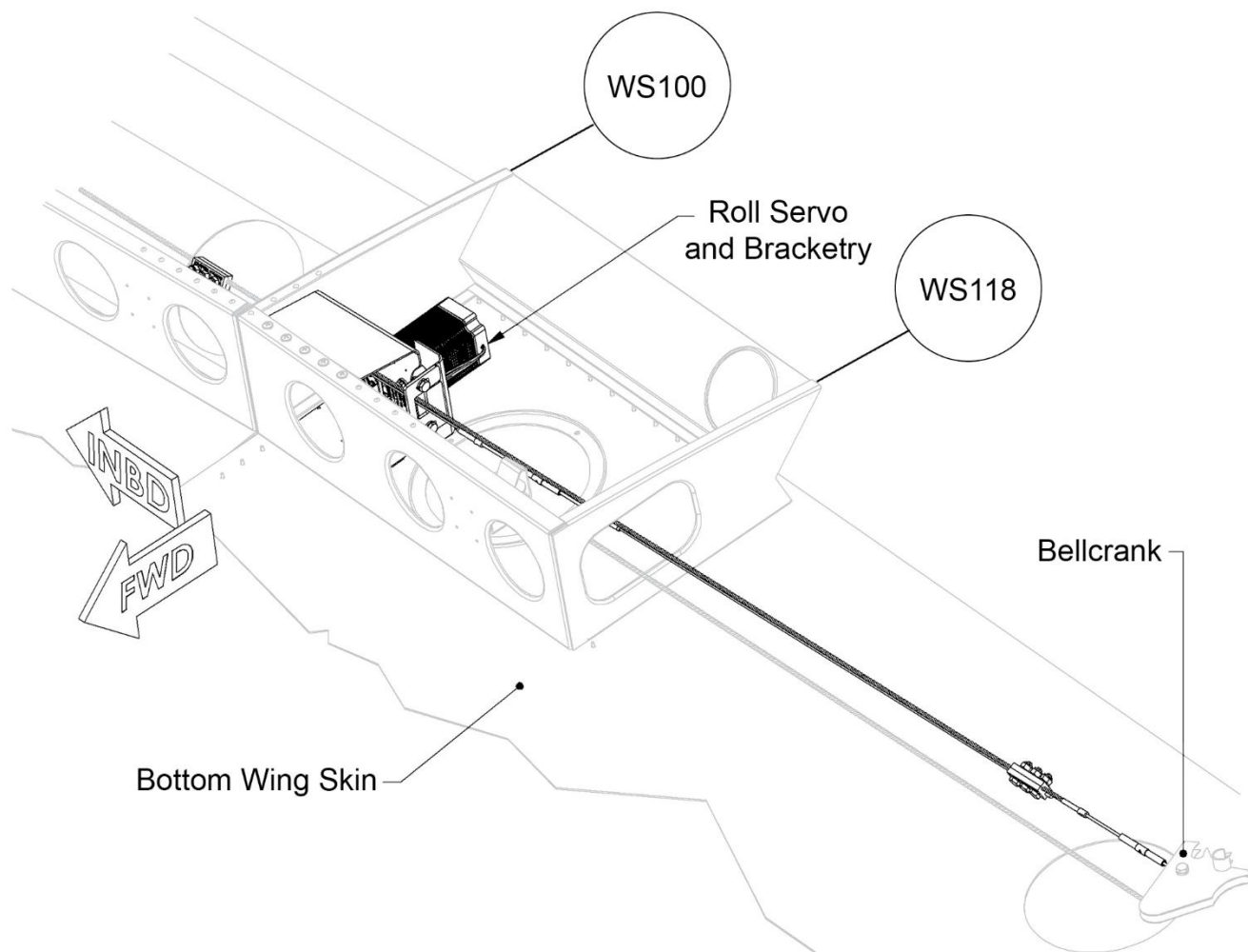


Figure 2: Roll Servo Complete Installation

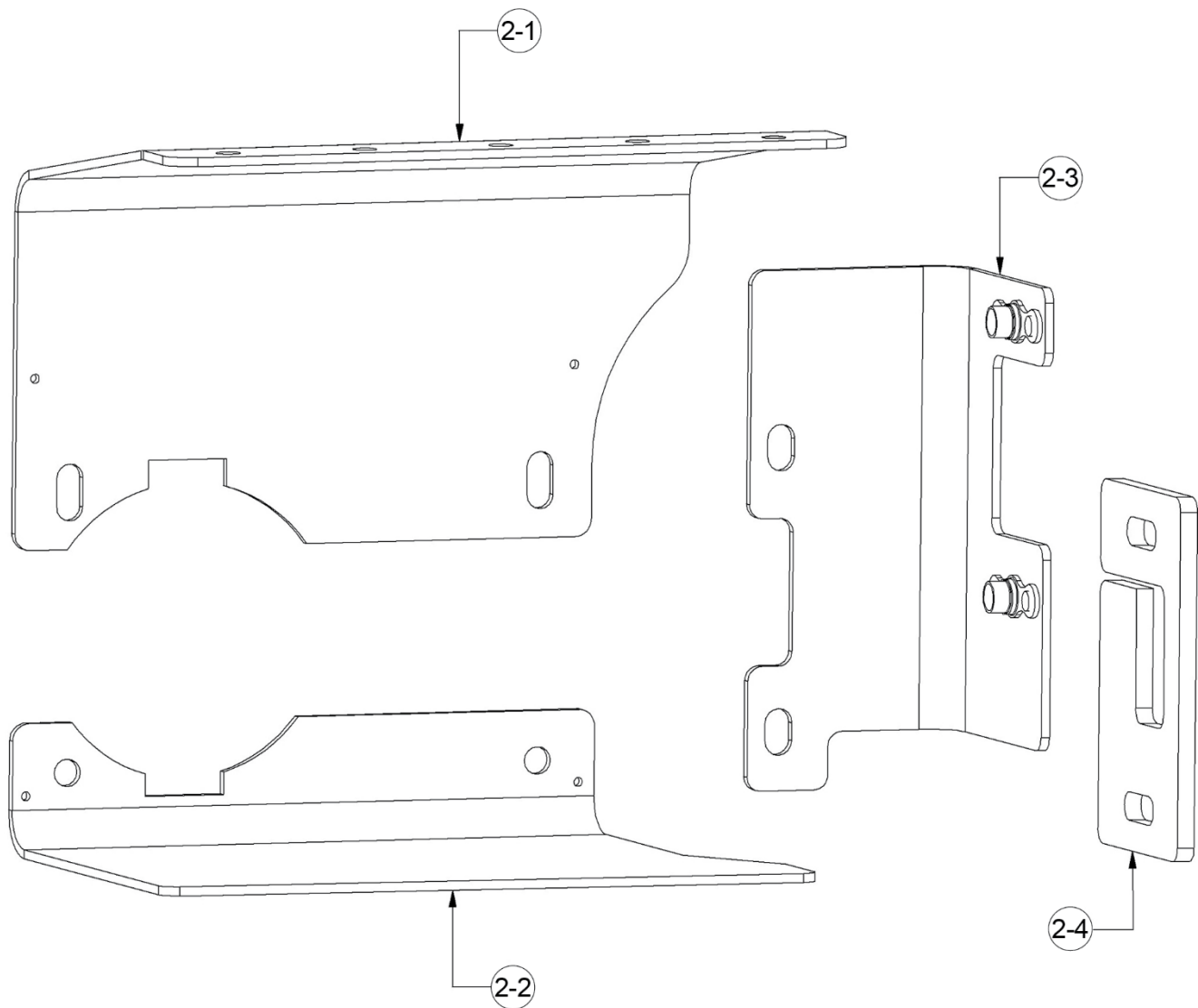


Figure 3: Roll Servo Bracketry

To install the roll servo and bracketry:

1. Remove capstan from roll servo (see Section [11.5](#)).



DO NOT remove shear screw from servo disc!

2. Permanently attach roll servo to lower bracket (see [Figure 4](#)) and temporarily attach roll servo to upper bracket. Make sure upper bracket is in the lowest position allowed by slots in bracket.

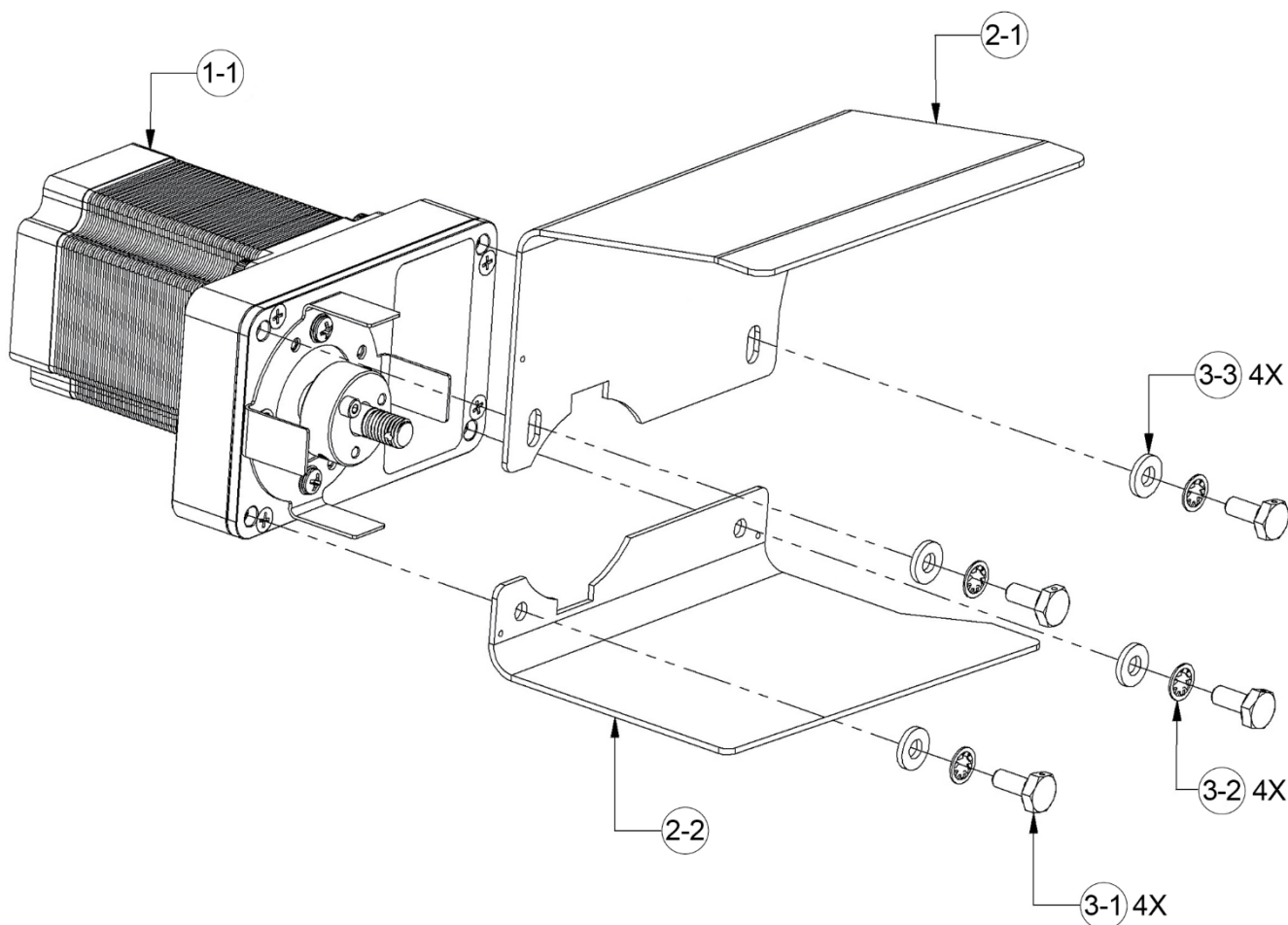


Figure 4: Attaching Upper and Lower Brackets to Roll Servo

3. Cut bridle cables to length and assemble, as shown in [Figure 5](#).

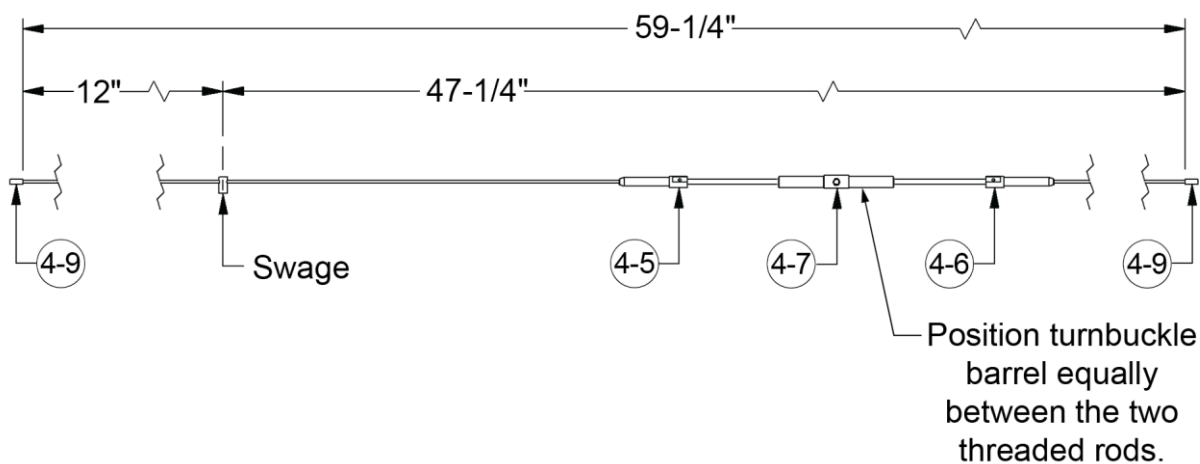


Figure 5: Preparing Bridle Cable

4. Crimp swage stops on bridle cables (see [Figure 5](#)), and then trim bridle cable ends flush with outside edge of swage stops.
5. Insert bridle cable assembly's swage into capstan's swage engagement hole, and then wrap bridle cable '1/2' revolution in each direction around capstan, as shown in [Figure 6](#).



The swage engagement hole must be in the 6 'o' clock position, and the orientation mark must face away from the servo, as shown in [Figure 6](#).



Securing the bridle cable to the capstan's grooves with tape prevents it from unraveling when handling.

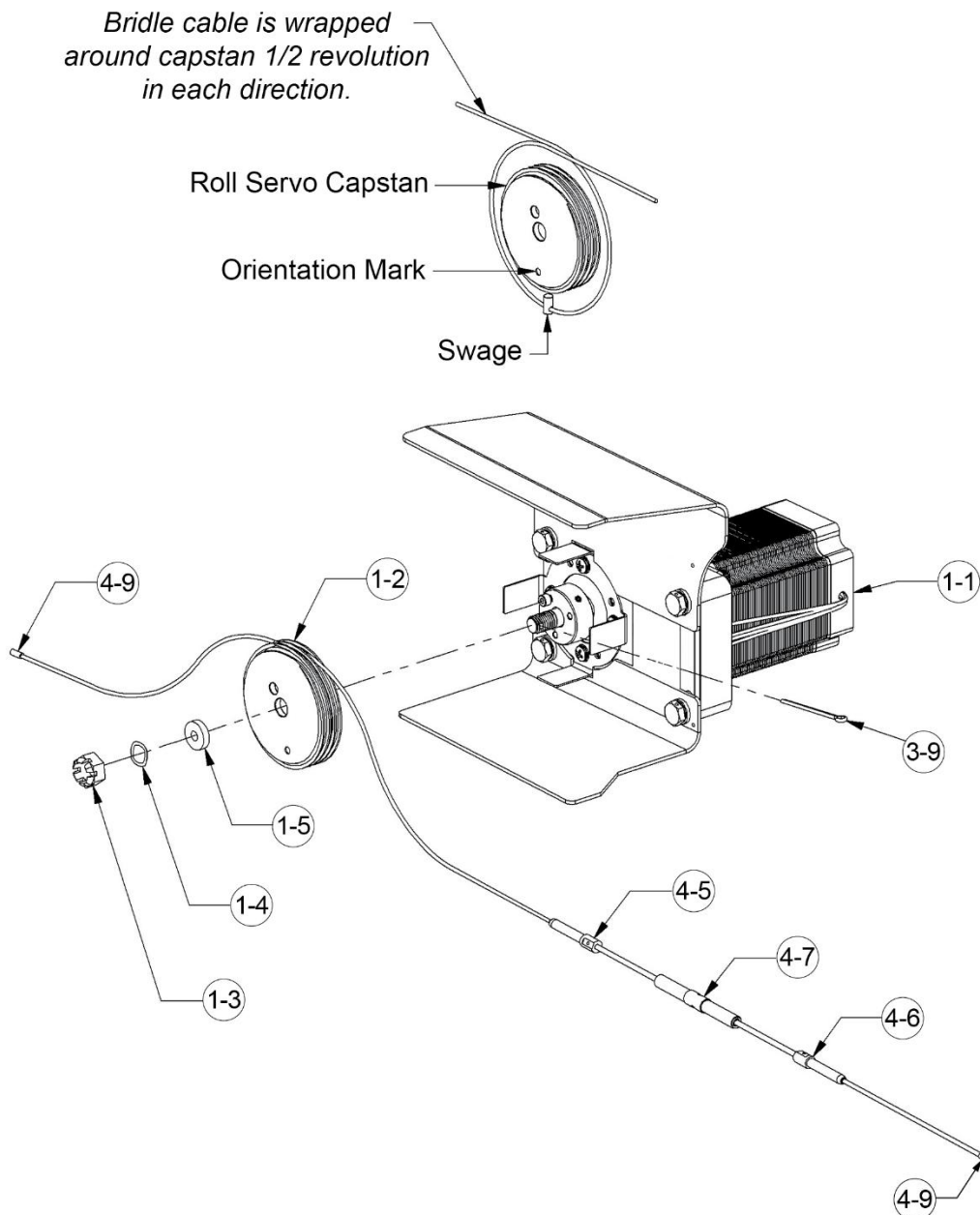
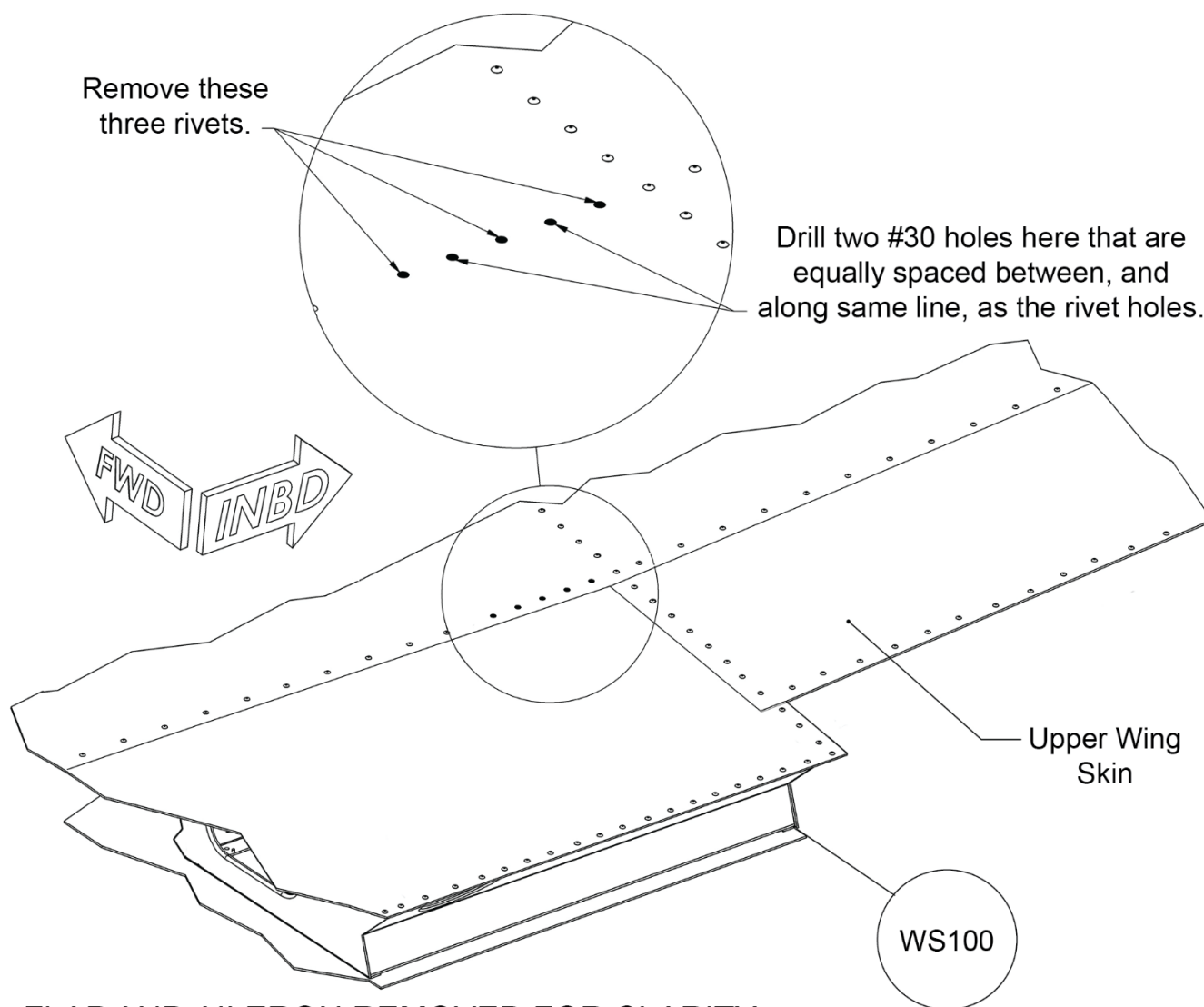


Figure 6: Wrapping Bridle Cable and Attaching Capstan to Roll Servo

6. Temporarily attach capstan to roll servo (see [Figure 6](#)). Cotter pin not needed at this time.
7. Prepare upper and lower wing skins for roll servo brackets, as shown in [Figure 7](#) and [Figure 8](#).



FLAP AND AILERON REMOVED FOR CLARITY

Figure 7: Preparing Upper Wing Skin

FLAP AND AILERON REMOVED FOR CLARITY

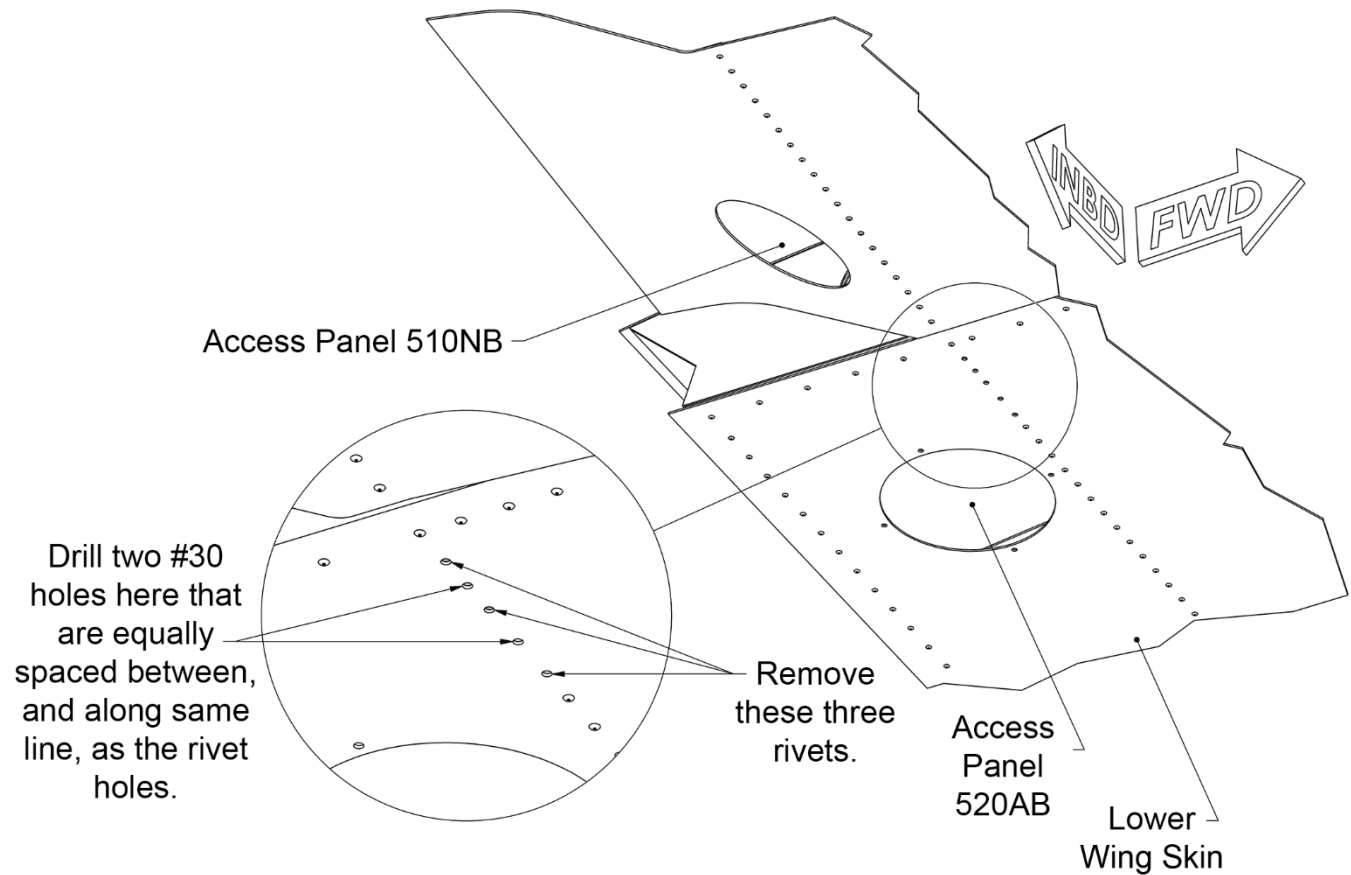


Figure 8: Preparing Lower Wing Skin

8. Loosen hardware that secures upper bracket to roll servo.

9. Insert roll servo assembly into wing, as shown in [Figure 9](#).

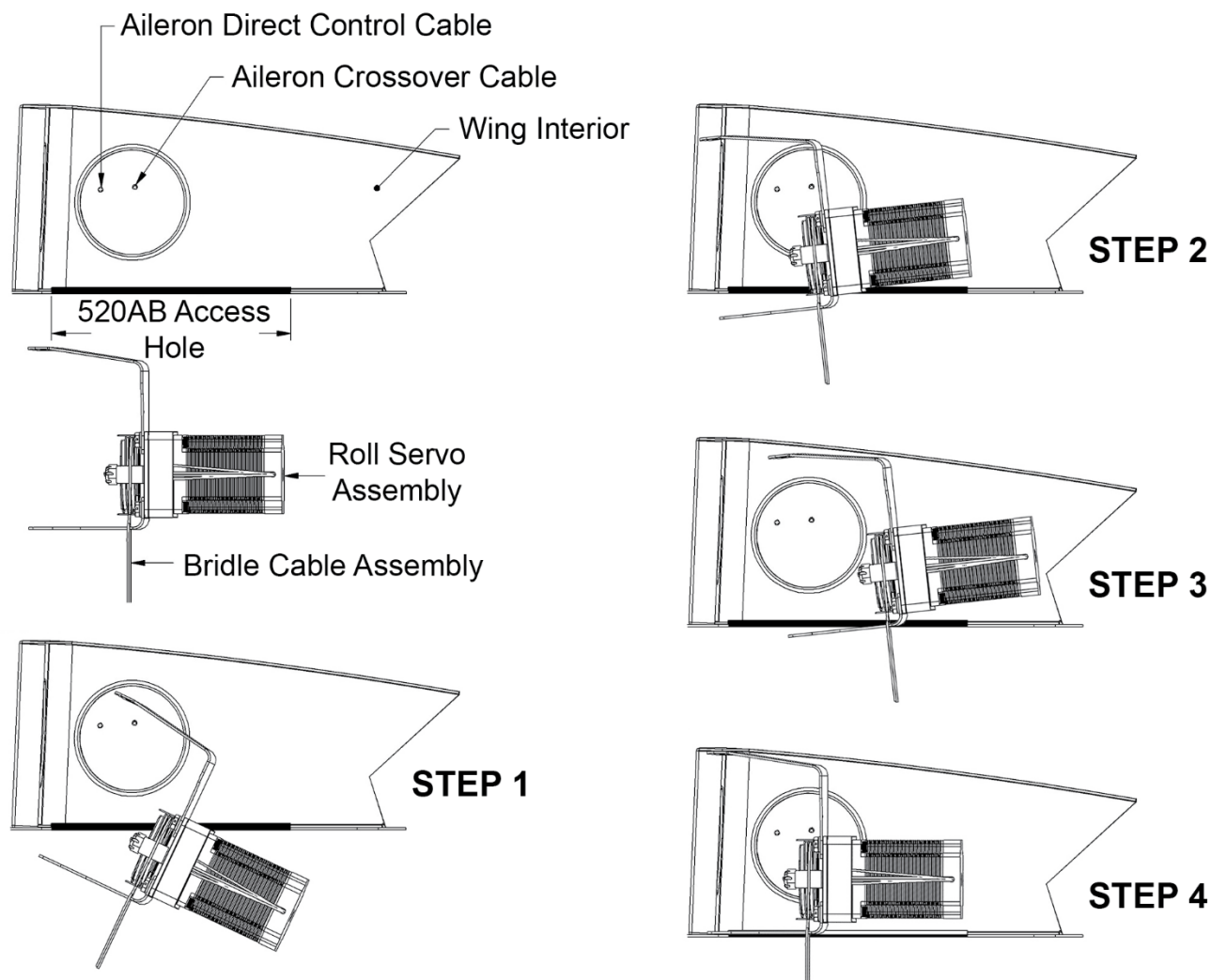


Figure 9: Inserting Roll Servo Assembly into Wing

10. After insertion, slide roll servo assembly inboard until brackets contact flange of inboard WS100 rib, and then raise upper bracket until bracket contacts upper rear spar flange.

11. Allow setback for bend radii on rear spar flanges, as shown in [Figure 10](#).

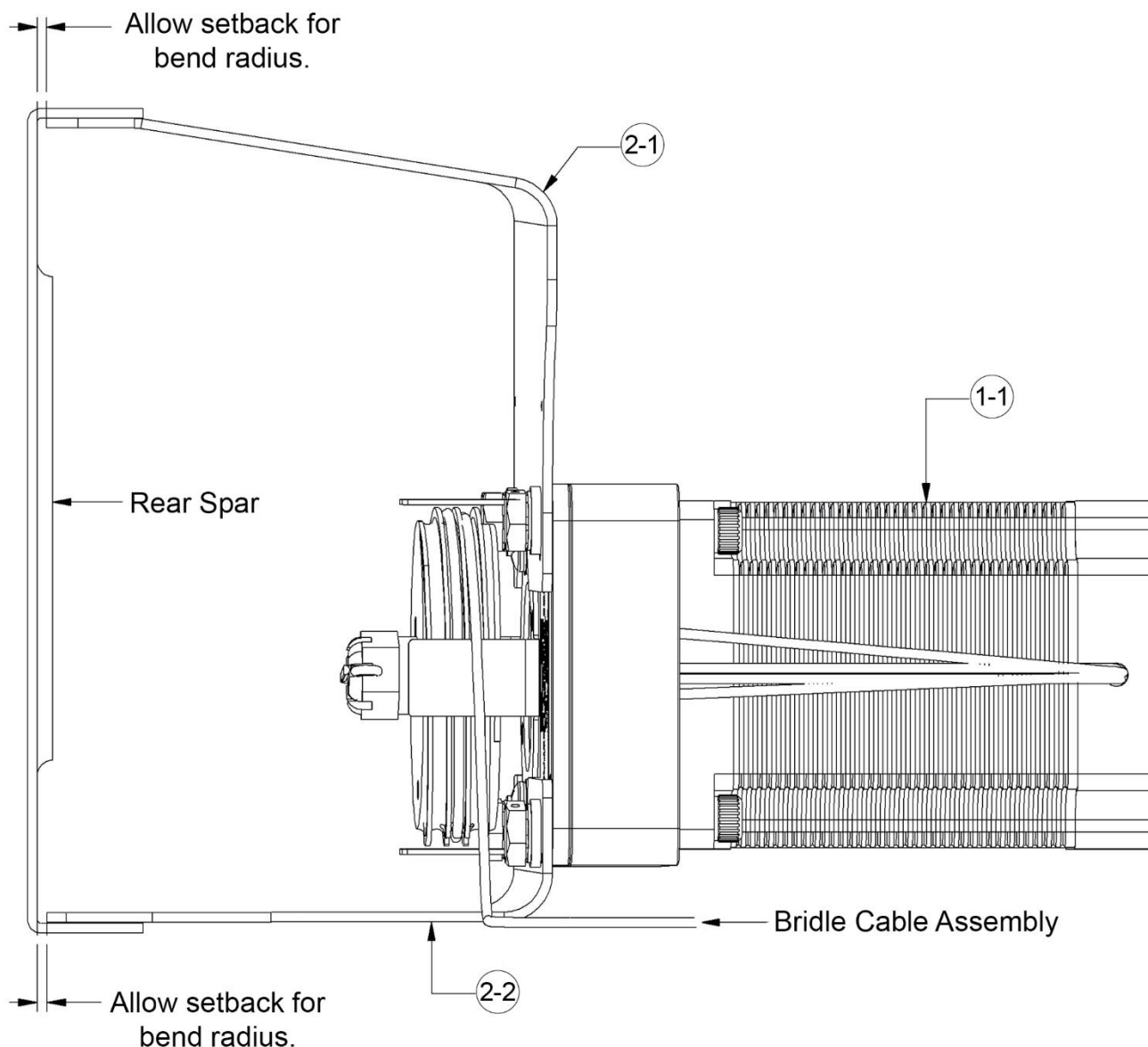


Figure 10: Allowing Setback for Bend Radii on Rear Spar Flanges

12. Tighten hardware that secures roll servo to upper bracket.
13. From outside airplane, use holes in wing skins to match drill #30 holes through upper and lower brackets. Install temporary fasteners while drilling as needed.
14. Drill up to #18 holes through wing skins and upper and lower brackets. Remove temporary fasteners while drilling as needed.

15. Attach roll servo assembly to wing skins and rear spar, as shown in [Figure 11](#).

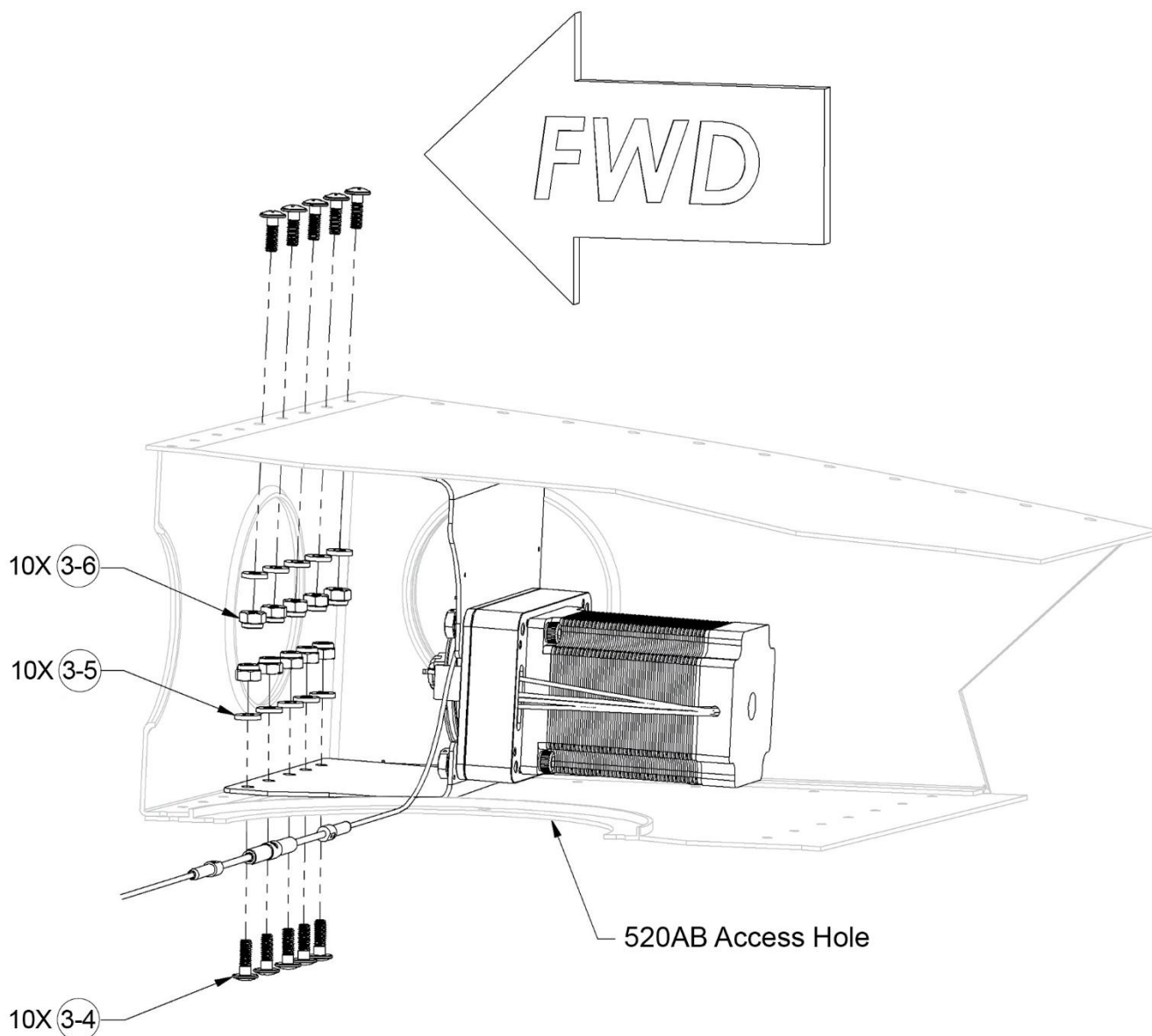


Figure 11: Attaching Roll Servo Assembly to Wing Skins and Rear Spar

To connect the roll servo to the aileron crossover cable:

1. Secure ailerons and/or yoke in center of travel.
2. Make sure aileron crossover cable in area where bridle cable clamps will attach is clean and free of dirt and grease.

3. Use bridle cable clamps to loosely connect inboard and outboard bridle cable ends to aileron crossover cable, as shown in [Figure 12](#). Make sure clamps contact swage stops at each end of bridle cable.

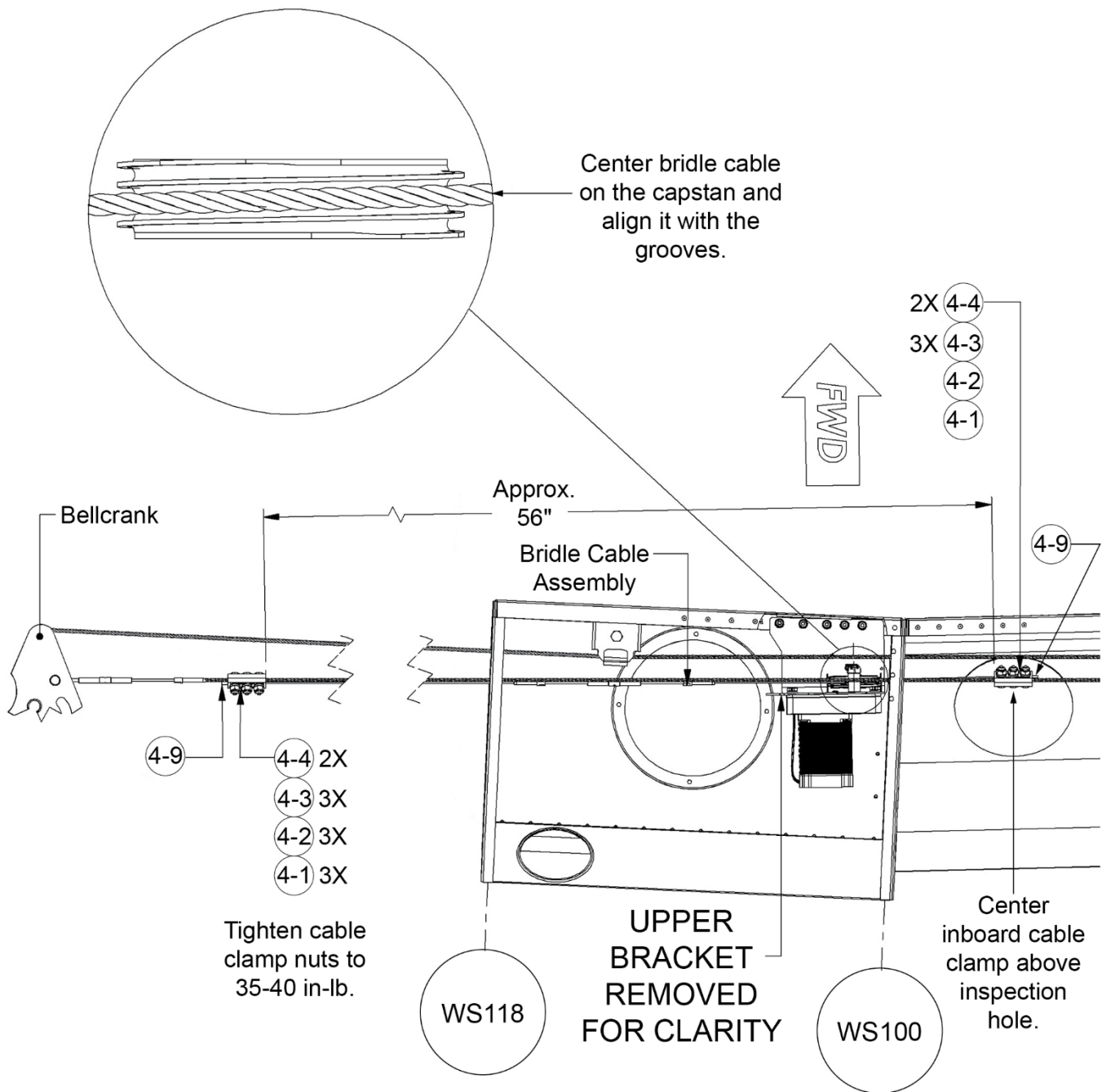


Figure 12: Connecting Bridle Cable to Aileron Crossover Cable

4. Position bridle cable clamps so that:
 - Capstan's swage engagement hole remains in the 6 'o' clock position.
 - Clamps are located as shown in [Figure 12](#).
 - Clamps are positioned to avoid contacting any structure.

5. Make sure bridle cable does not contact servo's cable guard.



The bridle cable will prematurely wear if bridle cable and cable guard make contact when control is in a neutral position.

6. If cable guard interferes with bridle cable, adjust cable guard position (see Section [11.6](#) for instructions), and then repeat Step 5.
7. Tighten all bridle cable clamp nuts to 35-40 in-lb.
8. Use a feeler gauge to measure gaps between bridle cable clamp halves (top and bottom). Make sure gaps meet the following criteria:
 - Gap measurements on both sides of clamp are not less than 0.003" and not more than 0.050".



If clamp gap measurements do not meet criteria above, measure diameter of control cable, and then contact Dynon Technical Support for a resolution.

Out-of-specification cable clamps can slip under load.

9. Using turnbuckle, tension bridle cable to 15-20 lbs. Make sure capstan's swage engagement hole remains in the 6 'o' clock position.



The tension on bridle cable should never exceed manufacturer's specified tension for control cable.

10. Use provided clips to safety wire bridle cable turnbuckle halves and barrel.
11. Permanently attach capstan to roll servo (see Section [11.5](#)).

12. Attach cable guard bracket to roll servo (see [Figure 13](#)).

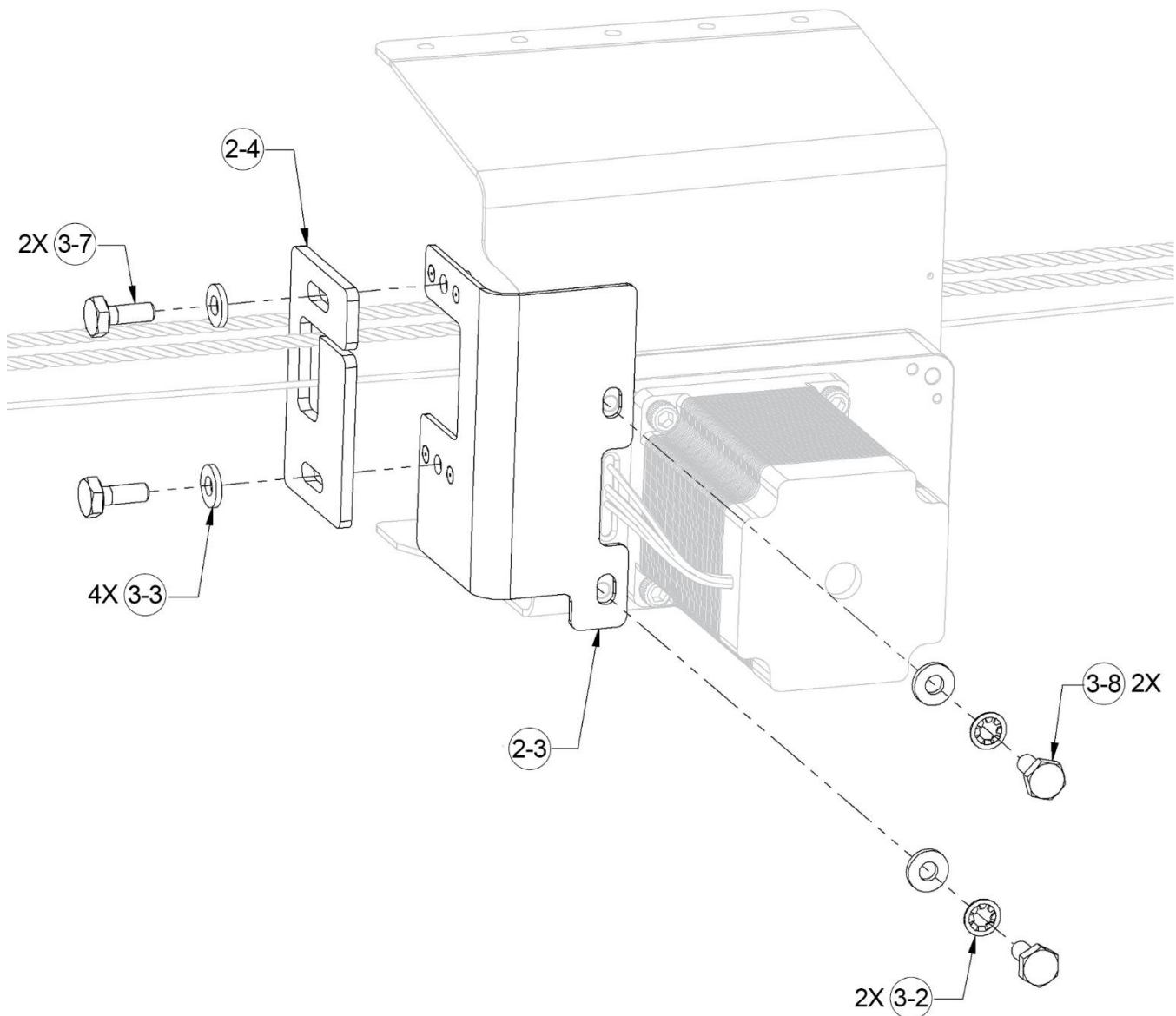


Figure 13: Attaching Cable Guard Bracket and Cable Guard to Roll Servo

13. Capture aileron crossover cable and bridle cable with cable guard, as shown in [Figure 13](#), and then attach cable guard to cable guard bracket (see [Figure 13](#)).
14. Adjust cable guard and/or cable guard bracket as needed so cables do not contact cable guard.

To check the roll servo installation:

1. Release ailerons and/or yoke.

2. Move aileron control through full range of motion per manufacturer's maintenance instructions, and verify the following:
 - Control is smooth throughout (i.e., no grinding, rubbing, or roughness).
 - Bridle cable clamps do not contact any structures during entire travel.
 - Capstan never rotates more than 90 degrees in either direction from neutral.
3. Cycle the control surface several times, return it to neutral, and verify the following:
 - Swage engagement hole is in the 6 'o' clock position.
 - Position of bridle cable clamps closely matches [Figure 12](#).
 - Bridle cable tension has not changed.

7.3 Pitch Servo Installation

The pitch servo and bracketry are installed underneath the floor of the baggage area, immediately behind the bulkhead at FS108 (see [Figure 14](#)). To install the pitch servo, installers need to access this area in accordance with the manufacturer's service manual. (See [Figure 15](#) for an example of a complete installation.)



Remove any previously installed autopilot equipment that may interfere with the new servo installation.



Make sure all flight control cables are rigged and tensioned in accordance with manufacturer's instructions.



Always disconnect aircraft battery before starting installation activities.



Always deburr drilled holes.



Unless otherwise specified, torque all fasteners per specifications in AC 43.13-1B, Table 7-1. Include specified friction drag value when torquing screws.

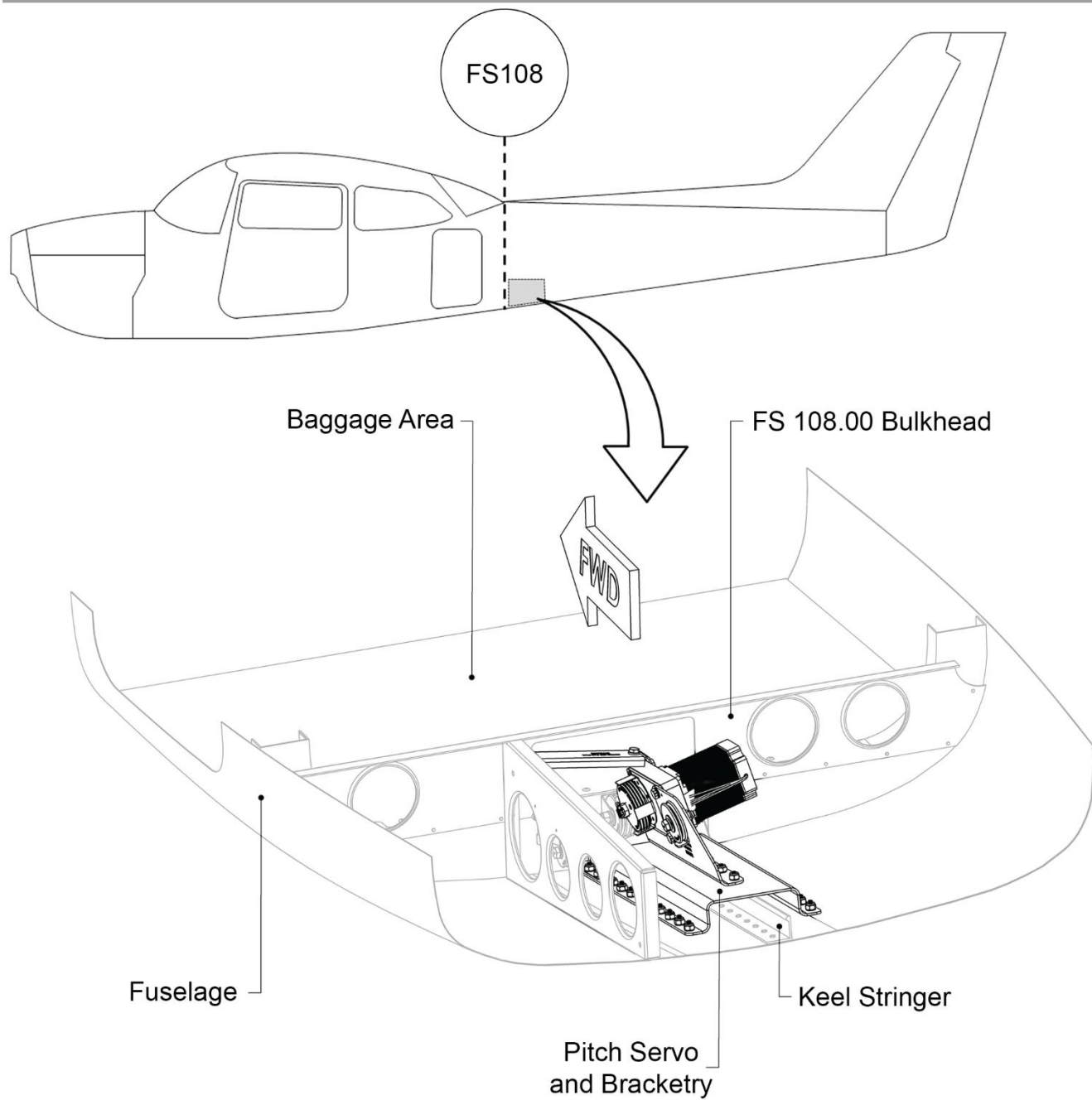


Figure 14: Pitch Servo Location

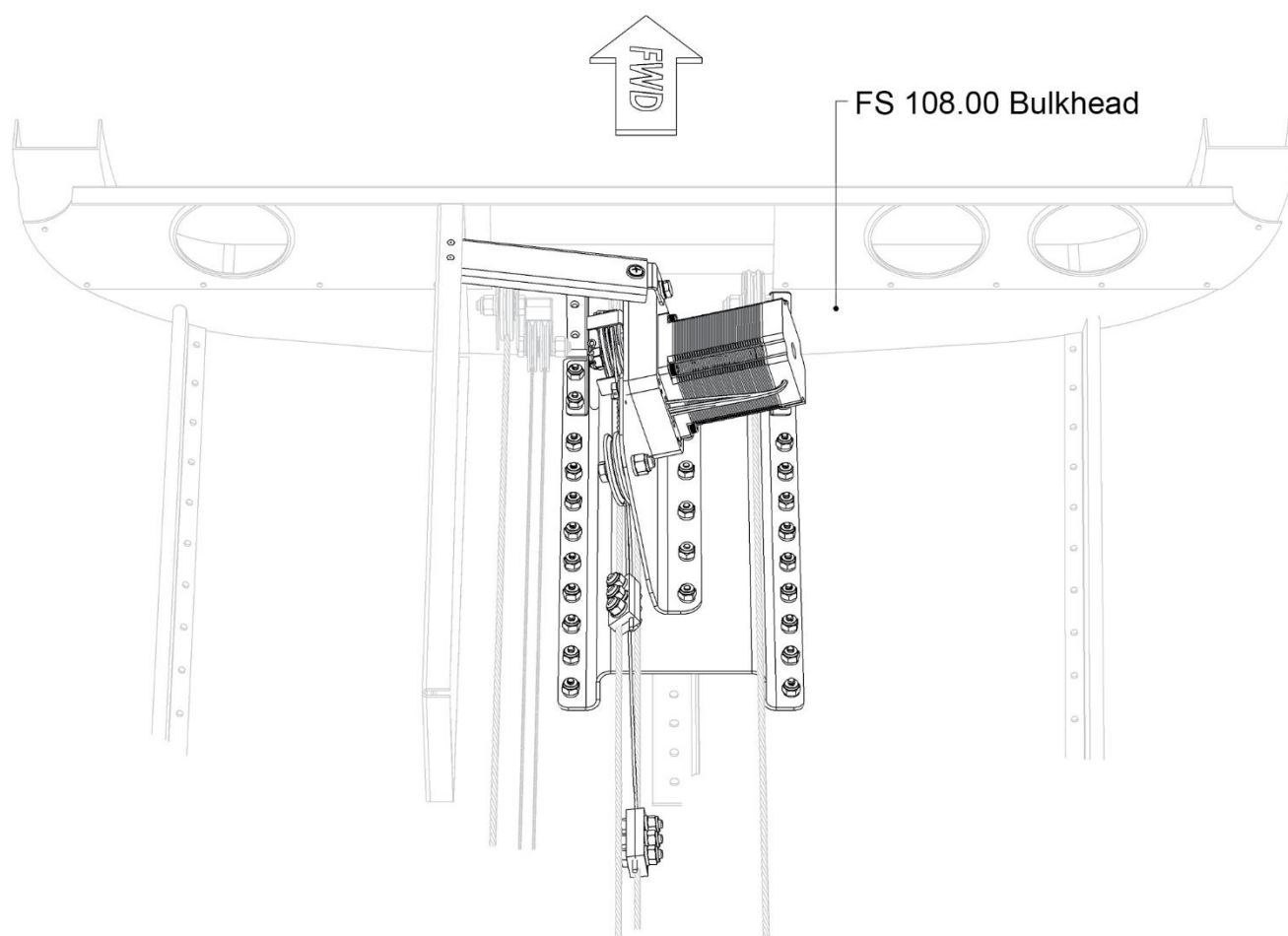


Figure 15: Pitch Servo Complete Installation

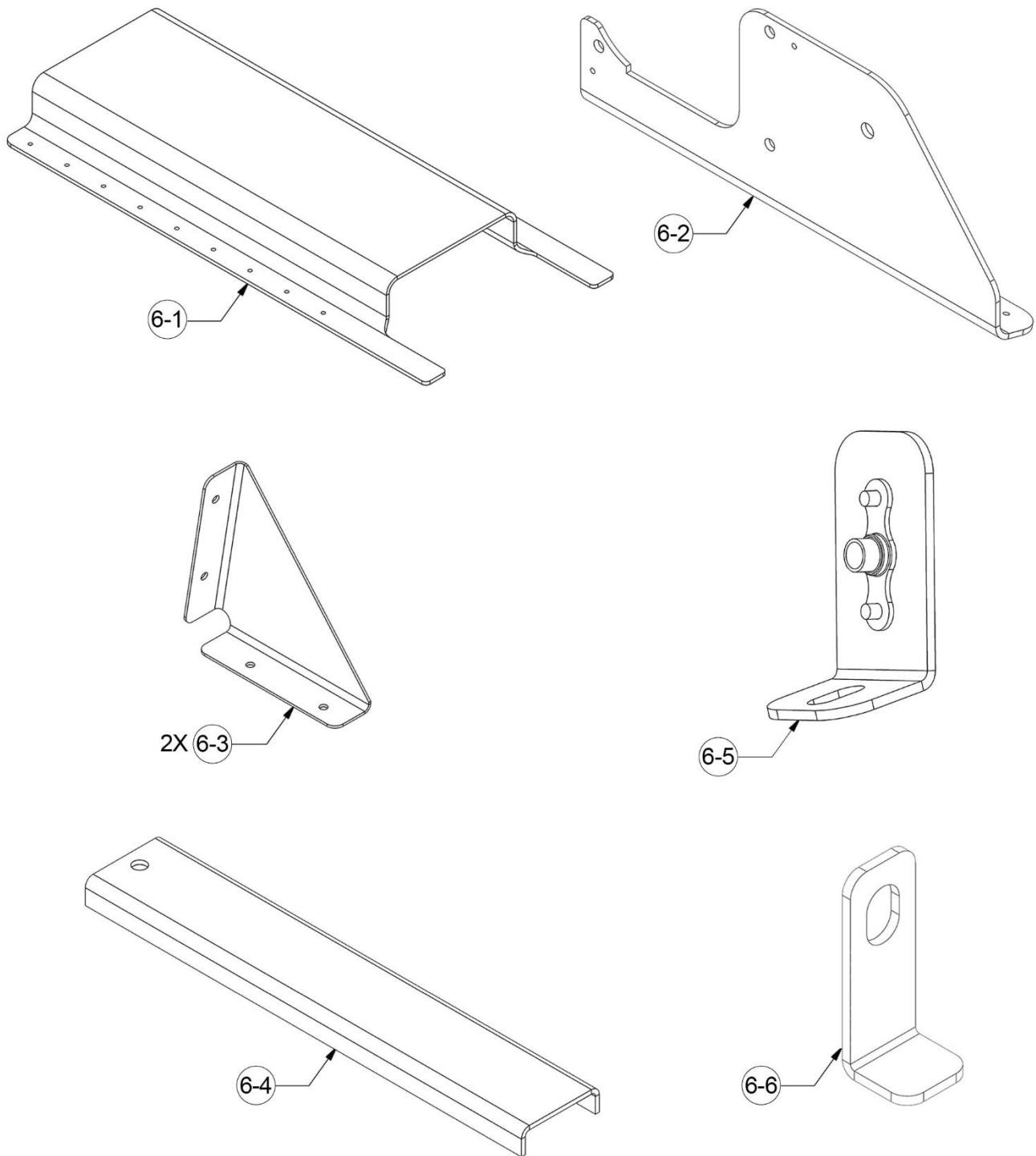


Figure 16: Pitch Servo Bracketry

To install the pitch servo and bracketry:

1. Position base bracket and angle brackets, as shown in [Figure 17](#).



It is critical to align base bracket, so it is perpendicular to the FS108 bulkhead and the angle braces do not contact the existing cable pulley brackets.

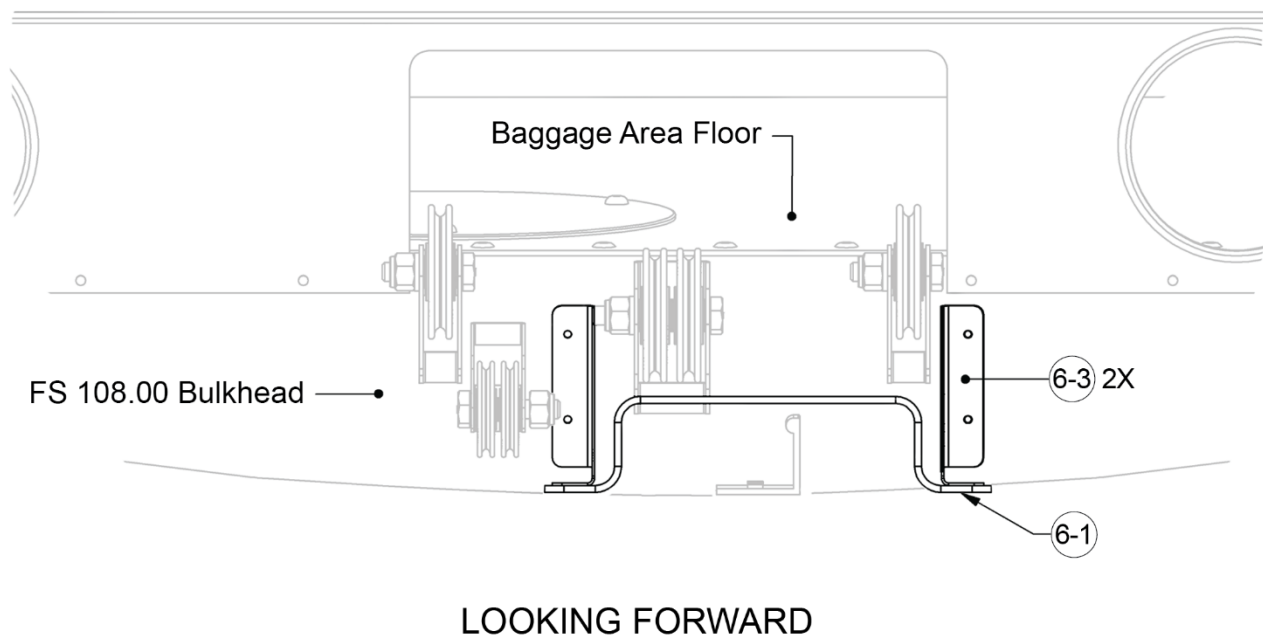
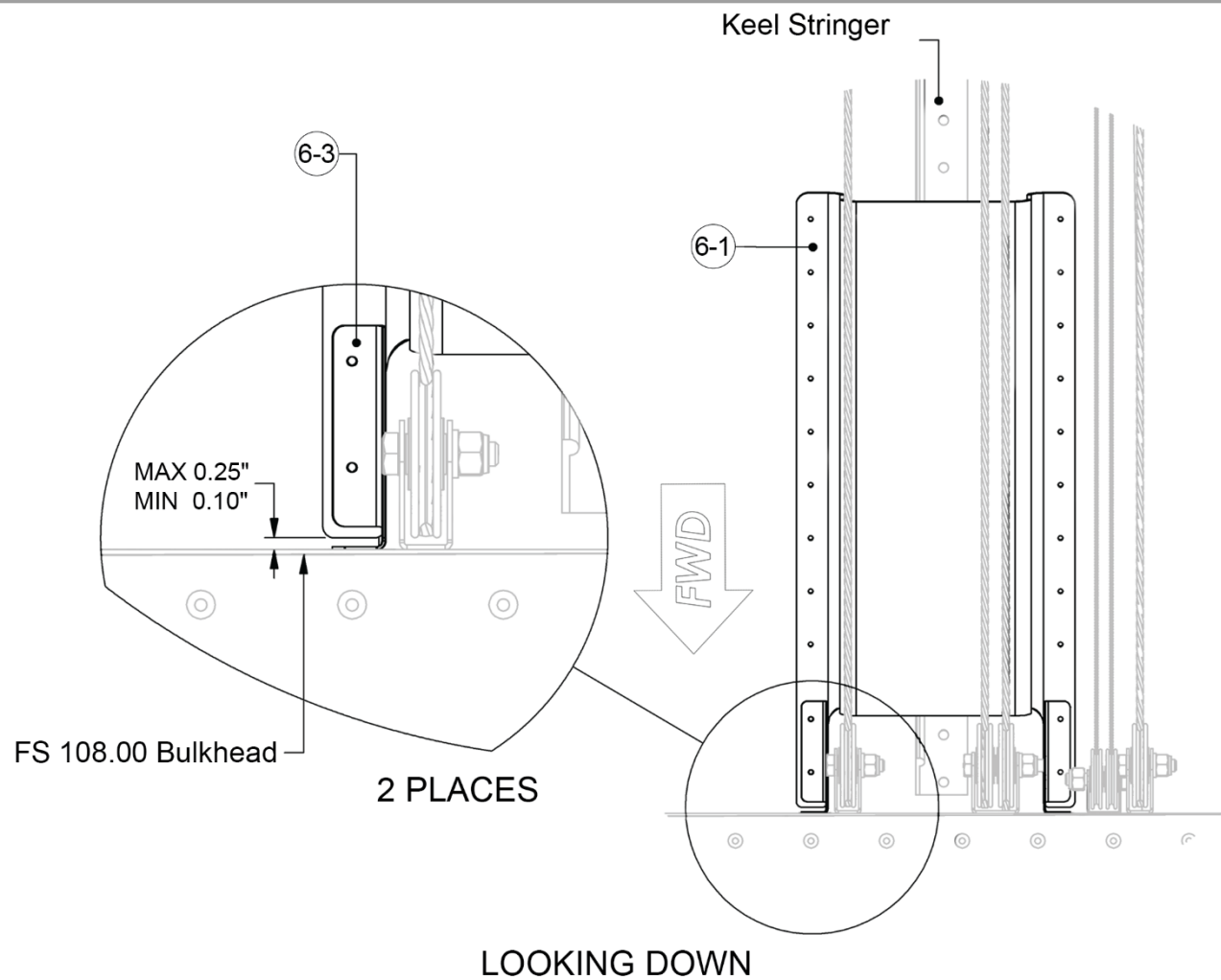


Figure 17: Positioning Base and Angle Brackets

2. Once positioned, use edges of base bracket to mark its position on fuselage skin, and then remove angle braces.
3. Using pilot holes in base bracket, match drill #40 holes through fuselage skin, making sure bracket stays in position. Install temporary fasteners to hold bracket in place (see [Figure 18](#)).

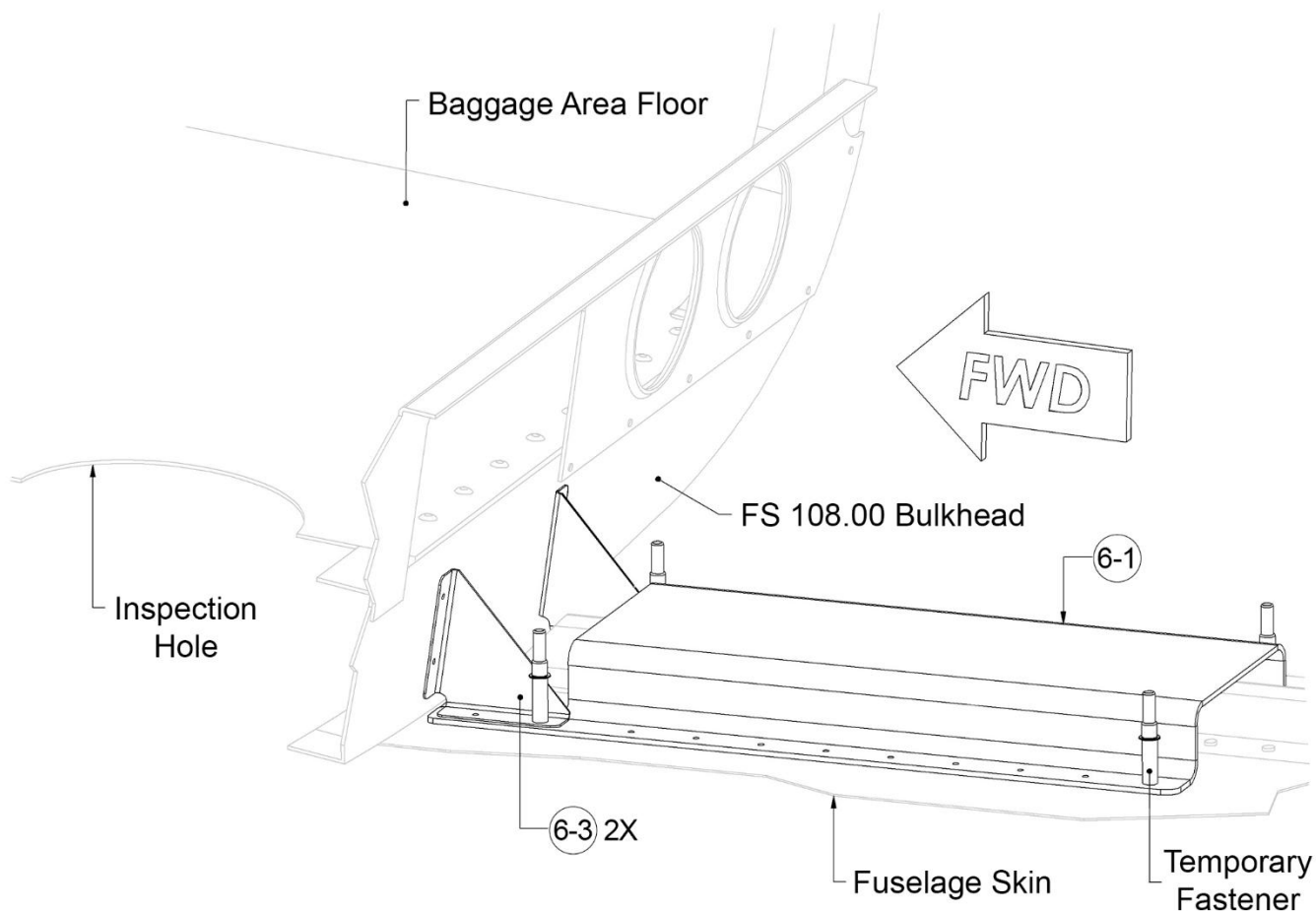


Figure 18: Base Bracket and Angle Brackets Positioned for Drilling

4. Temporarily fasten angle brackets to base bracket, as shown in [Figure 18](#).
5. Using pilot holes in brackets, match drill #40 holes through FS108 bulkhead.

6. Attach pitch servo and idler pulley to vertical bracket, as shown in [Figure 19](#). Do not fully tighten hardware yet.

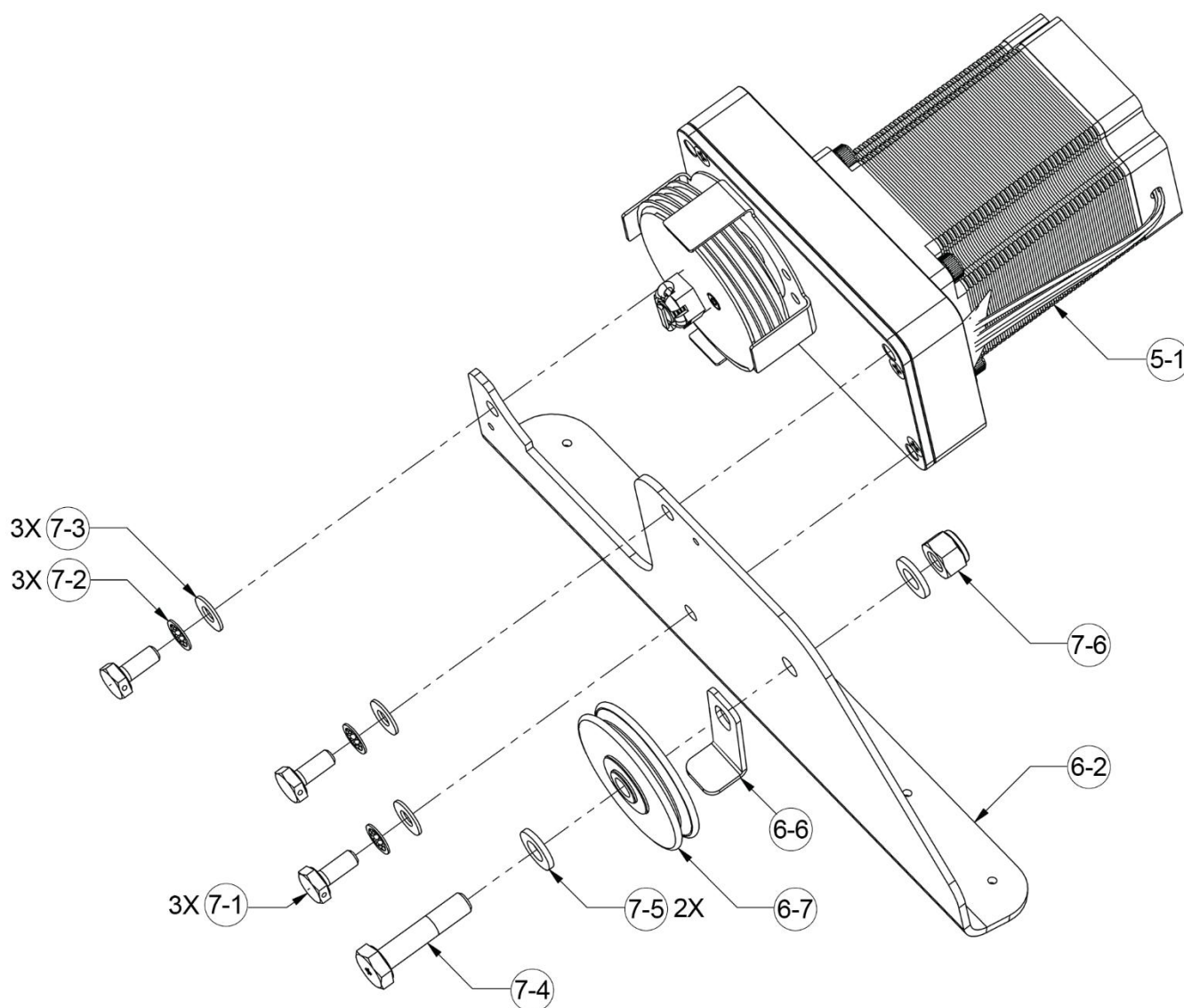


Figure 19: Attaching Pitch Servo and Idler Pulley to Vertical Bracket

7. Place servo assembly on base bracket.

8. Position servo assembly longitudinally on base bracket so that forward edge of servo capstan maintains a minimum of 0.25" spacing from elevator control cable pulleys mounted to FS108 bulkhead (see [Figure 20](#)).

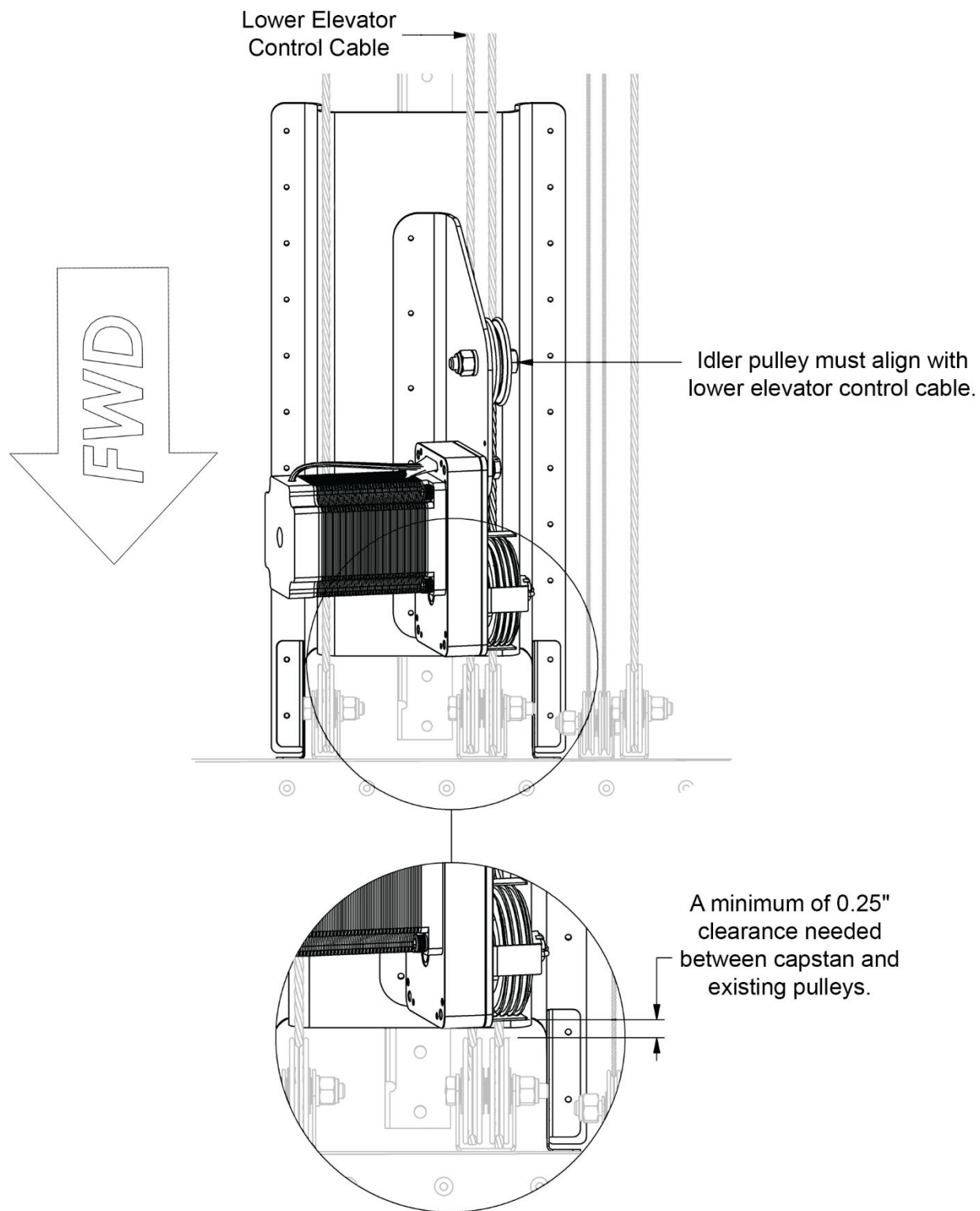


Figure 20: Positioning Servo Assembly Longitudinally on Base Bracket

9. Position servo assembly laterally on base bracket as needed to align idler pulley with lower elevator control cable (see [Figure 21](#)). Make sure no components interfere with elevator and elevator trim control cables.

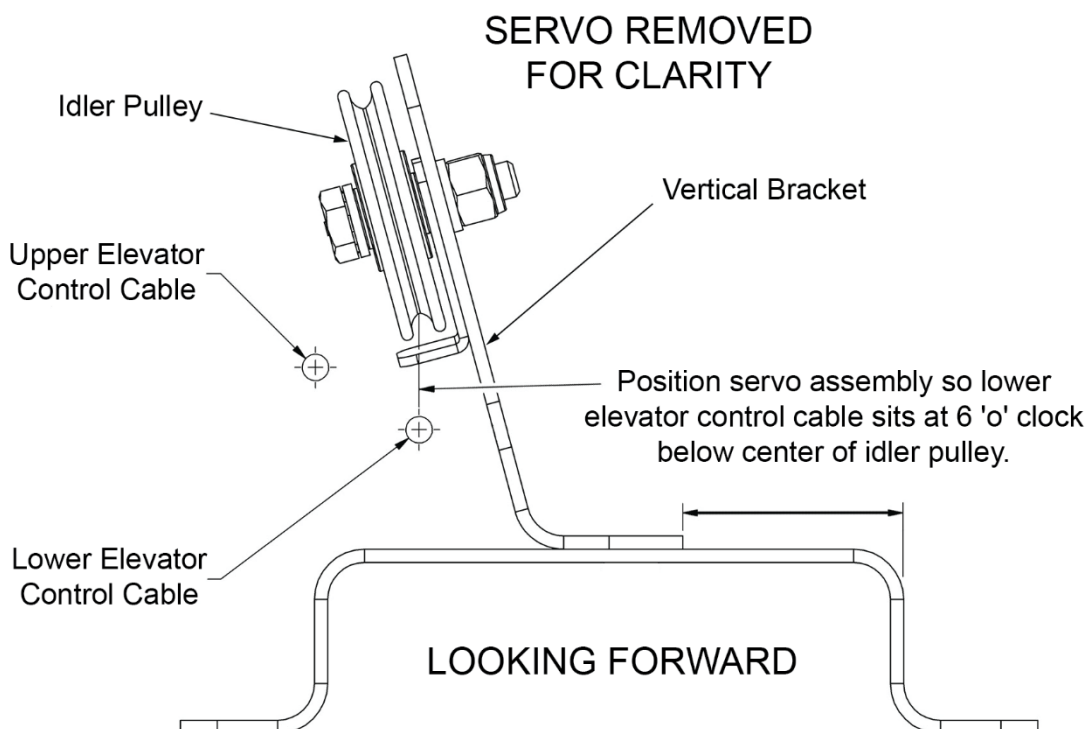


Figure 21: Positioning Servo Assembly Laterally on Base Bracket

10. Once positioned, use pilot holes in vertical bracket to match drill #40 holes through base bracket. Install temporary fasteners to hold bracket in place.
11. Remove servo assembly, angle brackets, and base bracket from aircraft.
12. Disassemble servo assembly.
13. Attach vertical bracket to base bracket with temporary fasteners.
14. Drill up to #18 holes through vertical and base bracket, removing temporary fasteners as needed.

15. Permanently attach vertical bracket to base bracket (see [Figure 22](#)).

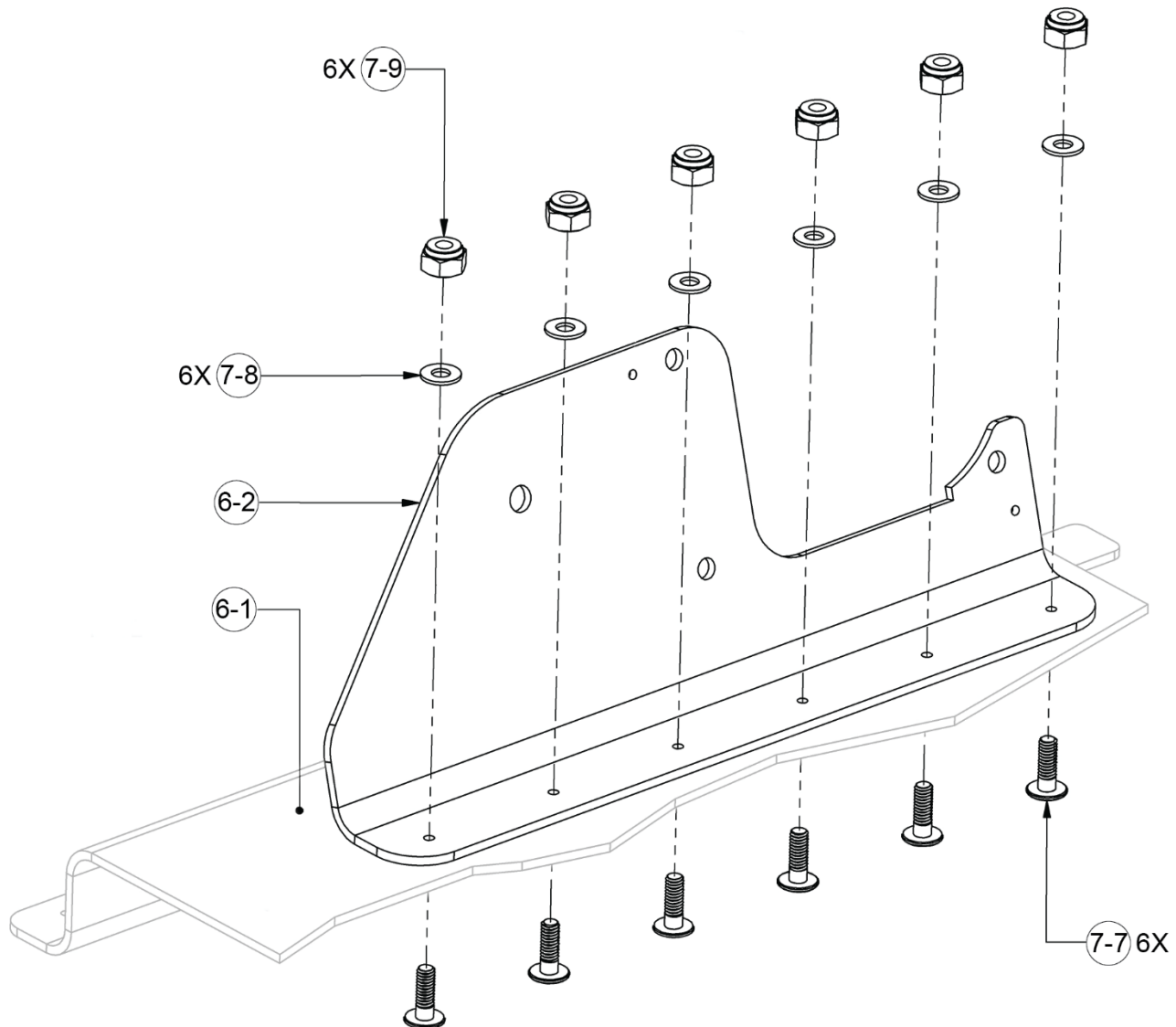


Figure 22: Attaching Vertical Bracket to Base Bracket

15. Permanently secure idler pulley and pulley guard to vertical bracket (see [Figure 19](#)).
16. Using marks and holes for alignment, place bracket assembly in aircraft and temporarily fasten to fuselage skin.
17. Using holes for alignment, place angle brackets in aircraft and temporarily fasten to FS108 bulkhead.
18. Drill up to #18 holes through base bracket and fuselage skin, removing temporary fasteners as needed.
19. Make sure bracket assembly is in correct position and temporarily fasten to fuselage skin.
20. Drill up to #30 holes through angle brackets and FS108 bulkhead, removing temporary fasteners as needed.

21. Permanently attach angle braces to FS180 bulkhead with rivets (see [Figure 23](#)). Rivet left angle brace from front of bulkhead and right-angle brace from rear of bulkhead.

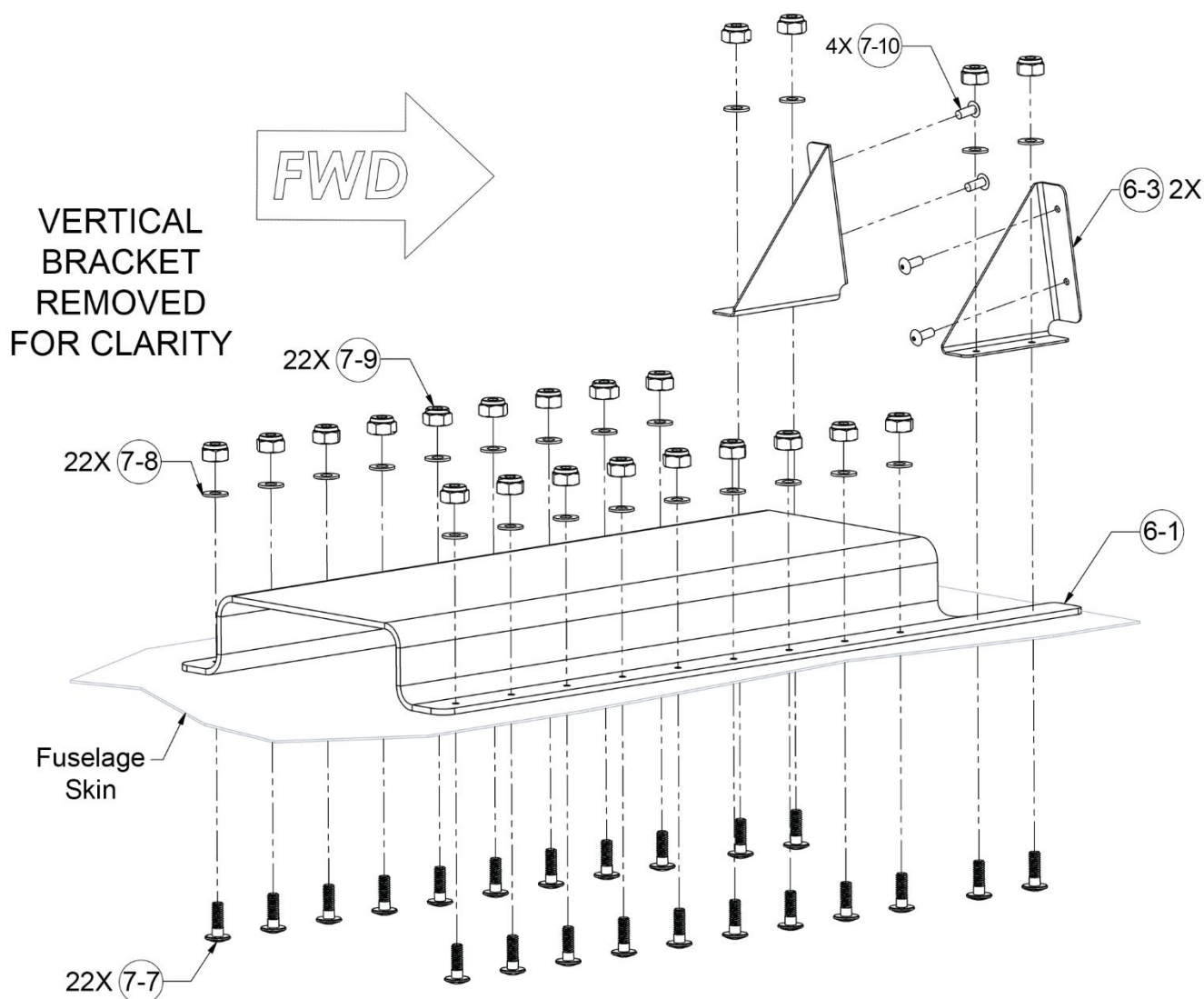


Figure 23: Attaching Bracket Assembly to Aircraft

22. Permanently attach bracket assembly to fuselage skin and FS180 bulkhead (see [Figure 23](#)).
23. Temporarily attach pitch servo to vertical bracket (see [Figure 19](#)).

24. Temporarily attach short brace to pitch servo, as shown in [Figure 24](#).

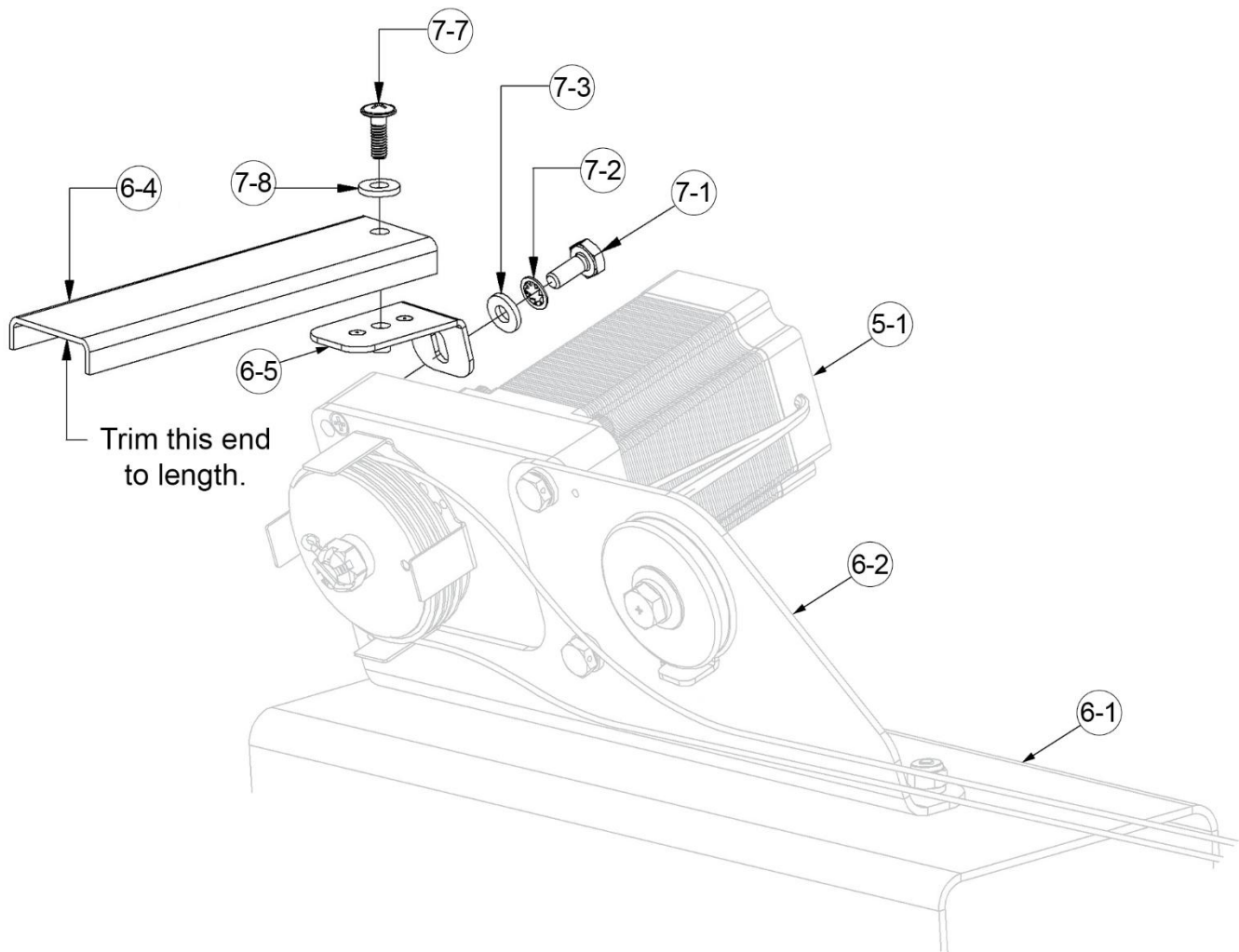


Figure 24: Attaching Short and Long Brace to Pitch Servo

25. Position long brace between FS180 bulkhead rib and short brace, as shown in [Figure 25](#). This determines final length of long brace.

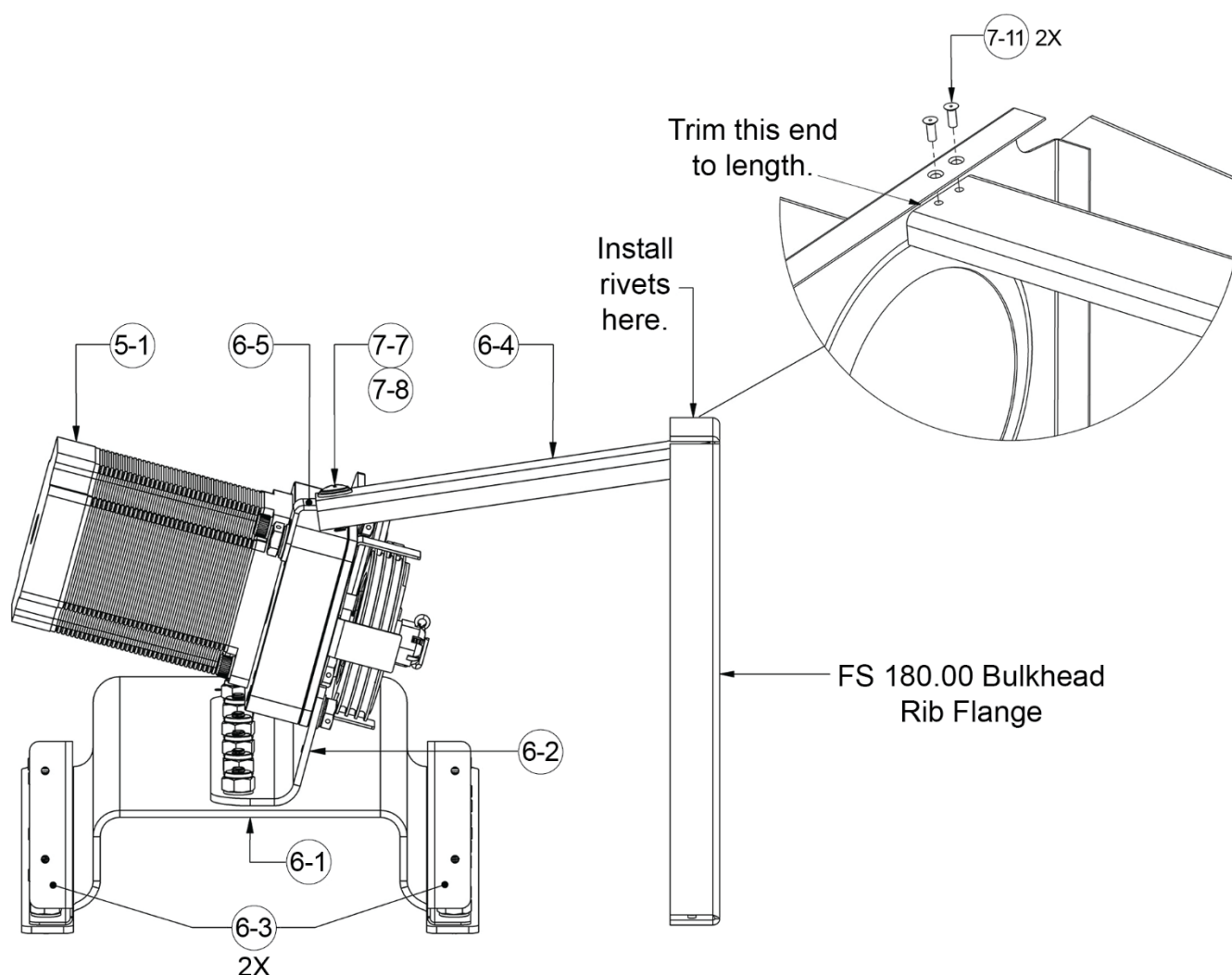


Figure 25: Attaching Long Brace to Aircraft

26. Mark and trim long sway brace (see [Figure 24](#) and [Figure 25](#)).
27. Temporarily fasten long brace to short brace (see [Figure 24](#)).
28. Drill #40 holes through FS180 bulkhead rib and long brace (see [Figure 25](#)). Install a temporary fastener to hold brace in place.
29. Loosen long brace from short brace.
30. Permanently attach long brace to FS180 bulkhead rib (see [Figure 25](#)).
31. Tighten all hardware, except for pitch servo bolts.
32. Remove pitch servo from aircraft.

To connect the pitch servo to the lower elevator control cable:

1. Secure elevator and/or yoke in center of travel.

2. Make sure lower elevator control cable in area where bridle cable clamps will attach is clean and free of dirt and grease.
3. Remove capstan from pitch servo (see Section 11.5).



DO NOT remove shear screw from servo disc!

4. Insert bridle cable's swage into capstan's swage engagement hole, and then wrap bridle cable '3/4' revolution in each direction around capstan, as shown in Figure 26.



The swage engagement hole must be in the 3 'o' clock position, and the orientation mark must face away from the servo, as shown in Figure 26.



Securing the bridle cable to the capstan's grooves with tape prevents it from unraveling when handling.

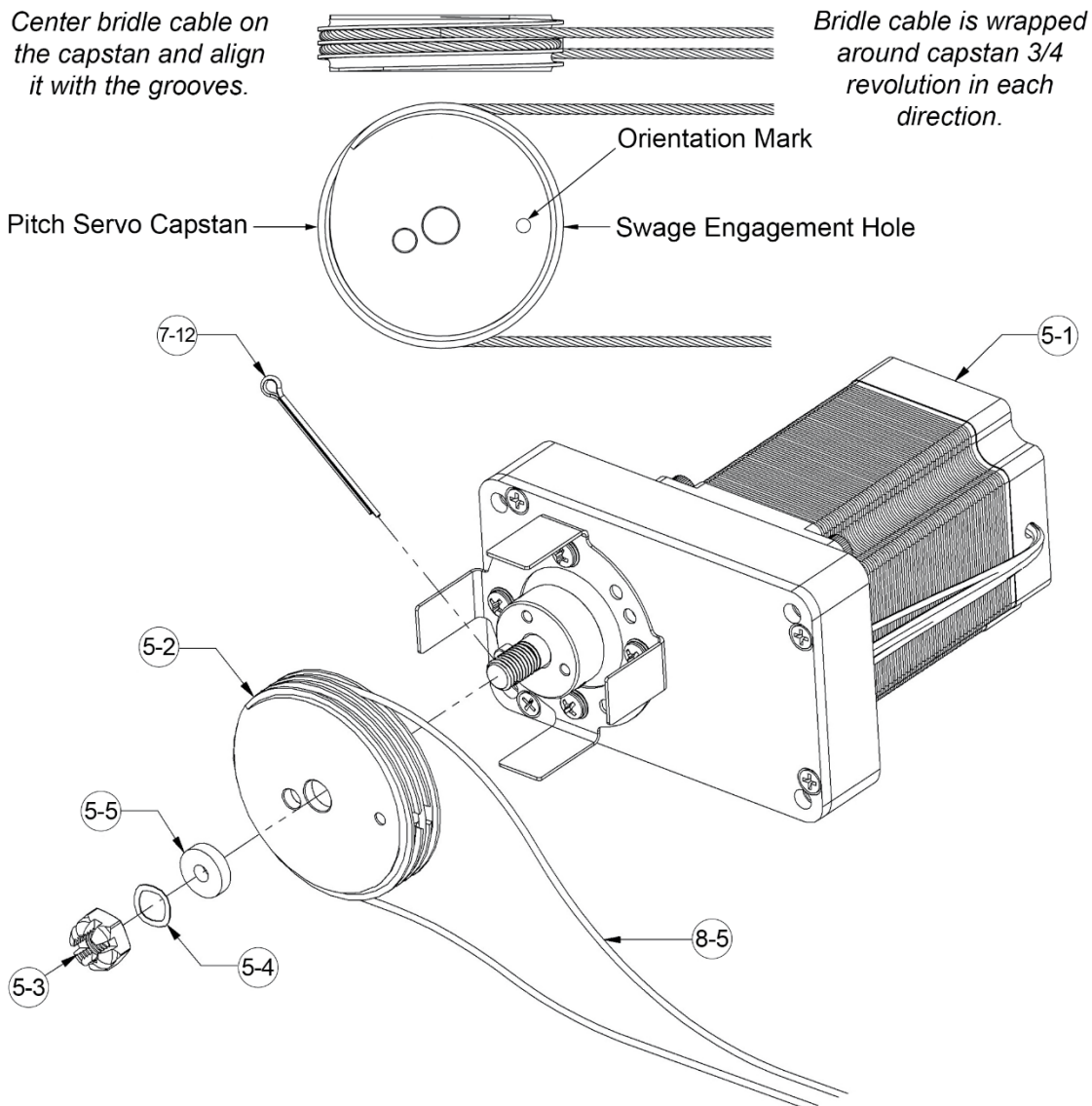


Figure 26: Wrapping Bridle Cable and Attaching Capstan to Pitch Servo

5. Temporarily attach capstan pitch servo (see [Figure 26](#)). Cotter pin not needed at this time.
6. Use bridle cable clamps to loosely connect bridle cable ends to lower elevator control cable, as shown in [Figure 27](#).

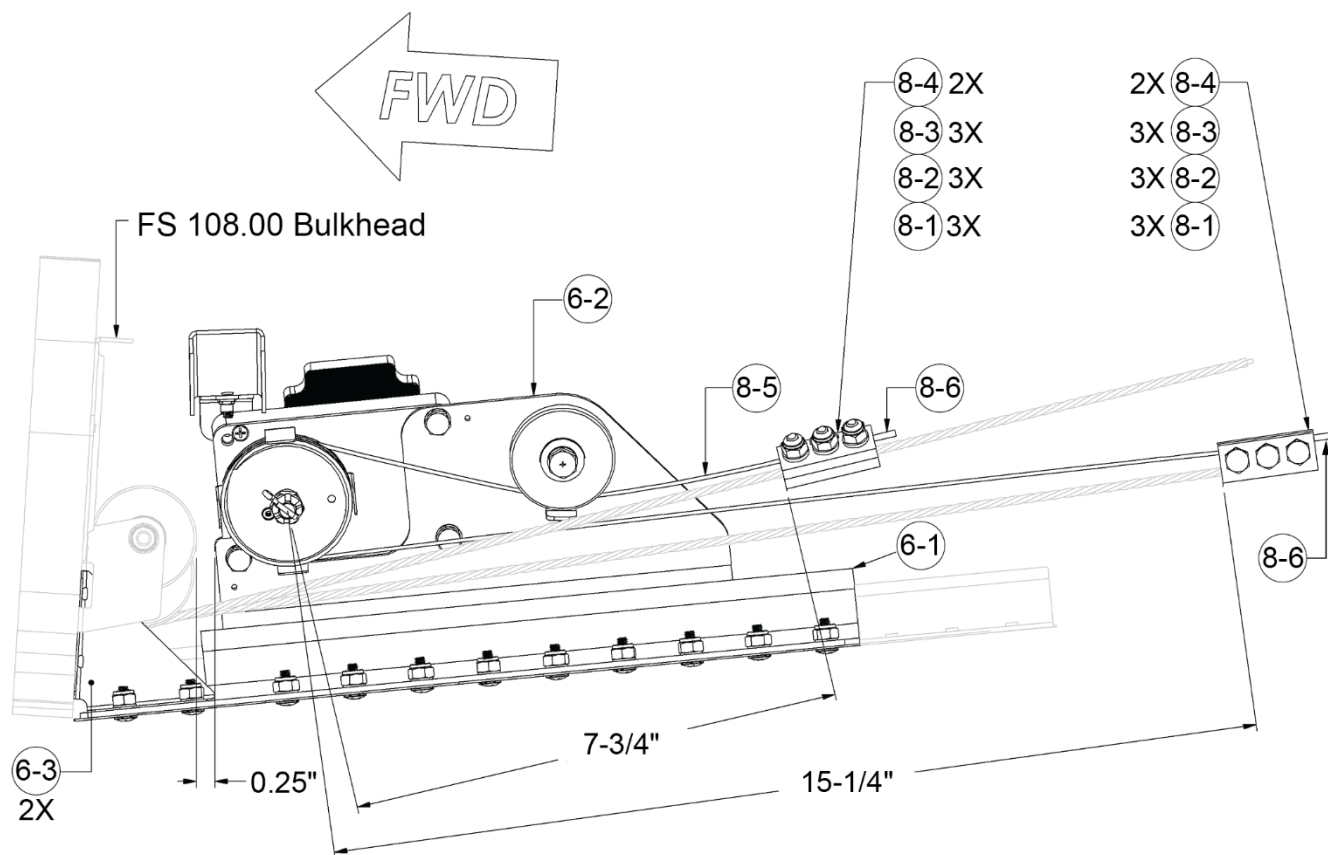


Figure 27: Connecting Bridle Cable to Lower Elevator Control Cable

7. Mark locations for swage stops on bridle cable at outside edges of bridle cable clamps.
8. Slide a swage stop onto one end of bridle cable, and then position it per specifications in [Figure 27](#).
9. Crimp swage stop to bridle cable, and then trim bridle cable end flush with outside edge of swage stop.
10. Repeat Steps 8 and 9 on the other end of bridle cable.
11. Make sure bridle cable does not contact cable guard.



The bridle cable will prematurely wear if bridle cable and cable guard make contact when control is in a neutral position.

12. If cable guard interferes with bridle cable, adjust cable guard position (see [Section 11.6](#) for instructions), and then repeat Step 11.

13. Tension and temporarily secure bridle cable to 15-20 lbs, ensuring swage engagement hole stays in the 3 'o' clock position.



The tension on bridle cable should never exceed manufacturer's specified tension for control cable.

14. When satisfied with tension and capstan position, tighten all bridle cable clamp nuts to 35-40 in-lb.
15. Use a feeler gauge to measure gaps between bridle cable clamp halves (top and bottom). Make sure gaps meet the following criteria:
 - Gap measurements on both sides of clamp are not less than 0.003" and not more than 0.050".



If clamp gap measurements do not meet criteria above, measure diameter of control cable, and then contact Dynon Technical Support for a resolution.

Out-of-specification cable clamps can slip under load.

16. Permanently attach capstan pitch servo (see Section [11.5](#)).

To check the pitch servo installation:

1. Release elevator and/or yoke.
2. Move elevator control through full range of motion per manufacturer's maintenance instructions, and verify the following:
 - Control is smooth throughout (i.e., no grinding, rubbing, or roughness).
 - Bridle cable clamps do not contact any structures during entire travel.
 - Capstan never rotates more than 150 degrees in either direction from neutral.
3. Cycle the control surface several times, return it to neutral, and verify the following:
 - Swage engagement hole is in the 3 'o' clock position.
 - Position of bridle cable clamps closely matches [Figure 27](#).
 - Bridle cable tension has not changed.

8 Servo Electrical Connection

Refer to the following documents at dynoncertified.com/docs for complete electrical connection instructions:

- SkyView HDX System Installation Manual
- SkyView HDX Wiring Diagram - Twin Engine

Dynon provides the SV-NET-SERVO Network Autopilot Servo Cable Kit to aid in wiring the servos. Contact Dynon Sales for more information.



Servo electrical harnesses must be routed through the airframe structure as outlined in AC 43.13-1B, Chapter 11, Section 3.



Servo electrical harnesses must not chafe against airframe structure. After all electrical connection activities are complete, visually inspect all harness routing.



Servo electrical harnesses cannot interfere with the airplane's flight controls. After all electrical connection activities are complete, confirm this by moving all controls through full range of motion per manufacturer's maintenance instructions.



Terminate servo electrical harnesses with a D9 connector shell with female pins; terminate pigtails on servo electrical harnesses with mating D9 connectors.



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



Servo power (AP Power) and the pitch and roll servo disconnect (AP DISC) circuits are required to be separate from the power and signal circuits provided over the SkyView Network. The servos should receive power from a common power source with circuit protection sized for the loads associated with all servos.



Do not connect the yaw servo disconnect circuit to the pitch and roll servo disconnect (AP DISC) circuit. This will result in a yaw servo calibration test failure. The yaw servo disconnect circuit should only be connected to a Yaw Damper button or left unconnected if no Yaw Damper button is installed.

After electrically connecting the Autopilot servos, perform the Servo Calibration Procedure (see Section [11.2](#) for instructions).

8.1 Custom Wire Harness Preparation

If your SkyView Autopilot installation requires customized wire harnesses, refer to [Table 3](#) for wire/pin connection guidance. Dynon harness standard is to connect servo wires to a D9 male connector with threaded jack nuts. (See the *SkyView HDX Wiring Diagram - Single Engine* and *SkyView HDX System Installation Manual* documents at dynoncertified.com/docs for additional electrical installation information.)

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	Servo Disconnect	Yellow	Autopilot Disconnect Button or Yaw Damper 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

9 Electric Trim Control

Existing pitch trim motors certified for the airplane can be controlled through the SkyView HDX Autopilot system. Such trim motors must operate on 10–30 Volts with a maximum current draw of 5 Amps. This includes trim motors with or without a clutch.

Instructions for connecting to a trim motor, configuring SkyView HDX for trim control, and functionally testing the feature are found in the *SkyView HDX System Installation Manual* document at dynoncertified.com/docs.

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10 Servo Troubleshooting

This section provides troubleshooting information for autopilot servos. See the *SkyView HDX General Maintenance Manual* for information about troubleshooting the SkyView Autopilot system interface.

10.1 Servos Offline Messages

Condition:

One or more of the following messages appear on SkyView HDX display unit:

1. PITCH SERVO OFFLINE
2. ROLL SERVO OFFLINE

If all three messages annunciate:

1. Verify master power is *ON*.
2. Verify autopilot circuit breaker and power switch are *ON*.
3. Verify servo harness connectors are properly mated.
4. Verify there is electrical power to servos.
5. Verify there is adequate ground for servos.

If condition persists, or if only one message annunciates:

1. Enter SETUP menu (hold Buttons #7 and #8)
2. Enter SYSTEM SETUP -> SKYVIEW NETWORK SETUP-> NETWORK STATUS
3. Locate the SV42 devices (servos) in list of network devices. If necessary, use knobs to scroll through entire list. If you do not see a servo entry in the list of network devices for each servo installed, press BACK button, and perform a SkyView Network Configuration.
4. If any servos are highlighted in RED:
 - a) Verify autopilot circuit breaker and power switch are *ON*.
 - b) Inspect/fix wiring to affected servo, or common wiring if multiple servos are offline.
5. If any servos are highlighted in YELLOW, a software upgrade did not complete properly.
6. If all above fails, contact Dynon Technical Support. Always have a properly rated mechanic or qualified facility remove unit.

10.2 Abnormal Operation

Condition:

One or more autopilot axes fail to move as expected or operate in an unexpected manner.

To test for bridle cable clamp slippage:

1. On ground, engage the autopilot into Level Mode.
2. From exterior of the airplane, grasp, and gently attempt to move the affected control surface (i.e., aileron or elevator).
3. Have an assistant observe the bridle cable clamps during Step #2.
4. If cable clamp slips, remove and install the clamp per guidance in [Section 0](#) or [Section 11.9](#).

To test for broken shear screw:

1. On ground, engage the autopilot into Level Mode.
2. From exterior of the airplane, grasp, and gently attempt to move the affected control surface (i.e., elevator, aileron, rudder).
3. If autopilot does not resist attempt to move control surface, contact Dynon Technical Support to request a 102991-000 Shear Screw Replacement Kit.

10.3 Servo Slip Messages

Condition:

One or more of the following messages appear and persist on SkyView HDX display unit:

1. PITCH SERVO SLIP
2. ROLL SERVO SLIP

The momentary appearance of SERVO SLIP messages is expected due to certain weather conditions during autopilot operation. If a SERVO SLIP message persists, contact Dynon Technical Support for assistance.

11 Servo Maintenance

This section provides maintenance information for autopilot servos and associated bracketry. See the *SkyView HDX General Maintenance Manual* for information about troubleshooting the Autopilot system interface.



No special tools or facility are required to service autopilot servos and associated bracketry.

11.1 Service

Every 12 months (1 calendar year), the autopilot servo components and wiring harnesses should be inspected to ensure continued integrity of the installation (see below).

- Inspect for security of servo attachment, which includes visual inspection of brackets and other supporting structures that attach to the airplane.
- Inspect servo capstan for roughness, sharp edges, and presence of foreign material embedded in grooves.
- Inspect bridle cables for *wear and* broken wires strands.
- Inspect for signs of corrosion.
- Inspect condition of wiring, shield terminations, routing, and attachment/clamping, along with any airplane penetration points.

In the event of system failures, contact Dynon Technical Support. Always have a properly rated mechanic or qualified facility remove a failed component.

11.2 Calibration Procedure

The SkyView Autopilot servo settings are available for download as a configuration file that is loaded into the SkyView HDX display. This file configures the autopilot servo performance settings to meet the applicable certification regulations. Servo calibration cannot be performed without the following:

- An ADAHRS module (SV-ADAHRS-200) installed and configured in the SkyView network.
- All servos installed and configured in the SkyView Network.
- V-speeds correctly entered in SkyView HDX. (See the *SkyView HDX System Installation Manual* document for instructions.)

To make a new servo appear on the SkyView HDX display, configure the SkyView Network (SYSTEM SETUP > NETWORK SETUP > CONFIGURE). (See the *SkyView HDX System Installation Manual* document for instructions.)

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).

SkyView checks the status of the AP DISC button. If SkyView detects that the button is pressed (the input is grounded) upon entering AP SERVO CALIBRATION, the AP DISC button is assumed to be stuck (or incorrectly installed), resulting in the following message being displayed, and the autopilot 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."

If the servo calibration procedure is not successful, inspect the button and servo wiring. (See the 103261-000 SkyView HDX System Installation Manual document for instructions.) If button type and wiring is correct, call Dynon Technical Support.

If the servo calibration procedure is successful, SkyView will automatically instruct you to run the servo test procedure. (See Section 11.3 for instructions.)

11.3 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).

11.4 Servo Operation Check

Complete the following procedures to confirm the servos are operating correctly.

To check the autopilot disconnect functionality:

1. Make sure master power and autopilot servo power are *ON*.
2. Engage autopilot.
3. Complete the following:
 - Press AP button in Autopilot Control menu, and make sure autopilot disconnects. "AUTOPILOT DISCONNECT" aural indication should be heard.
 - Turn autopilot servo power switch OFF, and make sure autopilot disconnects. "AUTOPILOT DISCONNECT" aural indication should be heard.
 - If installed, press AP button on Autopilot Control Panel, and make sure autopilot disconnects. "AUTOPILOT DISCONNECT" aural indication should be heard.

- If installed, press panel-mounted AP DISC button, and make sure autopilot disconnects.
"AUTOPILOT DISCONNECT" aural indication should be heard.
- If installed, press yoke-mounted autopilot disconnect button, and make sure autopilot disconnects.
"AUTOPILOT DISCONNECT" aural indication should be heard.

To check the pitch and roll axes:

1. Make sure master power and autopilot servo power are *ON*.
2. Center, and lightly hold in place, flight control yoke.
3. Align HDG/TRK bug with current heading.
4. Select ALT and HDG.
5. Engage autopilot.
6. Set vertical speed to +1000.
7. Set altitude 1000 feet above current. Yoke should move in Nose Up direction.
8. Press and hold ALT button to return altitude bug to current. Yoke should move back to neutral position.
9. Change HDG/TRK bug to right of current heading. Yoke should move in direction of a right roll.
10. Change HDG/TRK bug to left of current heading. Yoke should move in direction of a left roll.

11.5 Servo Capstan Removal and Attachment

Dynon's autopilot servos are shipped with capstans installed. Servo installation procedures often require the temporary removal and re-attachment of capstans.



Unless otherwise specified, torque all fasteners per specifications in AC 43.13-1B, Table 7-1. Include specified friction drag value when torquing screws.

Reference [Figure 28](#) when performing the following procedure.

To remove and re-attach the capstan:

1. Remove cotter pin that secures castle nut to servo shaft.
2. Mark position of castle nut in relation to servo shaft, and then remove castle nut from servo shaft.
3. Remove wave washer from servo shaft.
4. Removed nylon washer from servo shaft.
5. Remove capstan from servo shaft.



The shear screw does not need to be removed from the servo disc. The capstan has a hole that fits over the shear screw head.



If the shear screw is loosened, it must be completely removed and replaced (see Section [11.7](#)).

6. Place capstan onto output shaft, aligning hole in capstan with shear screw head located in servo disc.
7. Replace nylon washer on servo shaft.
8. Replace wave washer on servo shaft.
9. Finger-tighten castle nut onto servo shaft, and then use a wrench to tighten until slot in castle nut lines up with hole for cotter pin in servo shaft.



DO NOT overtighten the castle nut!

Tightening the castle nut beyond 4 in-lbs may prevent the capstan from rotating freely in the event of shear screw failure.

10. Install new cotter pin to secure castle nut to servo shaft.

11.6 Cable Guard Adjustment

Dynon's autopilot servos are shipped with cable guards installed. The cable guard may need to be repositioned to avoid interference with the flight control cables or the bridle cables during servo installation procedures. The following procedure details the task of adjusting a cable guard.



Unless otherwise specified, torque all fasteners per specifications in AC 43.13-1B, Table 7-1. Include specified friction drag value when torquing screws.

Reference [Figure 28](#) when performing the following procedure.

To adjust the cable guard:

1. Remove capstan from servo shaft (see Section [11.5](#) for instructions).
2. Remove screws and star washers that secure capstan guard to servo.
3. Rotate capstan guard to correct position.
4. Secure capstan guard to servo with screws and star washers.
5. Re-attach capstan to servo shaft (see Section [11.5](#) for instructions).

11.7 Shear Screw Replacement

Dynon autopilot servos come equipped with a capstan. The capstan connects to the servo via a frangible shear screw. The shear screw can be broken by the pilot to restore system movement should a servo become jammed. It is possible for turbulence loads acting on the airplane to cause a shear screw to fail, even though the servo never jammed.



In the event of a shear screw failure, contact Dynon Technical Support to request a 102991-000 Shear Screw Replacement Kit.



Shear screw replacement instructions are provided in the *Dynon Servo Shear Screw Replacement Instructions* document included in the Shear Screw Replacement Kit.

11.8 Roll Servo Removal and Replacement

This section provides instructions for removing and replacing a roll servo and connecting it back to the control system.

The roll servo and bracketry are installed between WS100 and WS118 (see [Figure 1](#)). To install the roll servo, installers need to access this area in accordance with the manufacturer's service manual. (See [Figure 2](#) for an example of a complete installation.)



Make sure all flight control cables are rigged and tensioned in accordance with manufacturer's instructions.



Always disconnect aircraft battery before starting removal and installation activities.



Unless otherwise specified, torque all fasteners per specifications in AC 43.13-1B, Table 7-1. Include specified friction drag value when torquing screws.

To remove the roll servo:

1. Disconnect D9 cable harness connector from servo.
2. Mark location of roll servo on upper bracket.
3. Mark locations of bridle cable clamps on aileron crossover cable.



Securing (e.g., taping) the bridle cable to capstan grooves prevents cable from unraveling when handling.

4. Remove safety clips from turnbuckle.
5. Loosen bridle cable clamps (see [Figure 12](#)).
6. Unfasten hardware that secures cable guard to cable guard bracket (see [Figure 13](#)), and then unfasten hardware that secures cable guard bracket to roll servo (see [Figure 13](#)). Retain hardware for installation.

7. Unfasten hardware that secures upper and lower brackets to wing skins and rear spar (see [Figure 11](#)). Retain hardware for installation.
8. Remove roll servo bracket assembly from aircraft (see [Figure 9](#)).
9. Unfasten hardware that secure roll servo to upper and lower brackets (see [Figure 4](#)).
10. Remove capstan (with bridle cable) from roll servo (see [Section 11.5](#) for instructions).



DO NOT loosen or remove the shear screw from the servo disc!

To replace the roll servo:

1. Secure ailerons in center of travel.
2. Make sure aileron crossover cable in area where bridle cable clamps will attach is clean and free of dirt and grease.
3. Temporarily attach capstan (with bridle cable) to new roll servo, as shown in [Figure 6](#). Cotter pin not needed at this time.



Position servo capstan so swage engagement hole is in the 6 'o' clock position, orientation mark faces away from servo, and is fully seated on servo disc. The capstan has a hole that fits over shear screw head.

4. Permanently attach roll servo assembly to upper and lower brackets (see [Figure 4](#)). Attach roll servo to upper bracket at mark made during removal process.
5. Insert roll servo bracket assembly into aircraft (see [Figure 9](#)).
6. Use bridle cable clamps to loosely connect bridle cable ends to aileron crossover cable at marks made during removal process. Make sure clamps contact swage stops at each end of bridle cable, as shown in [Figure 12](#).
7. Make sure bridle cable does not contact cable guard.



The bridle cable will prematurely wear if it contacts the cable guard throughout its travel.

8. If cable guard interferes with bridle cable, adjust cable guard position (see [Section 11.6](#) for instructions), and then repeat Step 7.
9. Tighten all bridle cable clamp nuts to 35-40 in-lb.
10. Use a feeler gauge to measure gaps between bridle cable clamp halves (top and bottom). Make sure gaps meet the following criteria:
 - Gap measurements on both sides of clamp are not less than 0.003" and not more than 0.050".



If clamp gap measurements do not meet criteria above, measure diameter of control cable, and then contact Dynon Technical Support for a resolution.

Out-of-specification cable clamps can slip under load.

11. Using turnbuckle, tension bridle cable to 15-20 lbs. Make sure capstan's swage engagement hole remains in the 6 'o' clock position.



The tension on bridle cable should never exceed manufacturer's specified tension for control cable.

12. Use clips to safety wire bridle cable turnbuckle halves and barrel.
13. Permanently attach capstan to roll servo (see Section [11.5](#)).
14. Attach cable guard bracket to roll servo (see [Figure 13](#)).
15. Capture aileron crossover cable and bridle cable with cable guard, as shown in [Figure 13](#), and then attach cable guard to cable guard bracket (see [Figure 13](#)).
16. Adjust cable guard and/or cable guard bracket as needed so cables do not contact cable guard.

To check the roll servo installation:

1. Release ailerons and/or yoke.
2. Move aileron control through full range of motion per manufacturer's maintenance instructions, and verify the following:
 - Control is smooth throughout (i.e., no grinding, rubbing, or roughness).
 - Bridle cable clamps do not contact any structures during entire travel.
 - Capstan never rotates more than 90 degrees in either direction from neutral.
3. Cycle the control surface several times, return it to neutral, and verify the following:
 - Swage engagement hole is in the 6 'o' clock position.
 - Position of bridle cable clamps closely matches [Figure 12](#).
 - Bridle cable tension has not changed.



After all Autopilot servos have been serviced, perform servo calibration procedure (see Section [11.2](#) for instructions).

11.9 Pitch Servo Removal and Replacement

This section provides instructions for removing and replacing a roll servo and connecting it back to the control system.

The pitch servo and bracketry are installed underneath the floor of the baggage area, immediately behind the bulkhead at FS108 (see [Figure 14](#)). To install the pitch servo, installers need to access this area in accordance with the manufacturer's service manual. (See [Figure 15](#) for an example of a complete installation.)



Make sure all flight control cables are rigged and tensioned in accordance with manufacturer's instructions.



Always disconnect aircraft battery before starting removal and installation activities.



Unless otherwise specified, torque all fasteners per specifications in AC 43.13-1B, Table 7-1. Include specified friction drag value when torquing screws.

To remove the pitch servo:

1. Disconnect D9 cable harness connector from servo.
2. Mark locations of bridle cable clamps on aileron crossover cable.



Securing (e.g., taping) the bridle cable to capstan grooves prevents cable from unraveling when handling.

3. Loosen bridle cable clamps (see [Figure 27](#)).
4. Unfasten hardware that secures short brace to pitch servo (see [Figure 24](#)). Retain hardware for installation.
5. Unfasten hardware that secures pitch servo to vertical bracket ([Figure 19](#)). Retain hardware for installation.
6. Remove pitch servo assembly from aircraft.
7. Remove capstan (with bridle cable) from pitch servo (see [Section 11.5](#) for instructions).



DO NOT loosen or remove the shear screw from the servo disc!

To connect the pitch servo to the lower elevator control cable:

1. Secure elevator and/or yoke in center of travel.
2. Make sure lower elevator control cable in area where bridle cable clamps will attach is clean and free of dirt and grease.

3. Temporarily attach capstan (with bridle cable) to new pitch servo, as shown in [Figure 26](#). Cotter pin not needed at this time.



Position servo capstan so swage engagement hole is in the 3 'o' clock position, orientation mark faces away from servo, and is fully seated on servo disc. The capstan has a hole that fits over shear screw head.

4. Insert pitch servo assembly into aircraft.
5. Use bridle cable clamps to loosely connect bridle cable ends to lower elevator control cable at marks made during removal process. Make sure clamps contact swage stops at each end of bridle cable, as shown in [Figure 27](#).
6. Make sure bridle cable does not contact cable guard.



The bridle cable will prematurely wear if bridle cable and cable guard make contact when control is in a neutral position.

7. If cable guard interferes with bridle cable, adjust cable guard position (see Section [11.6](#) for instructions), and then repeat Step 6.
8. Tension and temporarily secure bridle cable to 15-20 lbs, ensuring swage engagement hole stays in the 3 'o' clock position.



The tension on bridle cable should never exceed manufacturer's specified tension for control cable.

9. When satisfied with tension and capstan position, tighten all bridle cable clamp nuts to 35-40 in-lb.
10. Use a feeler gauge to measure gaps between bridle cable clamp halves (top and bottom). Make sure gaps meet the following criteria:
 - Gap measurements on both sides of clamp are not less than 0.003" and not more than 0.050".



If clamp gap measurements do not meet criteria above, measure diameter of control cable, and then contact Dynon Technical Support for a resolution.

Out-of-specification cable clamps can slip under load.

11. Permanently attach capstan pitch servo (see Section [11.5](#)).

To check the pitch servo installation:

1. Release elevator and/or yoke.
2. Move elevator control through full range of motion per manufacturer's maintenance instructions, and verify the following:
 - Control is smooth throughout (i.e., no grinding, rubbing, or roughness).
 - Bridle cable clamps do not contact any structures during entire travel.
 - Capstan never rotates more than 150 degrees in either direction from neutral.

3. Cycle the control surface several times, return it to neutral, and verify the following:

- Swage engagement hole is in the 3 'o' clock position.
- Position of bridle cable clamps closely matches [Figure 27](#).
- Bridle cable tension has not changed.



After all Autopilot servos have been serviced, perform servo calibration procedure (see Section [11.2](#) for instructions).

12 Appendix 1: Servo Capstan Removal / Installation Figure

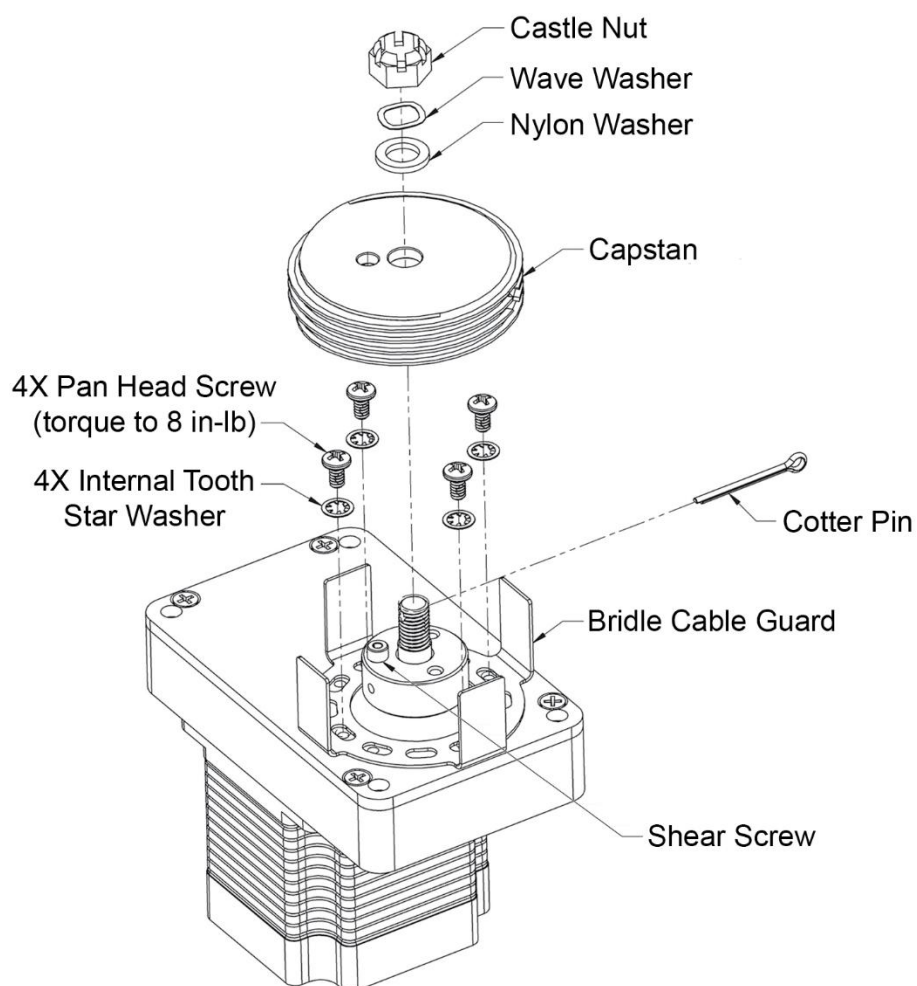


Figure 28: Exploded View of a Typical Servo Capstan Assembly