

STC GROUP LLC
480 RUDDIMAN DRIVE
MUSKEGON, MICHIGAN 49445

REPORT NO: 1006006 REV D

TRIO AUTO PILOT INSTALLATION INSTRUCTIONS

CESSNA MODEL 172 & 172RG
CESSNA NAVOMATIC EQUIPPED MODELS

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REVISIONS

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-	20 November 2017	Paul Odum	Jeff Ley
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C	18 June 2021	AJ Abdulshafi	Jeffrey Odum
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Rev. A	Moved Section 4 to Appendix A. Appendix A changed to Appendix B.		
Rev. B	Appendix B moved to Appendix C. Updated wiring diagram.		
Rev. C	Sections 1.0, 2.0, 3.0, Updated Appendix B Pro Pilot Wiring Diagram, Added Appendix C 172/175/172RG Pitch Servo Installation.		
Rev. D	Updated References, Sections 1.0, 2.0, Appendices B & C, Added Appendix D. Renamed Images to Figures		



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REFERENCES

The following documents form a part of this report. Unless a specific revision of one of these documents is specified, the revision in effect at the time of original issue of this document shall apply.

DWG 413000XX Trio Pro Pilot System Wiring Diagram

Industry Specifications and Standards:

1. MMPDS-09 Metallic Materials Properties Development and Standardization
2. AC 43.13-1B Aircraft Inspection, Repair & Alterations

Other Data:

ER1006 – STC GROUP LLC Program Engineering Record.



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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ASSY	Assembly
Autopilot	Trio Pro Pilot Autopilot
Cessna	Cessna Aircraft Corporation
C.G.	Center of Gravity
ER	Engineering Record
FAA	Federal Aviation Administration
ICA	Instructions for Continued Airworthiness
INCH	Inches
LH	Left Hand
OEM	Original Equipment Manufacturer
OUTBD	Outboard
PCS	Pilot Controlled Steering
Recover	Recover Button
RH	Right Hand
Servo	Trio Gold Stand Servo
STC	Supplemental Type Certificate
WS	Wing Station
ASSY	Assembly
Autopilot	Trio Pro Pilot Autopilot
Cessna	Cessna Aircraft Corporation
C.G.	Center of Gravity
ER	Engineering Record
FAA	Federal Aviation Administration



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1.0 GENERAL

Thank you for your purchase of the TRIO Pro Pilot Autopilot for your aircraft. This document is written to ensure your installation is simple, safe, and professionally completed. Before you begin: Read All Instructions!

This installation procedure provides information and data necessary to install the Trio Auto Pilot Controller along with the Pitch and Roll servos in a Cessna 172 aircraft.

For the **Roll** installation, this manual is applicable to all serial numbers.

The following Cessna 172 **Pitch** Installation Instructions and Top Level Drawing # 1006204-1 (Refer to Appendix C) are valid for Serial Numbers:

Cessna 172 - 610, 612, 615, 622, 625, 630, 28000 through 47746, & 17247747 through 17249544.

The following Cessna 172RG Pitch Installation Instructions and Top Level Drawing # 1006204-1 (Refer to Appendix D) are valid for Serial Numbers:

Cessna 172RG – All Serial Numbers

Check all items included in the kit to ensure all parts are accounted for. You may compare the contents of the kit with the Illustrated Parts Catalog. Please contact us if there are missing items.

The STC Group Technical Support is available 0800 to 1700 Monday through Friday Pacific Time:

+1 (231) 220-9296

+1 (888) 350-2998

Trio Avionics may be reached Monday through Saturday at +1 (619) 448-4619



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NOTE:

Care should always be taken to avoid marring or scratching of any surfaces of autopilot assemblies including anodized surfaces. Painters tape may be used to prevent damaging hardware surfaces. Remove any previously installed autopilot and related servos, and harnesses. Record the station position of each component removed and weigh each component. This information will be used to update Weight & Balance data.

The STC Group LLC recommends that a flight test of the subject aircraft be conducted to assess aircraft rigging and handling characteristics prior to autopilot installation. Use Test 4 of The STC Group LLC Flight Test Cards, document F-1006-43. Documents can be found at The STC Group LLC website at www.thestcgroupllc.com/documents.

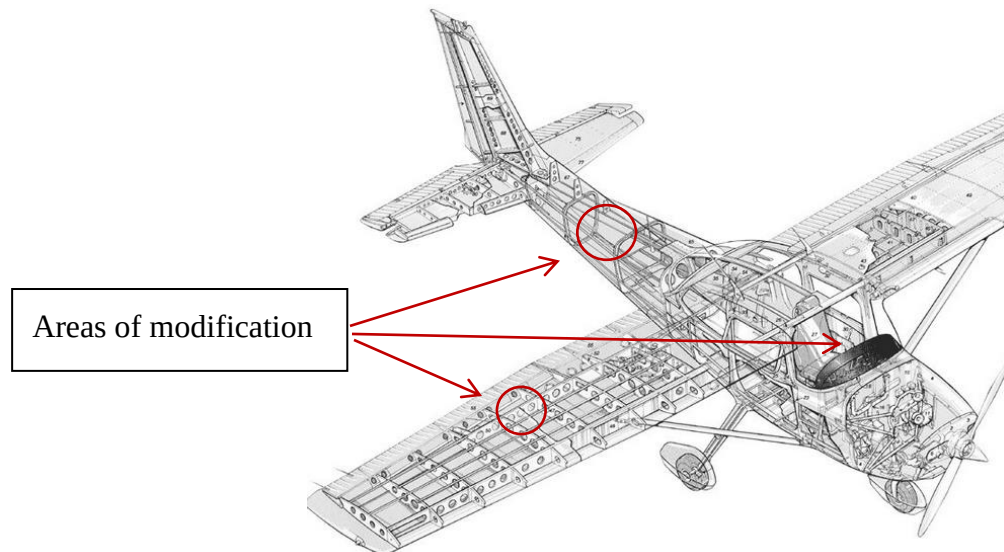


FIGURE 1-1 CESSNA 100 SERIES INSTALLATION LOCATIONS



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TABLE 1-1 PITCH INSTALLATION APPLICATION CHART

MODEL	PITCH SERVO INSTRUCTIONS
172	Appendix C
172A	Appendix C
172B	Appendix C
172C	Appendix C
172D	Section 3.0
172E	Section 3.0
172F (USAF T-41A)	Section 3.0
172G	Section 3.0
172H (USAF T-41A)	Section 3.0
172I	Section 3.0
172K	Section 3.0
172L	Section 3.0
172M	Section 3.0
172N	Section 3.0
172P	Section 3.0
172Q	Section 3.0
172R	Section 3.0
172S	Section 3.0
P172D	Section 3.0
R172E (USAF T-41B/C/D)	Section 3.0
R172F (USAF T-41D)	Section 3.0
R172G (USAF T-41C/D)	Section 3.0
R172H (USAF T-41D)	Section 3.0
R712J	Section 3.0
R172K	Section 3.0
172RG	Appendix D



2.0 ROLL SERVO INSTALLATION

2.1 OEM Wing Servo Removal

1. Remove RH wing inspection panels located at WS 103.5, 112.0, and 144.8, Ref Figure 2-2.
2. If the airplane is equipped with the OEM installed servo, disconnect the servo electrical harness connector and servo drive cable. Remove the servo, and servo bracket installed at W.S. 108.00.
3. Remove the cable guide pulley and bracket, located at RH WS 118.25 by removing the attachment bolts or drilling out the attachment rivets common to the guide wheel bracket and the aft spar web. Refer to Figure 2-1.

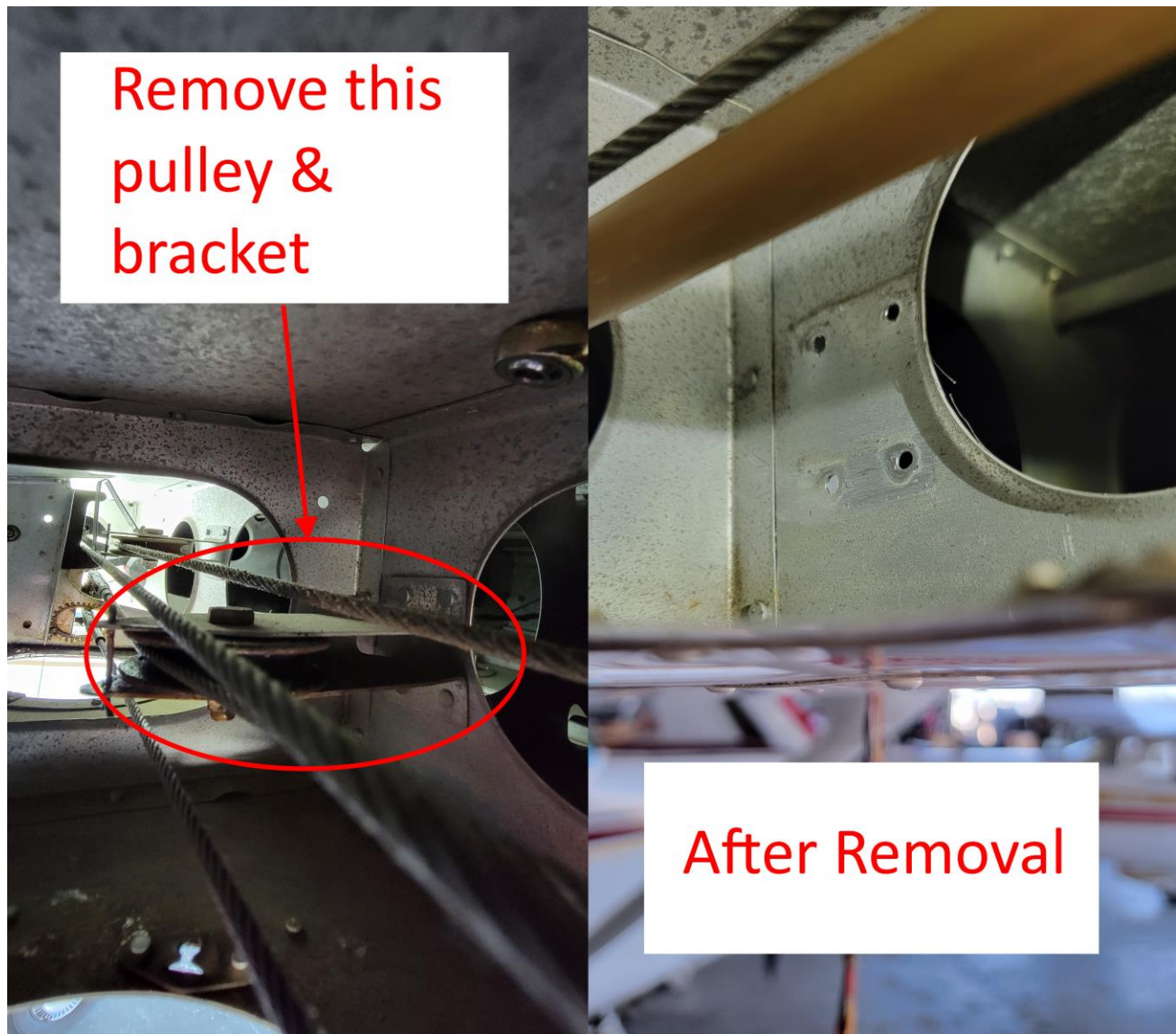


FIGURE 2-1 REMOVE THIS PULLEY & BRACKET



4. Cap, coil, and stow the servo wiring harness forward of the aft spar for use as a pull string when installing the TRIO roll servo wire harness.
5. Weigh and record all removed parts for weight and balance calculations.
6. Retain the old autopilot components in a suitable storage container.

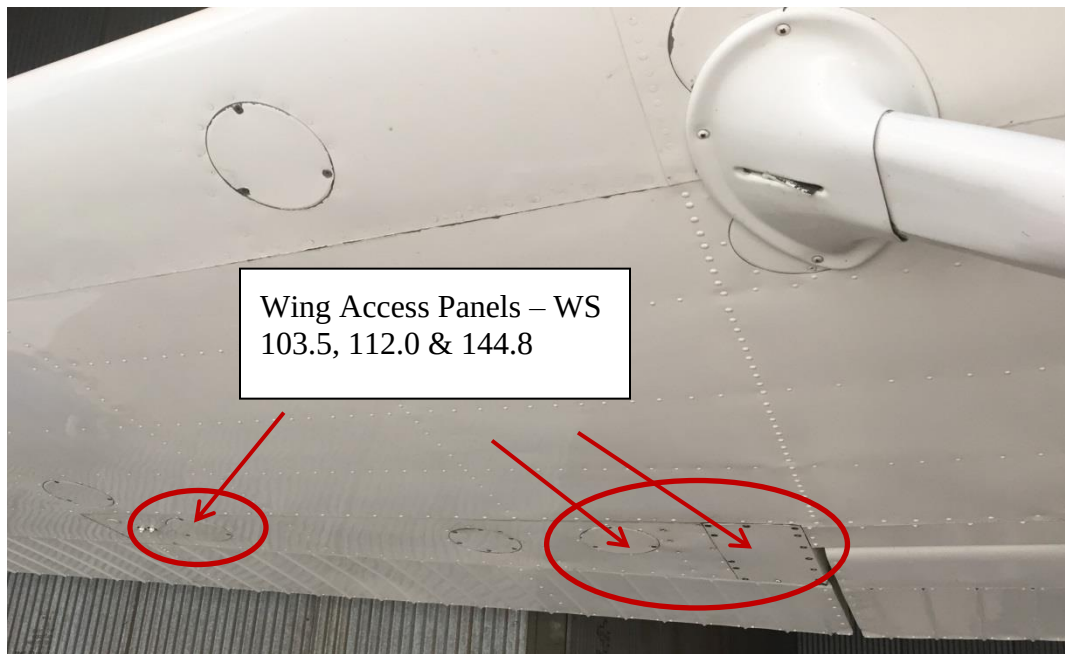


FIGURE 2-2 ROLL SERVO ACCESS PANELS

Note:

If any issues arise during installation of the bracket assemblies or autopilot, contact The STC Group LLC.



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FIGURE 2-3 RH AILERON BELLCRANK



2.2 TRIO Auto Pilot Roll Servo Mount Installation

1. Drill the 4 corner mounting holes on the servo baseplate using a #16 drill bit.
2. Install the hardware provided onto the servo hub. Refer to Figure 2-4.

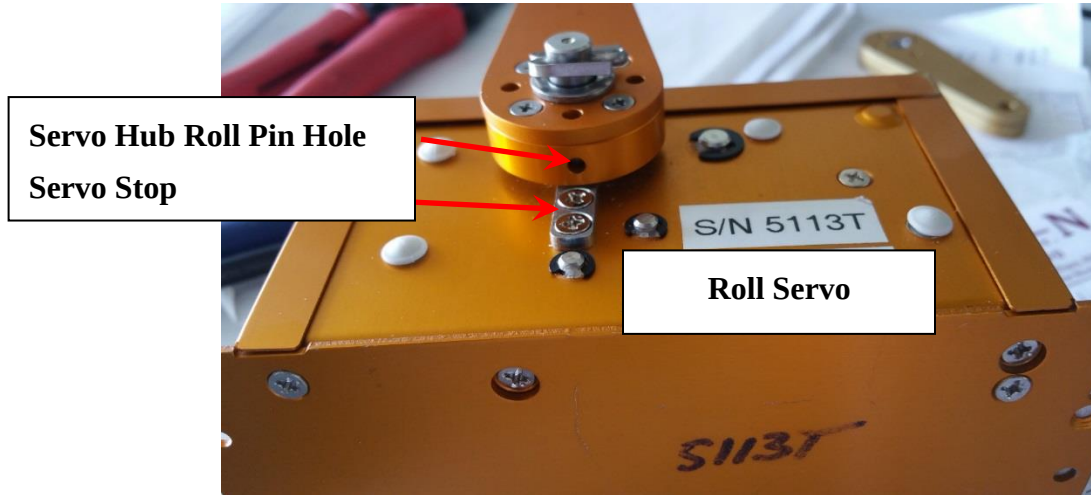


FIGURE 2-4 SERVO HUB ROLL PIN ALIGNMENT

3. Trim the top aft corner of the mounting plate as shown in Figure 2-5.



FIGURE 2-5 TRIM MOUNTING PLATE



4. Install the roll servo onto the mounting plate with the servo hub facing the bottom wing skin.
5. Dry fit the roll servo, mounting plate, and inboard angle piece inside the wing with clearance of 0.125" to 0.375" between the servo housing and the aileron carry-through cable. Refer to Figure 2-6.

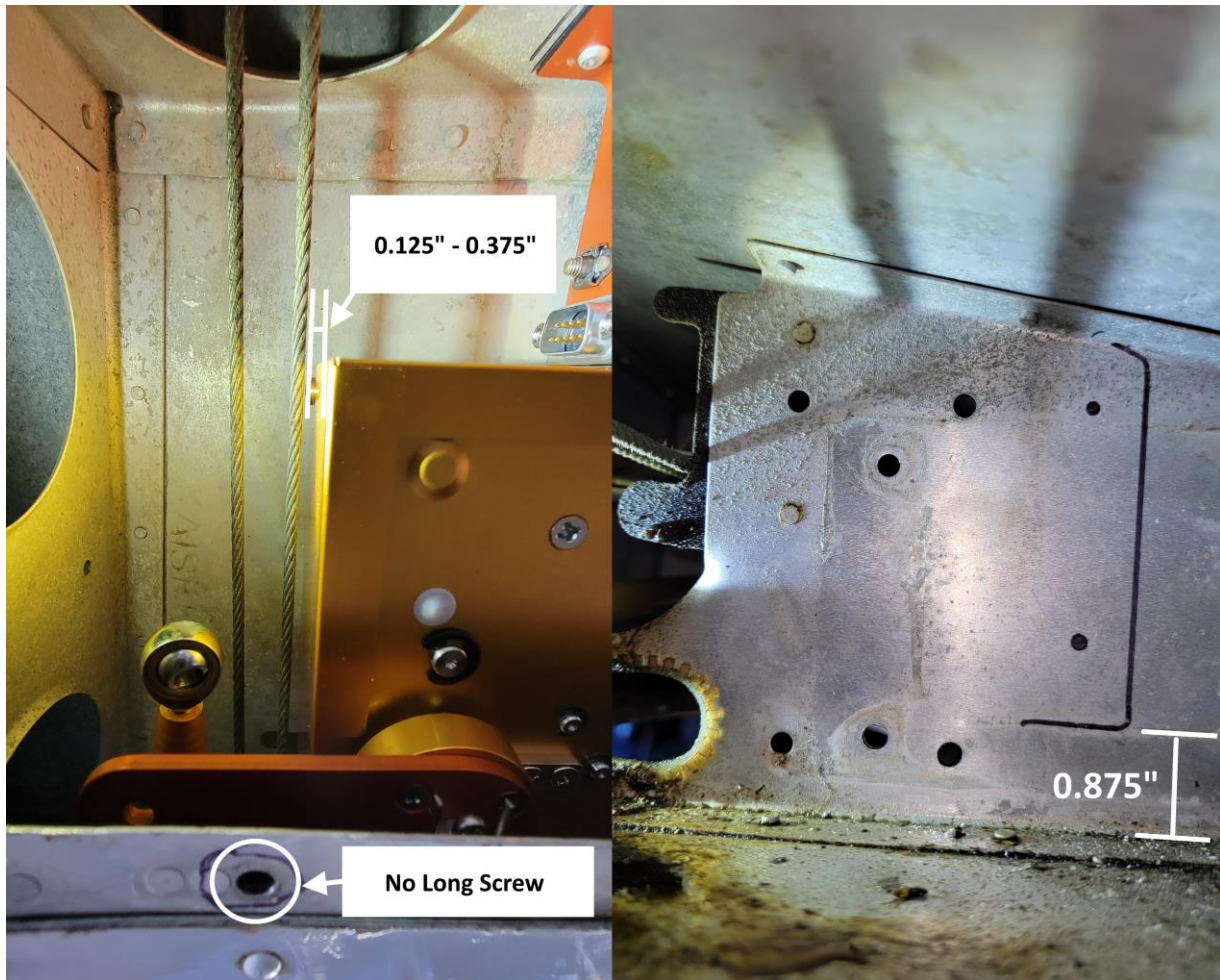


FIGURE 2-6 ROLL SERVO PLACEMENT

6. Mark the location of the mounting plate and angle piece. Refer to Figures 2-6 & 2-7.



2.2.1 Roll Servo Angle Installation

NOTE:

The second from bottom pilot hole on the angle piece may not line up with the flap closeout angle. It is acceptable to relocate this rivet. Refer to Figure 2-7.

1. Lay out and drill four (4) #40 drill size pilot holes through the Angle as shown in Figure 2-7.
2. Position the Angle on the WS 100.5 rib as shown in Figure 2-7.
3. Using the angle as a drill locator, drill four (4) #40 drill holes, following FAA best practices, through the Angle and WS 100.5 rib as shown in Figure 2-7.
4. Using Temporary Cleco Clamps, secure the angle in position as shown in Figure 2-7.
5. Enlarge all holes using a #30 drill bit.
6. Remove the angle and deburr.
7. Deburr the four (4) W.S. 100.5 holes.
8. Reposition the Angle and secure it into position using 1/8" Copper P Series Temporary Cleco Clamps.
9. Install four (4) MS20470AD4-4 rivets through W.S. 100.5 into the Angle at W.S. 100.5 rib. It may be necessary to install Cherry 3213 rivets into the upper hole(s). Refer to the Note below.

Note:

If the airplane was previously modified with flap gap seals, CR3213-4-04 Cherry Max rivets may be used in lieu of driven fasteners at all blind locations. Flap gap seals may be removed and reinstalled if driven rivets are desired.



FIGURE 2-7 ANGLE PIECE



2.2.2 Mounting Plate - Roll Servo Installation

1. Position the mounting Plate to and align the outboard flange of the Plate with the WS 108.0 rib and the forward face of the angle.
2. Using the inboard angle nutplates as a guide use a center punch, or equivalent, to mark the hole locations into the mounting plate.
3. Remove the Mounting Plate and drill (2) #16 drill size holes at the marks.
4. Secure the Mounting Plate to the Angle using the appropriate clamps or as shown in Figure 2-8.



FIGURE 2-8 MOUNTING PLATE TO ANGLE

5. Center punch through the Mounting Plate return flange holes onto WS 108.0 rib. Refer to Figures 2-8.
6. Pilot drill two (2) #40 holes.
7. Reposition the servo mounting plate and check for fitment.
8. If fitment is acceptable enlarge the holes using a #16 drill bit.
9. Remove the Servo Mounting Plate and deburr all drilled holes.
10. Reinstall the Servo Mounting Plate using the supplied screws. Torque to the proper specification.

Note:

The Push-Pull Tube attachment will vary according to the year of the aircraft. Later model 172 aileron bellcranks allow the rod end to be positioned between the bellcrank arms. Earlier models may require the rod end to be positioned either on top or below the aileron bellcrank arm.

Note:

The push pull tube should be protected from damage by using painters tape or equivalent.



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11. Install the push pull tube through the access hole at WS 144.80 with the rod end oriented towards the roll servo arm.
12. Temporarily attach the push pull tube to the roll servo. Refer to Figure 2-8.

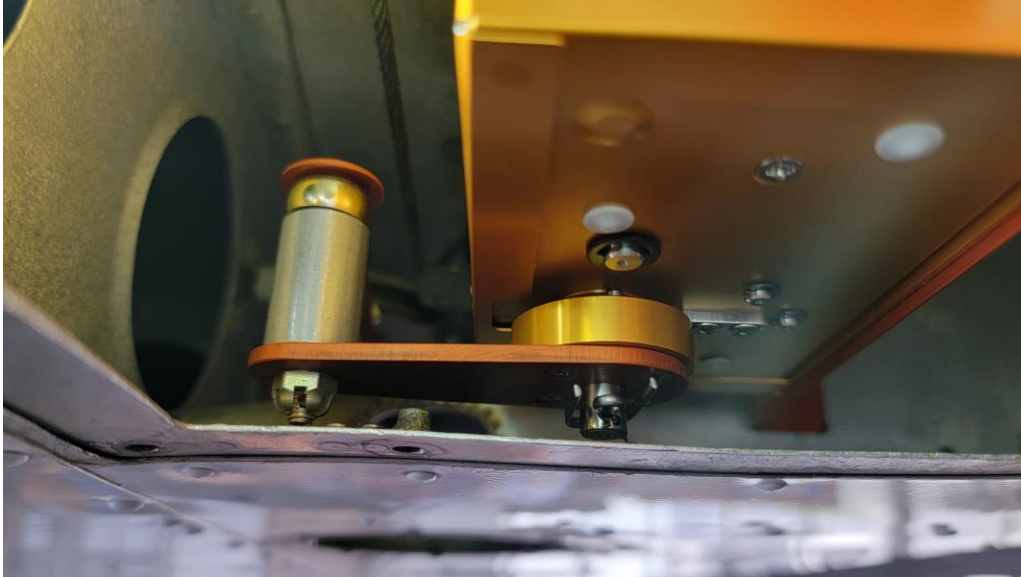


FIGURE 2-9 ROLL SERVO HARDWARE

13. Attach the DB9 connector to the servo DB9 connector after completing the Wiring harness installation in Appendix B.
14. With servo electrically connected go to "LNAV SERVO SET" page and either set the servo arm to 0 degrees or turn the HNAV servo on to keep at 0 degrees. Alternatively, if you do not have the electrical side of the installation done then you can ensure the roll servo arm is facing forward at 90 degrees from its base .
15. With ailerons in the neutral position mark the RH aileron attach point on the open end of the tube with a sharpie, or equivalent marking device. Refer to Figure 2-11.
16. Remove the 1006231-1 tube from the aircraft and on the open end of the tube place the provided rod- insert bolt hole next your mark. (with 4 threads showing on the rod end). Make a new marking on the tube at the base of the taper of the insert. Cut the tube at the new marking. Refer to Figure 2-11.
17. Install rod end insert with the rivets and drill guide provided.
18. Power on the Trio Pro Pilot autopilot and enter the Maintenance menu by pressing the Encoder knob and VMODE button simultaneously.
19. Turn, or Press, the Encoder knob until the LNAV SERVO SET screen is displayed.
20. Adjust the rod ends until the LNAV SERVO SET reading is 0.00 degrees.
21. Tighten the jam nuts on the rod ends.
22. All bolts and nuts that retain the spherical rod ends should be set for the proper preload (backlash) before the cotter pins are installed.
23. Completely install roll servo and bellcrank hardware. Refer to Figure 2-9 & 2-10.

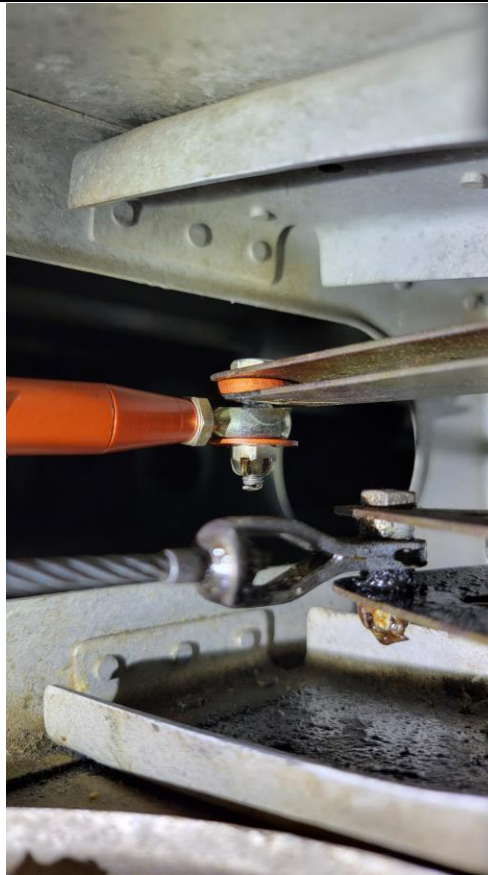


FIGURE 2-10 RH AILERON BELLCRANK HARDWARE

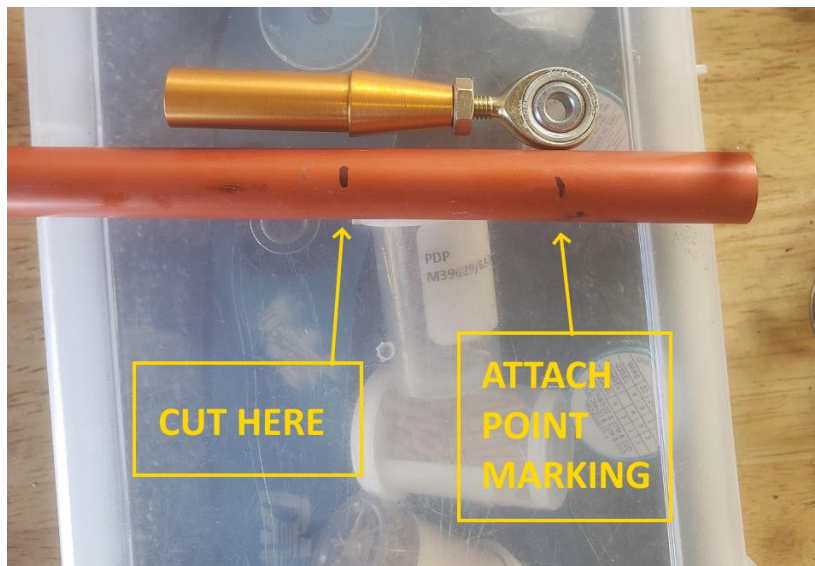


FIGURE 2-11 PUSH PULL TUBE TRIMMING



3.0 PITCH SERVO INSTALLATION

1. Carefully study this section before starting the pitch servo installation.
2. Review all drawings for proper installation of the brackets prior to installation.
3. Neutralize the elevators and lock them into position with padded blocks, AN4 bolts, AN970 washers, and a nut, or equivalent, fasteners.
4. For easier installation, assemble the pitch servo to the servo brackets, p/n's 1006241 and 1006242, before starting the measuring process. Accomplishing this operation will simplify bracket orientation and location.
5. Remove the baggage compartment cover to access the installation area.
6. Locate upper pitch cable at FS 124.00 and mark rear of shelf FS 124.00 and bulkhead at FS 142.00 with the location of the cable. Refer to Figures 3-1, 3-2, and 3-3.

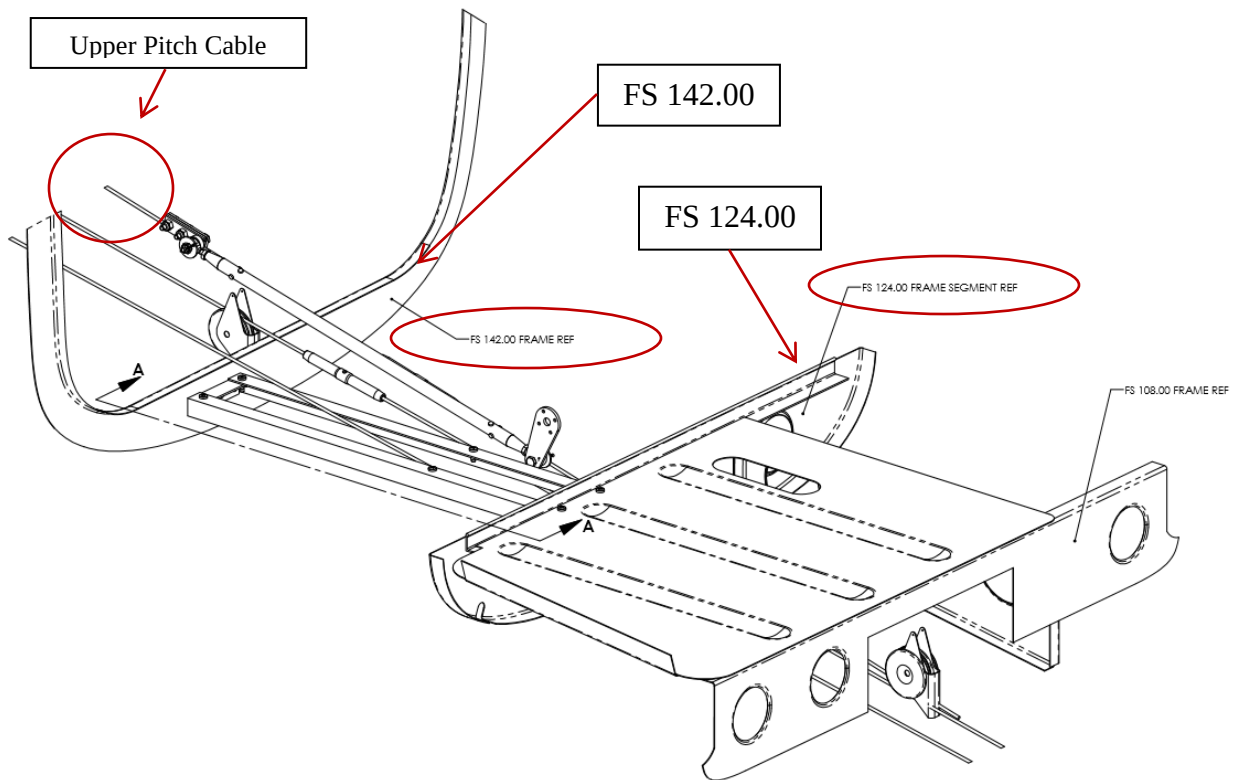


FIGURE 3-1 PITCH SERVO INSTALLATION DIAGRAM



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7. With the elevator locked in neutral, mark the location of the starboard side (right) rudder cable pulley at FS-142.00. Refer Figure 3-2 and 3-3.

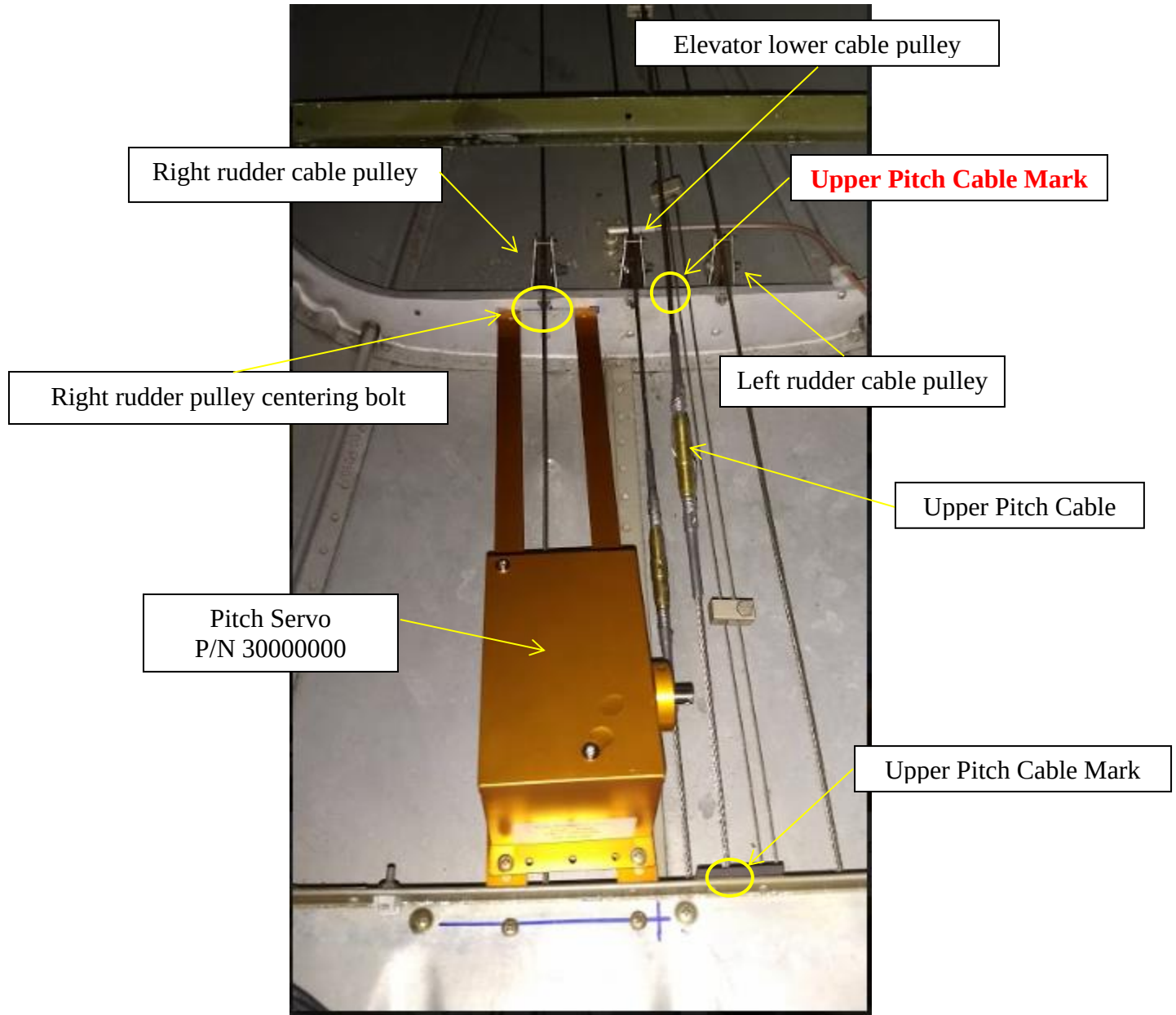


FIGURE 3-2 RIGHT RUDDER CABLE PULLEY



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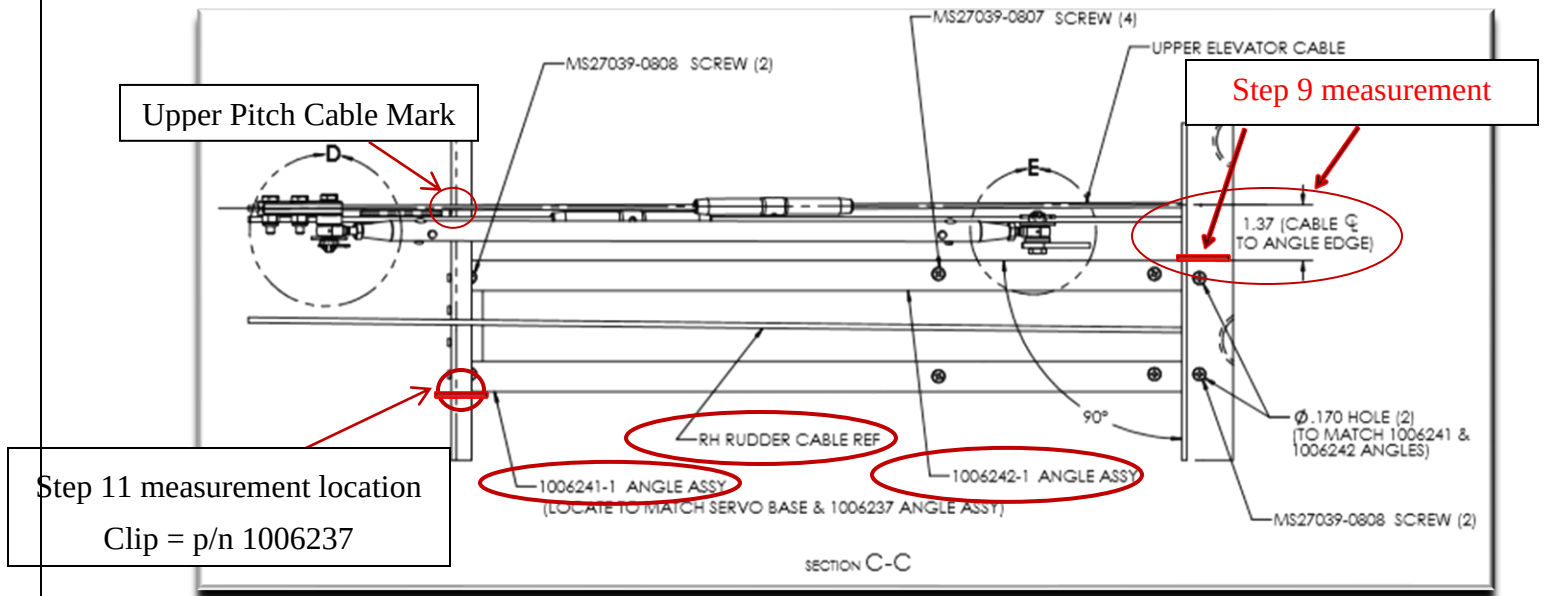


FIGURE 3-3 (TOP VIEW) PITCH SERVO BRACKET ASSEMBLY

8. The port edge of the pitch servo bracket is located 1.37 inches from the cable. Mark F.S. 124.00 with this measurement. **This is a critical measurement.** Refer to Figure 3-3.
9. The outboard edge of the Clip is located approximately 1.185" from the center of the cable centering bolt. Mark the FS 142.00 bulkhead with this measurement. This measurement may vary due to manufacturing differences.
10. This measurement defines the right most edge of clip, P/N 1006237. Refer to Figures 3-3, 3-4, & 3-5.

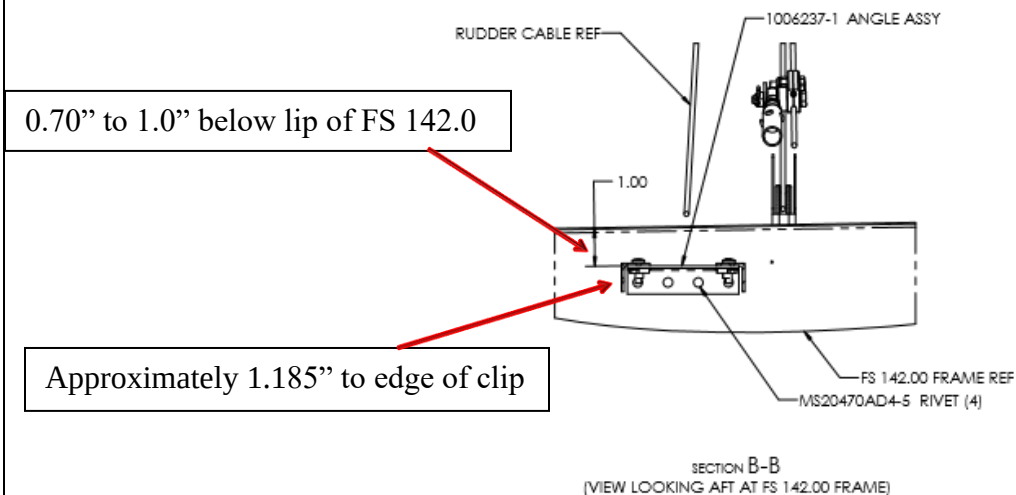


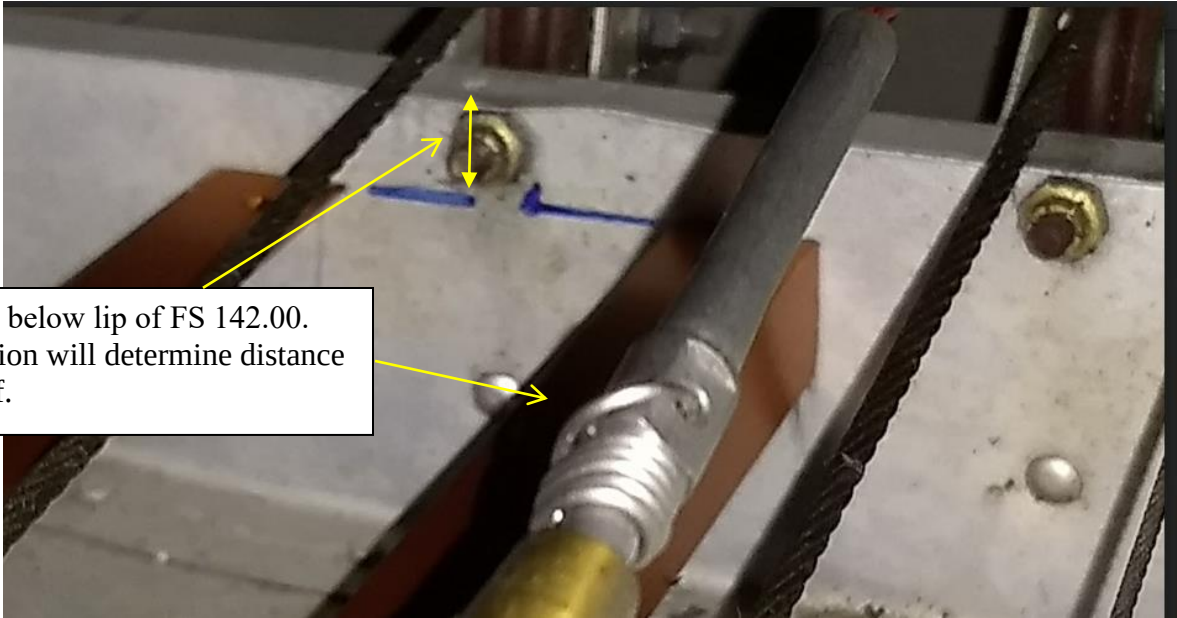
FIGURE 3-4 PITCH SERVO CLIP INSTALLATION



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11. Measure 0.70" to 1.00" inch below the lip of FS142 and mark the bulkhead as depicted in Figure 3-5.

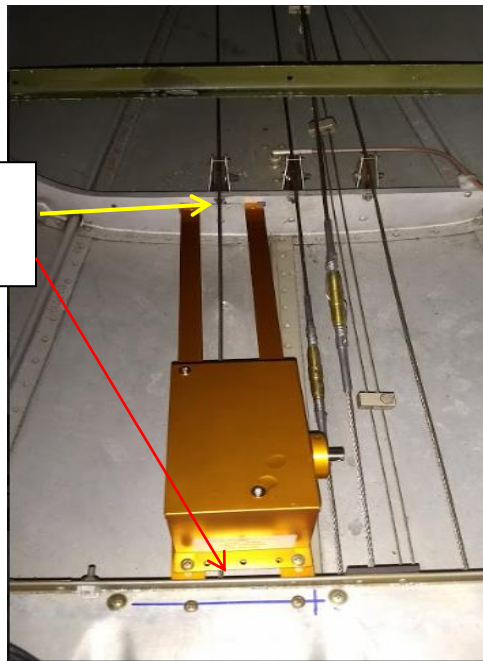


0.70" to 1" below lip of FS 142.00.
Rivet location will determine distance
above shelf.

FIGURE 3-5 BRACKET (CLIP) MEASUREMENT BELOW FS 142.00

12. This measurement indicates the top surface of clip, P/N 1006237. Refer to Figure 3-6 & 3-7.

13. Align bracket (clip) square with the rear of shelf at FS 124.00. Refer to Figure 3-6.



Clip upper surface should be level
with the accessory tray.

FIGURE 3-6 BRACKET (CLIP) TO REAR SHELF ALIGNMENT



14. Align the clip so that one rivet hole is located starboard of the pulley bracket and that one rivet hole is positioned under the RH rudder pulley bolt hole position. It may be necessary to adjust the clip position side to side for proper fit. Use tension clamps to hold the clip into position. Adjust as required.

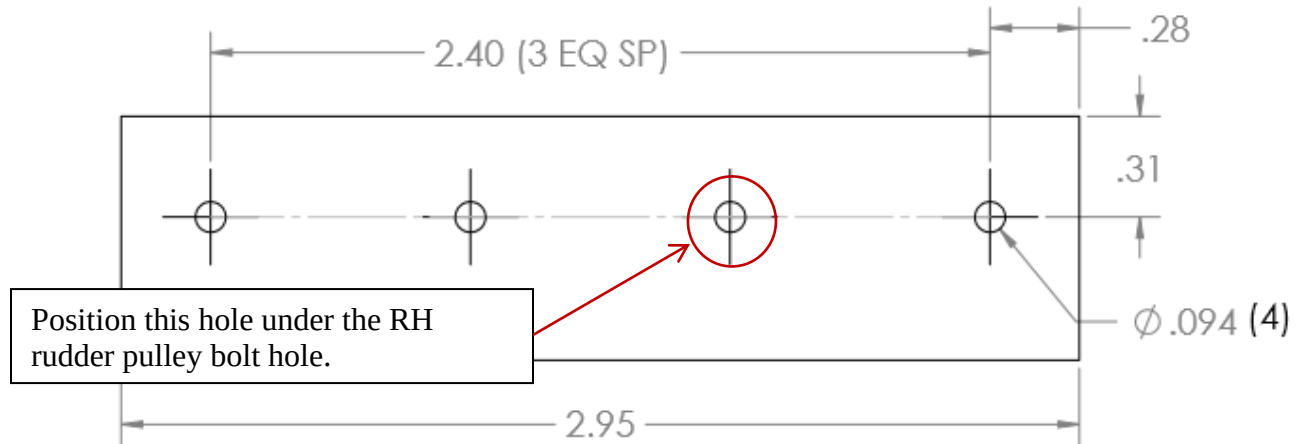


FIGURE 3-7 POSITION OF RIVET HOLES IN CLIP (1006237)



FIGURE 3-8 TENSION CLIP USED TO HOLD CLIP INTO POSITION

15. Fasten the pitch servo to the pitch servo angle assemblies, part numbers 1006241 and 1006242, using the MS27039-0807 screws supplied in the kit as depicted in Figures 3-6 & 3-10. This step will hold the angles square. This may have been accomplished in Step 4.
16. Prior to drilling any holes position the angle assemblies square with the clip, P/N 1006237, and FS 124.0 accessory shelf. Clamp the LH and RH angles into position on the shelf and to the clip.
17. Recheck positioning to agree with the dimensions depicted in Figure 3-3.
18. The upper pitch cable should be located “a minimum horizontal distance” of 1.37 inches from the edge of the LH (port side) angle assembly, part number 1006242, at FS 124.0.

Note:

Clearance dimensions are required to be maintained fore and aft of the LH angle assembly. The dimension should not exceed 1.45 inches at FS 124.0.

19. Take measurements at FS 124.0 and FS 142.0. Refer to Figures 3-6, 3-10, and 3-11.

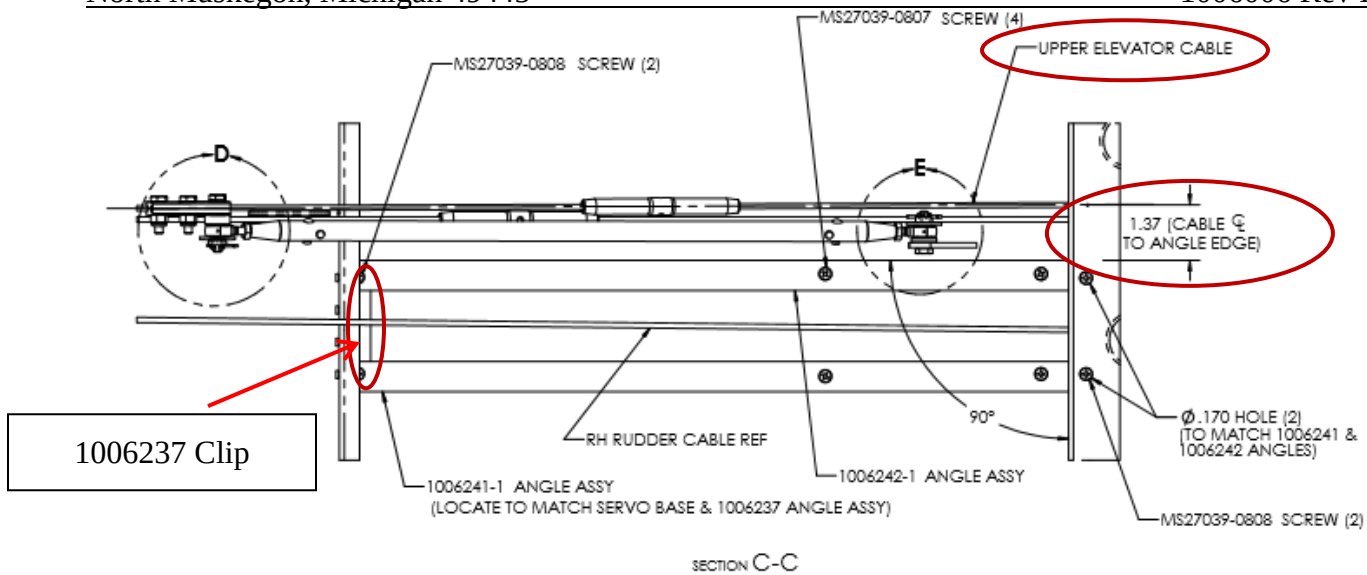


FIGURE 3-9 ANGLE TO BRACKET CLEARANCES

20. Clamp the angle assemblies into position using cleco clamps or equivalent. Take care to protect anodized surfaces.

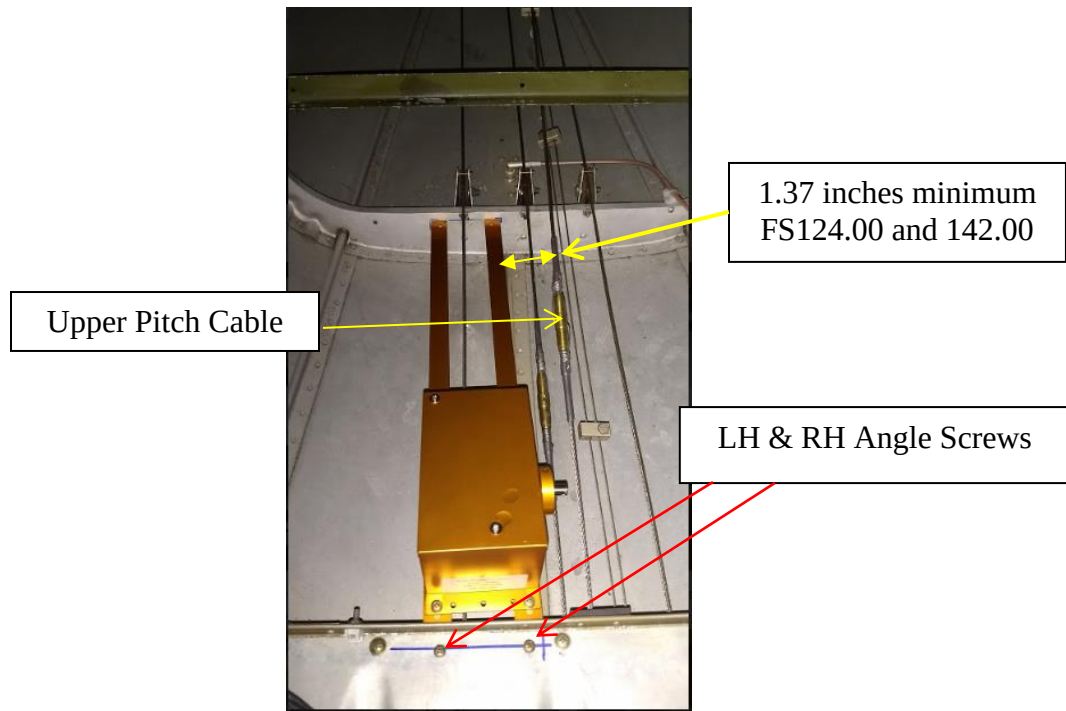


FIGURE 3-10 UPPER PUTCH CABLE

21. Ensure that the clip (P/N 1006237) is clamped securely to the FS 142.0 bulkhead.
22. The clip is pre-drilled with four (4) #40 holes.



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23. Using the clip as a drill guide, drill four (4) #40 holes through the FS 142.00 bulkhead.
24. Drill the outboard holes first then drill the inner two (2) holes.
25. Cleco the clip into position after drilling each hole.
26. Enlarge the holes using a #30 drill bit.
27. Deburr the holes in the FS 142.00 bulkhead and the clip.
28. Using the MS20470AD4 rivets supplied with the kit (or Cherrymax equivalent) rivet the clip into position.
29. Fasten the RH and LH angles to the clip using the MS27039-0807 screws supplied in the kit.
30. Clamp the LH and RH angles into position at FS 124. Refer to Figure 3-10 and 3-11.
31. Remeasure the upper pitch cable clearance dimensions at FS-124 and FS 142 as in described Step 18.
32. Mark the FS-124 accessory tray as depicted in Figure 3-11 with the locations of the LH and RH angles.
33. These marks will assist in the location of the mounting holes for the 1006241 & 1006242 angles.
34. Using the edge of the accessory tray and using a colored marker, draw a reference line across the LH and RH angles as depicted in Figure 3-11.
35. Measure the distance from the reference line to the center of the LH and RH mounting holes. These holes are pre-drilled and have MS21075L08N nutplates installed in them. **Accuracy is important.**

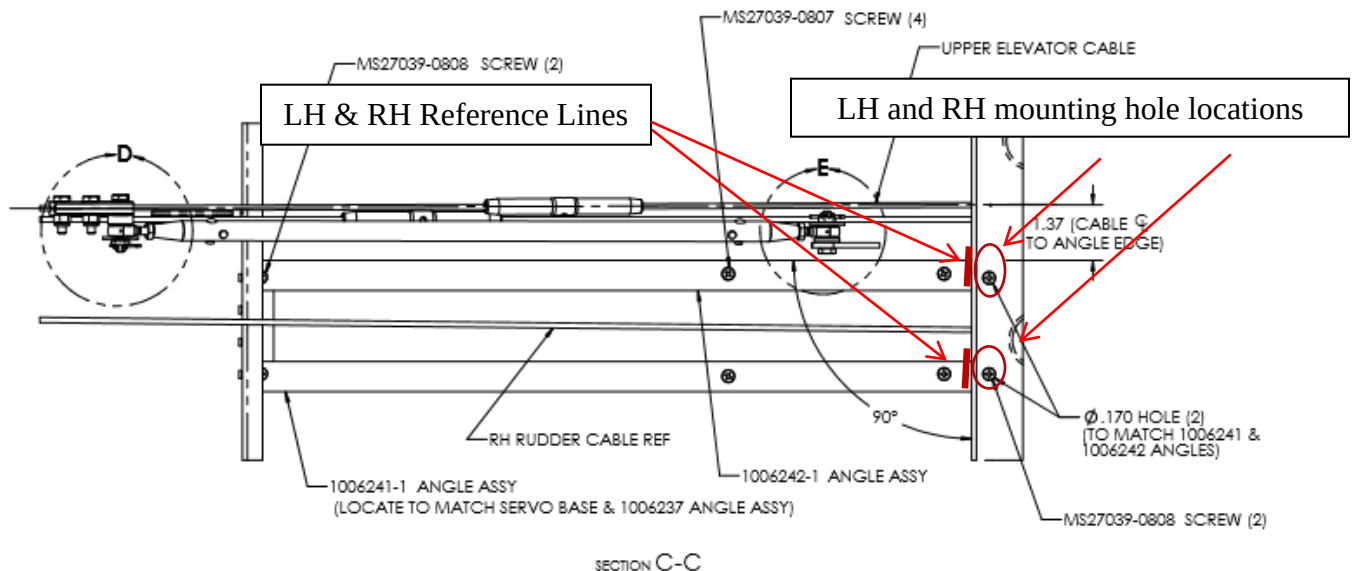


FIGURE 3-11 LH & RH ANGLE REFERENCE & MOUNTING

36. Using the accessory tray edge as a guide measure the distance taken in Step 35 and mark the LH and RH angle hole locations as depicted in Figure 3-12.
37. Use a center punch to mark the LH and RH angle mounting hole locations.
38. Remove the clamps from the LH angle and let them hang below the shelf.
39. Drill a pilot hole through the center punch mark on the shelf using a #40 drill bit. Do not allow the drill bit to extend below the angle more than .125 inch or less. **Use a drill stop for this step.**
40. Clamp the LH angle back into position and check the hole alignment with the nutplate.



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41. Unclamp the LH rail and enlarge the hole using a #30 drill bit.
42. Using a #30 cleco clamp secure the LH angle into position.
43. Repeat Steps 36 through Step 42 for the RH angle.
44. Unclamp the LH angle and let it hang free.
45. Enlarge the mounting hole using a #17 drill bit. Deburr both sides of the hole.
46. Repeat Step 44 and 45 for the RH angle
47. Fasten the LH and RH angles into position on the accessory tray, as depicted in Figure 3-12, using the MS27039-0807 screws supplied in the kit.
48. Remeasure and verify the dimensions taken in Step 18.



FIGURE 3-12 LH & RH ANGLES FASTENED TO ACCESSORY TRAY



FIGURE 3-13 SERVO HUB PIN & ARM ALIGNMENT

49. Coat the four (4) M3x.5x10mm servo arm screws supplied in the autopilot hardware kit with Loctite Blue (Medium) 242 thread locker. Allow Loctite to dry completely before installation.

Note

The Pitch Servo hub roll pin hole must be aligned with the servo top case Figure 3-13 before attaching the servo arm to the servo hub.

50. Fasten the servo arm to the servo hub using the four (4) M3 (metric) screws supplied. The screws must be coated with Blue Medium strength Loctite before installation.
51. Assemble the pitch push pull tube linkage to the upper elevator cable as depicted in Detail D, Detail E in Figure 3-14.

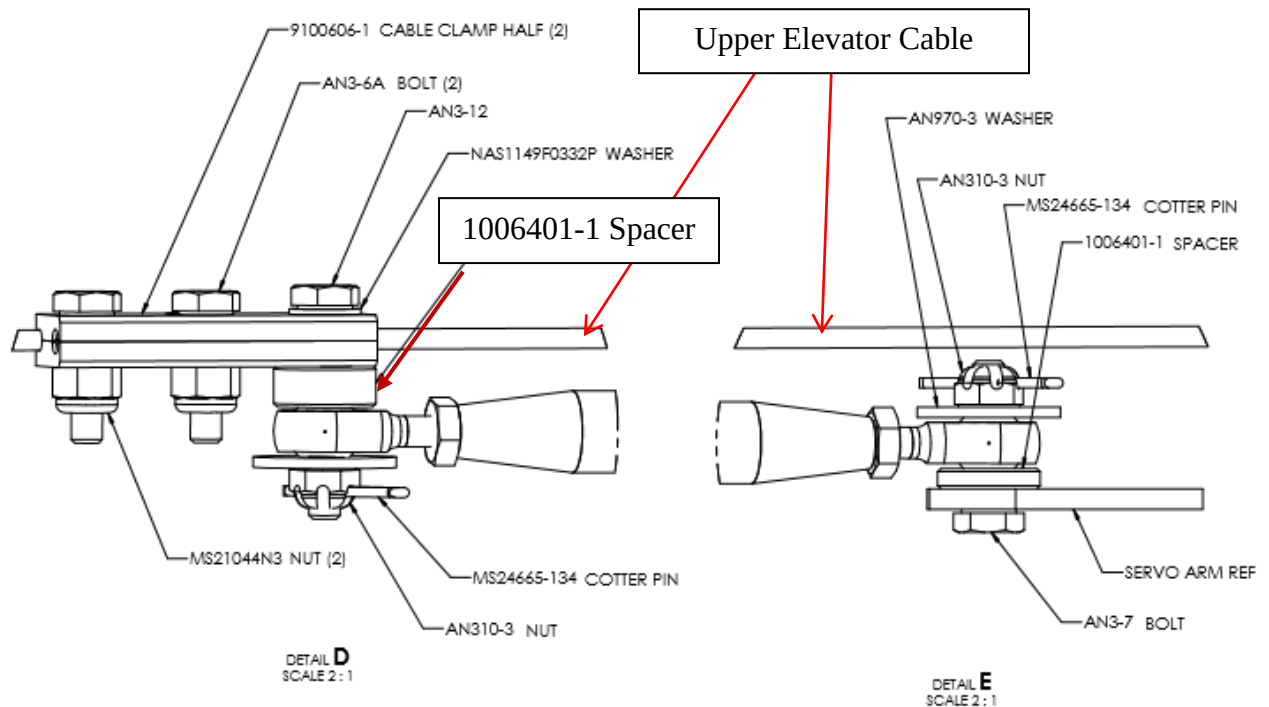


FIGURE 3-14 PITCH SERVO LINKAGE ATTACHMENT

Note

Ensure that the elevator controls are locked in the neutral position for the following steps.

52. Attach the cable clamp, part number 9100606-1, to the upper elevator cable and lightly anchor it so that it does not shift position easily. This is to allow for final adjustment after elevator travel checks.
53. Attach the push pull tube to the servo arm and upper elevator cable clamp as depicted in Figure 3-14. Ensure proper preload on the castellated nut before inserting the cotter pin.
54. Ensure that the servo arm is oriented with the upper elevator control cable as depicted in Figure 3-14.

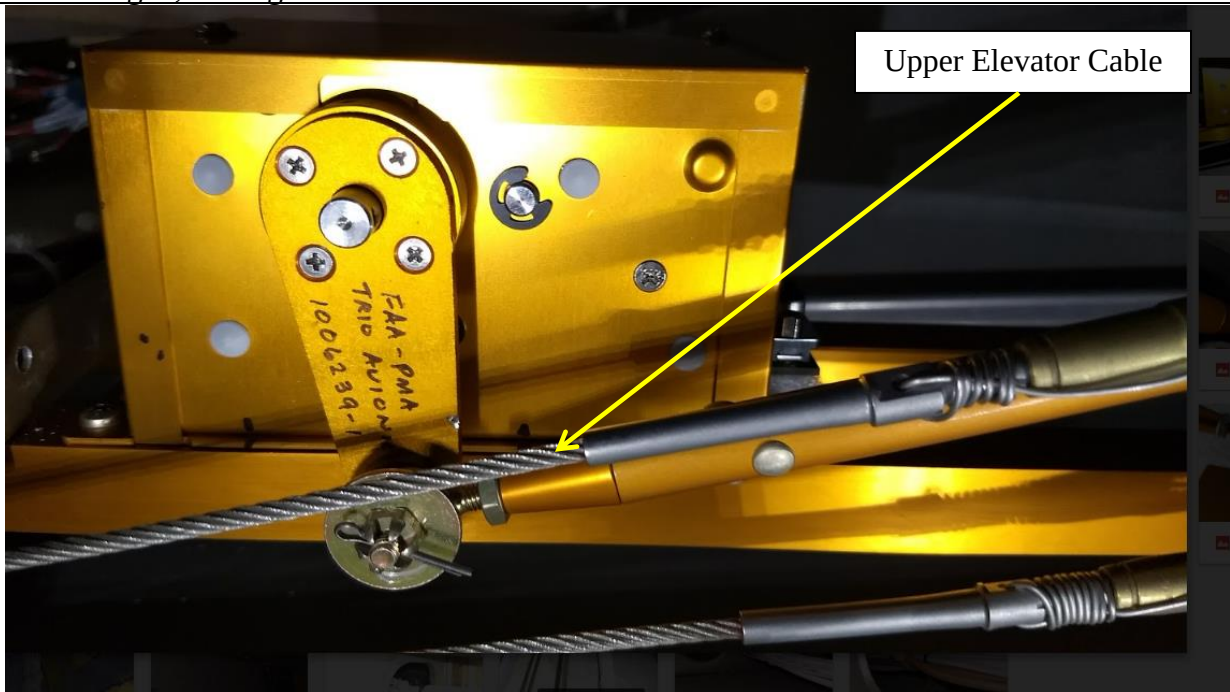


FIGURE 3-15 PITCH SERVO ARM ALIGNMENT - NEUTRAL POSITION

55. Remove the blocks holding the elevator in the neutral position.
56. Have an assistant move the control yoke, or elevator, through the full up and down travel.
57. The servo arm should be positioned as depicted in Figure 3-14 when the elevator pitch controls are in the neutral position.
58. After the Trio Pro Pilot autopilot controller and harness installation is complete, the following steps may be accomplished.
59. Power ON the autopilot and enter the Maintenance Mode.
60. Use the Encoder Knob to sequence to the VNAV Servo Set screen.
61. Adjust the rod ends until the VNAV SERVO SET reading has equal throw in both directions within $\pm 1^\circ$.
62. Tighten the nuts on the rod ends.
63. Finish installing the cable clamp bolts/nuts, castle nuts, and cotter pins.



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APPENDIX A TRIO PRO PILOT AUTOPILOT ELECTRICAL INSTALLATION

NOTE

Prior to plugging harness DB9 or DB37 into servos or autopilot control perform a full power, ground, and data test on the harness by ringing the wires from plug to plug using PRO PILOT WIRING HARNESS DWG 41300008 or latest approved version. Refer to Appendix B.

Call Trio Avionics at +1 619-448-4619 if you have additional questions or need assistance.

The Trio Pro Pilot autopilot controller must be integrated with the aircraft pitot and static system. A pitot and static system test must be performed prior to opening the pitot and static system.

Roll Servo Harness Installation

1. Remove interior trim panels on cockpit passenger side
2. Remove existing Cessna factory autopilot wiring and set aside for weighing if so equipped.
3. Route Trio Harness Roll servo wiring along same path and using the same clamps as factory autopilot wiring.
4. Take care to protect harness pins at end of harness.
5. Terminate supplied DB9 connector per Trio diagram.
6. Attach DB 9 connector to Trio Roll Servo.
7. Secure harness cable end at the servo end with supplied clamp or equivalent.

Pitch Servo Harness Installation

1. Remove co-pilot seat
2. Route Trio Harness Pitch servo wiring under cockpit floor taking care to secure away from other aircraft wiring and moving components.
3. Route harness to Trio Pitch Servo location.
4. Take care to protect harness pins at end of harness.
5. Terminate supplied DB9 connector per Trio diagram.
6. Attach DB 9 connector to Trio Roll Servo.
7. Secure harness cable end at the servo end with supplied clamp or equivalent.

Trio Autopilot Controller

1. The Trio autopilot controller is ordered in Panel Mount or Instrument Mount versions.
2. The Trio autopilot controller will support 12 to 30 volts.
3. The Trio controller is provisioned with Pitot and Static ports.
4. **A pitot static system check must be performed before installation** to verify system operation and integrity.
5. The Trio Pro Pilot autopilot controller is provisioned with Pitot and Static ports on the rear of the controller.
6. The controller pitot and static ports must be integrated (plumbed) into the aircraft pitot and static systems.



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7. Every aircraft Pitot and Static system is different. The following are for example only as the aircraft systems will vary.
8. The following components, or equivalent, will be used in most installations.:
 - a. Tygon tubing. 2 each x 24" pieces. Aircraft Spruce P/N 05-00944, or equivalent.
 - b. Nylo Seal fittings. 2 each. Aircraft Spruce P/N 264-N04.
 - c. Nylo Seal Inserts. 8 each. Aircraft Spruce P/N 259-N04.
9. Extend the pitot & static hoses & cable connector through the tray and out through the front of the instrument panel to allow for ease of servicing.
10. Mate the pitot and static hoses to the control head.
11. Secure pitot and static connections at the rear of the autopilot controller.
12. Mate the 37 pin D connector to the control head using the screws provided.
13. If using an Instrument mount control head secure the control head using #6 brass instrument screws.
14. If using a Panel mount control head slide the control head into the tray, then tighten the securing screw. Do not over tighten control head in the tray.
15. It is required that a pitot and static system leak test is performed after autopilot installation.
16. Install the controller using best practices in either panel or hole locations. Refer to AC 43-13 for this step and all following steps.
17. Utilize Trio DWG 41300008 and Appendix B for the following steps.
18. Install supplied 5 ampere circuit breaker within easy reach of the pilot and label per Illustrated Parts Catalog 1006905 Sheet 2 of 5.
19. If a Panel Mount unit is ordered install the supplied power switch and label.
20. Terminate supplied DB37 connector per Trio drawing in Step 3.
21. Terminate wiring with aircraft GPS or handheld.
22. If ARINC 429 is available from GPS terminate ARINC 429 connections.
23. Install the supplied PCS button on the left side of the pilots control yoke and label PCS.
24. Install Recover button in an available convenient location within easy reach of the pilot and label AP Recover.
25. Ensure that the analog alarm out is connected to the un-switched audio input on the Audio Panel.
26. Install Limitation Placard, P/N 1006450-1, supplied in plain view of Pilot.

Trio Autopilot Data Connections

1. For the RS-232 connection set the output at the GPS unit to "Aviation w/ no altitude" or NMEA 0183 OUT.
2. If your aircraft is equipped with a GPS that has ARINC 429, set unit to output "GAMA" Low or High Speed.
3. Prior to making the connections to the GPS unit in the aircraft determine what else is connected.
4. It may be necessary to parallel the connections.
 - a. If parallel connections are required, verify that the lines you are connecting to use, or can use, the same data format that is required.
5. Both the RS-232 and the ARINC 429 can be paralleled with like connections.



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Trio Initial Setup and Checks

1. Refer to The Avionics Addendum Section 10 for initial checks and setup of the autopilot installation.
2. Autopilot gain settings have been programmed before shipment.
3. Individual aircraft may require fine tuning of servo gains on the first few test flights.
4. The Avionics Addendum may be downloaded at thestcgroupllc.com.

END



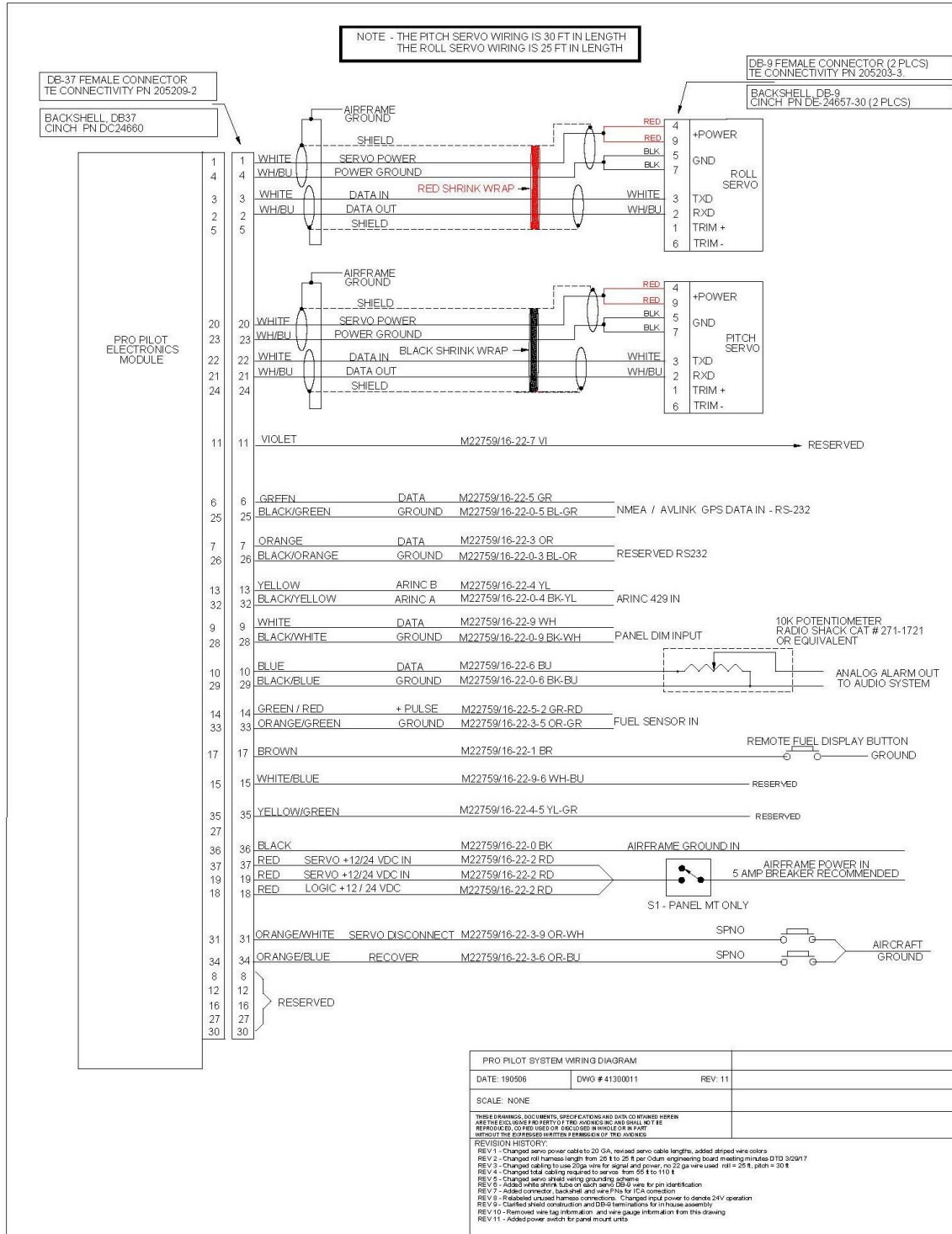
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APPENDIX B TRIO PRO PILOT WIRING DIAGRAM

ORIGINAL WIRING DIAGRAM

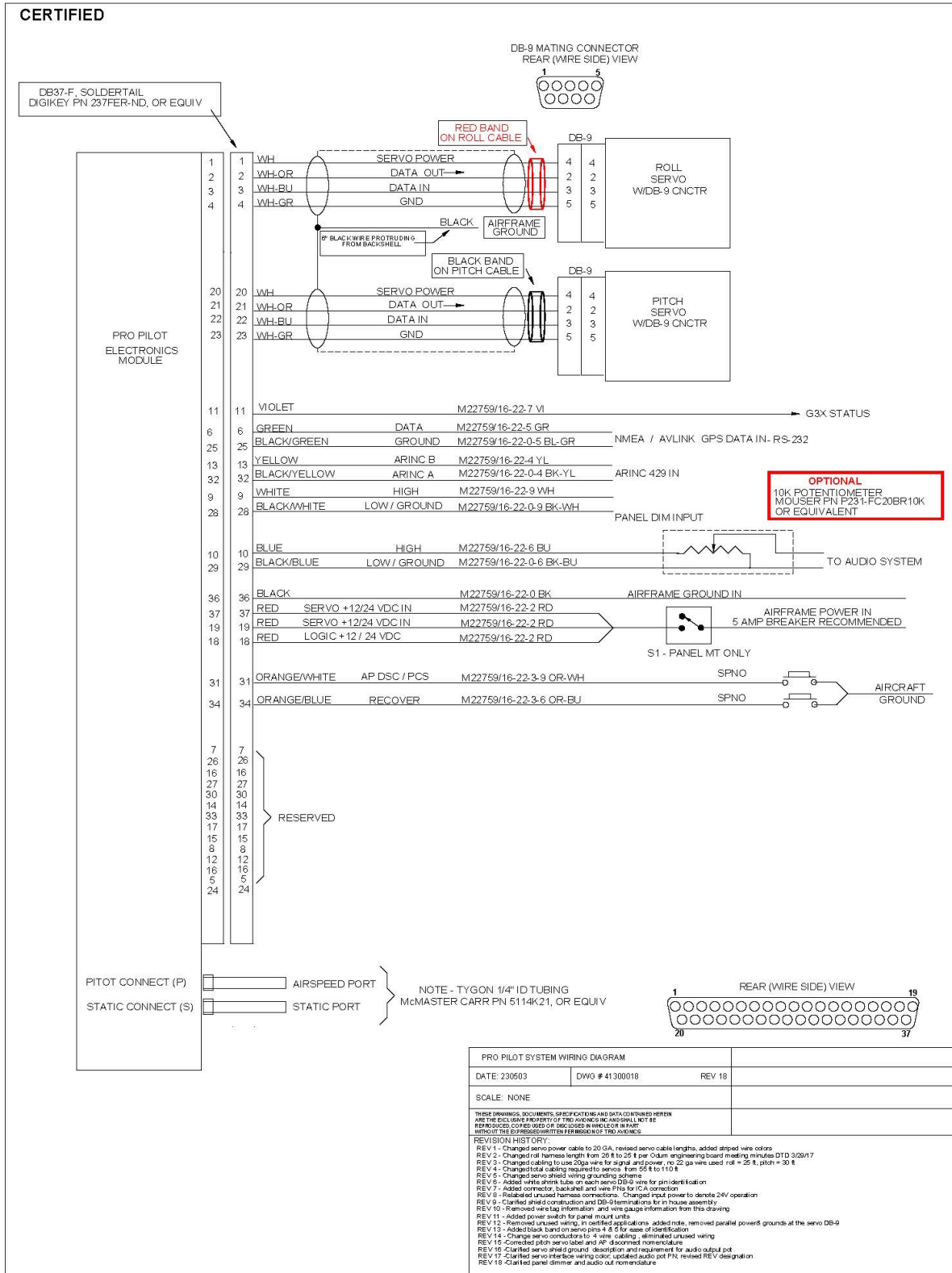




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NEW WIRING DIAGRAM (CURRENT DIAGRAM SHIPPED WITH HARNESS)





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APPENDIX C CESSNA 172 PITCH INSTALLATION

Note:

The following Cessna 172 Pitch Installation Instructions and Top Level Drawing # 1006204-1 are valid for Serial Numbers:

Cessna 172 - 610, 612, 615, 622, 625, 630, 28000 through 47746, & 17247747 through 17249544.

Pitch Servo Installation

1. Level the aircraft.
2. Support the aircraft after it has been leveled.
3. Clamp the 17" angle to Bulkhead STA 172.00. Refer to Image C-1.
4. Ensure that the angle is level side to side 1.5" (approximately) above the center cable.



F.S. 172.00 – Cessna 172

Center Cable

IMAGE C-1

5. Repeat the above steps for the forward 23" angle at F.S. 140.00. Refer to Image C-2.

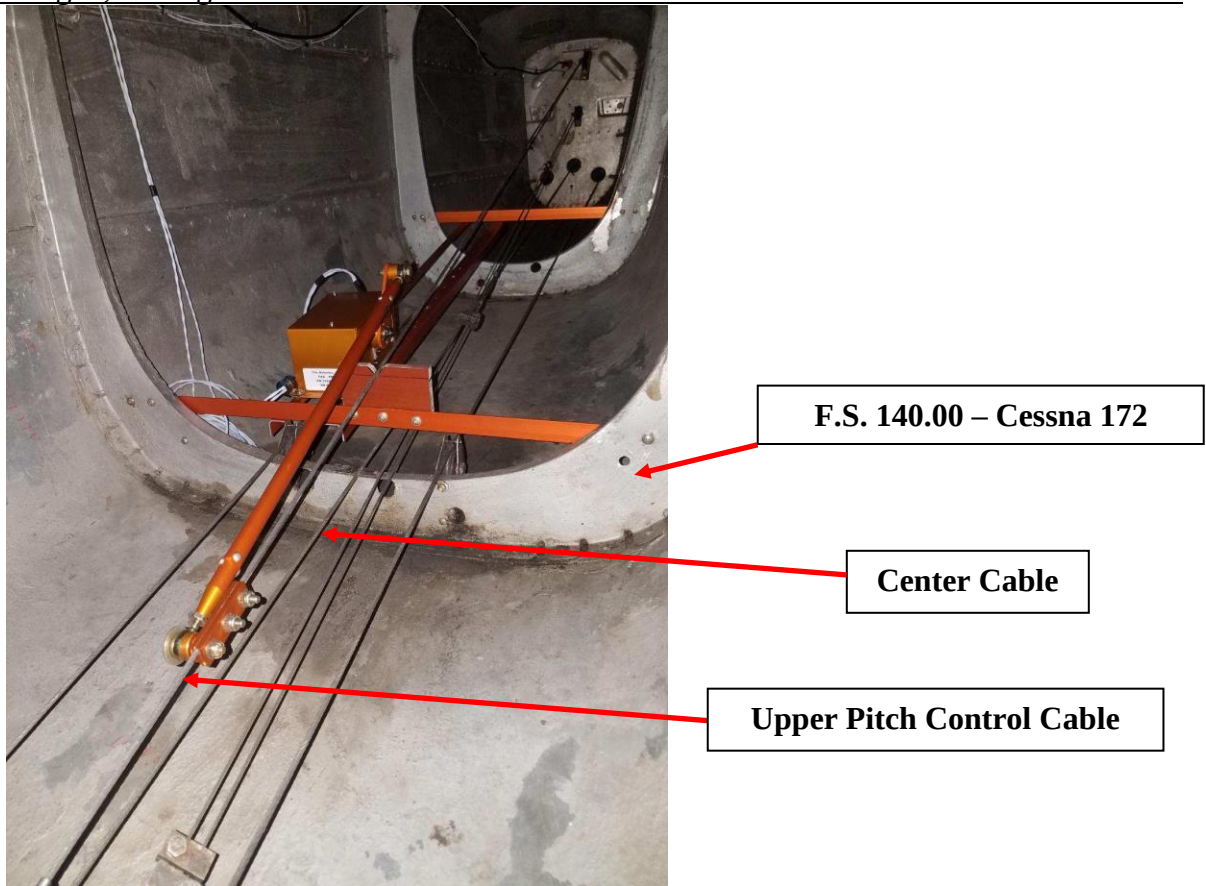


IMAGE C-2

6. Ensure that the angle is level side to side 1.5" (approximate) above the center cable. Refer to Image C-2.
7. When angles have been clamped into position verify that there is no cable interference.
8. Clamp the fore / aft angles to the crossmember angles.
9. Ensure that the angles are protected from scratching.
10. Attach the servo arm to the pitch servo. Refer to Image C-3.
11. Position the pitch servo on the fore / aft angles approximately 2" from the face of the forward angle. Refer to Image C-4.
12. When the servo arm is pointed directly up (LNAV SERVO SET 0.0 degrees) the center of the servo arm attach bolt should be at least 0.25" above the upper pitch control cable.



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Cessna Model 172 & 172RG Autopilot Installation Instructions
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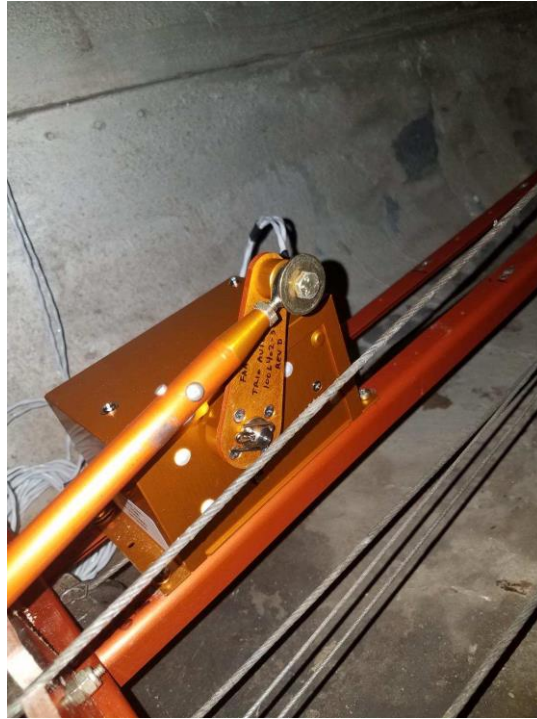


IMAGE C-3

**Pitch servo is located approximately
2" from angle face.**



IMAGE C-4



13. Assemble the pitch servo tube to the servo arm. Refer to Image C-5.

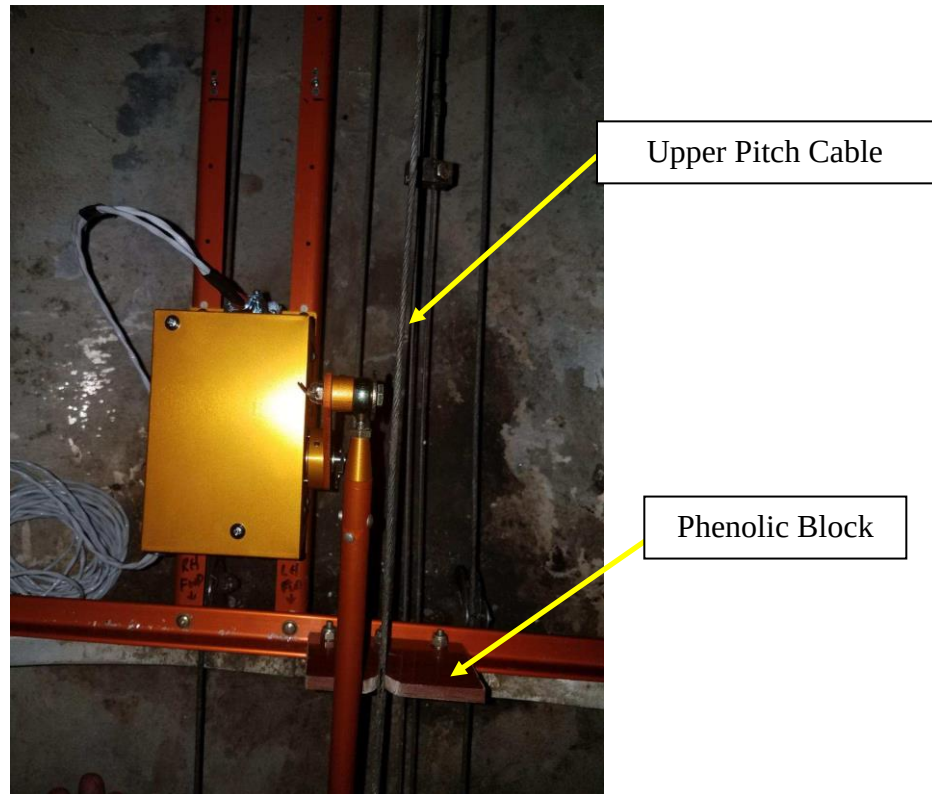


IMAGE C-5

14. Assemble the pitch servo push pull tube to the servo arm. Refer to Image C-5.
15. Attach the cable clamp halves to the pitch push pull tube and upper pitch control cable. Refer to Image C-2.

Note:

It is critical to check clearances before drilling.

16. Two persons are required for the following operation.
17. Move the flight controls forward and aft.
18. Move pitch trim through its full travel in both directions.
19. Check for any clearance issues.
20. It may be necessary to reposition the pitch servo / angle assembly side to side to ensure clearance between the pushrod and the upper pitch cable.
21. Install nutplates on the fore / aft angles.
22. Secure the servo to the angles using the hardware supplied.



23. Mount the angles to the fuselage bulkheads using the hardware supplied.

NOTE:

Each angles are attached to the fuselage stations using a minimum of two (2) screws on each side of the aircraft on each angle.

24. A phenolic block has been supplied to support the upper control cable.
25. Position the phenolic block on the forward lower bulkhead. Refer to Image C-5.
26. Mark the upper cable height on the side of the phenolic block.
27. Cut a V in the center of the phenolic block to the depth of the cable height.
28. Mount the phenolic block to the forward lower bulkhead using the hardware supplied. Refer to Image C-2 and Image C-5.

NOTE:

Location of the phenolic block hardware is shown in the Images, reference above.

Pitch Servo Arm Adjustment

29. After the Trio Pro Pilot autopilot controller and harness installation is complete, the following steps may be accomplished.
30. Power ON the autopilot and enter the Maintenance Mode.
31. Use the Encoder Knob to sequence to the VNAV Servo Set screen.
32. Adjust the rod ends until the VNAV SERVO SET reading has equal throw in both directions within +/- 1°.
33. Tighten the nuts on the rod ends.
34. Finish installing the cable clamp bolts/nuts, castle nuts, and cotter pins.

NOTE:

IT IS VITAL THAT THE PITCH PUSH ROD AND CABLE CLAMP ARE ORIENTED IN A WAY THAT WILL NOT ALLOW AN OVER CENTER CONDITION.



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APPENDIX D CESSNA 172RG PITCH INSTALLATION

Note:

The following Cessna 172RG Pitch Installation Instructions and Top Level Drawing # 1006204-1 are valid for Serial Numbers:

Cessna 172RG – All Serial Numbers

Pitch Servo Installation

1. Level the aircraft.
2. Support the aircraft after it has been leveled.
3. Drill the 4 corner mounting holes on the servo baseplate using a #16 drill bit.
4. Cut the 17" angle down to 16".
5. Clamp the 16" angle to Bulkhead 178.00. Refer to Image D-1.



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IMAGE D-1



6. Ensure that the top of the aft angle is level side to side approximately 3.75" above the top of the stringers. Refer to Image D-2.

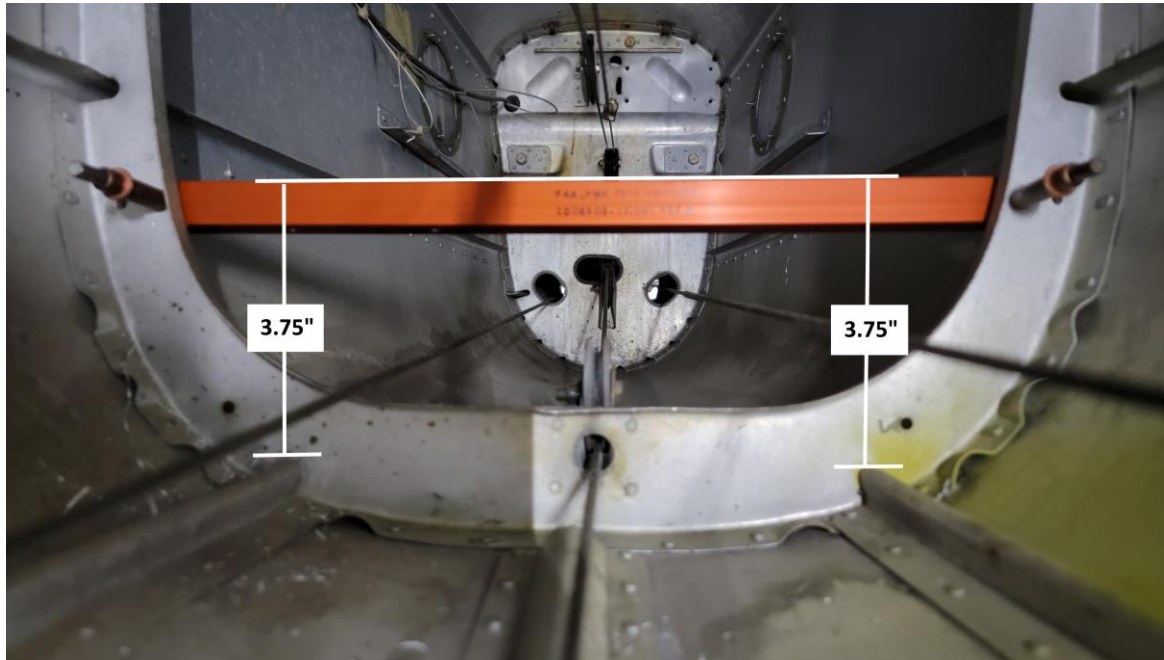


IMAGE D-2

7. Temporarily attach the assembled servo (Including the push/pull tube and cable clamps) to the rails, aft angle, and forward avionics tray angle (F.S. 142.00). Refer to Image D-1.
8. When assembly has been clamped into position verify that there is no cable interference and the push pull tube travel is parallel to the upper pitch cable.
9. Position the pitch servo on the fore / aft angles approximately 18.5" from the aft face of the avionics tray angle. Refer to Image D-3.



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IMAGE D-3



10. When the servo arm is pointed directly down (VNAV SERVO SET 0.0 degrees) the center of the servo arm attach bolt should be 0.25" below the upper pitch control cable. Refer to Image D-4.

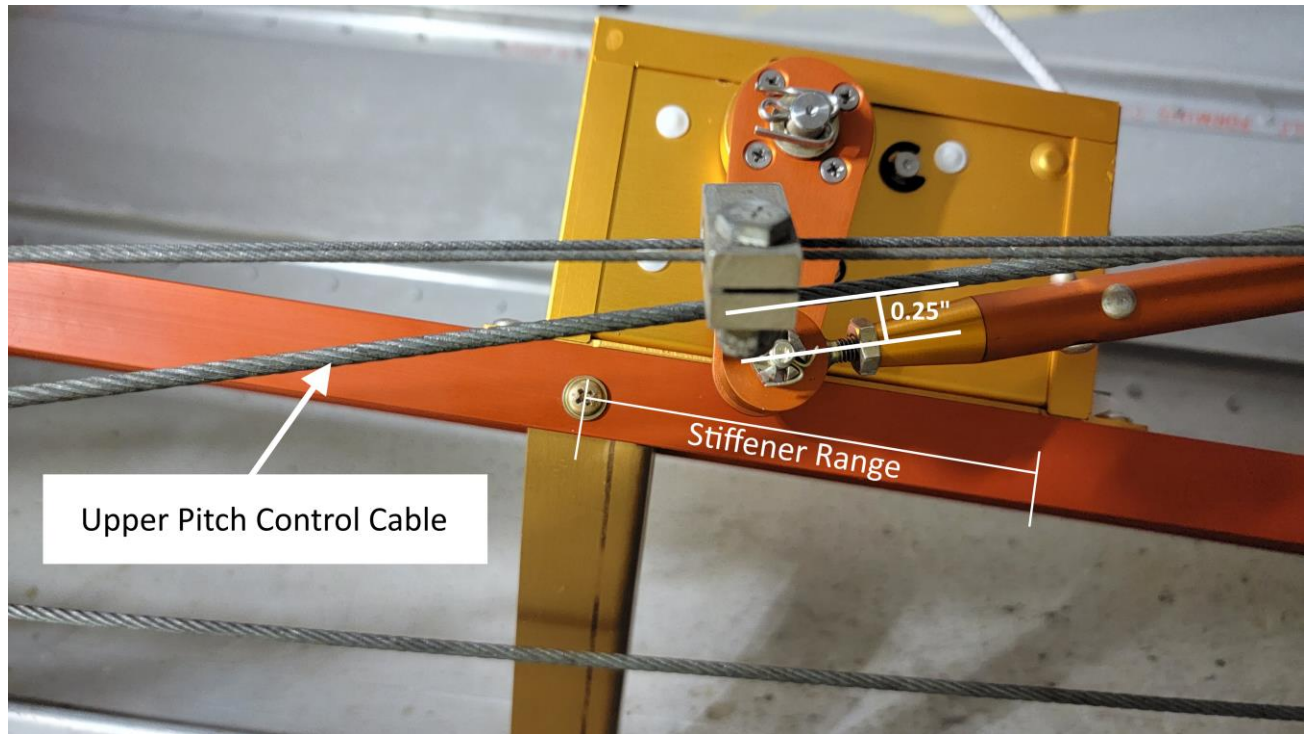


IMAGE D-4

Note:

It is critical to check clearances before drilling.

11. Two persons are required for the following operation.
12. Move the flight controls forward and aft.
13. Move pitch trim through its full travel in both directions.
14. Check for any clearance issues.
15. It may be necessary to reposition the pitch servo / angle assembly side to side to ensure clearance between the pushrod and the upper pitch cable.
16. Once you have the servo in the correct position then mark the servo attach screw points.
17. Install the servo attach nutplates on the fore / aft angles.
18. Secure the servo to the angles using the hardware supplied.



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19. Mount the aft angle to the fuselage bulkhead using the hardware supplied.

NOTE:

The aft angle is attached to fuselage station F.S. 142.00 using a minimum of two (2) screws on each side of the aircraft.

20. Mark, drill and install the fore /aft angles with the hardware supplied.
21. Fabricate the lower stiffener angles and install under the servo. See Images D-5, D-6, & D-7. The stiffener attach points must be within the range depicted in Image D-4.

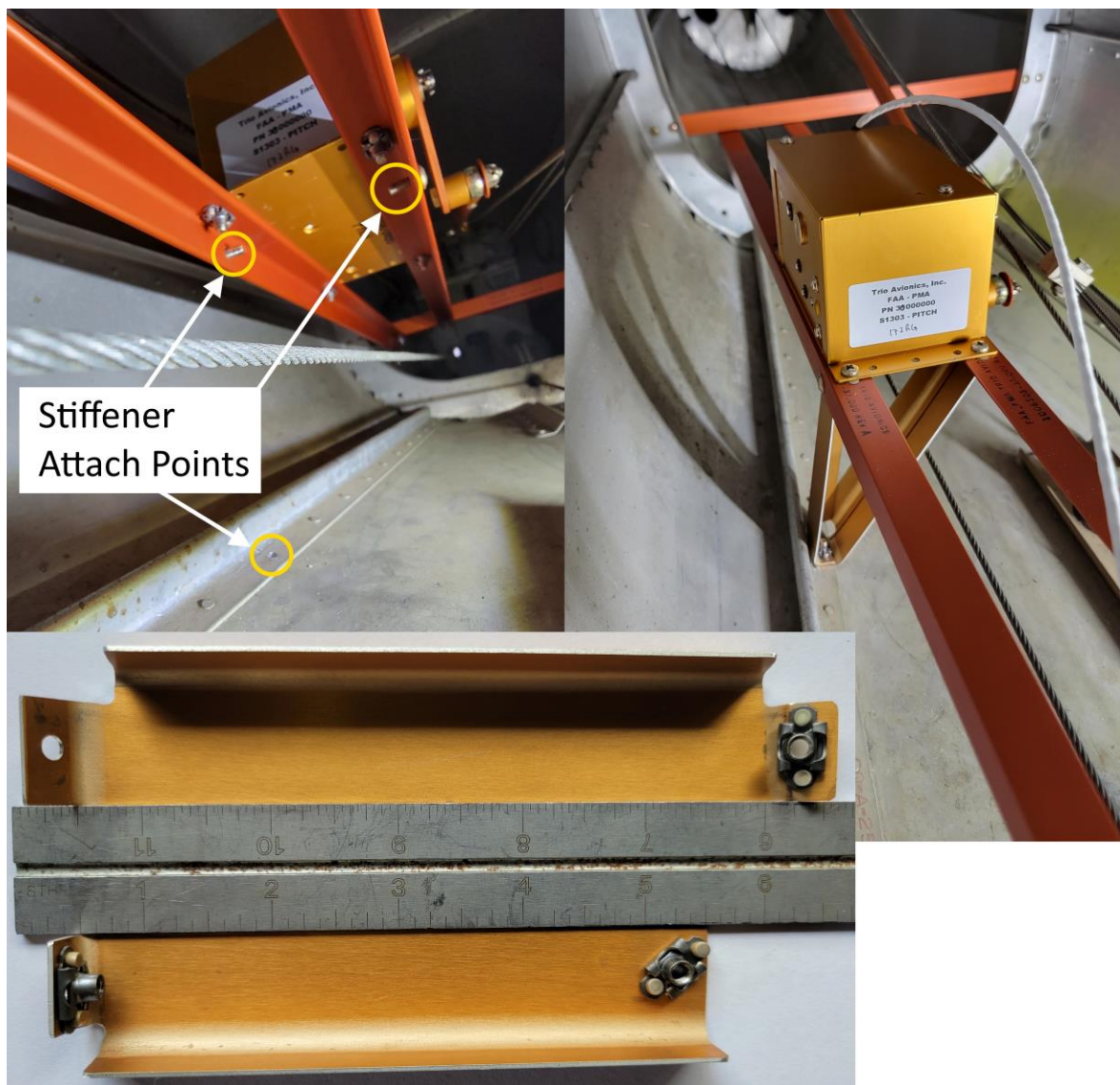
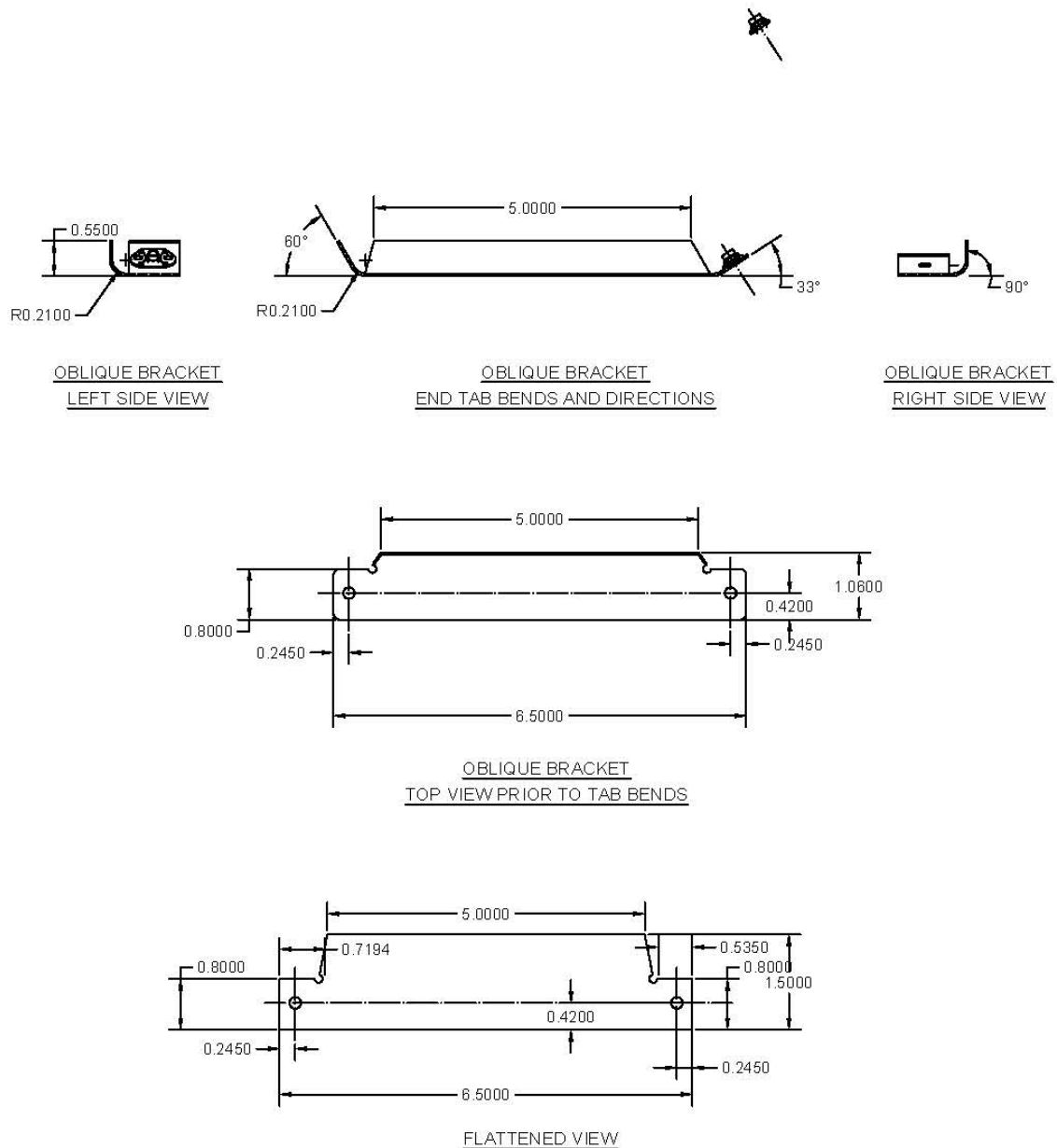


IMAGE D-5



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- NOTES:
1. MINIMUM METAL THICKNESS 0.040.
 2. ALUMINUM 2024-T3 or 6061-T6
 3. ALL DIMENSIONS IN INCHES

C172RG PITCH SERVO BRACKET

OBLIQUE BRACKET INSTRUCTIONS

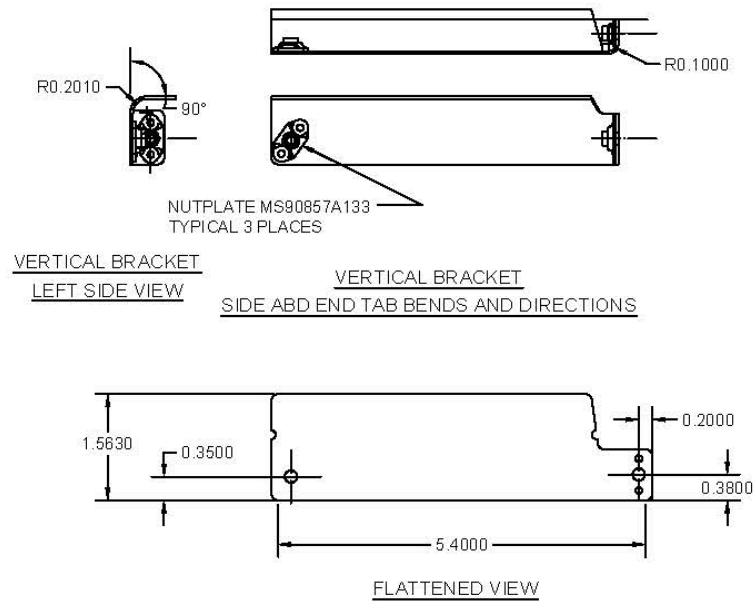
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IMAGE D-6



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NOTES:

1. MINIMUM METAL THICKNESS 0.040.
2. ALUMINUM 2024-T3 or 6061-T6
3. ALL DIMENSIONS IN INCHES

C172RG PITCH SERVO BRACKET

VERTICAL BRACKET INSTRUCTIONS

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IMAGE D-7



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Pitch Servo Arm Adjustment

22. After the Trio Pro Pilot autopilot controller and harness installation is complete, the following steps may be accomplished.
23. Power ON the autopilot and enter the Maintenance Mode.
24. Use the Encoder Knob to sequence to the VNAV Servo Set screen.
25. Adjust the rod ends until the VNAV SERVO SET reading has equal throw in both directions within $\pm 1^\circ$.
26. Tighten the nuts on the rod ends.
27. Finish installing the cable clamp bolts/nuts, castle nuts, and cotter pins.

NOTE:

IT IS VITAL THAT THE PITCH PUSH ROD AND CABLE CLAMP ARE ORIENTED IN A WAY THAT WILL NOT ALLOW AN OVER CENTER CONDITION.