

STC GROUP LLC
480 RUDDIMAN DRIVE
MUSKEGON, MICHIGAN 49445

REPORT NO: 1028001 REV F

TRIO AUTO PILOT INSTALLATION INSTRUCTIONS

PIPER AIRCRAFT CORPORATION PA-28
TAPER WING

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WRITTEN BY:	Ahmed J. Abdulshafi
APPROVED BY:	Jeffrey Odum



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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

Piper Aircraft Corporation PA-28 Service Manual Taper Wing

Piper Aircraft Corporation PA-28 Parts Catalog Taper Wing

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.



ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ASSY	Assembly
Autopilot	Trio Pro Pilot Autopilot
C.G.	Center of Gravity
ER	Engineering Record
FAA	Federal Aviation Administration
F.S.	Fuselage Station
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 Standard Servo
STC	Supplemental Type Certificate
WS	Wing Station



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 Piper Aircraft, Inc. aircraft with a **taper wing**.

You may contact The STC Group LLC for hardware and servo installation questions. Contact Trio Avionics, Inc with all autopilot related questions.

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

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.



2.0 PREPARE THE SERVOS

- 2.1 Remove the Pitch and Roll servos from the shipping boxes.
- 2.2 Enlarge the 4 corner mounting holes on **only the roll servo baseplate** using a #16 drill bit and deburr.
- 2.3 Remove the pitch servo baseplate screws from the pitch servo and install the new pitch servo baseplate which has PEM nuts installed on it. Refer to Figure 2-1. The pitch servo may come from the factory with the 901-115 baseplate already installed.
- 2.4 Attach the pitch servo arm and associated hardware per applicable STC Group Illustrated Parts Catalog.
- 2.5 Attach the roll servo arm and associated hardware per applicable STC Group Illustrated Parts Catalog and Figure 4-9. Retractable landing gear roll servo arm is depicted in Figures 4-7, 4-11, & 4-12.

NOTE:

The Installation kits are shipped with all servo arm screws pre-coated with Loctite. Do NOT apply additional Loctite to any screws. The screws may be reinstalled and torqued up to three (3) times.



FIGURE 2-1 PITCH SERVO BASEPLATE



3.0 PREPARE THE AIRCRAFT FOR THE INSTALLATION

- 3.1 Pitot and static system leak checks are recommended be performed on the aircraft before any work begins. {i.e. FAR §43 Appendix E, Paragraph (a)}
- 3.2 Remove seats and interior as needed for wiring installation.
- 3.3 Remove interior and exterior panels to gain access to F.S. 255 for pitch installation. Reference Figure 3-1 and Item #4 in Figure 3-2.
- 3.4 Remove right hand wing access panel between W.S. 140.09 & W.S. 157.00. Reference Item #6 (RH Wing) in Figure 3-2.

NOTE:

If your aircraft has aileron centering plate/spring mechanisms installed then they will need to be removed from **BOTH** aileron bellcranks. Refer to Figure 3-6.

- 3.5 Verify pitch, roll, and yaw control system rigging and cable tensions are correct in accordance with the applicable Type Certificate Data Sheet and Maintenance/Service Manual.
Left Aileron Deflection: _____ up _____ down ☐ Within Tolerance
Right Aileron Deflection: _____ up _____ down ☐ Within Tolerance
Stabilator Deflection: _____ up _____ down ☐ Within Tolerance
- 3.6 Record pitch and roll control system cable tensions for reference later.
Pitch Cable Tension: _____
Roll Cable Tension: _____
- 3.7 Remove safety wire/clips from the roll control balance cable turnbuckle (Item #24, Figure 3-3) and loosen for ease of roll servo pushrod installation.
- 3.8 Remove the clevis bolt from the RH forward (primary/forward) cable at the bellcrank.
- 3.9 The RH aileron cable attach clevis bushing (Piper PN's: 63882-08, 63900-31, & 63900-73) will be replaced with the provided oil imbedded bushing to obtain the correct height and clearance for final assembly. Refer to Figure 3-3 and applicable STC Group Illustrated Parts Catalog.
- 3.10 Attach the roll servo pushrod and associated hardware to the RH aileron bellcrank. Refer to applicable STC Group Illustrated Parts Catalog & Figure 4-7. For retractable landing gear aircraft refer to figure 4-12.
- 3.11 Temporarily re-tension the balance cable that was loosened in step 3.7 but do not safety at this point.
- 3.12 Remove safety wire/clips from the upper pitch cable turnbuckle (Item #16, Figure 3-5) and loosen for ease of pitch servo installation.

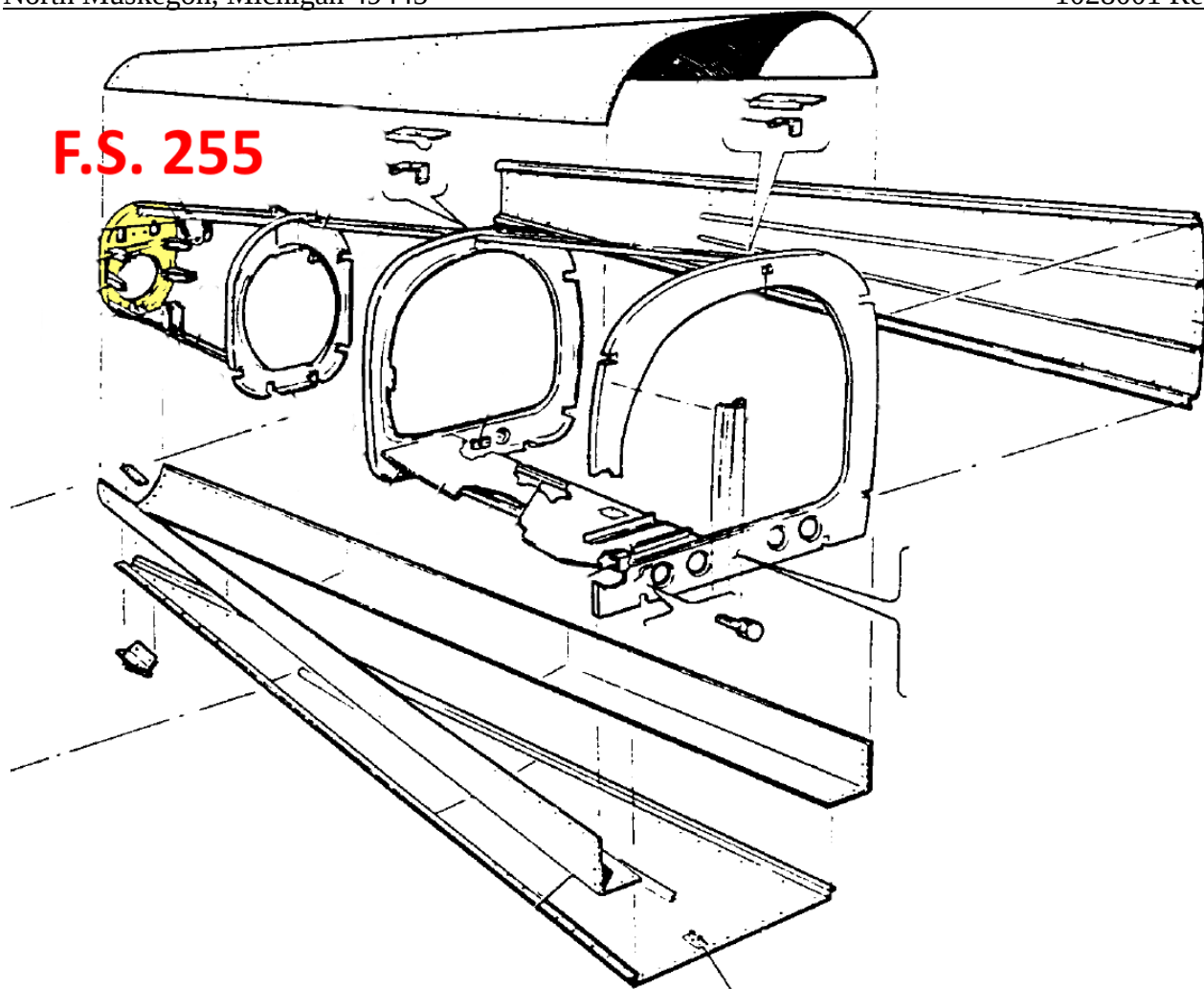
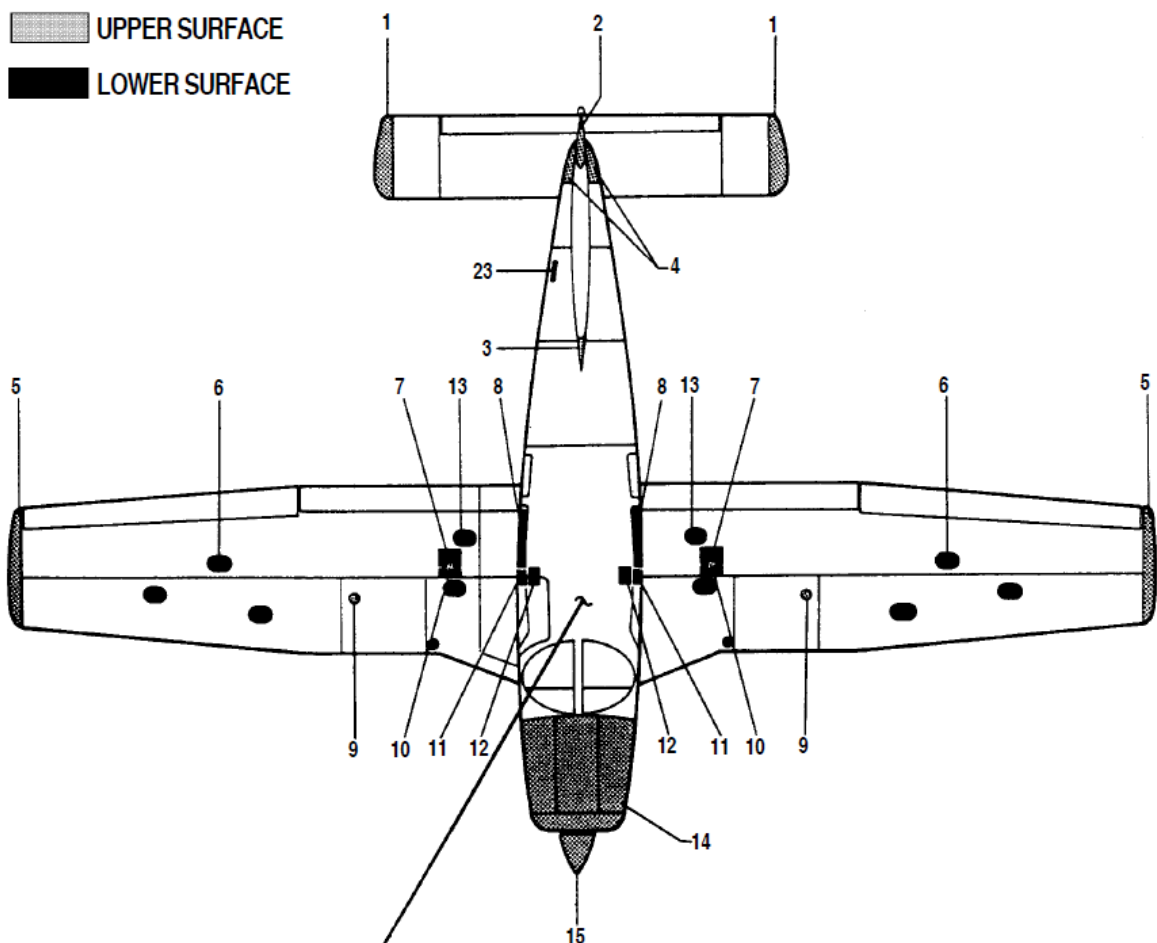


FIGURE 3-1 PITCH INSTALLATION LOCATION F.S. 255



 UPPER SURFACE
 LOWER SURFACE



1. TIP, STABILATOR
2. TIP, RUDDER
3. FAIRING, FIN
4. TAIL CONE, CONTROL CABLE AND TRIM SCREW
5. TIP, WING
6. COVER, BELLCRANK AND CONTROL CABLES
7. FAIRING, MAIN GEAR STRUT ASSEMBLY
8. FAIRING, FLAP TORQUE TUBE AND AILERON CABLES
9. CAP. FUEL TANK FILLER
10. CAP. STRUT FILLER
11. FAIRING, FUEL LINES
12. COVER, FUEL LINES AND SPAR ATTACHMENT BOLTS
13. COVER, CONTROL CABLES
14. COWL ASSEMBLY, ENGINE
15. SPINNER, PROPELLER
16. SEAT, BATTERY, TORQUE TUBE AND CONTROL CABLES
17. PLATE, CONTROL CABLES, MIDDLE
18. PLATE, AILERON AND STABILATOR CONTROL CABLES, FORWARD
19. COVERS, AILERON AND STABILATOR CONTROL CABLES
20. PANEL, AFT AREA OF FUSELAGE, STROBE LIGHT POWER SUPPLY
21. PLATE, CONTROL CABLES AND PULLEYS, REAR
22. COVER, FLAP CONTROL
23. EMERGENCY LOCATOR TRANSMITTER
24. CONTROL CABLE INSPECTION PANELS (AIRPLANES MANUFACTURED BEFORE 1979 MAY NOT HAVE THESE PANELS INSTALLED. REFER TO SECTION IV FOR PROCEDURES TO INSTALL CONTROL CABLE INSPECTION PANELS.) (REFER TO LATEST REVISION OF PIPER SERVICE BULLETIN NO. 977.)

FIGURE 3-2 REMOVEABLE PANELS

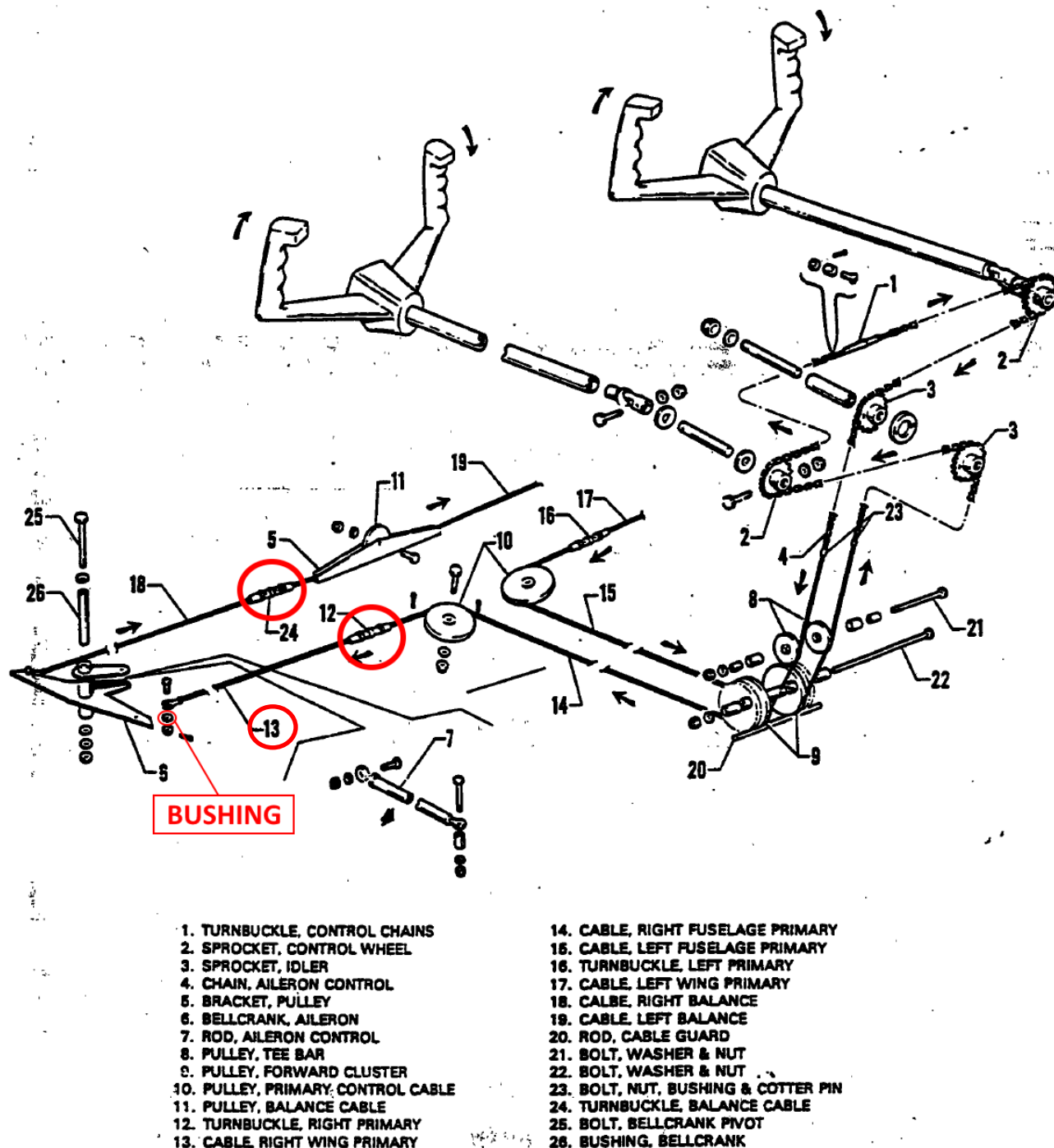


FIGURE 3-3 AILERON CONTROL SYSTEM



FIGURE 3-4 TAIL CONE FAIRINGS REMOVED

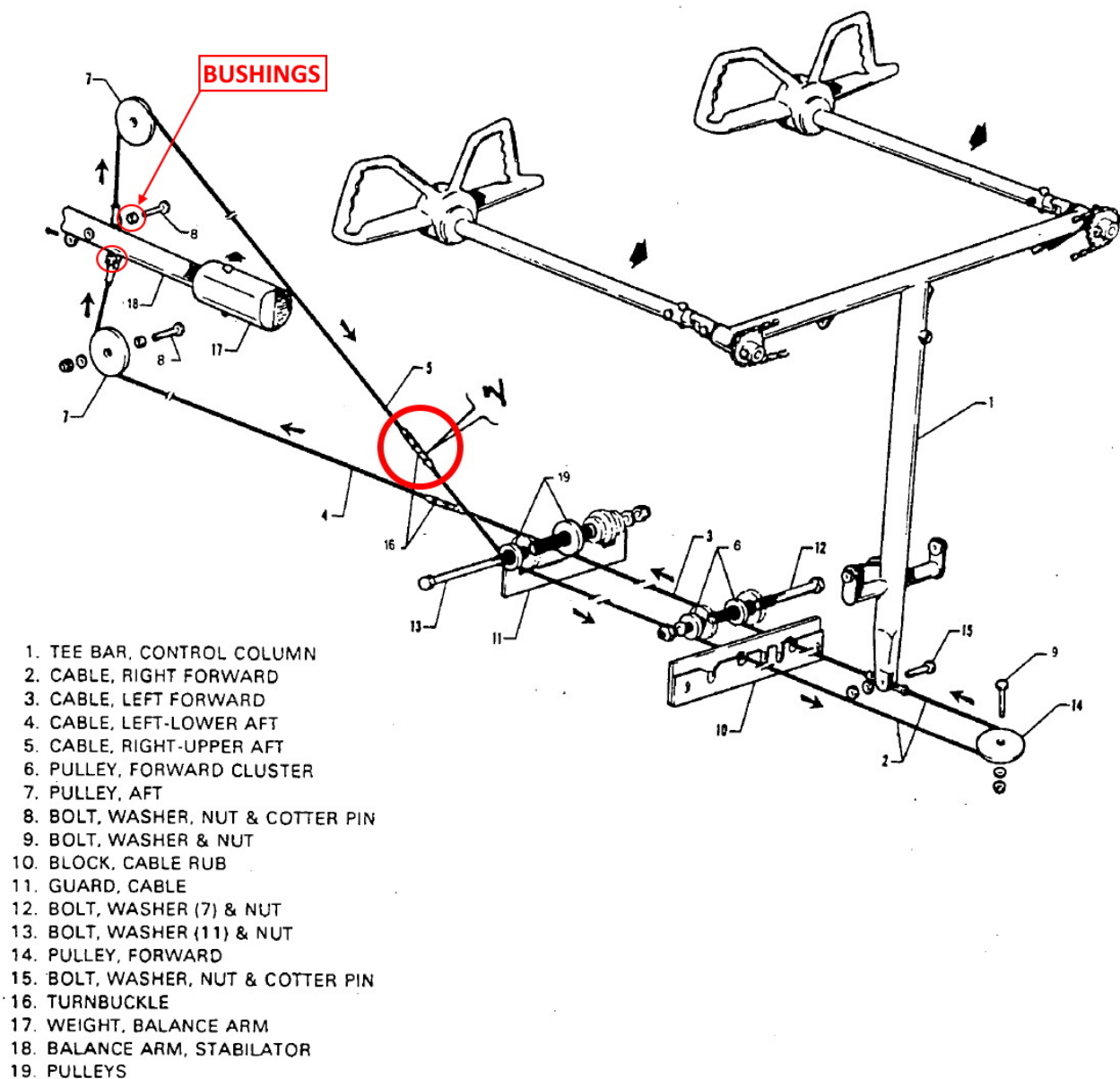


FIGURE 3-5 PITCH CONTROL SYSTEM

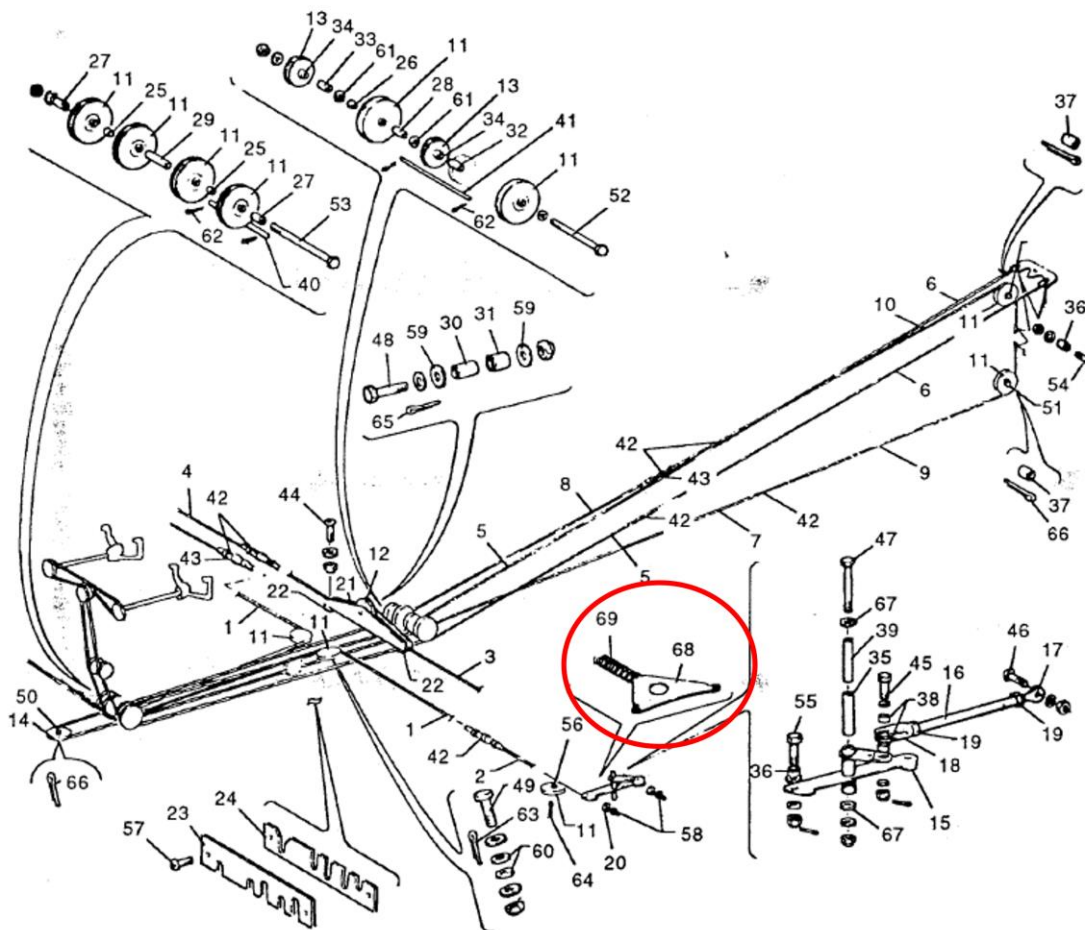
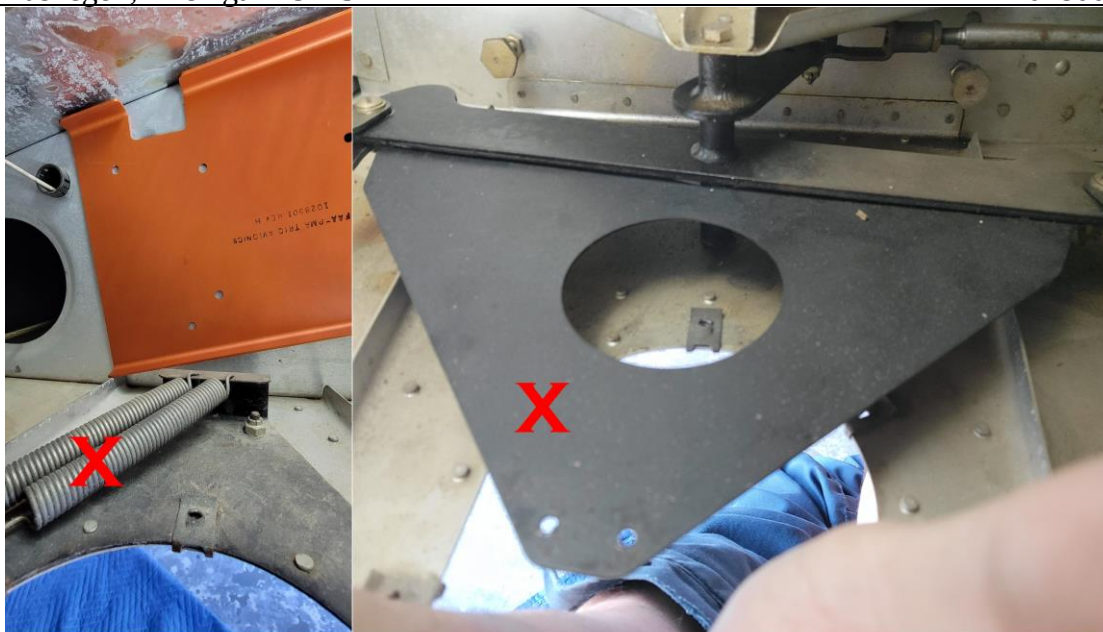


FIGURE 3-6 AILERON CENTERING MECHANISM REMOVAL



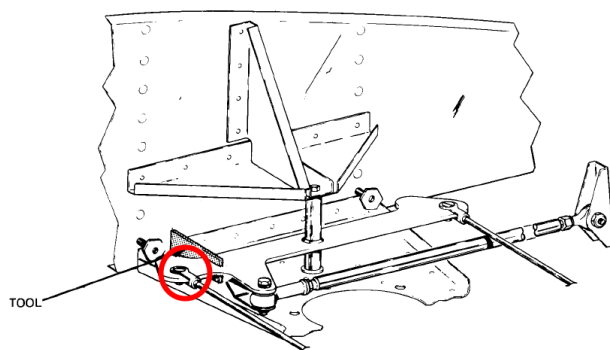
4.0 SERVO INSTALLATIONS

4.1 ROLL SERVO INSTALLATION

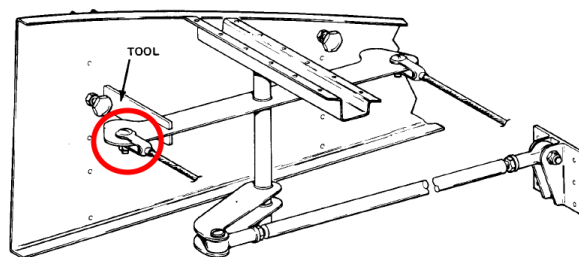
NOTES:

1. The orientation of the servo and servo arm will depend on the aircraft landing gear configuration.
2. The images in this section depict a fixed gear installation unless otherwise specified. When installing the roll servo in a retractable gear aircraft the roll servo will be mounted with the servo hub and servo arm facing the upper skin of the wing and forward.

FIXED GEAR



RETRACTABLE GEAR



Use Roll Servo PN: 30000000

PA-28-151

PA-28-236

PA-28-161

PA-28-201T

PA-28-181

Use Roll Servo PN: 31000000

PA-28R-201

PA-28R-201T

FIGURE 4-1 ROLL SERVO BELLCRANK CONFIGURATIONS

- 4.1.1 The roll servo bracket is mounted on the RH wing rib at W.S. 140.09.
- 4.1.2 Align servo bracket mounting plate to the wing rib approximately 5/8" aft of the spar as shown in Figure 4-3, or
- 4.1.3 For retractable landing gear aircraft, the mounting bracket may need to be modified for aileron control cable clearance. Refer to Figure 4-4.
- 4.1.4 Tape the servo mounting plate into position using painters' tape or equivalent.
- 4.1.5 Using a center punch, or equivalent, mark the position of the four outer holes for drilling.



FIGURE 4-2 ROLL SERVO LOCATION - RIGHT WING



FIGURE 4-3 SERVO BRACKET MOUNTING PLATE ALIGNMENT

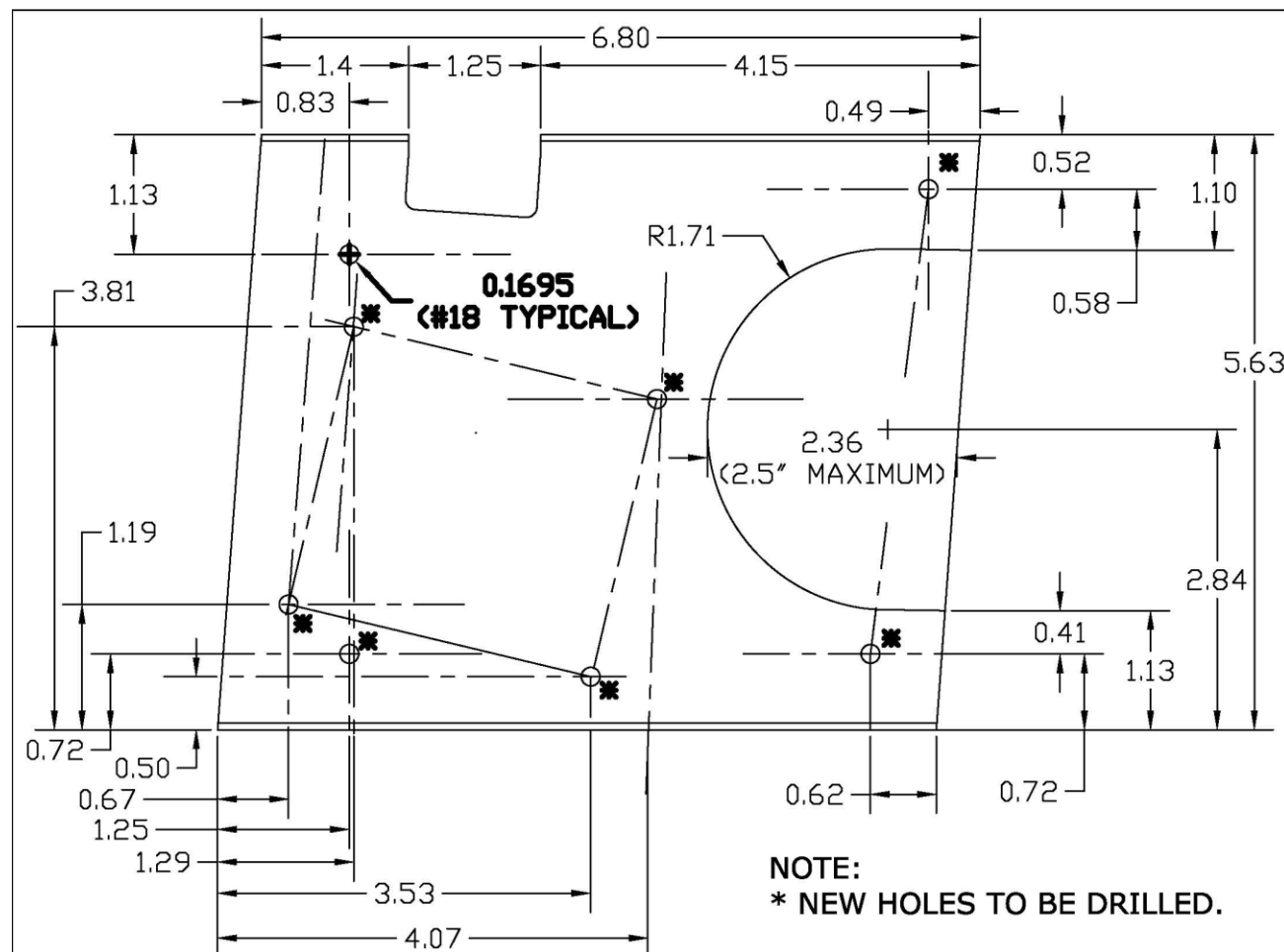


FIGURE 4-4 MODIFYING ROLL BRACKET FOR RETRACTABLE GEAR

NOTE:

45-degree and 90-degree air drills that utilize threaded inserts are required for all drilling operations to prevent aircraft damage. Do not start the installation without the tools listed in Appendix D. Use the three (3) step drilling method to match drill through the plate starting with a #40 threaded drill bit using the plate as a guide. It is recommended to enlarge the holes with a #30, and then enlarge to #18.

- 4.1.6 Secure the plate into position using Silver Cleco P Series Temporary Fasteners.
- 4.1.7 Enlarge all holes to a final size using a #18 drill bit.
- 4.1.8 Remove the plate and deburr all drilled holes.
- 4.1.9 Prepare all surfaces for ClickBond nutplate installation using the ClickBond surface preparation kit provided.
- 4.1.10 Install four (4) ClickBond nutplates on the inboard side of the wing rib using the ClickBond adhesive supplied. Refer to Figure 4-5 and Appendix B.



NOTE:

Follow the ClickBond installation instructions. and ClickBond Nutplate Installation Instructions on the ClickBond website. ***This is a critical operation.*** ClickBond nutplate installation requires clean hands, a clean environment, and properly prepared surfaces. Careful adherence to ClickBond installation instructions is required for successful nutplate installation.

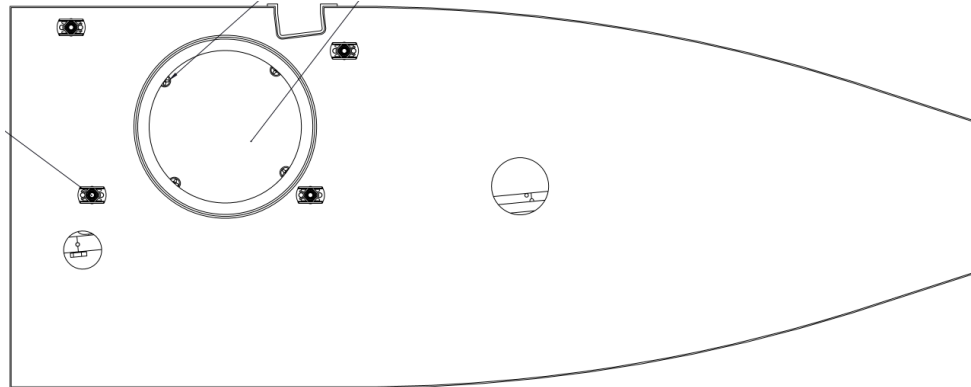
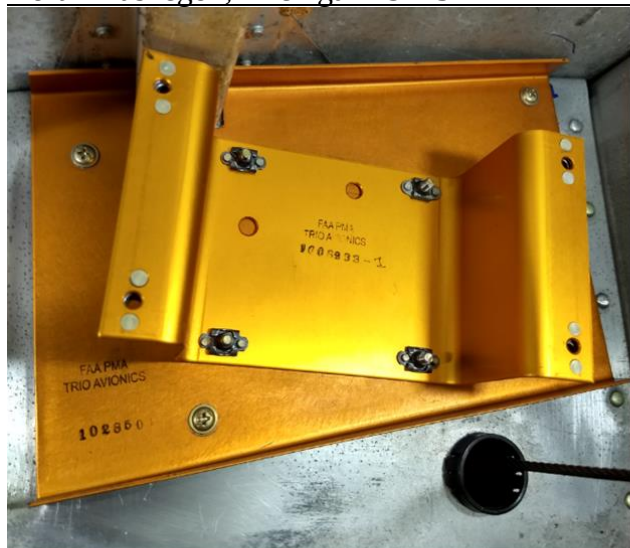


Figure 4-5 CLICKBOND NUTPLATE INSTALLATION

- 4.1.11 After the ClickBond nutplates have been installed allow the ClickBond adhesive “a minimum” of three (3) hours to cure.
- 4.1.12 Install the servo bracket onto the mounting plate, insert into wing, and fasten onto the wing rib using the screws supplied. It may be necessary to trim the servo bracket for clearance of the aft lower bracket to rib screw as seen in Figure 4-6.
- 4.1.13 Install the servo mounting plate with the servo bracket onto the wing rib, using the fasteners supplied. Refer to Figure 4-6.



FIXED GEAR

PA-28-151 PA-28-236
PA-28-161 PA-28-201T
PA-28-181



RETRACTABLE GEAR

PA-28R-201
PA-28R-201T

FIGURE 4-6 MOUNTING PLATE WITH SERVO BRACKET

4.1.14 Position the roll servo onto the servo bracket as shown in Figure 4-8. Retractable landing gear aircraft will have the servo hub and servo arm facing the upper skin of the wing and forward as depicted in Figure 4-7 & 4-12.

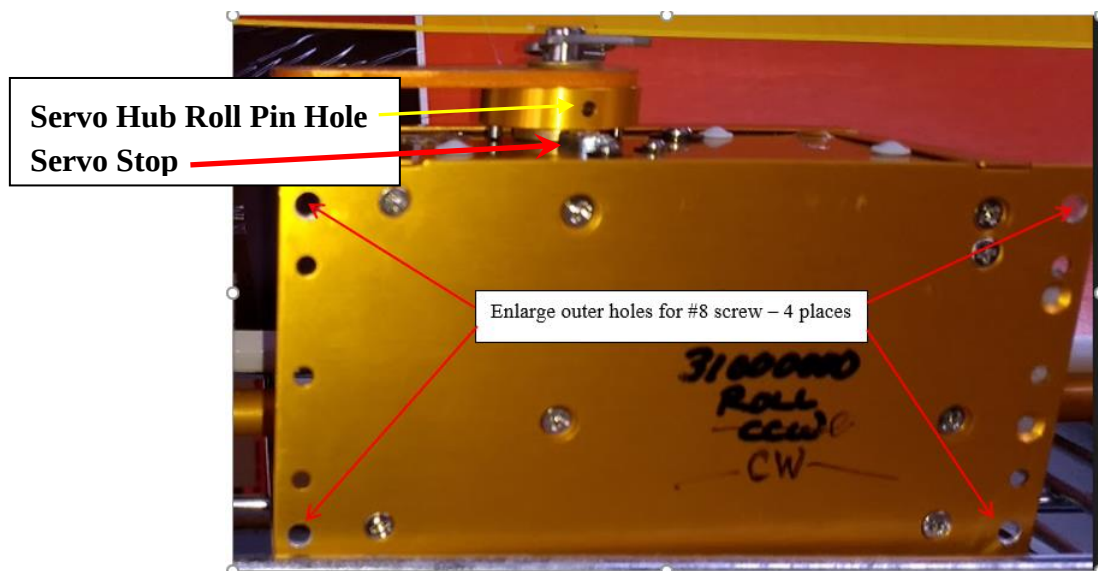


FIGURE 4-7 SERVO HUB AND STOP (RETRACTABLE GEAR SERVO)

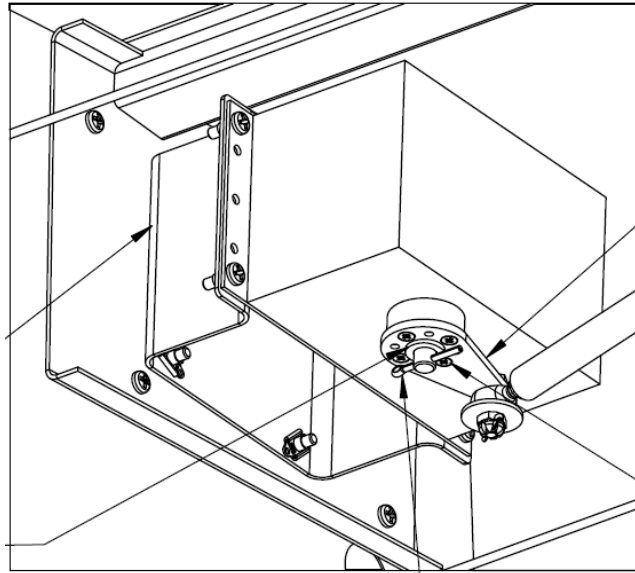


FIGURE 4-8 ROLL SERVO INSTALLATION & SERVO ARM ALIGNMENT

4.1.15 Install the four (4) screws supplied in the hardware kit through the servo baseplate into the mounting bracket. Refer to Figure 4-9.

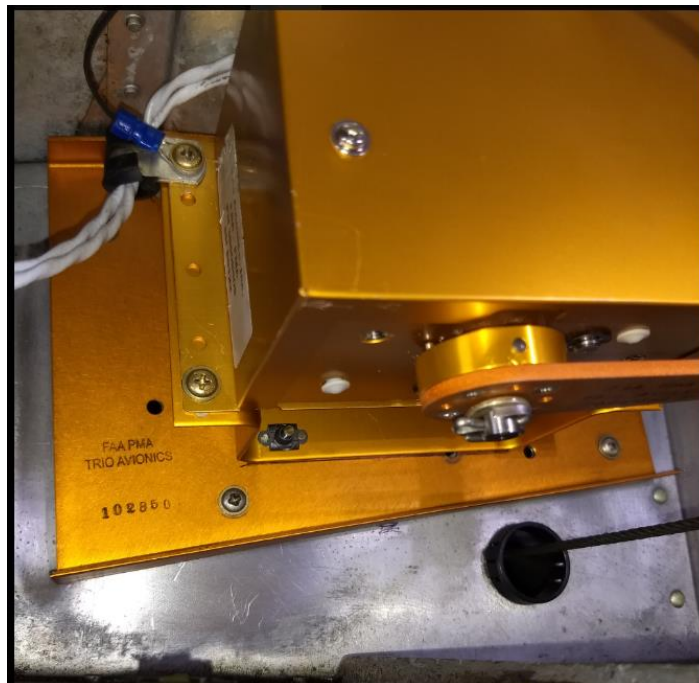


FIGURE 4-9 ROLL SERVO ASSEMBLY

4.1.16 Attach the roll servo pushrod assembly to the roll servo arm using the hardware supplied. See Illustrated Parts Catalog Document # 1028900.

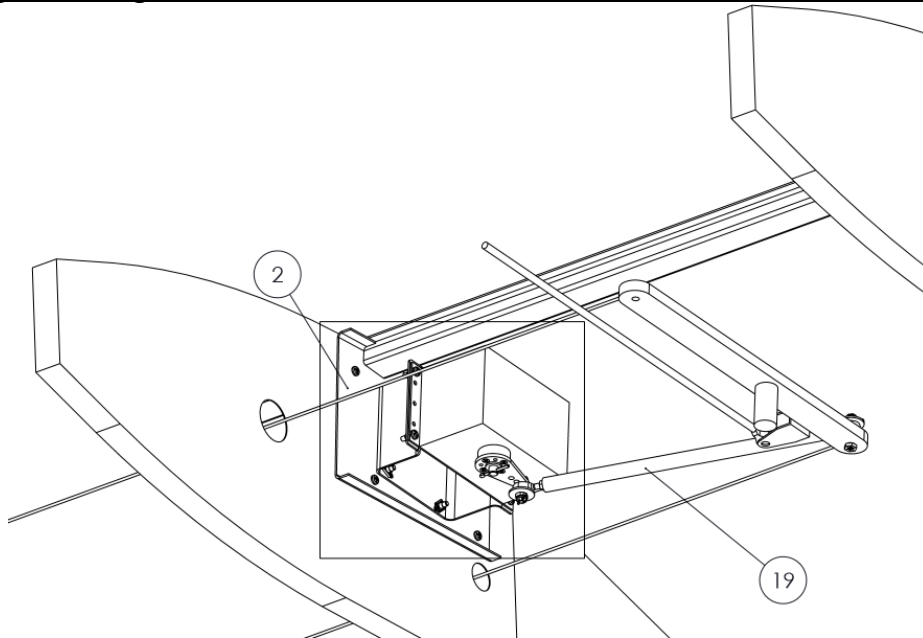


FIGURE 4-10 COMPLETE ROLL SERVO ASSEMBLY

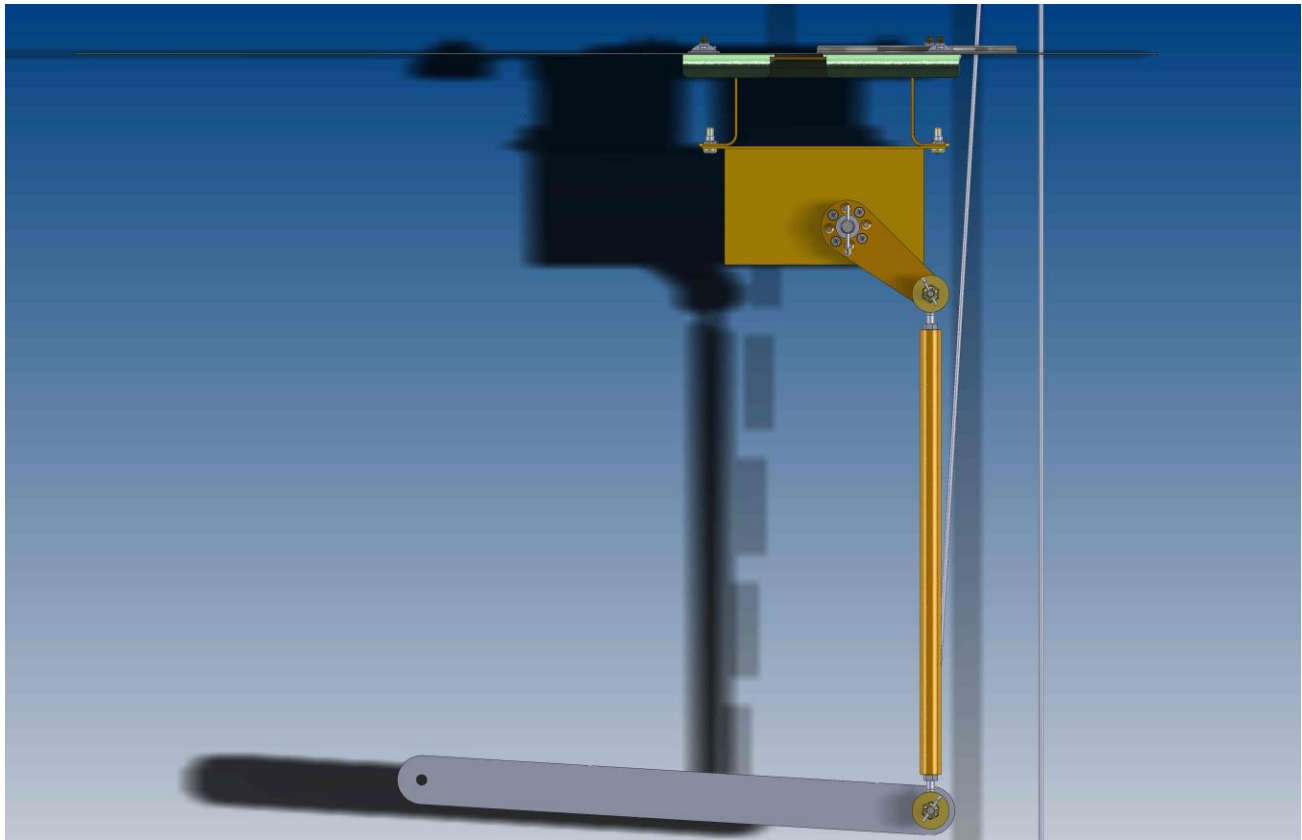


FIGURE 4-11 RETRACTABLE GEAR AIRCRAFT ROLL SERVO TOP VIEW

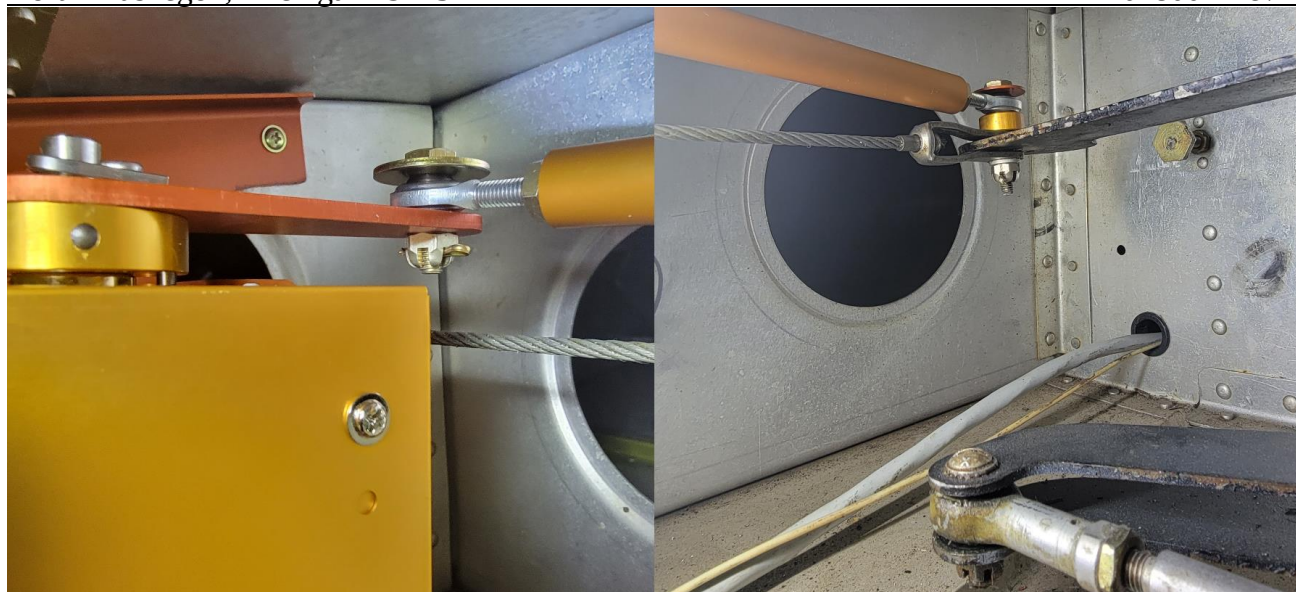


FIGURE 4-12 RETRACTABLE GEAR CONNECTIONS



4.2 PITCH SERVO INSTALLATION

- 4.2.1 The Pitch Servo Bracket Assembly is mounted on the forward edge of the tail cone bulkhead gussets located just forward of and butted up against F.S. 255 and is accessed through the fuselage ELT inspection panel, from the rear of the aircraft, and/or climbing through the aft fuselage.
- 4.2.2 Remove both pitch cable clevis's that attach to the stabilator.
- 4.2.3 Place the pitch servo bracket as far aft as possible on top of the (2) lower steel airframe gussets and clamp in place. Refer to Figure 4-12 and 4-13.
- 4.2.4 Use a #40 drill bit and 90-degree air drill to drill the 4 pilot holes through the gussets. Cleco each hole after drilling.
- 4.2.5 Enlarge the holes through the bracket and gussets with a # 19 drill bit.
- 4.2.6 Deburr all drilled holes.
- 4.2.7 Steps 4.2.8 through 4.2.10 can be skipped if four (4) locknuts (MS21044N08) are used to install the pitch tray.
- 4.2.8 Prepare all surfaces for ClickBond nutplate installation. Refer to Appendix B and the Clickbond Nutplate Installation Instructions on the ClickBond website. ***This is a critical operation.***

NOTE:

Clickbond nutplate installation requires clean hands, a clean environment, properly prepared surfaces, and careful adherence to Clickbond installation instructions for successful nutplate installation.

- 4.2.9 Install the four (4) Clickbond nutplates on the underside of the gussets using the ClickBond adhesive supplied.
- 4.2.10 Allow the Clickbond adhesive to dry before proceeding.
- 4.2.11 Position the pitch servo on the pitch servo bracket (mounting of the pitch servo to pitch bracket can be accomplished later if necessary). Refer to Figure 4-12 and 4-13.
- 4.2.12 Attach the pitch servo using the four (4) screws and lock washers supplied.
- 4.2.13 Install the pitch servo bracket assembly onto the steel gussets, using the four (4) screws supplied.
- 4.2.14 Fasten the pitch adapter to the stabilator clevis's. Refer to Figure 4-12, 4-13 and the applicable STC Group Illustrated Parts Catalog.

NOTE:

Ensure that the new supplied oil imbedded bushings are installed in the stabilator clevis attach tabs.

- 4.2.15 Secure the pitch adapter using the hardware supplied. ***Do not overtighten clevis attach hardware.*** Once installation is complete ensure that clevis's can still move freely forward and aft.
- 4.2.16 Attach the pitch servo push pull rod to the servo arm using the hardware supplied. Refer to Figure 4-12, 4-13 and applicable STC Group Illustrated Parts Catalog.



4.2.17 Attach the upper end of the push pull rod to the pitch adapter using the hardware supplied.
Refer to Figure 4-12, 4-13 and applicable STC Group Illustrated Parts Catalog.

NOTE:

On some installations it may be necessary to shorten the push pull rod to achieve equal throw in both directions. The maximum allowed length reduction is 1/4" (0.25") from each side of the rod.

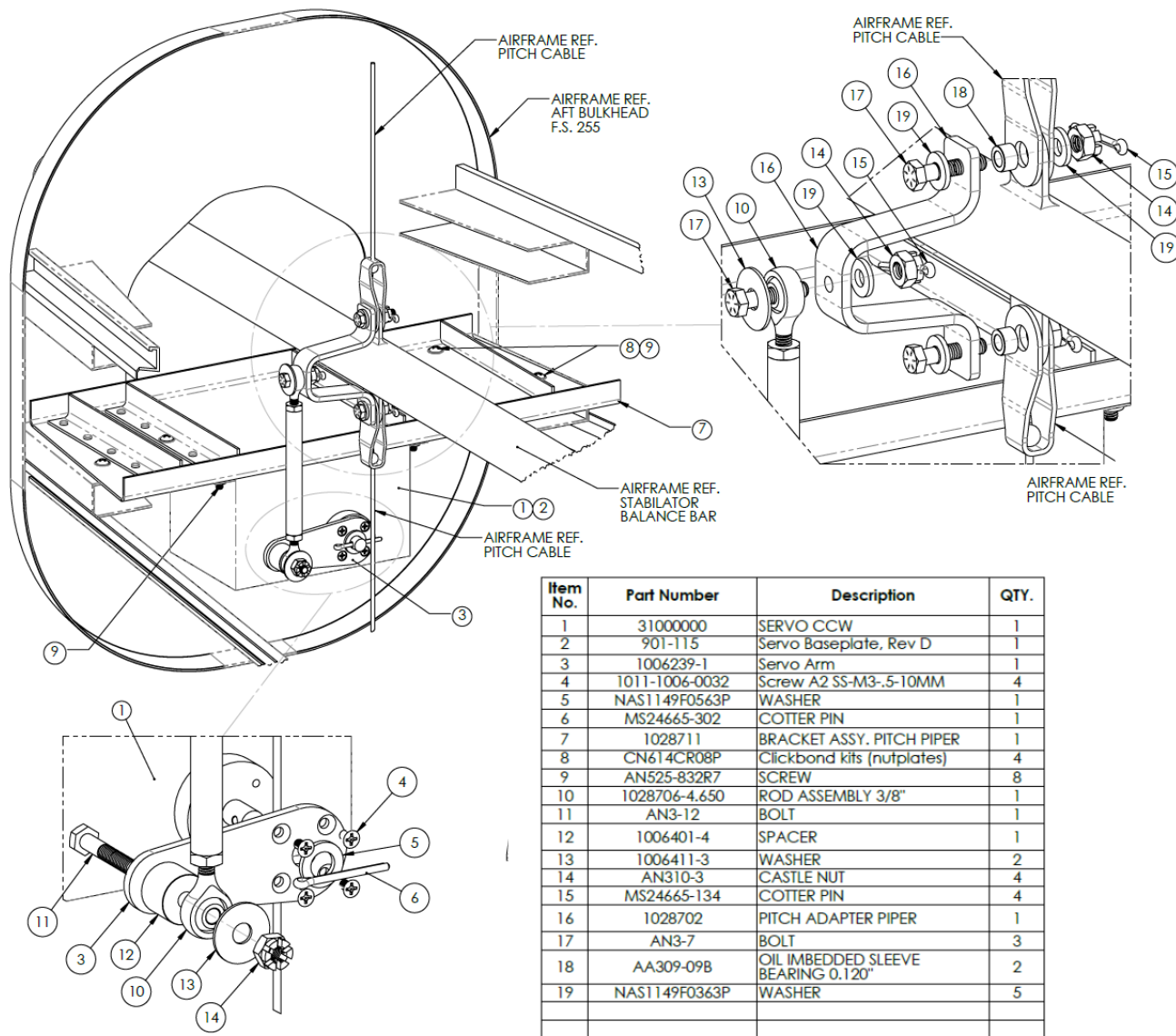


FIGURE 4-13 PITCH ASSEMBLY EXPLODED VIEW

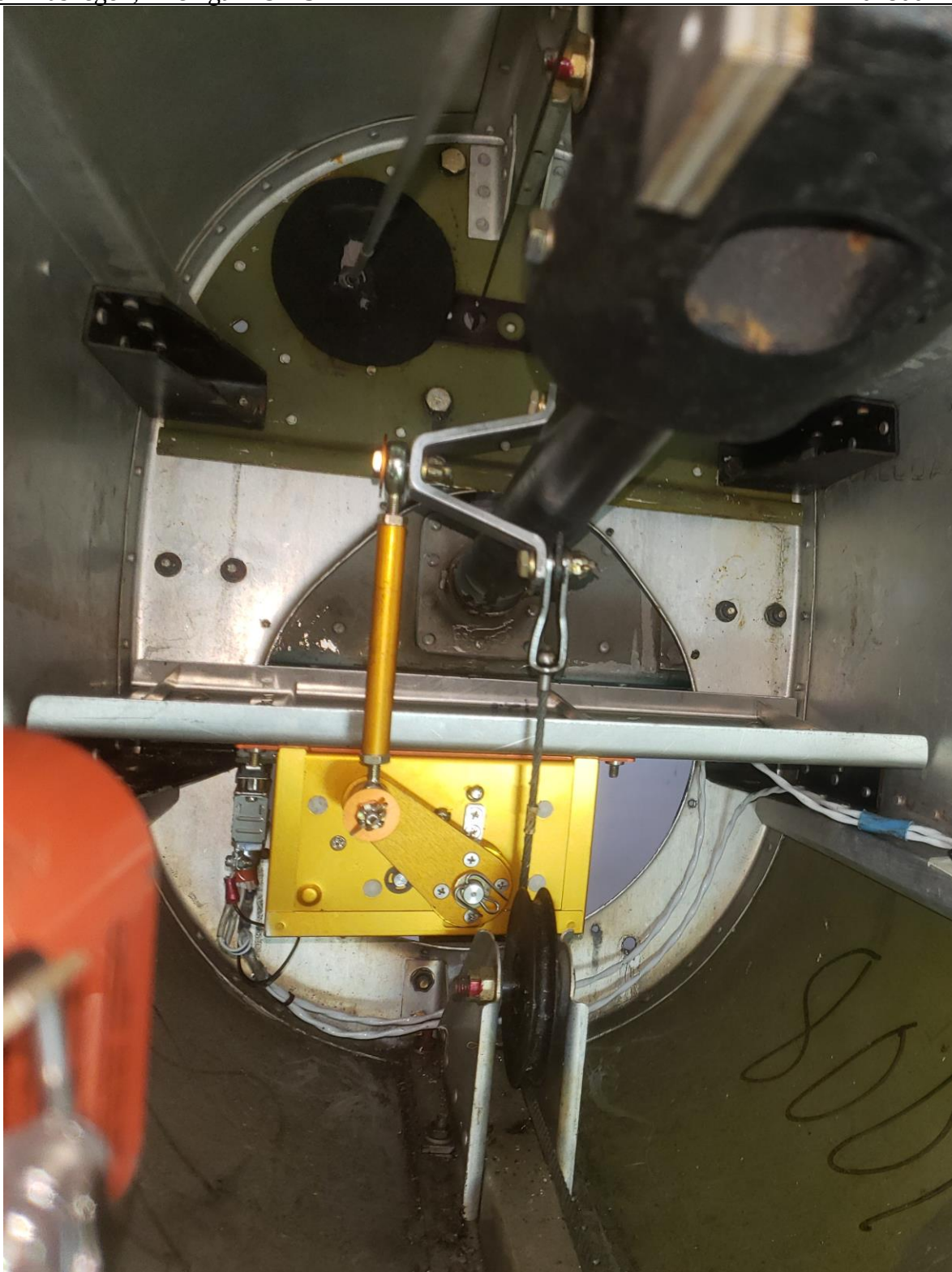


FIGURE 4-14 PITCH INSTALLATION



5.0 PRO PILOT INSTALLATION & WIRING

NOTE:

Prior to connecting the wiring harness DB9 or DB37 connectors into the servos or autopilot control head perform complete power, ground, and data pinout tests on the harness.

Reference the STC Group LLC Avionics Addendum for information not mentioned here.

5.1 SERVO WIRE HARNESSES INSTALLATION

- 5.1.1 Remove existing factory autopilot wiring and set aside for weighing (if installed).
- 5.1.2 Route Trio servo wire harnesses along same path and using the same clamps as factory autopilot wiring. If there was no previously installed autopilot then use best practices for routing wires.
- 5.1.3 Take care to protect harness pins at the end of the harnesses.
- 5.1.4 Terminate supplied DB9 connectors per latest revision Trio Wiring Diagram.
- 5.1.5 Attach DB 9 connectors to Trio Servos.
- 5.1.6 Secure the harnesses as necessary.

5.2 TRIO AUTOPILOT CONTROLLER

- 5.2.1 The Trio autopilot controller is ordered in Panel Mount or Instrument Mount versions. Refer to Figure 5-3.
- 5.2.2 The Trio autopilot controller will support 12 to 30 volt inputs.
- 5.2.3 Install the autopilot controller using best practices in either panel or instrument hole locations. Refer to AC 43-13 for this step and all following steps.
- 5.2.4 Utilize Trio Wiring Diagram for the following steps (Appendix A).
- 5.2.5 Install supplied 5 ampere circuit breaker within easy reach of the pilot and label.
- 5.2.6 If a Panel Mount unit is ordered install the supplied power switch and label.
- 5.2.7 Install the supplied Red Disconnect button on the left side of the pilots control yoke and label "AP DSC" "PCS" or "Autopilot Disconnect."
- 5.2.8 Install the Recover button, supplied, in an available convenient location within easy reach of the pilot and label AP Recover.
- 5.2.9 Install Limitation Placard in plain view of Pilot.

5.3 PITOT AND STATIC PORTS

- 5.3.1 The Trio Pro Pilot autopilot controller is provisioned with Pitot and Static ports on the rear of the controller.
- 5.3.2 The controller pitot and static ports must be integrated (plumbed) into the aircraft pitot and static systems.
- 5.3.3 Every aircrafts pitot and static system is different. The following are for example only as the aircraft systems will vary.
- 5.3.4 The following components, or equivalent, will be used in most installations:



- Tygon tubing. 2 each x 24" pieces. Aircraft Spruce P/N: 05-00944.
- Nylo Seal tubing. 2 each x 6" pieces. Aircraft Spruce P/N: 44-P
- Nylo Seal "T" fittings. 2 each. Aircraft Spruce P/N: 264-N04.
- Nylo Seal Inserts. 8 each. Aircraft Spruce P/N: 259-N04.
- 5.3.5 Extend the pitot & static hoses & cable connector through the tray (if applicable) and out through the front of the instrument panel or radio rack to allow for ease of servicing.
- 5.3.6 Mate the pitot and static hoses to the control head.
- 5.3.7 Secure pitot and static connections at the rear of the autopilot controller.
- 5.3.8 Mate the 37 pin D connector to the control head using the screws provided.
- 5.3.9 If using an Instrument mount control head secure the control head using #6 brass instrument screws.
- 5.3.10 If using a Panel mount control head slide the control head into the tray, then tighten the securing allen screw. Do not over tighten control head in the tray.
- 5.3.11 It is required that pitot and static system leak tests and inspections are performed after autopilot installation. Refer to your local authorities' regulations. {i.e. FAR §43 Appendix E, Paragraph (a)}

5.4 TRIO AUTOPILOT DATA CONNECTIONS

- 5.4.1 For most RS-232 connections, set the output of the GPS unit to "Aviation w/ no altitude" or NMEA 0183 OUT.

NOTE:

For Avidyne IFD Series GPS Navigators it may be necessary to use "Aviation" format.

- 5.4.2 If your aircraft is equipped with a GPS that has ARINC 429, set unit to output "GAMA" Low Speed.
- 5.4.3 Prior to making the connections to the GPS unit in the aircraft determine what else is connected.
- 5.4.4 It may be necessary to parallel the connections.
- 5.4.5 If parallel connections are required, verify that the lines you are paralleling use, or can use, the same data format that is required.
- 5.4.6 Both the RS-232 and the ARINC 429 can be paralleled with like connections.
- 5.4.7 Ensure that the analog alarm output is connected to the un-switched audio input on the Audio Panel.

5.5 POSITION THE SERVO ARMS

NOTE:

A notepad will be required for the following steps.

- 5.5.1 In the following steps the servo arm positions will be recorded in three (3) locations: neutral, full up stabilator, full down stabilator.
- 5.5.2 Power ON the Pro Pilot autopilot.
- 5.5.3 Press the Encoder knob when Elevation is displayed (field elevation is not required).
- 5.5.4 Simultaneously Press and Hold the Encoder knob and V MODE button. Refer to Figure 5-1.



- 5.5.5 After approximately three (3) seconds the “MAINTENANCE SETTINGS” screen will appear. Refer to Figure 5-1.
- 5.5.6 Advance through the Maintenance Settings by either pressing or turning the Encoder knob until VNAV Servo Set screen is displayed.
- 5.5.7 The **pitch** zero (center) setting may vary between aircraft but the servo arm throw in either direction must be equal to each other $\pm 1^\circ$. (i.e. -44.2° & $+44.2^\circ$). Refer to Figure 5-2.
- 5.5.8 If the reading is not in this range adjust the rod ends equally until the VNAV Servo Set screen displays equal throw in both directions, $\pm 1^\circ$.

NOTE:

The Aurora Bearing Company recommends a minimum of 1.5 x thread diameter for rod end engagement in the push pull rods.

- 5.5.9 Lock the rod ends into position and mark them with tamper proof torque seal.
- 5.5.10 Record the reading shown on the VNAV Servo Set screen.
- 5.5.11 Move the control yoke fully aft until the stabilator reaches the mechanical stops.
- 5.5.12 Record the reading on the VNAV Servo Set screen.
- 5.5.13 The reading cannot not exceed 45 degrees. The electrical limit is approximately 44.7° .
- 5.5.14 Move the control yoke fully forward until the stabilator reaches the mechanical stops.
- 5.5.15 Record the reading on the VNAV Servo Set screen.
- 5.5.16 The reading should not exceed 45 degrees.
- 5.5.17 The stabilator travel tests and readings are complete.
- 5.5.18 Advance through the Maintenance Settings by either pressing or turning the Encoder knob until LNAV Servo Set screen is displayed.
- 5.5.19 With the ailerons locked in the neutral position the **roll** (LNAV) servo center setting must be equal $0^\circ \pm 1^\circ$.
- 5.5.20 If the reading is not in this range adjust the rod ends equally until the LNAV Servo Set screen displays $0^\circ \pm 1^\circ$.

NOTE:

The Aurora Bearing Company recommends a minimum of 1.5 x thread diameter for rod end engagement in the push pull rods.

- 5.5.21 Lock the rod ends into position and mark them with tamper proof torque seal.
- 5.5.22 Record the reading shown on the LNAV Servo Set screen.
- 5.5.23 Move the control yoke fully left until the stabilator reaches the mechanical stops.
- 5.5.24 Record the reading on the LNAV Servo Set screen.
- 5.5.25 The reading cannot not exceed 45 degrees. The electrical limit is approximately 44.7° .
- 5.5.26 Move the control yoke fully right until the stabilator reaches the mechanical stops.
- 5.5.27 Record the reading on the LNAV Servo Set screen.
- 5.5.28 The reading should not exceed 45 degrees.
- 5.5.29 The aileron travel tests and readings are complete.
- 5.5.30 Power OFF the autopilot.
- 5.5.31 Turn off the aircraft radio master, if so equipped.
- 5.5.32 Turn off the aircraft power.



FIGURE 5-1 MAINTENANCE SETTINGS



FIGURE 5-2 PITCH POSITIONED IN NEUTRAL (EXAMPLE)

5.6 TRIO INITIAL SETUP AND CHECKS

- 5.6.1 Refer to the STC Group Avionics Addendum for initial checks and setup of the autopilot installation.
- 5.6.2 Complete applicable portions of the STC Group Post Installation Flight Checks Document No. F-1006-43.
- 5.6.3 Autopilot gain settings have been programmed before shipment.
- 5.6.4 Individual aircraft may require fine tuning of servo gains on the first few flights. The following rough gain sets are a common starting point for Piper straight wing aircraft:

SET SERVO GAINS
HNAV=24 VNAV=24

NOTE:

Gains are not to be changed by the aircraft owner / operator / pilot without contacting Trio Avionics or The STC Group LLC in advance for guidance.

The procedures for “fine tuning” gains are located in the Avionics Addendum available on The STC Group LLC website: www.thestcgroupllc.com/documents.



- NOTES:
1. SEE FILE 1006103.SLDASM FOR SOLID MODEL.
 2. ROUTE WIRE HARNESS WITH EXISTING WIRE BUNDLES & SECURE PER AC43.13-18.
 3. POSITION INSTR PANEL MOUNTED COMPONENTS APPROXIMATELY AS SHOWN.
- IF YOKE IS NOT PROVIDED FOR SWITCH INSTL, FABRICATE BRACKET & ATTACH TO YOKE FOR MOUNTING SWITCH AS REGD.

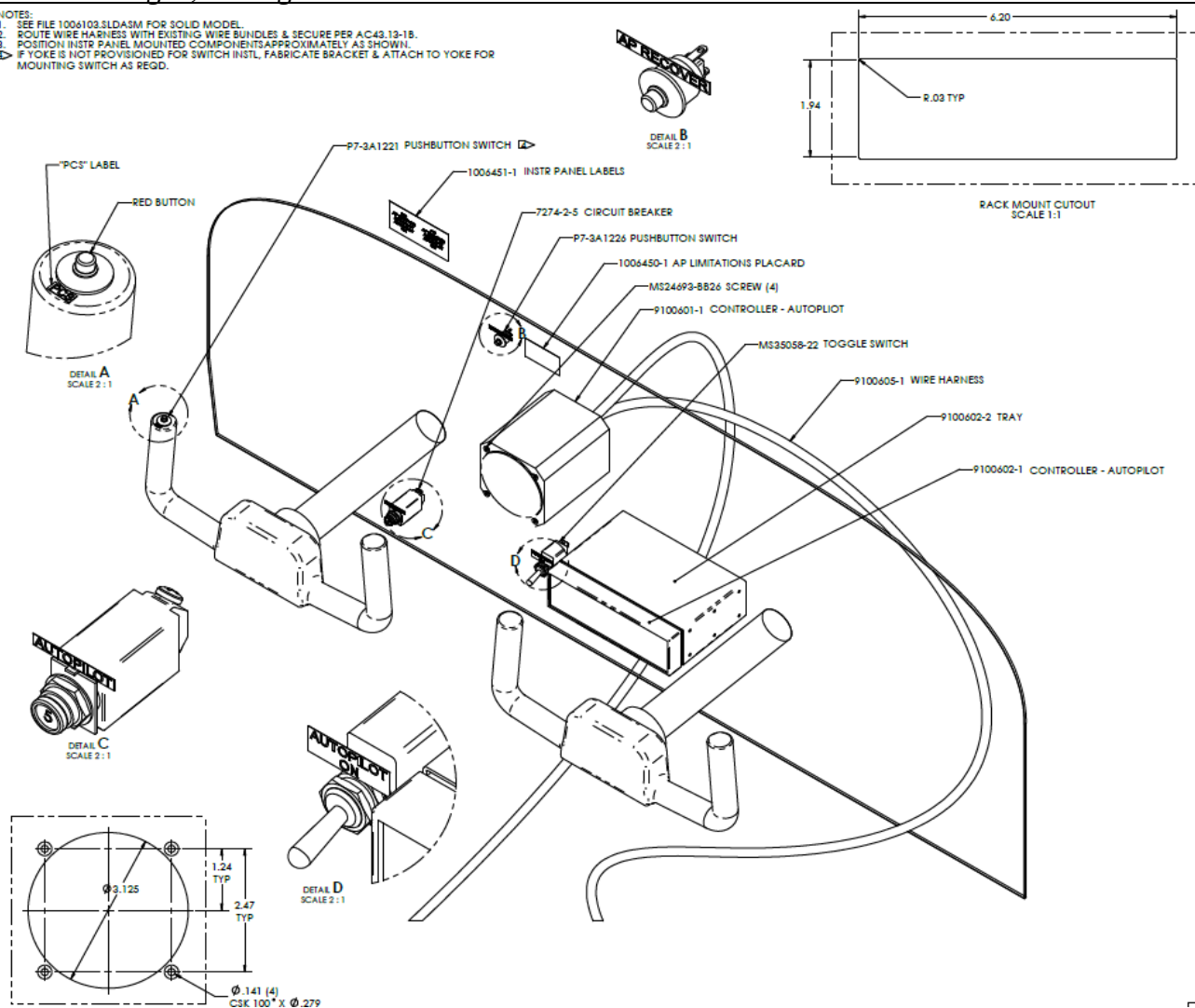


FIGURE 5-3 TYPICAL COCKPIT INSTALLATION



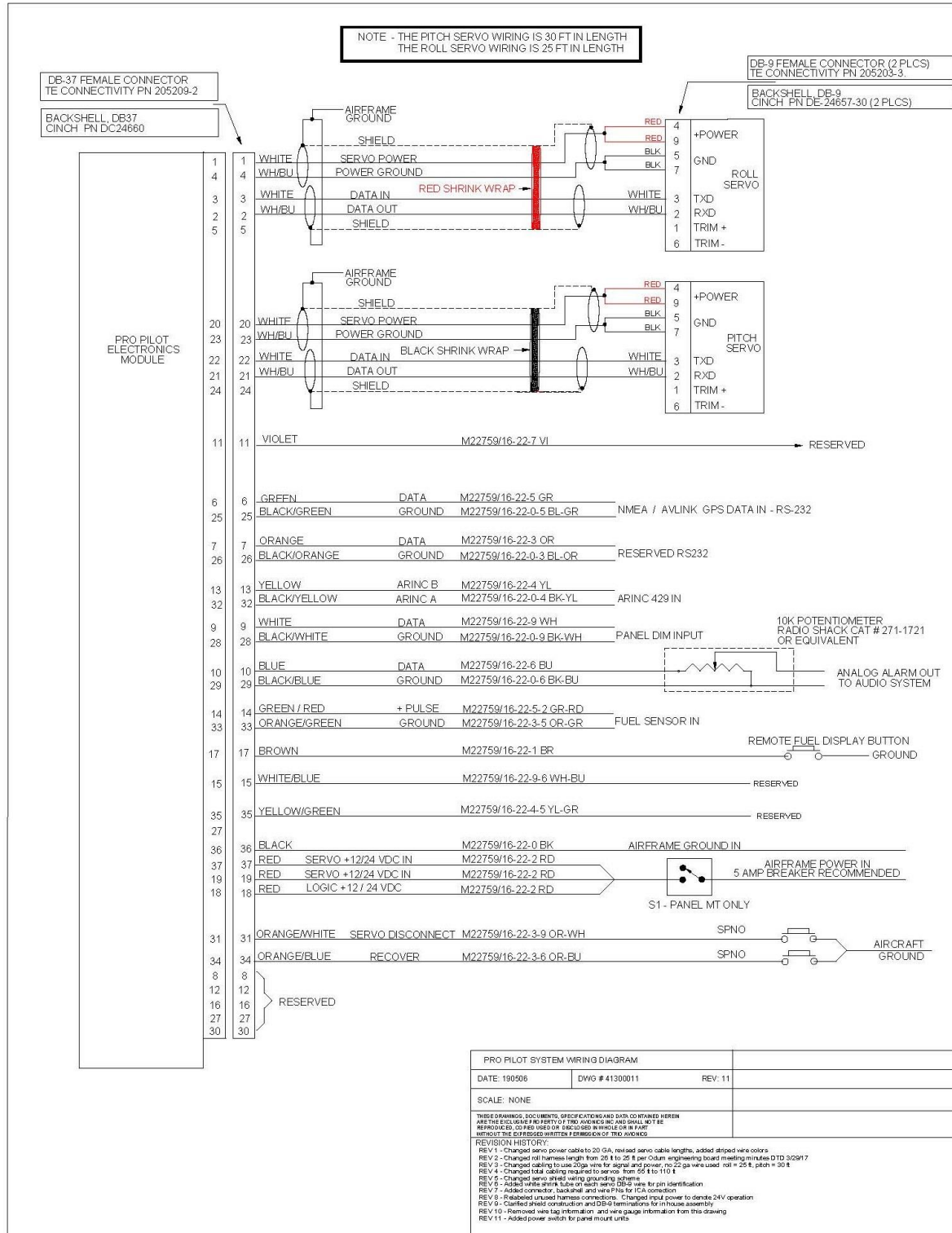
6.0 CLOSEUP

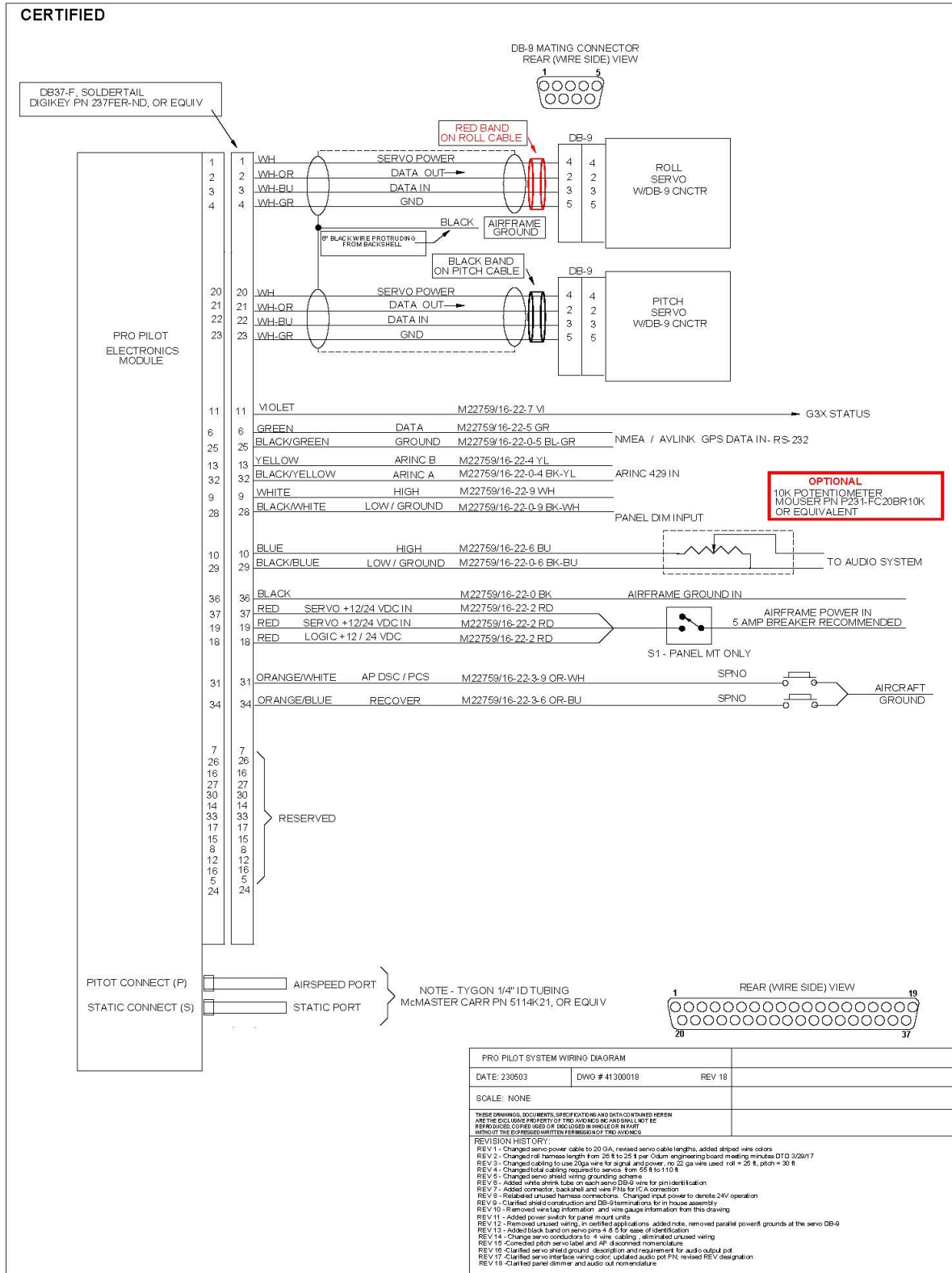
- 6.1 Re-tension and safety aileron balance cable/turnbuckle.
- 6.2 Re-tension and safety pitch cable/turnbuckle.
- 6.3 Install all items removed in Section 3 of this document **except** aileron centering mechanisms.
- 6.4 It is required that pitot and static system leak tests and inspections be performed after autopilot installation. Refer to your local authorities' regulations. {i.e. FAR §43 Appendix E, Paragraph (a)}
- 6.5 Amend the Weight & Balance and Equipment List.
- 6.6 Install FAA Approved Aircraft Flight Manual Supplement into the AFM, POH, or applicable flight manual for the aircraft.
- 6.7 Complete all logbook entries as required to return the aircraft to service.
- 6.8 Submit applicable paperwork in accordance with local authority regulations. (i.e. FAA Form 337)



APPENDIX A PRO PILOT SYSTEM WIRING DIAGRAM

ORIGINAL WIRING DIAGRAM







APPENDIX B CLICKBOND NUTPLATE INSTALLATION INSTRUCTIONS

CLICK BOND

Nutplate Installation Instructions
Applicable Parts: All standard and sealed nutplates

Safety First
When using solvents and adhesives, follow appropriate safety precautions. These include use of personal protection equipment (gloves & protective eye wear) and adequate ventilation. Refer to SDS for complete information. Read all instructions before starting work.

Step 1 Prepare Substrate
Clean
Clean substrate to remove all surface contaminants:

- Use a clean, lint-free cloth and fresh cleaning solvent (CB911 or acetone is recommended). Saturate cloth with solvent and wipe substrate with a single rolling motion.
- Check cloth for residue. If present, fold cloth over to use a clean side, or use a fresh clean cloth and repeat wipe.

Tip: Always use clean side of cloth for each wipe. Never use same side more than once.

- If necessary, use clean dry cloth to remove any solvent left on substrate.

Abrade
Abrade substrate where part is to be installed:

- Use appropriate abrasive, and method. (Metallic 120-180 grit, Composite 160-180 grit)

Caution: If installing on composite substrate, do not damage fibers during abrading.

- Remove surface oxides, top coat, and primer to expose bare material.

Tip: Use random motion to abrade substrate.

Clean
Repeat cleaning process to remove abrasion residue:

- Solvent wipe the substrate with a single rolling motion.

Tip: Solvent clean progressively smaller areas to avoid introducing contamination.

- Check cloth for residue. If present, fold cloth over to use a clean side, or use a fresh clean cloth and repeat wipe.

Tip: Always use clean side of cloth for each wipe. Never use same side more than once.

- If necessary, use clean dry cloth to remove any solvent left on substrate.

Step 2 Prepare Part

- Solvent wipe nutplate base with single rolling motion to remove residue.

Note: Unprimed parts should be abraded prior to solvent wipe.

- Apply adhesive evenly to nutplate base as shown.

Tip: Use enough adhesive to give a small, uniform amount of "squeeze-out" when nutplate is pulled into place.

Step 3 Locate & Bond

- Align nutplate and use installation fixture to gently pull nutplate into place.

Caution: Take care not to pull too hard on installation fixture. It is important for installation fixture to remain with nutplate while adhesive cures.

- Make sure nutplate is seated securely against surface, and adhesive squeeze out is visible all the way around base of part.

Step 4 Cure & Complete

- Allow adhesive to cure. Do not wipe away adhesive squeeze out. Do not disturb part or fixture during cure. Refer to appropriate adhesive data sheet for cure times.
- Once adhesive is cured, remove installation fixture and discard.
- If necessary, touch up coatings.

CB720H159-A
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APPENDIX C TORQUE VALUES - A2 STAINLESS STEEL SCREWS



Torque Values for A2 or A4 Metric Stainless Steel Fasteners

Bolt Dia (mm)	Torque (N-m)		Torque (in-lbs. through M10; M12 & over ft-lbs.)	
	Dry	Lubricated	Dry	Lubricated
3	1.0	0.9	8.9 in-lbs.	8.0 in-lbs.
4	2.6	2.3	23.0	20.7
5	5.1	4.6	45.1	40.6
6	8.7	7.8	77.0	69.3
8	21.2	19.1	188	169
10	42	38	372	335
12	73	66	54 ft-lbs.	48 ft-lbs.
14	118	106	87	78
16	180	162	133	119
18	258	232	190	171
20	370	333	273	246
22	485	437	358	322
24	603	543	445	400

Suggested Maximum Torquing Values - a guide based upon actual lab testing on dry or near dry fasteners wiped clean. The lubricated values were calculated at 90% of the dry condition test results. Values listed in N-m; in-lbs. up through M10, and foot-pounds for M12 and over.

Note: Stainless steel fasteners tend to gall while being tightened. The risk of galling or thread seizing can be reduced by:

- Using lubrication
- Tighten fasteners with low rpm's; without interruptions
- Apply only light pressure
- Avoid prevailing torque lock nuts when possible



APPENDIX D RECOMMENDED INSTALLATION TOOLS

Cleco P Series Temporary Fasteners



QTY	PART NUMBER	DIAMETER	COLOR CODE	GRIP	DRILL SIZE	PRICE EACH
☐	20-101	3/32	Zinc	0-1/4	#40	\$0.50
☐	20-102	1/8	Copper	0-1/4	#30	\$0.50
☐	20-103	5/32	Black	0-1/4	#21	\$0.50

45-Degree Air Drills & Threaded Bits



90-Degree Air Drills



Hex-Nut and Wing-Nut Draw Clecros

