CONTROL WHEELS
INSTALLATION INSTRUCTIONS
CW-8001

Rev- 2.2 Sept 07, 2022

- Cast Aluminum
- Cored in both grips for internal wiring.
- Each wheel weighs approximately 2.7 lbs. each. (Excluding switches)

CESSNA 150, 152, 170, 172, 175, 180, 185 & 182 (to 1961) with ¾" diameter control shaft.

Removal of original control wheels. (Reference drawing CW-6001)

Remove the nut and bolt securing the control shaft to the universal joint at the control column behind the instrument panel. Withdraw the shaft from the panel.

Remove the two rivets holding the original Cessna control wheel to the shaft by drilling off the heads or tails. Carefully drive the rivet out with a punch. Try not to enlarge the rivet holes. Remove the wheels by twisting off the shaft. Clean the end of the shaft to remove any residual structural epoxy. Check fitting the shaft into the new hub to ensure that it can be easily assembled.

Prepare the new control wheels:

1) Set the height of the control wheel relative to the control shaft to suit leg clearance requirements or your personal preference. (Except 180/185 1965-on see note below. There are four different heights allowing a height range of 2.5 inches.

2) Attach the control shaft hub to the control wheel using 4 x MS35207-264 screws. Apply Loctite thread locker to each screw, install and torque to 15 inch-lbs.

3) Apply Loctite thread locker to the inside of the hub and insert the control shaft into the new control hub. Install two bolts MS27309-1-16 to secure the original shaft to the new hub via the original rivet holes. Install MS21042-1032 nuts and tighten. Torque bolts to 32 inch-lbs. and allow the Loctite to harden prior to the next step.

Re-Install Control Wheels:

Install control wheel shaft through the control shaft guide on the panel and onto the universal joint on the control column. Re-install the nut and bolt and securely tighten. Repeat for the other wheel. Check that the control wheel has full and free motion and that the motion of the control column is not impeded in any way.

Note: 1965 – on Cessna 180/185 aircraft

The control wheel shaft/hub should be mounted in the best position on the Avion control wheel aircraft to provide adequate clearance between the Avion wheel LH bottom edge and the mixture control when the mixture is in idle-shutoff (fully out) and left aileron is fully applied.

CESSNA 177, 182 (1962 0n), 205, 206, 207 & 210

With 1.25" diameter control shaft.

Removal of original control wheels. (Reference drawing CW-6002)

Remove plastic cover from rear of wheel with a screwdriver or the edge of a knife. The cover is held in place with a formed detent in the plastic. Slide the cover up the shaft to gain access to the three screws located 120 degrees apart around the shaft, these screws secure the wheel to the control shaft. Remove the three screws and remove the original control wheel by withdrawing out of the end of the control shaft. Disconnect the ribbon cables and remove the original control wheels.

Prepare the new control wheels:

1) Set the height of the control wheel relative to the control shaft to suit leg clearance requirements or your personal preference. There are four different heights allowing a height range of 2.5 inches.

2) Attach the control shaft hub to the control wheel using 4 x MS35207-264 screws. Apply Loctite thread locker to each screw, install and torque to 15-inch pounds.

Re-installation of control wheels.

Reference drawing CW-6002
Re-install the control wheels onto the control shafts and re-install the three attaching screws. Add a drop of Loctite (Blue) to the three screw threats. Tighten securely to recommended torque setting. Repeat procedure for the other wheel.

Wiring Access:

The switch plates can be removed from each grip by removing the two #4-40 screws from each plate. Carefully drill necessary switch holes in the switch cover plates to install switches.
Wiring is fed down the control wheel grip and out the bottom to be strain relieved on the rear of the wheel. A coiled cord can be secured to the rear of the wheel using any of the four available # 6-32 holes or # 8-32 unused mounting holes. The wiring can also be fed through the control shaft and exit in the same manner as the OEM installation.

Switches:

Avion does not supply PTT, A/P disconnect or Cygnet trim switches, but does recommend the following Otto P7-5 series Mil-Spec miniature push button switches. These switches are available with normally open or closed circuits and with either black or white actuators. A common PTT switch is the Otto P7-5A1122 Black Knob (normally open) and the Otto P7-5A1121 Red Knob (normally closed) for the Auto Pilot Disconnect switch.

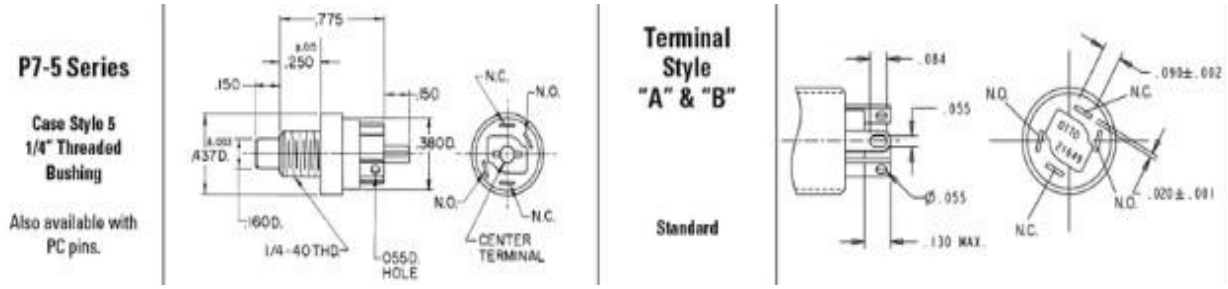
P7 PART NUMBER CODE

P7 – X X X X X X

Case Style	Terminal Style/ Construction Grade	Circuit Form	Contact Rating	Case Color/ Button Dia.	Button Color
1. Style 1	A. Solder/Commercial	1. N.O.	1. Std.	1. Clear/Std.	1. Red
2. Style 2	B. Solder/Watertight Commercial	2. N.C.	2. Low Level	2. Black/Std.	2. Black
3. Style 3	1. Solder/Military/Short	3. N.C. 3 Terminal		3. Clear/0.312 ①	3. Orange
5. Style 5	2. Solder/Commercial/Short	4. N.O. 3 Terminal		4. Black/0.312 ①	4. Yellow
6. Style 6	3. Solder/Mil. Watertight/Short	5. 5 Terminal		5. Clear/ Square .50 ②	5. Green
7. Style 7	4. PC Piv/Commercial	6. 2 Circuit		6. Black/ Square .50 ②	6. Blue
8. Style 8	5. PC Piv/Military				7. Purple
A. Style A	6. PC Piv/Mil. Watertight				8. Gray
	7. Solder/Com. Watertight/Short				9. White
	8. PC Piv/Com. Watertight				

① Not available with Case Styles 2 & 5
② Available with Case Style A only

- Qualified to MIL-PRF-8805/110
- Moistureproof and dusttight to IP64 and MIL-PRF-8805 Design 2 or Watertight to IP68S and MIL-PRF-8805 Design 3
- RoHS compliant



The Otto switches are generally available at Mouser Electronics, Digikey, Newark Electronics and other electronics suppliers.

Trim Switch

CA3112-G $395

Description:

Cygnet manufactures this FAA-PMA trim switch for Garmin Autopilots for STC SA01844WI see AML for applicable models.

This trim switch is NOT a replacement for the King or Century trim switches that use 3 individual micro switches.

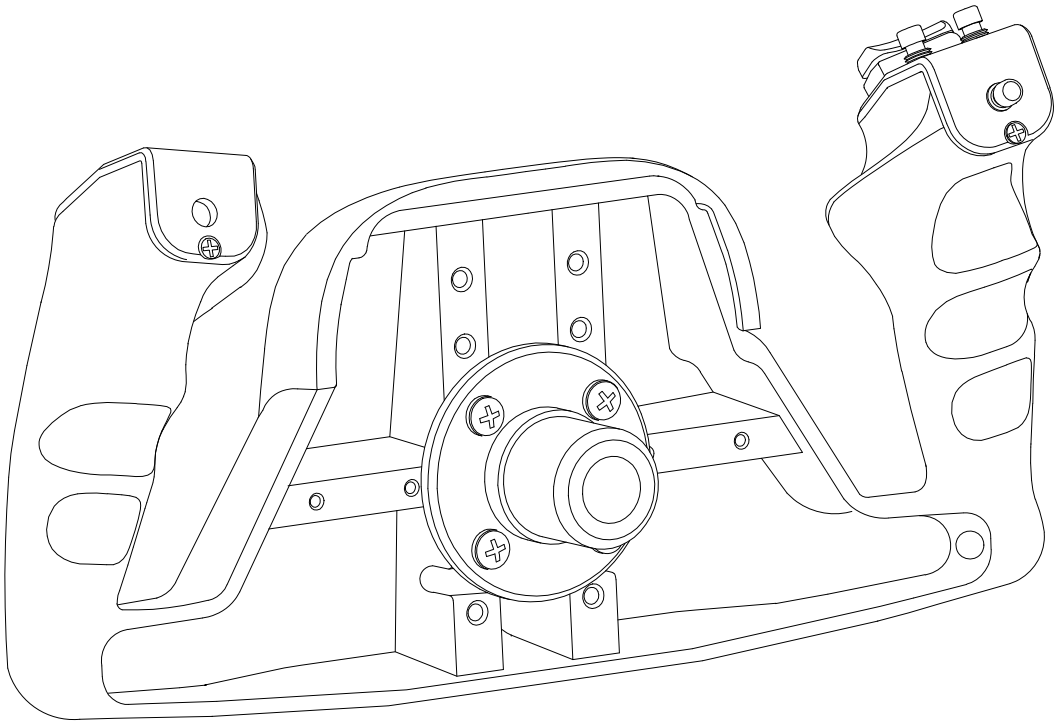
Features:

- All Aluminum construction (no plastic parts to crack) giving the switch a "solid feel"
- Hard Anodized for durability
- Permanently filled and engraved lettering
- 2-56 X 3/8" stainless steel cap screws included

Note: Although this trim switch has the same form, fit, and function and uses the same switches as the STEC 03112, it is not covered under this PMA at this time.

Note:
Cygnet supplies two # 2-56 cap head screws to secure the Cygnet trim switch to the control wheel switch plate, however Avion electric trim switch plates are tapped for # 4-40 threads. The # 2-56 screws should be replaced with # 4-40 flat head screws for more secure mounting when used with the Avion control wheel switch plate. The OEM Cygnet mounting holes can be counter sunk to accommodate the #4-40 flat head screws.

REV.	DATE	DESCRIPTION	ENGR.
1	11/1/92	AS ISSUED	TBH



ITEM	QTY.	PART/MATERIAL DESCRIPTION	MAT'L-PART NO.	MATL/DRWG NO.	MATL/SPEC.
1	1	AVION CONTROL WHEEL, CESSNA			QQ-A-601

DRAWN BY: ME10 — DATE: 1 NOV 92
ENGINEER/CHECKER: T BURWARD-HOY — DATE: 1 NOV 92
RELEASE TO PROD.:
SUPERSEDES DRWG.:

TITLE: CONTROL WHEEL

SCALE: NONE — SHEET 1 OF 1

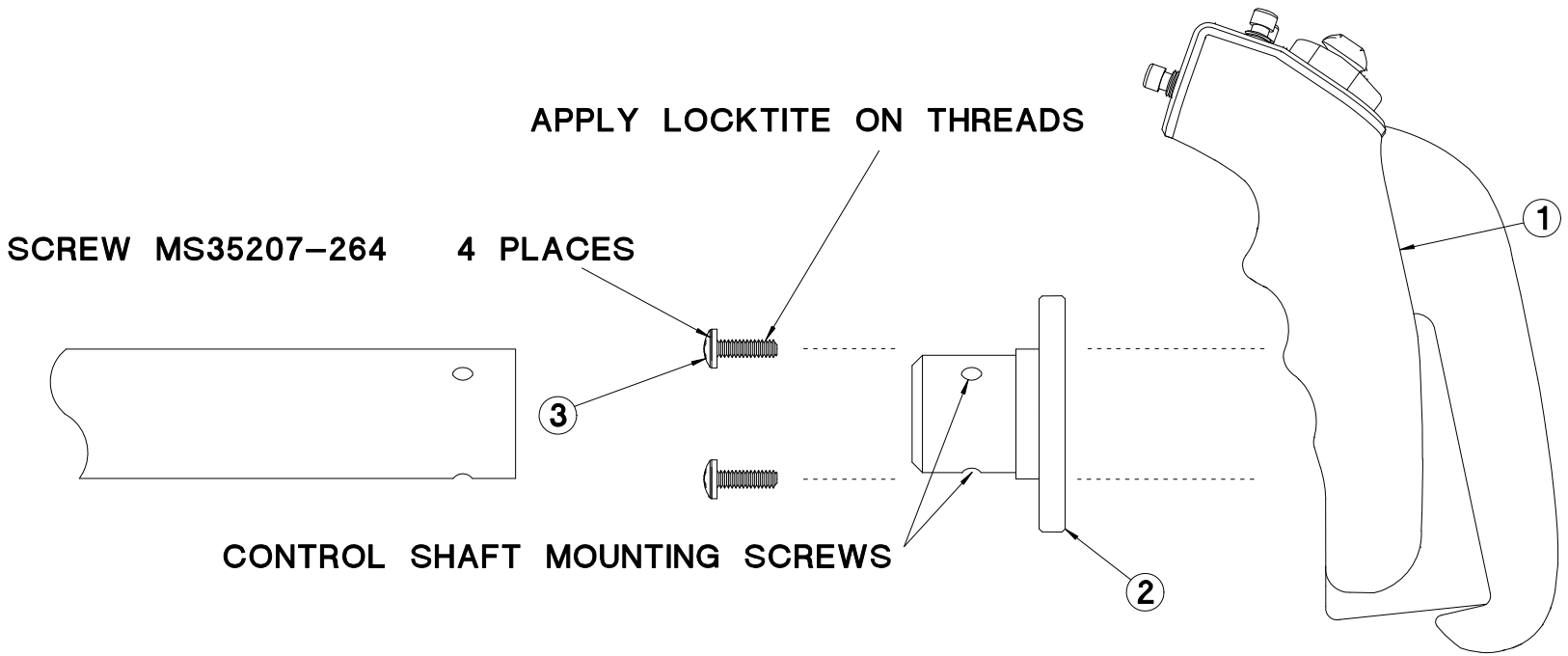
AVION RESEARCH CORPORATION
1022 W. MAUDE AVE, SUITE 102
SUNNYVALE CA 94086

CW-6003

REV.	DATE	DESCRIPTION	ENGR.
1	2/26/98	AS ISSUED	TBH

CESSNA AIRCRAFT MODEL 182(1963–ON), 177, 205, 210(1960–ON), 206, 207

CESSNA AIRCRAFT WITH 1.25" SHAFT (SEE MODEL APPLICABILITY LIST)



NOTES:

1 SELECT HEIGHT POSITION FOR THE CONTROL SHAFT HUB
2 VERIFY THE ORIENTATION OF THE CONTROL SHAFT MOUNTING SCREWS
3 PLACE SMALL QTY OF LOCKTITE ON THE SCREW THREADS AND INSTALL THROUGHT MOUNTING HOLES AND INTO THE CONTROL WHEEL.
4 TORQUE EACH SCREW TO APPROX. 15 INCH–LBS
5 ALLOW SEVERAL HOURS FOR LOCKTITE TO HARDEN

ITEM	QTY.	PART/MATERIAL DESCRIPTION	MAT'L–PART NO.	MATL/DRWG NO.	MATL/SPEC.
3	4	SCREWS, MS35207–264		N/A	
2	1	SHAFT HUB ATTACH		CW–003	
1	1	AVION CONTROL WHEEL, CESSNA		CW–001	

DRAWN BY	ME10	1 NOV 92 DATE	HUB INSTALLATION 1.250" DIA SHAFT
ENGINEER/CHECKER	T BURWARD–HOY	1 NOV 92	
RELEASE TO PROD.			TITLE
SUPERSEDES DRWG.		NONE SCALE	1 1 SHEET OF

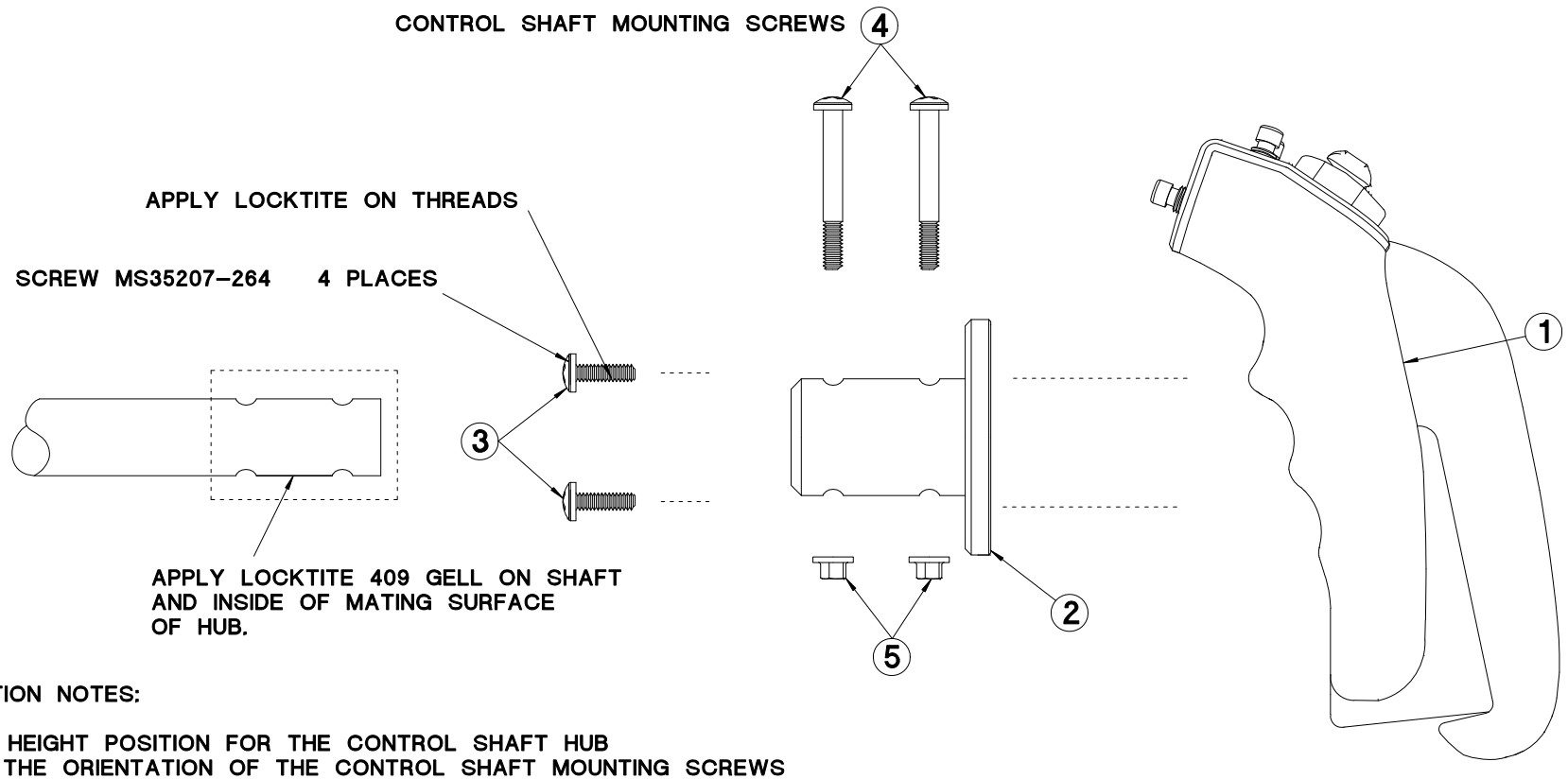
AVION RESEARCH CORPORATION
1022 W. MAUDE AVE, SUITE 102
SUNNYVALE CA 94086

CW–6002

REV.	DATE	DESCRIPTION	ENGR.
1	2/26/98	AS ISSUED	TBH

CESSNA AIRCRAFT MODEL 150, 152, 170, 172, 175, 180, 185, 182(TO 1962), 210(TO 1962)
SEE MODEL APPLICABILITY LIST

CESSNA AIRCRAFT WITH 3/4" SHAFT



INSTALLATION NOTES:

1 SELECT HEIGHT POSITION FOR THE CONTROL SHAFT HUB
2 VERIFY THE ORIENTATION OF THE CONTROL SHAFT MOUNTING SCREWS
3 PLACE SMALL QTY OF LOCKTITE ON THE SCREW THREADS AND INSTALL THROUGHT MOUNTING HOLES AND INTO THE CONTROL WHEEL.
4 TORQUE EACH SCREW TO APPROX. 15 INCH-LBS
5 ALLOW SEVERAL HOURS FOR LOCKTITE TO HARDEN
6 APPLY SMEAR OF LOCTITE ON CONTROL SHAFT PRIOR TO ASSEMBLING ONTO CONTROL SHAFT.
7 ORIGINAL WHEELS/SHAFTS THAT REQUIRE THAT THE RIVETS BE REMOVED TO DETACH THE ORIGINAL WHEELS FROM THE SHAFTS ARE A LARGER DIAMETER THAN THE RELACEMENT BOLTS. THE THROUGH HOLES ON THE SHAFTS MAY ALSO BECOME OVERSIZED. THE BOLTS SECURE THE HUB TO THE SHAFT AND THE LOCTITE 409 GEL ADHESIVE LOCKS THE SHAFT AND HUB TO PREVENT ROTATIONAL PLAY.

ITEM	QTY.	PART/MATERIAL DESCRIPTION	MAT'L-PART NO.	MAT'L/DRWG NO.	MAT'L/SPEC.
5	2	NUT, 10-32 MS21042-3		N/A	
4	2	SCREW, MS27035-1-20		N/A	
3	4	SCREWS, MS35207-264		N/A	
2	1	SHAFT HUB ATTACH		CW-002	
1	1	AVION CONTROL WHEEL, CESSNA		CW-001	

DRAWN BY: ME10	DATE: 1 NOV 92	HUB INSTALLATION 3/4" DIA SHAFT	AVION RESEARCH CORPORATION
ENGINEER/CHECKER: T BURWARD-HOY	1 NOV 92	TITLE	1022 W. MAUDE AVE, SUITE 102 SUNNYVALE CA 94086
RELEASE TO PROD.			
SUPERSEDES DRWG.		SCALE: NONE / SHEET: 1 OF 1	CW-6001

INSTRUCTIONS FOR CONTINUING AIRWORTHINESS

14 CFR part 25, section 25.1529

Maintenance Requirements.

"Modification of an aircraft by this supplemental type certificate obligates the aircraft operator to include the maintenance information provided by this document in the operator's aircraft maintenance and operators scheduled maintenance program."

1. Maintenance manual information, if any, is contained in Control Wheel Installation Instructions CW-8001 and should be placed in the operators appropriate Airplane Maintenance Manual.

2. There are no LRU's associated with modifications made under this STC.

3. All wiring diagram changes, where applicable, are contained within the Control Wheel Installation Manual CW-8001 and should be placed into the aircraft operators Wiring Diagram Manuals.

4. Scheduled Maintenance Program tasks to be added to the aircraft operators Airplane Maintenance Program are as follows,

    a. Lubricate the control shaft bearing with light lubricant every 100 hours of operation.

    b. Check the tightness of the control wheel hub mounting screws at each annual inspection.

    c. Conduct a general inspection of the control wheel for system integrity, security, wear, chafing etc. at each annual inspection.

United States Of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number SA00709LA

This Certificate issued to Trevor Burward-Hoy
10384 Dempster Avenue
Cupertino, California 95014

*certifies that the change in the type design for the following product with the limitations and conditions thereof as specified hereon meets the airworthiness requirements of Part * of the * Regulations. **

Original Product Type Certificate Number: *
Make: *
Model: *

*See Attached FAA Approved Model List (AML) No. SA00709LA for list of approved aircraft models and applicable airworthiness regulations.

Description of Type Design Change: Installation of Control Wheel in accordance with FAA approved Avion Research Corporation Master Drawing List No. CW-ML001, Revision 3, dated August 26, 1999, or later FAA approved revisions.

Limitations and Conditions: NOTE: This installation includes provisions only for a push to talk (PTT) switch. Before returning an aircraft modified by this STC to service, separate FAA approval of the PTT switch is required.

Approval of this change in type design applies to the aircraft models listed on AML No. SA00709LA only. This approval should not be extended to aircraft of this model on which other previously approved modifications are incorporated unless it is determined that the relationship between this change and any previously approved modifications, including changes in type design will not introduce any adverse effect upon the airworthiness of the aircraft. (Continued)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: March 6, 2000

Date of issuance: May 26, 2000

Date reissued: May 14, 2002

Date amended:

By direction of the Administrator

for [signature]
(Signature)
Acting Manager, Technical & Administrative
Support Staff Los Angeles Aircraft Certification Office
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

1 *This certificate may be transferred in accordance with FAR 21.47.*

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number SA00709LA

Limitations and Conditions: (Continued)

A copy of this Certificate and FAA Approved Model List (AML) No. SA00709LA, dated May 16, 2000, or later FAA Approved revision, must be maintained as part of the permanent records of the modified aircraft. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

- E N D -

U.S. Department
of Transportation
Federal Aviation Administration

FEDERAL AVIATION ADMINISTRATION - PARTS MANUFACTURER APPROVAL

Custom Aircraft Services
10384 Dempster Ave.
Cupertino, California 95014

PMA No. PQ05436NM
Supplement No. 1
Date:October 14, 2021

ARTICLE NAME	ARTICLE NUMBER	APPROVED REPLACEMENT FOR PART NUMBER	APPROVAL BASIS AND APPROVED DESIGN DATA	Make/TCH ELIGIBILITY	MODEL/SERIES ELIGIBILITY
Control Yoke and Control Panel	MDL C172 ML001	Modification Article	Identicality per 14 CFR 21.303, licensing agreement between Avion Research and Trevor Burward-Hoy Dated 08/28/21 DWG No: C172-ML001 Rev: 3 Date: 06/23/06 or later FAA approved Revisions	Cessna	170 170A 170B 172 172A 172B 172C 172D 172E 172F 172G 172H 172I 172K 172L 172M 175 175A 175B 175C
Control Yoke and Control Panel	MDL C180-ML001	Modification Article	STC SA00023SE DWG No: C180-ML001 Rev: 7 Date:08/26/99 or later FAA approved Revisions	Cessna	180 180A 180B 180C 180D 180E 185F 180G 180H 180J 180K 185 185A 185B 185C 185D 185E A185E A185F
Control Yoke and Control Panel	MDL C182-ML001	Modification Article	STC SA1347GL DWG No: C182-ML001 Rev: A Date: 08/20/1989 or later FAA approved Revisions	Cessna	182, 182A, 182B 182C, 182D
Instrument Panel	MDL C177-ML001	Modification Article	Identicality per 14 CFR 21.303, licensing agreement between Avion Research and Trevor Burward-Hoy Dated 08/28/21 DWG No: MDL C177-ML001 Rev: 1 Date: 08/26/1999 or later FAA approved revisions	Cessna	177 177A 177B 177RG

ARTICLE NAME	PART NUMBER	APPROVED REPLACEMENT FOR PART NUMBER	APPROVAL BASIS AND APPROVED DESIGN DATA	MAKE ELIGIBILITY	MODEL ELIGIBILITY
Control Wheel	MDL CW-ML001	Modification Article	STC SA00709LA DWG No: MDL CW-ML001 Rev: 4 Date: 06/23/06 or later FAA approved revisions	Cessna	150 150A 150B 150C 150D 150E 150F 150G 150H 150J 150K A150K 150L A150L 150M A150M 152 A152 170 170A 170B 172 172A 172B 172C 172D 172E 172F (USAF T-41A) 172G 172H (USAF T-41A) 172I 172J 172K 172L 172M 172N 172P 172Q 172R 172S P172D R172E (USAF T-41B USAF T-41C & -41D) R172F (USAF T-41D) R172G(USAF T-41C&D) R172H (USAF T-41D) R172J R172K 172RG 175 175A 175B 175C 177 177A 177B 177RG 180 180A 180B 180C 180D 180E 180F 180G 180H 180J 180K 182 182A 182B 182C 182D 182E 182F 182G 182H 182J 182K 182L 182M 182N 182P 182Q 182R 182S R182 T182 TR182 185 185A 185B 185C 185D 185E A185E A185F 206 P206 P206A P206B P206C P206D P206E U206 U206A U206B U206C U206D U206E U206F U206G TP206A TP206B TP206C TP206D TP206E TU206A TU206B TU206C TU206D TU206E TU206F TU206G T206H 206H 207 207A T207 T207A 210 210A 210B 210C 210D

ARTICLE NAME	PART NUMBER	APPROVED REPLACEMENT FOR PART NUMBER	APPROVAL BASIS AND APPROVED DESIGN DATA	MAKE ELIGIBILITY	MODEL ELIGIBILITY
“ “	“ “	“ “	“ “	“ "	210E 210F T210F 210G T210G 210H T210H 210J T210J 210K T210K 210L T210L 210M T210M 210N P210N T210N 210R P210R T210R 210-5 (205) 210-5A (205A) F172D F172E F172F F172G F172H F172K F172L F172M, F172N F172P T303 310, 310A (USAF U-3A) 310B 310C 310D 310E (USAF U-3B) 310F 310G 310H E310H 310I 310J E310J-1 310K 310L 310N 310P T310P 310Q T310Q 310R T310R 320 320-1 320A 320B 320C 320D 320E 320F 335 340 340A 336 401 401A 401B 402 402A 402B 402C 411 411A 414 414A 421 421A 421B 421C 425 404 406 441 500 550 S550 552 560 S560XL 501 551 525

----------End of Listing----------

Note: The procedures that have been accepted by the type certificate or TSO authorization holder and its cognizant FAA Aircraft Certification Office, for minor changes to original articles used on type-certificated products, are also acceptable for incorporating the same minor changes on identical PMA replacement articles. The PMA holder must be able to show traceability relating to the TC, STC, or TSO authorization holder on all minor changes incorporated by this procedure. When these procedures are no longer applicable because of completion of the production contract, or termination of the licensing agreement or business relationship, all subsequent minor design changes to the PMA articles must be submitted in a manner as determined by the ACO. Major design changes (reference 14 CFR §§ 21.319 and 21. 619) to drawings and specifications are to be handled in the same manner as that for an original PMA.

ELIZABETH C CAMPBELL

Digitally signed by ELIZABETH C CAMPBELL
Date: 2021.10.18 12:37:29 -07'00'

Elizabeth C. Campbell
Manager, Seattle MIDO Section
System Oversight Division
Aircraft Certification Service