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MVA-177C10M&O
Installation and Maintenance Instructions for
Door Steward™
In Accordance with STC SA01120SE

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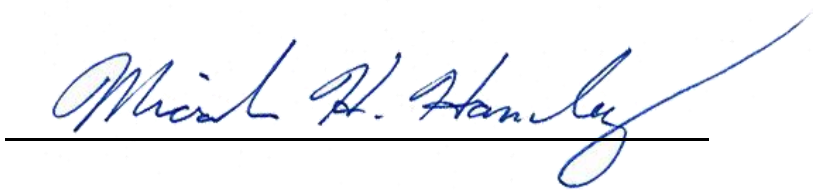
Revision Log		
Revision	Date	Description
IR	1 Sep 2006	Initial Release
A	31 Jan 2022	Update address and contact information; add alternate parts to Section C

Approved for Release 

SECTION A

Installation Instructions

A. Introduction.

Insure that the intended aircraft is included in the eligibility of the STC. Installation to be accomplished by an FAA licensed Airframe Mechanic and inspected by an FAA licensed Airframe and Powerplant Mechanic with Inspection Authorization or by an FAA Part 145 Repair Station. Review all of the installation instructions before beginning the installation process. Pay particular attention to "NOTES". Inventory the kit prior to beginning to insure it is complete. Upon completion of the installation, an FAA Form 337, Major Repair and Alteration form will need to be completed and submitted to the FAA. A sample of the completed form is included in SECTION D. For questions, comments or problems with this installation please contact Mtn. View Aviation, 921 SE 47th Avenue, Portland, OR 97215, Ph. (503) 262-0978 or 1-800-837-0271, Fax (503) 262-7476, email info@mtnviewaviation.com. Please contact Mtn. View Aviation for any in service problems or difficulties with this product.

B. Description of the Product.

The ***Door Steward™*** for the Cessna Cardinal models 177 is a product improvement installation that greatly improves the operation of the aircraft doors. It is supplemental to the factory original stops. The installation consists of a gas spring attached to brackets mounted on the door and the airframe. When the door is unlatched the gas spring gently but firmly opens the door to or near the full open position, depending on the resistance of the original factory stops. The gas spring while in the open position protects the aircraft and occupants from unexpected openings and closings by providing resistance to considerably higher wind gusts and prop wash than the original stops. While the gas spring installation was designed to help control the inadvertent opening of the door in a tailwind, it is always advisable to avoid these tailwind situations or be prepared to assist the gas spring in limiting the opening speed. The gas spring is extremely simple and reliable. The weight of each door installation is 1.0 Lb. Closing the door compresses the gas spring. The gas spring can easily be removed from its brackets to facilitate removal of the aircraft door, replacement of a defective gas spring or to conduct other maintenance.

C. Tools and Equipment Requirements.

1. #2 Screwdriver
2. Drill Motor, #30 and #21 hi-speed drill and drill stop.
3. 1/8" and 5/32" Clecos and Cleco Pliers
4. Cherrymax G-27 Hand Riveter or suitable equivalent
5. Deburring tool(s) and Hand files

6. Open end wrenches (7/16” and ½”)
7. 5/32 Blind hole spotter (supplied in the kit) or equivalent
8. Small to medium ball peen hammer

D. Installation Steps.

1. Refer to the Aircraft Manufacturer’s Maintenance Instructions for information regarding standard practices, precautions and notes.
2. It is the installer’s responsibility to insure that this approved installation does not interfere or conflict with any other installed equipment or options previously installed on the aircraft. Many aircraft will have a small bracket on the bottom of the L/H instrument panel for the headset and may need to be relocated inboard so as not to conflict with the airframe bracket (P/N 177C103-1).
3. Gain access to the door frame directly below the instrument panel by removing any interior panels and or covers. Any door wind lace material will need to be removed in the area of the airframe bracket installation.
4. The airframe bracket (P/N 177C103-1) is to be located on the door frame, approximately ¾” above the factory door stop upper bracket. The aft facing portion of the door frame should be flat with a couple existing countersunk rivets in that area. Any existing countersunk rivets should not conflict with the rivet pattern on the bracket. The inboard side of the bracket will be in an area where two #5 (5/32”) rivets will need to be removed in order to allow the bracket to come into full contact with the door frame.

Refer to below photos regarding airframe bracket location

Figure 1

Figure 2

Figure 1: Shows a 3/4” mark made above the existing upper door stop bracket and both #5 existing rivets removed.

Error! Reference source not found.: Shows the 5/32” blind hole spotters inserted nto the empty holes.

5. Using a #21 Drill remove the two 5/32” rivets located behind where the inboard flange of the airframe bracket is to be mounted. (Ref. **Figure 1**.)
6. Place a supplied 5/32” blind hole spotter in each of the removed rivet holes. (Ref. **Error! Reference source not found.**.) Position the airframe bracket into osition, insuring the bracket is in full contact with the aft face of the door frame and transfer the hole locations to the airframe bracket by tapping with a small ball peen hammer on the bracket opposite the blind hole spotters location. Inspect the bracket to see that the blind hole spotters left a mark indicating the location to drill. The marked position for the #21 holes should be located diagonally aft and away from the predrilled #30 holes also located on this inboard flange. Drill the airframe bracket with the two #21 holes located.
7. Cleco the bracket in place with two #21 Clecos and drill the six #30 holes on the aft flange and the two additional #30 holes on the inboard flange using the bracket as a template.
8. Cleco the bracket with #30 clecos as you drill.
9. Remove the airframe bracket and deburr all holes and remove any chips.
10. Install the drilled airframe bracket with the eight CR3213 4-4 and two CR3213 5-4 Cherrymax rivets provided in the kit.

Figure 3

11. Inspect the installation for security. (See Figure 3.)
12. Reinstall interior panels and modify as required to accommodate the new bracket.
13. Install the 5/16”-18 10mm Ball Stud (P/N MVA-9003) in the airframe bracket with the ball stud on top and a washer and the self-locking nut on the bottom. Tighten to 80-90 in. lbs.
14. Remove the arm rest from the cabin door.
15. Locate the door bracket (P/N 177C102-1 L/H or 177C102-2 R/H) behind the arm rest and reinstall the arm rest with the door bracket between the door and the arm rest using the new 1⅛” screws supplied with the kit. The door bracket hole for the ball stud is slotted to allow setting the full open position within the range of the slot.

16. Install the tube end of the gas spring onto the airframe bracket ball stud and install the safety clip (P/N MVA-9002). On the left hand door installation it is easier to snap the uninstalled ¼”-20 ball stud (P/N MVA-9004) into the rod end of the gas spring, insert the safety clip and then put the ball stud shank through the door bracket slot from the bottom. Add a washer and then the self-locking nut. Do not tighten the nut down until you establish the full open position, which should be just as the factory door stop reached its full open position. It is best if the gas spring reaches full open just prior to the original stop location so that in a tailwind open situation the gas spring will have already slowed the door down when it arrives at the original factory stop. Tighten the nut to 40-50 in. lbs.

Figure 4. Installation Complete – Door Closed

Figure 5. Installation Complete – Door Open

E. Post Installation Inspection and Operation.

1. Operate the door through several opening and closings to insure smooth and proper operation. Close and latch the door and inspect the interior of the aircraft. Insure the gas spring is not going to hinder or interfere with the operation of the seats, seat belts or any other feature.
2. Open the door. With the original factory door stop and the original flat metal spring installed, the gas spring may not push the door open into the full open detent, this is normal. Slight pressure on the door will assist the gas spring into the full open detent position.
3. If all inspections are satisfactory, proceed to the final steps.

F. Final Steps.

1. Install the safety clips (P/N MVA-9002) into the end fittings of the gas spring, if not already done.
2. Install the supplied ***Door Steward*™ *Equipped*** decal to the exterior of the aircraft near the door latch assembly of the door(s) altered. The purpose of this decal will be to provide an indication that when the door latch is opened; the door will want to push open on its own.
3. Install the following SECTION B, Maintenance, Inspection & Repair Instructions and SECTION C, Parts List, in the aircraft maintenance records.
4. Complete the FAA Form 337, Major Repair and Alteration using the included sample in SECTION D, as a guide.
5. Enter the installation on the installed aircraft equipment list and add the weight change to the empty weight of the aircraft. Each door kit adds +1.0 lbs. to the empty weight of the aircraft at station +85.6. If installing both left hand and right hand kits total weight change is +2.0 lbs. at station +85.6.
6. Complete the logbook entry in accordance with CFR 14 Part 43, Maintenance, Preventive Maintenance, Rebuilding and Alteration.

END

SECTION B

Maintenance, Inspection & Repair Instructions

For questions, comments or problems with this installation please contact Mtn View Aviation, 921 SE 47th Avenue, Portland, OR 97215, Ph. (503) 262-0978 or 1-800-837-0271, Fax (503) 262-7476, email info@mtnviewaviation.com. Please contact Mtn View Aviation for any in service problems or difficulties with this product.

ATA Chapter 05 Time Limits/Maintenance Checks

05-00 General

The ***Door Steward***™ installation should be inspected during scheduled airframe periodic inspections that cover the door and door frame areas.

05-20 Scheduled Maintenance

Inspection of the installation will consist of the following:

1. Security of attachment of both airframe and door brackets to the associated structure.
2. Security of the gas spring attachment to the ball studs.
3. Security of the threaded ball stud to the airframe and door brackets.
4. Smooth operation of the gas spring. Inspect for evidence of end seal leakage or loss of gas spring pressure.

ATA Chapter 52 Doors

52-00 General

The ***Door Steward***™ is a product improvement installation that greatly improves the operation of the aircraft doors. The installation consists of a gas spring attached to brackets mounted on the door and the airframe. When the door is unlatched the gas spring gently but firmly opens the door to the full open position. The gas spring while in the open position protects the aircraft and occupants from unexpected openings and closings by providing resistance to considerably higher wind gusts and prop wash than the original stops. In addition, the gas spring is extremely simple and reliable. The weight of each door installation is 1.0 lbs. Closing the door compresses the gas spring. The gas spring can easily be removed from its brackets to facilitate removal of the aircraft door, replacement of a defective gas spring or to conduct other maintenance.

1. Removal of the gas spring from attachment ball studs.

   Locate the wire safety clip (P/N MVA-9002) installed in the end fitting. It is installed in a set of holes on one side of the end fitting parallel to the gas spring and snapped around the end fitting. Remove the safety clip. Grip the gas spring at the end fitting and pull it directly off of the ball stud. Repeat for the opposite end.

2. Installation of the gas spring onto the attachment ball studs.

   Insure the safety clips are not installed in the end fitting. Push the end fitting of the gas spring onto the ball stud until it snaps on. Locate the set of holes on one side of the end fitting and install the safety clip from inboard toward outboard of the gas spring and then snap the safety clip around the end fitting. One end may be easier to do first than the other.

3. Loose ball stud in either the airframe or door bracket.

   Torque the locking nut on the door bracket (1/4”-20) to 40-50 in. lbs. and the airframe locking nut (5/16”-18) to 80-90 in. lbs. If still loose, determine if the bracket hole is worn or the threaded ball stud is worn. Replace any worn parts with new.

4. Defective gas spring.

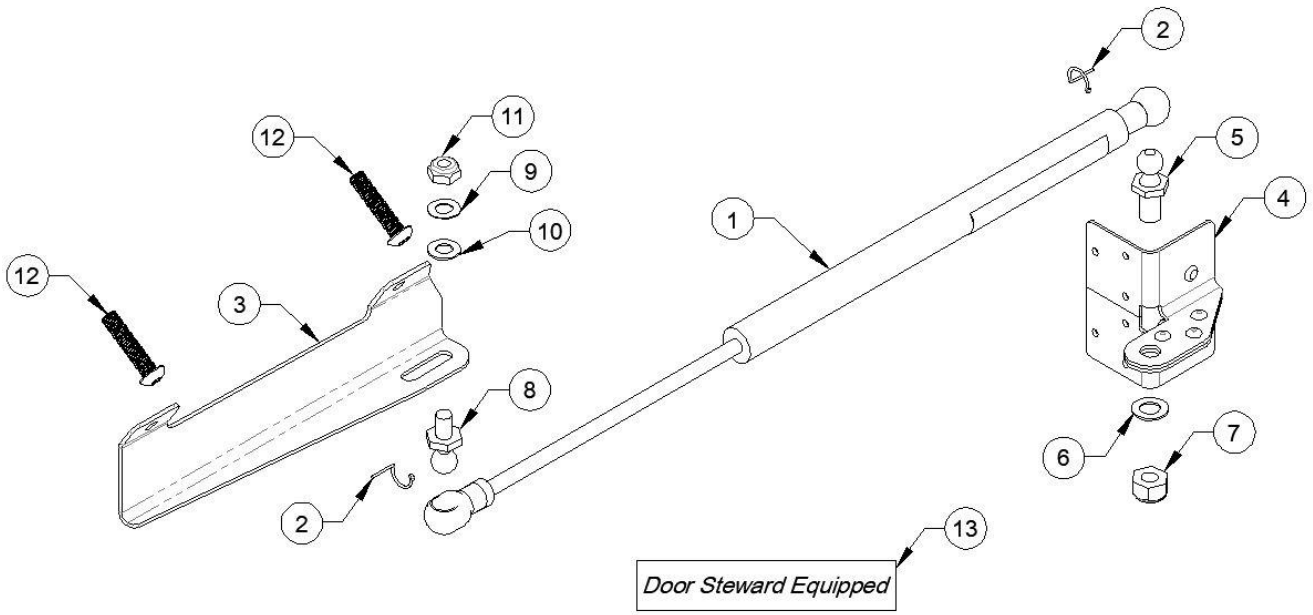
   A gas spring which is has lost pressure is not repairable. When a gas spring that has lost pressure no longer opens the door satisfactorily, replace the defective gas spring with a new one with the same part number as removed. Gas spring end fittings which are damaged or worn can be replaced with new. Refer to the Parts List in SECTION C for the correct part number.

SECTION C

Parts List for 177C10 Installation

Item No.	Part Number	Description	Qty Req'd
	177C10-1	Installation Assembly, LH	Ref.
	177C10-2	Installation Assembly, RH	Ref.
1	. 177C101-1	Gas Spring Assembly	1
	. . 177C101-002	Gas Spring	1
	. . MVA-9001	End Fittings	2
	. . MVA-177	Identification Label	1
2	. MVA-9002	Safety Clips	2
3	. 177C102-1	Bracket Assembly, Door, L/H	1
	. 177C102-2	Bracket Assembly, Door, R/H	1
4	. 177C103-1	Bracket Assembly, Airframe	1
5	. MVA-9003	Threaded Ball Stud, 5/16"-18	1
6	. NAS1149F0532P	Washer, (AN960-516L)	1
7	. MVA-9006-5	Nut, Fiber Self-Lock NC threads 5/16"-18	1
8	. MVA-9004	Threaded Ball Stud, ¼"-20	1
9	. NAS1149F0463P	Washer, (AN960-416)	1
10	. NAS1149P0432P	Washer, (AN960-416L)	1, opt
11	. MVA-9005-4	Nut, Thin, Fiber Self-Lock, NC Threads ¼"-20	1
12	. NAS603-18P	Screw, Arm Rest Bracket Attach1⅛"	2
13	. MVA-201	Decal, Door Steward Equipped	1
*	. CR3213 4-4	Rivets, Blind	8
*	. CR3213 5-4	Rivets, Blind	2

* Not Illustrated



SECTION D

SAMPLE FAA FORM 337

U.S. Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No.2120-0020

For FAA Use Only

Office Identification

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act of 1958).

1. Aircraft	Make CESSNA	Model
	Serial No.	Nationality and Registration Mark
2. Owner	Name (As shown on registration certificate)	Address (As shown on registration certificate)

3. For FAA Use Only

4. Unit Identification				**5. Type**	
Unit	Make	Model	Serial No.	Repair	Alteration
AIRFRAME	*(As described in item 1 above)*				**X**
POWERPLANT					
PROPELLER					
APPLIANCE	Type Manufacturer				

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
	X	U.S. Certificated Mechanic	
		Foreign Certificated Mechanic	
		Certificated Repair Station	
		Manufacturer	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Date	Signature of Authorized Individual

7. Approval for Return To Service

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☑ APPROVED ☐ REJECTED

BY							Other *(Specify)*
	☐	FAA Flt. Standards Inspector	☐	Manufacturer	☐	Inspection Authorization	
	☐	FAA Designee	☐	Repair Station	☐	Person Appoved by Transport Canada Airworthiness Group	

Date of Approval or Rejection	Certificate or Designation No.	Signature of Authorized Individual

FAA Form 337 (12-88)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

A/C: CESSNA 177___, S/N 177_____, A/C T.T. _____, DATE: _____

INSTALLED DOOR STEWARD GAS SPRING DOOR ASSIST ALTERATION ON LEFT HAND AND RIGHT HAND CABIN DOORS IN ACCORDANCE WITH FAA APPROVED SUPPLEMENTAL TYPE CERTIFICATE NUMBER SA01120SE. WEIGHT CHG. +2.0 LBS @ STATION +85.6. WEIGHT AND BALANCE UPDATED. EQUIPMENT LIST UPDATED. STC INSTRUCTIONS FOR CONTINUED AIRWORTHINESS ADDED TO AIRCRAFT RECORDS.

ATA Chapter 05 Time Limits/Maintenance Checks

05-00 General

The ***Door Steward*** ™ installation should be inspected during scheduled airframe periodic inspections that cover the door and door frame areas.

05-20 Scheduled Maintenance

Inspection of the installation will consist of the following:

1. Security of attachment of both airframe and door brackets to the associated structure.
2. Security of the gas spring attachment to the ball studs.
3. Security of the threaded ball stud to the airframe and door brackets.
4. Smooth operation of the gas spring. Inspect for evidence of end seal leakage or loss of gas spring pressure.

********** NOTHING FOLLOWS **********

☐ Additional Sheets Are Attatched

*U.S.GPO:1994-568-012/00019