



## McFarlane Aviation Products

**Instructions for Continued Airworthiness**  
McFarlane Aviation Inc. FAA-PMA Part Number MC0513120-5, MC0513120-6,  
MC0513120-8, MC0513120-9, & MC0513120-200  
**FUEL SELECTOR VALVE ASSEMBLIES**

FAA PMA Number: PQ3732CE

*Notice: Verify that this document is the latest approved revision before use! Current version can be found at:*

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Approved By:

Quality Assurance Manager

Engineering Manager

Production Manager

### Revisions

Revision	Date	Summary
Original	02/22/2017	Original release
A	01/08/2018	Clarified valve eligibility and corrected formatting issues.

### List of Effective Pages

Page	Rev/Date
ALL	Original / 02/22/2017
ALL	Rev A, 01/08/2018

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**INTRODUCTION**

This document provides for the continued airworthiness of McFarlane Aviation, Inc. PMA Fuel Selector Valve assemblies, P/N: MC0513120-5, MC0513120-6, MC0513120-8, MC0513120-9, and MC0513120-200. These valve assemblies are direct replacements for the Cessna 0513120 series fuel selector valves. Listed below are the fuel selector valves and the associated Cessna aircraft.

McFarlane P/N	Eligible Cessna Aircraft*
MC0513120-5	170B*, 172, 172A, 172B, 172C, 175, 175A, 175B
MC0513120-6	172D, 172E, F172D, F172E, FP172, P172D, 175C
MC0513120-8	172F (T-41A), 172G, 172H (T-41A), 172I, 172K, 172L, 172M*, F172F, F172G, F172H*, F172K, F172L, F172M*
MC0513120-9	177, 177A, 177B
MC0513120-200	172M*, F172M*

\* Part eligibility presented as reference, consult FAA Part Manufacturer Approvals for specific valve eligibility.

\*\* Indicates partial model eligibility.

**SYSTEM DESCRIPTION**

A key component of the Cessna 170, 172, 177 series fuel systems is the fuel selector valve. It is a four position, rotating valve that controls fuel flow from the two wing tanks. It is operated by rotating the fuel selector handle to the desired system configuration, e.g. Left, Both, Right, Off. The fuel selector handle, which is connected directly to the cam, rotates and forces the cam lobe to contact one or both of the two internal valves depending on selected configuration. When contacted, each valve is displaced and fuel flow begins.

**SPECIAL OPERATING INFORMATION**

The control and operation of the fuel selector valve does not change; see the applicable Cessna service manuals for the operational control of this system.

**PART REMOVAL, REPLACEMENT, AND SERVICE INFORMATION**

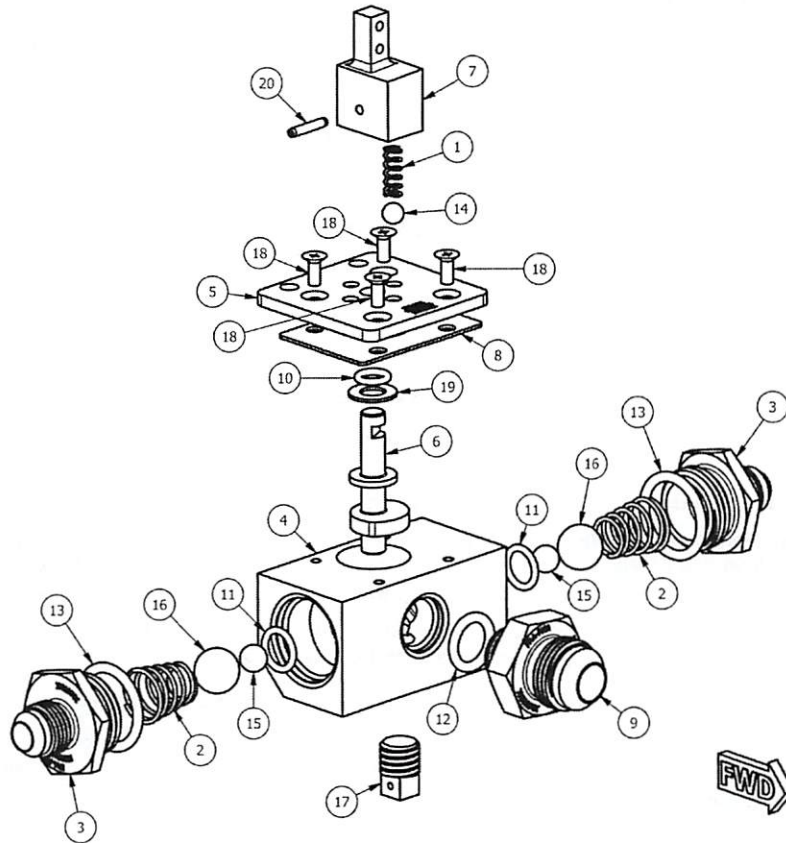
Use the Cessna instructions, per the applicable Cessna service manual, to remove an existing Cessna fuel selector valve and replace it with the McFarlane fuel selector valve. For the initial installation of a McFarlane valve, no flow capacity inspection, rotation sensitivity inspection, or valve leak check is required. This has been done at the McFarlane facility prior to shipping.

For any subsequent maintenance or repair of the McFarlane fuel selector valve assembly, use the instructions and special considerations provided in the sections that follow. All inspections listed in this document must be successfully completed prior to returning the McFarlane valve to service.

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**MC0513120 SERIES FUEL SELECTOR VALVE**

(Valve assembly parts are listed in table 1 and 2 on next page)

**TABLE 1 - FUEL SELECTOR VALVE PART LIST**

ITEM	QTY	PART NUMBER	ALTERNATE	DESCRIPTION
1	1	MC0513120-1	0513120-1	POSITIONING SPRING
2	2	MC0513120-2	0513120-2	VALVE SPRING
3	2	MC0513120-3	0513120-3	FUEL INLET FITTING
4	1	MC0513121	0513121	VALVE BODY
5	1	MC0513122	0513122	COVER PLATE
6	1	MC0513123		FUEL SELECTOR CAM
7	1	SEE TABLE 2		POSITION HOUSING
8	1	MC0513125	0513125	COVER GASKET
9	1	SEE TABLE 2		FUEL OUTLET FITTING
10	1	MCM83248/1-010		CAM O-RING
11	2	MCM83248/1-012		VALVE O-RING
12	1	MCM83248/1-111		OUTLET O-RING
13	2	MCM83248/1-116		INLET O-RING
14	1	MCS272-207	S272-207	POSITIONING BALL
15	2	MCS272-209	S272-209	LIFTER BALL
16	2	MCS272-215	S272-215	CHECK VALVE BALL
17	1	MS20913-1D		DRAIN PLUG
18	4	MS24693S25		COVER SCREW
19	1	NAS1149C0432R		THRUST WASHER
20	1	NAS561P3-8		ROLL PIN

**TABLE 2 – VALVE SPECIFIC PARTS**

VALVE ASSY	POSITION HOUSING	OUTLET FITTING
MC0513120-5	MC0513124-2	MC0513126
MC0513120-6	MC0513124-2	MC0513126-1
MC0513120-8	MC0513124-3	MC0513126-1
MC0513120-9	MC1716014-1	MC0513126-1
MC0513120-200	MC0516011-2	MC0513126-1

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**FUEL SELECTOR VALVE DISASSEMBLY INSTRUCTIONS**

Disassemble the McFarlane Fuel selector valve, after it has been removed from the aircraft, in the order described below.

1. Remove all safety wire.
2. Remove the FUEL OUTLET FITTING (Item #9) from the VALVE BODY (Item #4).
3. Remove the O-RING (Item #12) from the fuel outlet fitting. Discard the used o-ring.
4. Loosen and remove a FUEL INLET FITTING (Item #3) from the valve body. Take care to retain and protect the VALVE SPRING (Item #2), VALVE BALL (Item #16), and LIFTER BALL (Item #15), all of which are installed under the fitting.
5. Remove O-Ring (Item #13) from the inlet fitting. Discard the used o-ring.
6. Repeat Steps 4 & 5 for the other fuel inlet fitting.
7. Remove the four COVER SCREWS (Item #18) that secure the COVER PLATE (Item #5) to valve body.
8. Remove the cover plate, and COVER GASKET (Item #8). Use caution not to damage the sealing surfaces (cover plate & valve body) during removal. Discard used gasket.
9. Remove both internal VALVE O-RINGS (Item #11) from the valve body. Discard used o-rings.  
**NOTE: The edges of the machined o-ring grooves in the valve body are thin and can easily be damaged with the wrong tool. A damaged groove edge may prevent the valve from fully sealing which would render the valve assembly unrepairable. To prevent damage, use a dental pick, or similar sharp and narrow tool, to spear and remove the valve o-ring without contacting the edges of the o-ring groove.**
10. Use a clamp to relieve the spring pressure between the POSITION HOUSING (Item #7) and the ROLL PIN (Item #20). Take care to not scratch or gouge the FUEL SELECTOR CAM (Item #6), position housing, or the cover plate when clamping these components.
11. Support the position housing, while leaving the roll pin hole exposed on both ends, and drive the roll pin out with .063 roll punch.
12. Remove the position housing from the cam and remove the cam from the cover plate. Take care to retain the internal components of the position housing, POSITIONING SPRING (Item # 1) and POSITIONING BALL (Item # 14). Discard positioning spring.  
**NOTE: Check the cam for burrs, especially around the roll pin notch, before removing it from the cover plate. An excessive burr can damage the cover plate during removal.**
13. Remove THRUST WASHER (Item #19) and CAM O-RING (Item #10) from cam. Discard used o-ring.
14. Remove DRAIN PLUG (Item #17).

**VALVE POST TEARDOWN CLEANING AND INSPECTION**

Clean and inspect the disassembled McFarlane Fuel selector valve components as described below. Replace any parts that are worn or damaged before reassembling the valve.

1. Inspect the position housing for the following:
  - a. Wear, deformation, and corrosion.
  - b. Ensure that the roll pin area and the control attachment area are free of damage.
  - c. Check the fitment (free play or wear) of the roll pin hole in the position housing.
2. Check the valve and lifter bearing balls are, free of any deep scratches, flats, and/or corrosion.
3. Check that the two valve springs and the positioning spring are free of corrosion, or other defects.
4. Inspect valve body for the following:
  - a. O-ring seats for smoothness, pitting or other defects that could affect sealing.
  - b. Inlet and Outlet threads for wear, burrs, corrosion or other defects.
  - c. Inlet/Outlet line mating surfaces for any gouges, scratches, burrs, or defects that could affect proper sealing.
  - d. Valve half mating surface for corrosion, smoothness, anodize defects, pitting, or other defects that could affect proper sealing.

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**VALVE POST TEARDOWN CLEANING AND INSPECTION (Continued.)**

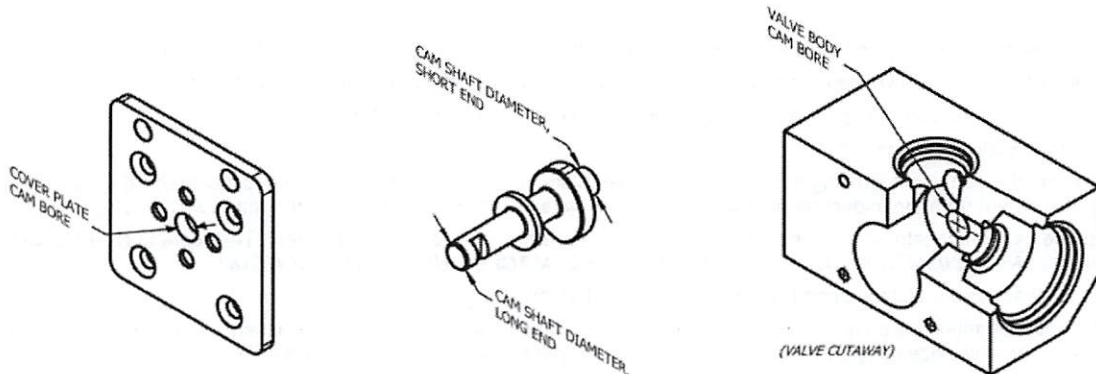
5. Inspect the cam, and the thrust washer for the following:
  - a. Check the cam faces for smoothness, anodize defects, pitting, or other defects that could affect valve action.
  - b. Inspect the top groove, where the roll pin contact occurs, for wear, burrs, corrosion or other defects.
  - c. Inspect the thrust washer for any gouges, scratches, burrs, or defects that could affect its function.
6. Check the cover plate for the following:
  - a. Check the top and bottom faces for smoothness, pitting or other defects that could affect valve action.
  - b. Check for corrosion.
  - c. Inspect the four detent holes for excessive wear. Positioning ball must engage and be stable with each detent hole.
8. Check Inlet/Outlet fittings for damage, wear, and corrosion.
9. Check the sealing and lifting balls for damage, wear, and corrosion.
10. Check the valve seat grooves in the valve body for damage, gauges, or corrosion.

**FUEL SELECTOR VALVE ASSEMBLY INSTRUCTIONS**

Assemble the McFarlane Fuel selector valve components as described below.

1. Check Clearances

- a. Measure the diameters of the fuel selector cam, valve body bore, and the cover plate bore that are shown in the figure below. Use appropriate measurement devices to find the four diameters. Record each of the measurements in the worksheets on the next page.



- b. Calculate the cover plate clearance by subtracting the long end cam shaft diameter from the cover plate cam bore diameter.

<b>COVER PLATE CLEARANCE</b>	
<input style="width: 100%;" type="text"/>	COVER PLATE CAM BORE DIAMETER (in)
-	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>	CAM SHAFT DIAMETER, LONG END (in)
Clearance must be between .001 to .007 in.	

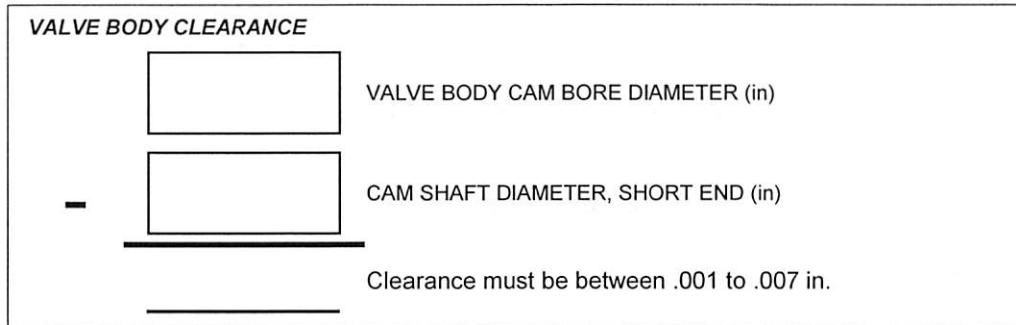
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**FUEL SELECTOR VALVE ASSEMBLY INSTRUCTIONS (Continued)**

- c. Determine the valve body clearance by subtracting the short end cam shaft diameter from the valve body cam bore diameter.



- d. The calculated valve clearances must both be within the limits shown. If one, or both, are outside of limits, replace and re-measure affected parts until acceptable clearances are achieved.
2. Install valve o-rings
- Lubricate the two valve o-rings (Item #11) with aviation motor oil (SAE Standard J1899 oil or equivalent). **NOTE: NON-FUEL SOLUBLE LUBRICANTS MUST NEVER BE USED AS EXCESS LUBRICANT COULD CIRCULATE THROUGH THE FUEL SYSTEM AND FOWL SENSITIVE FUEL SYSTEM COMPONENTS. LUBRICANTS USED MUST BE FUEL SOLUBLE.**
  - Turn valve body (item #4), so that one of the two inlet passages faces up.
  - Set valve o-ring into valve body o-ring groove.
  - Use the McFarlane o-ring tool (P/N: 740), or a blunt dull tool, to gently press the valve o-ring completely into its groove. **NOTE: THERE MUST BE SOME RESISTANCE TO THE O-RING ENTERING THE GROOVE; THIS INDICATES THAT GROOVE AND O-RING ARE PROPERLY SIZED.**
  - Rotate valve body around to bring the other inlet up, and repeat the process to install the remaining check valve o-ring.
3. Prepare fuel selector cam
- Lubricate the cam o-ring (Item #10) and the cam o-ring seal area with aviation motor oil (SAE Standard J1899 or equivalent).
  - Slide thrust washer (Item #19), down the long end of the fuel selector cam (Item #6) until it contacts the thrust flange.
  - Follow thrust washer with the cam o-ring, down the fuel selector cam until it contacts the thrust washer.
4. Create Cam and Cover Plate Subassembly
- Insert prepared cam through cam mounting hole in center of cover plate (item #5) until the cam o-ring just contacts the edges of cover plate. Cam can only be inserted from the underside of cover plate (this is the side with the o-ring gland and thrust washer step).
  - Carefully press the cam o-ring into o-ring gland until the thrust washer is flush to the cover plate step. Take care to NOT PINCH OR GOUGE o-ring when pressing. **NOTE: IMMEDIATELY REPLACE O-RING IF DAMAGED DURING INSTALLATION.**
  - Hold, or clamp, cam and cover plate assembly together to ensure that the o-ring remains seated.
  - Place a small amount of anti-seize compound or grease on end of positioning spring (item #1), and insert it into the mounting bore of the position housing (Item #7). *The anti-seize compound will help retain position spring when the housing is turned over.*
  - Hold the cam and cover plate subassembly level and facing up (the cover plate is facing up when the part face with the detent holes is pointing up.).
4. Create Cam and Cover Plate Subassembly (Continued)
- Place the position ball (Item #14) in one of the detent holes.
  - Capture the position ball with position housing and spring as they are slid over the end of the fuel selector cam.
  - Press the position housing on to the cover plate to compress the position spring until the notch in the end of the cam shaft is visible through roll pin mounting hole. **NOTE: ROTATE CAM AS REQUIRED TO ALIGN NOTCH AND ROLL PIN MOUNTING HOLE.**
  - Temporarily lock assembly together by carefully sliding a 1/16" roll pin punch, or similarly sized tool, into the roll pin hole.
  - Properly support the cam and cover plate to prevent assembly forces from being transferred to the cam shaft. Carefully drive the roll pin (Item # 20) into position housing. *Remove roll pin punch as the roll pin is inserted.*
5. Install cover plate assembly
- Align holes in fuel selector valve gasket (Item #8) with the four tapped mounting holes and the cam bore on the top side of the valve body. Set gasket on valve body when aligned.
  - Hold cover plate assembly over valve body, and align with the cover mounting holes and the cam bore. When positioned properly, capture gasket and hold.

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**FUEL SELECTOR VALVE ASSEMBLY INSTRUCTIONS (Continued)**

- c. Coat the threads of the four mounting screws (Item #18) with Loctite 242 threadlocker. Install screws to secure cover plate assembly. Torque the four 6-32 screws to 12 in-lbs.
6. Install fuel inlet fittings
  - a. Lubricate both inlet fitting o-rings (Item #11) with aviation motor oil (SAE Standard J1899 or equivalent).
  - b. Slide inlet o-ring around the large threaded end of the fuel inlet fitting until making contact with the wrench flats. Do this for both inlet fittings.
  - c. Set valve body with one of the two inlet passages facing up.
  - d. Inside the inlet passage, set the lifter ball (Item #15) into the lift ball bore.
  - e. Verify that the cam lobe is visually centered in the lifter ball bore.
  - f. Verify that lifter ball will remain in contact with the cam surface when the ball is moved around the extents of the lift ball bore.
  - g. Insert valve ball (Item #16) into inlet passage and follow with valve spring (Item #2). **NOTE: THE SMALL END OF THE VALVE SPRING SHOULD BE INSTALLED CONTACTING THE VALVE BALL; THE LARGE END OF THE SPRING SHOULD NEST INSIDE FITTING.**
  - h. Mix anti-seize compound by volume 25 parts aviation motor oil (SAE Standard J1899 or equivalent) with one part TS-001 Moly powder, Technical grade, from T.S. Moly Lubricants, or equivalent molybdenum disulfide powder (particle size = 3.0 to 4.0µ Fischer Scale).
  - i. Lubricate the inlet fitting threads with the mixed anti-seize compound.
  - j. Capture the three valve components (spring, lifter ball, and valve ball) in valve body with the inlet fitting. Thread fitting into valve body and tighten until sealed. (Torque fitting to 20-25 ft-lbs).
  - k. Rotate valve assembly to bring the other inlet face up, and repeat steps to complete installation of fuel inlet fittings.
7. Install fuel outlet fitting
  - a. Lubricate the outlet fitting o-ring with aviation motor oil (SAE Standard J1899 or equivalent).
  - b. Slide outlet o-ring around threaded end of fitting until making contact with the wrench flats.
  - c. Lubricate outlet fitting threads with anti-seize compound.
  - d. Thread outlet fitting into the valve body and tighten until sealed. (Torque fitting to 22-24 ft-lbs)
8. Install drain plugs
  - a. With the exception of the first thread, coat drain plug threads with thread sealer Tite-seal, p/n: T20-66, or equivalent. **DO NOT PUT THREAD SEALER ON THE FIRST THREAD.**
  - b. Thread the plug into valve body and tighten until sealed. (Torque installation of NPT threads is not a recommended practice. Alternatively, the drain plug should be installed with reference to Turns From Finger Tight (T.F.F.T), for this plug 2-3 T.F.F.T. is appropriate).
9. Fuel Selector Valve assembly finishing
  - a. Secure roll pin in position housing with .032" safety wire.
  - b. Secure drain plug to valve assembly with .032" safety wire.
  - c. Apply inspection lacquer across screws for rotation inspection.

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**INSTALLATION INSPECTIONS**

Prior to returning the fuel selector valve to service, inspect it for proper ball lift (valve deflection). *NOTE: FUEL FLOW THROUGH THE SELECTOR VALVE IS DIRECTLY RELATED TO VALVE LIFT.* To accomplish this use following instructions and worksheet to complete measurements and inspection.

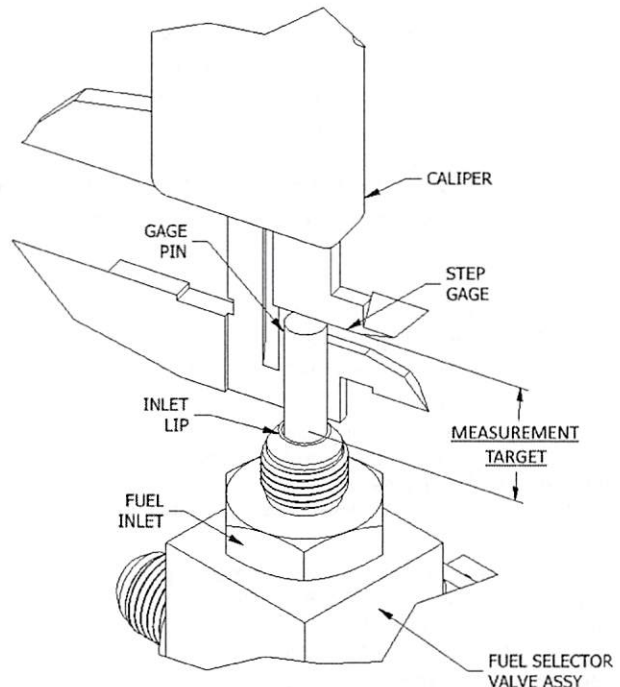
**FLOW CAPACITY INSPECTION**

**1. Position and Prepare to Measure Right Fuel Inlet**

- a. Using a shop vise, or similar device, secure the assembled valve with the right outlet pointing up. Ensure that the positioning housing can rotate unobstructed and that the detent positions are distinct
- b. Locate a gage pin that closely fits the fuel inlet, and insert it. The pin should slide in and out of inlet with no drag. It should not wobble when inserted into the inlet fitting. The end of the pin must be square to the pin length.
- c. Locate a precision step gage (caliper).

Notes:

- A step gage is typically built into the top end of a modern caliper (see figure to right).
- Take all deflection measurements from the end of the gage pin to the outboard lip of the fuel inlet fitting.
- Take all measurements square to the end of the gage pin
- The internal components of the valve can produce minor variation in valve deflections; as such, multiple measurements are taken for identifying the minimal deflections.
- A typical valve setup and measurement is shown in to the right



TYPICAL VALVE DEFLECTION MEASUREMENT

**2. Measure Right Fuel Valve Displacement – “OFF” Position**

- a. Rotate the positioning housing in the clockwise direction until the valve assembly is in the “OFF” position.
- b. Measure valve deflection as shown on measurement worksheet #1. Record results as the Right Closed Measurement (“A” on worksheet #1).

**3. Measure Right Fuel Valve Displacement – “RIGHT” Position**

- a. Rotate the positioning housing in the clockwise direction until the valve assembly to the “RIGHT” position. The cam must rotate at least one full revolution.
- b. Measure valve deflection as shown on the measurement worksheet #1. Record results on worksheet
- c. Rotate the positioning housing at least one revolution in the counter-clockwise direction to the “RIGHT” position. Repeat measurement and record.
- d. Review the measured “RIGHT” deflection values. Select the lesser of the two measurements, and record as the “RIGHT” valve deflection (“B” on worksheet #1).

**4. Measure Right Fuel Valve Displacement – “BOTH” Position**

- a. Rotate the positioning housing in the clockwise direction until the valve assembly is in the “BOTH” position. The cam must rotate at least one full revolution.
- b. Measure valve deflection as shown on measurement worksheet #1. Record results on worksheet
- c. Rotate the positioning housing at least one revolution in the counter-clockwise direction to the “BOTH” position. Repeat the measurement and record.
- d. Review the measured “BOTH” deflection values. Select the lesser of the two measurements, and record as the “BOTH” valve deflection (“C” on worksheet #1).



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**FLOW CAPACITY INSPECTION (Continued)**

**5. Position and Measure Left Fuel Valve Displacement – “OFF” Position**

- a. Using the same clamping device from right side measurement, secure the assembled valve with left inlet pointing up. Ensure that the positioning housing can rotate unobstructed.
- b. Locate a gage pin that closely fits fuel inlet, and insert it. Pin should rest in on the internal parts of top of the valve with minimal to no wobble. It should slide in and out of inlet with no drag. Typically, the gage pin used for step 1 is sufficient for use in step 3.
- c. Rotate the positioning housing in the clockwise direction until the valve assembly to the “OFF” position.
- d. Measure valve deflection as shown on measurement worksheet #2; record results as the “OFF” Measurement (“J” on worksheet #2).

**6. Measure Left Fuel Valve Displacement – “LEFT” Position**

- a. Rotate the positioning housing in the clockwise direction until the valve assembly to the “LEFT” position. The cam must rotate at least one full revolution.
- b. Measure valve deflection as shown on measurement worksheet #2. Record results as one entry on worksheet
- c. Rotate the positioning housing at least one revolution in the counter-clockwise direction to the “LEFT” position. Repeat measurement and record.
- d. Review the measured “LEFT” deflection values. Select the lesser of the two measurements, and record as the “LEFT” valve deflection (“K” on worksheet #2).

**7. Measure Left Fuel Valve Displacement – “BOTH” Position**

- a. Rotate the positioning housing in the clockwise direction until the valve assembly to the “BOTH” position. The cam must rotate at least one full revolution.
- b. Measure valve deflection as shown on measurement worksheet #2. Record results on worksheet
- c. Rotate the positioning housing at least one revolution in the counter-clockwise direction to the “BOTH” position. Repeat the measurement and record.
- d. Review the measured “BOTH” deflection values. Select the lesser of the two measurements and record as the “BOTH” valve deflection (“L” on worksheet #2).

**8. Calculate Right Valve Deflections**

- a. Enter the valve measurements from measurement worksheet #1 and calculate the resultant valve deflections.

**RIGHT VALVE DEFLECTION – SINGLE FUEL SOURCE**

“RIGHT” MEASUREMENT	-	“OFF” MEASUREMENT	=	VALVE DEFLECTION “RIGHT”
B <span style="float: right;">(in)</span>		A <span style="float: right;">(in)</span>		<span style="float: right;">(in)</span>

**RIGHT VALVE DEFLECTION – COMBINED FUEL SOURCES**

“BOTH” MEASUREMENT	-	“OFF” MEASUREMENT	=	VALVE DEFLECTION “BOTH”
C <span style="float: right;">(in)</span>		A <span style="float: right;">(in)</span>		<span style="float: right;">(in)</span>

**9. Verify Right Valve Deflections Meet Minimum Threshold**

- a. Compare calculated right valve deflections to minimum valve deflection for each valve position.
- b. Circle result for both valve comparisons.

**RIGHT SINGLE SOURCE VALVE DEFLECTION**

<span style="float: right;">(in)</span>	≥	0.048 (in)	YES / NO
VALVE DEFLECTION “RIGHT”		MIN VALVE DEFLECTION	(Circle Result)

**RIGHT COMBINED SOURCE VALVE DEFLECTION**

<span style="float: right;">(in)</span>	≥	0.048 (in)	YES / NO
VALVE DEFLECTION “BOTH”		MIN VALVE DEFLECTION	(Circle Result)

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**FUEL SELECTOR VALVE ASSEMBLIES**  
**FAA PMA Number: PQ3732CE**

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**FLOW CAPACITY INSPECTION (Continued)**

10. Calculate Left Valve Deflections

- a. Enter the valve measurements from measurement worksheet #2 and calculate the resultant valve deflection.

LEFT VALVE DEFLECTION – SINGLE FUEL SOURCE

"LEFT" MEASUREMENT	-	"OFF" MEASUREMENT	=	VALVE DEFLECTION "LEFT"
K <span style="float: right;">(in)</span>		J <span style="float: right;">(in)</span>		

LEFT VALVE DEFLECTION – COMBINED FUEL SOURCE

"BOTH" MEASUREMENT	-	"OFF" MEASUREMENT	=	VALVE DEFLECTION "BOTH"
L <span style="float: right;">(in)</span>		J <span style="float: right;">(in)</span>		

11. Verify Left Valve Deflections Meet Minimum Threshold

- a. Compare calculated left valve deflections to minimum valve deflection for each valve position.  
 b. Circle results in table of each comparison

LEFT SINGLE SOURCE VALVE DEFLECTION

(in)	≥	0.048 (in)	YES / NO
VALVE DEFLECTION "LEFT"		MIN VALVE DEFLECTION	(Circle Result)

LEFT COMBINED SOURCE VALVE DEFLECTION

(in)	≥	0.048 (in)	YES / NO
VALVE DEFLECTION "BOTH"		MIN VALVE DEFLECTION	(Circle Result)

**ACCEPTANCE:** To accept the fuel selector cam, and its installation, as airworthy, all four compared valve deflections must meet or exceed the minimum valve deflection of .048 inches. If the fuel selector valve and the cam fail to meet the minimum valve deflection, repeat steps 1 through 11, and re-measure and compare valve deflection results.

**ROTATION SENSITIVITY INSPECTION**

Check the rotational sensitivity of the McFarlane Fuel selector valve by manipulating it through the process described below.

**RIGHT Position Check**

1. Turn the valve control turned to the RIGHT detent position.
2. Insert a gage pin (use the same tool as was used in the flow capacity inspection) into the RIGHT inlet.
3. Apply and maintain gentle pressure to the exposed end of gage pin.
4. Slowly rotate the valve control to the CLOSED position. Note the angle of the position housing when gage pin first moves; this indicates the valve is beginning to closing.

**LEFT Position Check**

1. Turn the valve control turned to the LEFT detent position.
2. Insert a gage pin into the LEFT inlet.
3. Apply and maintain gentle pressure to the exposed end of gage pin.
4. Slowly rotate the valve control to the CLOSED position. Note the angle of the position housing when gage pin first moves; this indicates the valve is beginning to closing.

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**ROTATION SENSITIVITY INSPECTION (Continued)**

**BOTH Position Check**

1. Turn the valve control to the BOTH position.
2. Insert the gage pin into the RIGHT inlet.
3. Apply and maintain gentle pressure to the exposed end of gage pin.
4. Slowly rotate the valve control to the LEFT position. Note the angle of the position housing when gage pin first moves; this indicates the right side is beginning to close.
5. Return the valve control in the BOTH" position, insert the gage pin into the LEFT inlet.
6. Slowly rotate the valve control to the RIGHT position. Note the angle of the position housing when gage pin first moves; this indicates the left side is beginning to close.

**ACCEPTANCE:** In each of the four required inspection rotations, the valve must rotate at least five degrees before a notable change in pin position is observed.

**LEAK CHECK INSPECTION**

A functioning fuel selector valve must not leak in any valve position. If a leak is found, disassemble valve as required and repair. When corrected, repeat the entire leak check procedure.

*NOTE: THE FOUR FOLLOWING PROCEDURES ARE DESIGNED TO IDENTIFY AND ISOLATE VARIOUS TYPES OF LEAKS ASSOCIATED THE FUEL SELECTOR VALVE. THESE ARE CONDUCTED AT A STANDARD PRESSURE AND THEN REPEATED AT A LOWER PRESSURE. THIS APPROACH MAY SEEM REDUNDANT, BUT IS REQUIRED TO EFFECTIVELY REPLICATE THE VARYING OPERATING CONDITIONS AND ENVIRONMENTS THE VALVE ASSEMBLY MAY ENCOUNTER.*

**LEAK CHECK – LEFT INLET PRESSURE CHECK**

1. Turn the fuel selector valve to the OFF position.
2. Attach an air source to the left fuel inlet fitting. Apply 5.0 to 6.0 psig of regulated dry air to the left inlet. **NOTE: SELECTOR VALVE PRESSURE MUST BE MAINTAINED WITH A CALIBRATED GAUGE THAT HAS AT LEAST 1% ACCURACY.**
3. Submerge pressurized valve in clean Stoddard solvent, or clean mineral spirits.
4. Check for leakage out the right fuel inlet fitting, outlet fitting, and at any o-ring seal or gasket location.
5. Remove valve from solvent.
6. Reduce source air pressure for the low pressure check; applied pressure must be greater than atmosphere pressure, but cannot exceed 1.0 psig.
7. Rotate the valve through at least one complete rotation and back to the OFF position.
8. Re- submerge the pressurized valve in to the solvent.
9. Check for leakage out right inlet port, outlet port, and at any o-ring or gasket location. .
10. Remove valve from solvent and wipe off any remaining solvent.

**LEAK CHECK – LEFT INLET CROSS-CHECK**

1. Cap the valve outlet fitting.
2. Turn the valve to the LEFT position. When selecting the left position, ensure that the position housing/cam is rotated through at least one full revolution.
3. Apply and verify that 5.0 to 6.0 psig of regulated dry air is being supplied to the left inlet.
4. Submerge pressurized valve in clean solvent.
5. Check for leakage out of the right fuel inlet fitting, and at any o-ring seal or gasket location.
6. Remove valve from solvent.
7. Reduce source air pressure for the low pressure cross-check; applied pressure must be greater than atmosphere pressure, but cannot exceed 1.0 psig.
8. Rotate the valve through at least one complete rotation and back to the LEFT position.
9. Re- submerge the pressurized valve in to the solvent.
10. Check for leakage out right inlet port and at any o-ring or gasket location. .
11. Remove valve from solvent and wipe off any remaining solvent.

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**LEAK CHECK INSPECTION (Continued)**

**LEAK CHECK – RIGHT INLET CROSS-CHECK**

1. Turn the valve to the RIGHT position. When selecting the right position, ensure that the position housing/cam is rotated through at least one full revolution.
2. Apply, and verify, that 5.0 to 6.0 psig of regulated dry air is being supplied to the right inlet.
3. Submerge the pressurized valve in to clean solvent
4. Check for leakage out of the left fuel inlet fitting, and at any o-ring seal or gasket location.
5. Remove valve from solvent.
6. Reduce source air pressure for the low pressure cross-check; applied pressure must be greater than atmosphere pressure, but cannot exceed 1.0 psig.
7. Rotate the valve through at least one complete rotation and back to the RIGHT position.
8. Re-submerge the pressurized valve in to the solvent.
9. Check for leakage out of the left inlet port and at any o-ring or gasket location.
10. Remove valve from solvent and wipe off any remaining solvent.
11. Remove cap from outlet fitting.

**LEAK CHECK – RIGHT INLET PRESSURE CHECK**

1. Turn the fuel selector valve to the OFF position; ensure that the position housing/cam is rotated through at least one full revolution.
2. Apply, and verify, 5.0 to 6.0 psig of regulated dry air at the right inlet.
3. Submerge pressurized valve in clean Stoddard solvent, or clean mineral spirits.
4. Check for leakage out the left fuel inlet fitting, outlet fitting, and at any o-ring seal or gasket location.
5. Remove valve from solvent.
6. Reduce source air pressure for the low pressure check; applied pressure must be greater than atmosphere pressure, but cannot exceed 1.0 psig.
7. Rotate the valve through at least one complete rotation and back to the OFF position.
8. Re- submerge the pressurized valve in to the solvent.
9. Check for leakage out right inlet port, outlet port, and at any o-ring or gasket location.
10. Remove valve from solvent and wipe off any remaining solvent.

**ACCEPTANCE:** The functioning fuel selector valve must not leak in any valve position.

**FUEL SELECTOR VALVE COMPLIANCE**

**COMPLIANCE:** The fuel selector valve must pass the *Flow Capacity Inspection*, the *Rotation Sensitivity Inspection*, and the *Valve Leak Check* prior to being returned to service. If inspections cannot be completed successfully after attempting repairs, the fuel selector valve assembly is not airworthy. Please contact McFarlane Aviation Engineering group for additional support.

You can contact us via email: [engineering@mcfarlaneaviation.com](mailto:engineering@mcfarlaneaviation.com) or phone: 1-785-594-2741.

**TROUBLESHOOTING**

Refer to the applicable Cessna 100 Series Service Manual for troubleshooting instructions and the applicable Cessna Illustrated Parts Catalog for component part numbers. For troubleshooting, refer to the Cessna instructions in the applicable service manuals.

**PLACARDS**

None applicable

**DATA**

All information to support the continued airworthiness of this replacement part is as defined herein and contained in:

- Relevant Cessna 100 Series Service Manuals.
- Relevant Cessna 100 Series Illustrated Parts Catalog.

**INSPECTION**

Follow all inspections listed in this document and those mandated by Cessna for the fuel selector valve assemblies, P/N: 0513120-5, 0513120-6, 0513120-8, 0513120-9, OR 0513120-200.

**Instructions for Continued Airworthiness**  
**McFarlane Aviation Inc. FAA-PMA Part Number MC0513120-5, MC0513120-6,**  
**MC0513120-8, MC0513120-9, & MC0513120-200**  
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**RECOMMENDED OVERHAUL PERIODS**

No additional overhaul time limitations exist with the use of these parts.

**AIRWORTHINESS LIMITATIONS**

The Airworthiness Limitations section is FAA approved and specifies maintenance required under Sec. 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved. No additional airworthiness limitations exist.

**ASSISTANCE & REVISIONS**

ICA revisions shall be made available on the McFarlane website, [www.mcfarlaneaviation.com/ICA](http://www.mcfarlaneaviation.com/ICA). For questions or assistance regarding these Instructions for Continued Airworthiness (ICA), contact McFarlane Aviation, Inc via email or phone. Email: [engineering@mcfarlaneaviation.com](mailto:engineering@mcfarlaneaviation.com) Phone: 1-800-544-8594 (within the US) or 1-785-594-2741.

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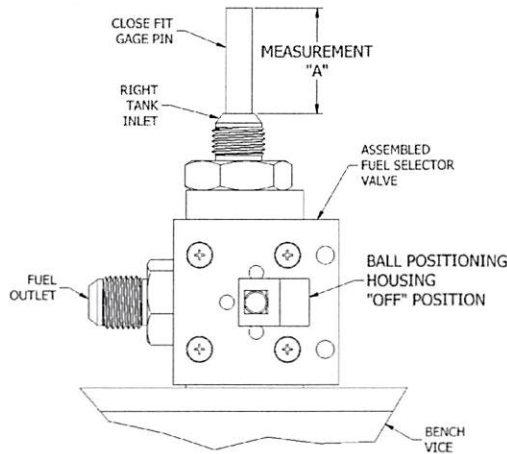
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MEASUREMENT WORKSHEET #1 - RIGHT FUEL INLET MEASUREMENT

"OFF" POSITION

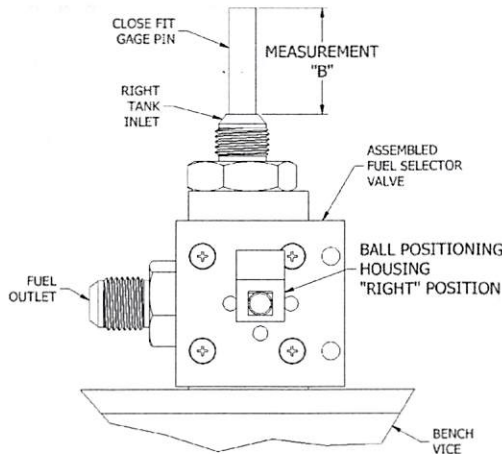


"OFF" MEASUREMENT

1. \_\_\_\_\_ (in)

**A =** \_\_\_\_\_ (in)

"RIGHT" POSITION



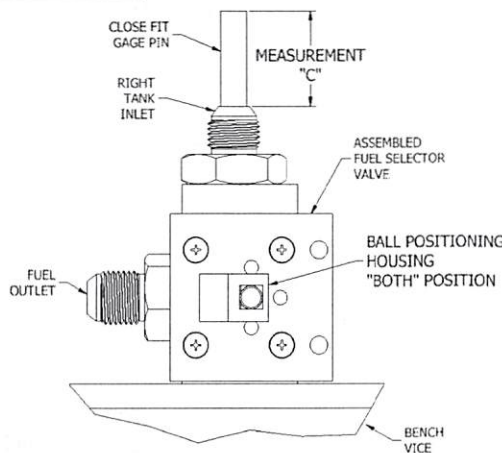
"RIGHT" MEASUREMENT

1. \_\_\_\_\_ (in)

2. \_\_\_\_\_ (in)

**B =** \_\_\_\_\_ (in)

"BOTH" POSITION



"BOTH" MEASUREMENT

1. \_\_\_\_\_ (in)

2. \_\_\_\_\_ (in)

**C =** \_\_\_\_\_ (in)

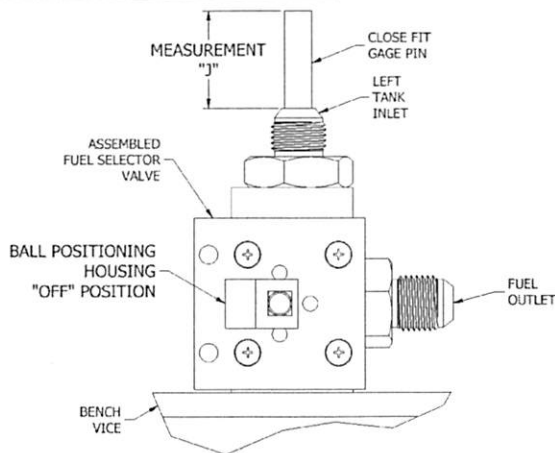
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MEASUREMENT WORKSHEET #2 - LEFT FUEL INLET MEASUREMENT

"OFF" POSITION, LEFT FUEL INLET

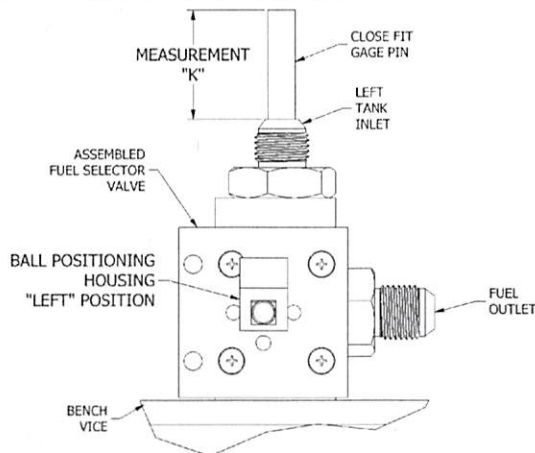


"OFF" MEASUREMENT

1. \_\_\_\_\_ (in)

**J =** \_\_\_\_\_ (in)

"LEFT" POSITION, LEFT FUEL INLET



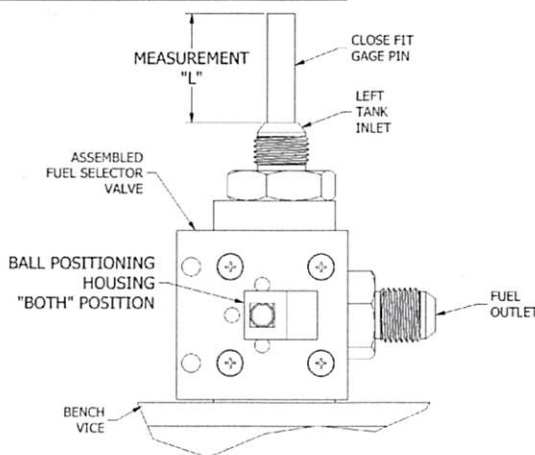
"LEFT" MEASUREMENT

1. \_\_\_\_\_ (in)

2. \_\_\_\_\_ (in)

**K =** \_\_\_\_\_ (in)

"BOTH" POSITION, LEFT FUEL INLET



"BOTH" MEASUREMENT

1. \_\_\_\_\_ (in)

2. \_\_\_\_\_ (in)

**L =** \_\_\_\_\_ (in)