

Title: Replacement of fuel shut-off valve and fuel take-off		
AG-SB-2024-05-B-EN	Effective Date: 01.10.2024	Compliance Category: A - MANDATORY B - RECOMMENDED C - OPTIONAL
Applicability		
Aircraft type & model: Cavalon equipped with 916iS	Affected Serial number(s): Built before August 2024	
The maintenance manual to be referenced is this stated or subsequent issue.		As per AutoGyro website
<p>This form is the response from AutoGyro GmbH either against a problem found in the product in service requiring a containment or rectification action, or as service information for aircraft modification incorporation. For help, contact airworthiness@auto-gyro.com.</p>		

Documentation (Service Bulletin Completion action)

The accomplishment of this Service Bulletin, or the decision of its rejection, must be properly documented within the aircraft records, in line with the requirements of the responsible aviation Regulatory Authority.

A worksheet may be attached to this bulletin to aid correct embodiment of this SB. This should be completed and retained with the aircraft records.

Category Codes

A – Mandatory – failure to comply result in a significant reduction of flight safety, injury or death
 B – Recommended – failure to comply may result in reduced safety margin, injury and/or equipment damage
 C – Optional – improves operating behavior, reliability and/or maintainability

Document approval signatures	
Head of Engineering	Engineering Manager

Reason and overview of the Service Bulletin (cause of problem if known)

Following market feedback and investigation, AutoGyro has been made aware of an issue of engine rpm drop when the P2 fuel pump is switched off. An improved fuel tank outlet and fuel shutoff tap installation has been engineered and proven to relieve this issue. This SB details the fitment process.

Manpower estimates

The task may only be performed by an organization or individual entitled and trained to carry out the relevant level of maintenance on AutoGyro aircraft.

Estimated man-hours to complete the task as a stand-alone item are:

- 4.0 hrs + time for de-fuelling the aircraft.
- 2 persons required for the installation of the take-off.

Compliance

This bulletin is recommended and has no compliance timeline.

Customer Support

AutoGyro will cover the costs for the parts (PN 49873), labour hours are not covered by this Service Bulletin.
AutoGyro Technical Support can be contacted for questions.

Tooling required

- Pump (alternative PN 30491 Fuel filler hose)
- Step drill (max 18mm)
- PN 46622 Pin Remover
- Hose clamp pliers
- Cordless screw driver
- Extension for screw driver
- Re-direction
- Torque wrench 0-5Nm

Weight and Balance Effects

Nil

Manuals affected

POH and AMM are not affected.

Previous Modifications that affect the SB

None

Accomplishment instructions (Action required to implement this bulletin):

All work is to be carried out in accordance with the latest model-relevant AutoGyro Aircraft Maintenance Manual.

Location and direction of every part which is de-installed needs to be noted to make sure it will sit in the correct position for the re-installation.

Procedure for Cavalon:

- Remove the cover for the push-pull cable, the intercom cover and the maintenance cover on the bottom of the aircraft covering the drain with a 2,5 hex screwdriver.
- Put tape on the cabin rear wall underneath the Intercom panel to avoid scratches.
- Defuel the aircraft using a pump and/or the drain at the tank connector at the bottom of the aircraft. If a pump is available the drain has to be used anyway to remove remaining fuel from tank. Degas the tank before using electric tools. Another way to defuel is to disconnect fuel hose from the engine and use aircraft pumps to pump out the fuel into a suitable receptacle.



Figure 1: Cover and Panel



Figure 2: Intercom Panel removed



Figure 3: Cover removed



Figure 4: Lower maintenance cover



Figure 5: Maintenance cover removed

- Disconnect the blue plug from the fuel level sensor and pin it out. To access the connector open the cable ties in the vicinity of the connector. Note: Be careful not to damage other cables. To pin the cables out remove the safety lock at the connector.

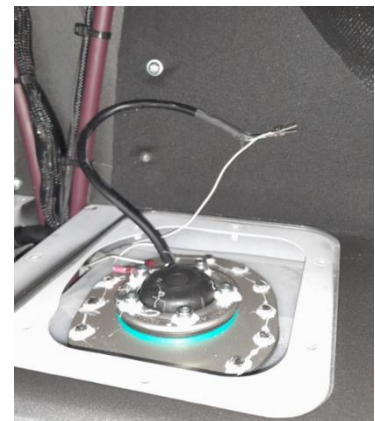
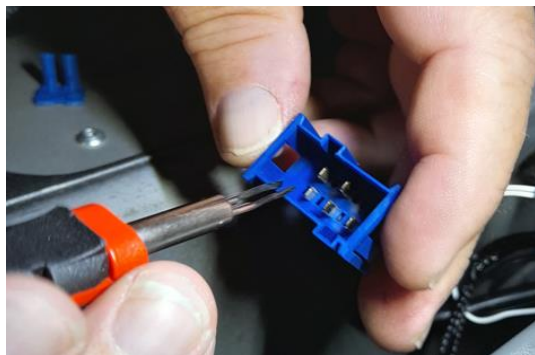


Figure 6-12: Disconnect plug, remove safety lock, pin out the fuel level sensor

- Remove the fuel level sensor from the fuel tank. For removal unscrew the outer 14 screws with a 7mm socket and the one screw of the inner circle where the ground cable is connected to the fuel level sensor. Remove fuel level sensor with attached cable. Cover the tank hole as long as you are not working in it to avoid FOD.



Figure 13: Fuel level sensor removed

- Remove the vent hose with filter and the tank connection. To remove the tank connection remove 3 of 4 clamps using a 5 mm socket. Push the left hose as far to the left as possible and do the same with the right side, Remove metal drain and afterwards the tank connection hose on the left side to get more work space. If this is not possible cut the old hoses off and use new ones which are included in the spare part kit.



Figure 14: Vent hose and filter removed



Figure 15: fuel tank connection removed

- Cut the clamp of the fuel hose which is installed to the fuel take-off and discharge the clamp. Remove the hose of the main fuel take-off. If is not possible cut the hose off. A spare hose is within the set of new parts. If the hose has been cut in this work step it can be cut while installing the shut-off valve, too. Unscrew the fuel take-off with a water pump plier or an open end wrench from the tank.

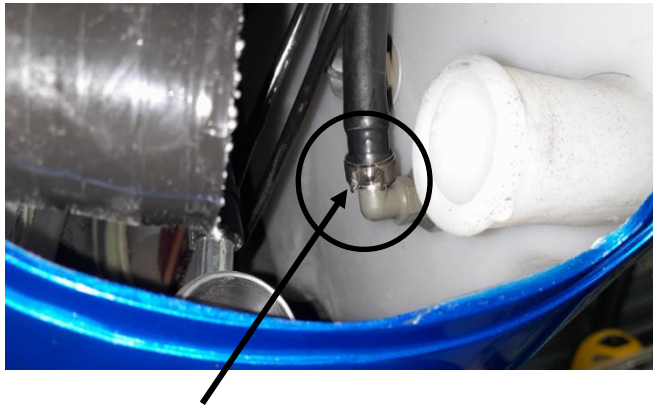


Figure 16: clamp loosened



Figure 17: after removing the take-off

- Unscrew the tank outlet

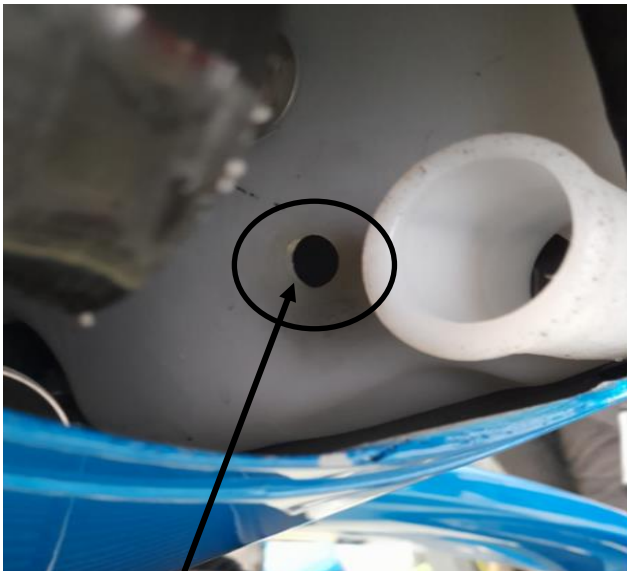


Figure 18: tank outlet removed

IMPORTANT NOTE:

Before using the drill to extend the hole for the new fuel take-off double check the size of the drill.

Make sure that the size of the hole is NOT BIGGER THAN 18mm !

- Enlarge the hole diameter with a step drill to 18mm. This can be done from below with a small tool and a re-direction or from the outside of the tank with an extension and a re-direction as seen on the picture below.



Figure 19: Tool



Figure 20: step drill

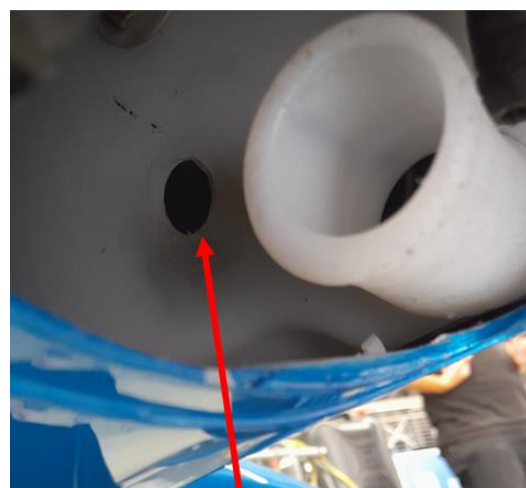


Figure 21: enlarged diameter (18mm now)

- After enlarging the hole carefully remove remaining chips with sticky tape. Don't use a vacuum cleaner. The fuel vapours can cause a blow-out in the vacuum cleaner. If you blow the chips out with compressed air they can be distributed in the aircraft.
- Apply a little bit of grease on the O-ring and Loctite 221 on the thread and install the new fuel take-off in the tank. Pay attention to the direction of the take-off.



Figure 22: new fuel take-off with greased O-ring

- Install the new fuel take-off in the tank. Apply Loctite 221 on thread of nut and take-off, put it in the tank in the right direction, about 40° up to the front and tighten the nut by holding the take-off from the inside with a grip pliers and turning the nut as seen in the picture until it is tight.



Figure 23: use small water pump tongs or equivalent to tighten new assembly

- Remove the old fuel shut-off valve by removing the nut which holds the part in place. As soon as the nut is removed the shut-off can be pushed through the tank wall to the back.



Figure 24: Fuel Shut-off valve nut removed

- Disconnect the fuel hoses from the fuel shut-off valve by removing the single ear clamp with a side cutter or equivalent. The hose coming from the take-off can be replaced if a non-destructive dismantling is not possible as stated in a previous work step description.



Single ear clamp removed, hose disconnected from shut-off, hose has to be shortened about 10mm, explanation follows in the next work step description

Figure 25: Hoses disconnected from old Shut-off valve

BE CAREFUL: Inner part of the new shut-off can be turned 360°. Before installing the hoses and the hose clamps check if there is a flow when the lever is open (vertical) and there is no flow if the lever is closed (horizontal). Mistakes will lead into a missing fuel flow to the engine and a new removal and installation of the shut-off.

- Due to the bigger size of the new shut off valve the short fuel hose going to the steel flex hose has to be cut approximately 10mm. Install the new shut-off and fix the hose with a new single-ear clamp 16.5mm. Remember to put the clamp on before connecting the hoses again. If the new shut-off is ready the assembly can be pushed through the tank wall. There is no washer between tank wall and shut-off but a washer needs to be installed on the outer side before installing the nut on the shut-off. Tighten the nut and re-install the lever. Install the hose on the take-off and clamp it, too.



Figure 26: New shut-off valve installed



Figure 27: lever installed, open = vertical

Note: In case that the fuel hose from the take-off to the shut-off has been cut to remove, it is recommended to install the new fuel hose first on the shut-off and clamp it and then guide the fuel hose between the tanks downwards to the take-off on the left side of the aircraft, near to the left hand tank. Remember to put the clamp on the hose before connecting the hose to the fuel take-off.



Figure 28: new shut-off installed in open position

- After take-off and shut-off have been replaced the tank cross-over tube connection needs to be re-installed. Pay attention to the direction of the drain.

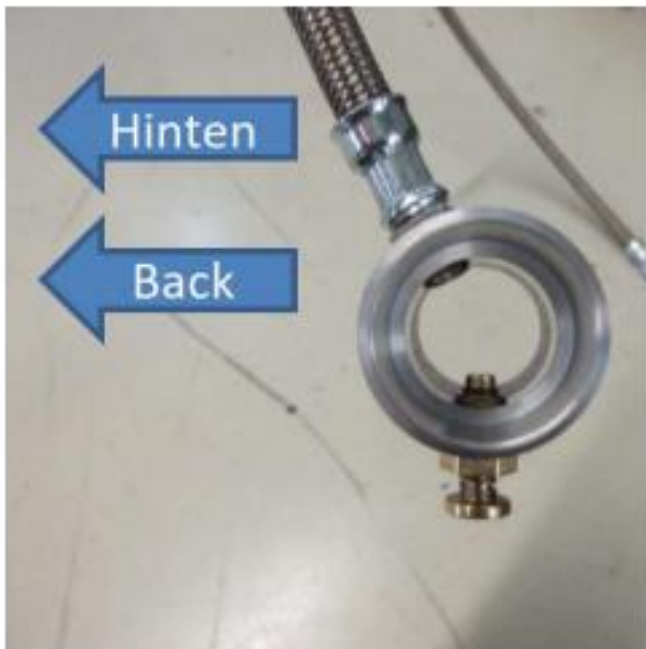


Figure 29: direction of the drain

NOTE: Before installing the tank connection check if the bushing in the tank outlet are in the correct position completely sitting on the tank flange surface. If they are loose check the diameter and order oversize bushings. The bushings shall be sitting with a slight resistance against pulling or pushing. They are not allowed to fall out.

- For the re-installation of the drain the second hose from the tank connection which has been removed at the beginning has to be re-installed. If the hoses have been cut to get the drain out new spare hoses can be taken. Push the two hoses as far as possible in the direction of the respective tank to get as much space as possible between the two hoses to install the drain. Insert the drain and push the hoses on the drain to center them between tank outlet and drain. If the installation of the drain is not possible due to missing space the hoses can be cut approximately 5mm. But before cutting them check the distance with the original length of both pieces. In the end there needs to be enough hose left to install the clamps on the tanks and the drain behind the bead on tank and drain, sitting completely on the hoses with a few mm of overhang on all sides.

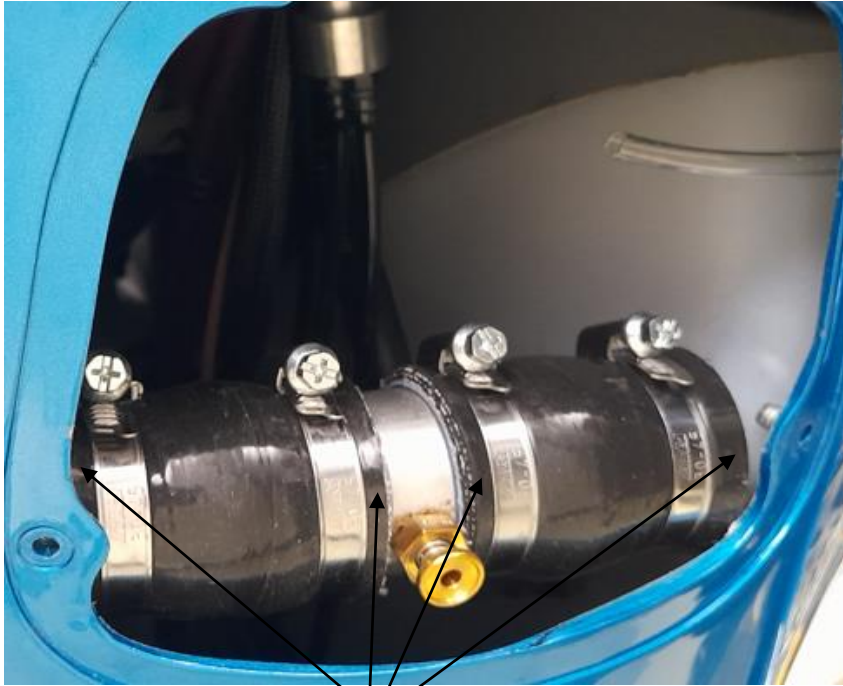


Figure 30: Installed clamps with overhang of the hoses on all sides

- Re-install the vent hose with filter with cable ties in the same position as before:



Figure 31: Re-positioned vent line with filter

- Perform a FOD control in the tank and if it is free from debris mount the tank lid with the rubber seal. Apply a small drop of Loctite 5331 in the threads and tighten them crosswise with 1,2Nm. Install the ground connection and the last screw on the fuel level sensor with Loctite 5331 as well (See standard torque for standard screw)



Picture 32: Loctite application on thread of lid screws. Do not put it on the end of the bolt or on the mating part; this drives sealant through the nut and into the tank.

- Put the wiring of the fuel level sensor the tank wall where it has been removed and install the two wires into the blue plug again. Re-connect the plug and secure the wiring and the fuel hoses as before with cable ties.

Model:
Cavalon

Fuel tank sender kit II

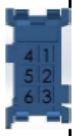
<u>Connection:</u> Tanks to wiring harness		<u>Case:</u> 32062		<u>Position on gyro:</u> Tank		
<u>Plug no. (wiring diagram):</u> 06						
Pin	Color	BT	Cross section mm ²	AWG	Function	Note
1	BK WH	(2)8328	0,35	#22	Fuel level sensor GND	
2			0,35	#22	Ground cable	
3						
4	WH		0,35	#22	Fuel level sensor	

Figure 33: Wiring of the fuel level sensor

- Perform a pressure test. Disconnect vent line from the filter and connect pressure test device.



Figure 34: Disconnected vent hose from filter and pressure test device connected to vent line

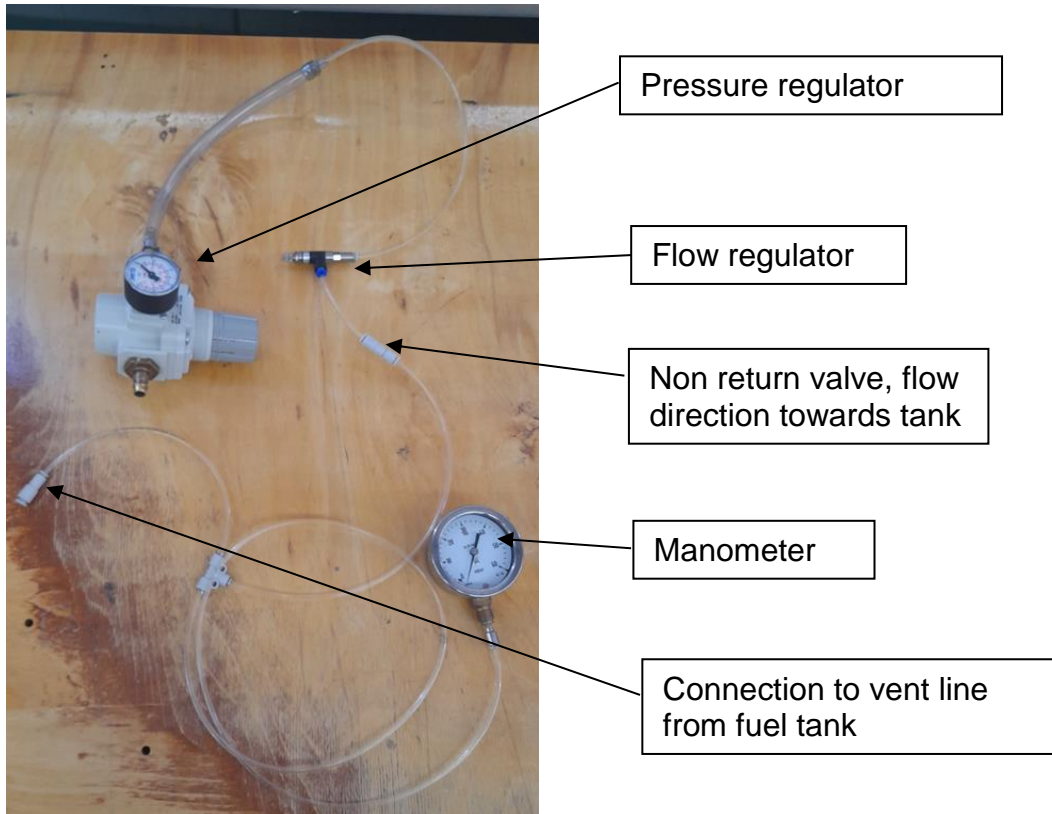


Figure 35: pressure test equipment

- Pressure test equipment consist of pressure regulator, a manometer, a flow regulator and a non-return valve. Limit the pressure to 0.5 bar with the regulator to avoid damages on the tank.
- Fill up the tank with compressed air. Tank will settle in the first step, pressure loss will be the result and a refill will be necessary. Apply 30mbar to the tanks. The tank need to hold this pressure for at least 10 minutes. Maximum pressure loss is 2mbar in this time. If there is a pressure loss above the limit use leakage spray and check the screws on the lid, on the fuel level sensor, the take-off from the tank and the tank connection including the drain. If there is no test equipment a bicycle air pump can be modified and used to build up pressure in the tank instead of a compressed air source.
- If pressure test was successful release the pressure by opening the tank filler cap. Refuel the aircraft and perform a ground run. Secure the aircraft. Start the engine and let it run for a few minutes and stop the engine. Check for leaks. If there are no leaks start the engine again and allow engine to run up until operating temperature is reached, continuing to check for leaks. Ad idle switch off pump 2 and ensure there is no drop in engine rpm. Carry out the same check at 3000 rpm and 4000 rpm. If everything is ok perform an FOD check, close all maintenance cover. Be sure to enter everything in the documentation linked to the aircraft.

Any life-limit changes must be recorded within the aircraft documentation, in line with the requirements of the country of operation.

Nil

Material information (Parts required to be made to implement this service bulletin):

PN 30487 – Loctite 221
 PN 30484 – Loctite 5331 Tank sealant
 Grease to retain the O-ring of the take-off in place during fitment
 Compressed Air

List of components (with purchasable part numbers)

PN 49873 – Upgrade set fire tap set I to II (aftermarket) (V)

Interchangeability

Not affected

Parts disposition

- a) Disposal requirements –
- b) Environmental hazards of parts containing hazardous materials –
- c) Scrap requirements (e.g. mutilate scrapped items beyond use) –

Aircraft serial no.: Registration:	<h2>Service Bulletin Worksheet</h2>	Date raised: Raised by:	
Purpose – record service repair implementation actions taken, then to inspect aircraft and return to service.		Document reference: AG-SB-2024-05-B-EN	
Maintenance manual referred to and issue level/date:	AMM_CV_915_EN_2029-09 REPRINTED		
Note; attach any secondary sheets to this document			
Task	Notes	Engineer check/date	Inspector check/date
Fuel removed, maintenance cover removed			
Tank level sensor disconnected and maintenance cap with sensor de-installed			
Drain and tank connection hoses removed			
Fuel take-off removed			
New fuel take-off installed			
Fuel shut-off valve removed			
New fuel shut-off valve installed			
Fuel hoses re-connected and secured with clamps. Three ear clamps securely crimped.			
FOD inspection before closing the tank			
Re-install fuel level sensor and tank connection with drain.			
Perform pressure test, maximum allowed pressure loss 0,2mB in 10 minutes.			

Aircraft serial no.: Registration:	<h2 style="margin: 0;">Service Bulletin Worksheet</h2>	Date raised: Raised by:		
Task	Notes	Engineer check/date	Inspector check/date	
If successful perform limited ground run.				
If ground run is ok, perform FOD control and close maintenance cover.				
Enter all work performed. in the aircraft documentation				
Permit Maintenance Release: The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight.				
Engineer/Inspector signature Name: Inspector Authorisation code if applicable:	Date of work Location where work completed:			