# OP-61: RV-6,7,9 TIP-UP CANOPY LATCH WARNING SYSTEM



TIP-UP CANOPY LATCH AND SWITCH (TOP VIEW, SOME COMPONENTS NOT SHOWN FOR CLARITY, REFER TO RV-7,9 DWG 48)





C-607-1 CANOPY LATCH

NOTE: Special tools required to complete this section include an ANGLE DRILL and BITS, SMALL CUT-OFF WHEEL, OHMMETER, D-SUB PIN CRIMP TOOL.

DATE OF COMPLETION:							
PARTICIPANTS:							
date <b>09/13/22</b>	REVISION: 0	RV-6,7,9	PAGE:	OP-61-01			

# VAN'S AIRCRAFT. INC.

Leave the fasteners loose enough to allow for final adjustment during installation.

Step 6: Assemble the Canopy Latch Switch Assembly as shown in Figure 6. Leave the fasteners loose enough to allow for final adjustment during installation.

Step 8: Position the Canopy Closed Switch Assembly as shown in Figure 7. Match-Drill #30 the F-768B-L, cleco each hole as you drill. Deburr the holes. Rivet the Canopy Closed Switch Assembly to the aft (cockpit) side of the F-768B-L, see Page OP-61-01.



Step 1: Remove the C-710 Pushrod from the C-607 Latch Handle. Remove the AN310-3 Nut and Washer from Latch Handle pivot bolt. Attach TOOL-00712 Drill Template to the bottom of the C-712 Lower Angle. See Figure 1. Reinstall the nut to hold the drill template in place. Apply a small c-clamp mid way between the nut and the holes to be drilled while keeping the edge of TOOL-00712 coincident with the C-712 Lower Angle.

Step 2: Match-Drill through both C-712 Angles, as shown in Figure 1. Keep the angle-drill bit perpendicular to the C-712 Angle. Remove the TOOL-00712.

#### WARNING: Do not cut off the upper C-712 angle.

Step 3: Using a small cut-off wheel (1.25" Dremel reinforced disc or similar) cut tab off of the C-712 Lower Angle. See the detail view in Figure 1. Deburr all edges.

Step 4: Final-Drill the center hole in the C-712 Upper Angle. See Figure 1. Deburr all holes.

Step 5: Attach the Canopy Latch Switch Assembly to the top of the C-712 Upper Angle with the wires facing inboard. Verify that the switch actuator lever operates freely and is not contacting the Upper or Lower C-712. See Figure 2.

Step 6: Route the Switch Connection Wire forward under the F-721B-L and F721A-L and aft through the snap bushing previously installed in the F-7105B-L, do not connect the Switch Connection Wire to the Canopy Closed Switch at this time.



#### NOTE: See KAI Section 5.21 Electrical for additional information about using an Ohmmeter.

Step 7: Install the C-607-1 and the C-609-1. Attach the C-710 Pushrod and install the VA-104-1 Knob. See RV-7.9 DWG 48 for details.

Step 8: Using an Ohmmeter connected to the Switch Connection Wire (that was installed during Step 6) and the airframe ground, adjust the Canopy Latch Switch to have continuity only when the C-607-1 Second Tooth is fully engaged with the C-609-1, see OP-61-01. Tighten the Latch Switch fasteners without moving the switch position.

Verify the Canopy Latch Switch has continuity only when the C-607-1 is fully latched.

Step 9: Using an Ohmmeter connected to the Canopy Closed Switch Common and Normally Open terminals, adjust the Canopy Closed Switch to have continuity only when the canopy is completely closed. Tighten Canopy Closed Switch fasteners without moving the switch position.

The Canopy Closed Switch should show an open circuit whenever the canopy is open high enough for the WD-622 Canopy Latch Lugs to rest on the WD-617 Canopy Latch Hooks when the C-607-1 canopy handle is latched.

Step 10: Connect the Switch Connection Wire to the Canopy Closed Switch common terminal.

# VAN'S AIRCRAFT. INC.



DATE09/13/	22	REVISION:	0	RV-6,7,9	PAGE:	OP-61-03
------------	----	-----------	---	----------	-------	----------

# VAN'S AIRCRAFT. INC.

#### NOTE: Follow the steps on the next three pages if installing the AV-01957 Canopy Latch Warning PCB.

The AV-01957 Canopy Latch Warning PCB is a computerized system designed to measure engine RPM and monitor the canopy latch switch circuit. The AV-01957 will play a verbal warning message whenever the canopy is unlatched or open and the engine exceeds 1600 RPM (3000 RPM for Rotax engines).

The AV-01957 canopy latch warning system uses a panel-mounted momentary-contact pushbutton that incorporates a red LED warning light.

The LED warning light will illuminate whenever the AV-01957 system is powered on and the canopy latch sense circuit is open (i.e.: when the canopy is unlatched or the canopy is open).

The pushbutton is used to play the warning message during setup and to activate the AV-01957 warning message mute mode.

The AV-01957 mute mode is intended to be used during extended engine run-ups with the canopy unlatched (clearing fouled plugs, etc.) or if the latch sense circuit would become open during flight because of a failed switch or wire.

The AV-01957 also contains a fail-safe mono audio mixer that will allow adjustment of the warning message volume when mixed with the com radio audio.

The AV-01957 circuit board mounting holes are spaced to fit in an optional Hammond Manufacturing plastic enclosure P/N 1591XXSSFLBK available at DigiKey (and other electronics suppliers) if you choose to mount the AV-01957 in an enclosure. Some modification to the enclosure will be required so the 9-pin d-sub connector will be accessible.

Step 1: Build a wire harness for your aircraft using the diagram in Figure 1 and the d-sub connector pin-out table below. Use WIRE #22 for all circuits except the RPM Input, com audio in and mixed audio out which use WIRE #24X10 S shielded wire.

The existing aircraft com audio wire going to pilot headset jack + terminal should be cut and routed through the AV-01957.

NOTE: Do not connect both aircraft ignitions to the AV-01957, only one TACH source is needed to measure engine RPM.

NOTE: When installing wire pins into d-sub connectors, gently pull-test each wire after insertion to verify it has locked into the connector body. If a pin is inserted into the wrong location, remove it using the TOOL ICM INSRT/EXTRCT tool available through Van's Aircraft. Refer to KAI Section 5.21 for additional shielded wire and electrical connector assembly information.

The AV-01957 9-pin D-Sub connector pin-out is as follows:

PIN	FUNCTION	CONNECT TO
1	RPM IN	** Magneto P-lead at the key switch (or similar) or the electronic ignition tach source. No additional resistor
		is required. Ground the shield at the keyswitch end only.
2	WARNING LED 3V NEG	Warning Button LED negative terminal.
3	COM AUDIO IN	** Aircraft Com output from radio or intercom that goes to pilot headphone jack + terminal.
4	MIXED AUDIO OUT	** Aircraft Com to pilot headphone jack + terminal.
5	12V POWER IN ~1 AMP	Fused 1A, 12v. power source on the Avionics or Master bus.
6	OVERRIDE BUTTON INPUT	Warning Button switch terminal #2.
7	LATCH SENSE INPUT	Canopy Closed Switch Normally Open terminal.
8	WARNING LED 3V POS	Warning Button LED positive terminal.
9	AIRFRAME GROUND	Airframe ground.
		** Use W/IRE M27500/24/TG1T14 (or similar) shielded wire. Do not connect shields to d-sub pin 9



panel.

ES HST-1/4.









Step 1: Adjust the CONFIG DIP switches as required for your aircraft engine and the ignition system tach signal source. See Figure 1. Detail view.

NOTE: The CONFIG DIP switch may have tape covering the switches, if so, remove and discard the tape.

NOTE: The CONFIG DIP switch settings are read by the computer only when it boots up. You MUST press the Reset Button after changing the CONFIG settings before the new settings will take affect if the AV-01957 is powered up when making CONFIG switch changes.

DIP 1 and DIP 2 are mutually exclusive, chose only one type of TACH input source.

DIP switches 3, 4 and 5 configure the ignition Pulses Per Revolution (PPR) sensed by the computer. All three PPR selection switches are set to OFF for a 4 cylinder magneto ignition system (1 PPR). A maximum of one PPR selection switch should be set to ON.

The default warning message is "CHECK CANOPY LATCH".

#### **CONFIG DIP SWITCHES 1-6 FUNCTION**

- DIP 1 ON for Magneto P-lead tach input.
- DIP 2 ON for Electronic Ignition tach input.
- DIP 3 (1.5 PPR) ON for 6 cylinder engines with magneto ignition. Also sets the warning message for the RV-10 "CHECK DOOR LATCHES".
- DIP 4 (2 PPR) ON for Electronic Ignition Wasted Spark 4 cylinder engines only.
- DIP 5 (3 PPR) ON for Electronic Ignition Wasted Spark 6 cylinder engines only. Also sets the warning message for the RV-10 "CHECK DOOR LATCHES".
- DIP 6 ON for Rotax engines only.

#### Example settings:

- DIP 1 is the only switch ON for a 4 cylinder engine with a magneto ignition.
- DIP 2 and DIP 4 are ON for a 4 cylinder engine with an electronic ignition.
- DIP 1 and DIP 3 are ON for a 6 cylinder engine with a magneto ignition.
- DIP 2 and DIP 5 are ON for a 6 cylinder engine with an electronic ignition.

DIP 2 and DIP 6 are ON for Rotax ULS engines.

#### NOTE: Skip to the next page if installing the AV-01957 with the CONFIG DIP 1 OFF and CONFIG DIP 2 ON for electronic ignitions.

If you are using the AV-01957 with CONFIG DIP switch 1 ON for a magneto ignition system, the P-Lead Trim potentiometer R5 may need final adjustment.

When the magneto sense circuit is used for RPM measurement via DIP 1, the small Test LED labeled LED40 on the AV-01957 PCB will blink briefly each time the computer senses a spark event while the engine is running.

The default setting for the P-Lead Trim pot R5 is midway between each stop. This setting has proven to work for most magneto ignition systems and R5 pot adjustment may not be necessary.

#### NOTE: Trim pot adjustments should be made with TRIMMER ADJUSTMENT TOOL P/N "TOOL-00000" available from Van's Aircraft.

Step 2: Position the aircraft where it is safe to run the engine and the AV-01957 is accessible.

With the canopy closed and latched so the Test LED (LED40) is not illuminated and with the engine running at idle speed, observe the Test LED, it should be blinking at the same rate as the engine RPM.

You may need to shade the Test LED if it is in direct sunlight, as the flash is very brief and dim.

If the Test LED is not blinking with engine RPM, adjust the R5 potentiometer very slowly from one extreme to the other while observing the Test LED. Stop adjusting the R5 pot when the Test LED blinks consistently with engine RPM. This is the final adjustment to the R5 pot.

If the Test LED does not blink with engine RPM verify d-sub pin 1 wiring to the key switch (or similar) for continuity, see OP-61-04, and try adjusting R5 again. The adjustment is extremely sensitive, so turn the pot very slowly with the engine running at idle.



# VAN'S AIRCRAFT. INC.

DATE09/13/22	REVISION: 0	RV-6,7,9	PAGE:	OP-61-05
--------------	-------------	----------	-------	----------

### VAN'S AIRCRAFT. INC.

After wiring and configuring the DIP switches, the AV-01957 audio output level can be tested and adjusted. See OP-61-05, Figure 1 for component locations.

The audio output volume level can be adjusted using the three separate, single-turn potentiometers marked as follows:

R30 Warning Audio Trim - adjusts the Warning message audio level going into the on-board audio mixer.

R32 Com Audio Trim - adjusts the Com radio audio level going into the on-board audio mixer.

R34 Audio Out Gain - adjusts the mixed audio output volume level.

Step 1: With the aircraft powered on, the audio system powered on and while wearing the headsets, depress and release the TEST button on the AV-01957 or the Warning Button on the instrument panel. The TEST LED and Warning Button LED will illuminate whenever the canopy warning verbal message is playing or when the canopy is open or unlatched.

Step 2: Tune the Com radio to your local AWOS frequency so you can receive com audio while adjusting the AV-01957 audio trim levels. Adjust the R30 and R32 trim levels so the warning message is louder than the com radio audio.

NOTE: The AV-01957 contains a com audio fail-safe pass-through circuit. Com audio will bypass the AV-01957 audio mixer if the AV-01957 is powered off. After making all audio adjustments disconnect the AV-01957 power source and verify the com audio pass-through circuit functions as expected.

Step 3: With the AV-01957 powered on, adjust the Audio Out Gain until the com audio level is approximately the same with the AV-01957 powered on or powered off. The Gain and Trim settings have no effect on the audio output level when the AV-01957 is powered off.

Step 4: Taxi the aircraft to a safe run-up area where the engine can be brought above 1600 RPM (3000 RPM for Rotax) for the AV-01957 functionality test.

WARNING: Secure the canopy from opening during high RPM operation while testing the AV-01957 canopy warning system.

Step 5: With the canopy closed and unlatched, advance the engine RPM above the applicable threshold in Step 4.

The warning message should be heard when the RPM threshold is exceeded, and it will repeat every three seconds until the RPM drops below the threshold or the canopy is latched. The Warning Button LED should also be illuminated.

If the warr	ning message	does not	t play and y	/ou have o	configured <sup>•</sup>	the AV-01957	to use magnet	o ignition (DIP 1	l on) it may be
necessary	/ to adjust the	P-Lead 7	Trim potent	tiometer R	85, refer to 0	DP-61-05.			

Step 6: With the canopy closed and latched, advance the engine RPM above the applicable threshold in Step 4.

The Warning Button LED should not be illuminated and the warning message should not play.

Step 7: Test the Mute mode. The AV-01957 has a mute function that can be activated by depressing the Warning Button for at least 3 seconds. When the mute mode is active the Warning Button LED will blink but no warning message will be played when the canopy is unlatched and the engine RPM's exceed the RPM threshold.

The mute mode automatically resets when the engine RPM drops below the applicable threshold in Step 4. The mute mode can also be canceled with a guick press and release of the Warning Button (the warning message should play once).

WARNING: DO NOT engage the mute mode before entering the runway for takeoff. Always verify the canopy is fully closed and latched and the Warning LED is not on solid or blinking before every takeoff.

OP-61-04.

