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THE GLIDING FEDERATION OF AUSTRALIA Inc.

GFA AD 684 Issue 2

Date: December 5th 2018

Fully replaces Issue 1 dated February 2017, clarifying inspection procedures and specifying replacement valves must comply with CS22.695

Subject	Inspection, replacement and life limitations of ON / OFF fuel valves fitted to powered sailplanes.
Background	There have been reported cases of Fuel Shut Off Valves failing, resulting in in-flight engine power loss. In most cases the valve partially restricts flow when selected in the "ON" position, causing a reduction of power. Subsequent ground runs may not reveal the problem. On returning the powered sailplane to service; the power loss in flight is repeated. Additionally, there have also been reports of external fuel leaks from the valve spindle. See "Defects." Photo (1) The valve is identified as a Truma, Type V Male / Male ¼ It may have an identification number displayed, depending on the supplier. Example: DE 21G D237 
Types / Models Affected	The shut off valve shown in Photo (1) is common to, but not restricted to, the following sailplane types: Grob G109 / G109B, Scheibe Falke SF25 all variants, SF27M, SF28, SF36, Sperber RF5, RF4, and Dimona H36.
Current Life Limitations	This fuel shut off valve in the Dimona H36 and the Scheibe Falke series has a sailplane manufacturer's 5 year life limitation, based on deterioration of the internal sealing. All other installations in other types have no life limitations.

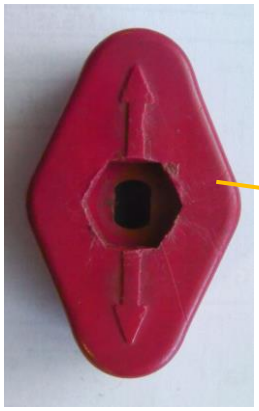
Defects

The restriction of fuel flow has been found to be caused by failure of the control knob to turn the shaft through full travel in the ON direction. The result of the rectangular slot in the knob, (engaging over the rectangular shoulder on the top of the shaft) becoming rounded as illustrated in Photo (4).

Photo (2)

The securing nut is plain, no locking provided. If this nut loosens even slightly the shaft will damage the rectangular slot. Removing the knob from the shaft shows the rectangular slot needed to drive the shaft. Any wear in the slot causes free play and loss of shaft movement

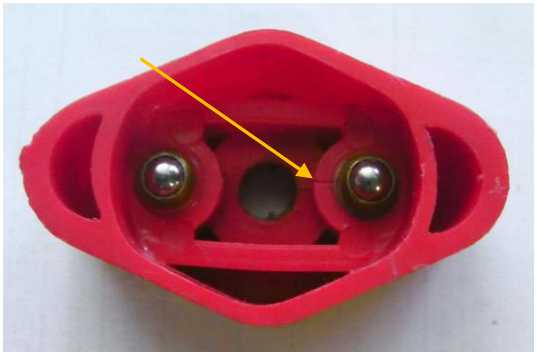
Photo (3)



Defects (cont)

Photo (4) shows a knob with a rectangular slot which has become rounded causing loss of shaft motion, resulting in fuel flow restriction when the knob is turned in the ON direction. The small, single crack on the inside of the knob may have been there from production, or induced by the stress developed while turning the knob against the loading created by the internal compression spring.

Photo (4)



It must be noted that this valve is used in European domestic and industrial heating systems which require very infrequent knob function (ON / OFF). Where, in the sailplane, it can be functioned every engine start up.

It has been suggested the knob failure is due to Ultra Violet Light exposure, however, cracks are seen in knobs with little or no UV damage. It is possible that knobs could be cracked prior to delivery. Photo (6) shows UV damage.

. Photo (5)

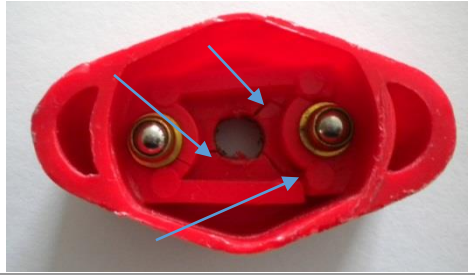


Photo (6)

	This internal damage is NOT detectable from the top of the knob as shown in Photo (6) It is only apparent when the knob is removed. The cracking in Photo (5) is most likely the result of the stress caused by the rectangular section of the shaft, “reaming” the hole in the knob from rectangular to round.
GFA ACTION	VALVE LIFE LIMITATIONS The Truma fuel valve is limited by this AD to 5 years service, in all powered sailplanes from the date of installation. This limitation is based on deterioration of the internal sealing.
Operator Actions **Valve Replacement**	BEFORE NEXT FLIGHT and EACH ANNUAL INSPECTION: (1) Remove the plastic plug covering the nut. Undo the nut and remove the knob, checking for damage to the rectangular slot. If damage is found the knob / valve is deemed unserviceable. If no damage, re-fit the knob. Fitment of a star washer and or thread lock is recommended. Place the knob in the OFF position and gently check for free play as the knob is turned to the ON position. No free play allows the valve to return to service. (1) If the knob passes the free play check, identify from logbook records the time in service / date fitted. If no records can be found, or if the date fitted is over 5 years, and the valve deemed serviceable, return the powered sailplane to service for a period of 3 months and endorse the MR accordingly. This provides time to organise a replacement valve. If the knob fails the free play inspection, showing loss of motion, remove the valve from service and replace before next flight. There are 4 options for valve / knob replacement: 1. If a valve has not reached 5 years in service and inspection shows a faulty knob, it may be replaced with a serviceable knob or a new knob from the valve manufacturer. That replacement knob is to be inspected for cracks and slot shape before installation, the securing nut fully tightened, the use of a star washer or thread lock recommended. 2. Replace a time expired valve with a new Truma valve with a life limitation of 5 years and subject to knob inspection both before installation and periodic at Form2 inspections. 3. Install a replacement valve which complies with: ***CS22. 695*** *(d) Each fuel tank selector must:* *(1) Require a separate and distinct action to place the selector in the OFF position.* REPLACEMENT RECOMMENDATION Use of any alternative valve, not recommended in this AD, will require individual engineering approval. Consult the GFA CAD for directions. At the date of this AD the Andair FS16x1 ¼” valve is the recommended alternative for all sailplane types and models affected by this AD. Photo (7) Andair FS16x1 1/ 4 ON / OFF fuel selector.

	CS22.695 compliant. http://www.andair.co.uk  The FS16x1 ¼" valve may be installed to guidelines provided in GFA Basic Sailplane Engineering, (AIRW M05), by suitably authorised GFA inspectors without additional engineering approval.
COMPLIANCE	Compliance with this Airworthiness Directive is mandatory and compliance, including action taken pursuant to this Airworthiness Directive, must be recorded in the sailplane log book.
Affect on Weight and Balance	No affect on W&B.
ISSUING AUTHORITY	Issued for and on behalf of **The Gliding Federation of Australia Inc**. Signed  GFA Chief Technical Officer
Effective Date	December 5th 2018