

**US SAFETY DIRECTIVE NUMBER 127**

**including**

**ISSUE 2**

**MODIFICATION M228**

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<b>TITLE</b>	CKT exhaust
<b>CLASSIFICATION</b>	The UK CAA have classified this as Mandatory.
<b>COMPLIANCE</b>	All aircraft, Inspection before further flight. At or before the next annual renewal, fit modification M228 or modified exhaust (exhaust serial number 10940809 onwards)
<b>APPLICABILITY</b>	All Quik, GT450 & QuikR fitted with CKT stainless steel twin exhausts. The CKT exhaust serial number is stamped on one end cover plate.

**INTRODUCTION**

The CKT exhaust silencer has separate front and rear perforated baffle tubes which are welded to the front and rear end cap flanges and plugged with a cap. A fatigue failure of a pair of exhausts serial no. 7811107 has occurred at 125 hours, around the flange edge on the rear end cap, at the weld edge (see fig 1). The baffle tube came free and was ejected from the silencer and hit the propeller. Fortunately this happened at low power on approach, propeller damage was localised and the baffle tube missed the sail; under high power the consequences could be very serious.

The exhausts were fitted to the prototype QuikR (Rotax 912s engine) where failure may be more prevalent due to use of high power settings. Failure has been caused by gas pressure pulses pushing the rear internal baffle plate inwards, causing disengagement of the inner baffle plate from the baffle tube, allowing free vibration of the baffle tube end, leading to failure of the end cap joint.

The problem has been solved by welding on back-keeper plates (modification M228), or by fitting new modified exhausts which have smooth end caps with no baffle tube features.

**ACTION**

**Inspection**

Before further flight, using good light and a magnifying glass, closely inspect the area around all 4 silencer end caps for cracks, particularly on the weld edges (see fig 1). If cracks are noted, contact P&M Aviation, if possible by email attaching pictures of the damage, hours run, aircraft and exhaust serial numbers. The aircraft must not be flown with cracks in this area.

**Implementation**

If no cracks are found, no immediate action is necessary except for increased vigilance and frequency of inspection. Modification M228 the fitting of keeper straps needs to be implemented on or before next Annual renewal.

For fitting keeper straps or if cracks are noted, proceed as follows:

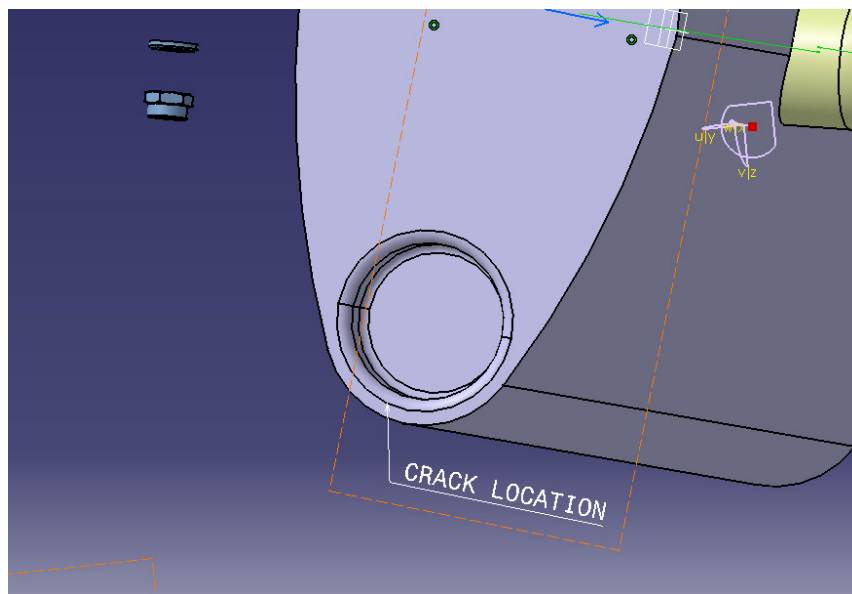
**Removal**

- a) Remove the backup cables from the exhaust joints.
- b) Undo the single M6 nut on the rubber mounting to the engine mount angle.
- c) Remove the exhaust springs and remove the exhaust.

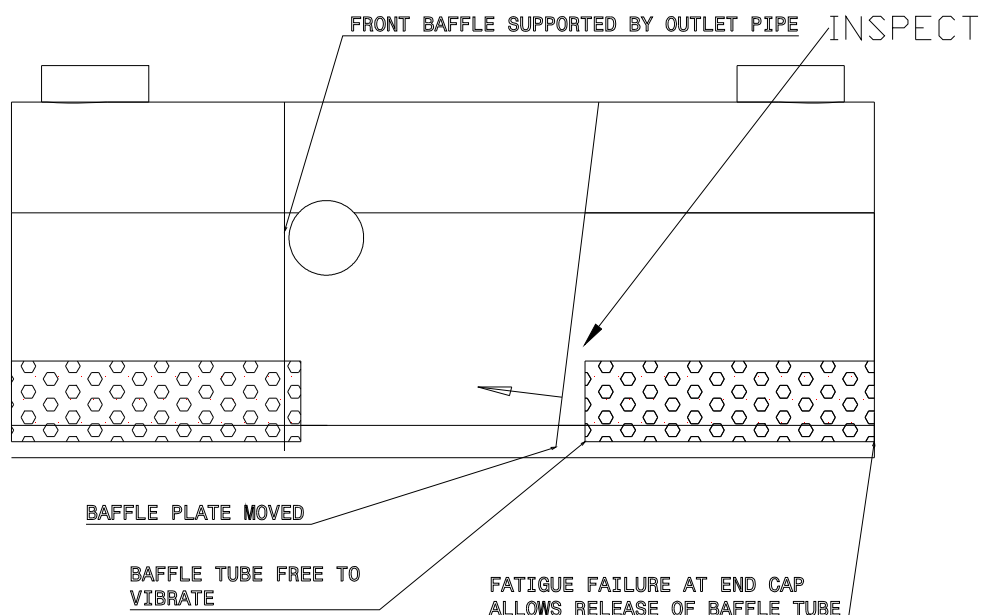
### Internal Inspection

See fig. 2. Through the exhaust header pipe holes, using a torch and mirror, inspect the welded connection between the internal baffle plate and the end of the perforated baffle tube. Try pushing the bottom of the internal baffle plate inwards. If the baffle plate has moved inwards towards the centre of the exhaust and the baffle tube has disengaged from the baffle plate, ***the exhaust must be replaced***. Disengagement is more likely on the rear internal baffle, as the front internal baffle is supported by the outlet pipe.

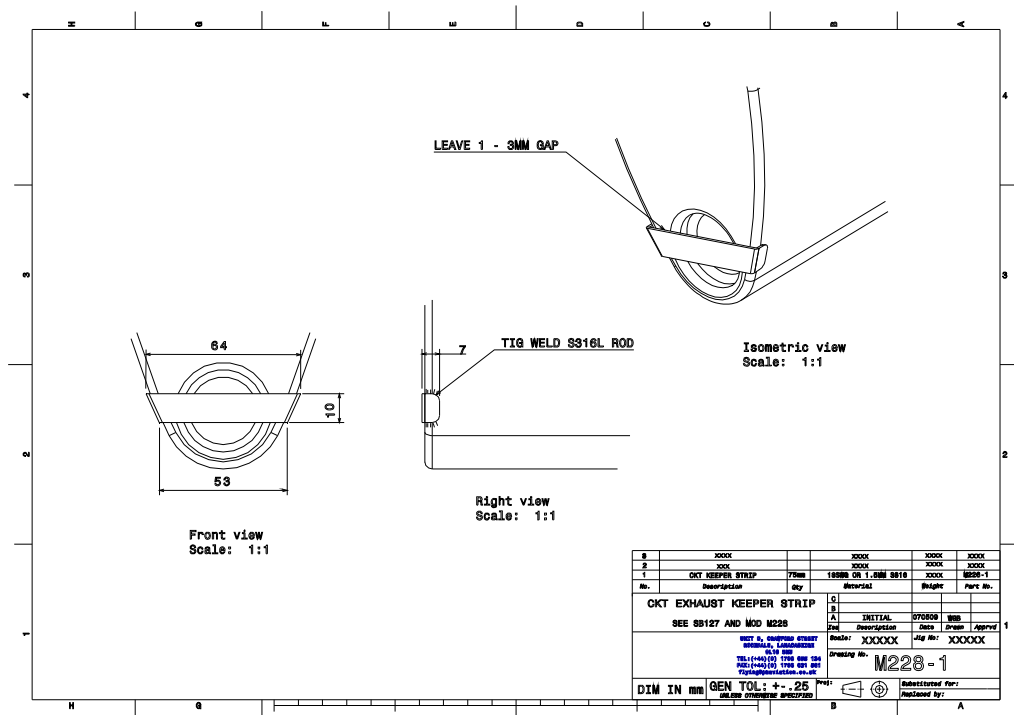
If the inner ends of the baffle tubes and internal baffles are secure, modification M228 can be carried out (see fig. 3). It provides a backup retainer if the baffle should become loose. Thoroughly clean the area. Do not use any dissimilar wire brush metals and do not mark with graphite or carbon pencils. Weld repair any cracks found using a stainless steel 316L welding rod and TIG process. Fit a 10mm wide x 18swg ( 1.22mm) or 1.5mm S316 strip with 7mm bent edges as shown, weld to the silencer ONLY at the corners, over the existing corner weld. The repair/modification must be carried out by a welder qualified for thin (0.9mm) stainless steel. FAA publication AC43-13-1B is a useful guide to procedures.



**Fig 1. Crack location all round weld outer edge**



**Fig 2. Movement of inner baffle plate.**



**Fig 3 Exhaust Keeper modification M228**

**Refitting**

Inspect the stainless steel back-up cables and springs for broken strands and wear. Inspect the rubber anti-vibration mount for cracks/disbonding. Replace with genuine P&M parts as necessary.

- d) Apply Copaslip or similar high temperature anti-seize compound to the ball joints
- e) Refit the springs, using a cord to fit them. Rocking the can relative to the pipes may help.
- f) Refit the anti-vibration mount using 20mm washer under a new nyloc nut. Avoid twisting the rubber mount.
- g) Refit the backup cables through the springs as shown in fig 4.

**Tools required for removal/refit include:**

- M10 spanner for AV mount.
- Pliers and a cord for spring removal/fitting
- Copaslip or similar anti-seize compound



**Fig 4 Exhaust springs and backup cable**

**CONTINUED AIRWORTHINESS**

Unless the exhaust is replaced with the new modified smooth end cap type, Modification M228 must be implemented at or before next Annual renewal. Close visual inspection of all 4 baffle weld features must be carried out as part of the daily check "A".

At each 50 hours, check the whole system closely for cracks, check springs for wear, check joints for security, check for loose baffles, lubricate the exhaust ball joints using Copaslip or similar high temperature anti-seize compound.

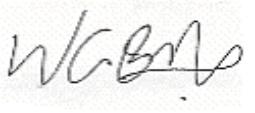
**DOCUMENTATION**

This Safety Directive must be attached to the operator's manual.

The aircraft Maintenance Log must be signed off by the owner when the inspection is carried out and if the exhaust is replaced. When modification/repair M228 is carried out it must be inspected against this Safety Directive by an LSA Repairman or A&P Mechanic or Factory Inspector, who must also sign it off in the aircraft technical log.

**ISSUED BY** W.G.Brooks

**DATE** 06/10/09

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