BRITISH MICROLIGHT AIRCRAFT ASSOCIATION

TECHNICAL INFORMATION LEAFLET

NO: 101 ISSUE 5 OCT 2013

STANDARD MINOR MODIFICATION – FLEX-WING MICROLIGHT RADIO / INTERCOM INSTALLATION

Introduction

This leaflet contains the required information to permit straightforward fitment of a radio installation in a flex-wing (weight-shift control) microlight aeroplane.

It permits only certain ways of doing this. This is because these ways are known to be straightforward, risk and hassle free. This doesn't mean that there aren't other ways of fitting a radio in a flex-wing microlight, but if you wish to do it in another way, this must be done through a more conventional mod application (at slightly greater cost) and more information than is required here may be requested by the BMAA technical office.

Notwithstanding the simple approach taken by this TIL, it is the aircraft owner's responsibility to ensure that all materials used in a modification are of adequate quality, that proper aircraft engineering standards are applied, that this modification does not create any safety problem when combined with any other modification to the aircraft, and that no relevant information has been withheld from the BMAA or inspector.

This issue specifies that radios must be 8.33 kHz channel spacing capable. This is a legal requirement for new fitments from 17th November 2013. (Previously approved 25 kHz channel spacing capable fitments may continue to be used until 1st January 2018.)

Permitted Options

1 Radio Type
- 1.1 The radio is to be either a hand-held type or a panel-mount type.
- 1.2 The type must be CAA approved.
- 1.3 The radio must be 8.33 kHz channel spacing capable.

2 Antenna Type
- 2.1 The antenna is to be of a "whip" type.

3 Power Supply
- 3.1 The radio will have an internal or integral battery, or…
- 3.2 The radio will be powered by an external battery and/or regulator attached to the engine's electrical generator.

4 Radio Location
- 4.1 A panel-mount radio is to be mounted in the instrument panel.
- 4.2 A hand-held radio is to be located in the cockpit, out of the airflow, and, in particular…
- 4.3 The radio is to be mounted on the instrument panel, or…
- 4.4 The radio is to be mounted on the inside side of the pod, or…
- 4.5 The radio is to be mounted on a bracket attached, without drilling, to the trike keel tube, in front of the pilot.

5 Antenna Location
- 5.1 The antenna is to be located on the kingpost, or…
- 5.2 The antenna is to be located on the upper / rear part of the trike frame, or…
- 5.3 The antenna is to be attached to the radio, or…
- 5.4 The antenna is to be on the nose of the trike (but not in front of the pitot, venturi, or static source), or…
- 5.5 The antenna is to be located below the pod with at least 6" / 150mm ground clearance.

6 Other Options
- 6.1 If attached to the pod, the antenna can have a metallic ground plane consisting of a plate, or metallic tape beneath it, on the inside of the pod. It is also possible to use the airframe as a ground plane in (predominantly) metal aircraft. (Recommended).

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Essential Safety Checks

1 Radio

1.1 The radio (including any mounting brackets and integral battery(s)) must be weighed.

1.2 A load test, using scales or a spring balance to 9 times the radio weight forwards, 4.5 times the radio weight up and down, 3 times the radio weight to port and starboard must be carried out.

1.3 For hand-held radios there must also be a "retaining lanyard" attached to both the aircraft and the radio when it is fitted, to stop it falling out of the aircraft if it comes loose from its mounts. This must be short enough to prevent it snagging the pilot as they enter or leave the cockpit.

1.4 For panel-mount radios, if a new cutout is required, this is only acceptable if the panel is not load bearing primary structure. If unsure, make certain first and cut later. There must be enough space around the radio that there is adequate mechanical strength left in the panel to carry the additional weight. Obviously this means that with a thick metal panel the radio can be far closer to other instruments than with a thick GRP panel for example (instruments with backing plates that are screwed into the panel are unlikely to have a significant weakening effect). In addition to the load test of check 1.2, test the panel in the area of the new radio with 9 times the combined weight of the radio and its adjacent instruments forward (spread the load over an area when performing this test). If there is any question as to whether the whole panel can cope with the additional weight, repeat the test with 9 times the combined weight of all the instruments.

1.5 The radio (or accompanying paperwork) must have a CAA or EASA approval number, and must be 8.33 kHz channel spacing capable.

2 Cabling

2.1 Any cables between the radio, intercom box, power supply and antenna, must be firmly secured (without over-tightening) with cable ties to the aircraft at intervals of 150mm / 6" or less.

2.2 Any cables bridging "de-riggable" parts of the aircraft must have quick release fasteners at the join (e.g. at the hang-point).

2.3 No holes must be drilled in any metal structure for cables to pass through.

2.4 No holes must be cut in the sail for cables to pass through.

2.5 Cables, if passing through the wing, must be routed so that they don't snag the cross tube, hang-point, or, if fitted, the trimmer.

2.6 If powered from anything but an internal or integral battery, the radio must be connected to its power supply via an in-line fuse and a switch (such that it is easy for the pilot to turn the power supply to the radio off in flight). The fuse rating must be between 1.5 and 2 times the maximum current draw of the radio, and placarded on, or adjacent to, the fuse holder. The switch can be a separate switch or the supply can be routed via the master switch. In the case of a separate switch, it must be clearly placarded with its function (for example 'radio') and its sense (on/off), which must be down for off.

3 Intercom Box

3.1 This should be fastened with cable ties to a non-moving part of the trike (e.g. keel tube or frame). It must be secure enough that aircraft occupants couldn't inadvertently push it off.

3.2 This must be mounted within the pod, out of the airflow (obviously not possible if no pod is fitted).

4 Antenna

4.1 This must be either permanently secured to the aircraft, or attached using a locking mechanism (e.g. twist lock, wire locking) that can't come undone.

4.2 There must be no way in which it can rotate to come within 6" / 150mm of the propeller or exhaust.

4.3 It is recommended that the antenna is located at least 12" / 300 mm from the compass. In any case a check must be made that radio transmission does not deflect the compass.

5 Ground Plane

5.1 If fitted, the ground plane must be firmly secured so that there is no significant risk of it peeling-off.

6 Aircraft Weight

6.1 The last weight report must be checked to ensure that the additional weight of the installation won't put the aircraft overweight.

6.2 The inspector must make an amended weighing entry in the aircraft logbook.

What to do once you have fitted your radio

In conjunction with your inspector, fill in the form on pages 4 and 5 of this TIL, and return it to the BMAA. The BMAA will return this form to you, with the full modification approval number shown at the bottom of the page. This mod number must then be entered in the aircraft logbook. The mod number will also be needed on your permit renewal form (form BMAA/AW/001), otherwise your permit renewal may be refused.

It is acceptable to send in the form with your permit renewal form, noting in the modifications box 'TIL 101 submitted'.

Aircraft must be wholly owned by BMAA members. A BMAA Ownership Trustee Grid should be submitted with this form for syndicate, group and company owned aircraft.

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BMAA – STANDARD MINOR MODIFICATION CHECKLIST: TIL 101

Reg: G-_ _ _ _	Aircraft type:	Serial No:
Owners name[1]:		Owners BMAA No:
[1] *BMAA Aircraft Ownership Trustee Grid required for syndicate/group/company owned aircraft*		

Installation Details

Radio Make and Model		Radio Weight	g
Type Approval No.		Total Installation Weight	g

Tick one box per section

1. Radio	Handheld		4. Power Supply	Integral Battery	
	Panel Mount			Aircraft Power Supply	
2. Radio Location	Keel Tube		5. Antenna	Whip	
	Inside Side of Pod				
	Instrument Panel		6. Ground Plane	None	
				Airframe	
3. Antenna Location	Kingpost			Metallic Plate	
	Trike Frame			Metallic Tape	
	Attached to Radio				
	Aircraft Nose		7. Intercom Box	None	
	Bottom of Pod			Attached to Radio	
				Separate	

Safety Checks

CHECK	ACTION	COMMENTS	INSPECTOR'S INITIALS
1 All radio types			
1.1	Radio type approved and 8.33 kHz capable		
1.2	Radio inside cockpit & outside airflow		
1.3	Radio installation load tested		
1.4	Aircraft within weight limits – amended weight entry in aircraft logbook		
2 Hand-held radios			
2.1	Lanyard fitted		
2.2	Primary flight instruments not hidden		
2.3	Aircraft controls not restricted		
2.4	Entry and exit of aircraft not impeded		
3 Panel-mount radios			
3.1	Mounted in instrument panel - not primary structure		
3.2	Instrument panel strength (see section 1.4)		
4 Radios powered by aircraft power supply			
4.1	Circuit protected by appropriate fuse		

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CHECK	ACTION	COMMENTS	INSPECTOR'S INITIALS
4.2	Fuse rating placarded		
4.3	Power to radio can be switched off by pilot in flight (master switch acceptable)		
4.4	Switch function clearly placarded		
4.5	Switch down for off and placarded as such		
5 General installation checks			
5.1	Multi-strand cable used - adequate cable flexibility and current capacity		
5.2	All cable terminations properly made - no exposed conductor		
5.3	Cables and other components properly secured		
5.4	Quick-release fasteners used for de-riggable parts of airframe		
5.5	No holes or cuts made in airframe		
6 Antenna installation			
6.1	Secure and clear of propeller & exhaust		
6.2	Minimum 6" ground clearance (if under pod)		
6.3	Not in front of pitot, venturi or static source		
6.4	Ground plane secure (if applicable)		
6.5	Transmission does not affect compass		
7 Separate intercom boxes			
7.1	Intercom box inside cockpit & outside airflow		
7.2	Secure (load test required if > 100g)		
7.3	Primary flight instruments not hidden		
7.4	Aircraft controls not restricted		
7.5	Entry and exit of aircraft not impeded		

OWNER'S DECLARATION

I declare that the foregoing information is correct to the best of my knowledge and I will not change the installation design once approved.

Signed:	Name.	Date:

INSPECTOR'S DECLARATION

I declare that the foregoing information is correct and the installation is fit to be flown.

Signed:	Name.	Insp No:	Date:

This form must be sent with payment as per BMAA Online Shop (www.bmaa.org), and BMAA Aircraft Ownership Trustee Grid (if applicable) to*:- technical.office@bmaa.org

BMAA Office Approval: **(signed)** **(Name)**

Mod No.: G-_ _ _ _ / TIL101 / 20 _ _ / _ _ _ _ _ **(Date)**

**Whilst waiting for this form to be returned by the BMAA the aircraft may be flown for upto one calendar month from the Inspection date above. Once this form is returned to you signed please enter the full modification approval number above in your aircraft logbook and retain this sheet with your aircraft records.*