
STANDARD MINOR MODIFICATION – SIMPLE FLEXWING / FIXEDWING LANDING LIGHT
INSTALLATION

1. Introduction

- 1.1 Although not mandatory, landing lights can offer a potential safety benefit for microlight aircraft when flying in marginal visibility or poor light conditions. Nonetheless, poorly fitted lights can endanger an aircraft and thus formal approval of such installations is necessary.
- 1.2 Note that these 'Landing' lights are not intended to illuminate the runway (since flying at night is not permitted) but as an aircraft visibility aid.
- 1.3 This leaflet contains the required information to permit straightforward fitment of landing lights to both fixed wing and flexwing microlight aircraft. For simplicity, and to avoid potentially time consuming and expensive flight testing, only certain ways are permitted by this TIL. Aircraft operators wanting to seek another way of fitting landing lights to their aircraft should refer to other BMAA TILs for guidance, the full list of which is contained in TIL 001, and then submit a full modification application on form BMAA/AW/002.
- 1.4 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 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.

2. Applicability

- 2.1 This TIL is applicable to one or two landing lights being fitted to a microlight aircraft.
- 2.2 The only acceptable mounting positions for landing lights within this TIL are:
- Flexwing aircraft: on the front pod / instrument binnacle or on the main rear gear legs. (If mounted below the pod there must be at least 6" / 150mm ground clearance)
 - Fixed wing Aircraft: On the front pod / fairing / engine cowling, on the nose leg or main gear legs. (If mounted below the pod there must be at least 6" / 150mm ground clearance)
- 2.3 For this modification to be applicable, the aircraft must have an existing onboard electrical charging system.
- 2.4 When attaching this modification the light, or light bracket, must be secured to an existing tube via a jubilee clip and protective tape, be secured via an existing bolt hole or be bolted or riveted directly to a **non-structural** pod / fairing / cowling.
- 2.5 Only white lights pointing forwards may be fitted.
- 2.6 The maximum total 'installation' weight allowed is 0.5 kg.

3. Safety Precautions

- 3.1 No dangerous glare must be visible to the pilot.
- 3.2 No hot parts of the system must create a fire risk, e.g. by being positioned close to parts of the fuel system.
- 3.3 The power source should be routed via the Master switch and in addition a separate ON/OFF switch must be easily accessible to the pilot in flight.
- 3.4 The ON/OFF switch must be placarded giving its function and sense of operation. (Also it must be orientated down=off).

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- 3.5 A fuse of suitable rating must be installed (between 1.5 and 2 times maximum current draw).
- 3.6 The system must meet all requirements for operation and installation made by the lamp manufacturer or supplier.
- 3.7 The system must be secure and mechanically robust.
- 3.8 A maximum power rating of 60W for a single light or a combined total of 100W is acceptable.
- 3.9 The maximum continuous current draw on the whole system (without landing light) must be calculated or measured. The sum of the maximum continuous current draw on the system plus the maximum current draw from the landing lights must not exceed 60% of the maximum current available from the aircraft's generator.

When calculating the current draw on the system, in the absence of any other source of information, the typical maximum current values in table 1 may be used for common load types. Maximum electrical power outputs of common engine types are listed in table 2.

An example calculation:

One 50W light is to be fitted.

Current 4.17 A at 12 V (nominal) (using the equation Power [W] = Voltage [V] x Current [A]).

Fuse rating chosen to be 7 A (between 1.5 and 2 times maximum current draw).

15 A rated switch (greater than 2 times fuse rating).

All other hardware used rated 10A or greater (greater than fuse rating).

1.5 A existing current draw on system (1 A transceiver plus 0.5 A GPS).

5.67 A current draw on system post modification (existing 1.5 A plus 4.17 A light).

Aircraft powered by Rotax 582 therefore modification acceptable

(5.67A is less than 60% of 14 A).

load type	maximum current [A]
digital engine instruments	1.0
GPS	0.5
transceiver (max 5W transmit)	1.0
transponder	2.5

Table 1 – typical maximum current values for common load types

engine	maximum power [W]	maximum current [A]
Fuji-Robin* EC34PM/EC44PM	75	6
Hirth 2706	250	21
HKS 700E	210	17
Jabiru 2200	120	10
Rotax 2-stroke (447 and larger)	170	14
Rotax 912/914	250	21
Verner 133M	160	13

Table 2 – maximum electrical power outputs of engines in common use

*Fuji-Robin engines @5500 RPM

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4. Installation Notes

Cables must be securely attached to the airframe at intervals of 150 mm (6 inches) or less. Any cables bridging de-riggable parts of the aircraft must have quick release fasteners at the join.

Holes and cuts may be made in the aircraft's instrument panel as long as this is not a stressed item (part of the aircraft's primary structure). No other holes or cuts are permissible. The maximum allowable hole diameter is 30 mm. **If unsure about drilling or cutting holes, ask first!** (See TIL027 for general advice on instrument panels)

The 'installation', including any mounting brackets, cables and switches must be weighed and recorded in the Aircraft Log Book and its empty weight / c of g checked and updated.

A load test, using scales or a spring balance, to 9 times the light's weight (including mounting bracket) forwards, 4.5 times its weight up, 6 times its weight down, 3 times the weight port and starboard must be carried out.

5. What to do once you've fitted your Landing Light.

In conjunction with your inspector, fill in the form on pages 4 and 5 of this TIL, and return it to the BMAA with the application fee (as noted in the most recent copy of MF). 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.

It is acceptable to send in the form with your permit renewal form.

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 110

Reg: G-_____	Aircraft type:	Serial No:
Light make:	Type & Quantity:	Model & Power rating:
Owners name:	Owners BMAA No:	
<i>BMAA Aircraft Ownership Trustee Grid required for syndicate/group/company owned aircraft</i>		

Initial Information

Max Continuous Current Draw of existing equipment (prior to installation)	A
Calculated or Measured?	
Max Continuous Current Draw of existing equipment plus current draw of light(s)	A
Aircraft Generator Max Current, from table 2 (Fuji-Robin: 5500 rpm value)	A

Safety Checks

<u>CHECK</u>	<u>ACTION</u>	<u>COMMENTS</u>	<u>Inspector's Initials</u>
<i>1 Equipment being fitted</i>			
1.1	General condition		
1.2	Manufacturers manuals attached to POH		
1.3	Location – Confirm correct location as per TIL		
<i>2. Mechanical security</i>			
2.1	General security		
2.2	Weight being added (see below). Total installation not more than 0.5kg.		

	<u>Light 1</u>	<u>Light 2</u>	<u>Cabling/switches/etc</u>	<u>Total</u>
Weight	kg	kg	kg	kg
Test to 9 x weight fwds, confirm secure				
Test to 6 x weight downwards, confirm secure				
Test to 4.5 x weight upwards, confirm secure				
Test to 3 x weight sideways, confirm secure				

2.3	Weight reports in logbook / manual / placards to be adjusted.		
<i>3. Electrical Condition</i>			
3.1	Confirm all installations as per manufacturers instructions		
3.2	Cable type suitable for purpose (see note 1) and properly secured		
3.3	All cable terminations properly made, no exposed conductor.		
3.4	Adequate cable flexibility		
3.5	Switch accessible in flight and placarded		
3.6	Switch secure and down = off		

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3.7	Switch type correct (see note 2)		
3.8	Correct fuse (see note 3)		
3.9	Confirm total current draw <60% of generator output		
<i>4. Location - safety issues</i>			
4.1	Confirm no dangerous glare from light visible to pilot.		
4.2	Confirm white light and pointing forwards.		
4.3	No component which is hot when running (see note 4) may be within 150mm (6") of any fuel system component, fabric, electronics or other temperature sensitive materials.		
4.4	No "hot" component, power supply or cable connection may be below a fuel filler or drain.		
4.5	Confirm at least 6"(150mm) ground clearance.		
4.6	Confirm no holes drilled in primary structure.		
4.7	Confirm at least 13mm longitudinal clearance between propeller blades and light(s). For composite propellers there must also be 125 mm longitudinal clearance at the tips. (This can be assumed to increase linearly from 13mm at the root to 125mm at the tips)		
<i>5. Operational Checks – Static engine run with light(s) switched on for 10 mins</i>			
5.1	Confirm system functions correctly without blowing any fuses.		
5.2	Confirm no damage has been sustained to the light fixing surroundings due to heat from the light(s).		

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:

Inspectors DECLARATION

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

Signed:

BMAA Inspector #:

Date:

BMAA Member #:

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

BMAA Office Approval:

(signed)

(Name)

Mod No.: G-____ / TIL110 / 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.*

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Notes

- 1 All cables and components must be suitable for the current drain and be weatherproof. In addition all cables must be multi strand type.
- 2 The switch rating must be at-least twice the fuse rating.
- 3 The primary supply must be protected, close to it's source, by a fuse or contact breaker rated in accordance with manufacturers instructions. If no information is available, fuse should be between 1.5 and 2.0 times the maximum current draw.
- 4 Hot is defined as any component which whilst running is not comfortable to leave a hand resting against.