

WHITTAKER MW5D SORCERER

Issue 3 note added regarding trim tab spring 12.9.08

1. UK contact

Plans for all aircraft are available from:
M Whittaker, Appletree Cottage, Churchfield Road,
Clayton, Doncaster, DN5 7BZ. Tel 01977 643508

MW CLUB, Web: www.mwclub.org

2. Description

The MW5D Sorcerer is a single seat high-wing microlight aircraft, available as a set of plans for constructions by amateurs. Engines options include the Rotax 377, Rotax 447, Rotax 503 (throttle stop may be required) and Robin EC34PM or EC44PM engines.

The MW5A was a one-off prototype built through the BMAA system. The MW5B had a larger wing and tail area than the MW5A, and was built in numbers through the PFA. The MW5C model, which has also been built in numbers through the PFA, was essentially the same as the MW5B apart from the use of a fibreglass spring main undercarriage and deletion of the lower part of the rudder which had proven vulnerable.

The MW5K is a BMAA model, either kitbuilt or factory built, with tapered outer sections to the wing rather than plain parallel chord wings. PFA is not involved with the MW5K model.

Compared to the MW5B and C models, the MW5D incorporates a slightly reduced wing and tailplane area (similar to the MW5A prototype) which increases the wing loading for better handling qualities whilst keeping within the microlight wing loading definition at a MTWA of 615 Lbs. The MW5D Sorcerer also incorporates a modified wing rear spar attachment to the fuselage which allows the wings to be folded for storage, and allow one-person rigging.

All MW aircraft are constructed from readily available, mainly commercial materials such as HE30TF or 6061T6 aluminium alloy, and S514 or 4130 steel. The aircraft are assembled using pop rivets and bolts. There is a small amount of turning and milling of key components and also some welding in the undercarriage and control system. The wings are of mono-spar design, in which a single large diameter tube carries both bending and torsional loads. Plywood ribs with spruce cap strips are slid along the spar tube in a simple assembly jig and are attached with a fillet of chopped strand fibreglass and polyester resin making a strong and robust joint. Builders are required to proof load test sample rib/spar joints during wing construction. The undercarriage on the MW5D is unusual being derived from Sherpa van composite leaf springs! The all-flying tail surfaces slide onto spigots and are attached with a single clip.

In the absence of a manufacturers recommended schedule, LAMS should be used as a guide to required inspections and this is reflected in the checklist in Section 1 of the PFA's permit renewal application form. Engines should be maintained in accordance with the engine manufacturer's recommended maintenance schedule.

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3. Fast Build Kit 51% Compliance

Not applicable - plans built aircraft

4. Build Inspections

Build inspection schedule 9 (MW aircraft).
 Inspector approval codes A-A or A-W or A-M. Inspector signing off final inspection also requires 'first flight' endorsement

5. Build Manual

Build information is provided by a set of drawings available from the designer, Mike Whittaker.

6. Maintenance Manual

Nil. In the absence of a manufacturers recommended schedule, LAMS should be used as a guide to required inspections and this is reflected in the checklist in Section 1 of the PFA's permit renewal application form. Engines should be maintained in accordance with the engine manufacturer's recommended maintenance schedule.

7. Flight Manual

None known. In the absence of a Flight Manual, briefing by a pilot experienced on type is strongly recommended. PFA inspector Eddie Clapham tel 01454 412094 is particularly experienced on MW type aircraft, having completed much of the development test flying and test flown many examples.

8. Mandatory Permit Directives

None applicable specifically to this aircraft type, but note

MPD: 1998-019-R1 Flexible Fuel Tubing Applies to all permit aircraft

9. PFA Mandatory Modifications

163/MWC/0001	Tailplane pivot point (incorporated in issue B drawings)*
163/MWC/0002	Design update: issue B drawings *
163/MWC/0003	Anti-balance tab*
163/MWC/0004	Wing/tail spar rib joints*

- Changes are incorporated in D model drawings – included here for completeness only for those using older issue drawings

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10. Service Bulletins

- Nil known for airframe.
- For Rotax engines, there are many Rotax service bulletins dealing with a variety of important safety topics. Copies of the bulletins applicable to individual engines by engine serial can be downloaded directly from the Rotax website at <http://www.rotax-aircraft-engines.com> More information is available on www.skydrive.co.uk

11. Standard Options

163/MWC/0005	O	Under wing fuel tanks
163/MWX/0006	O	Rudder-elevator pivot blocks
163/MWC/0007	O	Fibreglass wing L/E
163/MWC/0008	O	Aluminium trailing edges
163/MWC/0009	O	Wheels and axles

Details of the above are available via the designer or the MW Club.

12. Special Inspection Points

- Refer to Rotax installation manual and Rotax installation checklist (available from Skydrive and PFA) for details of Rotax installation requirements, as drawings of aircraft do not include comprehensive engine installation details.
- With Robin engines, problems have been experienced with catastrophic failures of certain belt reduction drive units, leading to loss of thrust and potentially loss of propeller. If use of one of these engines is contemplated, consult PFA for details.
- With fan-cooled Rotax engined versions, corrosion of fan belt pulleys must be avoided as this causes very rapid drive belt wear and has been a common source of in-flight drive belt failure, leading to engine seizure through overheating.
- As with other low-cost microlights, you may find MW aircraft stored in less than ideal conditions, in which case you should be particularly wary of corrosion, fabric damage, rodent attack etc. Maintenance of the airframe is otherwise typical of a fabric-covered wood and metal airframe. Watch out for corrosion of tubing and on any unprotected aluminium parts, and loosening of rivets. Be wary of any signs of loosening or detachment of the bonded joints between wing and tail ribs and spars. Pay particular attention to short-lived items such as non-aeronautical fuel pipes, which will most likely need regular replacement.
- Many MW aircraft on the PFA fleet are over ten years old and are likely to be due for recovering - especially those which have been tied down outside, or those which have no proper UV blocker applied. Problems with premature loss of fabric strength were experienced on one MWs covered with 'Aerolene' - a one time popular fabric for this sort of application. A 'Bettsometer' can be used to check the fabric strength whilst doing minimal damage.

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- Ensure that the tailplane trim spring and its attachments are in good condition and are not worm or corroded or cracked. Failure of the trim spring can cause wild tab flutter and makes the aircraft very difficult to control, so it is essential these apparently minor components are kept in good shape. An MW club modification permits an alternative spring attachment to reduce the likelihood of wear developing in service, see newsletter 78/79 for details.

13. Operating Limitations and Placards

Maximum number of occupants authorised to be carried: One

The aircraft must be operated in compliance with the following operating limitations, which shall be displayed in the cockpit by means of placards or instrument markings:

Aerobatic Limitations

The aeroplane is permitted to fly only for non-aerobatic operation. In this context non-aerobatic operation includes:

- i) Any manoeuvre necessary for normal flying
- ii) Intentional stalls from level flight
- iii) Steep turns in which the angle of bank doesn't exceed 60 degrees

Intentional spinning is prohibited

Loading Limitations

Maximum Total Weight Authorised: 279 Kg (615 Lbs)

CG Range: 12.5 inches to 17.0 inches aft of datum.

Datum Point is: The leading edge of the wing.

Engine Limitations

Maximum Engine RPM: with Rotax engines: 6800.

with Robin engines: 7000

Airspeed Limitations

Maximum Indicated Airspeed: 80 kts

Other Limitations

The aircraft shall be flown by day and under Visual Flight Rules only.

Smoking in the aircraft is prohibited.

Additional Placard

"Occupant Warning - This Aircraft has not been Certificated to an International Requirement"

Fireproof identification plate must be fitted to fuselage, engraved or stamped with aircraft's registration letters.

As a microlight aircraft, additional microlight weight placard must be fitted as described in TL2.11 regarding empty weight and payload.

14. Additional Engine Limitations/Placards

With Rotax 447 engine: Max CHT: 260 (normal 190-230 deg C) max difference 20C

Max EGT: 650C (normal 460-580) max difference 25C

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<u>Model</u>	<u>Engine</u>	<u>Weight Max Gross</u>	<u>Weight Max Empty</u>
MW5D	Rotax 447	279 Kg	182 Kg with full fuel
MW5D	Rotax 503	279 Kg	178 Kg with full fuel

16. Special Test Flying Issues

If Rotax engine fitted, Rotax two-stroke flight test schedule to be completed.

In the absence of a Flight Manual, briefing by a pilot experienced on type is strongly recommended. PFA inspector Eddie Clapham tel 01454 412094 is particularly experienced on MW type aircraft, having completed much of the development test flying and test flown many examples.

With low-mounted fuel tank and high-mounted engine, the fuel pump on these aircraft has to raise the fuel through a considerable height and this can lead to fuel starvation or vapour-lock problems if the fuel system is not operating at maximum efficiency. Problems can be minimised by close attention to avoiding air-leaks in fuel pipe and pipe connections, cleanliness of filters, minimising restrictions to fuel flow and proper maintenance of pulse pump and pulse pump vacuum line.

Due to the lack of fixed fin or keel area on these aircraft, directional stability is low and care is required to maintain balanced flight at all times.

17. Control surface deflections

Ailerons	Up: TBD
	Down: TBD
Elevators	Up: TBD
	Down: TBD
Rudder	Left TBD
	Right TBD
Flap	Down N/A
Elevator tab	Up and down TBD

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18. Noise Certification

As a microlight aircraft, a noise certificate must be issued by the CAA specific to each individual aircraft built. A new noise certificate must be obtained following any change in noise output, including change to engine type, reduction gear ratio, propeller type, propeller pitch setting, type of exhaust, exhaust after-muffler or intake silencer.

Approved:



F.R. Donaldson
Chief Engineer

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