LAA TYPE ACCEPTANCE DATA SHEET TADS 164

WHITTAKER MW6, MW6S, MW6-LW AND MW6S-LW

Issue 2 note added about trim spring retention dated 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 MW6 range are two seat high-wing microlight aircraft, available as a set of plans for constructions by amateurs. Engines options include the Rotax 503, 532, 582, Hirth 2706 and Robin EC44PM engines. As the weight of the MW6 variants has grown considerably over the years, the higher power engines are recommended, otherwise the rate of climb may be marginal as a two seater.

The MW6 was the original tandem seat version, the MW6-S was a side-by-side seat derivative. Both were cleared with a max gross weight of 372 Kg. A modification was designed to allow the MW6 and MW6-S to be cleared to a higher max gross weight of 390 Kg, in which form they were designated MW6 (Modified) and MW6-S (modified). The modification consisted of extended wing tip and wide chord wing strut fairings, both of which were fitted to increase the effective wing area. A new wing was also designed with greater span, this also allowed the max gross weight to be 390 Kg without the need for wide chord strut fairings. With the longer span wing the aircraft was designated an MW6-LW or MW6S-LW.

Following the amendment of the microlight definition to the 450 Kg rules, a subsequent modification was developed to allow the MW6 (Modified), MW6S (Modified), MW6-LW or MW6S-LW to be cleared with a max gross weight of 415 Kg.

Following the adoption of the 450 Kg microlight rules which include minimum stall speed as an alternative to wing loading criteria, it was determined that the MW6 or MW6S could be cleared to 390 Kg without the need for the extended span wing tips or wide chord strut fairings, as the aircraft complied with the stall speed criteria without these extra appendages. .

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 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 LAA's permit renewal application form. Engines should be maintained in accordance with the engine manufacturer's recommended maintenance schedule.

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 LAA'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. LAA 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. LAA Mandatory Modifications

Four mandatory modifications are required by the LAA for acceptance of the type in the UK, as follows:

164/MWC/0001	Tailplane pivot point (incorporated in issue B of drawings)
164/MWC/0002	Design Update (incorporated at issue B of drawings)
164/MWC/0003	Anti-balance tab attachment
164/MWC/0004	Wing and tail spar/rib joints

10. Service Bulletins

Nil known. MW Club's newsletter ' Tubular Belles' provides advice on building and operating MWs, but Mike Whittaker has not promulgated service bulletins as such.

- 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

164/MWC/0005	Under wing fuel tanks
164/MWC/0006	Rudder and elevator pivot block
164/MWC/0007	MW6S side by side conversion
164/MWC/0008	Fibreglass wing leading edge
164/MWC/0009	Aileron cables in struts
164/MWC/0010	In-wing fuel tanks
164/MWC/0011	All-up weight increase to 390 Kg
164/MWC/0012	Aluminium trailing edges
164/MWC/0013	Wheels and axles
164/MWC/0014	390Kg Wing
164/MWC/0015	Increase in AUW maximum of 415 Kg

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 LAA) 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 LAA 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-lifed items such as non-aeronautical fuel pipes, which will most likely need regular replacement.

- Many MW aircraft on the LAA 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.

- Ensure that the seats fitted are of a robust type which will not shatter on impact in a heavy landing, as this can result in serious injuries or death in an otherwise survivable accident.

- Ensure that the seat harness attachments are exactly as specified on the drawings or to a scheme accepted individually by the LAA in writing. Incorrect seat harness attachments can result in serious injuries or death in an otherwise survivable accident.

- 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: Two
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
Intentional spinning is prohibited
Aerobatic manoeuvres are prohibited
Loading Limitations
Maximum Total weight Authorised: 372, 390 or 415 Kg depending on modification state
CG Range: 430 mm to 530 mm aft of datum.
Datum Point is: leading edge of wing
Engine Limitations
Maximum Engine RPM (Rotax and Hirth engines): 6800 (Max continuous 6500)
with Robin engines: 7000
Airspeed Limitations
Maximum Indicated Airspeed: 80 KIAS

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 503 engine: Max CHT: 250C (normal 180-220C) max difference 20C
Max EGT: 650C (normal 460-580C) max difference 25C

With Rotax 582 engine: Max CHT: 150C (normal 110-130C) max difference 10C
Max EGT: 650C (normal 500-620C) max difference 25C

15 Maximum Permitted Empty Weight

Maximum empty weight permitted depends on max gross weight of aircraft and fuel consumption of engine at max cruise power.

Model	Engine	Max Gross weight	Max empty weight
MW6 or 6S	Rotax 503	372 Kg	185 Kg
MW6 or 6S	Rotax 503	390 Kg	203 Kg (Caution–low rate of climb!)
MW6 or 6S	Rotax 503	415 Kg	228 Kg(Caution – low rate of climb!)
MW6 or 6S	Rotax 532	372 Kg	185 Kg
MW6 or 6S	Rotax 532	390 Kg	203 Kg
MW6 or 6S	Rotax 532	415 kg	228 Kg
MW6 or 6S	Rotax 582	372 Kg	182 Kg
MW6 or 6S	Rotax 582	390 Kg	200 Kg
MW6 or 6S	Rotax 582	415 Kg	225 Kg

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. LAA 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.

Check rate of climb meets Section S minimum of 250 ft/minute when loaded to maximum gross weight, especially with 503 engine fitted and maximum gross weights above 372 Kg. If rate of climb does not meet Section S minimum figure then lesser maximum gross weight must be determined which does meet the

climb requirement. Note however that to be cleared as a two seater it must also meet Section S payload requirements for a two seater.

Problems have been experienced in the past with the MW6 and 6S suffering marginal directional stability in flight, it may be necessary to fit stiffer rudder centering springs to correct this. This must be checked in carefully on individual aircraft during the test flights.

Some MW6 aircraft have also demonstrated weak pitch control centering leading to undesirable pitch stability – shown up by the failure of the aeroplane to return to the trim speed following a slight push or pull on the stick. If yours shows this characteristic, the addition of flettner strips to the tailplane trailing edges has been found to solve the problem. LAA inspector and MW6 builder Ian Bishop (01865 331441) has experience of this problem.

It is also particularly important to get Rotax engines set up with the correct mixture setting otherwise long engine life and engine reliability will be compromised. The EGT is the essential instrument for checking mixture strength and experimentation may be required to achieve satisfactory results. You need to keep a very close check on the EGT throughout the first few flights, particularly when throttled back – at full throttle the mixture is enrichened, so the critical condition is with partial throttle when the engine runs on the lean part of the needle.

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

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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