

DYN AERO MCR-01 CLUB

Issue 4 Correction to Max Coolant Temperature 9/3/2009
MPD 2008-002 and LAA MOD/301/020 added
Hand operated brakes option added
Control surface deflections added

1. UK contact

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2. Description

The MCR01 series is a single-engined two-seat monoplane design of composite construction, developed from the Colomban Ban-bi design, both designs having been developed in France. The Dyn-Aero MCR-01 Club variant of the aircraft is fitted with wings and tailplane of greater area and a different wing section to that of the original MCR-01 VLA variant and separate flaps and ailerons rather than combined flaperons. The Club variant was developed by Dyn-Aero as a less demanding to fly variant for less experienced pilots.

The fuselage is a two-part moulding, split horizontally, with a fin skin moulded integral with the upper fuselage half and the firewall integral with the lower half. A fuel tank is fitted between the instrument panel and the firewall. A one-piece canopy is fitted over the cockpit, hinged at the front, allowing straight-forward access to the side-by-side seating arrangement. The horizontal tail is in a T-tail arrangement on top of the fin, and is a one-piece all-flying surface, fitted with a trailing edge anti-balance tab. The wing is in two pieces and the wing panels are easily deriggable from the fuselage using a glider-style overlapping spar-tang design. The wing panels are fitted with large-span double-slotted flaps, and ailerons. This aircraft is fitted with a quick-disconnect on the flap operation system which allows the aircraft to be easily rigged and de-rigged without the need for independent inspection.

The aircraft has a fixed tricycle undercarriage.

The fuselage shell halves are manufactured from a multi-axial stitched carbon-fibre cloth and are moulded with an epoxy resin using the wet lay-up technique, vacuum bagged during cure for consolidation. Unidirectional carbon fibre stiffeners are used at the bottom and the top of the lower hull. These stiffeners form the longerons of the fuselage. The fuselage frames carrying undercarriage and wing attachments are manufactured from wood with carbon fibre faceplates. All other fuselage frames are +/- 45 degree carbon/epoxy/foam sandwich construction. Each wing panel has a box spar manufactured with +/- 45 degree carbon fibre shear webs and pultruded carbon-fibre/epoxy spar caps of variable thickness, the whole assembly being epoxy-bonded together under pressure. The root-rib of the wing is manufactured from stamp-moulded woven carbon-fibre/epoxy, while the remaining ribs are from 6mm thick PVC foam, close pitched to provide support against wrinkling for the one-piece sheet aluminium skins. The tailplane has a similar construction to the wings, although the skins are available manufactured from either woven carbon fibre or sheet aluminium. Either design of skin is acceptable. Carbon-fibre ribs are used at the centre of the tailplane to react torque loads into the control rod.

The vertical tail has upper and lower ribs manufactured from carbon-fibre, while the intermediate ribs are from PVC foam. The rear spar of the fin is manufactured from UD

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carbon caps with a +/-45 degree carbon-fibre shear-web. The rudder, flaps and ailerons are manufactured from a one-piece wrap-around aluminium skin with a PVC foam spar and carbon fibre ribs at point load attachments, with PVC foam intermediate ribs. The aluminium skin is bonded and riveted at the trailing edge. Woven carbon fibre skins are an acceptable factory option.

The main undercarriage is a one-piece carbon-fibre/glass/epoxy cantilever spring, while the noseleg is made up of telescopic steel tube.

The engine type accepted by the LAA on the Club is the Rotax 912-ULS, normally with ground adjustable Ecoprop 160R130/3 propeller (set at a pitch angle of 27 degrees measured at 75% radius) or variable pitch Arplast PV50 160R130/3 or MT Variable Pitch Propeller MTV-7-A/156-122.

3. Fast Build Kit 51% Compliance

The LAA technical leaflet TL.11 shows the contents of the accepted fast build kit.

4. Build Manual

Is provided on CD supplied by the manufacturer with the kit ref: MEXNO02

5. Build Inspections

Build inspection schedule 34 (Dyn Aero MCR 01).

Inspector approval codes A-A or AC-1 or K. Inspector signing off final inspection also requires 'first flight' endorsement.

6. Maintenance Manual

The Maintenance Manual ref: OEXNO0301. The latest version can be downloaded from www.dynaero.com

7. Flight Manual

The Flight Manual ref: OEXNO07. The latest version can be downloaded from www.dynaero.com

8. Mandatory Permit Directives

MPD 1999-013 Elevator Trim Tab Control.

This MPD refers to DGAC AD 1999-385 which in turn refers to Dyn-Aero Bulletin Service BS 20 1 0001. This requires removal of the tailplane and removal of the rod lower attachment to perform inspection of the rivets attaching the rod ends to the control rod. There should be no play. This inspection is required every 50 hours. See SPARS MPD Section. Owners should obtain a copy of BS 20 1 0001 from Lyndhurst Touchdown.

MPD 2005-013 Replacement Baumeister Flap Servo Motor.

With immediate effect on the issue of this MPD (31 December 05), use of the Baumeister flap drive motor fitted with the John Scott flap operating system is not permitted. An alternative, approved by the LAA, must be installed. See SPARS MPD Section. LAA letter to owners Mr Bishop, Greenwood and Scott re mod 11744 and MPD 2005-013 Baumeister Motor refers, also LAA MOD/301/019 refers.

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MPD 2005-014 Installation of Audible Stall Warner.

With effect from 31 December 05 all LAA Dyn-Aero MCR-01 aircraft must be fitted with an audible stall warning device. See SPARS MPD Section. LAA MOD/301/018 refers.

MPD 2008-002 Tailplane Attachment Failure.

With effect from 8th February 2008, the tailplane attachment brackets of all MCR-01 variants must be modified before further flight (LAA MOD/301/020 refers). The modification method used depends on the type of tailplane attachment brackets fitted to the aircraft.

MPD: 1998-019 – Flexible Fuel Tubing

This MPD applies to all LAA aircraft with flexible fuel tubing and requires inspection and logbook entry to record compliance at every Permit renewal inspection. See SPARS MPD and SPARS Procedures Sections.

9. LAA Mandatory Modifications / Inspections

MOD/301/001	Extra reinforcement of lap strap attachments. The seat belt attachments to the fuselage have been reinforced by laminating additional plies of carbon fibre over the aft ends of the bathtub fittings, to improve impact resistance. The seat-belt attachments to the fuselage have been reinforced by laminating additional plies of carbon fibre over the aft ends of the bathtub fittings, to improve impact resistance. Not required after Kit #130 as improvement incorporated as standard.
MOD/301/002	External door handles required. Factory optional external door handles or equivalent required to be installed. These should be easily opened from outside the aircraft without additional equipment.
MOD/301/003	N/A to CLUB version
MOD/301/004	Wire-lock the elevator anti-balance tab hinge pins, or use two M3 plain nuts locked together and Loctite adhesive.
MOD/301/005	Protect wooden cappings of wing spar tangs with varnish (or thin cope of dope followed by wax polish has been found satisfactory for ease of rigging/de-rigging). Procedure is now specified in the aircraft build manual.
MOD/301/006	Rudder horn / cable attach bolts must be retained by castle nuts and split pins rather than stiffnuts, as should any other bolts where rotation occurs around the bolt. Now factory standard.
MOD/301/007	Bolts replace blind rivets in tension for the attachment of the pitch control rod bracket to the leading edge of the tailplane. Now factory standard.
MOD/301/008	Placard seat adjustment to stress importance of proper engagement
MOD/301/009	Fit baggage compartment covers / FOD guard to prevent loose objects in cockpit jamming in flap system or rudder cables. Factory option or equivalent is mandatory. The system must be fitted between frames 4a, 4b, 5 and 6 and a guard must also be fitted to the pulley behind frame 6.
MOD/301/010	Quick release connector in pitot-static system (if fitted) to be of type acceptable to the LAA. An approved connector is available from Lyndhurst Touchdown Services, the UK kit agent.

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MOD/301/011	Fuel drain must drain fuel overboard. Factory standard on all models.
MOD/301/012	Pitch trim indicator to be fitted if pilot-controllable elevator trim tab is installed. N/A to CLUB model if factory standard bias spring pitch trim system fitted as provided the aircraft is correctly configured the control stick may act as the indicator, i.e. ensure that control stick neutral position is vertical prior to take-off.
MOD/301/013	Padding to be added to cockpit combing over instrument panel to provide protection from head injury in a forward impact.
MOD/301/014	Rivetting of trailing edges of controls and wing trailing edges, now factory standard ref 'Gammes de rivetage voilure et gouverne MCR-01'. Not required on carbon skinned control surfaces.
MOD/301/015	Flap deflection reduced to 35 degrees maximum
MOD/301/016	Engine mount diagonal brace – new reinforced part to be fitted
MOD/301/017A	To avoid possibility of control restrictions in flight, ensure adequate spanwise clearance exists between aileron and flaps – minimum 3mm.
MOD/301/017	Nose Landing Gear Check (ref Dyn Aero BS 05 L 0027)
MOD/301/018	Mandatory Stall Warning System Installation (ref Dyn Aero BS05 H 0026)
MOD/301/019	Flap Drive Motors Fitted to Modified MCR01 CLUB and MCR01 ULC Aircraft.
MOD/301/020	Replacement of tailplane attachment lugs.

10. Service Bulletins (latest list may be obtained from www.dynaero.com)

BS 20 I 0001	Tab Rod	14/09/99
BS 20 I 0001	Tab Rod	09/04/04
BS 20 I 0002	Main landing gear wheel bolts	21/09/99
BS 20 I 0003	Main landing gear silentblocs	21/09/99
BS 20 I 0004	R912 air intake security valve fixing	21/09/99
BS 20 I 0005	Seat belts attachment bracket reinforcement	21/09/99
BS 20 B 0006	Tailplane stiffener plate riveting check	14/02/00
BS 20 B 0007	Flap control system play control	16/02/00
BS 20 C 0008	JPX (BS CSB 662A) Magneto capacitors	30/03/00
BS 20 F 0009	Capacitor wiring	05/06/00
BS 20 F 0010	Flap control system	30/06/00
BS 21 K 0011	Flap carriage electrical stop installation	05/12/00
BS 21 F 0012	Tailplane trim carriage	29/06/01
BS 22 I 0013	Unleaded gasoline operation	07/09/01
BS 22 I 0014	Flap leading screw modification	07/09/01
BS 22 E 0015	Flap lead screw universal joint split pin Control	27/05/02
BS 03 A 0016	Control (replacement) of frame 12 elevator Control bellcrank	06/01/03
Ge062-4S	Portion of assembly instructions of fin Rod cut out	06/01/03
BS 03 C 0017	Main landing gear drum brake control	10/03/03
BS 03 K 0018	Check of the rivet of the canopy locking System	12/11/03
BS 03 K 0019	Check of seat support MCR4S	15/01/04
BS 04 D 0020	Check of adhesive tapes covering Parachute straps	23/04/04

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BS 04 F 0021	Clearance check between wheel and main Landing gear	14/06/04
BS 04 F 0022	Two seater MCR main fuel tank leak	14/06/04
BS 04 F 0023	Installation of flap control system	29/06/04
BS 05 I 0024	CO ratio control	21/09/04
BS 05 I 0025	Corrective actions in case of CO ratio Greater than regulation limit	21/09/04
SI 05 L 0003	Ignition key-switch ACS A-510-2	20/12/04
BS 05 H 0026	Stall warning system installation	31/08/05
BS 05 J 0027	Front landing gear leg check	10/10/05
BS 06 C 0028	Carburettor air intake manifold check	20/03/06
BS 06 L 0030	High lift device (ULC Flaps)	09/01/07

For Rotax 912 series 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

- The tailplane skins and control surface skins are available manufactured from either woven carbon fibre or sheet aluminium. Either design of skin is acceptable.
- An alternative flap system option is available, designed by Mr John Scott. When fitted with this flap system, modifications are also required to the pitch trim system, because the modified flap operating system displaces the normal location for the trim drive system between the seats. LAA must be consulted if this alternative flap system is planned.
- Quick release flap system connection, reference OPLPAU0.
- Hand operated hydraulic brakes.

12. Special Inspection Points

- Undercarriage noseleg for signs of damage. The noseleg is rather fragile in appearance and should be checked for distortion / damage particularly following any heavy landing. (ref Dyn Aero BS 05 L 0027).
- Security of fixed noseleg lower bush. Hold down tail of aircraft to raise nosewheel off the ground, and attempt to rock the nosewheel fore and aft, looking for signs of free play.
- The flap system is unusually complicated for an aircraft in this category, consisting of electric motors, pulleys and toothed drive belts. The system needs careful attention to maintenance and inspection to preserve the integrity of the system. Any failure which causes asymmetric flap operation would cause serious control problems in flight and must therefore be avoided at all cost.
- Problems have been experienced with failure of the very lightweight engine mount cross brace. Possibly due to engine shake during start-up and shut-down. The condition of the engine mounting cross brace must be monitored carefully in service for any signs of cracking or bending, and repaired or replaced immediately if damage

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is found. The Engine mount and cross brace must be painted white and flexible type coatings avoided, otherwise cracks may not be visible before a complete failure occurs.

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: 490 Kg

CG Range: 192 mm to 384 mm aft of datum point.

(refer to Dyn Aero weight and balance envelope)

Datum Point is: a point 13.5 mm forward of the left wing leading edge at root
(which is the mean of leading edges of port and starboard wings)

Engine Limitations

Maximum Engine RPM: 5800

Maximum continuous RPM: 5500

Airspeed Limitations

Max Indicated Airspeed: 162 kts (300 Km/hr)

Max indicated airspeed flaps extended 0-17.5 degrees: 89 kts (165 km/hr)
18-35 degrees: 68 kts (125 km/hr)

Max airspeed rough air (Vno) – Kit #204 and after: 128 kts (238 Km/hr)
Kits prior to #204: 109 knots (202 km/hr)

Other Limitations

The aircraft shall be flown by day and under Visual Flight

Rules only.

Smoking in the aircraft is prohibited.

Cockpit placard to be fitted stating 'This is a high performance aircraft and it is recommended that

pilots unfamiliar with this class of aircraft should undergo type conversion training prior to flying as pilot in command.'

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.

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14. Additional Engine Limitations/Placards

With Rotax 912-UL engine:

Maximum CHT: 150C

Max Coolant Temp: 120C (with 50/50 Glycol/water coolant)

Oil Temp Limits: 50C to 140C (Normal 90-110C)

Oil Pressure 2-5 Bar

Minimum Fuel Pressure: 0.15 bar

With Rotax 912-ULS engine:

Maximum CHT: 135C

Max Coolant Temp: 120C (with 50/50 Glycol/water coolant)

Oil Temp Limits: 50C to 130C (Normal 90-110C)

Oil Pressure: 2-5 Bar

Minimum Fuel Pressure: 0.15 bar

15. Maximum Permitted Empty Weight

<u>Model</u>	<u>Engine</u>	<u>Max empty weight</u>
MCR-01 Club	Rotax 912-ULS	305 Kg
MCR-01 Club	Rotax 912-UL	308 Kg

16. Special Test Flying Issues

- Rotax 912 Flight test schedule. VP prop schedule if VP prop fitted.
- Because of the high performance of this aircraft, and the associated limitations concerning the maximum rough airspeed (VNO), pilots must be educated as to the significance of the yellow arc marking on the ASI. The majority of homebuilt aircraft are not limited by a rough airspeed. In view of this, and other high performance issues, a placard has been called for to advise pilots of the need for proper conversion training before flying an aircraft of this type.
- During flight testing it was noted that the factory pitch trim range was excessive, and a procedure has been written reference 'G-CCMM Trim Limit Setting' dated 19 January 2004 to establish satisfactory trim limits.
- On the basis of the analysis provided, LAA were not satisfied that the flap hinges are adequate for the loads on the flaps when fully deflected at the 165 km/h flap limiting speed suggested by Dyn-Aero. In order to restore adequate safety margins, the maximum permitted flap travel has been restricted to 35 degrees and the maximum permitted airspeed with flaps deflected above 17.5 degrees reduced from 165 km/h to 125 km/h.

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- The first UK example G-LMLV was fitted with early style tailplane attachments which resulted in limiting the maximum speed in rough air, VNO to 202 km/hr. The first aircraft in the UK to be fitted with reinforced tailplane attachments is Dyn-Aero kit number 204. This and later aircraft have their VNO set to 128 knots (238 km/h) as quoted in the standard Dyn-Aero flight manual for the type.

17. Significant Airworthiness Approval Notes

LAA-301/410 Supplement 1 Issue 1
Issue 2

Initial Type Acceptance.
Increased VNO and updated modification list.

18. Control surface deflections

Refer to Build Manual for travels, except as follows:

Ailerons	Up: 20° ($\pm 1^\circ$)
	Down: 10° ($\pm 1^\circ$)
Tailplane	Up: 10° ($+2^\circ/-0^\circ$)
	Down: 3.5° ($+1^\circ/-0^\circ$)
Rudder	Left 20° ($+0^\circ/-2^\circ$)
	Right 20° ($+0^\circ/-2^\circ$)
Flap	Down 35° ($+0^\circ/-1^\circ$)

Approved :



F.R. Donaldson
Chief Engineer

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