LAA TYPE ACCEPTANCE DATA SHEET
TADS 187
ZENAIR CH 701 UL & CH 701 STOL

Issue 5	Revised format, updated information and addition of STOL variant	Dated 13/12/17	JP

This TADS is intended as a summary of available information about the type and should be used during the build, operation and permit revalidation phases to help owners and inspectors. Although it is hoped that this document is as complete as possible, other sources may contain more up to date information, e.g. the manufacturer's website.

Section 1 contains general information about the type.

Section 2 contains information about the type that is **MANDATORY** and must be complied with.

Section 3 contains advisory information that owners and inspectors should review to help them maintain the aircraft in an airworthy condition. If due consideration and circumstances suggest that compliance with the requirements in this section can safely be deferred, is not required or not applicable, then this is a permitted judgement call. This section also provides a useful repository for advisory information gathered through defect reports and experience.

Section 1 - Introduction

1.1 UK contact

Metal Seagulls

Tel: 07502 593671 or 0121 3644437
Email: info@metalseagullls.co.uk
Website: www.metalseagulls.co.uk

Manufacturer's website: www.zenair.com

1.2 Description

The Zenair CH 701 UL is a small two-seat high-wing STOL microlight aeroplane of all riveted metal construction. The cabin area upper frame is a welded steel tube assembly, the rest of the airframe structure being of aluminium. Originally, the aircraft were manufactured by Zenair in Canada and under licence by the Czech Aircraft Works in the Czech Republic. The kit is now produced and marketed by the Zenith Aircraft Company of Mexico, Missouri. The licence agreement with the Czech Aircraft Works was terminated in 2006.

The aircraft is supplied in the UK in standard or quick-build kit form through Metal Seagulls and can be built from plans or from a kit, both types have been approved for build by the LAA.

Over the years there have been a number of similar Zenair clones produced around the world and factory built Zenairs are manufactured through the Ontario-based company and through an agreement with a company in Alabama. Only the genuine Zenair kits are eligible to be operated under an LAA Permit to Fly.

The aircraft was designed for rough field operations and incorporates a number of features to assist with this mission: the wing is a high-lift design with full span, fixed, leading edge slats, full span flaperons, an all flying rudder and large tires.

The undercarriage is of a nose wheel configuration with a single, aluminium leaf spring for the main gear and a nose wheel strut that uses a single heavy duty bungee for

shock absorbency. Steering is via a direct linkage to the rudder pedals. Hydraulic disc brakes are fitted to the main wheels.

The flaperons are actuated by pushrods and bellcranks from a single, centrally mounted control column. The elevators and rudder are operated by stranded steel control cables.

The wings are reasonably easy to remove and there is also a folding wing option available that can be retrofitted to completed aircraft.

The only standard engine models currently approved in the UK for use in the CH 701 UL are the Rotax 912 UL and Jabiru 2200A. The Verner 1400 engine has also been accepted on a one-off basis. The latest kits have an option to use the UL Power engine although there are no CH 701 UL's flying yet in the UK with this engine.

Various manufacturers' propellers have been approved by LAA Engineering for installation on the CH 701 UL including Ecoprop, GSC, GT, Ivoprop, Warp Drive and Woodcomp.

Note that the only propeller(s) approved for an individual aircraft are those listed on the individual aircraft's Operating Limitations document or in the PTL/1 (Propeller Type List) for the type.

The CH 701 UL is classes as a Microlight Aeroplane with a maximum gross weight of 450 kg. It is a development of the standard CH 701, which includes several structural reinforcements and other changes (see below) to comply with Section S requirements at 450 kg maximum gross weight. The CH 701 STOL may be an SEP (Group A as was) aircraft with a MAUW of 460 kg although a number remain at 450 kg.

Section 2 – Mandatory information for owners, operators and inspectors

At all times, responsibility for the maintenance and airworthiness of an aircraft rests with the owner. Condition No 3 of a Permit to Fly requires that: *"the aircraft shall be maintained in an airworthy condition".*

2.1 Fast Build Kit 51% Compliance

The technical leaflet TL 1.11 shows the contents of the accepted fast build kit. Note that it is essential that the closing skins of the fuselage and flying surfaces are supplied in un-riveted condition so that the inspector is able to inspect the 'open' assemblies and so that the builder is tasked with riveting these skins in place as part of the 'major portion' requirements.

2.2 Build Manual

The kit is supplied with a set of blue prints of the entire airframe assembly and individual parts as well as an assembly manual. In addition, there is a 'photo assembly guide' supplied on a CD-ROM.

2.3 Build Inspections

Build inspection schedule (metal aircraft).
Inspector approval codes A-A or A-M or K. The inspector signing off the final inspection also requires 'first flight' endorsement.

2.4 Flight Manual

Zenair does not provide a flight manual for their kit built aircraft designs. They cite the fact that that each kit built aircraft may perform slightly differently to another due to the various engine, propeller and equipment options that are available.

Some owner/builders have produced their own flight manuals and Zenair do make these available for reference purposes to other owner/builders through a password-protected online Builder Resource area.

2.5 Mandatory Permit Directives

No MPDs are applicable specifically to this aircraft type but check the LAA website for other MPDs that are non-type specific (TL 2.22).

2.6 LAA Required Modifications (including LAA issued AILs, SBs, etc)

Two modifications were required by the LAA for acceptance of the type in the UK, as follows:

MOD-187-001	'Home-made' cable tensioners 7.C.6.2 are to be replaced by conventional aircraft turnbuckles. The previous UK Zenair importer, Lewis Aviation Sales supplied the turnbuckles with UK kits. The current assembly drawings appear to show these turnbuckles are now standard from the factory.
MOD-187-002	Flaperon deflection limitation has been introduced to the first stage of flap, giving a maximum deflection of 16 degrees, by modification to gate item 7.C.3.3.

In addition, the following bulletins have been issued by LAA:

MOD-187-003	There has been one reported instance of cracks discovered in both front right-angled tailplane mounting brackets on a LAA CH-701. The hairline cracks were not easy to spot even though one crack stretched from the bolt hole to the bottom edge of the bracket. A thick coat of flexible paint may conceal such cracks altogether. A good visual inspection at every pre-flight of these brackets is recommended. In case of cracking, do not fly, contact LAA. A full copy of this information was sent directly to all owners of affected aircraft during March 2002, and is otherwise available from LAA on request.
MOD-187-004	Zenair 701 Fuel Cocks (Andair FS20 fuel cock to be fitted if stops or detents not satisfactory with existing fuel cock). It has been found that fuel cocks fitted to certain Zenair CH 701 aircraft are not provided with effective stops or detents. This bulletin mandates fitment of fuel cocks that do meet the requirements. Note: this bulletin is the same as MOD/162/008 applying to Zenair 601 series).
MOD/Prop/04-005	This concerns a mandatory change to Woodcomp Klassic Propellers to replace any blades prior to serial number 600.

The following mandatory changes/upgrades are required by the LAA to enable the original CH 701 to qualify as the CH 701 UL model (these were originally specified by CZAW when they were involved with Zenair aircraft):

1. Wing strut attachment bolts increased to AN6 size
2. Wing spar root fitting material change to 2024-T3
3. Additional diagonal jury struts fitted
4. Elevator central hinge bracket increased to 0.090" thick
5. Control column wall thickness increased to 0.049"
6. Control column bottom bearing bolt increased to AN4 size
7. Rudder top hinge, material change to 4130N
8. Shoulder harness attachments increased to 0.049" gauge and rivet pattern changed (seven A5 rivets)
9. Lap strap attachments increased to 0.049" gauge and rivet pattern changed (seven A5 rivets)
10. Undercarriage attach bolts changed to AN6
11. Baggage restraint added
12. All self-locking nuts subject to angular motion replaced with castle nuts and split pins

2.7 Additional engine operating limitations to be placarded or shown by instrument markings

Notes:

1. Refer to the engine manufacturer's latest documentation for the definitive parameter values and recommended instruments.
2. Where an instrument is not fitted, the limit need not be displayed.

With Rotax 912 UL engine:

Maximum CHT: 135°C
Max Coolant Temp: 120°C (with 50/50 Glycol/water coolant)
Oil Temp Limits: 50°C to 130°C (Normal 90-110°C)
Oil Pressure: 2-5 Bar
Minimum Fuel Pressure: 0.15 bar

*Note: Originally, the Rotax 912 used Cylinder Head Temperature to monitor coolant temperature. More recently, following a change in cylinder head design, the parameter is now termed Coolant Temperature. This applies to engines with a -01 suffix. Further information can be found in Rotax Service Bulletin SB-912-066

With Jabiru 2200A:

Max CHT: 210°C
Oil temp: 50-110°C
Oil pressure 125-525 kPa @ 3100 RPM

2.8 Control surface deflections

Ailerons	Up	15° ±1°
	Down	15° ±1°
Elevators	Up	32° +3°/-0°
	Down	28° +2°/-0°
Rudder	Left	23° ±2°
	Right	23° ±2°
Flap	Up	0°
	Land	16°
Elevator tab	Up	Not specified
	Down	Not specified

2.9 Operating Limitations and Placards

1. Maximum number of occupants authorised to be carried: Two
2. 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:

2.1 Aerobatic Limitations:
Aerobatic manoeuvres are prohibited
Intentional spinning is prohibited

2.2 Loading limitations
Maximum Total Weight Authorised: 450 kg
CG Range: 10.0 inches to 18.0 inches aft of datum
Datum Point is: the leading edge of the wing slat at rib 1

2.3 Engine Limitations
Maximum Engine RPM: Rotax 912 UL: 5800
Maximum Engine RPM: Jabiru 2200A: 3300

2.4 Airspeed Limitations
Maximum Indicated Airspeed: 110 mph
Maximum Indicated Airspeed, flaps extended: 60 mph

2.5 Other Limitations
The aircraft shall be flown by day and under Visual Flight Rules only
Smoking in the aircraft is prohibited

Additional Placards:

“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.

2.10 Maximum Permitted Empty Weight

Model	Engine	Max Empty Weight
CH 701 UL	Rotax 912 UL	268 kg
CH 701 UL	Jabiru 2200	268 kg

Note: The longitudinal levelling datum is the upper fuselage tubes in the cabin

Section 3 – Advice to owners, operators and inspectors

3.1 Maintenance Manual

Zenair do not produce a maintenance manual for the CH 701 UL or CH 701 STOL. Reference should therefore be made to the LAA Generic Maintenance Schedule which is detailed in TL 2.19. For airframe rigging information, consult the build manual and drawings.

For engine maintenance, consult the relevant engine manufacturer's schedule which is often available for download from the manufacturer's website.

3.2 Standard Options

The listing below shows the factory options that have been accepted by the LAA:

1. Wing tanks (wing tanks must be fitted with fuel gauges and finger strainers)
2. Folding wing option
3. Zenair elevator vortex generator kit
4. Two types of main undercarriage are available: standard and tundra
5. 21" tyres for additional ground clearance. Note: due to the additional drag and weight from these tyres, this option would be more appropriate to installation on the higher performance (ie more powerful) variants.

5.3 Manufacturer's Information (including Service Bulletins, Service Letters, etc)

The Zenair factory provides updates and continuing airworthiness data through their Builder Resource online facility. This does require an owner/builder to register in order to be able to access the data.

Zenair Europe does have some Service Bulletins and Service Letters for download from their website, without registering.

The Zenair factory provides 'News from the Zenair Factory' on their website.

Engine and equipment continuing airworthiness data should be obtained from the relevant manufacturer. Many manufacturers provide access to the continuing data online.

In the absence of any over-riding LAA classification, inspections and modifications published by the manufacturer should be satisfied according to the recommendation of the manufacturer. It is the owner's responsibility to be aware of and supply such information to their Inspector.

3.4 Special Inspection Points

1. Check that the LAA modification upgrades for CH 701 UL model and are incorporated (see above)
2. Check for cracks in the tailplane attachments in service (refer to LAA bulletin MOD-187-003)
3. Check for cracks at the base of rudder pedals (Zenair letter dated 17.02.98 refers)
4. Elimination of undue friction in rudder control system and nose wheel steering. In order for the rudder to self-centre in flight and for the aircraft to meet normal directional stability requirements, it is essential to avoid undue friction in the rudder controls. This involves attention to the lubrication of the system, avoiding over-tight fits and the correct setting up of the rudder cable tensions. The rudder cable tension check should be carried out with the aircraft jacked up so that the nose wheel is off the ground to simulate the flight case.
5. Elimination of undue friction in the elevator control system. It is important to avoid undue friction in the elevator controls. This is achieved through proper attention to lubrication, avoiding over-tight fits and correct elevator cable tensions.
6. The throttle spring on the carburettor must be adjusted so that the system does not have a strong tendency to spring to 'full throttle' when the throttle knob is released, or require a strong pull to keep it in the closed position.
7. If a Rotax engine is fitted, the Rotax 912 series installation checklist is to be completed (apart from flight test section) as part of final inspections prior to applying for the Permit to Fly.
8. Ensure that any self-locking nuts subject to angular motion are replaced with equivalent castle nuts and split pins.
9. Widespread use is made of Avex rivets using riveting techniques specially developed by Zenair and not applicable to other types of aircraft including use of Avex blind countersunk rivets into non-countersunk holes and solid rivets set using flat dolly on a mushroom head. Zenair permit the use of non-radiused (sharp-corner) aluminium angle extrusions for primary structure (contrary to normal aviation practise using radiused material) and inspectors should be vigilant for the appearance of cracks in such structure.
10. Care is required in interpreting the drawings, the dimensioning being vague in some areas with a possibility of errors creeping in on such major features as the location of the firewall bulkhead. Anticipate later construction stages and check dimensions/fit of parts carefully, prior to bending, cutting or drilling.
11. Care must be taken to avoid warps in the wings as once the wing skins are 'drilled-off', any warps are there for the duration.
12. For UK-built examples it is recommended that suitable corrosion protection of aluminium airframe is carried out throughout, e.g. epoxy primer on aluminium parts and assembly compound where steel parts are assembled to aluminium parts.
13. Refer to construction manual for information concerning rigging and control surface range of movements. Take care to minimise operating friction in flying controls by careful attention to hinges, cable tensions, lubrication etc.
14. The correct rigging of wing slats per drawing sheet 7S2 is critical.

15. Maintenance typical of riveted aluminium airframe (see CAA CAP 562 Leaflet 51-50 'Inspection of metal Aircraft Structures').
16. Only reported snag is crazing and cracking in the sharply-bent upper corners of the windshield.
17. Pay attention to simple metal-to-metal bearings in control systems, undercarriage etc which are to be kept well lubricated and checked in particular for signs of wear. Some builders have opted to fit improved bearing materials for better wear characteristics, although this is not mandatory.
18. Plastic nose wheels, if fitted, are to be checked carefully for any signs of overstress/failure/melting of the hub.
19. Earlier type mainwheels utilised welded on brake drums which should be inspected carefully and treated with caution.
20. The build manual is not detailed regarding engine installation and inspectors should take care to check that standard UK practices have been followed with regard to engine installation, fuel system etc. Refer to Rotax installation checklist or other engine installation manual as appropriate.
21. The CH 701 UL is a very lightweight aircraft and heavy and complex instrument/avionic fits should be avoided, otherwise performance and payload will be compromised.

3.5 Special Test Flying Issues

1. Check that there is an adequate rate of climb and engine cooling if the Jabiru 2200A engine is fitted.
2. With the Jabiru engine, encourage test pilot to work the engine quite hard to avoid glazed piston bores, vary rpm settings and do not fly at low power settings for too long.
3. No reported difficulties except for high sink rate and 'aileron' adverse yaw when full (32 degree) flap was used, which could lead to control difficulties.
4. Regarding the STOL Variant, it should be noted that this is a STOL aeroplane with low wing loading (practically a microlight) hence those whose previous experience has only been on higher wing-loading aircraft will need a thorough 'dual check'. Particular care is required on windy days, especially with crosswinds.

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Please report any errors or omissions to LAA Engineering: engineering@laa.uk.com