

## CLUTTON FRED SERIES 2, 3

Issue 4			
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**Section 1 - Introduction**1.1 UK contact

There is no UK contact.

Drawings are available from the designer: Eric Clutton, 913 Cedar Lane, Tullahoma, TN 37388, USA. Email:

Email: [doctordiesel@cafes.net](mailto:doctordiesel@cafes.net)

Website: [www.cluttonfred.info](http://www.cluttonfred.info)

1.2 Description

The Fred (Flying Runabout Experimental Device) is a small, single-seat, all-wood, parasol monoplane with fabric covered fuselage and flying surfaces. The wings are designed to fold for road towing. It is available in the form of a set of drawings for amateur construction. The Series 2 model is the original version released as a set of plans (to differentiate it from the original Series 1 prototype). The Series 3 is the latest plans set which differs in showing a controllable elevator trim tab, quick-release aileron controls, reduced span tailplane, optional swept forward undercarriage, optional dihedral and optional reserve fuel tank.

The VW engine is standard, of between 1500cc and 1834cc capacity – 1834 cc being preferred for performance reasons. The Continental A65 engine has also been used, although giving better performance but at the expense of payload, due to the heavier engine weight. Despite its small size and light weight, all FREDs are SEP Aeroplanes, not microlights.

Alternative rounded or angular shape all-moving rudder designs are shown on the drawings. Due to poor directional stability with the all-moving rudder, an alternative arrangement with a fixed fin and conventional rudder (either rounded or angular type) has been cleared by the LAA, and is strongly recommended. Drawings of the fixed fin modification are available from the LAA.

**Section 2 – Mandatory information for owners, operators and inspectors**2.1 Fast Build Kit 51% Compliance

Not applicable to plans built aircraft.

2.2 Build Manual

No build manual is provided, but the construction drawing set provides all of the required information. The drawing set consists of the following:

Sheet 1	General assembly	Sheet 15	Rudder controls
2	Wing ribs	16	Elevator controls (front)
3	Fuselage basic	17	Elevator controls (rear)

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4	Fuselage detail	18	Tailplane fittings
5	Top decking	19	Flying wires and fittings
6	Rudder	20	Firewall and fairing
7	Tailplane	21	Fuel system
8	Wing assembly and spars	22	Tailskid and pitot
9	Wing root fittings	23	Rigging and balance
10	Engine mount and cabane	24	Road fittings
11	Undercarriage	25	Optional extra fuel tank
12	Stick assembly	26	Wing and undercarriage fairings
13	Aileron controls (fuselage)	27	Cabane bracing
14	Aileron controls (wing)		

2.3 Build Inspections

Build inspection schedule 1 (wooden aircraft).

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

2.4 Flight Manual

Nil. An information pack available from LAA Engineering includes details of flying characteristics.

2.5 Mandatory Permit Directives

None specifically applicable to this aircraft type.

Also check the LAA website for MPDs that are non-type specific (TL2.22).

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

Nil.

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

Refer to the engine manufacturer's latest documentation for the definitive parameter values.)

With VW engine:      Max CHT: 225°C  
                               Max EGT: 800°C  
                               Max oil temp: 90°C  
                               Min oil pressure: 2.5 kg/cm<sup>2</sup> at 3000 rpm

2.8 Control surface deflections

Not available.

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2.9 Operating Limitations and Placards

(Note that the wording on an individual aircraft's Operating Limitations document takes precedence, if different.)

1. Maximum number of occupants authorised to be carried: one
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: 770 lb \*  
CG Range: 15 inches to 21 inches aft of datum  
Datum Point is: leading edge of the wing
  - 2.3 Engine Limitations  
Maximum Engine RPM: 3300.
  - 2.4 Airspeed Limitations  
Maximum Indicated Airspeed ( $V_{NE}$ ): 92 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"

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

\* Max gross weight may be increased to 800 lb subject to climb performance exceeding the CS-VLA minimum requirement of 390 ft/min at max gross weight, standard day conditions.

2.10 Maximum permitted empty weight

Fuel tank contents may vary slightly between examples so it is not possible to define a universal maximum empty weight. With full fuel tank, aircraft must be able to carry a pilot weighing 170 lb without exceeding max permitted gross weight.

**Section 3 – Advice to owners, operators and inspectors**3.1 Maintenance Manual

Nil. In the absence of a manufacturer's schedule, recommend using LAMS schedule. See TL2.19.

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### 3.2 Standard Options

Angular or rounded shape all-moving rudder.

Angular or rounded conventional rudder with separate fixed fin (recommended).

Increased max gross weight of 800 Lbs (subject to climb performance).

Swept forward main undercarriage for use with wheel brakes.

2 ½" wing dihedral.

Reserve fuel tank (subject to weight considerations).

Controllable elevator trim tab.

Firewall location moved to suit direct firewall-mounted VW engine, avoiding welded engine mount.

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

Nil.

### 3.4 Special Inspection Points

- With the VW engine, the design of the conversion is to be agreed with LAA Engineering as there is no standard design. 'Peacock' VW conversion drawings are available from LAA Engineering, but these drawings are now many years old and not all parts called up are still available. A dual ignition system (of an accepted type) is required. LAA VW Engine Build checklist to be completed during build up of engine to record critical measurements. Refer to SPARS section on VW engines. An oil cooler will almost certainly be required, and careful ducting to achieve adequate cylinder cooling. Compression ratio must be set up (usually no more than 8.0:1) using choice of cylinder base shims if required. With 1834cc conversions, failing to use base shims usually results in excessively high compression ratio and consequent excessively short engine life.
- With VW conversions, if gravity fuel feed is used, check gravity flow from downstream side of carburettor float valve (by removing float chamber bowl or float chamber drain plug) rather than at carburettor fuel inlet. If an automotive carburettor (e.g. Stromberg CD150) is used with gravity feed, the carburettor float valve is often found to provide inadequate or very marginal flow. This is because automotive carburettors are set up for use with a pump-fed installation not gravity feed. The fuel pressure from a pump allows a carb float jet of only about 1.5 mm diameter to be used: this restricts the flow too much with the much lesser fuel pressure in a typical gravity fed system. This is a common cause of lean running and engine failure. This is cured by fitting a larger diameter jet to the float valve, (typically 2.5 to 3mm diameter) or carefully opening up the existing jet and lapping it in with a household brass polish.
- With VW engines, the quality of fit of propeller hub on the crankshaft nose is critical to the security of propeller mounting in flight.

### 3.5 Special Test Flying Issues

- The engine installation must be closely monitored for adequate cooling.

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- The aircraft must be checked for satisfactory climb performance at the maximum gross weight that the aircraft is to be approved for (see section 2.9).

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Please report any errors or omissions to LAA Engineering: [engineering@laa.uk.com](mailto:engineering@laa.uk.com)