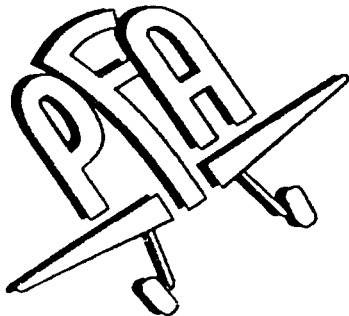


MOD NUMBER <b>1060Z</b>
PFA ENGINEERING USE ONLY

# Popular Flying Association

## APPLICATION FOR ASSESSMENT OF PROPOSED MODIFICATION



REGISTRATION	<b>G - IANI</b>
AIRCRAFT TYPE	<b>Europa XS Trigear</b>
A/C SERIAL NUMBER	<b>PFA 247-1371</b>

OFFICE USE ONLY	DATE	BY
FORM RECEIVED		

### 1. APPLICANT'S DETAILS

Name Of Registered Owner..... **I.F. Rickard/I. A. Watson** ..... Membership No. .... **031450** .....

Name and address of person to be contacted regarding this modification proposal (*Please print*).

**I. F. Rickard,**

**37 Willowmead Close, Woking, Surrey, GU21 3DN**

Daytime telephone number..... **01483 714096** .....

### 2. MODIFICATION DETAILS

Purpose of Modification..... **Provision of "Averlec" capacitance fuel gauge.** .....

Brief Description of Modification.....

**Modification to the fuel tank to provide access/mounting plate as per the attached drawings.**

Does the modification appear on any similar aeroplanes: Yes:  No:  Not Sure:

If 'Yes' - Give the registration of other aeroplane(s), source of modification and maker of the components used.

### 3. DESIGNER'S DECLARATION OF NO TECHNICAL OBJECTION

You are encouraged and in some cases required to obtain a declaration of 'no technical objection' from the designer of your aircraft regarding the modification that you intend to install. It is suggested that prior to sending this mod form to PFA

Engineering, you ask the designer of your aircraft to complete this section, if possible.....

..... Designer's Signature.....

#### 4. MODIFICATION APPLICANT'S OPINION

Will the proposed modification affect any of the following: (If 'yes' then submit details on enclosed sketch sheets)

- |  |  |  |  |
|--|--|--|--|
| The integrity of the primary structure | Yes ___ No <input checked="" type="checkbox"/> | The flying control system                    | Yes ___ No <input checked="" type="checkbox"/> |
| The fuel and oil systems               | Yes <input checked="" type="checkbox"/> No ___ | The occupant restraint system                | Yes ___ No <input checked="" type="checkbox"/> |
| The aircraft crashworthiness           | Yes ___ No <input checked="" type="checkbox"/> | The aircraft aerodynamics                    | Yes ___ No <input checked="" type="checkbox"/> |
| The flight handling qualities          | Yes ___ No <input checked="" type="checkbox"/> | The ground handling qualities                | Yes ___ No <input checked="" type="checkbox"/> |
| The aircraft performance               | Yes ___ No <input checked="" type="checkbox"/> | Any part of the power unit (including drive) | Yes ___ No <input checked="" type="checkbox"/> |
| The propeller or reduction drive       | Yes ___ No <input checked="" type="checkbox"/> | The aircraft noise levels (Microlights)      | Yes ___ No <input checked="" type="checkbox"/> |
| The radio installation                 | Yes ___ No <input checked="" type="checkbox"/> | The aircraft electrical system               | Yes ___ No <input checked="" type="checkbox"/> |

What would be the estimated empty weight change if any [ + / - ]\* ..... lb. 0.1 ..... kg. (\* Delete as appropriate)

What would be the estimated gross weight change if any [ + / - ]\* ..... lb. 0.1 ..... kg. (\* Delete as appropriate)

What would be the estimated change to the c. of g. Fwd.....in. Aft.....in. NONE.

Would you recommend the modification for use on other aircraft? Yes  No \_\_\_

We would strongly encourage inspector involvement before submitting this form. It will eventually be required that the inspector signs off the installation and function of the modification, so we feel that he/she should be involved from the start.

Has your inspector been involved in the development of this modification? Yes \_\_\_ No \_\_\_

#### 5. INSPECTOR'S OPINION

The inspector for the project is invited to add any comments which he/she feels appropriate.....

*A Cannon modification*

Inspector's Name *[Signature]* Inspector No. 140

#### 6. FUNCTION AND FLIGHT TEST PROPOSALS

Please state your proposals for function testing and flight testing the modification. Note that flight with the modification installed is prohibited until the modification is approved for flight testing by PFA Engineering. ....

#### 7. OWNER'S DECLARATION

I declare the foregoing information correct and I agree to abide by any conditions pertaining to this modification. I agree that this modification and all ideas contained within are the property of PFA (Ulair) Ltd and can be used in any way for the benefit of the PFA and its members.

Signed.....Owner. Mem No..... Date.....

# **AVELEC LTD**

## **FMD FUEL MONITORING SYSTEM (variant 1BB1E)**

### **FOR EUROPA**

#### **1. GENERAL**

##### **a. Warranty**

Avelec Ltd warrants that this product will be free from defects for a period of one year from the date of its purchase from Avelec Ltd or one of its authorised dealers. Within this period the product will be repaired without charge for parts and labour. Simply contact your supplier who will authorise repair as appropriate. Any product which has been subjected to misuse, excessive voltage or accidental damage is excluded from this warranty.

This guarantee in no way affects your statutory rights.

NB. This unit should be powered using 12 volts DC and the airframe should be connected to the negative battery terminal. A version for use with Alternating current (AC) derived from Bosch or Ducati alternators as supplied with Rotax engines is also available. Please contact us for details.

##### **b. Approvals**

This equipment is supplied with details of a modification to the Europa fuel tank. If you wish to apply this modification to your aircraft you must inform the PFA and have the work inspected by a PFA approved inspector.

##### **c. Description**

The Avelec FMD comprises a Fuel Level Sensor, a Processor Module and a fuel Tank Adapter. The Processor module converts the measured fuel level to fuel volume and has been calibrated before delivery to compensate for the shape of the fuel tank assuming that the tank is in an attitude corresponding to normal cruising as agreed with the manufacturer of the aircraft kit.

The indicator has a horizontal scale and also displays the fuel volume in litres. The fuel volume indication is damped to reduce surging.

##### **d. Modification Description :**

The modification involves the cutting of elliptical holes in both tank and cockpit module between the headrests, manufacture of the Fuel Tank Plate and the Clamping Ring and reinforcement of the cockpit module hole perimeter with BID in order to recover its strength.

The Fuel Tank Plate fits on the inside of the hole in the tank and is sealed against the inner surface of the tank using PTFE Foam Sealer Strip applied around the outside of the 12 clamping screws. The screw threads are locked with Loctite compound.

Reinforcement of the cockpit module hole is achieved by application of 4 strips of BID, top and bottom, around the edge of the ellipse.

## The contents of this package comprise the following :

1 x Fuel Level Sensor	1 x Fuel Tank Adapter kit
1 x Processor Module plus Fixing Clamps and power input connector	
PTFE Foam Sealer Strip.	3 x template drawings
1 x Installation Instructions	1 x Calibration Manual

## You must supply the following :

Aluminium plate (see drawings enclosed).	Loctite 243 or 932.
Fuel resistant epoxy resin adhesive (eg Araldite Rapid).	Hermetite Gold.
BID and Flox composite materials.	Coarse emery paper/cloth.
Suitable saw or other tools to cut a rectangular hole in the instrument panel. Also cable ties or other fixings to secure the Processor Module and wiring inside your aircraft.	

## e. Specification

Full Scale Fuel Indication : This unit is supplied ready calibrated. The maximum indications have been set to the usable fuel quantity. You may alter this if you wish (see Calibration Manual).

Zero Fuel Indication : Equal to or greater than the unusable fuel quantity.

Resolution of Indication : 2 litres.

Accuracy of Indication : This unit has been calibrated using Esso or Shell unleaded petrol unless you have specified otherwise at time of ordering (see the Calibration Placard on the Processor Module Housing). Best results will be obtained with these fuels unless the unit is calibrated for another.

NB. Variation in the dimensions or materials used in the construction of the fuel tank may cause the tank capacity to deviate from the supplied calibration. If this is excessive recalibration will be necessary (see accompanying Calibration Manual).

Power Consumption : 9-18VDC, 15mA typ (45mA typ at 14V with backlight on). Internal fuse rating 0.25A 20mm quick blow (accessible through a hole in the side of the case). NB. Use only power supplies with no voltage excursions outside the specified limits.

Operating Temperature Range : -20 to +60 degrees centigrade ambient air temperature with Fuel Level Sensor shaded from direct sunlight.

## 2. FITTING

### a. Fuel Tank Adapter

Use the enclosed template drawings and the drawings overleaf to manufacture the Clamping Ring, the Fuel Tank Plate and the fuel Tank Module modification.

Empty the fuel tank. Stick the Fuel Tank Machining Template Drawing to the top of the fuel tank using a suitable adhesive eg Pritt Stick and cut out the required opening using a suitable saw. Use the Clamping Ring as a template to drill aligned holes in the tank and the Fuel Tank Plate. Remove all traces of swarf from the tank after this operation.

Fit the Fuel Tank Adapter Assembly to the Fuel Tank Plate. Loosely Finger tighten the retaining bolts.

Apply PTFE Foam Sealer Strip to the top surface of the Fuel Tank Plate outside the line of the fixing screws. Join the ends with Hermetite Gold. Fit the 1 Fuel Tank Plate and

Adapter Assembly to the inside of the tank and secure externally with the Clamping Ring and M3 x 20mm screws.

Slide the Fuel Level Sensor all the way through the fitted Tank Adapter assembly into the tank. Rotate the Tank Adapter so that the tip of the sensor rests adjacent to the front side of the tank. Tighten the bolts to lock the Adapter in place. Be careful not to get any fuel inside the Adapter Bung at this stage.

Using coarse emery cloth, roughen the Fuel Level Sensor tube where it passes through the Adapter Bung. Clean and degrease the surface with a suitable solvent.

Mix a little Araldite Rapid and smear it on the shaft of the Fuel Level Sensor while running the shaft up and down a little in the Tank Adapter so that the inside of the Adapter Bung is coated. Be careful not to get adhesive into any of the drilled holes in the Fuel Level Sensor shaft.

Push the Fuel Level Sensor fully home into the Tank Adapter. Allow the adhesive to set.

### **b. Processor Module**

Use a suitable saw to cut a 71 x 46mm rectangular hole in the instrument panel. Be sure to allow for the depth of the instrument case behind the panel (allow at least 130mm from the front of the panel) before starting.

Connect the end of the green earth wire to a suitable earth point. If it is necessary to disturb the green earth wire connection on the rear of the instrument case then avoid more than light stress for fear of dislodging the threaded stud internally.

NB. Never remove the green earth lead which is part of the equipment safety system.

Fit the orange power connector to the aircraft 12V DC power leads via a protective fuse (maximum 15 amps, quick blow) for the left hand lead (marked 12V on the rear panel illustration). Note that the right hand lead (0V) will be earthed to chassis internally in the instrument via the green earth lead.

If backlight is required, connect a switch between the two leftmost terminals of the power connector. Alternatively, link the two terminals with a short piece of wire to have the backlight permanently on.

Note : DO NOT feed power from an external source into either of the two backlight terminals.

Plug in the power connector and the sensor lead (see FIG 1. overleaf)

Fit the Processor Module to the instrument panel from the front. Fit the securing clamps one on either side of the case and then tighten with a suitable screwdriver.

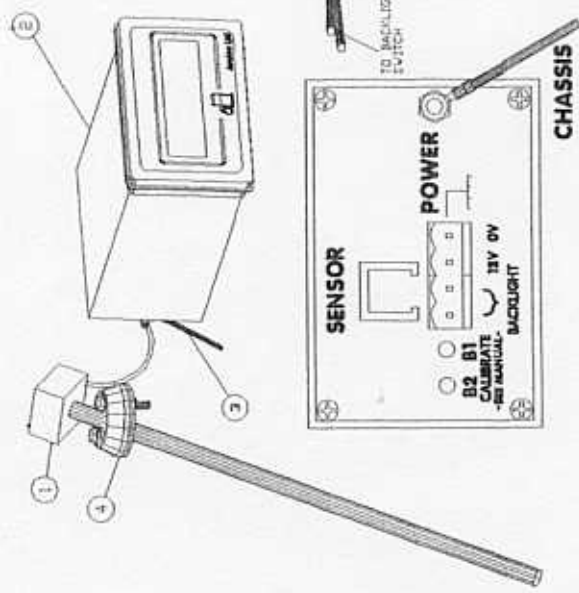
Secure all loose cables, remove all swarf before filling the tank and ensure that all surfaces are clean. Switch on the power. Confirm satisfactory operation and accuracy.

### **c. Maintenance**

None is necessary beyond regular inspection of cables for chafing or other damage and a periodic calibration check. NB. Always confirm satisfactory operation and accuracy before each flight.

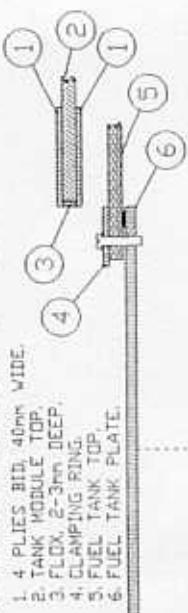
It should be noted that the Fuel Level Sensor and Processor Module are calibrated as a pair. Replacement of either of these will necessitate recalibration. Consult your Calibration Manual or contact us if adjustments are required.

1. FUEL LEVEL SENSOR
2. PROCESSOR MODULE
3. EARTH WIRE
4. FUEL TANK ADAPTER
5. POWER CONNECTOR



**CHASSIS**

**SECTION THROUGH TOP OF TANK MODULE**

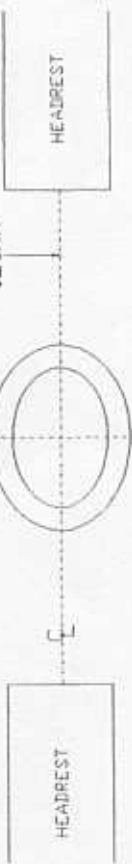


1. 4 PLYS BID, 40mm WIDE.
2. TANK MODULE TOP.
3. FLOX, 2-3mm DEEP.
4. CLAMPING RING.
5. FUEL TANK TOP.
6. FUEL TANK PLATE.

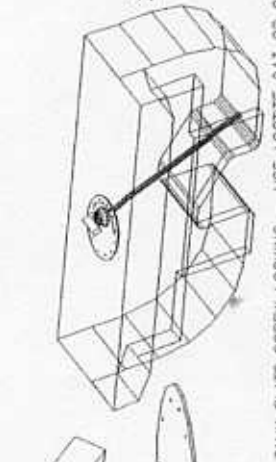
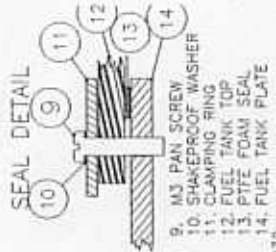
APPLY 4 STRIPS OF BID, 40mm WIDE, IN A RING ON BOTH SIDES OF HOLE IN TANK MODULE.

TANK REAR FACE

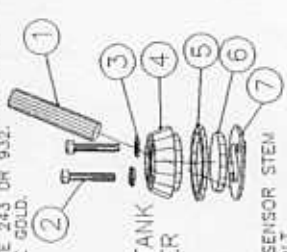
120mm



**TOP VIEW OF TANK MODULE**

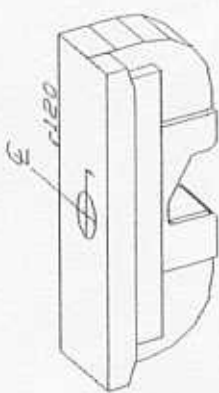


TANK PLATE SCREW LOCKING - USE LOCTITE 243 OR 932. JOIN ENDS OF PTFE SEAL USING HERMETITE GOLD.

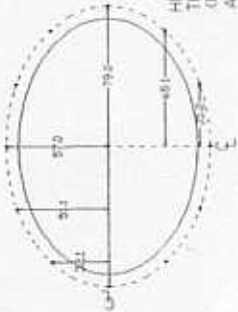


**FUEL TANK ADAPTER ASSY.**

1. FUEL LEVEL SENSOR STEM
2. RETAINING BOLT
3. SEALING WASHER
4. ADAPTOR BUNG
5. RUBBER WASHER
6. HOLE IN FUEL TANK PLATE
7. CLAMPING PLATE
8. FUEL TANK PLATE

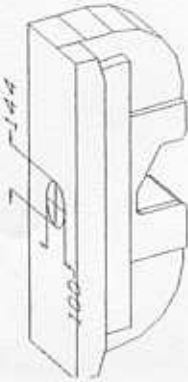


**TANK TOP CUTOUT**

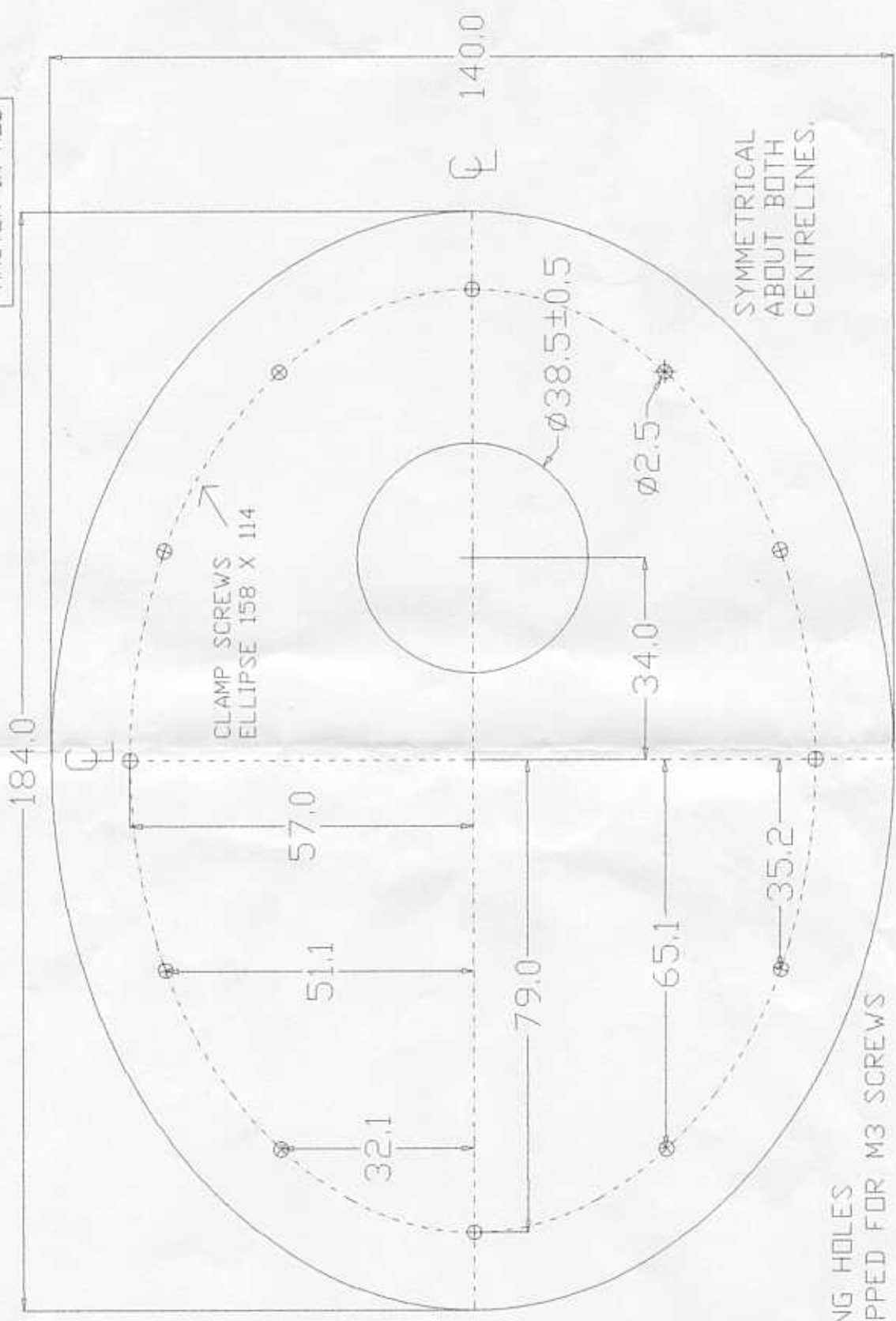


SYMMETRICAL ABOUT BOTH CENTRELINES

HOLE POSITION TOLERANCES: +/- 2mm (USE CLAMPING RING AS TEMPLATE).



MASTER IN RED



SYMMETRICAL  
ABOUT BOTH  
CENTRELINES.

MOUNTING HOLES  
ARE TAPPED FOR M3 SCREWS

MATERIAL:  
4mm HE30 ALUMINIUM PLATE

POSITION 2.5mm HOLES USING CLAMPING RING AS TEMPLATE.

SUBJECT :  
FUEL TANK PLATE  
TEMPLATE(EUROPA)

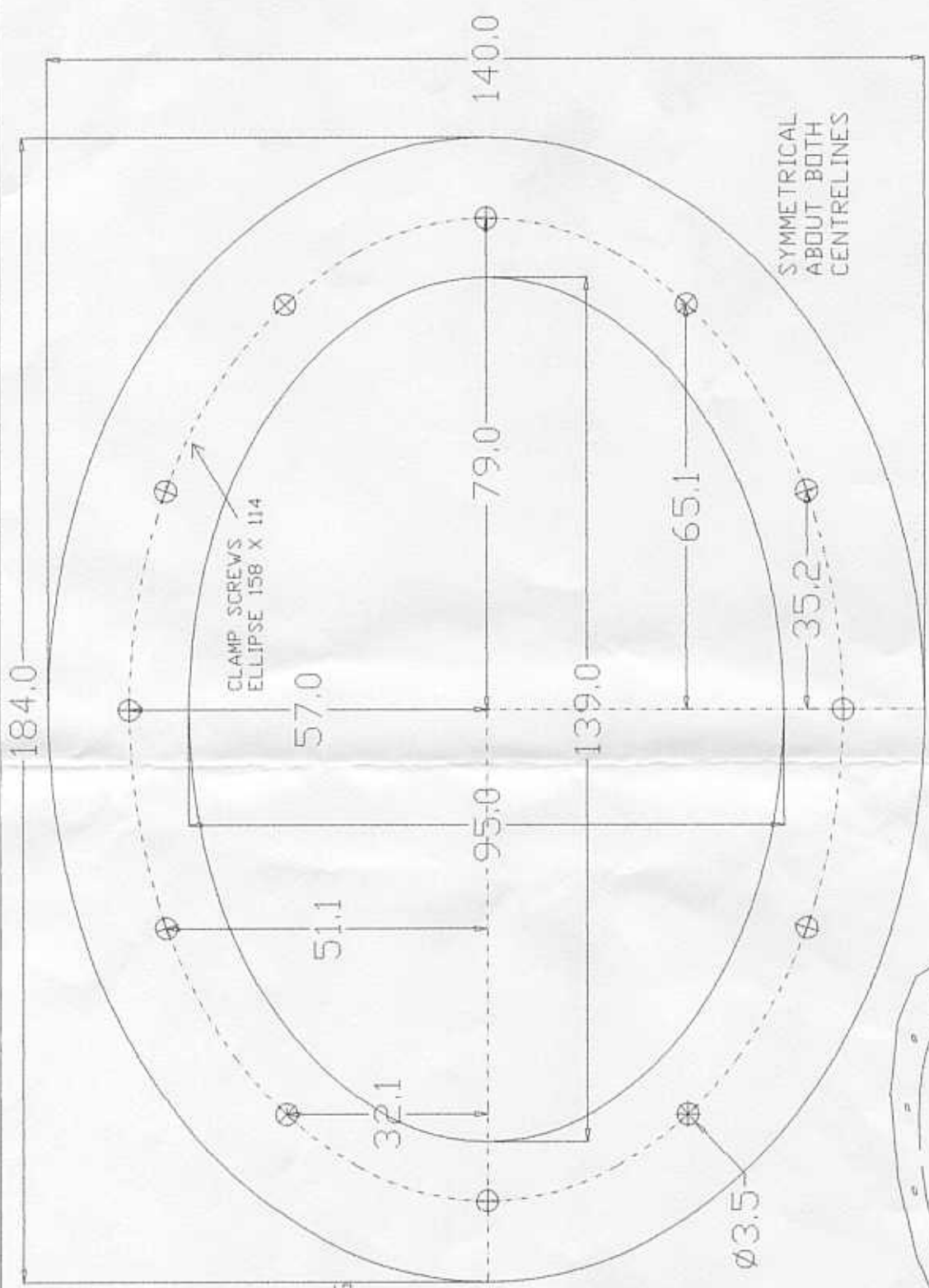
DIMS IN mm  
GEN TOL. +/- 2mm  
- EXCEPT WHERE INDICATED -

DRAWING No :  
AV-0121  
SCALE : 1:1  
SHEET : 1 OF 1

APPROVED	DATE	INITIAL	DESCRIPTION	APPROVED	DATE

(C) Avetec Ltd 1996  
\* Stonecraft  
\* Stone  
\* Assembly  
\* 1872 004  
\* 1872 004  
\* 1872 004

MASTER IN RED

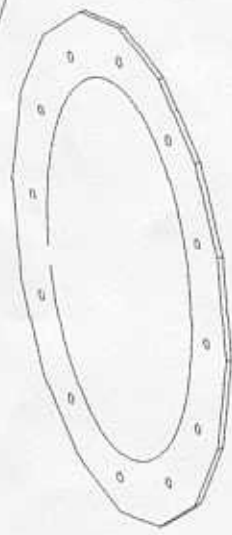


SYMMETRICAL ABOUT BOTH CENTRELINES

CLAMP SCREWS ELLIPSE 158 X 114

DRILL SCREW HOLES 2.5mm DIAM AND USE CLAMPING RING AS SCREW HOLE TEMPLATE FOR TANK AND COVER PLATE. THEN INCREASE CLAMPING RING AND TANK HOLES TO 3.5mm DIAM.

SCREW HOLES POSITION TOLERANCE +/- 2mm ONLY IF CLAMPING RING IS USED AS ABOVE.



MATERIAL: 2mm HE30 ALUMINIUM PLATE

SUBJECT :		DATE	NAME	INITIAL		Description		Approved	Date
FUEL TANK CLAMPING RING TEMPLATE(EUROPA)		20/02/96	E-ELDRSK	A		(C) Avelec Ltd 1996			20/02/96
DIMS IN mm		DRAWING No :		4 Stonecraft		Stone			
GEN TOL +/- .2mm		AV-0148		Avelec Pty BPA		Bucks HP17 BPA			
- EXCEPT WHERE INDICATED -		SCALE 1:1		160/Fox 1 02556 748846					
		SHEET 1 OF 1							