

MICROLIGHT AIRWORTHINESS APPROVAL NOTE

MAAN NO: 1661

ISSUE 1

DATE: 12 November 2002

TITLE: Microlight Airworthiness Approval Note 1661, ASI and altimeter corrections on Shadow Series C and CD aircraft.

REG: All Shadow Series C and CD

STAGE: APPROVAL

1. INTRODUCTION

Due to the positioning of the static pressure reference on the CFM Shadow aircraft, error is introduced into those instruments that use this static reference. This MAAN introduces ASI and altimeter correction placards and an addendum to the Pilots Handling Notes.

2. BASIS FOR APPROVAL

The basis for approval of this aircraft is BCAR Section S Advanced Issue dated March 1983 as amended 11 October 1988, along with BCAR Section C5-4 Issue1, paragraph 2.

3. DESCRIPTION

The Shadow range of aircraft are high wing, 3 axis aircraft. Due to the position of the static port on the Shadow Series C and CD aircraft (at the rear of the instrument panel), the ASI and altimeter on these aircraft types over read significantly. This is due to the reduced static pressure induced inside the cockpit as the speed increases because of the shape of the cockpit and the air flow around it.

The purpose of this MAAN is to report the effects of this static pressure reduction and to introduce placards that the pilot of these aircraft may use to correct for this phenomenon.

4. TECHNICAL INVESTIGATION

Four Shadow CD aircraft have been flown to establish the errors in the static system. In each case, the aircraft were flown using the ASI calibration method as set out in BMAA TIL027. This involves a 'racetrack' pattern being flown, recording ASI readings against GPS readings upwind and downwind.

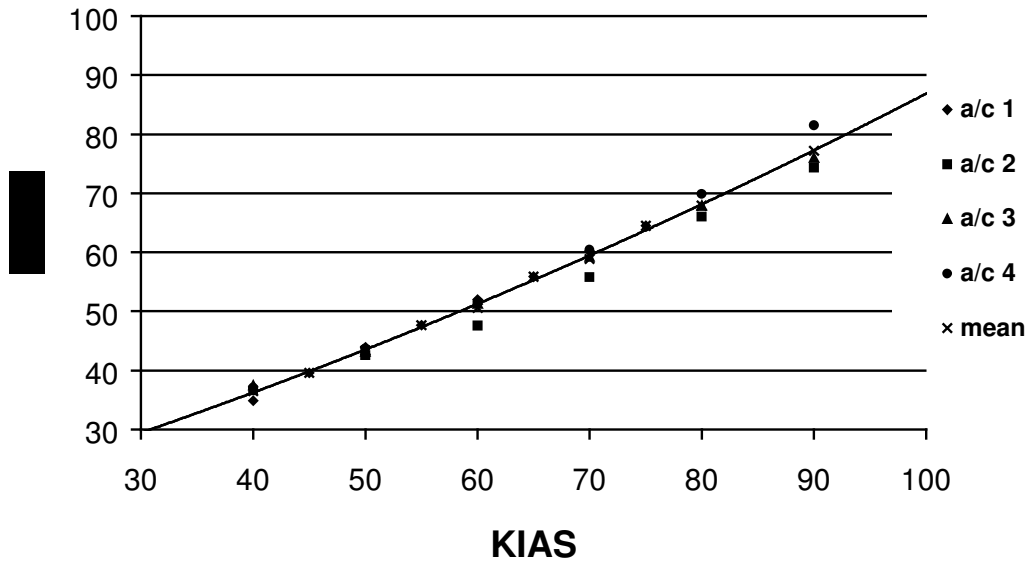
The four sets of flight test data show good correlation, enabling a speed correction table to be produced with high confidence. This is shown in the attached Service Bulletin.

Evaluation of the associated altimeter errors was done on the basis that all of the pressure errors

were in the static system. It has been assumed that the difference in dynamic pressures between the indicated and calibrated airspeeds represents the error in the static pressures. At each indicated airspeed, this pressure difference has been converted to altimeter errors, and is shown in the attached Service Bulletin (to the nearest 5 feet).

5. FLIGHT TESTING

Flights on four representative aircraft have been carried out to gather ASI calibration data for this MAAN.



6. MANUALS, PLACARDS AND INFORMATION

The aircraft is to be placarded and the Pilots Handling Notes to be modified as per the attached Service Bulletin.

7. NOISE CERTIFICATION

Noise certification is not affected by this MAAN.

8. RADIO

Radio installations are not affected by this MAAN.

9. INSPECTION

All Shadow Series C and CD aircraft are to carry out the Service Bulletin associated with this

MAAN. Inspectors should ensure that the placards are in place and the pilots notes correctly amended at each annual inspection.

10. WEIGHT AND BALANCE

Weight and balance is not affected by this MAAN.

11. SIGNIFICANT FEATURES AND LIMITATIONS

None.

12. CERTIFICATION

I certify that all examples of the Shadow Series C and CD, as described in this MAAN 1661 issue 1, are suitable for flight with this modification installed. This modification is mandatory from 1 January 2003 or the next permit renewal (whichever is sooner) from the date of issue of this MAAN.

I also recommend the amendment of TADS BM40 and BM41 to reflect the contents of this MAAN.

Eur Ing G B Gratton
Chief Technical Officer
British Microlight Aircraft Association

Initial Distribution:

CAA Light Aircraft Certification Section (Gatwick)
CAA Applications and Certifications Section (Gatwick)
All owners of Shadow Series C and CD aircraft (SB annex A only)
BMAA Shadow aircraft file
MAAN File 1661
PFA Chief Engineer

Annex A to MAAN 1661

BMAA Service Bulletin 1661

Title: Airspeed Indicator and Altimeter Error Corrections
Applicability: All CFM Shadow Series C and CD aircraft
Classification: Mandatory
Issue: 1
Dated: 12 November 2002

Reason for SB:

Due to the position of the static port on the Shadow Series C and CD aircraft (at the rear of the instrument panel), the ASI and altimeter on these aircraft types over read.

This SB introduces ASI and altimeter correction placards and an addendum to the Pilots Handling Notes.

Compliance:

1. All operators of CFM Shadow Series C and CD aircraft to make themselves aware of the discrepancy between the indicated airspeed and actual airspeed and the altimeter errors through the flight envelope.
2. Add Appendix A of this SB to the Pilots Handling Notes.
3. Placards showing these discrepancies must be displayed adjacent to the ASI and altimeter, as shown in Appendix B.

Note: separate SBs will cover CFM Shadow Series B and Series D aircraft.

Approved by:

Guy Gratton
Chief Technical Officer
British Microlight Aircraft Association

Appendix A to SB 1661 issue 1

This page to be inserted into Pilots Handling Notes for CFM Shadow Series C and CD aircraft.

The static reference port for the airspeed indicator (ASI) on the Series C and CD aircraft is located in the cockpit behind the instrument panel. Due to the shape of the fuselage, the pressure in the cockpit decreases as speed increases, relative to the actual static pressure. This affects the ASI and altimeter readings accordingly.

Calibration checks have been made on a number of representative aircraft. The following correction table should be used as a guide to ASI and altimeter accuracy in these aircraft types:

Knots Indicated	Knots Calibrated	Altimeter error, feet (over read)
30	29	0
35	33	5
40	36	10
45	40	20
50	44	25
55	47	35
60	51	40
65	55	50
70	59	60
75	64	70
80	68	75
85	72	85
90	77	90
94	80	95

Appendix B to SB 1661 issue 1

ASI Correction Placard – to be displayed next to ASI in all Shadow Series C and CD aircraft.

Kn CAS (calibrated)	29	33	36	44	51	56	59	68	77	80
Kn IAS (indicated)	30	35 (Vs)	40	50	60	66 (Va)	70	80	90	94 (Vne)

Altimeter Correction Placard – to be displayed next to Altimeter in all Shadow Series C and CD aircraft.

Kn IAS (indicated)	30	40	50	60	70	80	90	94
Altimeter over-read (feet)	0	10	25	40	60	75	90	95

MANDATORY PERMIT DIRECTIVE (proposed wording)

MPD: 2002-00x CFM

Subject: Installation of ASI and altimeter correction placards

Applicability: CFM Shadow Series C and CD microlights

Reason: Investigations undertaken by the BMAA have shown that due to the location of the static pressure source on this aircraft type, the ASI and altimeter over read significantly. This MPD requires placards to be fitted and operators manual supplement added to indicate the necessary corrections.

Compliance: Before 1 January 2003 or at the next permit renewal, whichever is the sooner, install the correction placards in accordance with British Microlight Aircraft Association (BMAA) Service Bulletin Ref: 1661 issue 1.

A copy of BMAA MAAN 1661 and further information can be obtained from:

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Record compliance with this MPD in the aircraft log book.

This MPD becomes effective on xx/xx/xx.