



# **OAT PROBE ASSEMBLY**

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**PRODUCT P/N: 681201-1**

## **INSTALLATION MANUAL**

**REV C**

**SHADIN AVIONICS**  
**Sales: (952) 927-6500**  
[www.shadin.com](http://www.shadin.com)

**MANUAL P/N: IM1201**

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4028-005	Installation, OAT Probe Assembly Kit	02/14/05	C
N/A	Parts List, OAT PROBE Assembly Kit P/N 681201-1	04/06/07	H

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**REVISION LOG**

REV.	DATE	APP'D	CHANGE
—	11-14-01	KCL	Baseline Release
A	03-10-05	OHR	Changed logo and company name
B	04-14-06	CB	Updated Install section 2.1 & Company logo
C			Updated 681201-1 Parts List and Section 2.1

The information in this manual is subject to change without notification. To ensure complete and current updates, note the Revision Log above and call Technical Assistance for updated information.

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**1. OVERVIEW****1.1 The Manual**

This manual is intended to determine a proper installation of the OAT PROBE ASSEMBLY. Installation instructions should be read and followed.

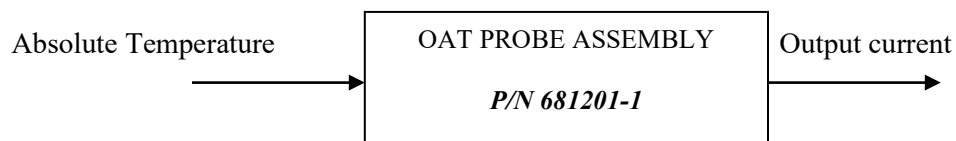
**1.2 Product Description**

The 681201-1 OAT PROBE ASSEMBLY will provide very accurate measurements of Outside Air Temperature (OAT) for inputs to the Air Data Computer and other airborne systems. The OAT Probe Assembly P/N 681201-1 produces an output current proportional to absolute temperature.

Part number 681201-1 depicts all the components required to install the OAT probe, part number 681201.

**1.3 Block Diagram**

A block diagram of the product depicting input and output signals is shown in Figure 1 below.



**Figure 1. Block Diagram of P/N 681201-1 OAT Probe Assembly**

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**1.4 Specifications****Dimensions:**2" x 0.359" dia. probe and 24"  
lead length wires**Weight:**

0.06 lbs.

**Electrical and Functional****Power Supply Voltage**

+4 to +30 VDC

**Nominal Temperature Coefficient**1  $\mu$ A/ °K**Calibration Error** $\pm 0.5$  °C**Absolute Error** $\pm 1.7$  °C When used with compatible  
Shadin Avionics**Breakdown Voltage** $\pm 200$  V**Forward/Reverse Voltage**

+44/-20 V

**Nominal current output @ 25°C**298.2  $\mu$ A**Environmental:****Operating Temperature**

-55 °C to +150 °C

**Storage Temperature**

-65 °C to +155 °C

**Operating Altitude**

Up to 55,000 ft

**Certification**

TSO-C43a

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**2. INSTALLATION PROCEDURE****2.1 Approval for Installation**

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

The installation should avoid the following locations:

- A. Prop Jet Stream
- B. Engine Exhaust Flow Path
- C. Cabin Heaters Exhaust Flow Path
- D. Transmitting Antennas (DME, TXP, COMM)
- E. Dark Painted Areas

**2.2 Mounting**

The OAT Probe can be mounted in any location along the bottom of the fuselage. A good location is a reasonably flat portion of the fuselage nose or under a wing or horizontal pylon near the leading edge.

1. Refer to Drawing # 4028-005 and OAT Probe Assembly Kit P/N 681201-1. Use the supplied stiffener P/N 543216 to support the OAT probe.
2. Use the supplied stiffener as a template to drill holes for the rivet P/N 511201 or drill using Detail A on drawing # 4028-005.
3. After drilling, bond stiffener to inside of fuselage with an aircraft approved structural adhesive. Then use rivet to install stiffener.
4. Install Temp Sensor Nut completely onto OAT Probe.
5. From inside fuselage, insert shoulder washer into stiffener, and slide OAT Probe through.
6. From outside of aircraft slide flat washer and thread Temp Shield onto OAT Probe, finger tight only.
7. From inside fuselage, hold Temp Sensor Hex with a 5/16" open-end wrench, and torque Temp Sensor Nut to 1.3 in/lbs. (max) against stiffener ring using a 3/8" open-end wrench.
8. For single engine installation, avoid mounting the OAT Probe on the belly or side of the aircraft to avoid erroneous reading due to the presence of hot exhaust gases.
9. The sun shield must be installed for proper indication of OAT.

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## 2.3 Electrical Connections

The Red Wire is the Power.

The White Wire is the Signal Return.

## 2.4 Field Test Procedure to Verify OAT Probe

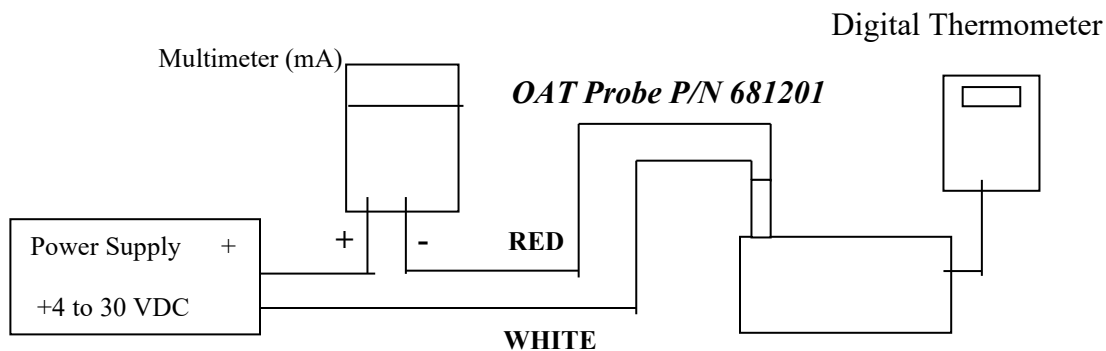


Figure 1. SETUP Test OAT Probe

- 1 Read the multimeter in milliamperes (mA) to 4 decimal places.
- 2 Read the thermometer in degrees and one decimal place of °C.
- 3 Add calibration error correction as applicable (from calibration record).
- 4 Add 273.15 to the temperature reading (°C).
- 5 The sum should be equal to the reading on the Fluke Meter  $\pm 0.0020$  mA (at 25 °C).

Example: Temperature	25.20 °C
Calibration error correction	+ 0.15 °C
Add	<u>+273.15 °C</u>
Sum OAT Probe Output	298.50

Reading on the Fluke Meter should be 0.2985 mA  $\pm 0.0020$  mA.

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**SECTION 3.0**

**INSTALLATION DRAWINGS AND  
INSTALL KIT PARTS LISTS**

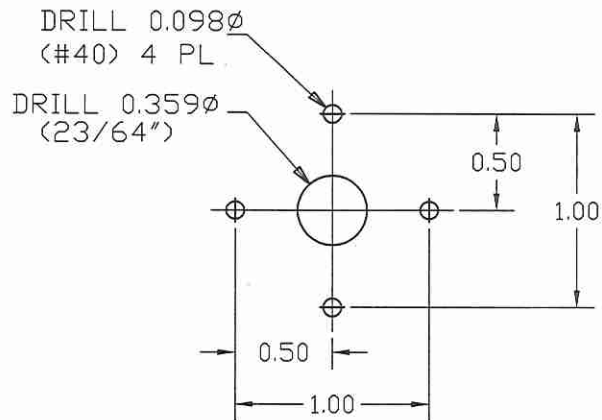
The following drawings are arranged in the sequence specified on page i of the Page Control Chart.

# NOTES:

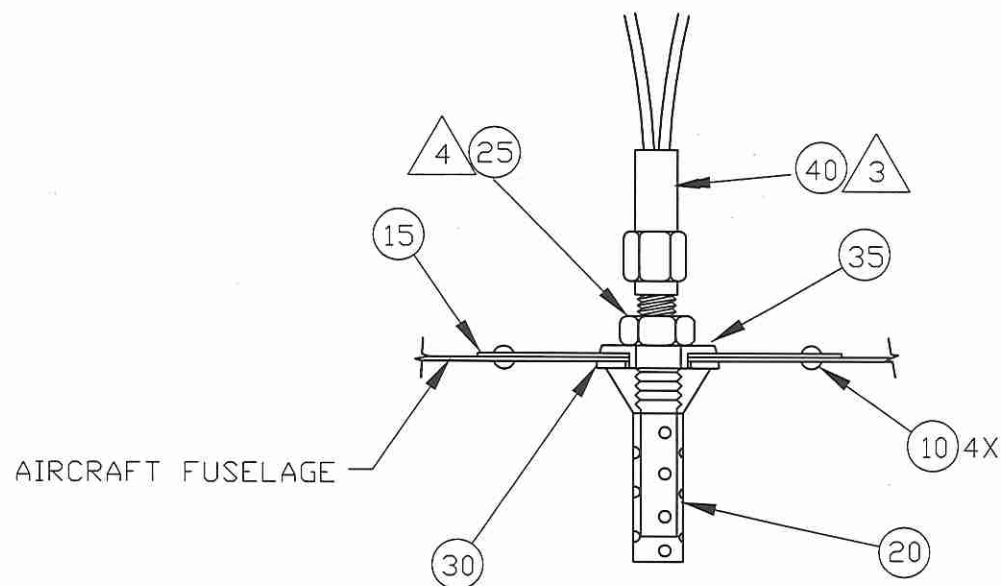
1. REFERENCE P/N 681201-1 DAT PROBE ASSEMBLY KIT
2. AVOID INSTALLING DAT PROBE IN OR NEAR:  
PROP AIRSTREAM  
ENGINE EXHAUST FLOW PATH  
CABIN HEATERS EXHAUST FLOW PATH  
TRANSMITTING ANTENNAS (DME, TXP, COMM.)  
DARK PAINTED AREAS

△ 3 DAT PROBE, P/N 681201

△ 4 TORQUE NUT, FN 25, TO 1.3 IN-LBS (MAX)



DETAIL A  
MOUNTING HOLE DETAIL



UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES: ±0.01					DRAWING DATE 4/8/91		<b>SHADIN</b> MINNEAPOLIS, MN 55426		
FINISH: N/A					DRAFTER DAP		INSTALLATION, DAT PROBE ASSEMBLY KIT		
					APPROVED SES				
MATERIAL: N/A					FILE NAME 681201-1C.J.DWG		DRAWING NO. 4028-005		
SCALE: NONE					DIRECTOR 681201-1				
SHEET 1 OF 1					SIZE A		P/N681201-1		
							REV C		

0501/032	C	2-14-05	PAB	2/2	UPDATED TITLE BLOCK & NOTE 4; ADDED "KIT" TO TITLE				
0111/001	B	11/14/01	PAB	KCL	STANDARDIZED DWG FORMAT TO MIMIC DWG NO. 4012-177				
0002/036	A	3/11/96	VMP	PG	CONVERT TO CAD; ADD NOTES 1 AND 3				
N/A	-	4/8/91	DAP	SES	BASELINE RELEASE				
ECD #	REV.	DATE	BY	APP'D	DESCRIPTION				

Report: 4032D  
ECO Date: April 4, 2007  
Rev: H  
Sec.: IX  
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Shadin Avionics  
Filename: 681201-1HP.doc  
DIRECTORY: 681201-1

ECO #: 0704/002  
Release date: 4-6-07  
Approved: ZH

# PARTS LIST

Drawing #s: 4028-005 Rev C

Part #: 681201-1  
Description: OAT PROBE ASSEMBLY KIT

<u>FN</u>	<u>P/N</u>	<u>QTY.</u>	<u>DESCRIPTION</u>	<u>MFG.</u>	<u>MFG.#</u>	<u>DESIGNATION</u>	<u>COMMENTS</u>
10	511201	4	RIVET, AN4703-4 or MS20470AD3-4				
15	543216	1	OAT STIFFENER RING	SHA	4032-082		
20	670503	1	SHIELD, Temp Sensor Assy	SHA	4005-265		
25	670504	1	NUT, Temp Sensor	SHA	4005-266		
30	670505	1	WASHER, Flat OAT	SHA	4005-303		
35	670506	1	WASHER, Shoulder OAT	SHA	4005-304		
40	681201	1	OAT PROBE	SHA	4005-794		

10 items