



UAS1000 Reference Sensor User Manual



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Contents

1. Product Overview	3
2. System Layout & Connections.....	3
2.1. Connections	5
3. Sensor Head Installation	5
3.1. Surface-Mount Socket Install	5
3.2. Soldering	6
3.3. Special Mechanical Requirements Requiring Adhesive	6
4. Technical Specifications.....	6
4.1. Sensor Head.....	6
4.2. UAS1000 Sensor Body	7
5. Mechanicals.....	7
5.1. Sensor Head.....	7
5.2. UAS1000 Sensor Body	8
6. Warranty.....	9

1. Product Overview

The UAS1000 *Reference* (RF) sensor, is part of Degree Controls' UAS1000 line of precise USB airflow sensors, used with the °C Port3600/ °C Port1200 Multipoint Measuring Instruments. It is designed to be integrated into thermal load cards, test boards and test equipment. The RF reference sensor consists of a UAS1000 sensor body with sensor electronics, and remote, board-mount sensor head, giving users the freedom to embed the sensor head into printed circuit board assemblies and thermal test chips for real time air velocity and temperature measurements, without using valuable space on the test board for sensor electronics.



Figure 1 Sensor Head & UAS1000 Sensor Body

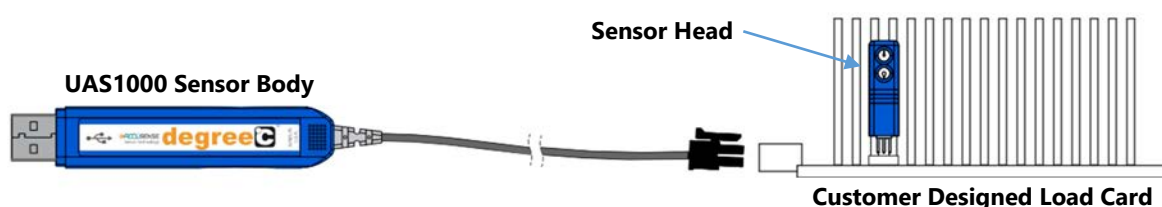


Figure 2 Load Card System with UAS1000 RF Air Velocity Sensor

The compact sensor head is designed to be soldered directly to a PCB, or plugged into a surface mount socket for easy removal, ideal for plug-and-play test strategies having flexible measurement locations. Multiple sockets can be put down for very detailed airflow studies, and airflow experiments are much less susceptible to non-uniformity of setup with the UAS1000 RF. The RF is designed for single or multi-point airflow measurements and has a convenient, USB output to a PC or °C Port1200/ °C Port3600 data acquisition instrument, having 12 or 36 sensor channels respectively.



Figure 3 °C Port Instruments

Traces are run on the load card from sensor locations to PCB mount connectors, mating to UAS1000 sensor bodies which are plugged into a PC or °C Port instrument. Connecting the °C Port to a PC or local network switch, and adding Windows® based AccuTrac™ software, allows air velocity, air temperature, and humidity data to be collected in real time, with automatic compensation for barometric pressure. Optional UTS1000 thermocouples can be added to include case temperatures in airflow studies, and the UHS1000 humidity and temperature sensor can also be added to provide high accuracy humidity input for real time compensation of measured air velocity.

2. System Layout & Connections

The diagram below illustrates a sample load card system using multiple UAS1000 RF sensors for thermal testing.

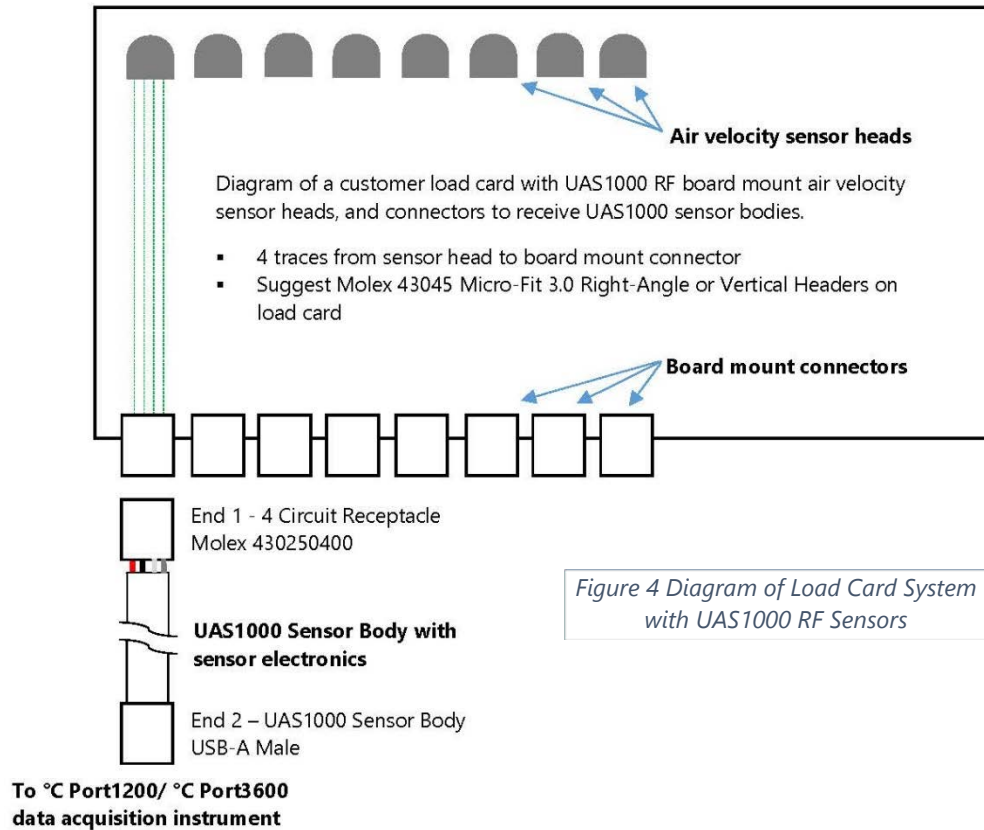


Figure 4 Diagram of Load Card System with UAS1000 RF Sensors

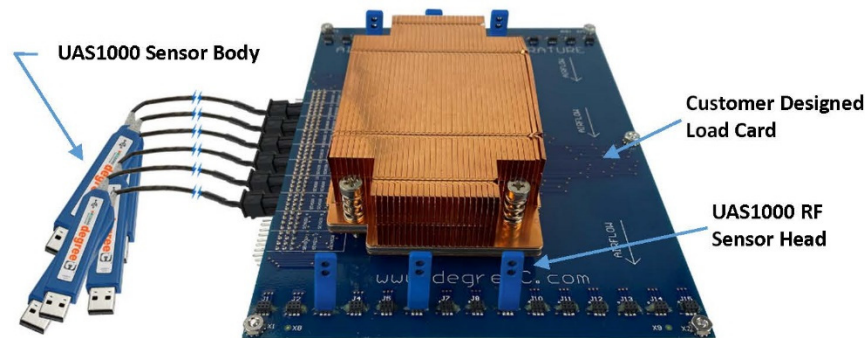


Figure 5 Example Customer Load Card with UAS1000 RF Velocity Sensors

Design Notes:

1. Degree Controls supplies a *sensor head*, which can be mounted onto a PCB assembly by using either a surface-mount socket, or with direct soldering, and a UAS1000 sensor body with a 4 pin connector on one end to connect to a load card. This way, valuable load card space is not used up for sensor electronics.
2. Run 4 traces on the load card from the sensor head to a PCB mount connector (not supplied).
3. End 1 of the UAS1000 sensor body connects to the load card's PCB mount connector.
4. The UAS1000 sensor body (End 2, per diagram above) is a USB connection to a PC or °C Port data acquisition instrument.

2.1. Connections

Run traces on the load card to make the connections from the sensor head to a 4 position PCB mount connector on the load card. The sensor head uses a 6 pin connector, only 4 pins need to be connected. The blue sensor head housing has a Pin 1 designator in the molding. Make the connections as follows:

Table 1 Connections from Sensor Head to Load Card Connector

Sensor Head		4-Position PCB Mount Connector on Load Card
Pin 1 – Flow Therm HI	Connects to	Pin 1
Pin 2 - Flow Therm Low	Connects to	Pin 4
Pin 3 - Tamb In	Connects to	Pin 2
Pin 4	Do not connect	
Pin 5 - GND	Connects to	Pin 3
Pin 6	Do not connect	

Sensor Head

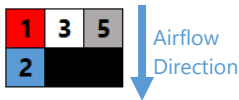


Figure 6 Top View of Samtec CLP-103-02-L-D-TR Socket on Customer Load Card

UAS1000 Sensor Body

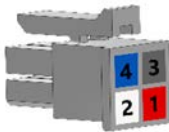


Figure 7 Position Identifiers for Molex 430250400 from UAS1000 Sensor Body (for reference)

Molex 43045 Micro-Fit 3.0 Right-Angle and Vertical Headers are suggested to mate to the Molex 430250400 end of the UAS1000 Sensor Body.

3. Sensor Head Installation

DegreeC’s UAS1000 RF sensor head can be mounted onto a PCB assembly by using either a surface-mount socket, or with direct soldering.

3.1. Surface-Mount Socket Install

Insert the sensor into the socket, noting the correct orientation of pin 1. This method assumes the socket is soldered onto the top side of the board. Please refer to the mechanical section for pin lengths.

Suggested top-mounted socket: *Samtec CLP-103-02-L-D-TR*, or equivalent

(Note: If using a bottom-mounted socket / attempting to mount the sensor to the top side of the board and using a socket soldered to the bottom side of the board with clearance holes for the sensor pins, please contact Degree Controls for advice.)

3.2. Soldering

A RoHS compliant, No-Clean (No-Wash) solder should be used for soldering DegreeC board-mount sensors:

1. Before soldering a sensor directly onto your circuit board surface, we advise you to follow best practices (ANSI/J-STD-001) during layout and processing to ensure optimal performance. Given the design of the nylon housing utilized in our board-mount sensors, DegreeC sensors must be soldered using a no-clean solder process, to prevent damage to sensor electronics.
2. In all instances, the soldering iron temperature must not exceed 480°F.
3. If a no-clean solder process is not used, install the sensor after printed circuit board wash, and hand clean.
4. For proper device soldering, please consult the mechanical section for recommended drill diameter, pitch, and silk screen outline dimensions. Pins 1 and 2 should be marked as indicated in the silk screen outline.

3.3. Special Mechanical Requirements Requiring Adhesive

For systems where the sensors are mounted vertically, or where high vibration or shock-loading is expected, Degree Controls recommends the addition of an electronics grade silicon RTV (room temperature vulcanizing) adhesive, installed according to IPC standards. This will form a tough, permanently flexible bond to the printed circuit board. Loctite® SI 5011CL, or equivalent, is suggested. Silicone should be applied after the soldering/wave processes are complete, and used to affix the perimeter of the part, not applied underneath.

4. Technical Specifications

4.1. Sensor Head

Technical Specifications	
<i>Warm Up Time</i>	< 5 seconds
<i>Supply Voltage</i>	Supplied by USB or °C Port Instrument via included UAS1000 Sensor Body
<i>Input Voltage</i>	Connections to the sensor head should only be made thru the UAS1000 Sensor Body as outlined in the manual. For PCB layout and trace considerations for customer de-sign of load card, 20 VDC max. See the System Layout & Connections section for instructions.
<i>Maximum Current</i>	For PCB layout and trace considerations for customer design of load card, < 100 mA.
<i>Response Time</i>	400 ms
<i>Operating Temperature</i>	0°C - 90°C (32°F - 194°F)
<i>Storage Temperature</i>	-40°C - 105°C (-40°F - 221°F)
<i>Relative Humidity</i>	5-95%, non-condensing
<i>Connector</i>	Samtec ASP-173375-03 6 Pin Header Strip, 0.050" pitch
<i>Housing Material</i>	UL94-V0
<i>Size (L x W x H)</i>	6.6 x 6.4 x 24.1mm (0.26 x 0.25 x 0.95")
<i>Weight</i>	Approximately 1.5g (.05oz)
<i>Compliance Standards</i>	CE, RoHS

4.2. UAS1000 Sensor Body

Technical Specifications	
End 1 (to load card)	Molex 430250400 4 Circuit Receptacle
End 2 (to PC or °C Port)	USB-A Male
Size (L x W x H)	98.5 x 16.0 x 8.1 mm (3.88 x 0.63 x 0.32")
Length	5m (16.4')
Compliance Standards	CE, RoHS

5. Mechanicals

5.1. Sensor Head

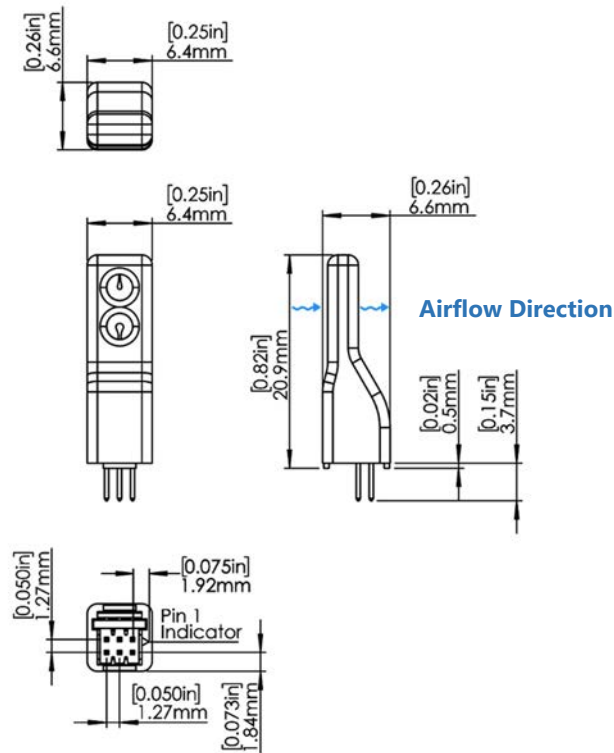


Figure 8 Sensor Head Drawing

Contact Degree Controls for a 3D STEP file of the UAS1000 RF sensor head.

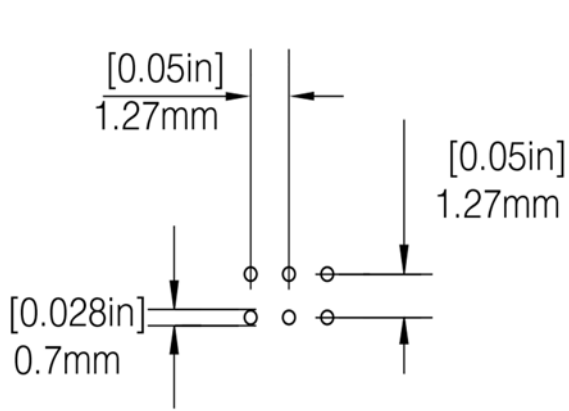


Figure 9 Sensor Head Drill Drawing

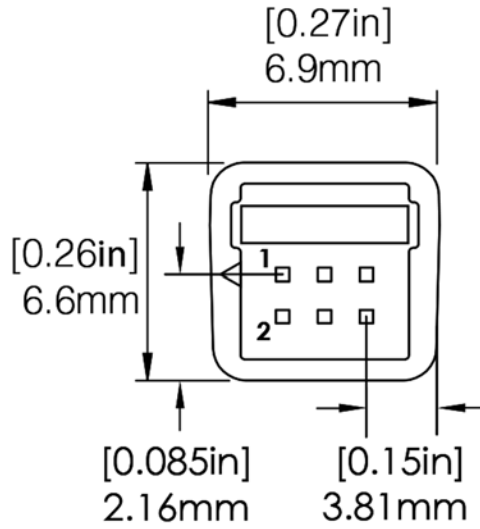


Figure 10 Sensor Head Silk Screen Outline on Customer Load Card

5.2. UAS1000 Sensor Body

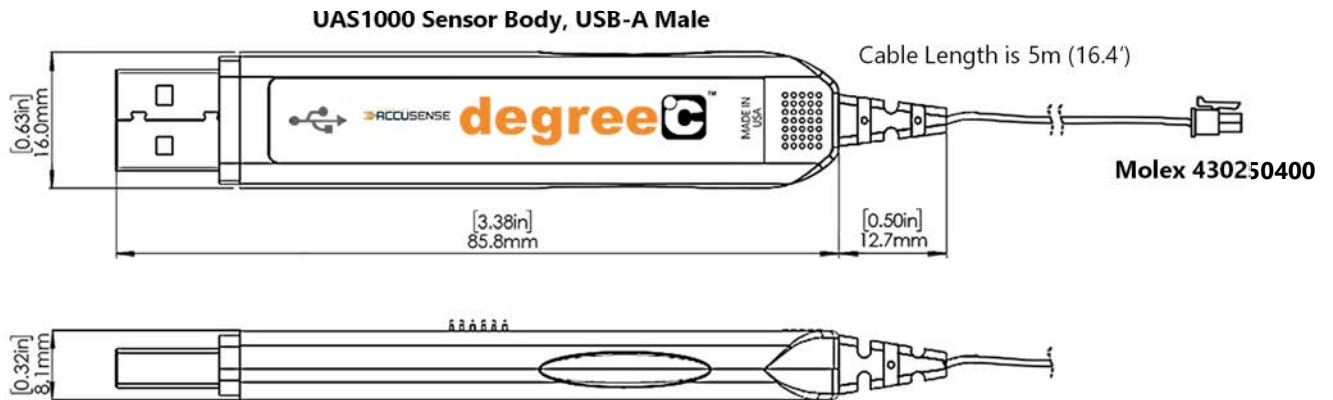


Figure 12 UAS1000 Sensor Body



Figure 11 Position Identifiers for Molex 430250400 (for reference)

6. Warranty

For a period of one (1) year following the date of delivery, and subject to the other provisions of this Warranty Section, DegreeC warrants that all new products that are both (a) manufactured by DegreeC and (b) purchased directly from DegreeC (or an authorized distributor of DegreeC) shall be free of material defects in materials and workmanship. Buyer's sole and exclusive remedy, and DegreeC's sole and exclusive obligation, in the event of any product defect shall be for DegreeC to, at its option, repair or replace such products free of charge. In no event shall DegreeC be liable for ordinary wear and tear. In order to get the benefit of the foregoing warranty, Buyer must examine the delivered products immediately upon receipt thereof and report to DegreeC, in writing, any visible defects within ten (10) working days of such receipt. Buyer's failure to report defects within the foregoing time period will be deemed an unqualified waiver of any and all of Buyer's rights to warranty claims. DegreeC does not provide any warranty for third party parts, components, or products that are not manufactured by DegreeC. Such parts, components, or products may be warranted by third parties on a "pass through" basis. The foregoing remedies shall not apply to any product failure caused in whole or in part by (i) Buyer's failure to operate, maintain, or service the products in accordance with DegreeC's documentation, (ii) any alteration, modification, or repair made to the products other than by DegreeC, or (iii) use of the products for a purpose other than that for which it is intended. THE FOREGOING EXPRESS WARRANTY extends only to the original customer of DegreeC or DegreeC's authorized distributor, as the case may be. THE CORRECTION OF ANY DEFECT IN, OR FAILURE OF, PRODUCTS BY REPAIR OR REPLACEMENT IN ACCORDANCE WITH DEGREEC'S POLICIES DESCRIBED HEREIN SHALL BE DEGREEC'S SOLE AND EXCLUSIVE OBLIGATION AND THE SOLE AND EXCLUSIVE REMEDY OF BUYER FOR ANY AND ALL LOSSES, DELAYS OR DAMAGES RESULTING FROM THE PURCHASE OR USE OF DEGREEC'S PRODUCTS. OTHER THAN THE LIMITED WARRANTY SPECIFICALLY STATED HEREIN, DEGREEC SPECIFICALLY DISCLAIMS ANY AND ALL OTHER WARRANTIES WITH RESPECT TO DEGREEC'S PRODUCTS, INCLUDING THE PERFORMANCE THEREOF AND ANY SERVICES PROVIDED TO BUYER, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY ARISING FROM A COURSE OF DEALING OR USAGE OF TRADE, NON-INFRINGEMENT AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE OR USE.