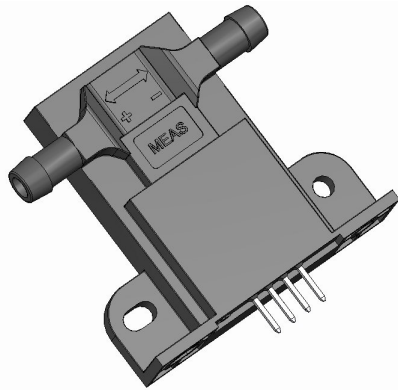


## HUMAF2703 – Combined Air Flow Humidity & Temperature module



- Compact, user friendly module, based upon state of the art MEMS technology
- Convenient integrated connecting pipe
- Air flow range : from -300 to 300 SCCM <sup>(1)</sup>
- Full interchangeability within +/-5 SCCM, +/-3%RH and +/-0.3°C
- Airflow accuracy independent of temperature drift
- Digital I2C compliant output, featuring high-resolution airflow, humidity & temperature readings



### DESCRIPTION

Based on rugged humidity and airflow sensor elements from MEAS, HUMAF2703 are dedicated, fully calibrated, combined airflow humidity & temperature plug and play modules designed for OEM applications where reliable and accurate measurements are needed, such as medical or HVAC applications. A universal digital I2C compliant protocol provides easy to connect interface to main MCU controller. A simple four pins connector allows for cost effective mounting options.

### FEATURES

- Product free from Lead, Cr (6+), Cd and Hg. Compliant with RoHS
- Precision bi-directional airflow, humidity and temperature measurements
- Demonstrated reliability and long term stability

### APPLICATIONS

- Medical industries
- Home Appliance
- HVAC

### PERFORMANCE SPECS

#### MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	T <sub>stg</sub>	- 40 to +85	°C
Supply Voltage Peak <sup>(2)</sup>	V <sub>cc</sub>	3.7	V <sub>dc</sub>
Pressure Operating Range	P	101.3 +/- 50	kPa
Humidity Operating Range <sup>(3)</sup>	RH	5 to 99	%RH
Temperature Operating Range	T <sub>a</sub>	-30 to +85	°C
Maximum Inrush Current	I <sub>avg</sub>	100	mA
Maximum Power Consumption @ 3.3V	P <sub>d</sub>	165	mW

(1) SCCM : Standard Centimeter Cubic per Minute @ T=20°C - P= 101.3 KPa.

(2) Peak conditions: less than 10% of the operating time.

(3) Avoid condensation.

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## HUMAF2703 – Combined Air Flow Humidity & Temperature module

### METROLOGICAL CHARACTERISTICS

@Vcc=3.3V<sub>dc</sub>, Standard condition : T=20°C – P= 101.3 Kpa, RH =55%

Characteristics	Symbol	Min	Typ	Max	Unit
Airflow Measuring Range <sup>(1)</sup>	AF	-300		+300	SCCM
Airflow Accuracy <sup>(2)</sup>			+/- (1.6 FR + 0.8 FS)		%
Airflow Resolution			+/- 0.1		SCCM
Airflow acquisition period			5		ms
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy (10% to 95%RH) <sup>(3)</sup>			+/-3	+/-5	%RH
Relative Humidity Resolution			+/-0.1		%RH
Temperature Measuring Range	T <sub>a</sub>	-30		85	°C
Temperature Accuracy (-10 to +40 °C)			+/-0.3	+/-0.5	°C
Temperature Resolution			+/-0.1		°C
Warm up time	t <sub>w</sub>		350		ms
Airflow Time Constant (at 63% of signal) typ. <sup>(4)</sup>	τ		1		s
Humidity Time Constant (at 63% of signal) typ. <sup>(5)</sup>	τ		3		s
Temperature Time Constant (at 63% of signal)	τ		10		s

(1) Extended Flow ranges 1000 SCCM are available on request.

(2) Accuracy = +/- (1.6% of Flow Rate + 0.8% of Full Scale)

(3) For airflow > 100 SCCM

(4) For airflow from 0 to 100 SCCM (to be validated)

(5) For Humidity from 33 to 76 % RH

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Supply Voltage <sup>(1)</sup>	V <sub>dd</sub>	3	3.3	3.7	Vdc
Supply Current	I <sub>avg</sub>		35	50	mA
SCL Frequency	F			100	kHz

(1) Supply voltage 5.5 Vdc available on request.

### TRANSMISSION SIGNALS

The HUMAF sensor is a slave module, compatible with I2C bus standard. Data format can be modified upon customer request.

- **HUMAF slave address**  
Each device is recognised by a unique address: **0x55**.  
Formats with 7-bits addresses + R/W bit: **0xAB (read access) and 0xAA (write access)**
- **Protocol**

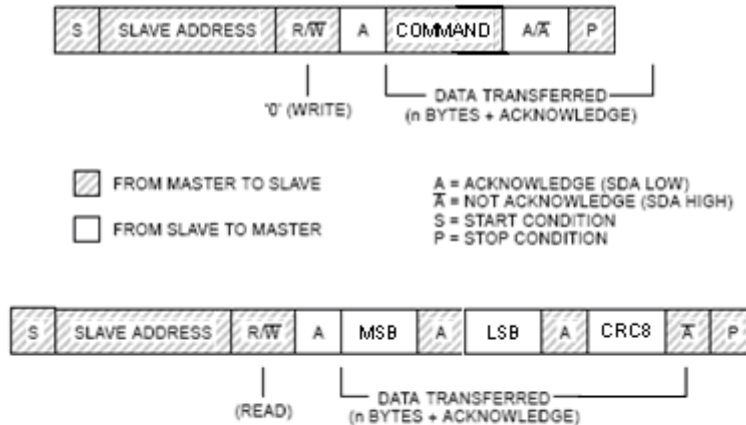
Command	Code
Reserved	0x0.
Air Flow read	0x2A
Temperature read	0x34
Humidity read	0x47

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$$CRC8 = \left( \overline{dataMSB \text{ XOR } dataLSB} \right) - 1$$

### TRANSMISSION DATA

Air Flow	Min	Typ	Max
Limits (SCCM)	-350.0		+350.0
Limits (DATA)	0xF254		0x0DAC
Resolution (SCCM)		0.1	
Resolution (DATA)		1	
Update period (ms)		20	
Temperature	Min	Typ	Max
Limits (°C)	-30.0		+85.0
Limits (DATA)	0xFED4		0x0352
Resolution (°C)		0.1	
Resolution (DATA)		1	
Update period (ms)		100	
Humidity	Min	Typ	Max
Limits (%RH)	0.0		+100.0
Limits (DATA)	0x0000		0x03E8
Resolution (%RH)		0.1	
Resolution (DATA)		1	
Update period (ms)		100	

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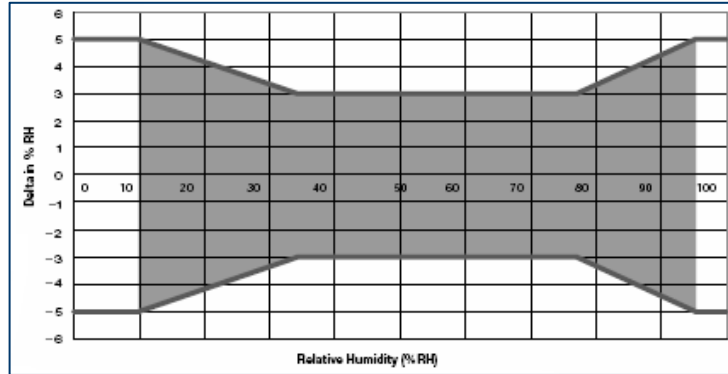
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## HUMAF2703 – Combined Air Flow Humidity & Temperature module

### HUMIDITY ERROR BUDGET CONDITIONS AT 23 °C

HUMAF2703 are specified for maximum accuracy measurements within 10 to 95 %RH. Excursion out of this range (< 10% or > 95% RH, including condensation) does not affect the reliability of HUMAF2703 characteristics.

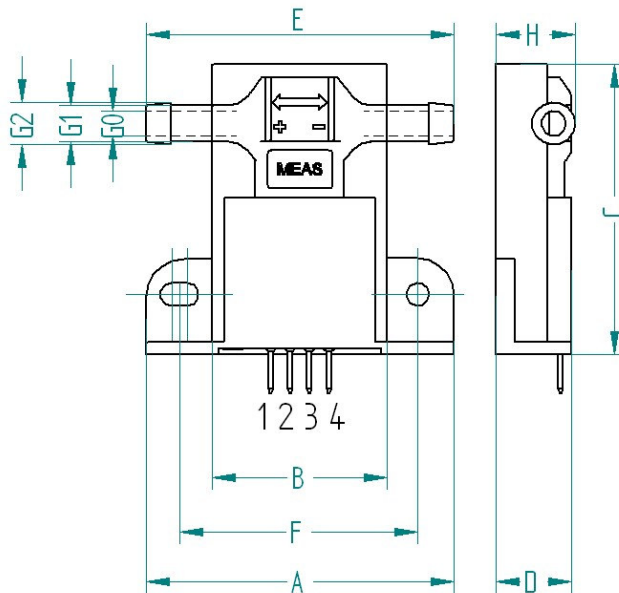


### PACKAGE OUTLINE

#### PINOUT ASSIGNMENT

N <sub>0</sub>	Function
1	SCL – Serial Clock
2	SDA – Serial Data
3	GND – Ground
4	VCC – Voltage Supply

#### HUMAF2703 PACKAGE OUTLINES



Dim	Typ (mm)
A	40.3
B	22.9
C	38
D	10
E	40.3
F	31.25
G0	3.2
G1	4.8
G2	5.6
H	10.4

- For board-to-board mounting, wave or iron soldering is suggested

- Connector pitch : 2.54 mm

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## HUMAF2703 – Combined Air Flow Humidity & Temperature module

### QUALIFICATION PROCESS

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#### RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

- HUMAF2703 contain circuits to protect its inputs and outputs against Electrostatic discharges (ESD) up to  $\pm 15\text{kV}$ , air discharge.
- HUMAF2703 are protected against EMC interferences.
- HUMAF2703 are protected against reverse polarity.  
Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere,  $\text{SO}_2$  (0.5%),  $\text{H}_2\text{S}$  (0.5%),  $\text{O}_3$ ,  $\text{NO}_x$ ,  $\text{NO}$ ,  $\text{CO}$ ,  $\text{CO}_2$ , Softener, Soap, Toluene, acids ( $\text{H}_2\text{SO}_4$ ,  $\text{HNO}_3$ ,  $\text{HCl}$ ), HMDS, Insecticide, Cigarette smoke, a non-exhaustive list.
- HUMAF2703 are not light sensitive.

### ORDERING INFORMATION

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**HUMAF2703 : HPP830A001**

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