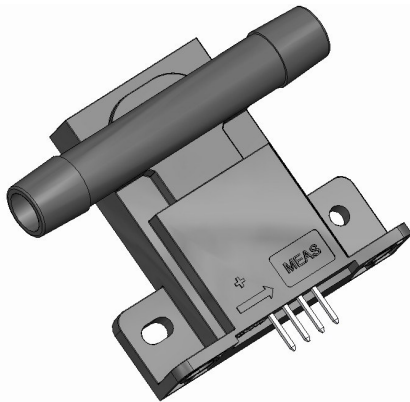


HUMAF2710 – Combined Air Flow Humidity & Temperature module



- Compact, user friendly module, based upon state of the art MEMS technology
- Convenient integrated connecting pipe
- Air flow range : from 0 to 10 SLPM ⁽¹⁾
- Full interchangeability within +/-0.2 SLPM, +/-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, HUMAF2710 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 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 _{stg}	- 40 to +85	°C
Supply Voltage Peak ⁽²⁾	V _{cc}	3.7	V _{dc}
Pressure Operating Range	P	101.3 +/- 50	kPa
Humidity Operating Range ⁽³⁾	RH	5 to 99	%RH
Temperature Operating Range	T _a	-30 to +85	°C
Maximum Inrush Current	I _{avg}	100	mA
Maximum Power Consumption @ 3.3V	P _d	165	mW

(1) SLPM : Standard Liter Per Minute @ T=20°C - P= 101.3 KPa.

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

(3) Avoid condensation.

深圳市新世联科技有限公司

地址：深圳市深南中路2066号华能大厦712室
 电话：0755-83680810 83680820 83680830 83680860
 网址：www.apollounion.com

邮编：518031
 传真：0755-83680866
 邮箱：sales@apollounion.com

HUMAF2710 – Combined Air Flow Humidity & Temperature module

METROLOGICAL CHARACTERISTICS

@Vcc=3.3V_{dc}, Standard condition : T=20°C – P= 101.3 Kpa, RH =55%

Characteristics	Symbol	Min	Typ	Max	Unit
Airflow Measuring Range ⁽¹⁾	AF	0		10	SLPM
Airflow Accuracy ⁽²⁾			+/(1.3 FR +0.4 FS)		%
Airflow Resolution			+/- 0.01		SLPM
Airflow acquisition period			5		ms
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy (10% to 95%RH) ⁽³⁾			+/-3	+/-5	%RH
Relative Humidity Resolution			+/-0.1		%RH
Temperature Measuring Range	T _a	-30		85	°C
Temperature Accuracy (-10 to +40 °C)			+/-0.3	+/-0.5	°C
Temperature Resolution			+/-0.1		°C
Warm up time	t _w		350		ms
Airflow Time Constant (at 63% of signal) typ. ⁽⁴⁾	τ		1		s
Humidity Time Constant (at 63% of signal) typ. ⁽⁵⁾	τ		3		s
Temperature Time Constant (at 63% of signal)	τ		10		s

(1) Extended Flow ranges 30 SLPM are available on request.

(2) Accuracy = +/- (1.3% of Flow Rate + 0.4% of Full Scale)

(3) For airflow > 0.1 SLPM

(4) For airflow from 0 to 0.1 SLPM (to be validated)

(5) For Humidity from 33 to 76 % RH

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Supply Voltage ⁽¹⁾	V _{dd}	3	3.3	3.7	Vdc
Supply Current	I _{avg}		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**.

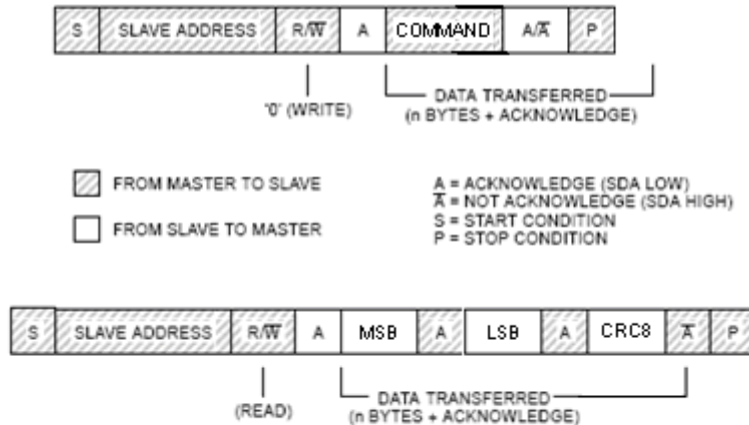
Formats with 7-bits addresses + R/W bit: **0xAB (read access) and 0xAA (write access)**

- Protocol**

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

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

TRANSMISSION DATA

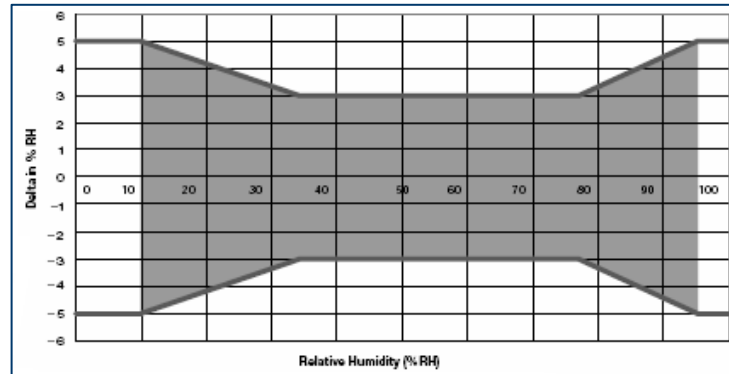
Air Flow	Min	Typ	Max
Limits (SLPM)	0		15.00
Limits (DATA)	0x0000		0x05DC
Resolution (SLPM)		0.01	
Resolution (DATA)		1	
Update period (ms)		20	
Temperature	Min	Typ	Max
Limits (°C)	-30.0		+85.0
Limits (DATA)	0xFED4		0x0352
Resolution (°C)		0.1	
Resolution (DATA)		1	
Update period (ms)		100	
Humidity	Min	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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HUMIDITY ERROR BUDGET CONDITIONS AT 23 °C

HUMAF2710 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 HUMAF2710 characteristics.

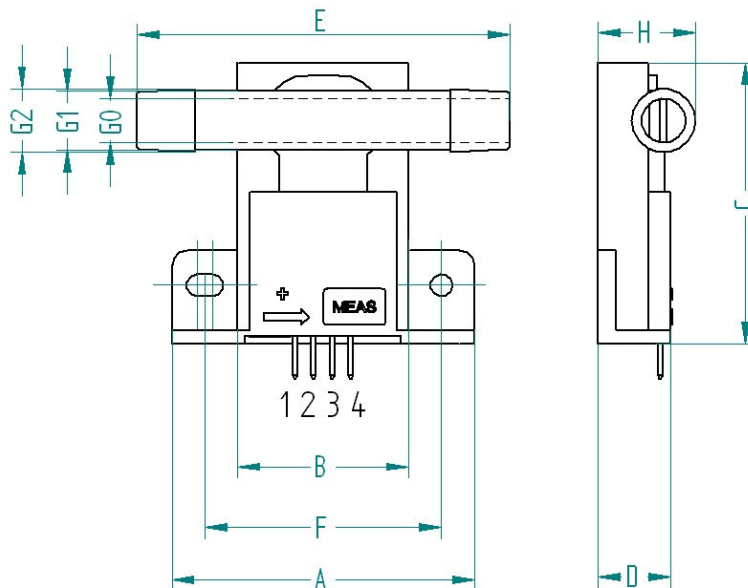


PACKAGE OUTLINE

PINOUT ASSIGNMENT

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

HUMAF2710 PACKAGE OUTLINES



Dim	Typ (mm)
A	41.3
B	23.3
C	38.4
D	10
E	50.9
F	32.3
G0	6
G1	8
G2	8.66
H	13.33

- Mounting interface following ISO 5356
- For board-to-board mounting, wave or iron soldering is suggested
- Connector pitch : 2.54 mm

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HUMAF2710 – Combined Air Flow Humidity & Temperature module

QUALIFICATION PROCESS

RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

- HUMAF2710 contain circuits to protect its inputs and outputs against Electrostatic discharges (ESD) up to $\pm 15\text{kV}$, air discharge.
- HUMAF2710 are protected against EMC interferences.
- HUMAF2710 are protected against reverse polarity.
Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere, SO_2 (0.5%), H_2S (0.5%), O_3 , NO_x , NO , CO , CO_2 , Softener, Soap, Toluene, acids (H_2SO_4 , HNO_3 , HCl), HMDS, Insecticide, Cigarette smoke, a non-exhaustive list.
- HUMAF2710 are not light sensitive.

ORDERING INFORMATION

HUMAF2710 : HPP830B001

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