

## Target Specification

## HTW2700 Series – Combined Air Flow Humidity & Temperature module



- Compact, user friendly module, based upon state of the art MEMS technology
- Convenient integrated connecting pipe
- Full interchangeability within +/-5 SCCM, +/-3%RH and +/-0.25°C
- Digital I2C compliant output, featuring high-resolution airflow, humidity & temperature readings



## DESCRIPTION

Based on rugged humidity and airflow sensor elements from MEAS, HTW2700 Series 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)	V <sub>cc</sub>	20	V <sub>dc</sub>
Pressure Operating Range	P	50 to 115	kPa
Humidity Operating Range	RH	0 to 100	%RH
Temperature Operating Range	T <sub>a</sub>	-30 to +85	°C
Maximum Input Current	I <sub>avg</sub>	50	mA
Maximum Power Consumption	P <sub>d</sub>	150	mW

**Peak conditions:** less than 10% of the operating time.

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### METROLOGICAL CHARACTERISTICS

(@V<sub>cc</sub>=3.3V<sub>dc</sub>, T=23°C, R<sub>L</sub>>1MΩ unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
Airflow Measuring Range	AF	-300		+300	sccm
Airflow Accuracy (-100 to +100 sccm)			+/-5		%FS
Airflow Resolution			+/-0.1		sccm
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy (10% to 95%RH)			+/-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)			+/-0.1	+/-0.3	°C
Temperature Resolution			+/-0.1		°C
Warm up time	t <sub>w</sub>		350		ms
Data sampling period			5		ms
Airflow Time Constant (at 63% of signal) typ. <sup>(1)</sup>	τ		50		ms
Humidity Time Constant (at 63% of signal) typ. <sup>(1)</sup>	τ		100		ms
Temperature Time Constant (at 63% of signal) typ. <sup>(1)</sup>	τ		100		ms

(1) For air flow, %RH, T (steps TBD)

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Supply Voltage	V <sub>dd</sub>	2.7	3.3	5.0	Vdc
Supply Current	I <sub>avg</sub>		100		mA
SCL Frequency	F			100	kHz

### TRANSMISSION SIGNALS

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

- HTW slave address**

Each device is recognised by a unique address.

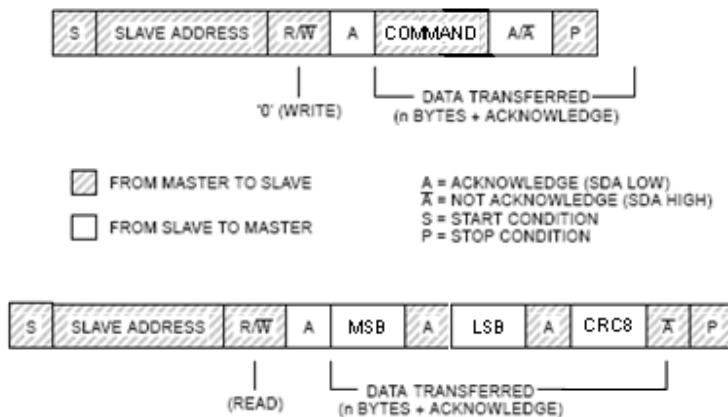
Formats with 7-bits addresses: **0x41 (read access) and 0x40 (write access)**

- Protocol**

Command	Code
Reserved	0x0.
Air Flow read	0x2A
Temperature read	0x34
Humidity read	0x47
Status read	0x53
Status write	0x61

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

### TRANSMISSION DATA

Air Flow	Min	Typ	Max
Limits (DATA)	-300.0		+300.0
Limits (DATA)	0xF448		0x0BB8
Resolution (scm)		0.1	
Resolution (DATA)		1	
Update period (ms)		10	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	

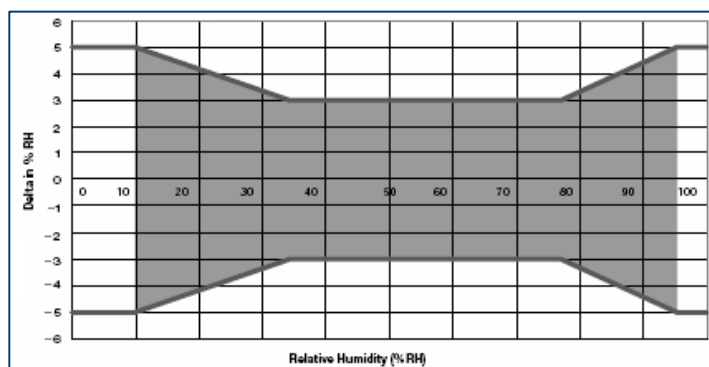
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### HUMIDITY ERROR BUDGET CONDITIONS AT 23°C

HTW2700 Series modules 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 HTW2700 Series characteristics.

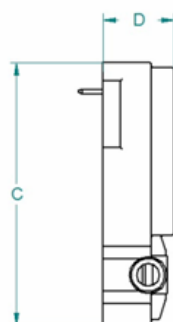
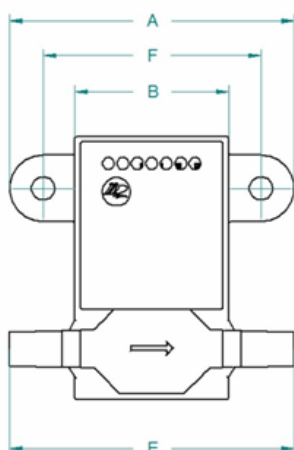
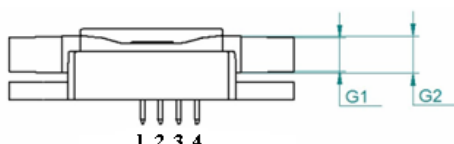


### PACKAGE OUTLINE

#### PINOUT ASSIGNMENT (SUBJECT TO FURTHER CONFIRMATION)

No	Function
1	VDD – Voltage Supply
2	GND – Ground
3	SDA – Serial Data
4	SCL – Serial Clock

#### HTW2700 SERIES PACKAGE OUTLINE



Dim	Typ (mm)
A	40
B	21.6
C	37
D	10
E	40
F	30.6
G1	4.7
G2	5.2

- (1) For board-to-board mounting, we suggest wave or iron soldering
- (2) Pin location : TBD
- (3) Connector pitch : 2.54 mm

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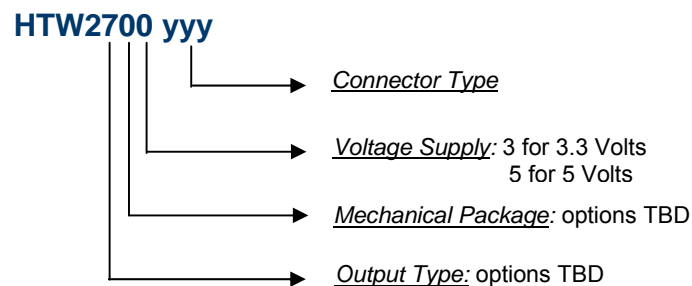
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### QUALIFICATION PROCESS

#### RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

- HTW2700 Series contain circuits to protect its inputs and outputs against Electrostatic discharges (ESD) up to  $\pm 15\text{kV}$ , air discharge.
- HTW2700 Series are protected against EMC interferences.
- HTW2700 Series 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.
- HTW2700 Series are not light sensitive.

### ORDERING INFORMATION



HPP830A001 FOR HTW2703

Revision	Comments	Who	Date
0	Creation document	D. LE GALL	December 07
A	Mechanical dimensions updated, product picture changed	D. LE GALL	January 08
B	Standardized datasheet format, Electrical characteristics updated, 3D schematic and Mechanical dimensions updated, Pinout assignment updated and Connector pitch added	D. LE GALL	May 08
C	Transmission Signals paragraph updated and HPP number added	D. LE GALL	October 08

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