



TEMPERATURE AND HUMIDITY MODULE

HF 3223 / HTF 3223

Based on the rugged HS1101 humidity sensor, HF 3223 / HTF 3223 is a dedicated **humidity and temperature transducer** designed for OEM applications where a reliable and accurate measurement is needed. It features a miniature connector for easy, cost-effective mechanical mounting. Direct interface with a micro-controller is made possible with the module's linear **frequency output**.

MAIN FEATURES

- Size and connector type match existing humidity modules.
- Stable, linear proportional frequency output from 10 to 95% RH.
- Calibrated within +/- 5% RH @ 55% RH.
- Optional 10 K +/- 3% NTC temperature sensor (HTF 3223)
- Stable characteristics with temperature.
- High reliability and long term stability.

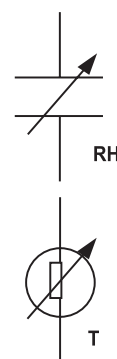


HUMIDITY SENSOR SPECIFIC FEATURES

- Instantaneous de-saturation after long periods in saturation phase.
- Fast response time.
- High resistance to chemicals.
- Not affected by water immersion.
- Patented solid polymer structure.

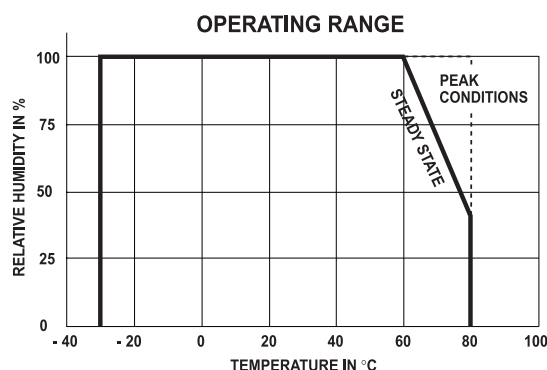
TEMPERATURE SENSOR SPECIFIC FEATURES

- High quality thermistor
- Stable
- High sensitivity



MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	T _{stg}	-40 to 85	°C
Storage Humidity Range	RH _{stg}	0 to 100	% RH
Supply Voltage (Peak)	V _s	7	V _{dc}
Humidity Operating Range	RH	0 to 99	% RH
Temperature Operating Range	T _a	-30 to 80	°C



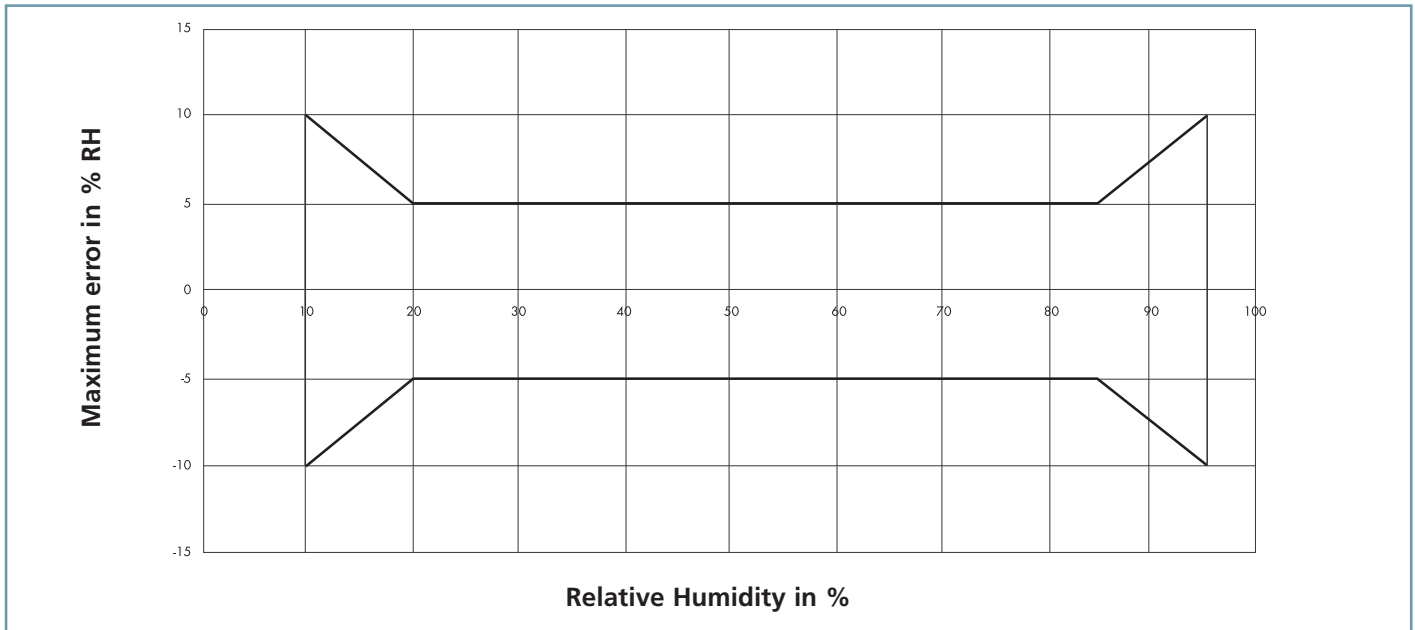
CHARACTERISTICS

Humidity sensor (T_a = 25°C, V_s = 5.0 V_{dc} +/- 5%, R_L > 100 KΩ unless otherwise stated)

Characteristics	Symbol	Min.	Typ.	Max.	Unit.
Humidity metrology range	RH	10		95	% RH
Relative Humidity accuracy (10 to 95 % RH)	RH		+/- 5	+/- 10	% RH
Voltage supply	V _s	4.75	5.0	5.25	V _{dc}
Nominal output @ RH = 55 %	F _{out}	8670	8750	8830	Hz
Current consumption	I _c			0.1	mA
Temperature coefficient (0 to 60 °C)	T _{cc}		+/- 0.1		% RH/°C
Averaged Sensitivity from 33 % to 75 % RH	ΔF _{out} /Δ RH	-16	-18	-19	Hz/% RH
Sink current capability	I _s		100		μA
Recovery time after 150 hours of condensation	t		10		s
Humidity Hysteresis			+/-1.5		% RH
Long term stability			0.5		% RH/yr
Response time (33 to 76% RH, static, @63 %)	τ		10		s



Relative Humidity Accuracy of HF 3223 / HTF 3223

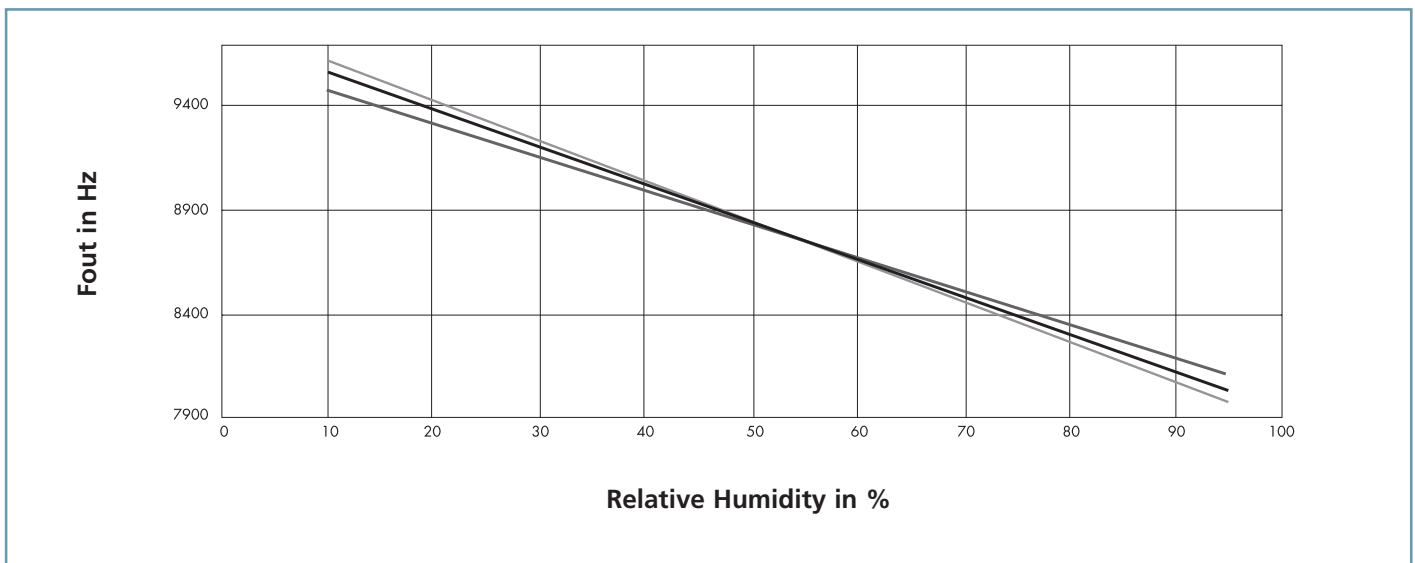


Modeled Signal output (Linear Reference curve) : $F_{out} = 9740 - 18 \cdot RH$ with F_{out} in Hz and RH in %

Typical response look-up table

RH (%)	0	5	10	15	20	25	30	35	40	45	50
Fout (Hz)			9560	9470	9380	9290	9190	9110	9020	8930	8840
RH (%)	55	60	65	70	75	80	85	90	95	100	
Fout (Hz)	8750	8660	8570	8480	8390	8300	8210	8120	8030		

Typical , Minimum and Maximum Frequency Values for HF 3223 / HTF3223



Calibration data are traceable to NIST standards through CETIAT laboratory.



CHARACTERISTICS

Temperature sensor (Ta = 25°C)

Characteristics	Symbol	Min.	Typ.	Max.	Unit.
Nominal resistance @ 25°C			10		kΩ
Beta value : B25/100	B	3600	3730	3800	
Temperature measuring range	Ta	- 30		80	°C
Nominal Resistance Tolerance	Rn		2	3	%
B value tolerance	B		3		%
Response Time	τ		10		s

Typical temperature output

Depending on the needed temperature measurement range and associated accuracy, we suggest two methods to access to the NTC resistance values.

$$① \quad R_T = R_N * e^{B \left(\frac{1}{T} - \frac{1}{T_N} \right)}$$

R_T NTC resistance in Ω at temperature T in K

R_N NTC resistance in Ω at rated temperature in K

T, T_N Temperature in K

B B value, material-specific constant of the NTC thermistor

e Base of natural logarithm (e = 2.71828)

The actual characteristic of an NTC thermistor can, however, only be roughly described by the exponential relation, as the material parameter B in reality also depends on temperature. So this approach is only suitable for describing a restricted range around the rated temperature or resistance with sufficient accuracy.

② For practical applications a more precise description of the real R/T curve may be required. Either more complicated approaches (e.g. the Steinhart-Hart equation) are used or the resistance/temperature relation as given in tabulated form. The below table has been experimentally determined with utmost accuracy for temperature increments of 1 degree.

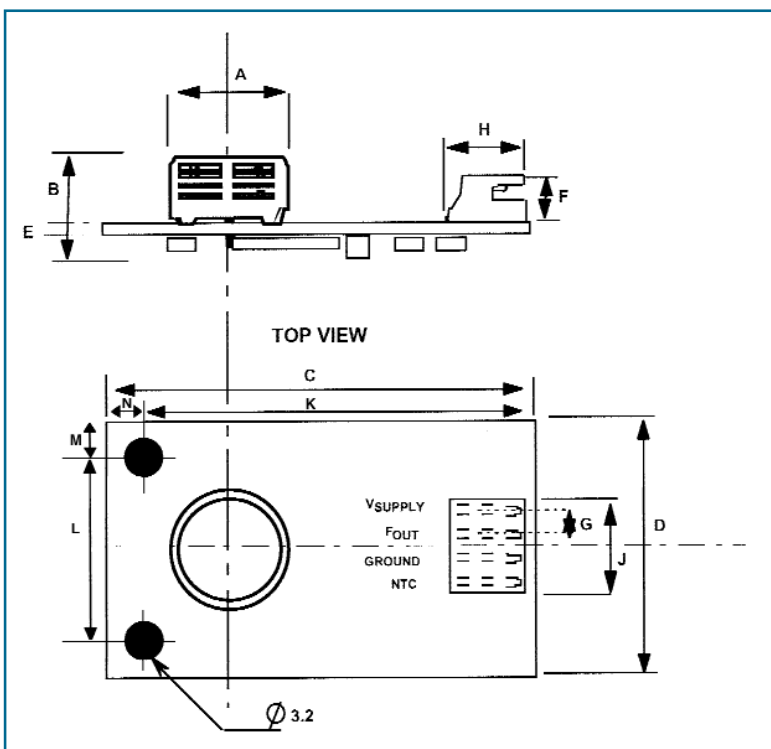
Temperature °C	Resistance (ohm)	Max. Deviation	Temperature °C	Resistance (ohm)	Max. Deviation	Temperature °C	Resistance (ohm)	Max. Deviation	Temperature °C	Resistance (ohm)	Max. Deviation
-30	144790	16636	-2	33100	2230	26	9600	300	54	3360	213
-29	136664	15444	-1	31557	2078	27	9218	300	55	3237	208
-28	129054	14343	0	30029	1932	28	8853	299	56	3126	204
-27	121925	13325	1	28627	1799	29	8506	297	57	3019	200
-26	115243	12383	2	27299	1675	30	8178	296	58	2917	197
-25	109030	11516	3	26042	1560	31	7866	294	59	2819	193
-24	103115	10705	4	24852	1452	32	7568	292	60	2720	189
-23	97565	9953	5	23773	1355	33	7283	290	61	2629	185
-22	92354	9257	6	22708	1261	34	7011	287	62	2542	182
-21	87460	8612	7	21698	1174	35	6734	284	63	2458	178
-20	82923	8020	8	20739	1093	36	6484	281	64	2378	175
-19	78581	7463	9	19829	1017	37	6244	278	65	2304	171
-18	74497	6947	10	18959	946	38	6015	275	66	2229	168
-17	70655	6468	11	18128	879	39	5796	271	67	2158	165
-16	67039	6023	12	17338	817	40	5575	267	68	2089	161
-15	63591	5606	13	16588	759	41	5373	264	69	2022	158
-14	60381	5222	14	15876	705	42	5180	260	70	1960	155
-13	57356	4865	15	15207	654	43	4995	257	71	1898	152
-12	54503	4533	16	14569	607	44	4817	253	72	1839	149
-11	51813	4225	17	13962	563	45	4636	248	73	1782	146
-10	49204	3932	18	13384	522	46	4473	245	74	1727	143
-9	46767	3662	19	12834	484	47	4316	241	75	1673	140
-8	44467	3411	20	12280	447	48	4166	237	76	1622	138
-7	42296	3177	21	11777	413	49	4021	233	77	1573	135
-6	40247	2960	22	11297	382	50	3874	229	78	1526	132
-5	38279	2756	23	10840	353	51	3737	225	79	1480	130
-4	36455	2568	24	10404	325	52	3606	221	80	1432	127
-3	34731	2393	25	10000	300	53	3481	217			

QUALIFICATION PROCESS

Resistance to physical and chemical stresses

- **HF3223 / HTF3223** has passed through qualification processes of HUMIREL including vibration, shock, storage, high temperature and humidity, ESD.
- Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere, SO₂ (0.5%), H₂S (0.5%), O₃, NO_x, NO, CO, CO₂, Softener, Soap, Toluene, acids (H₂SO₄, HNO₃, HCl), HMDS, Insecticide, Cigarette smoke, a non exhaustive list.
- **HF3223 / HTF3223** is not light sensitive.

PACKAGE OUTLINE HF3223 / HTF3223



Dim	A	B	C	D	E	F	G
Min	9.7	8.5	33.5	21.5	1.55	3.5	1.45
Max	10.8	9.5	34.5	22.5	1.65	3.9	1.55

Dim	H	J	K	L	M	N	Φ
Min	4.5	7.3	29.5	13.8	3.5	3.5	3.0
Max	4.7	7.7	30.5	14.2	4.5	4.5	3.4

Dimensions in millimeters

Connector type : JST model S4B-ZR

to be mated with ZHR or 04ZR type female connectors

ORDERING INFORMATION (Multiple Package Quantity of 40 pieces) :

HF3223 : Humidity Frequency output alone

HTF3223 : Humidity Frequency output + NTC (Temperature direct output)

**SAMPLE KIT OF HF 3223 / HTF 3223
IS AVAILABLE THROUGH
HUMIREL WEB SITE**

www.sunstare.com

email :suns@public.szptt.net.cn

The information in this sheet has been carefully reviewed and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Furthermore, this information does not convey to the purchaser of such devices any license under the patent rights to the manufacturer. Humirel reserves the right to make changes without further notice to any product herein. Humirel makes no warranty, representation or guarantee regarding the suitability of its product for any particular purpose, nor does Humirel assume any liability arising out of the application or use of any product or circuit and specifically disclaims any and all liability, including without limitation consequential or incidental damages. « Typical » parameters can and do vary in different applications. All operating parameters, including « Typical » must be validated for each customer applications by customer's technical experts. Humirel does not convey any license under its patent rights nor the rights of others. Humirel products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other application intended to support or sustain life, or for any application in which the failure of the Humirel product could create a situation where personal injury or death may occur. Should buyer purchase or use Humirel products for any such unintended or unauthorized application, Buyer shall indemnify and hold Humirel and its officers, employees, subsidiaries, affiliates and distributors harmless against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Humirel was negligent regarding the design or manufacture of the part. Humirel is a registered trade mark of Humirel.

SUNSTAR自动化 <http://www.sensor-ic.com/> TEL: 0755-83376489 FAX:0755-83376182 E-MAIL:szss20@163.com

深圳市商斯达实业有限公司荣誉出品

欢迎索取免费详细资料、设计选型指南和光盘、样品；产品繁多未能尽录，欢迎来电查询。

中国传感器科技信息网：[HTTP://WWW.SENSOR-IC.COM/](http://www.sensor-ic.com/)

工控安防网：[HTTP://WWW.PC-PS.NET/](http://www.pc-ps.net/)

消费电子专用电路网：[HTTP://WWW.SUNSTARE.COM/](http://www.sunstare.com/)

E-MAIL：xjr5@163.com szss20@163.com

MSN：suns8888@hotmail.com

QQ: 195847376

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-83376549 83376489 83387030 83387016

传真：0755-83376182 83338339 邮编：518033 手机：(0)13902971329

**深圳展销部：深圳华强北路赛格电子市场 2583 号 TEL/FAX：
0755-83665529 25059422**

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL：010-81159046 82615020 13501189838 FAX：010-82613476

上海分公司：上海市北京东路 668 号上海赛格电子市场 2B35 号

TEL：021-28311762 56703037 13701955389 FAX：021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)

西安劳动南路 88 号电子商城二楼 D23 号

TEL：029-81022619 13072977981 FAX:029-88789382

成都：TEL:(0)13717066236

技术支持：0755-83394033 13501568376