

DATASHEET: PHARMALOGG PROBE THR-40125 HUMIDITY AND TEMPERATURE PROBE

- Temperature range from -40 °C to +125 °C
- Relative humidity range from 0% to 100%
- Fully calibrated with 1.8%RH accuracy
- Fully calibrated with 0.2 °C accuracy
- Digital output, I2C interface
- Low power consumption
- Excellent long term stability

PHARMALOGG PROBE THR-40125 is humidity and temperature sensor of AliusGrupa d.o.o. is about to set new standards in terms of size and intelligence.

With a completely new designed CMOSens® chip, a reworked capacitive type humidity sensor and an improved band gap temperature sensor the performance has been lifted even beyond the outstanding level of the previous sensor generation. Every sensor is individually calibrated and tested. Lot identification is printed on the sensor and an electronic identification code is stored on the chip - which can be read out by command. Furthermore, the resolution of PHARMALOGG PROBE THR-40125 can be changed by command (8/12bit up to 12/14bit for RH/T), low battery can be detected and a checksum helps to improve communication reliability.

SENSOR CHIP

PHARMALOGG PROBE THR-40125 features a generation Sensirion 4C CMOSens® chip. Besides the capacitive relative humidity sensor and the band gap temperature sensor, the chip contains an amplifier, A/D converter, OTP memory and a digital processing unit.

MATERIAL CONTENTS

While the sensor itself is made of Silicon the sensors housing consists of a plated Cu lead-frame and green epoxy-based mold compound. The device is fully RoHS and WEEE compliant, e.g. free of Pb, Cd and Hg.

SENSOR PERFORMANCE:

Relative Humidity:

Parameter	Condition	min	typ	max	Units
Resolution ¹	12 bit		0.04		%RH
	8 bit		0.7		%RH
Accuracy tolerance ²	typ		±1.8		%RH
	max	see Figure 1			%RH
Repeatability			±0.1		%RH
Hysteresis			±1		%RH
Nonlinearity			<0.1		%RH
Response time ³	τ63%		8		s
Operating Range	extended ⁴	0		100	%RH
Long Term Drift ⁵	normal		< 0.5		%RH/yr

Temperature:

Parameter	Condition	min	typ	max	Units
Resolution ¹	14 bit		0.01		°C
	12 bit		0.04		°C
Accuracy tolerance ²	typ		±0.2		°C
	max	see Figure 2			°C
Repeatability			±0.1		°C
Operating Range	extended ⁴	-40		125	°C
Response time ⁶	τ63%	5		30	%RH
Long Term Drift			<0.04		°C/yr

— maximal tolerance
 - - - typical tolerance

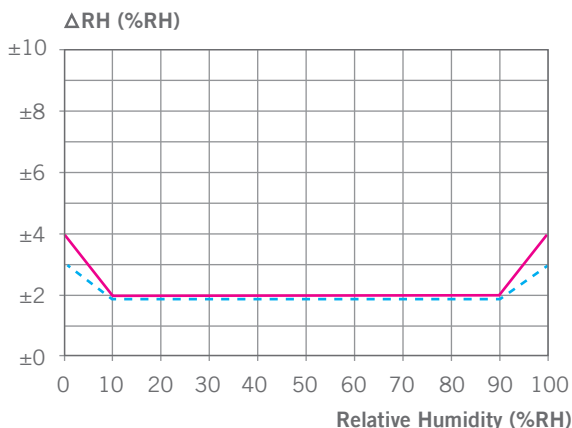


Figure 1: Typical and maximal tolerance at 25°C for relative humidity.

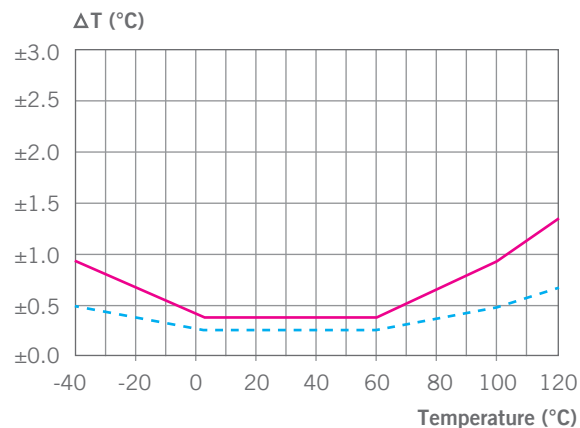


Figure 2: Maximal tolerance for temperature sensor in °C

- 1 Default measurement resolution is 14bit (temperature) / 12bit (humidity). It can be reduced to 12/8bit, 11/11bit or 13/10bit by command to user register.
- 2 Accuracies are tested at Outgoing Quality Control at 25°C and 3.0V. Values exclude hysteresis and long term drift and are applicable to non-condensing environments only.
- 3 Time for achieving 63% of a step function, valid at 25°C and 1m/s airflow.
- 4 Normal operating range: 0-80%RH, beyond this limit sensor may read a reversible offset with slow kinetics (+3%RH after 60h at humidity >80%RH).
- 5 Value may be higher in environments with vaporized solvents, out-gassing tapes, adhesives, packaging materials
- 6 Response time depends on heat conductivity of sensor substrate.

RH ACCURACY AT VARIOUS TEMPERATURES

Maximal tolerance for RH accuracy at 25°C is defined in Figure 1. For other temperatures maximal tolerance has been evaluated to be within limits displayed in Figure 3.

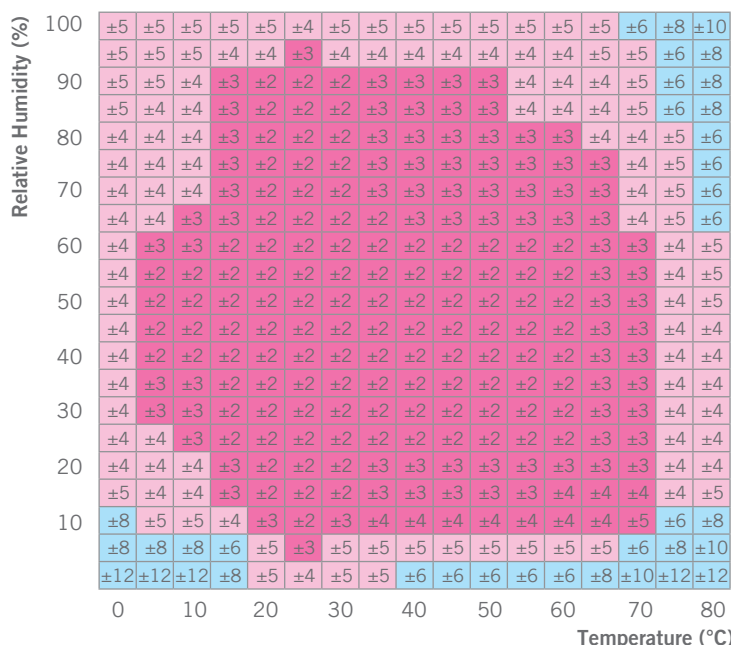


Figure 3: Maximal tolerance of relative humidity measurements given in %RH for temperatures 0-80°C