



# HYGROCHIP

## DIGITAL HUMIDITY SENSOR

### HYT-939

#### Characteristic features

- ▶ Measuring range 0 .. 100 % rH, -40 ... 125 °C
- ▶ Accuracy  $\pm 1.8\%$  rH, Temperature  $\pm 0.2$  °C in the range 0...10% rH  $\pm(0.1\% \text{ rH} + 17\% a_w)$
- ▶ Resistant to pressure up to 16 bar
- ▶ Precisely calibrated and temperature compensated
- ▶ Chemical resistant, dew formation resistant
- ▶ Sealed TO 39 housing with glass grommet and Sinter filter
- ▶ Low Hysteresis, compensated Linearity error and Temperature drift
- ▶ Operating voltage 2.7 ... 5.5V
- ▶ I<sup>2</sup>C, address 0x28 or alternative address
- ▶ RoHS conformance
- ▶ Dimensions 5.2 x 9 mm

#### Typical areas of application

- ▶ Medical systems
- ▶ Autoclaves
- ▶ Pressure dew point measurement
- ▶ Drying systems
- ▶ Laboratories

#### Features

##### HYT 939 – the specialist for compressed air

The welded, hermetically sealed TO39 housing with glass grommet and sinter filter is designed for compressed air systems up to 16 bar.

Due to the humidity calibration process and special polynomial correction method, a high accuracy ( $\pm 0.1\%$  rH) is achieved, especially in the lower humidity region (up to 50 ppm water content). Because of this, the sensor is suitable for dew point measurements to  $-40^\circ\text{C}$  dp, for example, the quality evaluation of medical compressed air.

Precisely calibrated, the HYT 939 delivers an accuracy of  $\pm 1.8\%$  rH and  $\pm 0.2$  °C in the remaining ranges. Features include integrated signal processing for the measurement of the physical parameters of relative humidity and temperature, an I<sup>2</sup>C compatible interface, interchangeability without adjustment as well as mechanical robustness, chemical stability, dew formation resistance and long term stability.

Both the linearity error and temperature drift are corrected "on chip" through computation.

Because of the especially robust construction, the sensor also withstands peak loading at high temperatures. Therefore, this special model is also ideal for extremely sophisticated industrial applications in drying systems and is suitable for medical systems.

Further variants and the full spectrum of HYGROCHIP product series can be found at:

<http://www.ist-ag.com>



All mechanical dimensions are valid at 25°C ambient temperature, if not differently indicated. ■ All data except the mechanical dimensions only have information purposes and are not to be understood as assured characteristics. ■ Technical changes without previous announcement as well as mistakes reserve. ■ The information on this data sheet was examined carefully and will be accepted as correct. No liability in case of mistakes. ■ Load with extreme values during a longer period can affect the reliability.  
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INNOVATIVE SENSOR TECHNOLOGY



# HYGROCHIP

## DIGITAL HUMIDITY SENSOR

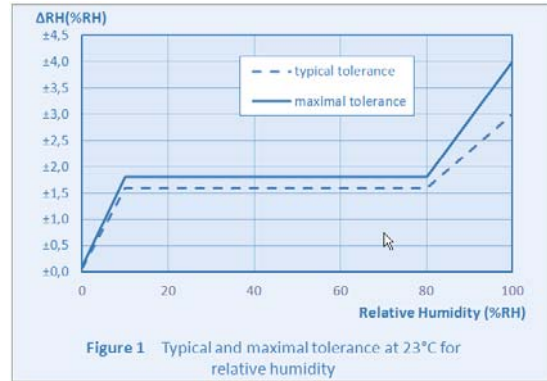
### HYT-939

### Technical data

| Humidity measurement                    |  |
|---|--|
| Humidity measuring range <sup>(2)</sup> | 0 ... 100% rH<br>see Figure 3            |
| Humidity accuracy <sup>(1)</sup>        | ±1.8% rH (10 ... 80% rH)<br>see Figure 1 |
| Accuracy 0...10% rH (0 ... 50°C)        | ±(0.1% rH + 17% a <sub>w</sub> )         |
| Hysteresis (50% rH)                     | < ±1% rH                                 |
| Humidity resolution                     | 0.02% rH                                 |
| Linearity error                         | < ±1% rH                                 |
| Response time t <sub>63</sub>           | < 10 sec with Sinter filter              |
| Tk Residual error (50% rH)              | 0.05% rH / K (0 ... 60 °C)               |
| Long term drift                         | < 0.5 % rH / a                           |
| Measuring principle                     | Capacitive polymer humidity sensor       |

| Temperature measurement       |                                       |
|-------------------------------|---------------------------------------|
| Temperature measuring range   | - 40 ... +125 °C                      |
| Temperature accuracy          | ±0.2 °C (0 ... 60 °C)<br>see Figure 2 |
| Reproducibility               | ±0.1 K                                |
| Response time t <sub>63</sub> | < 10 sec with membrane filter         |
| Temperature resolution        | 0.015 °C                              |
| Long term drift               | < 0.05 K / a                          |
| Measuring principle           | PTA (integrated)                      |

### Relative humidity accuracy



- Figure 1 Typical and maximal tolerance at 23°C for relative humidity
- (1) The accuracy is tested at 23°C and 3.3 V operating voltage in the direction of rising humidity. The accuracy does not include Tk-Residual error, residual linearity error or Hysteresis effect.
  - (2) The maximum dew point is brought down to 80°C.

### Temperature measurement accuracy

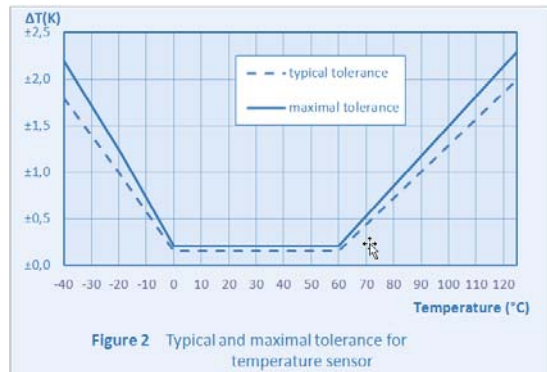


Figure 2 Typical and maximal tolerance for temperature sensor

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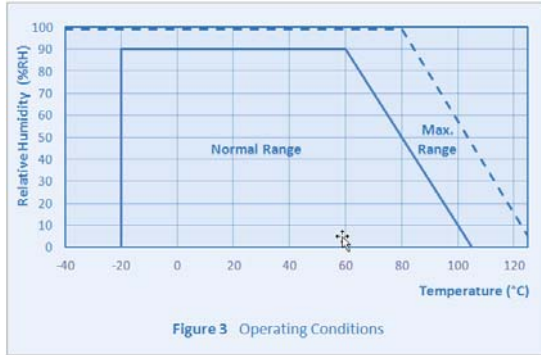


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# HYGROCHIP DIGITAL HUMIDITY SENSOR HYT-939

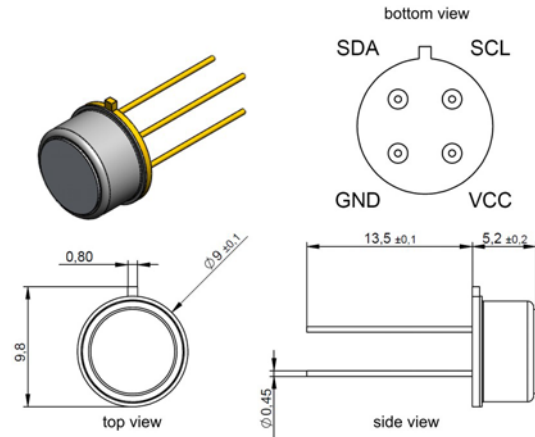
## Humidity application range



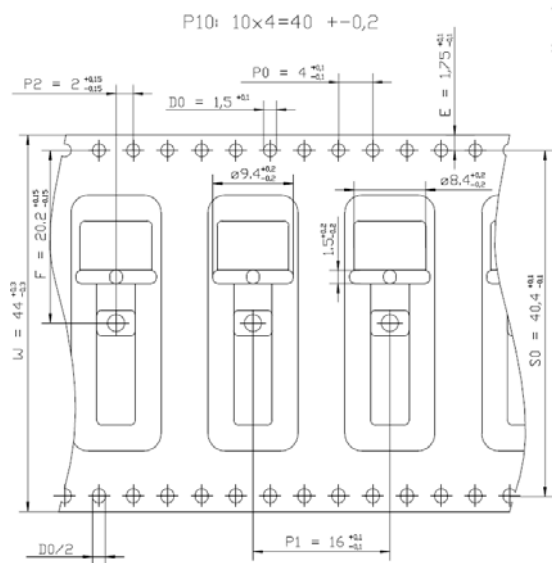
Further information about the component can be found at:

<http://www.ist-ag.com>

## Mechanical dimensions



## Packing



Tape & Reel, 44 mm Strap

| Operating data                |   |
|-------------------------------|---|
| Operating voltage             | 2.7 ... 5.5 V   |
| Current consumption (Nominal) | < 22µA at 1Hz measuring rate<br>850 µA maximum        |
| Current consumption (Sleep)   | < 1µA   |
| Application temperature       | -40 °C ... 125 °C                                     |
| Humidity application range    | 0 ... 100% rH   |
| Digital interface             | I <sup>2</sup> C, address 0x28 or alternative address |

| Limits              |                   |
|---------------------|-------------------|
| Operating voltage   | -0.3 ... 6.0 V    |
| Storage temperature | -50 °C ... 150 °C |

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