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## HYT 271/939P/221 Digital Humidity and Temperature Module Optimal for general purpose humidity applications with best accuracy at 0 - 50 °C and 0 - 90 % RH

## Benefits & Characteristics

- Fast response time (HYT 271)
- Low hysteresis
- Low drift
- Stable at high humidity
- Custom specific versions
- Humidity and temperature sensor with excellent accuracy
- Easy integration, interchangeable without adjustments
- I<sup>2</sup>C protocol
- Fully calibrated and temperature compensated

## The HYT humidity module family

### HYT 271

The fastest and smallest of the HYT family is the 271. The digital module with only  $10.2 \times 5.1 \times 1.8$  mm size offers a wide application window and an optimal priceperformance-ratio. It is only the best solution for fast measurements or sophisticated mass applications.



### HYT 221

The round stainless-steel casing can be easily fitted into housing openings and sealed against a wall with the use of an O-Ring. A textile membrane filter with hydrophobic coating protects the sensor from dust while enabling a compact assembly with high dynamic responsiveness.



The strongest of the HYT modules in TO39 packaging particularly features mechanical robustness. Through glass to metal seals and welding of the stainless-steel cap onto the metal header, it is pressure tight up to 16 bar.





If a higher accuracy or different sensor design is needed, the modular design of HYT allows for high flexibility – the sensor, its calibration and assembly can easily be adapted to develop tailor-made modules fulfilling individual demands. Customized IST AG humidity modules feature extraordinary response times, high accuracies in condensing environment or low humidity conditions. Please contact us for custom specific versions.



## **Innovative** Sensor Technology

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# Technical Data

|                                  | Humdity  |        |        | Temperature              |        |        |
|----------------------------------|--|--------|--------|--------------------------|--------|--------|
| Accuracy:                        | ±1.8 % RH at +23 °C (0 % RH to 90 % RH)  |        |        | ±0.2 °C (0 °C to +60 °C) |        |        |
| Reproducibility:                 | ±0.2 % RH  |        |        | ±0.1 °C                  |        |        |
| Resolution:                      | 0.03 % RH  |        |        | 0.015 °C                 |        |        |
| Response time t <sub>63</sub> 1: | 271  | 221    | 939P   | 271                      | 221    | 939P   |
|                                  | < 4 s  | < 10 s | < 10 s | < 5 s                    | < 10 s | < 10 s |
| Long-term drift:                 | < 0.5 % RH/a (at 23 °C and 30 % RH<br>to 70 % RH in synthetic air)<br>Exposure to VOCs can lead to higher values. Please find<br>more details in HYT application note. |        |        | < 0.05 °C/a              |        |        |
| Measurement principle:           | Capacitive polymer humidity sensor   |        |        | PTAT (integrated)        |        |        |

| Hysteresis:                    | < ±1 % RH at 25 ℃   |
|--------------------------------|---|
| Operating voltage:             | 2.7 V to 5.5 V  |
| Current consumption (nominal): | < 22 µA at 1 Hz measuring rate; 850 µA max.   |
| Current consumption (sleep):   | < 1 µA  |
| Digital interface:             | l <sup>2</sup> C, address 0x28 or alternative address   |
| Operating voltage (limits):    | -0.3 V to 6 V   |
| Measuring range <sup>2</sup> : | 0 °C to 50 °C, 0 % RH to 90 % RH<br>For usage in condensing environment please refer to HYT application note.             |
| Operating range <sup>3</sup> : | -40 to 125 °C, 0 to 100 % RH<br>Non-condensing. For usage in condensing environment please refer to HYT application note. |
| Storage conditions:            | -5 to 30 °C, < 30 % RH<br>Please refer to HYT application note for packaging recommendations.                             |

<sup>1)</sup> The response time is often measured for increasing humidity steps, whereas physics predicts that decreasing humidity leads to generally far longer response times for capacitive humidity sensors. IST always measures response times for decreasing humidity values, since this is the worst case.

<sup>2)</sup> In the specified range the modules measure within typical tolerance ±1.8 % RH, see Fig. 1. At T > 50 °C and/or high humidity over a long period of time, an offset in the % RH signal can occur. Please refer to HYT application note for reconditioning procedure.

<sup>3)</sup> Specifies the range the modules work without permanent damage. % RH/T tolerances etc. cannot be guaranteed in these conditions.



±2.5 Typical tolerance ±2.0 ±1.5 ∆T [°C] ±1.0 ±0.5 ±0.0 -40 -20 0 20 40 60 80 100 120 Temperature [°C]

Fig. 1: Typical tolerance of the % RH measurement



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## HYT 271

Mechanical Dimensions



## HYT 221

**Mechanical Dimensions** 



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## HYT 939P



## Order information

| Version           | HYT 271 | HYT 221 | HYT 939P                              |  |
|-------------------|---------|---------|---------------------------------------|--|
| Order code        | 153349  | 153680  | 153658                                |  |
| Former order code | 103921  | 103923  | 103922 (HYT 939)<br>103941 (HYT 939P) |  |

## Additional Documents

|                  | Document name |
|------------------|---------------|
| Application Note | AHHYTM_E      |

Please find software code examples on www.ist-ag.com.



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