T9602 Humidity & Temperature Sensor for OEM Installation

**Features**
- Fully calibrated and temperature compensated
- Water resistant (IP 67 Certified)
- Digital or Pulse Density Modulated convertible to analogue
- Available in multiple flexible cable lengths
- Precision & accuracy (±2% RH, ±0.5°C, 14 bit resolution)
- Low current consumption
- Designed for reliability in harsh environments
- Flexible mounting options

**Applications**
- Process Control & Instrumentation - Medical Instruments, Handheld Devices, Weather Stations, Food Processing, printers, RFID's

The T9602 offers the most advanced and cost effective humidity and temperature sensing solution for virtually any type of application. Based on our own capacitive polymer sensor chip and ASIC integrated into an easy mount OEM package. Each sensor is individually calibrated and tested. The T9602 is simple and ready to use without further calibration or temperature compensation. The T9602 provides linearized output signals in one of two interfaces to meet customer requirements.

- I²C interface
- PDM output convertible to an analogue signal
- Refer to Application guide section for more detailed interfacing information

Amphenol Advanced Sensors
### Assembly Accuracy Specifications

#### Relative Humidity (RH%)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Accuracy</th>
<th>Repeatability</th>
<th>Hysteresis</th>
<th>Linearity</th>
<th>Response Time</th>
<th>Temp Coefficient</th>
<th>Operating Range</th>
<th>Long Term Drift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>14 bit (0.01% RH)</td>
<td>±0.2% RH</td>
<td>±1.0% RH</td>
<td>&lt;2.0% RH</td>
<td>≤29 sec (T 63%)</td>
<td>0.13% RH/°C</td>
<td>0 ~ 95% RH</td>
<td>&lt;0.5% RH/year</td>
</tr>
<tr>
<td>Accuracy¹</td>
<td>±2.0% RH (20~80% RH)</td>
<td>±0.2% RH</td>
<td>±1.0% RH</td>
<td>&lt;2.0% RH</td>
<td>≤29 sec (T 63%)</td>
<td>0.13% RH/°C</td>
<td>0 ~ 95% RH</td>
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</tr>
<tr>
<td></td>
<td>±3.5% RH (0% to 20%) and (80% to 100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Repeatability</td>
<td>±2.0% RH</td>
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</tr>
<tr>
<td>Hysteresis</td>
<td>±0.2% RH</td>
<td>±2.0% RH</td>
<td>±1.0% RH</td>
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</tr>
<tr>
<td>Linearity</td>
<td>±2.0% RH</td>
<td>±2.0% RH</td>
<td>±1.0% RH</td>
<td>&lt;2.0% RH</td>
<td>≤29 sec (T 63%)</td>
<td>0.13% RH/°C</td>
<td>0 ~ 95% RH</td>
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</tr>
</tbody>
</table>

1. Accuracies measured at 25°C, nominal voltage.
2. 30% RH step response, measured at 25°C in a 1 m/sec air flow.

#### Temperature (°C)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Accuracy¹</th>
<th>Repeatability</th>
<th>Response Time²</th>
<th>Operating Range³</th>
<th>Long Term Drift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>14 bit (0.01°C)</td>
<td>±0.1°C</td>
<td>≤116 sec (T 63%)</td>
<td>-20°C to 70°C</td>
<td>&lt;0.05°C/year</td>
</tr>
<tr>
<td>Accuracy¹</td>
<td>±0.5°C</td>
<td>±0.1°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.1°C</td>
<td>±0.1°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time²</td>
<td>≤116 sec (T 63%)</td>
<td>±0.1°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Range³</td>
<td>-20°C to 70°C</td>
<td>±0.1°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Term Drift</td>
<td>&lt;0.05°C/year</td>
<td>±0.1°C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Accuracies measured at 25°C, nominal voltage.
2. 25°C step response in a 1 m/sec air flow.
3. Minimum design range, documented testing 0°C to 50°C.

### Typical %RH Accuracy

![Typical %RH Accuracy Graph](image)

### Typical Temperature Accuracy

![Typical Temperature Accuracy Graph](image)

### Application Guide

Users can refer to Application Guide AAS-916-127 to find the firmware requirements needed to interface to the digital sensors in the update mode, as well as the processes necessary to convert the Pulse Density Modulated (PDM) outputs to analogue outputs.
Hardware and Environmental Specifications

Method
Capacitive polymer RH Sensor, PTA (Proportional to Absolute) integrated temperature sensor.

Operating Conditions
• -20°C to 70°C
• 0% to 100% RH

Storage Conditions
• -40°C to 85°C

Output Modes
• Digital Models - I²C
• Analogue Models - PDM (Convertible to analogue)

Power Supply Requirements
• 3.3 VDC or 5.0 VDC ±5% (Nominal voltage is model dependent)

Current Consumption
• 750 µA (typical)

Cable
• Outer Diameter 4.20 ± 0.20 mm, 4 Core, shielded, double insulated and flexible
• Varying lengths dependent on the model. Refer to the ordering information

Connector
• Manufacturer - JST
• Sensor Connector Housing - Part Number EHR-4
• Sensor Connector Header - Part Numbers B4B-EH-A or S4B-EH

Mounting Options
• Grommet or cable P Clamp
• P Clamp - 9.53 mm Hellermann Tyton (MPN T3D03750M4) or equivalent
• Grommet – 11 mm Advanced Antivibration Components (MPN V12R30M16004616) or equivalent.

Approvals and Qualifications
• RoHS / REACH Compliant
• IP67 Certified
• Halogen Free Design
• Cable UL VW-1 Certified

Warranty Terms
• 12 months

Internal Wiring Diagrams

T9602 Digital Wiring Diagram

19602 Analog Wiring Diagram
Sensor Pin Design

**Digital**
1. V+
2. Ground
3. SDA
4. SCL

**Analogue**
1. V+
2. Ground
3. PDM RH
4. PDM Temp

Customer Interface Drawing

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Output</th>
<th>Operating Voltage</th>
<th>Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>T9602-3-D</td>
<td>I2C Digital</td>
<td>3V</td>
<td>1.8m cable length</td>
</tr>
<tr>
<td>T9602-5-D</td>
<td>I2C Digital</td>
<td>5V</td>
<td>1.8m cable length</td>
</tr>
<tr>
<td>T9602-3-D-1</td>
<td>I2C Digital</td>
<td>3V</td>
<td>1m cable length</td>
</tr>
<tr>
<td>T9602-5-D-1</td>
<td>I2C Digital</td>
<td>5V</td>
<td>1m cable length</td>
</tr>
<tr>
<td>T9602-3-A</td>
<td>PDM Analogue</td>
<td>3V</td>
<td>1.8m cable length</td>
</tr>
<tr>
<td>T9602-5-A</td>
<td>PDM Analogue</td>
<td>5V</td>
<td>1.8m cable length</td>
</tr>
<tr>
<td>T9602-3-A-1</td>
<td>PDM Analogue</td>
<td>3V</td>
<td>1m cable length</td>
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