

# Humidity Sensor Units

Unit type

CHS series

Type: CHS-U (For industrial use and measuring equipment)  
CHS-SS(For consumer and office equipment)  
CHS-C(For consumer and office equipment)

Issue date: January 2010

- All specifications are subject to change without notice.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

# Humidity Sensor Units

## CHS Series CHS-U, -SS, -C Types

TDK's CHS series humidity sensors are compact and extremely simple to apply. Because they contain the necessary circuitry, there is no need to provide additional control circuitry or perform time-consuming calibration. With simple connection to a power supply, they will output DC at 100% relative humidity. This makes it possible to read RH directly with a voltmeter.

### CHS-U TYPE

For industrial use and measuring equipment

#### FEATURES

- These sensors can measure a wide range of humidity – from 5(%) to 95(%)RH.
- They are highly accurate. The nominal accuracy for the CHS-UPR and CHR-UPS is within  $\pm 3$ (%) RH.

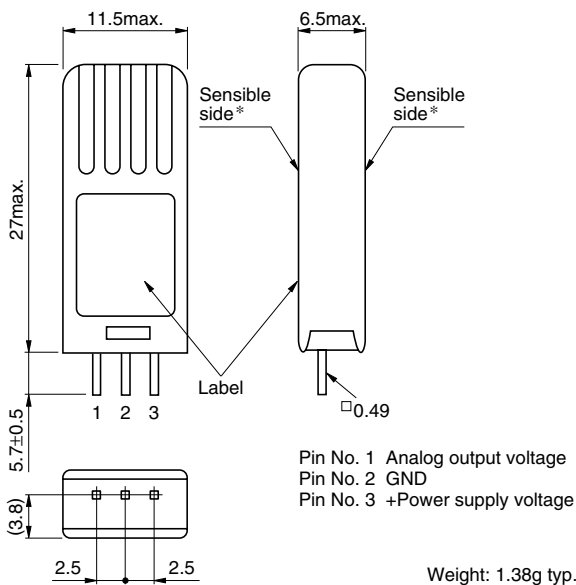
| Type                  | CHS-UGS<br>CHS-UGR | CHS-UPS<br>CHS-UPR |
|-----------------------|--------------------|--------------------|
| Nominal accuracy(%)RH | $\pm 5$            | $\pm 3$            |
| Measuring range(%)RH  | 5 to 95            | 5 to 95            |

- Characteristics are stable over a wide temperature range.
- Humidity sensing characteristics exhibit virtually no hysteresis.
- Highly cost-effective and compact, requiring extremely little mounting space.
- Low current consumption.
- Outputs DC.1V at 100(%)RH; relative humidity can be read directly with a voltmeter.
- All-in-one construction integrates sensor with support circuitry. The entire module operates off a 5V power supply.
- Generated ripple at low humidity levels will not exceed 2.5mV.

### SHAPES AND DIMENSIONS

#### SQUARE TYPE

##### CHS-UGS, -UPS

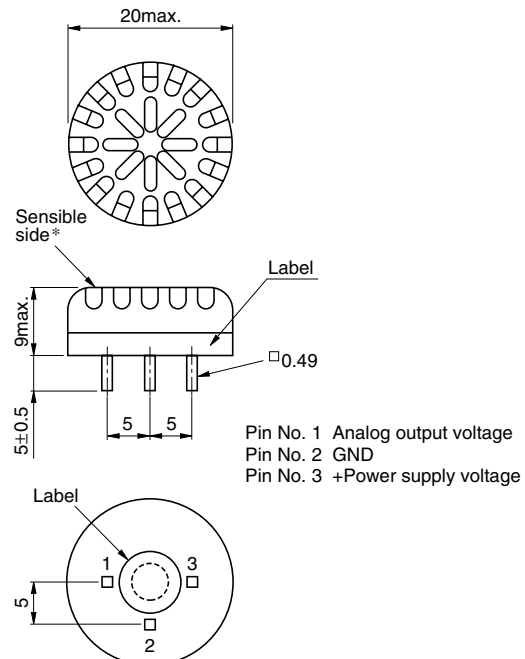


#### MAXIMUM RATINGS (Ta=25°C)

|                          |   |
|--------------------------|---|
| Power supply voltage Edc | 7V max.   |
| Operating conditions     | 0 to +50°C, power supply voltage 5V, without dewing |
| Storage conditions       | -20 to +60°C, without dewing                        |

#### ROUND TYPE

##### CHS-UGR, -UPR



\*When installing the device, ensure that the humidity sensing surface is not obstructed.

Weight: 1.68g typ.

Dimensions in mm  
Tolerance:  $\pm 0.2$

## CHS-U TYPE

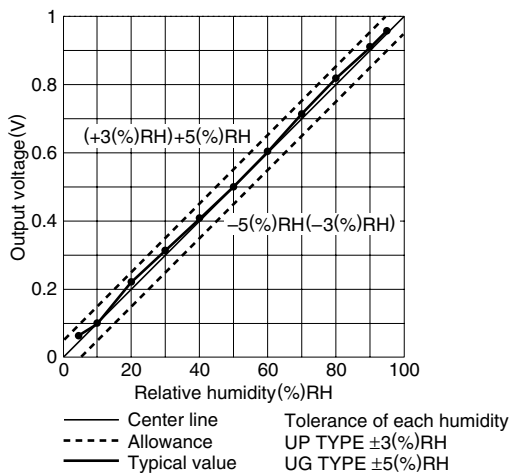
### ELECTRICAL CHARACTERISTICS

| Item                                  | Specifications |          |         | Conditions  |
|---------------------------------------|----------------|----------|---------|---|
|                                       | Minimum        | Standard | Maximum |   |
| Operating voltage Edc (V)             | 4.75           | 5        | 5.25    |   |
| Operating current(mA)                 |                |          | 0.6     | E <sub>dc</sub> =5V, 25°C   |
| Output voltage(mV)/(%)RH              |                | 10       |         | E <sub>dc</sub> =5V, 25°C, 5 to 95(%)RH   |
| Output impedance(kΩ)                  |                | (200)*   |         | at DC   |
| Accuracy(%)RH                         | CHS-UPS, -UPR  | -3       | +3      | E <sub>dc</sub> =5V, 25°C, 5 to 95(%)RH<br>(For details, please refer to typical characteristics) |
|                                       | CHS-UGS, -UGR  | -5       | +5      |   |
| Hysteresis(%)RH                       |                | ≈0       |         | Stable time: 20min  |
| Temperature dependency(%)RH           |                | -5       | +5      | E <sub>dc</sub> =5V, 25°C standard, +5 to +45°C, 5 to 95(%)RH                                     |
| Response time(min)                    |                | 1        |         | Response time to reach 90% of actual humidity as for from 30 to 85(%)RH                           |
| Recommended operating temperature(°C) | +5             |          | +45     | E <sub>dc</sub> =5V   |

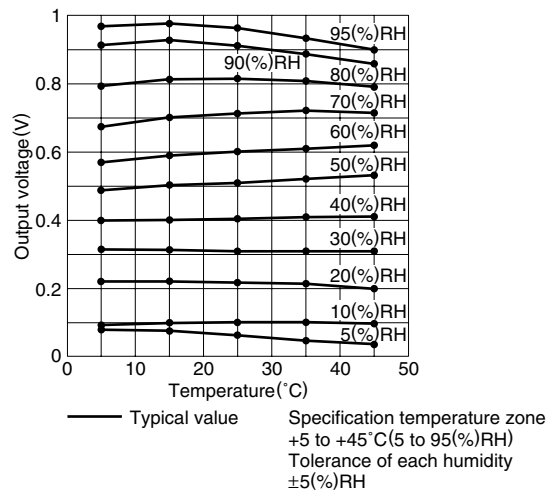
\*( ): Reference value

### TYPICAL CHARACTERISTICS

#### SENSOR LINEARITY CHARACTERISTICS (T<sub>a</sub>=25°C E<sub>dc</sub>=5V)



#### TEMPERATURE DEPENDENCY CHARACTERISTICS



## CHS-SS TYPE

For consumer and office equipment

### FEATURES

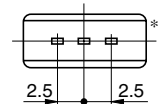
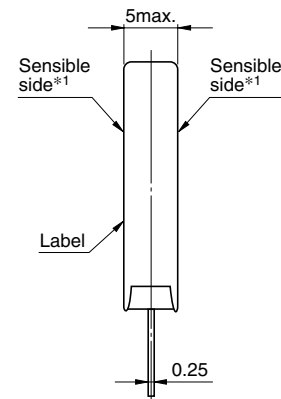
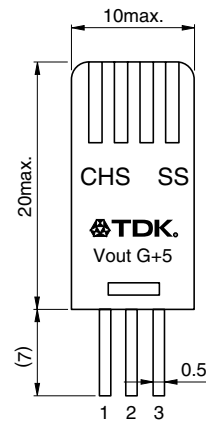
- Humidity sensing characteristics exhibit virtually no hysteresis.
- Compact size.
- Low current consumption.
- Outputs DC.1V at 100(%)RH; relative humidity can be read directly with a voltmeter.
- All-in-one construction integrates sensor with support circuitry. The entire module operates off a 5V power supply.
- Generated ripple at low humidity levels will not exceed 2.5mV.

|                       |          |
|-----------------------|----------|
| Type                  | CHS-MSS  |
| Nominal accuracy(%)RH | ±5       |
| Measuring range(%)RH  | 20 to 85 |

### MAXIMUM RATINGS (Ta=25°C)

|                                      |   |
|--------------------------------------|---|
| Power supply voltage E <sub>dc</sub> | 7V max.   |
| Operating conditions                 | 0 to +50°C, power supply voltage 5V, without dewing |
| Storage conditions                   | -20 to +60°C, without dewing                        |

### SHAPES AND DIMENSIONS SQUARE TYPE



Pin No. 1 Analog output voltage  
Pin No. 2 GND  
Pin No. 3 +Power supply voltage

\*1 When installing the device, ensure that the humidity sensing surface is not obstructed.  
\*2 The three leads are parallel to within 0.2mm.

Weight: 1.1g typ.

Dimensions in mm  
Tolerance: ±0.2

### ELECTRICAL CHARACTERISTICS

| Item                                  | Specifications |          |         | Conditions   |
|---------------------------------------|----------------|----------|---------|--|
|                                       | Minimum        | Standard | Maximum |  |
| Operating voltage E <sub>dc</sub> (V) | 4.75           | 5        | 5.25    |  |
| Operating current(mA)                 |                |          | 0.6     | E <sub>dc</sub> =5V, 25°C  |
| Output voltage(mV)/(%)RH              |                | 10       |         | E <sub>dc</sub> =5V, 25°C  |
| Output impedance(kΩ)                  |                | (200)*   |         | at DC  |
| Accuracy(%)RH                         | -5             |          | +5      | E <sub>dc</sub> =5V, 25°C, 20 to 85(%)RH(For details, please refer to typical characteristics) |
| Hysteresis(%)RH                       |                | ≈0       |         | Stable time: 20min   |
| Temperature dependency(%)RH           | -5             |          | +5      | E <sub>dc</sub> =5V, 25°C standard   |
| Response time(min)                    |                | 1        |         | Response time to reach 90% of actual humidity as for from 30 to 85(%)RH                        |
| Recommended operating temperature(°C) | +15            |          | +35     | E <sub>dc</sub> =5V, without dewing(For details, please refer to typical characteristics)      |

\*( ): Reference value

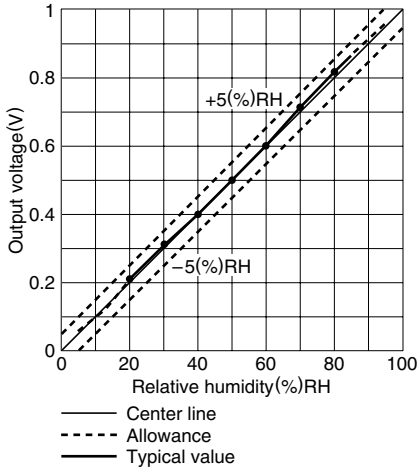


**CHS-SS TYPE**

**TYPICAL CHARACTERISTICS**

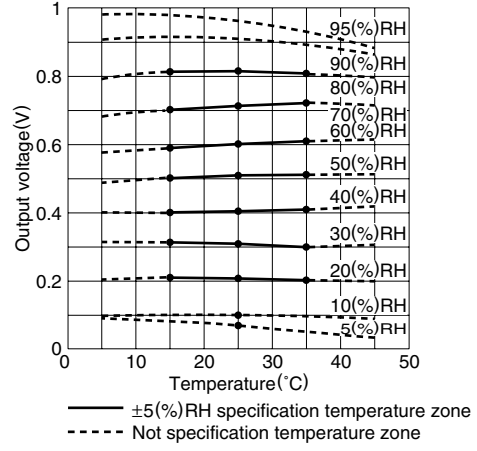
**SENSOR LINEARITY CHARACTERISTICS (Ta=25°C Edc=5V)**

**CHS-MSS TYPE**



**TEMPERATURE DEPENDENCY CHARACTERISTICS**

**CHS-MSS TYPE**



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## CHS-C TYPE

For consumer and office equipment

### FEATURES

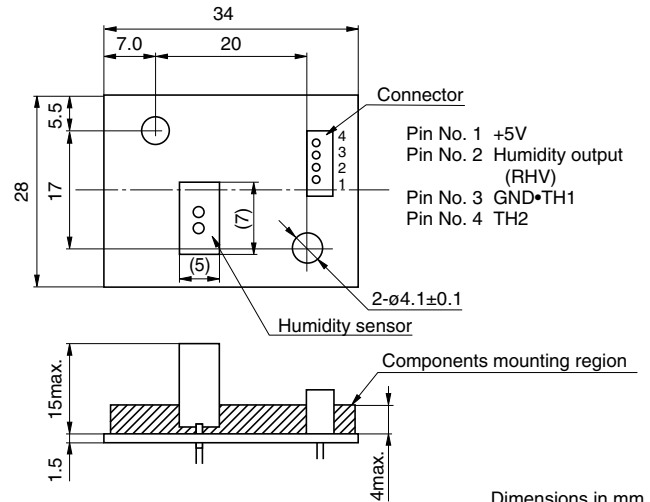
- Temperature detection thermistor can be added.
- Humidity sensing characteristics exhibit virtually no hysteresis.
- Low current consumption.
- Absolute humidity can be read directly with DC. 1V voltmeter.
- All-in-one construction incorporates circuits and 5V power supply operation.
- Generated ripple at low humidity levels will not exceed 2.5mV.

|                       |            |
|-----------------------|------------|
| Type                  | CHS-CMC-__ |
| Nominal accuracy(%)RH | ±5         |
| Measuring range(%)RH  | 30, 50, 80 |

### MAXIMUM RATINGS (Ta=25°C)

|                          |   |
|--------------------------|---|
| Power supply voltage Edc | 7V max.   |
| Operating conditions     | 0 to +50°C, power supply voltage 5V, without dewing |
| Storage conditions       | -20 to +60°C, without dewing                        |

### SHAPES AND DIMENSIONS



Dimensions in mm  
Tolerance: ±0.5

### ELECTRICAL CHARACTERISTICS

| Item                                  | Specifications |               |               | Conditions   |
|---------------------------------------|----------------|---------------|---------------|--|
|                                       | Minimum        | Standard      | Maximum       |  |
| Operating voltage Edc (V)             | 4.75           | 5             | 5.25          |  |
| Operating current(mA)                 |                |               | 0.6           | E <sub>dc</sub> =5V, 25°C  |
| Output impedance(kΩ)                  |                | (200)         |               | at DC  |
| Accuracy(%)RH                         | 30(%)RH        | -5<br>(0.5V)  | +5<br>(0.7V)  | E <sub>dc</sub> =5V, 25°C<br>(For details, please refer to typical characteristics)          |
|                                       | 50(%)RH        | -5<br>(0.86V) | +5<br>(1.06V) |  |
|                                       | 80(%)RH        | -5<br>(1.5V)  | +5<br>(1.7V)  |  |
| Hysteresis(%)RH                       |                | ≈0            |               | Stable time: 20 min  |
| Temperature dependency(%)RH           | -5             |               | +5            | E <sub>dc</sub> =5V, 25°C standard<br>(For details, please refer to typical characteristics) |
| Response time(min)                    |                | 1             |               | Response time to reach 90% of actual humidity as for from 30 to 85(%)RH                      |
| Recommended operating temperature(°C) | +15            |               | +35           | E <sub>dc</sub> =5V  |

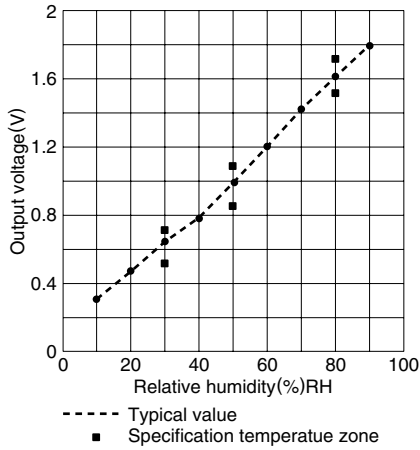
### RECOMMENDED CHARACTERISTICS OF TEMPERATURE DETECTION THERMISTOR

|                                       |                   |
|---------------------------------------|-------------------|
| Part No.                              | NTCCM16084BH103JC |
| Resistance value(Between TH1 and TH2) | 10kΩ±5%           |
| Constant B                            | 4100K±3%          |
| Maximum rated power                   | 230mW             |

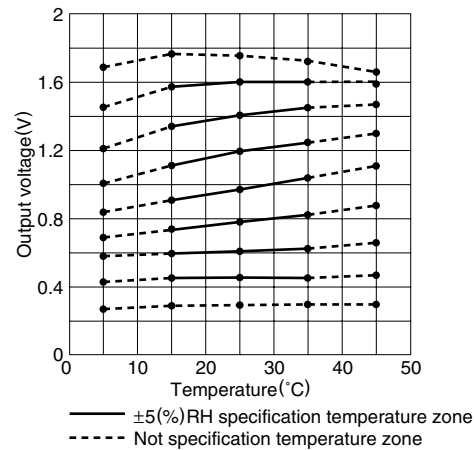
### CHS-C TYPE

#### TYPICAL CHARACTERISTICS

##### SENSOR LINEARITY CHARACTERISTICS(Ta=25°C, Edc=5V)

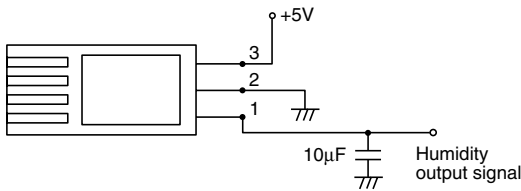


##### TEMPERATURE DEPENDENCY CHARACTERISTICS

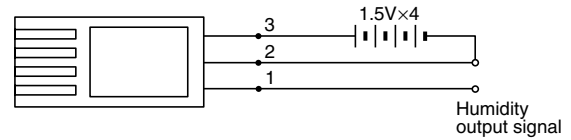


#### TYPICAL APPLICATIONS

##### HUMIDITY MONITOR



##### BATTERY POWERED SYSTEM



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