

**On-wall outdoor humidity sensors (± 2.0%),
for mixture ratio, relative/absolute humidity,
dew point, enthalpy (switchable) and temperature,
with multi-range switching, with active output**

The universal humidity sensors **HYGRASGARD® AAVTF** are used to determine diverse characteristic variables in humidity measurement. The relative humidity and temperature of the ambient air are measured. From these measurands, the different characteristic variables are internally calculated.

For device version x-U, two outputs of 0 - 10V are available, for Version x-I two outputs of 4...20 mA. Here, the output variables for these outputs can be defined using DIP switches. Selectable for output 1 are relative humidity [% RH], absolute humidity [g/m³], mixture ratio [g/kg], dew point temperature [°C], or enthalpy [kJ/kg] (while neglecting the atmospheric air pressure). At output 2, four different measuring ranges for ambient temperature [°C] are selectable. Ex-factory condition (default) for output 1 is relative humidity 0...100% RH, for output 2 temperature measuring range 0...+50 °C. Due to the different configuration alternatives provided, numerous measurement and control tasks can be solved by just one device. These devices must be operated in pollutant-free, non-precipitating air, with neither above-atmospheric nor below-atmospheric pressure at the sensors. Application examples include medical technology, refrigeration, air conditioning, and clean room technology. These sensors are suitable for wall mounting.

TECHNICAL DATA

| | |
|---------------------|---|
| Power supply: | 24 V AC (±20%); 15...36 V DC for U variant 15...36 V DC for I variant, depending on working resistance, residual ripple stabilised ±0.3 V |
| Working resistance: | R _a (ohm) = (U _b -14 V) / 0.02 A for I variant |
| Load resistance: | R _L > 5 kOhm for U variant |
| Power consumption: | < 1 W at 24 V DC; < 2 VA at 24 V AC |
| Sensors: | Digital humidity sensor with integrated temperature sensor, low hysteresis, high long-term stability |
| Sensor protection: | Plastic sinter filter, Ø 16 mm, L = 35 mm, exchangeable (optional metal sinter filter, Ø 16 mm, L = 32 mm) |

HUMIDITY

| | |
|----------------------------|---|
| Measuring range, humidity: | Multi-range switching with 8 switchable measuring ranges (see table) 0...100% RH (default) |
| Operating range, humidity: | 10...95% RH, without formation of dew |
| Accuracy, humidity: | typically ± 2.0% (20...80% RH) at +25 °C, otherwise ± 3.0% Deviations of other outputs result from deviations of humidity and temperature. |
| Output 1, humidity: | 0 - 10V for U variant (see table) 4...20 mA for I variant (see table) |

TEMPERATURE

| | |
|-------------------------------|--|
| Measuring range, temperature: | Multi-range switching with 4 switchable measuring ranges (see table) 0...+50 °C (default); -20...+80 °C; -35...+75 °C; -35...+35 °C |
| Operating range, temperature: | -35...+85 °C sensors |
| Accuracy, temperature: | typically ± 0.6 K at +25 °C |
| Output 2, temperature: | 0 - 10V for U variant (see table) 4...20 mA for I variant (see table) |
| Ambient temperature: | storage -35...+85 °C; operation -30...+70 °C, non-precipitating |
| Electrical connection: | 4-wire connection for U variant 3-wire connection for I variant (Transmitter) 0.14 - 1.5 mm ² , via terminal screws |
| Housing: | Plastic, UV-resistant, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted/Phillips head combination), colour traffic white (similar to RAL 9016), housing cover for display is transparent! |
| Housing dimensions: | 72 x 64 x 37.8 mm (Tyr 1 without display) 72 x 64 x 43.3 mm (Tyr 1 with display) |
| Cable connection: | Cable gland, plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm) or M12 connector according to DIN EN 61076-2-101 (optional on request) |
| Protective tube: | Stainless steel V2A (1.4301), Ø=16 mm, NL =55 mm |
| Process connection: | by screws |
| Protection class: | III (according to EN 60 730) |
| Protection type: | IP 65 (according to EN 60 529) Housing tested, TÜV SÜD, Report No. 713139052 (Tyr 1) |
| Standards: | CE conformity according to EMC directive 2014/30/EU |
| Optional: | two-line display with illumination, cutout approx. 36x15 mm (W x H), for displaying actual temperature and actual humidity, as well as the selectable output variables |

ACCESSORIES see last chapter

AAVTF
with plastic sinter filter
(standard)



SF-M
Metal sinter filter
(optional)





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Dimensional drawing

AAVTF

without display

with display

with plastic sinter filter (standard)

M12 connector (optional on request)



Temperature table MR: -35...+75 °C

| °C | U _A [V] | I _A [mA] |
|-----|--------------------|---------------------|
| -35 | 0.0 | 4.0 |
| -30 | 0.5 | 4.7 |
| -25 | 0.9 | 5.5 |
| -20 | 1.4 | 6.2 |
| -15 | 1.8 | 6.9 |
| -10 | 2.3 | 7.6 |
| -5 | 2.7 | 8.4 |
| 0 | 3.2 | 9.1 |
| 5 | 3.6 | 9.8 |
| 10 | 4.1 | 10.5 |
| 15 | 4.5 | 11.3 |
| 20 | 5.0 | 12.0 |
| 25 | 5.5 | 12.7 |
| 30 | 5.9 | 13.5 |
| 35 | 6.4 | 14.2 |
| 40 | 6.8 | 14.9 |
| 45 | 7.3 | 15.6 |
| 50 | 7.7 | 16.4 |
| 55 | 8.2 | 17.1 |
| 60 | 8.6 | 17.8 |
| 65 | 9.1 | 18.5 |
| 70 | 9.5 | 19.2 |
| 75 | 10.0 | 20.0 |

Temperature table MR: -35...+35 °C

| °C | U _A [V] | I _A [mA] |
|-----|--------------------|---------------------|
| -35 | 0.0 | 4.0 |
| -30 | 0.7 | 5.1 |
| -25 | 1.4 | 6.3 |
| -20 | 2.1 | 7.4 |
| -15 | 2.9 | 8.6 |
| -10 | 3.6 | 9.7 |
| -5 | 4.3 | 10.9 |
| 0 | 5.0 | 12.0 |
| 5 | 5.7 | 13.1 |
| 10 | 6.4 | 14.3 |
| 15 | 7.1 | 15.4 |
| 20 | 7.9 | 16.6 |
| 25 | 8.6 | 17.7 |
| 30 | 9.3 | 18.9 |
| 35 | 10.0 | 20.0 |

Temperature table MR: 0...+50 °C

| °C | U _A [V] | I _A [mA] |
|----|--------------------|---------------------|
| 0 | 0.0 | 4.0 |
| 5 | 1.0 | 5.6 |
| 10 | 2.0 | 7.2 |
| 15 | 3.0 | 8.8 |
| 20 | 4.0 | 10.4 |
| 25 | 5.0 | 12.0 |
| 30 | 6.0 | 13.6 |
| 35 | 7.0 | 15.2 |
| 40 | 8.0 | 16.8 |
| 45 | 9.0 | 18.4 |
| 50 | 10.0 | 20.0 |

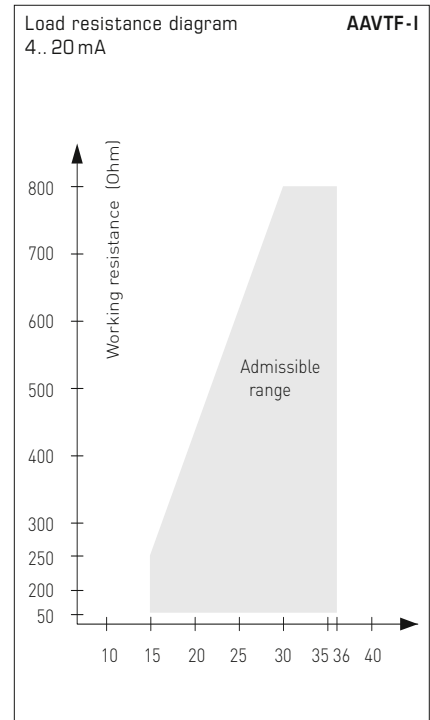
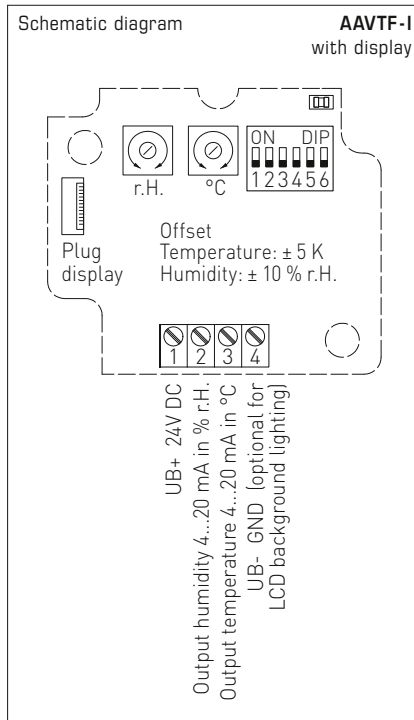
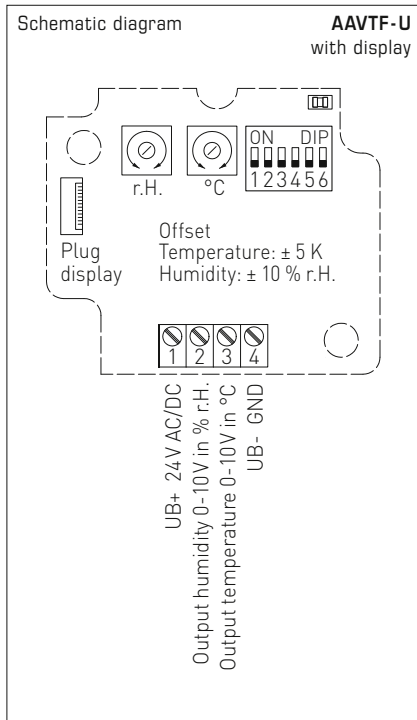
Temperature table MR: -20...+80 °C

| °C | U _A [V] | I _A [mA] |
|-----|--------------------|---------------------|
| -20 | 0.0 | 4.0 |
| -15 | 0.5 | 4.8 |
| -10 | 1.0 | 5.6 |
| -5 | 1.5 | 6.4 |
| 0 | 2.0 | 7.2 |
| 5 | 2.5 | 8.0 |
| 10 | 3.0 | 8.8 |
| 15 | 3.5 | 9.6 |
| 20 | 4.0 | 10.4 |
| 25 | 4.5 | 11.2 |
| 30 | 5.0 | 12.0 |
| 35 | 5.5 | 12.8 |
| 40 | 6.0 | 13.6 |
| 45 | 6.5 | 14.4 |
| 50 | 7.0 | 15.2 |
| 55 | 7.5 | 16.0 |
| 60 | 8.0 | 16.8 |
| 65 | 8.5 | 17.6 |
| 70 | 9.0 | 18.4 |
| 75 | 9.5 | 19.2 |
| 80 | 10.0 | 20.0 |

Humidity table MR: 0...100% RH

| % RH | U _A [V] | I _A [mA] |
|------|--------------------|---------------------|
| 0 | 0.0 | 4.0 |
| 5 | 0.5 | 4.8 |
| 10 | 1.0 | 5.6 |
| 15 | 1.5 | 6.4 |
| 20 | 2.0 | 7.2 |
| 25 | 2.5 | 8.0 |
| 30 | 3.0 | 8.8 |
| 35 | 3.5 | 9.6 |
| 40 | 4.0 | 10.4 |
| 45 | 4.5 | 11.2 |
| 50 | 5.0 | 12.0 |
| 55 | 5.5 | 12.8 |
| 60 | 6.0 | 13.6 |
| 65 | 6.5 | 14.4 |
| 70 | 7.0 | 15.2 |
| 75 | 7.5 | 16.0 |
| 80 | 8.0 | 16.8 |
| 85 | 8.5 | 17.6 |
| 90 | 9.0 | 18.4 |
| 95 | 9.5 | 19.2 |
| 100 | 10.0 | 20.0 |

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| Temperature measuring ranges (adjustable) | DIP 1 | DIP 2 |
|---|-------|-------|
| 0...+50 $^{\circ}\text{C}$ (default) | OFF | OFF |
| -20...+80 $^{\circ}\text{C}$ | ON | OFF |
| -35...+75 $^{\circ}\text{C}$ | OFF | ON |
| -35...+35 $^{\circ}\text{C}$ | ON | ON |

| Switchable measuring ranges (adjustable) | DIP 3 | DIP 4 | DIP 5 |
|--|-------|-------|-------|
| RH: 0...100% (default) | OFF | OFF | OFF |
| MR: 0...50 g/kg | ON | OFF | OFF |
| MR: 0...80 g/kg | OFF | ON | OFF |
| A.H.: 0...50 g/m ³ | OFF | OFF | ON |
| A.H.: 0...80 g/m ³ | ON | ON | OFF |
| DP: 0...+50 $^{\circ}\text{C}$ | ON | OFF | ON |
| DP: -20...+80 $^{\circ}\text{C}$ | OFF | ON | ON |
| ENT.: 0...85 kJ/kg | ON | ON | ON |

Possible parameters:

- [RH] = relative humidity in %
- [MR] = mixture ratio in g/kg
- [A.H.] = absolute humidity in g/m³
- [DP] = dew point in $^{\circ}\text{C}$
- [ENT.] = enthalpy in kJ/kg

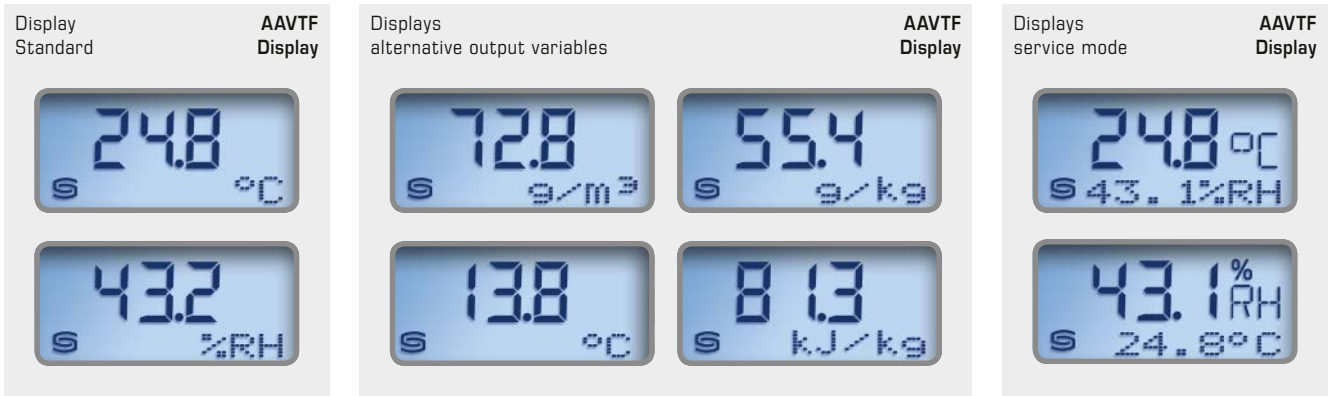
| Service display/output (adjustable) | DIP 6 |
|--|-------|
| Display $^{\circ}\text{C}$ and % RH, output of set measurements via DIP 1-5 (service mode for setting $^{\circ}\text{C}$ and % RH) | ON |
| Display and output of set measurements via DIP 1-5 | OFF |





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By default, the display alternates between the **actual temperature** and the **actual humidity** (relative humidity). In this case, the first line displays the value while the second line displays the corresponding unit:

Temperature in °C
Relative humidity in % RH

For improved legibility, backlighting is provided.

DIP switches can be used to display an **alternative output variable** instead of the standard display:

Absolute humidity in g/m³
Dew point in °C
Mixture ratio in g/kg
Enthalpy in kJ/kg

The **service mode** simultaneously displays (alternately in the first and second lines) the **actual temperature** and the **actual humidity** (relative humidity).

HYGRASGARD® AAVTF On-wall outdoor humidity sensors ($\pm 2.0\%$)

| Type / WG01 | Measuring Range Humidity | Temperature | Output Humidity | Temperature | Display | Item No. |
|--------------------|--|----------------------|--------------------|-------------|---------|--------------------|
| AAVTF-I | (switchable) | (switchable) | | | | I variant |
| AAVTF-I | 0...100% RH (default) | 0...+50 °C (default) | 4...20 mA | 4...20 mA | | 1201-1162-6000-028 |
| | 0...50 g/kg (MR) | -20...+80 °C | | | | |
| | 0...80 g/kg (MR) | -35...+75 °C | | | | |
| | 0...50 g/m ³ (A.H.) | -35...+35 °C | | | | |
| | 0...80 g/m ³ (A.H.) | | | | | |
| | 0...+50 °C (DP) | | | | | |
| | -20...+80 °C (DP) | | | | | |
| | 0...85 kJ/kg (ENT.) | | | | | |
| AAVTF-I LCD | (8x as above) | (4x as above) | 4...20 mA | 4...20 mA | ■ | 1201-1162-6200-028 |
| AAVTF-U | | | | | | U variant |
| AAVTF-U | (8x as above) | (4x as above) | 0-10V | 0-10V | | 1201-1161-6000-028 |
| AAVTF-U LCD | (8x as above) | (4x as above) | 0-10V | 0-10V | ■ | 1201-1161-6200-028 |
| Extra charge: | Other non-standard ranges optional | | | | | |
| Optional: | Cable connection with M12 connector according to DIN EN 61076-2-101 | | | | | on request |

ACCESSORIES

| | | |
|--------------|--|--------------------|
| SF-M | Metal sinter filter, \varnothing 16 mm, L = 32 mm, exchangeable stainless steel V4A (1.4404) | 7000-0050-2200-100 |
| WS-01 | Sun and ball-impact protection hood , 184 x 180 x 80 mm, stainless steel V2A (1.4301) | 7100-0040-2000-000 |
| WS-04 | Weather and sun protection hood , 130 x 180 x 135 mm, stainless steel V2A (1.4301) | 7100-0040-7000-000 |

For further information, see last chapter Accessories!