

On-wall humidity and temperature sensors ($\pm 1.8\%$ / $\pm 2.0\%$),
calibratable, with multi-range switching,
with active (Automatic Output Switching) and passive output

Patented quality product (AOS patent no. DE 10 2015 015 941 B4)

Calibratable outside humidity and temperature sensor **HYGRASGARD® AFF/AFTF** ($\pm 2.0\%$) and **AFF-20/AFTF-20** ($\pm 1.8\%$) with plastic sinter filter (exchangeable) or **AFF-25/AFTF-25** ($\pm 1.8\%$) with **pluggable measuring head** with metal sinter filter (exchangeable), housing made of impact-resistant plastic with quick-locking screws, with cable gland (optional M12 connector according to DIN EN 61076-2-101), with active output (optional passive temperature sensor), to exactly detect the relative humidity (0...100% RH) and the temperature with 4 switchable measuring ranges (max. $-35\text{ }^\circ\text{C}/-31\text{ }^\circ\text{F}$ to $+80\text{ }^\circ\text{C}/+176\text{ }^\circ\text{F}$) and to detect various parameters in humidity measurement, optionally with/without display.

The display can be changed from SI [$^\circ\text{C}$] to imperial [$^\circ\text{F}$] units via DIP switch. The measuring transducer converts the measured variables into a standard signal of 0-10V or 4...20mA. The unit with **Automatic Output Switching** (AOS variant) detects the required output type and **automatically** switches to U or I output. Alternatively, a **type version** (I2W) with 2-wire connection and I output is available.

The measurands are used to calculate **alternative parameters** internally, that can be retrieved via output **OUT3** (selectable via DIP switches for AOS): absolute humidity [g/m^3], mixing ratio [g/kg], dew temperature [$^\circ\text{C}$] [$^\circ\text{F}$] or enthalpy [kJ/kg] while excluding the atm. air pressure.

The on-wall sensor is applied in a non-aggressive, dust-free environment. It is used in the refrigeration, air conditioning and clean room technology. A long-term stable, **digital humidity and temperature sensor** guarantees exact measurement results. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

AFF/AFTF ($\pm 2.0\%$)
with plastic sinter filter



AFF-20/AFTF-20 ($\pm 1.8\%$)
with plastic sinter filter



AFF-25/AFTF-25 ($\pm 1.8\%$)
pluggable measuring head
with metal sinter filter



TECHNICAL DATA

AF(T)F-xx-I (I2W)	
Power supply:	15...36V DC, depending on working resistance, residual ripple stabilised $\pm 0.3\text{ V}$
Working resistance:	$R_B \text{ (Ohm)} = (U_B - 14\text{ V}) / 0.02\text{ A}$
Connection type:	2-wire connection
Output:	4...20 mA
AF(T)F-xx-A (AOS)	
Power supply:	24V AC/DC ($\pm 10\%$)
Load resistance:	$R_L = 25...450\text{ Ohm}$ with AOS I variant $R_L > 15\text{ kOhm}$ with AOS U variant
Connection type:	3-wire connection
Output:	automatic 0-10V / 4...20 mA (Automatic Output Switching – the unit detects the required output type and automatically switches to U or I output)
GENERAL	
Power consumption:	$< 3.0\text{ W} / 24\text{ V DC}$; $< 5.5\text{ VA} / 24\text{ V AC}$
System of units:	SI (default) or Imperial (switchable via DIP switch)
Data points:	relative Humidity [% RH], Temperature [$^\circ\text{C}$] [$^\circ\text{F}$]
Parameters:	absolute humidity [g/m^3], mixing ratio [g/kg], dew point [$^\circ\text{C}$] [$^\circ\text{F}$], enthalpy [kJ/kg] (while excluding the atm. air pressure)
Sensors:	digital humidity sensor with integrated temperature sensor , low hysteresis, high long-term stability (passive temperature sensor optional, see table)
Measuring range, humidity:	0...100% RH
Operating range, humidity:	0...95% RH (without formation of dew)
Accuracy in humidity:	typically $\pm 1.8\%$ (10...90% RH) at $+25\text{ }^\circ\text{C}$, otherwise $\pm 2.0\%$
Measuring range temp.:	multi-range switching with 4 measuring ranges (via DIP switch) 0... $+50\text{ }^\circ\text{C}$ / $+32...+122\text{ }^\circ\text{F}$ 0... $+80\text{ }^\circ\text{C}$ / $+32...+176\text{ }^\circ\text{F}$ (I2W) $-20...+80\text{ }^\circ\text{C}$ / $-4...+176\text{ }^\circ\text{F}$ (AOS) $-35...+75\text{ }^\circ\text{C}$ / $-31...+167\text{ }^\circ\text{F}$ $-35...+35\text{ }^\circ\text{C}$ / $-31...+95\text{ }^\circ\text{F}$
Operating range temp.:	$-10...+60\text{ }^\circ\text{C}$ / $+14...+140\text{ }^\circ\text{F}$
Accuracy temperature:	typically $\pm 0.4\text{ K} / \pm 0.7\text{ }^\circ\text{F}$ at $+25\text{ }^\circ\text{C}$ AF(T)F-20 / AF(T)F-25: typically $\pm 0.2\text{ K} / \pm 0.5\text{ }^\circ\text{F}$ at $+25\text{ }^\circ\text{C}$
Ambient temperature:	storage $-35...+85\text{ }^\circ\text{C}$; operation $-30...+70\text{ }^\circ\text{C}$, non-precipitating
Long-term stability:	$\pm 1\%$ per year
Protection class:	III (according to EN 60 730)
Protection type:	IP65 (according to EN 60 529)
Standards:	CE conformity according to EMC directive 2014/30/EU
ACCESSORIES	see table

Continued on next page!

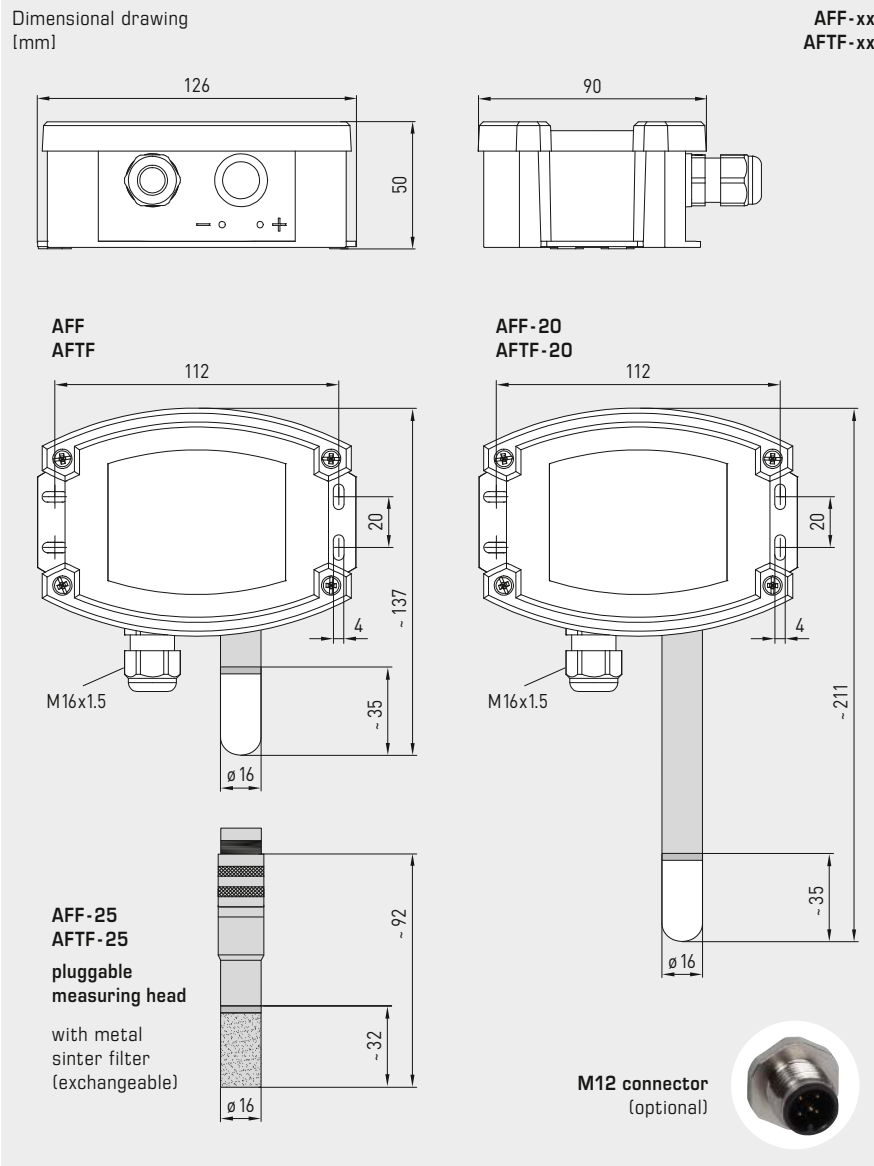


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HYGRASGARD® AFF-xx
HYGRASGARD® AFTF-xx

On-wall humidity and temperature sensors ($\pm 1.8\%$ / $\pm 2.0\%$),
calibratable, with multi-range switching,
with active (Automatic Output Switching) and passive output



AFF/AFTF ($\pm 2.0\%$)
with plastic sinter filter
and display



AFF-20/AFTF-20 ($\pm 1.8\%$)
with plastic sinter filter
and display

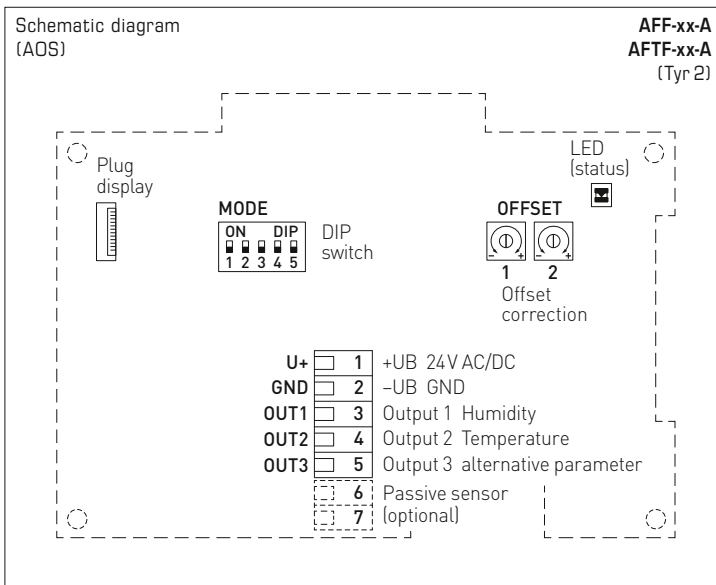


AFF-25/AFTF-25 ($\pm 1.8\%$)
pluggable measuring head
with metal sinter filter
and display



TECHNICAL DATA (continued)

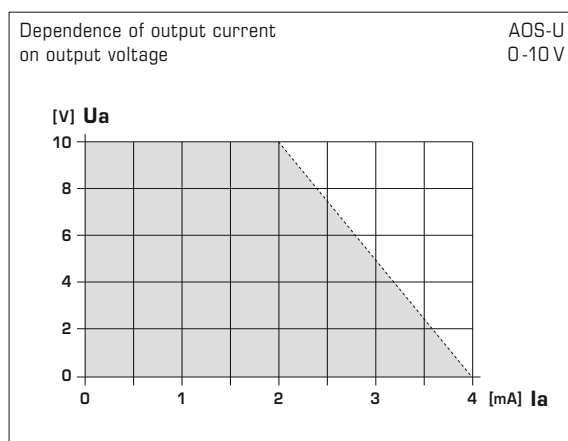
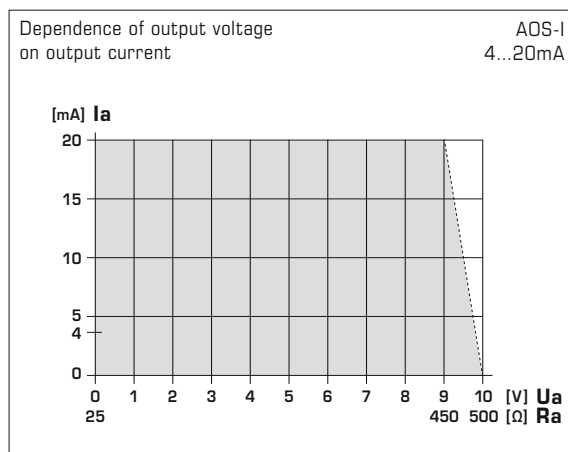
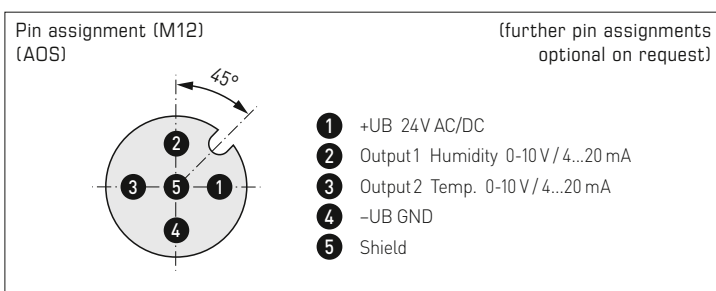
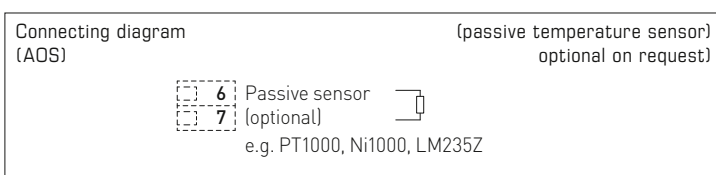
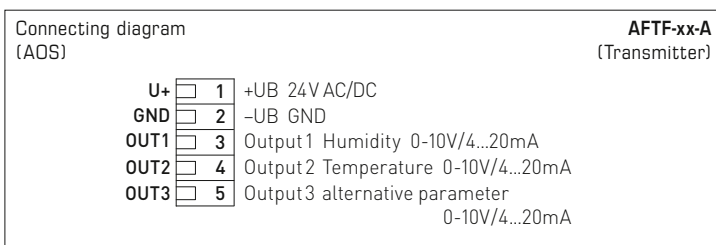
Sensor protection:	plastic sinter filter, \varnothing 16 mm, L = 35 mm, exchangeable (optional metal sinter filter, \varnothing 16 mm, L = 32 mm) AF(T)F-25: pluggable measuring head (probe) stainless steel V2A (1.4301) with metal sinter filter, \varnothing 16 mm, L = 32 mm, exchangeable, complete replacement element: L = 92 mm (with filter)
Protective tube:	stainless steel V2A (1.4301), \varnothing 16 mm, AF(T)F: NL = 50 mm (with filter) AF(T)F-20: NL = 125 mm (with filter)
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:	126 x 90 x 50 mm (Tyr2)
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)
Electrical connection:	2-, 3-, or 4-wire connection (see connecting diagram), 0.2 - 1.5 mm ² , via push-in terminals
Process connection:	by screws
Optional:	three-line display with illumination, cutout 70 x 40 mm (W x H), for displaying ACTUAL temperature and / or ACTUAL humidity and/or alternative parameters



DIP switch (AOS)	AFF-xx / AFTF-xx	
Measuring range temperature	DIP 1	DIP 2
-35...+35 °C / -31... +95 °F	ON	ON
-35...+75 °C / -31...+167 °F	OFF	ON
-20...+80 °C / -4...+176 °F	ON	OFF
0...+50 °C / +32...+122 °F (default)	OFF	OFF
Measuring range, OUT3 parameter	DIP 3	DIP 4
E: 0...85 kJ/kg / 0...36 Btu/lbm	ON	ON
D: -20...+80 °C / -4...+176 °F	OFF	ON
A: 0...50 g/m ³ / 0...22 gr/ft ³	ON	OFF
R: 0...50 g/kg / 0...357 gr/lbm (default)	OFF	OFF
System of units	DIP 5	
Imperial: [°F], [gr/lbm], [gr/ft ³], [Btu/lbm]	ON	
SI (default): [°C], [g/kg], [g/m ³], [kJ/kg]	OFF	

Value indicated in display depends on system of units set (DIP 5).

★ **Alternative parameters**
E: Enthalpy [kJ/kg] [Btu/lbm]
D: Dew point [°C] [°F]
A: Absolute humidity [g/m³] [gr/ft³]
R: Mixing ratio [g/kg] [gr/lbm]



Automatic detection and switching to standard signal 0...10V or 4...20 mA

AOS-PATENTED
AUTOMATIC OUTPUT SWITCHING

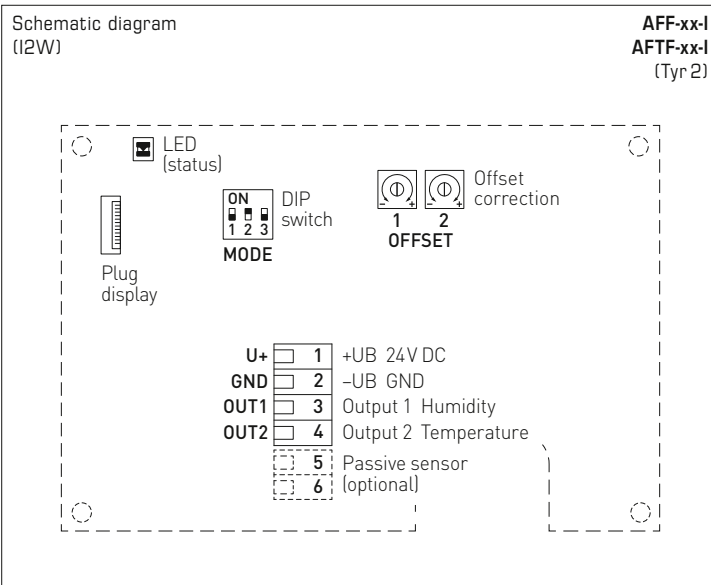


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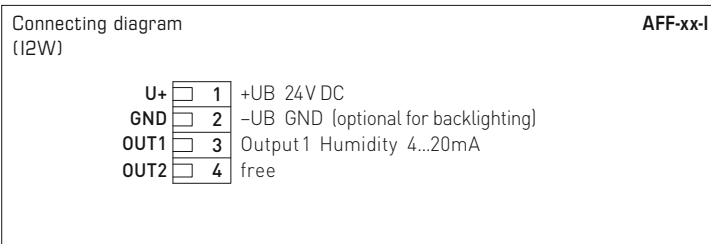
HYGRASGARD® AFF-xx
HYGRASGARD® AFTF-xx

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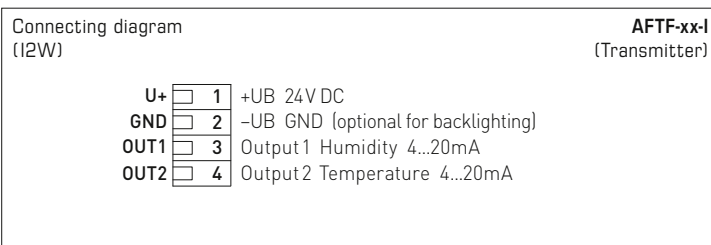
DIP switch (I2W)	AFF-xx / AFTF-xx	
Measuring range temperature	DIP 1	DIP 2
-35...+35 °C / -31... +95 °F	ON	ON
-35...+75 °C / -31...+167 °F	OFF	ON
0...+80 °C / +32...+176 °F	ON	OFF
0...+50 °C / +32...+122 °F (default)	OFF	OFF
System of units	DIP 3	
Imperial: [°F]	ON	
SI (default): [°C]	OFF	
Temperature		
Value indicated in display depends on system of units set (DIP 3).		

Note:
The offset potentiometers are assigned to the corresponding output of the measurand
Output 1 → Offset 1 (humidity)
Output 2 → Offset 2 (temperature)

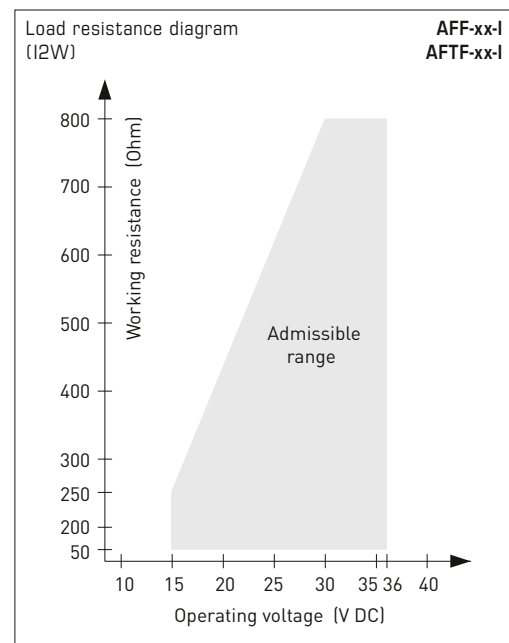
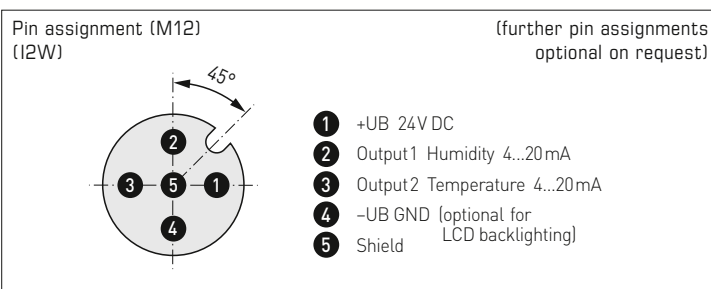
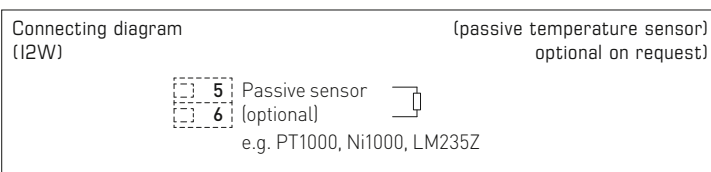


For the **I variant** (I2W) the humidity path must be connected!

Connection*:
2-wire connection for devices with / without display (not illuminated)
3-wire connection for devices with illuminated display



Connection**:
3-wire connection for devices with / without display (not illuminated)
4-wire connection for devices with illuminated display



Temperature

MR: -35...+75 °C /
-31...+167 °F

°C	U _A [V]	I _A [mA]	°F
-35	0.0	4.0	-31
-30	0.5	4.7	-22
-25	0.9	5.5	-13
-20	1.4	6.2	-4
-15	1.8	6.9	+5
-10	2.3	7.6	+14
-5	2.7	8.4	+23
0	3.2	9.1	+32
+5	3.6	9.8	+41
+10	4.1	10.5	+50
+15	4.5	11.3	+59
+20	5.0	12.0	+68
+25	5.5	12.7	+77
+30	5.9	13.5	+86
+35	6.4	14.2	+95
+40	6.8	14.9	+104
+45	7.3	15.6	+113
+50	7.7	16.4	+122
+55	8.2	17.1	+131
+60	8.6	17.8	+140
+65	9.1	18.5	+149
+70	9.5	19.2	+158
+75	10.0	20.0	+167

Temperature

MR: -35...+35 °C /
-31...+95 °F

°C	U _A [V]	I _A [mA]	°F
-35	0.0	4.0	-31
-30	0.7	5.1	-22
-25	1.4	6.3	-13
-20	2.1	7.4	-4
-15	2.9	8.6	+5
-10	3.6	9.7	+14
-5	4.3	10.9	+23
0	5.0	12.0	+32
+5	5.7	13.1	+41
+10	6.4	14.3	+50
+15	7.1	15.4	+59
+20	7.9	16.6	+68
+25	8.6	17.7	+77
+30	9.3	18.9	+86
+35	10.0	20.0	+95

Temperature

MR: 0...+50 °C /
+32...+122 °F

°C	U _A [V]	I _A [mA]	°F
0	0.0	4.0	+32
+5	1.0	5.6	+41
+10	2.0	7.2	+50
+15	3.0	8.8	+59
+20	4.0	10.4	+68
+25	5.0	12.0	+77
+30	6.0	13.6	+86
+35	7.0	15.2	+95
+40	8.0	16.8	+104
+45	9.0	18.4	+113
+50	10.0	20.0	+122

Temperature

MR: 0...+80 °C /
+32...+176 °F

°C	U _A [V]	I _A [mA]	°F
0	0.0	4.0	+32
+5	0.6	5.0	+41
+10	1.3	6.0	+50
+15	1.9	7.0	+59
+20	2.5	8.0	+68
+25	3.1	9.0	+77
+30	3.8	10.0	+86
+35	4.4	11.0	+95
+40	5.0	12.0	+104
+45	5.6	13.0	+113
+50	6.3	14.0	+122
+55	6.9	15.0	+131
+60	7.5	16.0	+140
+65	8.1	17.0	+149
+70	8.8	18.0	+158
+75	9.4	19.0	+167
+80	10.0	20.0	+176

Temperature

MR: -20...+80 °C /
-4...+176 °F

°C	U _A [V]	I _A [mA]	°F
-20	0.0	4.0	-4
-15	0.5	4.8	+5
-10	1.0	5.6	+14
-5	1.5	6.4	+23
0	2.0	7.2	+32
+5	2.5	8.0	+41
+10	3.0	8.8	+50
+15	3.5	9.6	+59
+20	4.0	10.4	+68
+25	4.5	11.2	+77
+30	5.0	12.0	+86
+35	5.5	12.8	+95
+40	6.0	13.6	+104
+45	6.5	14.4	+113
+50	7.0	15.2	+122
+55	7.5	16.0	+131
+60	8.0	16.8	+140
+65	8.5	17.6	+149
+70	9.0	18.4	+158
+75	9.5	19.2	+167
+80	10.0	20.0	+176

Humidity

MR: 0...100% RH

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

WS-03

Weather and sun protection hood
(optional)



SF-K

Plastic sinter filter
(standard)



SF-M

Metal sinter filter
(optional)

ACCESSORIES

SF-M	Metal sinter filter , Ø 16 mm, L = 32 mm, exchangeable, stainless steel V4A (1.4404)	7000-0050-2200-100
SF-K	Plastic sinter filter , Ø 16 mm, L = 35 mm, exchangeable	7000-0050-2310-000
WS-01	Sun and ball-impact protection hood , 184 x 180 x 80 mm, stainless steel V2A (1.4301)	7100-0040-2000-000
WS-03	Weather and sun protection hood , 200 x 180 x 150 mm, stainless steel V2A (1.4301)	7100-0040-6000-000

For further information see last chapter!



NEW

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HYGRASGARD® AFTF

On-wall humidity and temperature sensors ($\pm 2.0\%$),
calibratable, with multi-range switching,
with active (Automatic Output Switching) and passive output

AFF / AFTF
with cable gland



Housing variants
with M12 connector
(on request)



HYGRASGARD® AFF On-wall humidity sensors ($\pm 2.0\%$), *Standard*
HYGRASGARD® AFTF On-wall humidity and temperature sensors ($\pm 2.0\%$), *Standard*

Type / WG02	Measuring range Humidity	Temperature	Output	Display	Item No.
AFF					
AFF-I	0...100% RH	-	4...20 mA		1201-7112-0000-10L
AFF-I LCD	0...100% RH	-	4...20 mA	■	1201-7112-0400-10L
AFF-A	0...100% RH	-	0-10 V / 4...20 mA		1201-711E-0000-000
AFF-A LCD	0...100% RH	-	0-10 V / 4...20 mA	■	1201-711E-0400-000
AFTF (switchable)					
AFTF-I	0...100% RH	0...+50 °C / +32...+122 °F 0...+80 °C / +32...+176 °F -35...+75 °C / -31...+167 °F -35...+35 °C / -31... +95 °F	4...20 mA		1201-7112-1000-10L
AFTF-I LCD	0...100% RH	(4x as above)	4...20 mA	■	1201-7112-1400-10L
AFTF-A	★ 0...100% RH	0...+50 °C / +32...+122 °F -20...+80 °C / -4...+176 °F -35...+75 °C / -31...+167 °F -35...+35 °C / -31... +95 °F	0-10 V / 4...20 mA	■	1201-711E-1000-000
AFTF-A LCD	★ 0...100% RH	(4x as above)	0-10 V / 4...20 mA	■	1201-711E-1400-000
★ plus alternative parameters (switchable)					
E: 0...85 kJ/kg / 0...36 Btu/lbm (Enthalpy)					
D: -20...+80 °C / -4...+176 °F (Dew point)					
A: 0...50 g/m³ / 0...22 gr/ft³ (Absolute humidity)					
R: 0...50 g/kg / 0...357 gr/lbm (Mixing ratio)					

Outputs: 4...20 mA (fixed setting) for **I variant** (I2W) or 0-10 V / 4...20 mA (automatically via **AOS**)
Number of active outputs depends on unit type: relative humidity (**OUT1**) and temperature (**OUT2**).
★ **AOS variant AFTF xx A** has a further output for alternative parameters (**OUT3**).

System of units: The display can be switched from SI to imperial units.

Optional: Cable connection with **M12 connector** according to DIN EN 61076-2-101
passive temperature sensor (e.g. Pt1000, Ni1000, LM235Z) on request
see below

HYGRASGARD® AFTF On-wall humidity and temperature sensors ($\pm 2.0\%$), *Standard*
(passive temperature sensor)

Type / WG02	Measuring range / Readout Humidity	Temperature	Output	Item No.
AFTF-A xx (switchable)				
AFTF-A Pt100	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + Pt100	1201-711E-2001-000
AFTF-A Pt1000	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + Pt1000	1201-711E-2005-000
AFTF-A Ni1000	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + Ni1000	1201-711E-2009-000
AFTF-A NiTK	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + Ni1000TK5000	1201-711E-2010-000
AFTF-A LM235Z	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + LM235Z, 10mV/K	1201-711E-2021-000
AFTF-A NTC1,8K	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + NTC 1,8 kOhm	1201-711E-2012-000
AFTF-A NTC10K	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + NTC 10 kOhm	1201-711E-2015-000
AFTF-A NTC20K	★ 0...100% RH	(see above, AOS)	0-10 V / 4...20 mA + NTC 20 kOhm	1201-711E-2016-000

Outputs: 0-10 V / 4...20 mA (automatically via **AOS**) + passive temperature sensor