HYGRASREG® AFTF-35

Condensation-protected on-wall humidity and temperature sensor for "high humidity", relative / absolute humidity, mixture ratio, dew point, wet bulb temperature and temperature, calibratable, with multi-range switching, with active and switching output

S+S REGELTECHNIK

Condensation-protected on-wall sensor **HYGR**ASREG® **AFTF-35** with active and switching output, housing made of impact-resistant plastic with quick-locking screws, cable gland, plastic sinter filter (replaceable), optionally with / without display, for detecting relative humidity (0…100 % RH) and temperature (4 switchable measuring ranges, max. 0…+100 °C) as well as for determining various parameters of humidity measurement technology. The measuring transducer converts the measured variables into a standard signal of 0-10 V or 4…20 mA.

The unit is specially designed for use in the **high humidity range** (95…99 % RH). A long-term stable, **digital humidity and temperature sensor** is used. Overtemperature prevents or hinders dew formation on the humidity sensor. A second, separate temperature measuring element is used to determine the actual relative humidity of the ambient air. The following measured variables are calculated internally from these parameters and are retrievable via output **OUT3**: absolute humidity, mixing ratio, dew point and wet bulb temperature (can be changed via DIP switch).

The sensor is used in medical technology, refrigeration technology, control technology, air conditioning and clean room technology. The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.

TECHNICAL DATA

Power supply:	24 V AC/DC (± 10 %)
Working resistance:	> 100 kOhm for U variant; 100…500 Ohm for I variant
Power consumption:	typically < 6 W at 24 V DC, peak current 200 mA
Measured variables:	relative humidity (% RH), temperature (°C)
Parameters:	absolute humidity (g/m³), mixture ratio (g/kg), dew point (°C), wet bulb temperature (°C)
Outputs:	3 active outputs (0-10 V or 4…20 mA) 1 changeover contact
Sensor:	**digital humidity sensor with integrated temperature sensor,** low hysteresis, high long-term stability, with condensation protection through heating function (plus a second, separate temperature measuring element)
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:	0…100 % RH
Accuracy in humidity:	typically ± 3.0 % (30…70 % RH) at +25 °C, otherwise ± 3.5 % (deviations of alternative parameters result from deviations from humidity and temperature.)
Output humidity:	0-10 V for U variant; 4…20 mA for I variant
TEMPERATURE	
Temperature measuring range:	**Multi-range switching with 4 switchable measuring ranges** (see table) 0…+50 °C (default); –20…+50 °C; –20…+80 °C; 0…+100 °C
Accuracy in temperature:	typically ± 0.5 K at +25 °C
Temperature output:	0-10 V for U variant; 4…20 mA for I variant
Long-term stability:	± 1 % per year
Response time (t90):	< 60 s
Warm-up time:	< 10 min
Electrical connection:	0.14 - 1.5 mm², via terminal screws
Cable connection:	**Cable gland,** plastic (M 16 x 1.5; with strain relief, exchangeable, max. inner diameter 10.4 mm)
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 (Typ 2)
Protective tube:	made of stainless steel **V2A** (1.4301), Ø 16 mm, NL = 55 mm (combined humidity and temperature measuring element) **and** of stainless steel **V4A** (1.4571), Ø 6 mm, NL = 65 mm (second, separate temperature measuring element)
Process connection:	via screws
Ambient temperature:	storage –20…+50 °C; operation –20…+50 °C
Permitted humidity:	< 99 % RH, non-precipitating air free of harmful substances
Protection class:	III (according to EN 60 730)
Protection type:	**IP 65** (according to EN 60 529) housing, IP 20 sensor technology
Standards:	CE-conformity according to EMC Directive 2014 / 30 / EU
FUNCTION	A constant overtemperature of the humidity sensor makes its dewing considerably more difficult or prevents its formation within the limits of the system. A faster reaction speed is achieved in the case of humidity fluctuations, even in the range above 95 % RH. The sensor (combined humidity and temperature measuring element) is heated approx. 3 K above the ambient temperature. The actual relative humidity is determined from the measured relative humidity at overtemperature, the chip temperature of the sensor and the ambient temperature (via a second, separate temperature measuring element).

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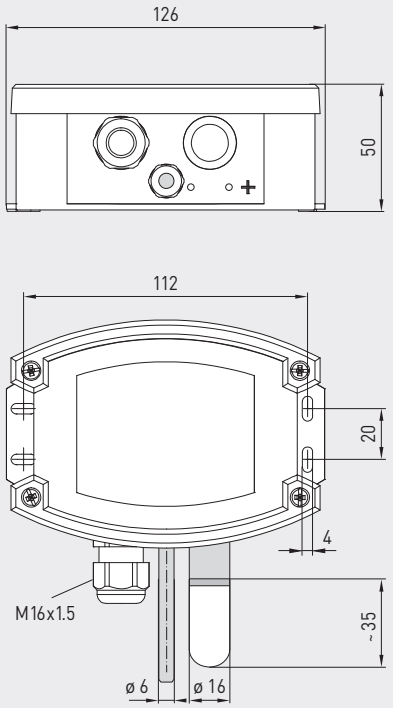
Dimensional drawing
[mm]

AFTF-35



SF-K
Plastic sinter filter
(standard)

SF-M
Metal sinter filter
(optional)

AFTF-35
with plastic sinter filter
(standard)

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

Temperature table
MR: –20...+50 °C

°C	U_A [V]	I_A [mA]
-20	0.0	4.0
-15	0.7	5.1
-10	1.4	6.3
-5	2.1	7.4
0	2.9	8.6
5	3.6	9.7
10	4.3	10.9
15	5.0	12.0
20	5.7	13.1
25	6.4	14.3
30	7.1	15.4
35	7.9	16.6
40	8.6	17.7
45	9.3	18.9
50	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: 0...+100 °C

°C	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

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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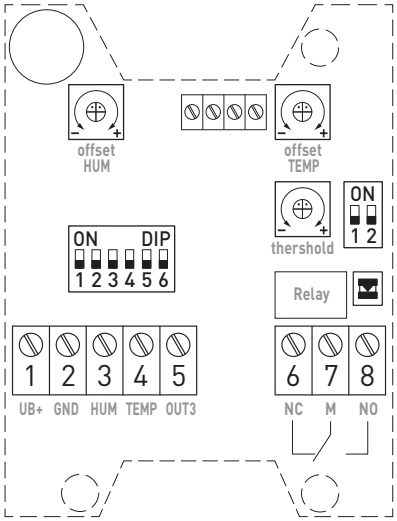
Schematic diagram **AFTF-35-xx**

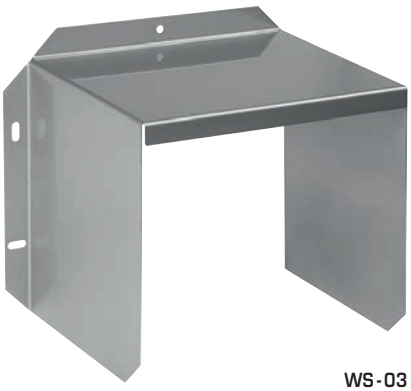


Connecting diagram **AFTF-35-I**

1	+UB 24V AC/DC
2	–UB GND
3	Output Humidity 4...20mA
4	Output Temperature 4...20mA
5	Output altern. parameters 4...20mA
6	NC Normally Closed
7	M Common
8	NO Normally Open

Connecting diagram **AFTF-35-U**

1	+UB 24V AC/DC
2	–UB GND
3	Output Humidity 0-10V
4	Output Temperature 0-10V
5	Output altern. parameters 0-10V
6	NC Normally Closed
7	M Common
8	NO Normally Open



WS-03
Weather and sun protection hood

ON DIP
1 2 3 4 5 6

Measuring ranges temperature	DIP 1	DIP 2
0...+50 °C (default)	OFF	OFF
–20...+50 °C	**ON**	OFF
–20...+80 °C	OFF	**ON**
0...+100 °C	**ON**	**ON**

Measuring ranges alternative parameters	DIP 3	DIP 4	DIP 5
(a.F.) **0...20 g/m³** (default)	OFF	OFF	OFF
(a.F.) 0...25 g/m³	**ON**	OFF	OFF
(MV) 0...20 g/kg	OFF	**ON**	OFF
(MV) 0...25 g/kg	**ON**	**ON**	OFF
(TP) 0...+50 °C	OFF	OFF	**ON**
(TP) –20...+50 °C	**ON**	OFF	**ON**
(FKT) –30...+30 °C	OFF	**ON**	**ON**
(FKT) –20...+50 °C	**ON**	**ON**	**ON**

(a.F.) = absolute humidity [g/m³]
(MV) = mixture ratio [g/kg]
(TP) = dew point [°C]
(FKT) = wet bulb temperature [°C]

Note: For factory service only, it must be set to "OFF" during operation!	DIP 6
Operation (default)	OFF

ON
1 2

Relay function assignment	DIP 1	DIP 2
inactive (default)	OFF	OFF
Humidity	**ON**	OFF
Temperature	OFF	**ON**
alternative parameters	**ON**	**ON**

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HYGRASREG® **AFTF-35**	Condensation-protected on-wallsensor for high humidity						
Type / WG02	**Measuring Range** Humidity	Temperature	**Output active**	**Output switching**	**Display**	**Item No.**	**Price**
AFTF-35-I						**I variant**	
AFTF-35-I/W	**0...100 %RH** 0...20 g/m³ (a.F.) 0...25 g/m³ (a.F.) 0...20 g/kg (MV) 0...25 g/kg (MV) 0...+50 °C (TP) –20...+50 °C (TP) –30...+30 °C (FKT) –20...+50 °C (FKT)	**0...+50 °C** –20...+50 °C –20...+80 °C 0...+100 °C	3x **4...20 mA**	1x Changeover contact		1201-714B-1000-000	**767,66 €**
AFTF-35-I/W **LCD**	(as above)	(as above)	3x **4...20 mA**	1x Changeover contact	■	1201-714B-1200-000	**877,31 €**
AFTF-35-U						**U variant**	
AFTF-35-U/W	(as above)	(as above)	3x **0-10 V**	1x Changeover contact		1201-714A-1000-000	**767,66 €**
AFTF-35-U/W **LCD**	(as above)	(as above)	3x **0-10 V**	1x Changeover contact	■	1201-714A-1200-000	**877,31 €**
Note	**Alternative parameters** are calculated internally from the measured variables, which are retrievable via the active output **OUT3**: absolute humidity, mixing ratio, dew point and wet bulb temperature (can be changed via DIP switch)						
ACCESSORIES							
SF-M	**Metal** sinter filter, Ø 16 mm, L = 32 mm, exchangeable stainless steel **V4A** (1.4404)					7000-0050-2200-100	**45,34 €**
WS-03	**Weather and sun protection hood**, 200 x 180 x 150 mm, stainless steel **V2A** (1.4301)					7100-0040-6000-000	**47,92 €**
	for further information see see chapter Accessories!						