S S REGELTECHNIK AFTF-35 Humidity and Temperature Sensor Instruction Manual

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S S REGELTECHNIK AFTF-35 Humidity and Temperature Sensor

Condensation-protected on-wall sensor HYGRASREG® 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

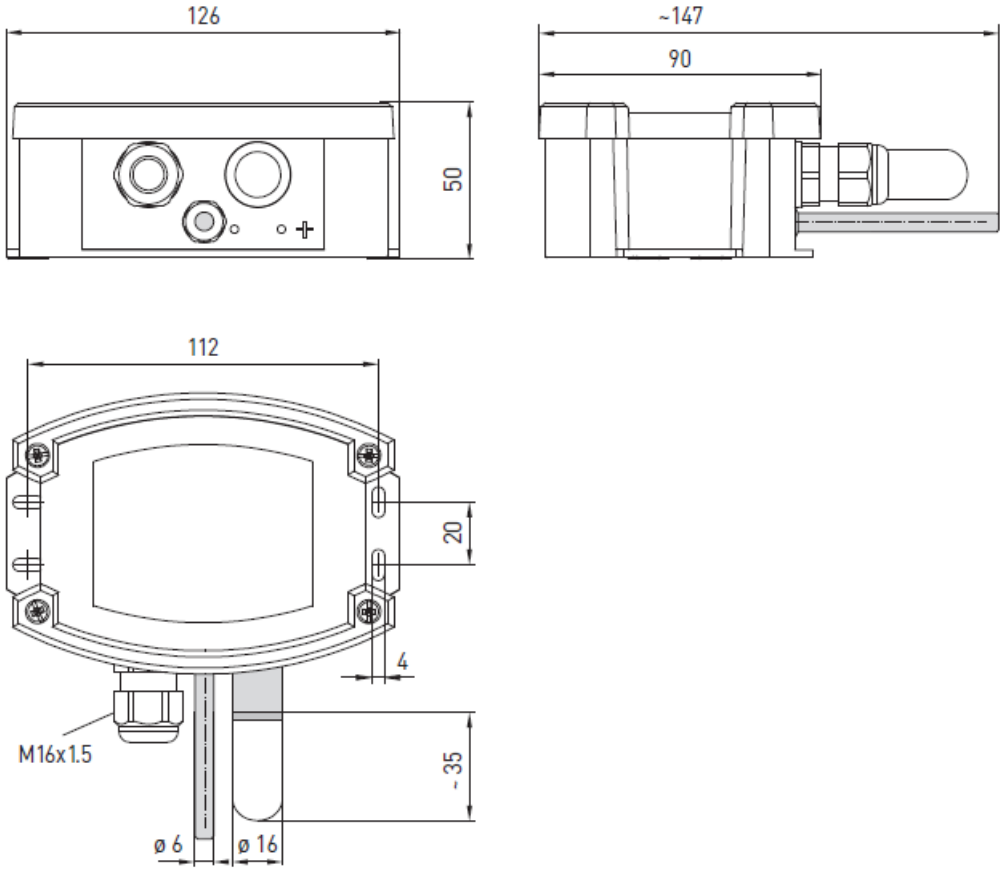
TECHNICAL DATA

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 (0-10V 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
Deviation 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:	0-10V 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…+60 °C; 0…+100 °C
Deviation in temperature:	typically ± 0.5 K at +25 °C
Temperature output:	0-10V 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), enclosure cover for display is transparent!
Housing dimensions:	126 x 90 x 50 mm (Tyr 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 (via a 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 (as per EN 60730)
IP rating:	**IP 65** (as per EN 60529) housing, IP 20 sensor technology
Standards:	CE-conformity, electromagnetic compatibility according to EN 61 326, 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).
ACCESSORIES	see table

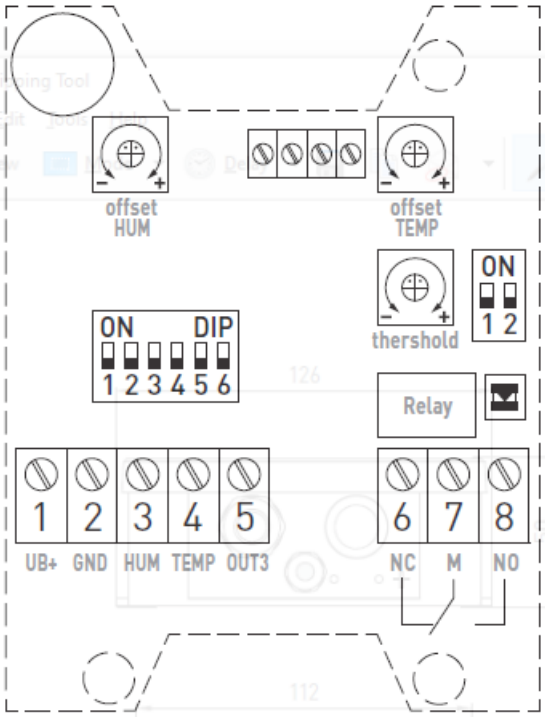
Type/ WG01	Measuring Range Humidity	Temperature	Output active	Output switching	Display	Item No.
AFTF-35-I						**I variant**
AFTF-35-I/W	**0...100 %RH** 0...20 g/m³ (a.F.) 0...25 g/m³ (a.F.) 0...20 g/kg (MV) 0...25 g/kg (MV) 0...+50 °C (TP) –20...+50 °C (TP) –30...+30 °C (FKT) –20...+50 °C (FKT)	**0...+50 °C** –20...+50 °C –20...+80 °C 0...+100 °C	3x **4...20 mA**	1x Changeover contact		1201-714B-1000-000
AFTF-35-I/W **LCD**	(as above)	(as above)	3x **4...20 mA**	1x Changeover contact	■	1201-714B-1200-000
AFTF-35-U						**U variant**
AFTF-35-U/W	(as above)	(as above)	3x **0-10 V**	1x Changeover contact		1201-714A-1000-000
AFTF-35-U/W **LCD**	(as above)	(as above)	3x **0-10 V**	1x Changeover contact	■	1201-714A-1200-000
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
WS-03	**Weather and sun protection hood**, 200 x 180 x 150 mm, stainless steel **V2A** (1.4301)					7100-0040-6000-000

DIAGRAMS

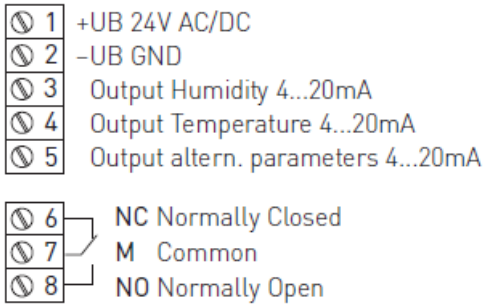
DIMENSIONS



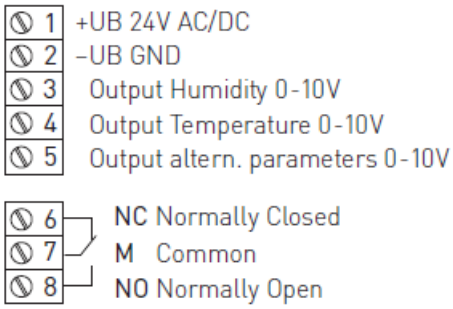
Schematic diagram

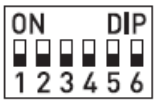


Connecting diagram AFTF-35 – I



Connecting diagram AFTF-35 – U





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

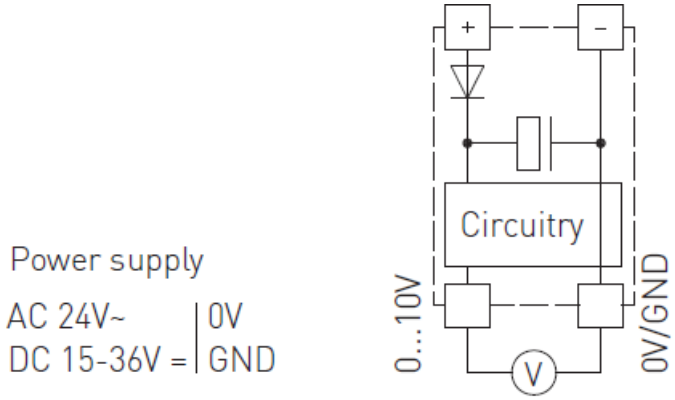
Measuring ranges alternative parameters		**DIP 3**	**DIP 4**	**DIP 5**
(a.F.)	**0**…**20 g /m3** (default)	OFF	OFF	OFF
(a.F.)	0…25 g/m3	**O N**	OFF	OFF
(MV)	0…20 g/kg	OFF	**O N**	OFF
(MV)	0…25 g/kg	**O N**	**O N**	OFF
(TP)	0…+50 °C	OFF	OFF	**O N**
(TP)	–20…+50 °C	**O N**	OFF	**O N**
(FKT)	–30…+30 °C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

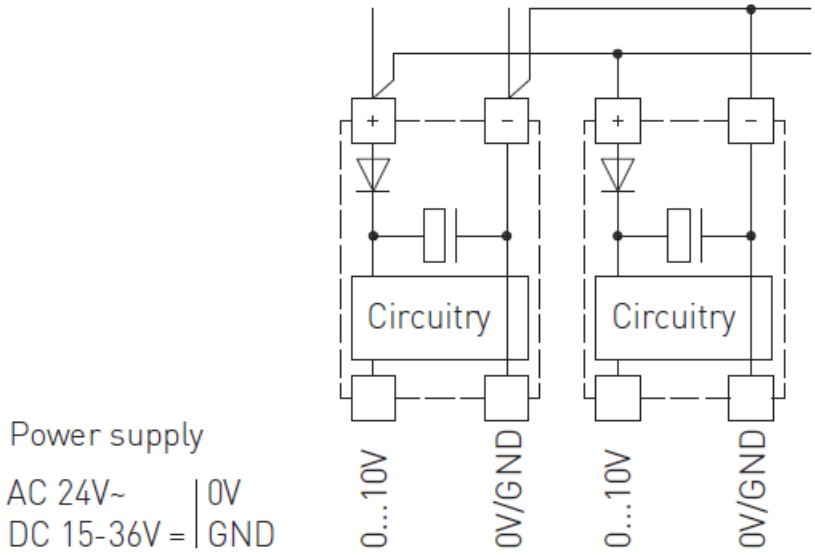
Relay function assignment	**DIP 1**	**DIP 2**
inactive (default)	OFF	OFF
Humidity	**O N**	OFF
Temperature	OFF	**O N**
alternative parameters	**O N**	**O N**

Installation and Commissioning

SUPPLY VOLTAGE :
For operating voltage reverse polarity protection, a one-way rectifier or reverse polarity protection diode is integrated in this device variant. This internal one-way rectifier on AC supply voltage. The output signal is to be tapped by a measuring instrument. The output signal is measured her against zero potential (O V) of the input voltage! When this device is operated on DC supply voltage, the operating voltage input UB+ is to be used for 15…36 V DC supply and UB – or GND for ground wire!



When several devices are supplied by one 24 V AC voltage supply, it is to be ensured that all ”positive“ operating voltage input terminals (+) of the field devices are connected with each other and all ”negative“ operating voltage input terminals (–) (= reference potential) are connected together (in-phase connection of field devices). All outputs of field devices must be referenced to the same potential! In case of reversed polarity at one field device, a supply voltage short-circuit would be caused by that device. The consequential short-circuit current flowing through this field device may cause damage to it. Therefore, pay attention to correct wiring



Temperature table
MR: –20…+80 °C

°C	UA	IA
	[V]	[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	UA	IA	
	[V]	[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	UA	IA	
	[V]	[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	UA	IA	
	[V]	[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

%	UA	IA
RH	[V]	[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

General notes

- This unit must only be used in non-precipitating air without positive or negative pressure at the sensor element.
- With outdoor and duct sensors, the sinter filter of the sensor element protects the humidity sensor against potential dust exposure. In case of contamination/soiling, this filter should be cleaned on a regular basis.
- Dust and contamination distort measurement results and are to be avoided.
  Small amounts of contamination and dust deposits can be removed using compressed air. – Touching the humidity element must be avoided under any circumstances, since this would result in serious measuring errors.
- In case of contamination, we recommend cleaning and recalibration in the factory.
- Under no circumstances should the sensor come into contact with chemicals or other cleaning agents.
- The relative humidity of 0 …100 % is represented by the output signal of 0 – 10 V. The operating range of the

unit covers 10.0… 99 % RH, ; faulty measurements or increased deviations may occur outside that range.
- When several sensors (0 – 10 V)are connected to one voltage supply of 24 V AC (alternating voltage), the correct polarity must be ensured as otherwise the alternating voltage source may be short-circuited.
- The voltage outputs are short-circuit proof; applying overvoltage or voltage supply to the voltage output will destroy the unit.
- If this unit is operated outside the specified range, all warranty claims are forfeited.

Our “General Terms and Conditions for Business“ together with the “General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry“ (ZVEI conditions) including supplementary clause “Extended Retention of Title“ apply as the exclusive terms and conditions.

In addition, the following points are to be observed

- These instructions must be read before installation and putting in operation and all notes provided therein are to be regarded!
- Devices must only be connected to safety extra-low voltage and under dead-voltage condition. To avoid damages and errors at the device (e.g. by voltage induction) shielded cables are to be used, laying parallel with current-carrying lines is to be avoided, and EMC directives are to be observed.
- This device shall only be used for its intended purpose. Respective safety regulations issued by the VDE, the states, their control authorities, the TÜV and the local energy supply company must be observed. The purchaser has to adhere to the building and safety regulations and has to prevent perils of any kind.
- No warranties or liabilities will be assumed for defects and damages arising from improper use of this device.
- Consequential damages caused by a fault in this device are excluded from warranty or liability.
- These devices must be installed and commissioned by authorised specialists.
- The technical data and connecting conditions of the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products.
- In case of any modifications made by the user, all warranty claims are forfeited.
- This device must not be installed close to heat sources (e.g. radiators) or be exposed to their heat flow. Direct sun irradiation or heat irradiation by similar sources (powerful lamps, halogen spotlights) must absolutely be avoided.
- Operating this device close to other devices that do not comply with EMC directives may influence functionality.
- This device must not be used for monitoring applications, which serve the purpose of protecting persons against hazards or injury, or as an EMERGENCY STOP switch for systems or machinery, or for any other similar safety-relevant purposes.
- Dimensions of housings or housing accessories may show slight tolerances on the specifications provided in these instructions.
- Modifications of these records are not permitted.
- In case of a complaint, only complete devices returned in original packing will be accepted.

Notes on commissioning:
This device was calibrated, adjusted and tested under standardised conditions. When operating under deviating conditions, we recommend performing an initial manual adjustment on-site during commissioning and subsequently at regular intervals. Commissioning is mandatory and may only be performed by qualified personnel! These instructions must be read before installation and commissioning and all notes provided therein are to be regarded

WS-03
Weather and sun protection hood (optional)

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Documents / Resources

	S S REGELTECHNIK AFTF-35 Humidity and Temperature Sensor [pdf] Instruction Manual AFTF-35 Humidity and Temperature Sensor, AFTF-35, Humidity and Temperature Sensor, Temperature Sensor, Sensor

References

- S+S Regeltechnik | Ihr zuverlässiger Partner