HYGRASGARD® ESFTF

Screw-in humidity and temperature sensor for pressure systems, mixing ratio, relative / absolute humidity, dew point and temperature, calibratable, with multi-range switching and active output

S+S REGELTECHNIK

Calibratable screw-in sensor **HYGR**ASGARD® **ESFTF** in a housing made of an impact-resistant plastic with quick-locking screws, with cable gland (optional M12 connector according to DIN EN 61076-2-101), duct tube with thread (G1/2") and metal sinter filter (replaceable).

The sensor is used for detecting the relative humidity (0…100 % RH) and the temperature (4 switchable measuring ranges) in **compressed air lines up to max. 10 bar**. The measuring transducer converts the measured values into a standard signal of 4…20 mA or 0 - 10 V. Further parameters are calculated internally from the measured values, that are retrievable via the humidity output: absolute humidity, mixing ratio and dew point temperature (can be changed via DIP switch).

Furthermore, the unit boasts a **sensor protection function for high humidity** (95…99 % RH).
The measuring element is heated automatically in the critical range and thus protected against condensation.
The sensor is factory-calibrated; an environmental precision adjustment by an expert is possible.
It must be installed vertically with the humidity sensor pointing downwards.

TECHNICAL DATA

Power supply:	24 V AC/DC (± 10 %) for U variant; 15…36 V DC for I variant, depending on working resistance
Working resistance:	RL_{max} = (UB – 15 V) / 0.02 A for I variant, see working resistance diagram
Power consumption:	< 1.1 VA for U variant; < 1.5 W for I variant
Data points:	relative humidity [% RH], absolute humidity [g/m³], mixing ratio [g/kg], dew point [°C], temperature [°C]
HUMIDITY	
Sensor:	**digital humidity sensor with integrated temperature sensor,** low hysteresis, high long-term stability
Sensor protection:	metal sinter filter, Ø 20 mm, replaceable, with condensation protection through heating function
Measuring range, humidity:	0…100 % RH (default)
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.)
Long-term stability:	± 1 % per year
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…+80 °C; –30…+70 °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
Response time (t90):	< 60 s
Warm-up time:	< 5 min
Electrical connection:	4-wire for U variant; 3-wire for I variant; 0.14 - 1.5 mm², via terminal screws
Housing:	plastic, UV-resistant, polyamide material, 30 % glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL 9016)
Housing dimensions:	72 x 64 x 37.8 mm (Tyr 1)
Cable connection:	**cable gland** made of plastic (M16 x 1.5; with strain relief, replaceable, max. inner diameter 10.4 mm) **or** **M12 connector** according to DIN EN 61076-2-101 (on request)
Protective tube:	made out of metal, Ø 20 mm, NL = 115 mm, compressive strength p_{max} = 10 bar
Process connection:	thread G1/2", immersion depth 25 mm
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) in the built-in state, sensors IP 30, housing tested, TÜV SÜD, report no. 713139052 (Tyr 1)
Standards:	CE-conformity according to EMC Directive 2014 / 30 / EU
FUNCTION	**sensor protection function for high humidity** (95…99 % RH) If the relative humidity exceeds the factory-set threshold of 95 % RH, a temporally restricted heating function is activated and the sensor is protected against condensation. In this operating state, the output signals remain at the previous measured values prior to activating the heating function.

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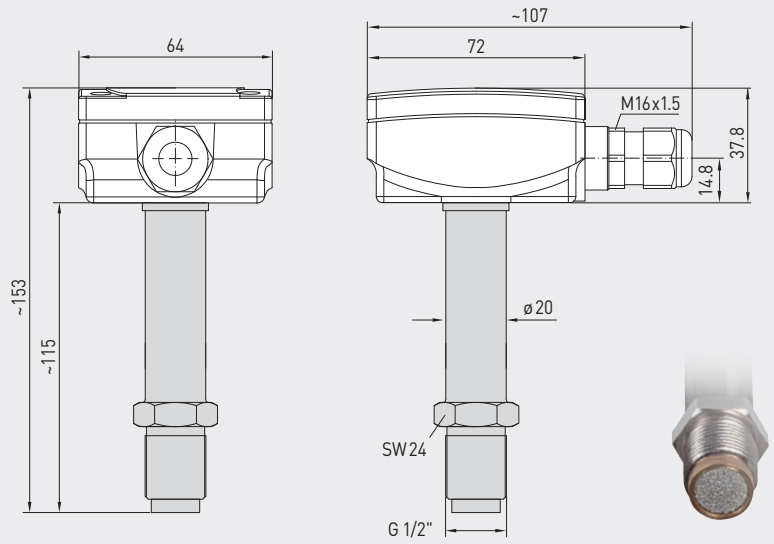
Dimensional drawing
[mm]

ESFTF



Metal sinter filter
(replaceable)

ESFTF

Temperature table
MR: –30...+70 °C

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

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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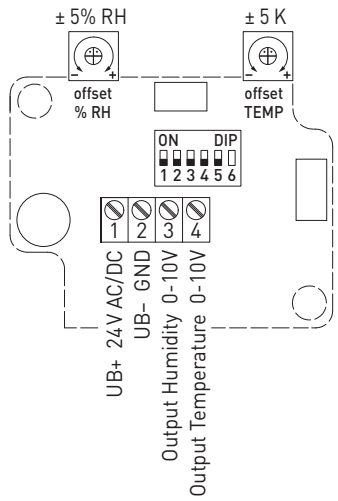
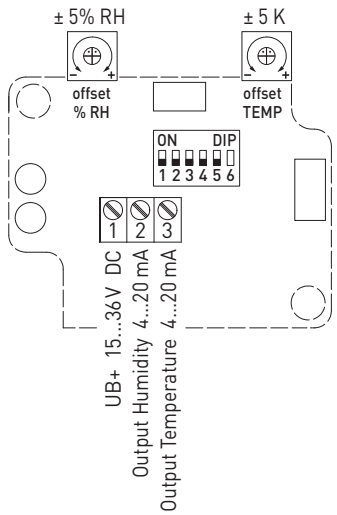
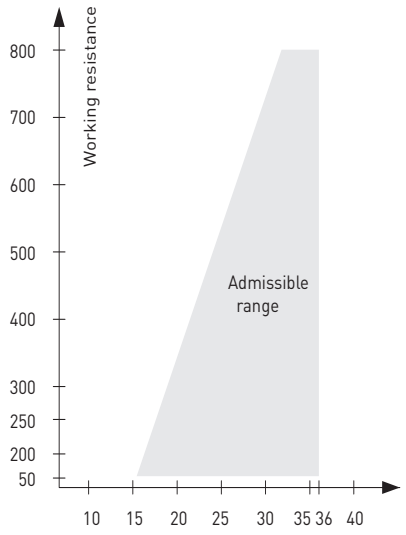
Schematic diagram **ESFTF-U**



Schematic diagram **ESFTF-I**



Load resistance diagram **ESFTF-I**
4.. 20 mA



Connecting diagram **ESFTF-U**

1	UB+ 24 V AC/DC
2	UB– GND
3	Output Humidity 0-10 V
4	Output Temperature 0-10 V

Connecting diagram **ESFTF-I**

1	UB+ 15...36 V DC
2	Output Humidity 4...20 mA
3	Output Temperature 4...20 mA

Temperature measuring ranges (adjustable)	**DIP 1**	**DIP 2**
0...+50 °C (default)	OFF	OFF
–20...+80 °C	**ON**	OFF
–30...+70 °C	OFF	**ON**
0...+100 °C	**ON**	**ON**

Switchable measuring ranges (adjustable)		**DIP 3**	**DIP 4**	**DIP 5**
(RH)	**0...100** % (default)	OFF	OFF	OFF
(a.F.)	0...50 g/m³	**ON**	OFF	OFF
(a.F.)	0...80 g/m³	OFF	**ON**	OFF
(MV)	0...50 g/kg	**ON**	**ON**	OFF
(MV)	0...80 g/kg	OFF	OFF	**ON**
(TP)	0...+50 °C	**ON**	OFF	**ON**
(TP)	–20...+50 °C	OFF	**ON**	**ON**
(TP)	–20...+80 °C	**ON**	**ON**	**ON**

(RH) = Relative Humidity [% RH]
(MV) = Mixing Ratio [g/kg]
(a.F.) = Absolute Humidity [g/m³]
(TP) = Dew Point [°C]

Note: **DIP 6** is not assigned!

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ESFTF

INTERNE MEMO ESFTF

1. **Display**
   bleibt auch zukünftig mit ConSens-Display,
   deshalb **kein Foto** vom Displaygerät!
2. **Typentabelle**
   Displaygeräte mit Artikel-Nummer und VK-Preis
   bleiben trotzdem im Datasheet!
3. **Preise überprüfen!**
   Gerät mit Display ist billiger als das ohne Display!
4. **Ohne Platinenfoto!**
   Blaue ConSens-Platinen werden nicht abgebildet!

19.08.2022 / pr

HYGRASGARD® **ESFTF**	Screw-in humidity and temperature sensor for pressure systems						
Type / WG02	**Measuring range** Humidity	Temperature	**Output** Humidity	Temperature	**Display**	**Item no.**	**Price**
ESFTF-I	**(switchable)**	**(switchable)**				**I variant**	
ESFTF-I	**0…100 % RH** 0…50 g/m³ (a.F.) 0…80 g/m³ (a.F.) 0…50 g/kg (MV) 0…80 g/kg (MV) 0…+50 °C (TP) –20…+50 °C (TP) –20…+80 °C (TP)	**0…+50 °C** –20…+80 °C –30…+70 °C 0…+100 °C	4…20 mA	4…20 mA		1201-2112-1000-000	**566,60 €**
ESFTF-I **LCD**	(as above)	(as above)	4…20 mA	4…20 mA	■	1201-2112-1200-000	**678,51 €**
ESFTF-U	**(switchable)**	**(switchable)**				**U variant**	
ESFTF-U	**0…100 % RH** 0…50 g/m³ (a.F.) 0…80 g/m³ (a.F.) 0…50 g/kg (MV) 0…80 g/kg (MV) 0…+50 °C (TP) –20…+50 °C (TP) –20…+80 °C (TP)	**0…+50 °C** –20…+80 °C –30…+70 °C 0…+100 °C	0-10 V	0-10 V		1201-2111-1000-000	**566,60 €**
ESFTF-U **LCD**	(as above)	(as above)	0-10 V	0-10 V	■	1201-2111-1200-000	**678,51 €**
Optional:	Cable connection with **M12 connector** according to DIN EN 61076-2-101					on request	