

Intrinsically Safe Industrial Measuring Probes for Humidity, Temperature, and Derived Variables

- The hygrothermal transducers measure the relative air humidity and temperature
- The calculations of dew point, absolute humidity, mixing ratio, and wet bulb temperature are possible as options
- New user-friendly, modular measuring probe concept
- Intelligent exchange probes that save all calibration coefficients
- Safe operation of the complete device in zones of category 1G/zone 0 as well as 1D/zone 20 with protection cover
- Electrical intrinsically-safe design type
- Traceable to NIST (including certificate)



The intrinsically safe industrial measuring probes are the first choice when it comes to humidity, temperature, and derived variables.

These new intrinsically safe industrial measuring probes were developed to meet the need of providing precise and risk-free humidity monitoring in potentially explosive areas. This series sets completely new standards for easy installation and user-friendliness.

The modular add-on concept consists of four parts that can be separated from each other (wall holder, case bottom, electronic unit, and probe), thereby substantially simplifying installation, operation, and maintenance. Versatile uses for almost all applications are possible in connection with five exchangeable probes.

Now no recalibration of the measuring probe is necessary when replacing the probes as all calibration coefficients are already stored in the probe's memory itself and the coefficients are transmitted when connected to the central processing unit. Otherwise, the probe design types do not differ from the established versions of the industrial series that offers 2 m, 5 m, or 10 m sensor lines. The special sensor head variants that permit use in an underpressure and overpressure range between 0 to 100 bar and at high process temperatures of up to 180 °C are also available.

The measuring probes are extremely robust and are based on the latest sensor technology.

They operate safely and reliably in areas with the constant explosion hazard of category 1 (zone 0).

Thanks to the microprocessor controlled electronics and a large number of options the measuring probes can be applied with a high degree of flexibility.

When ordering, the user can directly specify the configuration of the measuring probe. A subsequent change in the configuration when on location is also possible.

The optional software extension allows the integrated microprocessor to calculate absolute humidity variables such as dew point T_d (°C), absolute humidity a (g/m³), mixing ratio x (g/kg), and wet bulb temperature T_w (°C).

Per default, the intrinsically safe measured probes are equipped with an analog output (4 to 20 mA). In addition, a second analog output and an integrated LCD display/operating pad can be added as an option.

The connection to the voltage supply (DC 12 to 28 V) must be carried out via protection barriers or intrinsically safe power supply units that are available externally (see "Technical data") when used in potentially explosive areas.

All measuring probes are equipped with sensors that have the latest thin film technology. The continuous further development and improvement of these sensors is backed by over 20 years worth of experience.

The sensors particularly distinguish themselves through the highest precision, reliability, and stability.

Technical data

Design types

Basic type 907025/61

Intrinsically safe humidity and temperature measuring probe for wall mounting, operating temperature -40 to +60 °C

Basic type 907025/63

Intrinsically safe humidity and temperature measuring probe with small sensor head on a 2 m sensor line, operating temperature 40 to +120 °C

Basic type 907025/64

Intrinsically safe humidity and temperature measuring probe with a pressure-resistant stainless-steel sensor head on a 2 m sensor line for process pressures between 0 to 10 MPa (0 to 100 bar), operating temperature -40 to +180 °C

Basic type 907025/65

Intrinsically safe humidity and a temperature measuring probe with stainless-steel sensor head on a 2 m sensor line, operating temperature -40 to +180 °C

Basic type 907025/68 and 907025/68L (long version, shaft length 400 mm)

Intrinsically safe humidity and temperature measuring probe with a pressure-resistant stainless-steel sensor head on a 2 m sensor line for process pressures between 0 to 4 MPa (0 to 40 bar), sensor head with adjustable clamping screw connection; operating temperature -40 to +180 °C

Note:

The connection to the voltage supply (DC 12 to 28 V) when used in potentially explosive areas must be carried out via protection barriers or intrinsically safe power supply devices that are available externally. When used in category 1 (zone 0), an intrinsically safe power supply device (e.g. type STAHL 9160/13-11-11) must be used per channel.

When used in categories 2 + 3 (zone 1 + 2) safety barriers (e.g. STAHL 9001/51-280-091-141) are sufficient.

These devices are not included in the JUMO scope of delivery!

Further information can be found in the operating manual or in the Internet at www.r-stahl.com/r-stahl-home.html

Measured values

Relative humidity

Measuring range 0 to 100 %rF

Accuracy (including nonlinearity and reproducibility)

for calibration against highly-precise,

certified humidity standards

±1 %rF (0 to 90 %rF)

±2 %rF (90 to 100 %rF)

Salt solutions (ASTM E104-85)

±2 %rF (0 to 90 %rF)

±3 %rF (90 to 100 %rF)

Response time $t_{0,9}$ at 20 °C

in still air (with sinter filter)

15 s

Humidity sensors:

HUMICAP®180 for standard applications

HUMICAP®180L2 for high chemical exposure

Temperature measuring ranges

-40 to +180 °C (depending on the selected probe)

Accuracy of the electronic parts at 20 °C, typical ±0.1 °C

Temperature dependency of the electronic parts 0.005 °C / °C

Temperature sensor

Pt1000 class AA (1/3 DIN B) according to DIN EN 60751

Derived variables (option)

Typical measuring ranges

With probe

With probes

907025/S61

907025/S63, .../S64, .../S65, .../S68

Dew point T_d -40 to +60

-40 to +100

[°C]

Mixing ratio x 0 to 160

0 to 500

[g/kg dry air]

Absolute humidity a 0 to 160

0 to 600

[g/m³]

Wet bulb temperature T_w 0 to 60

0 to 100

[°C]

(The accuracy of the derived variables depends on the accuracy of the humidity and temperature measurements as well as the respective working point.)

Outputs

2 analog outputs

4 to 20 mA (2-wire circuit technology)

(one is standard, the other is optional)

Accuracy of the analog outputs at 20 °C

0.05 % of the end value

Temperature dependency

0.005 % / °C of the end value

Ex-classifications (analog outputs)

Europe/VTT

EU (94/9/EG, ATEX100a)

II 1G
EEx ia IIC T4 Ga
VTT 09 ATEX 028 X edition no.: 1**Safety factors** $U_{max.} = DC 28 V, I_l = 100 mA, P_l = 700 mW, C_l = 1 nF, L_l = \text{negligibly small}$ **Ambient conditions** $T_{amb.} = -40 \text{ to } +60 \text{ }^\circ\text{C} (-40 \text{ to } +140 \text{ }^\circ\text{F}), P_{amb.} = 0.8 \text{ to } 1.1 \text{ bar}$ **Dust Ex-protection**

II 1 D (IP65 T = 70 °C)

(with protection cover)

VTT 04 ATEX 023X

USA (FM)

Classes I, II, III, section 1, groups A – G
and section 2, groups A – D, F and G 1G
FM project ID: 3010615**Safety factors** $U_{max.} = DC 28 V, I_{max.} = 100 mA, C_l = 1 nF, P_l = 0.7 W, L_l = 0 \mu H, T_{amb.} = 60 \text{ }^\circ\text{C} (140 \text{ }^\circ\text{F}), T_5$

Japan (TIIS)

Ex ia IIC T4
Code number: TC17897**Safety factors** $U_{max.} = DC 28 V, I_l = 100 mA, C_l = 1 nF, P_l = 0.7 W, L_l = 0 \mu H, T_{amb.} = 60 \text{ }^\circ\text{C} (140 \text{ }^\circ\text{F})$

Canada (CSA)

Class I

Section 1 + 2, groups A – D

Class II

Section 1 + 2, groups G and coal dust

Class IIICSA document no.: 213862 0 000
CSA report no.: 1300863**Safety factors** $T_{amb.} = 60 \text{ }^\circ\text{C}, T_4$
Intrinsically safe when installing according to installations diagram DRW213478

China (PCEC)

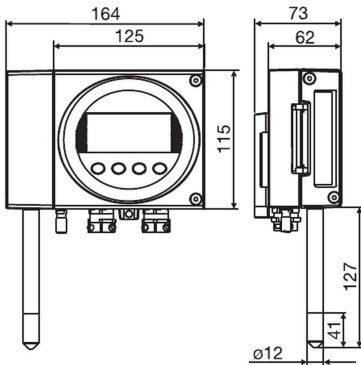
Ex ia IIC T4
Certificate no. CE092145
Standard GB3836.1-2000 and GB3836.4-2000

IECEx (VTT)

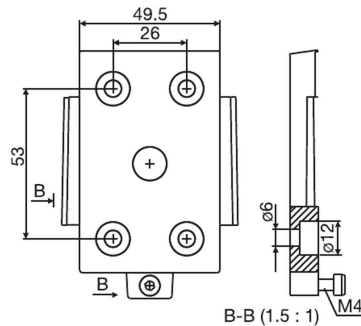
Ex ia IIC T4 Ga
VTT 09.0002x edition no.: 1**Safety factors** $U_{max.} = DC 28 V, I_l = 100 mA, P_l = 700 mW, C_l = 1 nF, L_l = \text{negligibly small}$ **Ambient conditions** $T_{amb.} = -40 \text{ to } +60 \text{ }^\circ\text{C} (-40 \text{ to } +140 \text{ }^\circ\text{F}), P_{amb.} = 0.8 \text{ to } 1.1 \text{ bar}$

General data	Voltage supply	DC 12 to 28 V
	When using the service interface	DC 15 to 28 V
	Operating temperature range	
	Electronic parts with LCD display	-20 to +60 °C
	Storage temperature range	-40 to +70 °C
	Connections	Screw terminals 0.33 to 2.0 mm ²
	Cable screw connection	Pg11 for sensor line with Ø 5 to 12 mm
	Pipe sleeve	Pg11/NPT 1/2"-14
	Case material	G-AlSi10 Mg (DIN 1725)
	Case dimensions	L 164 mm × W 115 mm × H 62 mm
	Case weight	950 g
EMV	According to EN 61326-1: 1997 + Annex 1: 1998 (EN 61000-4-5 only when external surge protector is used)	
Probes	907025/S61	Probe for wall mounting
	907025/S63	Temperature operating range -40 to +60 °C
	907025/S64	Probe in small design type
		Temperature operating range -40 to +120 °C
		Probe for high pressures
		Temperature operating range -40 to +180 °C
		Pressure operating range 0 to 10 MPa (0 to 100 bar)
	907025/S65	Probe for high temperatures
		Temperature operating range -40 to +180 °C
	907025/S68 and 907025/S68L	Probe for pressure pipes
	Temperature operating range -40 to +180 °C	
	Pressure operating range 0 to 4 MPa (0 to 4 bar)	
	Probe cable diameter (all basic types)	5.5 mm
	Probe cable length	2 m (standard) 5 m or 10 m (optional)
Options	Second analog output	4 to 20 mA (2-wire circuit technology)
	Case with display/control panel	Two-line LCD display
	Character size (1st line/2nd line)	12 mm/10 mm
	Extension for derived variables	Dew point temperature T_d , mixing ratio x , absolute humidity a , wet bulb temperature T_w
	Sensor protection	Sinter filter 38 µm out of acid-resistant, rust-free stainless steel AISi 316L (material-no. 1.4404), stainless steel grid AISi 316L (material-no. 1.4404), PPS grid with stainless steel mesh AISi 316 (material-no.: 1.4436), PPS grid

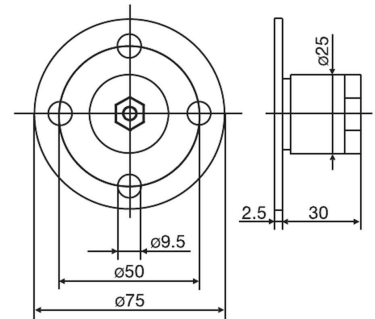
Dimensions



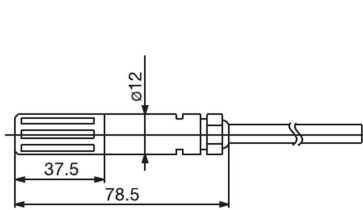
Central processing unit with probe
907025/S61
Basic type 907025/61



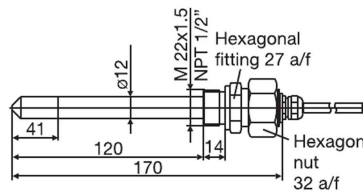
Holder for wall mounting



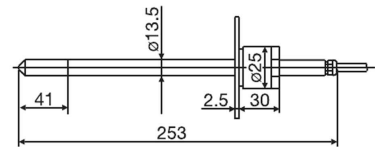
Installation kit
and mounting flange



Probe
907025/S63

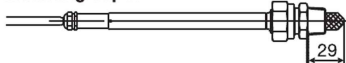


Probe
907025/S64

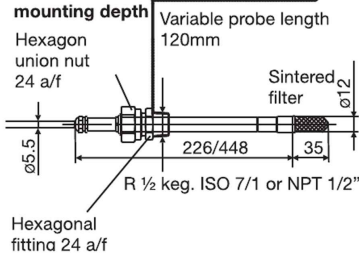


Probe
907025/S65
inc. mounting flange (optional)

Minimum mounting depth



Maximum mounting depth



Probe
907025/S68 and .../S68L

All measurements in mm.

Order details: Intrinsically safe industrial measuring probes
for humidity, temperature, and derived variables
with Ex-approval according to ATEX 100a 94/9/EG (PTB)

	907025/61	(1) Basic type Intrinsically safe humidity and temperature measuring probe for wall mounting, operating temperature -40 to +60 °C
x	11	(2) Output variables rF + T
x	15	rF + T + Td + a + Tw + x
	.0	(3) Analog output variables channel 1 (and channel 2 optionally) For standard use of only one channel please select 0 for channel 2!
x	1 1	rF 0 to 100 %rF
x	2 2	T (see temperature measuring ranges)
x	3 3	Td ² -40 to +60 °C
x	4 4	a ² 0 to 160 g/m ³
x	5 5	Tw ² 0 to 60 °C
x	6 6	x ² 0 to 160 g/kg dry air
x	9 9	Special scaling (specify in plain text)
	472	(4) Temperature measuring ranges -40 to +60 °C
x	632	-20 to +60 °C
x	807	0 to 60 °C
x	999	Special measuring range (specify in plain text)
	2	(5) Probe shaft/filter 120 mm probe shaft length (60 °C), PPS plastic grid filter with stainless steel mesh
	000	(6) Extra codes Without extra code
x	427	Pipe sleeve NPT 1/2" (for installation pipe)
x	777	Unit not metric (°F)
x	789	Integrated LCD display/control panel
x	801	PPS plastic grid filter with PTFE membrane
x	803	Stainless steel sinter filter
x	805	PPS plastic grid filter without stainless steel net
x	823	Special sensor for high concentrations of chemicals
x	826	2 analog output variables (channel 1 and 2), 4 to 20 mA
x	828	Operating instructions in English

Order code - - - - / , ...¹

Order example 907025/61 - 11 - 12 - 472 - 2 / 000

¹ List extra codes in sequence, separated by commas.

² The calculated variables Td, a, Tw, and x are only available if option 15 is selected at the output variables.

Order details: Intrinsicly safe industrial measuring probes
for humidity, temperature, and derived variables
with Ex-approval according to ATEX 100a 94/9/EG (PTB)

(1) Basic type

907025/63 Intrinsicly safe humidity and temperature measuring probe
with small sensor head on a 2 m sensor line,
operating temperature 40 to +120 °C

(2) Output variables

11 rF + T
15 rF + T + Td + a + Tw + x

(3) Analog output variables channel 1 (and channel 2 optionally)

.0 For standard use of only one channel please select 0 for channel 2!
1 1 rF 0 to 100 %rF
2 2 T (see temperature measuring ranges)
3 3 Td² -40 to +100 °C
4 4 a² 0 to 500 g/m³
5 5 Tw² 0 to 100 °C
6 6 x² 0 to 500 g/kg dry air
9 9 Special scaling (specify in plain text)

(4) Temperature measuring ranges

474 -40 to +80 °C
478 -40 to +120 °C
635 -20 to +80 °C
643 -20 to +120 °C
814 0 to 100 °C
999 Special measuring range (specify in plain text)

(5) Sensor cable lengths (probe shaft / filter)

2 2 m shaft length 60 mm (120 °C), PPS plastic grid filter with stainless steel mesh
5 5 m shaft length 60 mm (120 °C), PPS plastic grid filter with stainless steel mesh
10 10 m shaft length 60 mm (120 °C), PPS plastic grid filter with stainless steel mesh

(6) Extra codes

000 Without extra code
427 Pipe sleeve NPT 1/2" (for installation pipe)
777 Unit not metric (°F)
783 Channel installation kit
789 Integrated LCD display/control panel
823 Special sensor for high concentrations of chemicals
826 2 analog output variables (channel 1 and 2), 4 to 20 mA
828 Operating instructions in English

Order code

Order example

	(1)	(2)	(3)	(4)	(5)	(6)	
							, ... ¹
	907025/63	-	11	-	12	-	474
		-		-	2	/	000

¹ List extra codes in sequence, separated by commas.

² The calculated variables Td, a, Tw, and x are only available if option 15 is selected at the output variables.

Order details: Accessories for intrinsically safe industrial measuring probes for humidity, temperature, and derived variables

(1) Basic type	
907025/90	Filter (Ø 12 mm)
907025/91	Replaceable humidity sensor
907025/92	Replaceable temperature sensor
907025/93	Humidity sensor checks
907025/94	Channel installation kit
907025/95	Mounting flange
907025/96	Ball valve installation kit
907025/88	Interface cable (service interface) ¹
(2) Filter	
803	Stainless steel sinter filter
804	PPS plastic grid filter with stainless steel net
805	PPS plastic grid filter without stainless steel net
(2) Replaceable humidity sensor	
814	HUMICAP® 180
(2) Replaceable temperature sensor	
816	Pt1000 class AA (1/3 DIN B) according to DIN EN 60751
(2) Humidity sensor checks	
820	33 %rF magnesium chloride
821	55 %rF magnesium nitrate
822	76 %rF sodium chloride
(2) Channel installation kit	
784	Channel installation kit (for basic type 907025/63 (Ø 12 mm))
(2) Mounting flange	
786	Stainless steel (for basic type 907025/65 (Ø 12 mm))
(2) Ball valve installation kit	
787	Ball valve installation kit (for basic type 907025/68 and .../68L)
(2) Interface cable	
817	Interface cable for service interface

 Order code
 Order example

(1)	-	(2)
907025/90	-	804

Stock versions: Accessories for intrinsically safe industrial measuring probes for humidity, temperature, and derived variables

(1)	-	(2)	Part no.
907025/90	-	803	00465143
907025/90	-	804	00465144
907025/90	-	805	00465145
907025/92	-	816	00387458
907025/93	-	820	00332758
907025/93	-	821	00332759
907025/93	-	822	00332760
907025/94	-	784	00476927
907025/95	-	786	00511237

¹ Use of the interface cable is only admissible outside of the potentially explosive area and only when the device is used temporarily! Data transfer from a potentially explosive area is not admissible due to the increased safety requirements of DIN EN 60079-26 for category 1 devices!