

Technical data ECOTRAC® SMART BREATHER. Dehydrating breather

10944585/00 EN



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We reserve the right to change the technical data, design and scope of supply.

Generally the information provided and agreements made when processing the individual quotations and orders are binding.

The product is delivered in accordance with MR's technical specifications, which are based on information provided by the customer. The customer has a duty of care to ensure the compatibility of the specified product with the customer's planned scope of application.

The original operating instructions were written in German.

1 Design/versions

This technical file contains detailed information about the technical properties of the product. Use our eShop for ordering: www.shop.reinhausen.com. You will find further information in the MR Reinhausen customer portal: <https://portal.reinhausen.com>.

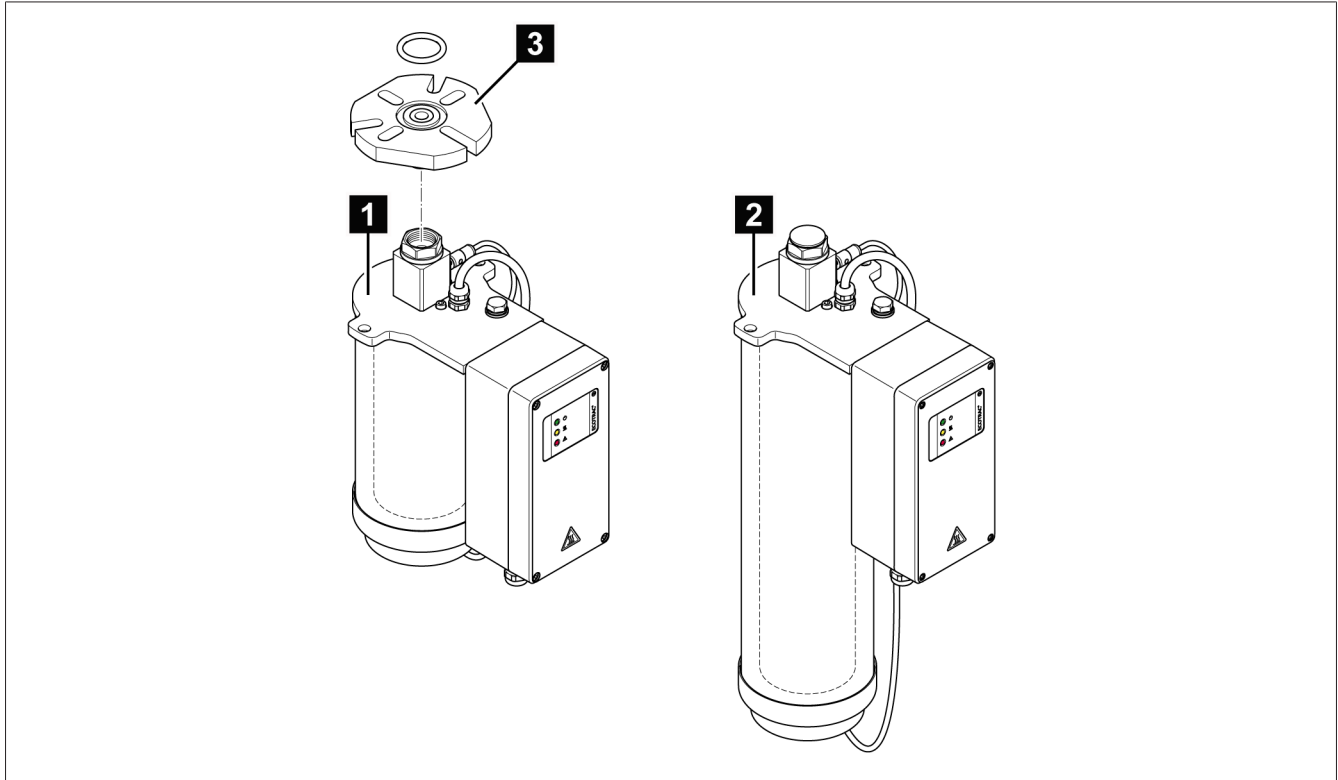


Figure 1: Design

1	Version S	2	Version M
3	Universal flange		

Version	Equipment
SL 120V, SL 230V	Without Modbus, without filter heater
SH 120V, SH 230V	With Modbus, with filter heater
ML 120V, ML 230V	Without Modbus, without filter heater
MH 120V, MH 230V	With Modbus, with filter heater

*) For details, see chapter "Technical data" and "Drawings"

2 Function description

The dehydrating breather is used in oil-insulated transformers, reactors or tap changers for dehydrating the air sucked into oil conservators.

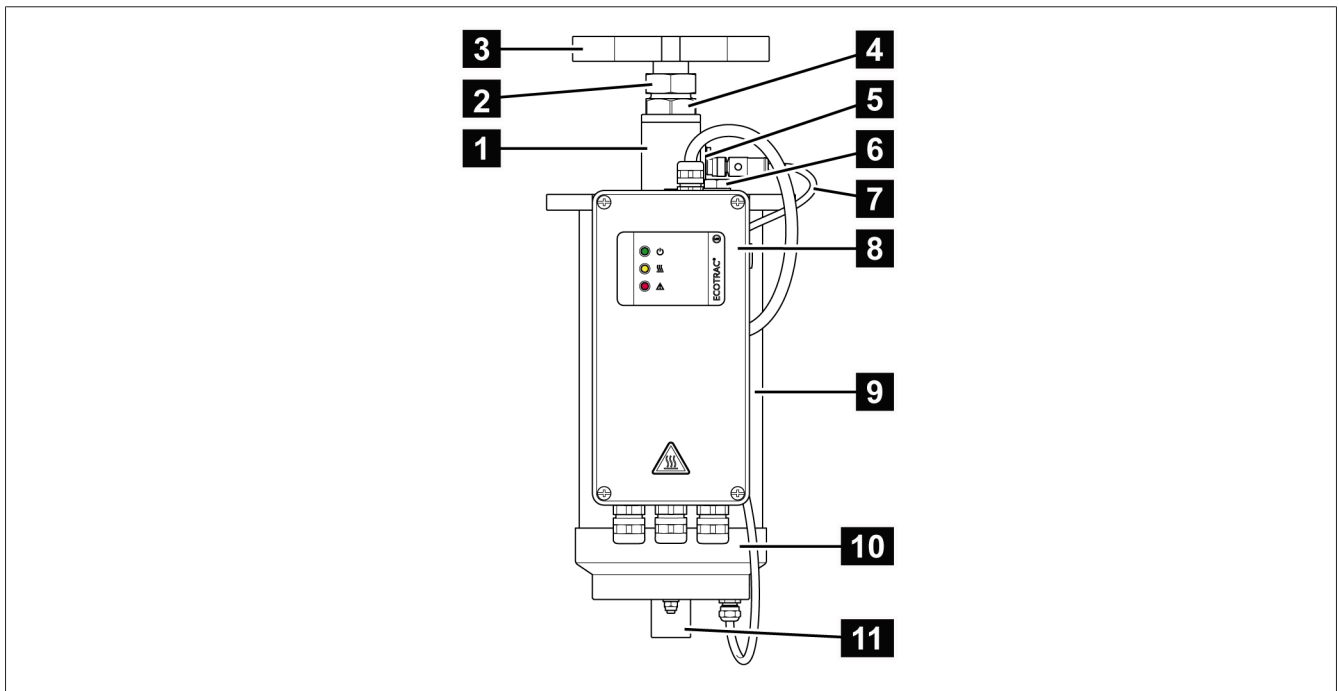


Figure 2: Overview

1	Upper air spout	2	Lock nut
3	Universal flange	4	Nut
5	Temperature and humidity sensor	6	Grounding screw
7	Sensor cable	8	Terminal box (RAL 7035 light gray)
9	Desiccant container	10	Lower metal flange
11	Dust protection tube and optional filter heater		

Refer to the chapter "Drawings" for illustrations of the various designs.

3 Terminal box

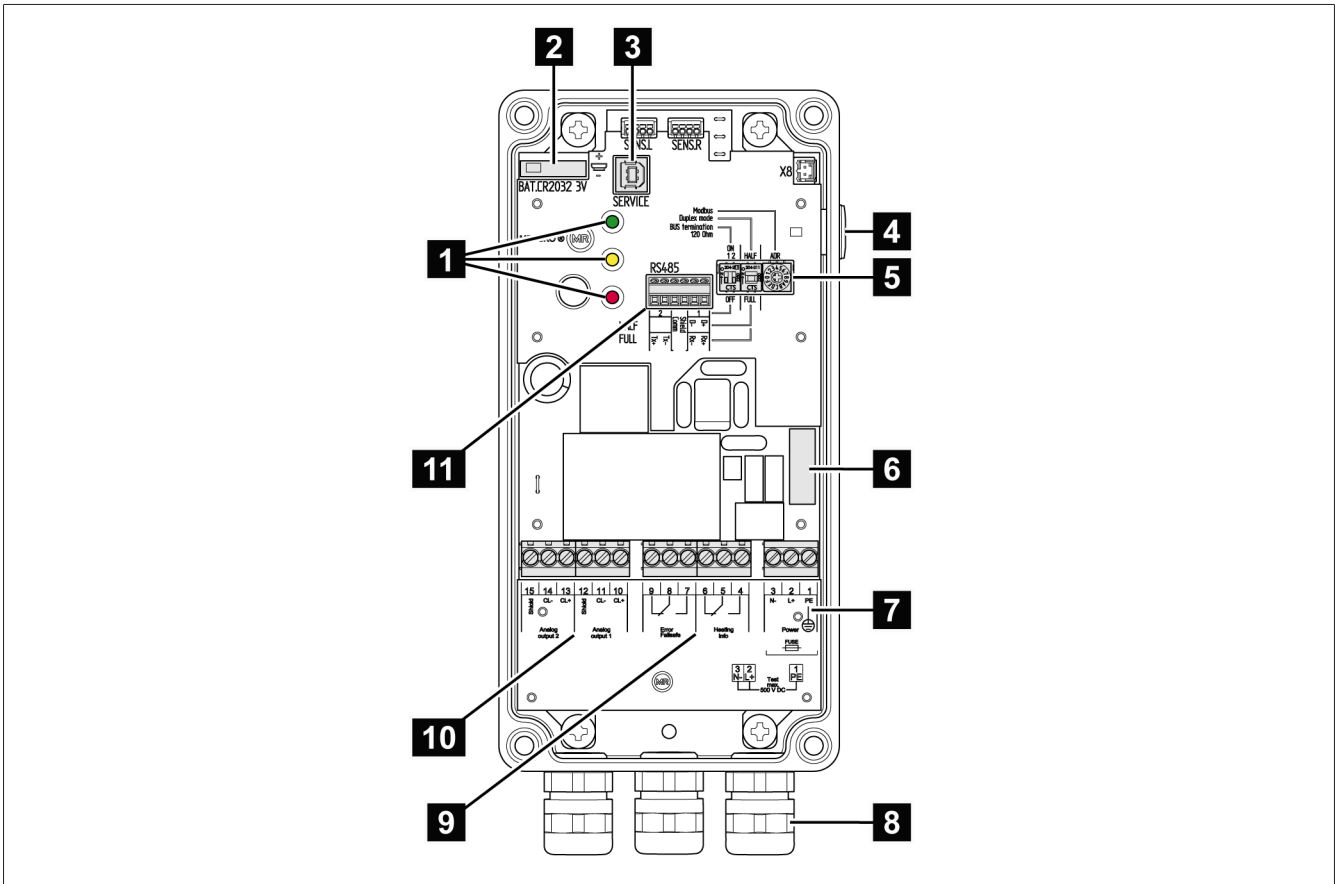


Figure 3: Terminal box



1	LEDs for status display	2	RTC buffer battery (type CR2032)
3	USB service interface (B socket)	4	Test button
5	Modbus settings (optional)	6	Fuse
7	Supply voltage 100...127 V DC/AC 50/60 Hz 200...240 V DC/AC 50/60 Hz	8	Cable gland 1/2" 14NPT (brass) with 100...127 V supply voltage M20x1.5 (brass) with 200...240 V supply voltage
9	Signaling relay	10	Analog output 1 (temperature), 4...20 mA Analog output 2 (humidity), 4...20 mA
11	RS485 interface (optional)		

4 Technical data

The technical data applies to the standard design and may vary depending on the design delivered. Subject to change without prior notice.

Operating conditions	
Location of use	Indoors and outdoors
Pollution degree (terminal box)	4
Relative humidity (operation and storage)	Inside the terminal box: 5...95% (non-condensing)
Ambient air temperature	SL/ML: 0...+70 °C (+32...+158 °F) SH/MH: -50...+70 °C (-58...+158 °F) Version with filter heater for applications in cold regions, i.e. ambient temperature is continuously below 0 °C over a time period of 20 days.
Storage temperature	-50 °C...+70 °C (-58...+158 °F)
Operating temperature	SL/ML: 0...+70 °C (+32...+158 °F) SH/MH: -40...+70 °C (-40...+158 °F) Version with filter heater for applications in cold regions, i.e. ambient temperature is continuously below 0 °C over a time period of 20 days.
Degree of protection in accordance with IEC 60529	<ul style="list-style-type: none"> - Entire device: IPx6 with limitation, application of spray water only from above or from the sides - Terminal box only: IP66 and IP67
Overvoltage category	III
Protection class	I
Installation altitude	Max. 4,000 m above sea level (max. 13,000 ft)

Design types	
Materials	All external parts are resistant to weathering and UV radiation
Color	Flange and metal parts: anodized (aluminum) Terminal box: Powder-coated (C4H in accordance with DIN EN ISO 12944-9) RAL 7035 (light gray)
Weight (without flange)	Version S: approx. 8.6 kg (19.0 lbs) Version M: approx. 12.6 kg (27.8 lbs)
Dimensions	See "Drawings" chapter
Flange connection	Universal flange, see "Drawings" chapter
Desiccant	Only use special colorless, non-toxic silica gel (silicon dioxide) sold by Maschinenfabrik Reinhausen GmbH; Refer to the "Application table" for volume

Power supply	
Nominal voltage	200 ...240 V AC, 50/60 Hz, 200...240 V DC Pmax. 2,500 W or 100...127 V AC, 50/60 Hz, 100...127 V DC Pmax. 2,500 W
Power consumption	Max. 100 mA (in normal operation); Increased power consumption during regeneration; refer to the heating current values in the "Application table" chapter
Heating current	Current during heating process (approx. 1–2 minutes after activating the heating): Refer to the heating current values in the "Application table" chapter
External fuse protection	Miniature circuit breaker characteristic C, K, Z with nominal current of 16 A or 20 A
Rated insulation voltage	500 V DC (in accordance with IEC 61010-1) L against protective conductor  N against protective conductor 
RTC buffer battery	CR2032 (recommendation CR2032 from Renata or CR2032W from Murata Electronics)

Terminal box	
Pressure equalization element	Ventilated to prevent water condensation
Cable glands	M20x1.5, nickel-plated brass or 1/2" 14NPT, nickel-plated brass
Connection terminals	Supply connection, relay, analog outputs: 1.5...4 mm ² , AWG11–15 (solid or flexible), tightening torque 0.5...0.6 Nm (4.4...5.3 lbf-in) RS485 interface: 0.14...1.5 mm ² , AWG15–26 (solid or flexible), tightening torque 0.25 Nm (2.2 lbf-in)
Status display	3 LEDs (green – operation indicator, yellow – regeneration heating, red – device malfunction) visible from the outside; refer to the "Status messages" chapter for the status
Test button	For the device function test
Fuse	5x20 mm; T2A; 250 V (e.g. Littelfuse 477 series 477002)

Signaling contacts	
Contact type	1x change-over contact, silica gel regeneration signaling relay;
	1x change-over contact, device error signaling relay (failsafe)
Contact material	Gold-plated contacts for applications with low switching currents Minimum load: ≥1 mV/1 mA

Signaling contacts	
Dielectric strength	Between circuits and ground: ≥ 2 kV, 50 Hz, duration 1 minute; Between contacts in the open position: ≥ 1 kV, 50 Hz, duration 1 minute; Impulse voltage withstand strength between contacts: ≥ 3 kV, 1.2/50 μ s
Reliable switching capacity	240 V AC, 8 A (IEC 61810, 100,000 switching cycles); 240 V AC, 10 A, 2,000 VA (UL 508, 30,000 switching cycles); 30 V DC, 8 A, 240 W; 240 V DC, 300 mA
Maximum switching capacity	In accordance with IEC 60076-22-7, 1,000 switching cycles: 230 V AC, 1,840 VA / $\cos \phi > 0.5$ 250 V AC, 2,500 W / resistive load 24 V DC, 192 W / resistive load

Analog outputs (active)	
Analog 1 output	Temperature: $-40 \dots +80$ °C ($-40 \dots 176$ °F) 4...20 mA: 7.5 K/mA (13.5 °F/mA) Measuring error: 4...20 mA: ± 2.3 K/mA (4.1 °F/mA)
Analog 2 output	Humidity: 0...100% 4...20 mA: 6.25% R.H./mA Measuring error: 4...20 mA: $\pm 1.9\%$ R.H.
Error signal in the event of sensor failure	< 3.6 mA
Load resistance	0...600 Ω

Options	
Filter heater	SH and MH versions: With heated stainless-steel filter; recommended for cold regions with an ambient temperature that is continuously below 0 °C for more than 20 days in order to guarantee proper function.
	Switching point < 5 °C (switch on)
RS485 interface	For connection to a SCADA system

Standards and directives

Electrical safety	
IEC 61010-1 UL 61010-1 CAN/CSA-C22.2 No. 61010-1	Safety requirements for electrical measurement and control and regulation equipment and laboratory instruments <ul style="list-style-type: none"> - Protection class I - Overvoltage category III - Contamination level 2
Electromagnetic compatibility	
IEC 61000-6-5, IEC/KC 61000-6-2, IEC/KC 61000-6-4, FCC 47 CFR Part 15B, ICES-003	
Environmental durability tests	
IEC 60529	<ul style="list-style-type: none"> - Entire device: IPx6 with limitation, application of spray water only from above or from the sides - Terminal box only: IP66 and IP67

Electrical safety	
IEC 60068-2-1	Dry cold -25 °C (-13 °F)/ 96 hours
IEC 60068-2-2	Dry heat +70 °C (+158 F)/ 96 hours

Power transformer and reactor accessories	
IEC 60076-22-7	Accessories and fittings
IEC 60076-22-7 Chapter 6.6.5.2.3	Duration test at least 100 regenerations passed
IEC 60076-22-8	<i>Power transformer and reactor fittings – Devices suitable for use in communication networks</i>

5 Application table

Application		Device model	Silica gel	
Tap changer		Version S	1.1 kg (2.4 lbs)	
Arc suppression coil (Petersen coil)		Version S	1.1 kg (2.4 lbs)	
Traction transformers		Version S	1.1 kg (2.4 lbs)	
Network transformers ≤ 40 MVA		Version S	1.1 kg (2.4 lbs)	
Network transformers and step-up transformers > 40 MVA ≤ 200 MVA		Version M	2.2 kg (4.8 lbs)	
Phase shifters ≤ 40 MVA		Version S	1.1 kg (2.4 lbs)	
Phase shifters > 40 MVA ≤ 200 MVA		Version M	2.2 kg (4.8 lbs)	
Reactors ≤ 40 MVA		Version S	1.1 kg (2.4 lbs)	
Reactors > 40 MVA ≤ 200 MVA		Version M	2.2 kg (4.8 lbs)	
Device model	Heating current ¹⁾		Silica gel	Control ²⁾
	$U_V = 120$ V	$U_V = 230$ V		
Version S	1.2 A	0.6 A	1.1 kg (2.4 lbs)	Status-led controller
Version M	2.3 A	1.2 A	2.2 kg (4.8 lbs)	Status-led controller

1) Heating current during the heating process (approx. 1–2 min. after heating activation).

2) **Status-led controller:** Self-learning system with status-dependent control of the heat-drying procedure through humidity monitoring and temperature-dependent determination of the most advantageous time to perform heat-drying.

6 Drawings

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CHKD. 05.03.2024	KISTNERM	CHANGE NO. SCALE
STAND. 06.03.2024	KLEYN	1127734 1:2

DIMENSION
 IN mm
 EXCEPT AS
 NOTED

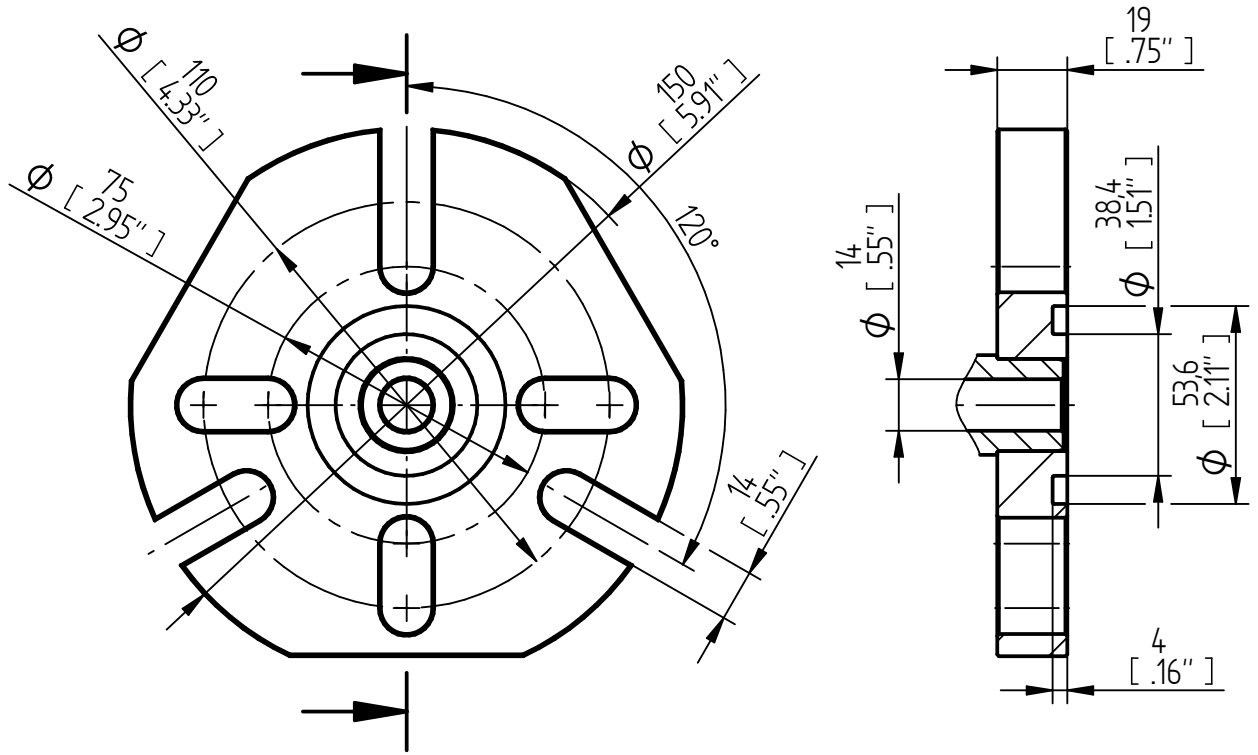


ECOTRAC® Universalflansch
 ECOTRAC® UNIVERSAL FLANGE
 Maßzeichnung / DIMENSION DRAWING

SERIAL NUMBER

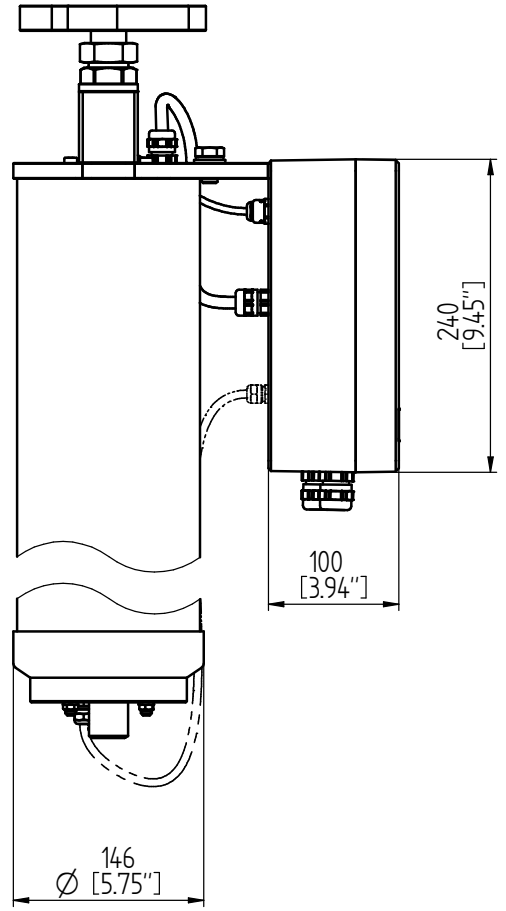
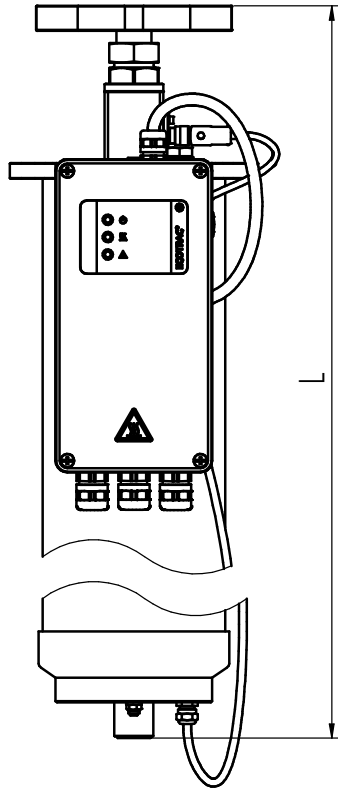
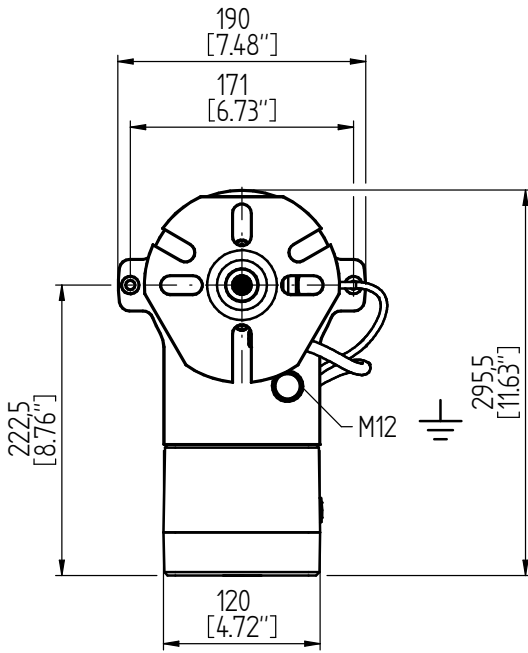
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SHEET
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29.02.2024	ETTAIQ	SED 10950969 000 00
CHKD 04.03.2024	SCHAEFERB	CHANGE NO. SCALE
STAND 05.03.2024	KLEYN	1127734 1:4



ECOTRAC-Abmessung mit Flansch / ECOTRAC DIMENSIONS WITH FLANGE	ECOTRAC S L	ECOTRAC M L
Universalflansch / UNIVERSAL FLANGE	454,5 [17.89"]	684,5 [27.11"]

DIMENSION
 IN mm
 EXCEPT AS
 NOTED



ECOTRAC® Smart Breather S/M
 ECOTRAC® SMART BREATHER S/M
 Maßzeichnung / DIMENSION DRAWING

SERIAL NUMBER

MATERIAL NUMBER
 101814310M

SHEET
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7 Appendix

7.1 Modbus RTU (optional)

Status information

Function code "02" to read the information

No.	Value	Designation
0	On/Off	Error present
1	On/Off	Error SiO2 heating
2	On/Off	Internal data point
3	On/Off	Voltage supply error
4	On/Off	Sensor error
5	On/Off	Internal data point
6	On/Off	Internal data point
7	On/Off	Internal data point
8	On/Off	RTC battery low
9	On/Off	Analog output 1 open
10	On/Off	Analog output 2 open
11	On/Off	Internal data point
12	On/Off	Internal data point
13	On/Off	Internal data point
14	On/Off	Internal data point
15	On/Off	Internal data point
16	On/Off	Internal data point
17	On/Off	Regeneration
18	On/Off	Internal data point
19	On/Off	Sensor status
20	On/Off	Internal data point

Analog values (input register)

Function code "04" to read the information

No.	MSW/LSW*	Value	Designation
0	MSW	float32	Humidity sensor
1	LSW		
2	MSW	float32	Temperature sensor
3	LSW		

*) MSW = most significant word; LSW = least significant word

Analog values (input register)

Function code "04" to read the information

No.	Value	Designation
16	sint16 / factor 10	Humidity sensor
17	sint16 / factor 10	Temperature sensor

7.2 RS485 communication settings (optional)

ADR position	Address	Baud rate	Parity	Description
0	247	9,600	EVEN	Address, baud rate and parity cannot be changed
1 - D	1 - 13	19,200	EVEN	The address 1 - 13 can be set via HEX rotary switch 1 - D; baud rate and parity cannot be changed
F	None	115,200	NONE	For service purposes

Factory settings

ADR position	Address	Baud rate	Parity	Description
3	3	19,200	EVEN	Delivery status

Duplex mode: HALF

BUS termination 120 ohms: OFF

Glossary

Ambient air temperature

Permissible temperature of the air in the surroundings of the equipment in operation on which the device is installed.

Operating temperature

Permissible temperature in the immediate surroundings of the device during operation taking ambient influences, for example due to the equipment and installation location, into consideration.

Storage temperature

Permissible temperature for storing the device in an unmounted state or in a mounted state so long as the device is not in operation.

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THE POWER BEHIND POWER.