## Measured quantities

- Relative pressure
- Absolute pressure
- Differential pressure
- Barometer reading
- Temperature

Applications

- Problem analysis in the gas network
- Monitoring in gas pressure control and measuring systems
- Pipe network calculation
- Leak test G469 / W400-2
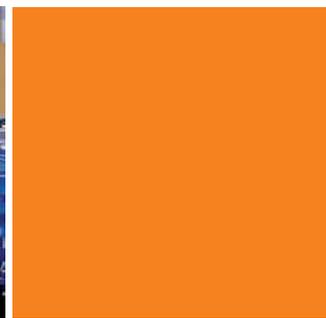
ESS3 R1

Data logger with one radial sensor

ESS3 R1 overview

The devices of the ESS3 R1 series are used to measure pressure, dif-ferential pressure and temperature in supply networks for gas, water, and district heating and are also suitable for measuring general liquid and gaseous media in industry.

Battery-operated devices have a modular design and comprise an operator control unit (housing, processor, software and display), sen-sor and battery in each case. The data loggers are approved for use in hazardous areas (Zones 1 and 2) and are designed in protection classes up to IP68 (water tight/immersible).

The operator control unit stores the measured values supplied by the pressure and temperature sensors in non-volatile memory. The current measured values are continuously indicated on a display. The data is transferred to the PC by means of a non-contact optical IrDA interface (USB connection).

A lithium battery unit enables multiple years of operation under ordi-nary conditions. The battery status is continually monitored and the remaining battery life is indicated.

The TfsWin III software is used to configure the logger (measuring cycle, measuring location, etc.) and to read out and graphically display the measured data. The communication for this takes place over the non-contact optical IrDA interface. Alternatively, keys can be used to operate the device.

Sensor

The sensor is the metrological link to the application. Performance and ease of use are therefore the central focus:

• A change of sensor by the user is possible and the new sensor is immediately ready for operation without calibration
• Stainless steel-enclosed, piezoresistive sensor with high long-term stability, resistant to corrosive media
• High resolution of measured values; multiple measuring ranges possible for one sensor
• Media temperature measurement
• High measuring rates through high self-resonant frequency
• High overpressure protection and high burst pressure
• Special designs, e.g., for O_2 measurement
• Appropriately-graduated fixed or customizable measuring ranges and various accuracy classes up to +- 0.05 % of full scale
• Temperature sensors are available as rod-type sensors or are suitable for use in thermowells

Technical data

Application	Measurement and storage of data (pressure and temperature) for fault analysis, monitoring of pipe network and gas pressure regulation systems
Sensor connections	One radial sensor connection (M30) for accommo-dation of a pressure- or temperature sensor
Explosion protection class	⟨Ex⟩ II 2G Ex ib IIC T4 Gb
Protection classes, Housing	Dependent on the sensor: IP 67 with relative pressure IP 68 with absolute- and differential pressure and temperature; W x H x D [mm]: 108 x 162 x 80 Weight [kg]: 1.2
Measuring ranges of pressure sensors	Rel. press.: 0 … 100/250 mbar a. 0 … 1/2.5/10/25/100 bar; Diff. press.: 0 … 100 mbar a. 0 … 1/10 bar further measuring ranges on request
Measuring ranges of temp. sensors	-10 °C ... +40 °C and -30 °C ... +150 °C
Measuring rate	125 msec ... 6 hours
Meas. precision	Dependent on the sensor (up to 0.05 % of full scale)
Resolution	up to 0.004 % of full scale
Comm. interfaces	IrDA; Display; Keyboard
Operating data	Battery operation up to 8 years
Display	Actual value; maximum and minimum value as well as differential value; Memory utilization and battery status
Settings	Date and time; upper and lower alarm threshold; averaging (2 … 600 values); resolution; measuring location name (29 characters); storage method (rolling / static)
Operation	Via keyboard using menu Via TfsWin III-software using IrDA-interface cable
Storage	250,000 date-time values / 512 kB
Typical operating span	2 years (through data compression)
Software	TfsWin III for parameter assignment, display, analysis and archiving of data

Table 1: ESS3 R1 (Operator Control Unit)

Pressure sensor

Media compatibility: All liquids and gases that are compatible with stainless steel 1.4301 and NBR seal material.

Process connection: G1/2 external thread, G1/8 internal thread

Measuring range	Precision [% of FS[1]]			
	Standard ± 0,4 %	Premium ± 0,09 %	Select ± 0,05 %	Select plus ± 0,05 % < 5mbar [2]
0 ... 100 mbar relative	x	x	~	~
0 ... 100 mbar differential pressure	x	~	~	~
0 ... 250 mbar relative	x	x	~	~
0 ... 1 bar relative	x	x	x	~
0 ... 1 bar differential pressure	x	~	~	~
0 ... 2.5 bar relative	x	x	x	~
0 ... 2.5 bar absolute	x	x	x	~
0 ... 10 bar relative	x	x	x	~
0 ... 10 bar absolute	x	x	x	~
0 ... 10 bar differential pressure	x	~	~	~
0 ... 25 bar absolute	x	x	x	x
0 ... 100 bar absolute	x	x	x	~
100 mbar ... 14 bar relative [3]	x	x	x [4]	~
2.5 bar ... 200 bar absolute [3]	x	x	x [4]	~
100 mbar ... 35 bar differential pressure[3]	x	~	~	~
0 ... 200 bar - 0 ... 700 bar absolutet [3]	x	~	~	~
Negative pressure	x	~	~	~

1) FS: of full scale
2) Difference < 5mbar at an ambient temperature change of 15 K, according to DVGW G469:2010 test method C3
3) customized measuring range; freely selectable within this range
4) on request

Table 2: Pressure sensors ESS3 R1
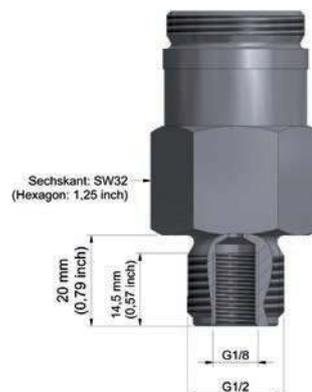
Figure 1: Pressure sensor

Temperature sensor

Media compatibility: All liquids and gases that are compatible with stainless steel 1.4301 and NBR seal material.

Rod-type sensor: 150 mm x 4.5 mm
Thermowell 90 / 140 mm: G3/4 internal thread

Temperature sensor measuring range and type		Screw-in sensor	Cable sensor
-10 °C ... +40 °C	Rod sensor	~	x
-10 °C ... +40 °C	Immersion sleeve 90 mm	x	x
-10 °C ... +40 °C	Immersion sleeve 140 mm	x	x
-30 °C ... +150 °C[1]	Rod sensor	~	x
-30 °C ... +150 °C[1]	Immersion sleeve 90 mm	x	x
-30 °C ... +150 °C[1]	Immersion sleeve 140 mm	x	x
Measuring precision		+/- 0,3 °C	

1) freely selectable within this range

Table 3: Temperature sensor ESS3 R1
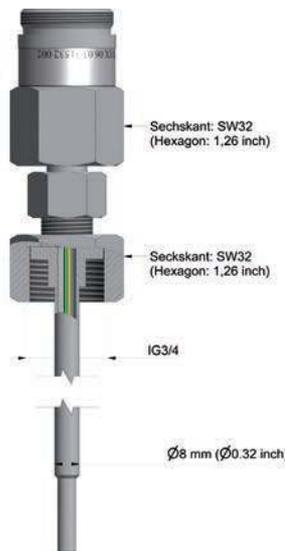
Figure 2: Temperature sensor, thermowell
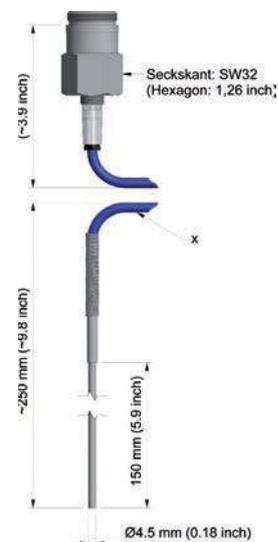
Figure 3: Temperature sensor, rod-type

About UNION Instruments

UNION Instruments GmbH, founded in 1919, is a specialized supplier of measuring instruments in the areas of calorimetry and gas composition. Its user and customer base includes biogas producers, the chemical industry, and energy and water suppliers. The company has its headquarters in Karlsruhe and a subsidiary in Lübeck. With 30 international distributors, UNION Instruments operates worldwide. The company's core businesses include development and production as well as maintenance, service, and support.

Our service performance

Support

The **UNION-hotline** helps to solve all inquiries and urgent issues fast and easy. Device specific concerns can be solved worldwide within minutes by direct communication via TEAMVIEWER.

Original spare parts

Original spare parts for the majority of UNION's products are on stock directly at site and ready for dispatch within a few hours.

Software

For read-out of measurement and calibration data a device-specific software is available for our clients. In addition to the graphic display of measurement data its export in several database formats is possible.

Training

UNION offers individual in-house training or on-site seminars for installation, use and maintenance of our devices even at the customer's premises. Training is individually adapted to the client's requirements.

Repair service

A global service for inspection, maintenance and repair of our devices and systems is provided directly by UNION and via its distributors.

Certification

Since 20 years we have implemented the ISO9001 system.
UNION's products are certified to ATEX and UL/CSA directives accordingly. Industrial safety **"Safety with System"** is part of UNION's company policy.

Engineering

In the last decades UNION compiled a very high level to the state of the art that covers many market segments. So a wide range of possible solution approaches is on-hand.

Calibration

As part of maintenance and service UNION provides the validation and re-calibration of measuring devices in conformity with certified custody transfer instruments and / or traceable perpendicular.

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