

Dräger Polytron SE Ex Fixed Gas Detector

The Dräger Polytron SE Ex sensing heads are gas detectors for the continuous monitoring of flammable gases and vapors in the ambient air. The measurement is based on the heat of reaction, where a chemical reaction takes place in a catalytic bead (so-called pellistor) inside the sensor.



By this concentrations of flammable gases can be detected long before they tend to be ignitable, or: before they reach the lower explosive limit (LEL). The sensing heads are intended to be used in the harsh industrial environment and connected to a suitable central controller by means of a 3-core cable. For different applications Dräger offers three versions: Dräger Polytron SE Ex PR M and Dräger Polytron SE Ex HT M to monitor for concentrations up to 100 %LEL, where the version HT is suitable for temperatures up to 150 °C, and a Dräger Polytron SE Ex LC M to detect very low concentrations up to 10 %LEL for leak detection.

FEATURES AND BENEFITS

- Operating temperature - 50 °C to + 85 °C, Dräger Polytron SE Ex HT M up to + 150 °C
- Poison resistant pellistor sensor
- Fast and accurate response

TWO VARIANTS

Dräger Polytron SE Ex PR M and SE Ex LC M are available in two variants differing in the size of the junction box. The big junction box with the cable entry on the left side is preferably used for out-door applications. The cable gland can also be inserted at the bottom side.

COMPREHENSIVE EXPLOSION PROTECTION

The Dräger Polytron SE Ex sensing heads are certified acc. to the directive 94/9/EG (ATEX 95) and marked by II 2 GD, indicating that they are suitable to be operated in potentially explosive atmospheres (zone 1 and 2 as well as zone 21 and 22).

MEASURING SIGNAL

The flame-proof encapsulated gas sensor produces a mV-signal which is proportional to the gas concentration and can be evaluated by a suitable central controller (e.g. Dräger REGARD Ex or Dräger Polytron SE Ex). Connected via a shielded 3-core cable of several hundreds of meters length to the sensing head, the central controller is intended to be used to activate alarms if dangerous gas concentrations occur.

PELLISTOR SENSORS

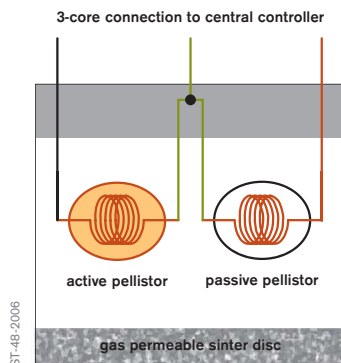
As they are used as precisely temperature-dependent resistors, the measuring beads housed in the Ex-sensor are called pellistors (from engl. pellet and resistor). A pellistor is made of very porous ceramic material embedding a small platinum wire coil. By means of an electrical current of approx. 270 mA on the one hand the platinum coil heats up the ceramic bead to



Dräger Polytron SE Ex PR M
Standard junction box.

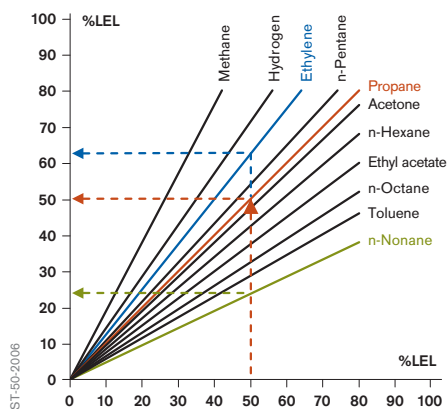


Dräger Polytron SE Ex PR M GB
Big junction box, cable inlet and stopping plug exchanged.



ST-46-2006

Design of a pellistor sensor



ST-50-2006

Different sensitivities of a propane-calibrated pellistor sensor

50 %LEL n-nonane cause a measuring value of only 23 %LEL propane while 50 %LEL ethylene cause a measuring value of 62 %LEL (schematic).



ST-46-2006

Dräger Polytron SE Ex LC M GB
Big junction box, cable inlet
left-sided.

approx. 450 °C, on the other hand the platinum coil acts as a measuring resistor dependent on the bead's temperature.

When molecules of a flammable gas penetrate into a catalytic bead they react with the activated airborne oxygen which is adsorbed in the porous ceramic and release heat of reaction causing the pellistor's temperature rising e.g. by about 2 °C for 10 %LEL octane. The resulting increase of the pellistor's resistance is in the magnitude of some milli-Ohms and is proportional to the gas concentration.

ENVIRONMENTAL CONDITIONS

The increase of temperature, dependent of the gas concentration, however, can only be used as a measurement signal if changes of ambient temperature, which might be much greater, are compensated. This is realized by a second pellistor, which in opposite to the described one does not contain catalytic material and thus is measuring only the ambient temperature.

As part of a Wheatstone bridge this passive pellistor compensates for environmental influences, especially for ambient temperature. For optimized behaviour both the pellistors must fit best concerning their measuring parameters, and they are accordingly matched to pairs during manufacturing.

POISON RESISTANCE

The pellistors which are manufactured by Dräger since decades are of type PR, which means poison resistant. Based on their special construction the sensors have a longer lifetime compared to conventional sensors when being exposed to industrial atmospheres containing catalytic poisons such as sulphur-, phosphor-, lead- or silicone-compounds.

CALIBRATION

A suitable central controller supplies the sensor with a constant current and, by means of its Wheatstone-semibridge input, converts the sensor's resistance change into a mV-signal. Before this, how-

ever, the sensor needs to be balanced to 0 mV when being exposed to normal clean air (zero calibration). When applying defined gas concentrations the resulting mV-signal needs to be adjusted at the central controller such that the current gas concentration is correctly displayed in %LEL. This is the procedure of span calibration.

As a pellistor-sensor reacts with different sensitivity when being exposed to different gases (s. graphics), in the presence of several gases and vapors it must be calibrated to the gas which the sensor is least sensitive to.

The oxygen content of the monitored atmosphere must be more than 12 % by vol.

EXPLOSION PROTECTION

The sensor must not be the ignition source in a flammable atmosphere. As many substances have ignition temperatures lower than the pellistor temperature they might be ignited. But the gas-permeable stainless-steel sinter disc prevents a flash-back into the outer atmosphere and so is an essential element of the flame-proof explosion protection concept "d".

MEASURING FUNCTION FOR EXPLOSION PROTECTION

In conjunction with some Dräger central controller units the Dräger Polytron SE Ex PR M and SE Ex HT M are type-approved to be used in preventive explosion protection applications acc. to EN 1127-1. Using a type-tested gas detection system, which in case of dangerous gas concentrations automatically activates counter measures to reduce the gas concentration, the extension of hazardous areas may drastically be reduced. By this electric installations can be performed more simply and in some cases even instruments not being ex-approved at all can be used.

This is because potentially explosive atmospheres occur seldom or even not at all when having a gas detection system like this.

DRÄGER POLYTRON SE EX PR M – THE UNIVERSAL ONE

The Dräger Polytron SE Ex PR M has established to a universal industrial standard since the recent years. Wherever there is a risk of flammable gas or vapor release, the Dräger Polytron SE Ex PR M can be used to prevent the formation of explosive atmospheres. By means of the central controller unit not only the operator is alarmed, but simultaneously counter measures (e.g. ventilation with clean air to reduce the gas concentration) are activated at pre-alarm conditions (e.g. at 20 %LEL). If however the counter measure fails and the gas concentration rises, the main-alarm threshold (e.g. at 40 %LEL) is exceeded and shut-downs are automatically activated. For this application the Dräger Polytron SE Ex PR M with the central controllers Dräger REGARD Ex and Dräger Polytron SE Ex is type-approved acc. to EN 61779.

DRÄGER POLYTRON SE EX LC M – THE EARLY LEAK DETECTOR

The Dräger Polytron SE Ex LC M (LC = Low Concentration) is suitable to detect very low gas concentrations reliably. This

sensing head is rather used for early leak detection of flammable gases and vapours with concentrations lower than 10 %LEL than for preventive explosion protection measures. Typical alarm thresholds are 3 %LEL and 5 %LEL, corresponding to e.g. 300 and 500 ppm n-hexane. The flameproof encapsulated sensor contains complex amplification electronics which is especially adjusted concerning several measuring parameters.

DRÄGER POLYTRON SE EX HT M – THE HEAT RESISTANT ONE

The Dräger Polytron SE Ex HT M (HT = High Temperature) is intended to be used at ambient temperatures up to 150 °C. This sensing head is preferably used at conditions, where extremely high temperatures exist, especially for leak detection in the direct vicinity of gas turbines. The temperature resistant terminals are housed in a robust galvanised cast iron enclosure.

AND ALSO A REMOTE SENSING HEAD

The sensing heads described can also be combined with the transmitters Dräger Polytron Ex and PEX 3000 as a remote sensing head.



ST-5669-2004

Dräger Polytron SE Ex HT M



ST-5669-2004

Dräger Polytron SE Ex LC M

TECHNICAL DATA

Type	Sensing head with catalytic sensor	
Gases	Flammable gases and vapours in ambient air, e.g. methane, propane, acetone, acetylene, ammonia, gasoline 065/095 (petrol), benzene, 1.3-butadiene, n-butane, n-butyl acetate, cyclopropane, diethyl ether, dimethyl ether, ethanol, ethylene (ethene), ethyl acetate, ethylene oxide, n-hexane, methanol, methylethyl ketone (MEK), n-nonane, n-octane, n-pentane, i-propanol, propylene (propene), propylene oxide, toluene, and hydrogen	
Full scale deflection	SE Ex PR M and HT M	With suitable central controller 100 % of the lower explosive limit (LEL)
	SE Ex LC M	With suitable central controller 10 % of the lower explosive limit (LEL)
Sensor current	SE Ex PR M and HT M	240 or 270 mA constant current from suitable central controller, approx. 1 W
	SE Ex LC M	276 mA constant current from suitable central controller, approx. 1 W
Response time (at 25 °C)	SE Ex PR M and HT M	t ₅₀ ≤ 6 s, t ₉₀ ≤ 15 s (methane)
	SE Ex LC M	t ₅₀ ≤ 6 s, t ₉₀ ≤ 20 s (methane)
Cable	3-core cable, shielded, cross-section 0.5 to 1.5 mm ²	
	SE Ex PR M and LC M	Outer diameter 6 to 12 mm
	SE Ex HT M	Outer diameter 7 to 12 mm, sufficiently temperature resistant
Max. cable length	With central controller Polytron SE Ex	3 x 1.5 mm ² : 1450 m
		3 x 1.0 mm ² : 950 m
		3 x 0.75 mm ² : 700 m
	With central controller REGARD Ex	3 x 1.5 mm ² : 700 m
		3 x 1.0 mm ² : 450 m
		3 x 0.75 mm ² : 350 m
Cable entry	M 20 x 1.5	

TECHNICAL DATA

Ambient conditions	SE Ex PR M	Min. temperature: – 50 °C	Max. temperature: T4: + 85 °C, T5: + 55 °C, T6: + 40 °C
	SE Ex LC M	Min. temperature: – 40 °C	Max. temperature: T4: + 85 °C, T5: + 50 °C, T6: + 40 °C
	SE Ex HT M	Min. temperature: – 50 °C	Max. temperature: T3: + 150 °C
	Pressure	700 to 1300 hPa	
	Humidity	0 to 95 %r.H. non condensing	
Junction box	SE Ex PR M and LC M	IP 66, glass-fiber reinforced Polyester (GRP)	
	SE Ex HT M	IP 66, cast iron enclosure, galvanised	
Dimensions (W x H x D)	SE Ex PR M and LC M	Standard junction box 80 x 140 x 55 mm incl. sensor and cable entry	
	SE Ex PR M and LC M	Big junction box 130 x 120 x 55 mm incl. sensor and cable entry	
	SE Ex HT M	150 x 160 x 80 mm	
Weight	SE Ex PR M and LC M	Approx. 0.6 kg	
	SE Ex HT M	Approx. 1.5 kg	
	Sensor PR M and HT M	Approx. 0.2 kg	
Expected sensor life time	> 3 years		
Explosion protection	SE Ex PR M and LC M	II 2G: EEx de IIC T6/T5/T4	II 2D: IP 6x T85/T100/T135 °C
	SE Ex HT M	II 2G: EEx de IIC T3	II 2D: IP 6x T170 °C
Approvals	CE-Mark	Electromagnetic Compatibility (Directive 89/336/ECC)	
	SE Ex PR M and HT M	Measuring function for explosion protection acc. to EN 1127-1 (EN 61779) with central controller Dräger REGARD Ex or Dräger Polytron SE Ex	
		MED-Approval (Marine Equipment Directive, 96/98/EC)	

ORDER INFORMATION

Dräger Polytron SE Ex PR M, standard junction box	68 09 758
Dräger Polytron SE Ex PR M GB, big junction box	68 11 500
Ex-Sensor PR M	68 09 225
Dust filter for Ex-Sensor PR M	68 10 537
Dräger Polytron SE Ex LC M, standard junction box	68 10 486
Dräger Polytron SE Ex LC M GB, big junction box	68 11 495
Ex-Sensor LC M	68 10 350
Dräger Polytron SE Ex HT M	68 10 530
Ex-Sensor HT M	68 10 526
Calibration adapter	68 06 978



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.