Dräger Polytron® SE Ex
Detector for flammable gases and vapours

The Dräger Polytron® SE Ex ... DQ sensing heads are gas detectors for the continuous monitoring of flammable gases and vapours in the ambient air. Measurement is based on the heat of reaction principle where a chemical reaction takes place in a catalytic bead (also known as a pellistor) inside the sensor.

Dräger. Technology for Life®

Benefits

Heat of reaction principle

By the heat of reaction principle, concentrations of flammable gases can be detected long before they tend to be ignitable, in other words: 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. Based on different sensor types Dräger offers three versions for different applications: On the one hand for the detection of up to 100 % LEL (where a special HT-version can be used at ambient temperatures up to 150 °C), on the other hand for the detection of very low concentrations in the range 0 ... 10 % LEL (leak detection).

Six housing variants

The sensing heads Dräger Polytron SE Ex PR ... DQ and SE Ex LC ... DD are available as four variants each, which differ by their junction boxes, specified by the following code:

M1 - small standard housing
M2 - midsize standard housing

Besides these junction boxes made of glass fiber reinforced Polyester (GRP) with type of protection “e” (increased safety) housing a sensor with metric (“M”) thread, a further variant with type of protection “d” (flameproof enclosure) is available, coded as:

NPT1 - flame-proof metal housing

This variant houses a sensor with NPT-thread and is intended to be used in conduit installations. The variant M2 should preferably be used in outdoor applications since the lateral cable gland may be exchanged by the stopping plug so that the cable can be inserted from the bottom.

Comprehensive explosion protection

The sensing heads Polytron SE Ex ... DQ are labeled according to the Directive 2014/34/EU as II 2G/ II 2D and thus are suitable for operation in areas with potentially explosive atmospheres of zone 1 and 2 as well as zone 21 and 22. In the same way, for world-wide applications, an IECEx-approval allows to operate these sensing heads in hazardous areas.

mV 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 or Polytron SE Ex). Connected to the sensing head via a shielded 3-core cable of several hundreds of meters length, the central controller is intended to activate alarms if dangerous gas concentrations occur.

Benefits

Pellistor sensors type DQ

Since they are operated as precisely measuring temperature dependent resistors, the measuring beads housed in the sensor are called pellistors (from engl. pellet and resistor). A pellistor is a small bead made of very porous ceramic material which is impregnated by a special catalyst and embedding a small platinum filament. By means of an electrical current of approx. 255 mA on the one hand the platinum filament heatsup the ceramic bead to roughly 450 °C,on the other hand this platinum wire actsas a measuring resistor dependent on thebead's temperature. When molecules of a flammable gaspenetrate into the catalytic bead they reactwith the activated airborne oxygen which is adsorbed in the porous ceramic and release heat of reaction causing the pellistor's temperature rising. The resulting resistance increase of some milli-Ohms is proportional to the gas concentration.

Compensation of environmental conditions

By means of a second, entirely uniform pellistor, which is especially encapsulated, any parameter affecting precise measurement is optimal compensated. This is particularly true in respect to humidity and ambient temperature. During manufacturing these pellistors are matched in respect to optimum compensation characteristics. Since both these pellistors are catalytic the sensor is called type DQ (double detector) with a resulting long-term stable sensor signal being nearly unaffected by ambient temperature changes.

Poison resistance

The pellistors which are manufactured since decades are of type PR, which means poison resistant. Based on their special construction these sensors have a longer lifetime compared to conventional sensors when being exposed to industrial atmospheres containing catalyst poisons such as sulfur-, phosphor-, lead- or siliconcompounds.

Very short response times

To achieve short response times the gas entrance of the DQ-sensor is not a conventional sinter disc but a thin wire mesh disc so that the gas to be detected can very quickly enter the pellistors by way of diffusion.

Measuring function for explosion protection

In conjunction with some Dräger central controller units the Dräger sensing heads Polytron SE Ex PR ... DQ and HT M DQ are type-approved to be used in pre ventive explosion protection applications acc. to EN 1127-1. This is a customer's benefit since in case of a dangerous gas concentration a performance approved gas detection system will auto matically activate countermeasures so that explosive concentrations cannot form and the extension of hazardous areas thus decrease. By this, electrical installations can be designed more simply and in some cases even no further explosion protection measures are necessary. This is because potentially explosive atmospheres occur seldom or even not at all when having a gas detection system like this.

System Components

D-10088-2018

Catalytic Bead DrägerSensor®

The DrägerSensor® ... DQ detects flammable gases and vapours such as hydrogen. Due to the double-detector compensation method, the catalytic sensor is particularly long-term stable. The wire mesh at the gas inlet serves as a flame barrier. So it ensures explosion protection at the same time short response time.

D-6806-2016

Dräger REGARD® 7000

The Dräger REGARD® 7000 is a modular and therefore highly expandable control system for monitoring various gases and vapours. Suitable for gas warning systems with various levels of complexity and numbers of transmitters, the Dräger REGARD® 7000 also features exceptional reliability and efficiency. An additional benefit is the backward compatibility with the REGARD®.

Related Products

D-11158-2011

Dräger PEX 3000

The transmitter Dräger PEX 3000 detects flammable gases and vapours in concentrations below their lower explosive limit (100 % LEL). It increases the explosion protection of your plant. Its catalytic bead sensor provides a long-term stable measuring signal and responds to gas within a few seconds.

Technical Data

SENSING HEADS

All sensing heads Polytron SE Ex ... DQ

Type	Sensing head with catalytic bead sensor	
Gases and Vapors	Flammable gases and vapors in the ambient air such as methane, propane, acetone, acetylene, ammonia, petrol 065/095, benzene, 1.3-butadiene, n-butane, n-butyl acetate, diethyl ether, dimethyl ether, ethanol, ethylene (ethene), ethyl acetate, ethylene oxide, n-hexane, hydrogen, methanol, methyl ethyl ketone (MEK), methyl methacrylate, n-nonane, n-octane, n-pentane, i-propanol, propylene (propene), propylene oxide, toluene and o-xylene.	
Maximum cable length	Between sensing head and 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
	Between sensing head and controller REGARD	3 x 1.5 mm^2: 700 m
		3 x 1.0 mm^2: 450 m
		3 x 0.75 mm^2: 350 m
Ambient conditions	Atmospheric pressure: 800 ... 1100 hPa	
	Relative humidity: 5 ... 95 %, non-condensing	
Expected sensor lifetime	> 3 years	

Polytron SE Ex PR ... DQ

Full scale deflection	Combined with a suitable controller - 100 % of the Lower Explosion Limit (LEL)		
Sensor current	240 ... 270 mA (preferably 255 mA) constant current produced by a suitable controller, approx. 1 W		
Response time (25 °C)	t50 ≤ 7 s, t90 ≤ 13 s (methane)		
	t50 ≤ 8 s, t90 ≤ 14 s (propane)		
Measuring function acc. to 2014/34/EU	Measuring function for explosion protection acc. to EN 60079-29-1 for the a.m. gases and vapors		
Measuring cable	screened 3-core cable, core cross sections 0.5 ... 1.5 mm2		
	outer diameter 7 ... 12 mm - exception: Sensing head Polytron SE Ex PR NPT1 DQ (Conduit thread)		
Cable gland	M 20 x 1.5 - exception: Sensing head Polytron SE Ex PR NPT1 DQ (comes without cable gland)		
Ambient temperature	SE Ex PR M1/2 DQ	minimum temperature: -50 °C	maximum temperature: T4: 85 °C, T5: 55 °C, T6: 40 °C
	SE Ex PR NPT1 DQ	minimum temperature: -40 °C	maximum temperature: T4: 60 °C, T5: 55 °C, T6: 40 °C
Housings	SE Ex PR M1/2 DQ	IP 66, glass fiber reinforced Polyester (GRP)	
	SE Ex PR NPT1 DQ	IP 66, aluminum	
Dimensions (w x h x d) and weight	SE Ex PR M1 DQ	small standard housing 80 x 130 x 56 mm incl. sensor and cable gland, 0.5 kg	
	SE Ex PR M2 DQ	midsize standard housing 136 x 107 x 56 mm incl. sensor and cable gland, 0.6 kg	
	SE Ex PR NPT1 DQ	flameproof metal housing 101 x 142 x 75 mm incl. Sensor, 0.7 kg	
Explosion protection acc. to EU-directive 2014/34/EU	SE Ex PR M1/2 DQ	Ex II 2 G D Ex db eb IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb(-50 °C bis + 40 °C/+55 °C/+85 °C)	
	SE Ex PR NPT1 DQ	Ex II 2 G D Ex db eb IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb(-50 °C bis + 40 °C/+55 °C/+85 °C)	
	EC-Type examination certificate BVS 10 ATEX E 060 X		
Explosion protection acc. to IECEx	SE Ex PR M1/2 DQ	Ex db eb IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x	

Technical Data

	IECEx Certificate of Conformity BVS 10.0045X

Polytron SE Ex HT M DQ

Full scale deflection	Combined with a suitable controller - 100 % of the Lower Explosion Limit (LEL)		
Sensor current	240 ... 270 mA (preferably 255 mA) constant current produced by a suitable controller, approx. 1 W		
Response time (25 °C)	t50 ≤ 7 s, t90 ≤ 13 s (methane)		
	t50 ≤ 8 s, t90 ≤ 14 s (propane)		
Measuring function acc. to 2014/34/EU	Measuring function for explosion protection acc. to EN 60079-29-1 for the a.m. gases and vapors		
Measuring cable	screened 3-core cable, core cross sections 0.5 ... 1.5 mm2		
	outer diameter 7 ... 12 mm, sufficiently temperature resistant		
Cable gland	M 20 x 1.5		
Ambient temperature	minimum temperature: -50 °C, maximum temperature: T3: 150 °C T4: 85 °C, T5: 55 °C, T6: 40 °C		
Housing	IP 66, galvanized cast iron housing		
Dimensions (w x h x d) and weight	150 x 152 x 85 mm incl. sensor and cable gland, 2.6 kg		
Explosion protection acc. to EU-directive 2014/34/EU	DrägerSensor HT M DQ	Ex II 2 G D Ex db IIC T6 / T5 / T4 / T3 Gb Ex tb IIIC T130/T195 °C Db IP6x Tamb(-50 °C bis + 40 °C/+55 °C/+85 °C/ +150 °C) DEMKO 09 ATEX 0924202 X / IECEx UL 09.0006X	
	Housing	Flameproof Enclosure Typ Range 2000 Ex II 2 G D Ex e IIC T3 Gb Ex tb IIIC T200 °C Db IP66 Tamb(-50°C bis + 40 °C/+55 °C/+85 °C/ +150 °C) CML 14 ATEX 3040	

Polytron SE Ex LC ... DD

Full scale deflection	Combined with a suitable controller - 10 % of the Lower Explosion Limit (LEL)		
Sensor current	276 mA constant current produced by a suitable controller, approx. 1 W		
Response time (25 °C)	t50 < 6 s, t90 < 20 s (methane)		
Measuring cable	screened 3-core cable, core cross sections 0.5 ... 1.5 mm2		
	outer diameter 7 ... 12 mm - exception: Sensing head Polytron SE Ex LC NPT1 DD (Conduit thread)		
Cable gland	M 20 x 1.5 - exception: Sensing head Polytron SE Ex LC NPT1 DD (comes without cable gland)		
Ambient condition	maximum temperature	SE Ex LC M1/2 DD	T4: 85 °C, T5: 50 °C, T6: 40 °C
		SE Ex LC NPT1 DD	T4: 60 °C, T5: 50 °C, T6: 40 °C
	minimum temperature	-40 °C	
	atmospheric pressure	800 ... 1100 mbar	
	relative humidity	5 ... 95 %, non-condensing	
Housings	SE Ex LC M1/2 DD	IP 66, glass fiber reinforced Polyester (GRP)	
Dimensions (w x h x d) and weight	SE Ex LC M1 DD	small standard housing 80 x 130 x 56 mm incl. sensor and cable gland, 0.6 kg	
	SE Ex LC M2 DD	midsize standard housing 136 x 107 x 56 mm incl. sensor and cable gland, 0.7 kg	
Explosion protection acc. to EU-directive 2014/34/EU	SE Ex LC M1/2 DD	SE Ex LC M1/2 DD Ex II 2 G D Ex db eb IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb(-40 °C bis + 40 °C/+50 °C/+85 °C)	

Technical Data

	EC-Type examination certificate BVS 10 ATEX E 060 X	
Explosion protection acc. to IECEx	SE Ex LC M1/2 DD	SE Ex LC M1/2 DQ
	IECEx Certificate of Conformity BVS 10.0045X	

SENSORS

Type	Catalytic bead sensor for range 0 ... 100 % LEL	
Explosion protection acc. to EU-directive 2014/34/EU	DrägerSensor PR M DQ	Ex II 2 G D Ex db IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb (-50 °C bis + 40 °C/+55 °C/+85 °C)
	DrägerSensor PR NPT DQ	Ex II 2 G D Ex db IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb (-50 °C bis + 40 °C/+55 °C/+85 °C)
	DrägerSensor HT M DQ	Ex II 2 G D Ex db IIC T6 / T5 / T4 / T3 Gb Ex tb IIIC T130/T195 °C Db IP6x Tamb (-50 °C bis + 40 °C/+55 °C/+85 °C/+150 °C)
	EC-Type examination certificate DEMKO 09 ATEX 0924202X	
Explosion protection acc. to IECEx	DrägerSensor PR M DQ	Ex db IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb (-50 °C bis + 40 °C/+55 °C/+85 °C)
	DrägerSensor PR NPT DQ	Ex db IIC T6 / T5 / T4 Gb Ex tb IIIC T130 °C Db IP6x Tamb (-50 °C bis + 40 °C/+55 °C/+85 °C)
	DrägerSensor HT M DQ	Ex db IIC T6 / T5 / T4 / T3 Gb Ex tb IIIC T130/T195 °C Db IP6x Tamb (-50 °C bis + 40 °C/+55 °C/+85 °C/+150 °C)
	IECEx Certificate of Conformity UL 09.0006X	
Type	Catalytic bead sensor for range 0 ... 10 % LEL	
Explosion protection acc. to EU-directive 2014/34/EU	Ex-Sensor LC M	Ex II 2 G D Ex db eb IIC T6 / T5 / T4 Gb Ex tb IIIC T80/T95/130 °C Db IP6x Tamb (-40 °C bis + 40 °C/+50 °C/+85 °C)
	Ex-Sensor LC NPT	Ex II 2 G D Ex db IIC T6 / T5 / T4 Gb Ex tb IIIC T80/T95/130 °C Db IP6x Tamb (-40 °C bis + 40 °C/+50 °C/+85 °C)
	EC-Type examination certificate DMT 02 ATEX E 188 X, 2nd Supplement	
Explosion protection acc. to IECEx	Ex-Sensor LC M	Ex db eb IIC T6 / T5 / T4 Gb Ex tb IIIC T80/T95/130 °C Db IP6x Tamb (-40 °C bis + 40 °C/+50 °C/+85 °C)
	Ex-Sensor LC NPT	Ex db IIC T6 / T5 / T4 Gb Ex tb IIIC T80/T95/130 °C Db IP6x Tamb (-40 °C bis + 40 °C/+50 °C/+85 °C)
	IECEx Certificate of Conformity BVS 10.0012X	

Dräger Polytron SE Ex PR M1 DQ, small standard housing, 0 ... 100 %LEL	68 12 711
Dräger Polytron SE Ex PR M2 DQ, midsize standard housing, 0 ... 100 %LEL	68 12 710

Ordering Information

Dräger Polytron SE Ex PR NPT1 DQ, flame-proof metal housing, 0 ... 100 %LEL	68 12 800
Dräger Polytron SE Ex LC M1 DD, small standard housing, 0 ... 10 %LEL	68 12 722
Dräger Polytron SE Ex LC M2 DD, midsize standard housing, 0 ... 10 %LEL	68 12 721
Dräger Polytron SE Ex HT M DQ, high temperature version, 0 ... 100 %LEL	68 12 720
DrägerSensor PR M DQ	68 12 220
DrägerSensor PR NPT DQ	68 12 380
DrägerSensor HT M DQ	68 12 390
Ex-Sensor LC M	68 10 350
Ex-Sensor LC NPT	68 10 675
Dust filter for DrägerSensor PR M DQ and PR NPT DQ (PE-discs, 10 pcs.)	68 10 537
Calibration adapter (PE, max. operation temperature 70 °C)	68 06 978
Process adapter (stainless steel, with locking nut M30 x 1,5) for DrägerSensor PR M DQ, PR NPT DQ and HT M DQ	68 12 470
Process adapter (stainless steel, with locking nut M36 x 1,5) for Ex-Sensor LC M and LC NPT	68 12 465

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