COMPUR Monitors

The detector testing itself with gas

Statox 560 Trustworthy Gas Detection

Why Self Test?

The everyday reading on a gas detector is “zero”. Most industrial plants operate in normally gas – free atmosphere. It is vital that unusual conditions cannot go unnoticed. As a rule, a zero reading can always be caused by two reasons, either the gas concentration is really zero, or the gas detector has failed.

Functional Safety

Gas detectors designed to ensure worker safety, is selected to comply with functional safety standards. These are rated in SIL levels (SIL = safety integrity level). This level depends on the pfd (= probability of failure on demand) and the sff (= safe failure fraction).These parameters quantify the rate of failure acceptable to ensure that dangerous situations are avoided.

The smaller pfd, and the higher sff, the higher the SIL rating. To achieve a high rating, manufacturers of instrumentation select high – quality parts and include many test routines into the software. A gas detector operates in the „low demand mode“. Therefore a pfd of 10^{-2} to 10^{-3} is sufficient to achieve a SIL 2 rating.

Even if a low pfd and a high sff quantify how unlikely a dangerous failure is today, there is no guarantee that it will not just happen tomorrow.

Statox 560 sensor head, a control module, a common alarm module and a power supply

Self - Test

Murphy´s law dictates that the latter will happen exactly at the moment when there is a gas leak. Therefore Statox 560 has been designed to not only comply with SIL 2, but also to test itself frequently with the target gas.

All precautions in order to comply with SIL requirements involve testing of the functionality of components – but applying gas to the sensor is the ultimate test of the entire system. The Statox 560 product family is a stationary detector for toxic gases with built – in automatic self – test.

How the self - test works

In programmable time intervals the following procedure starts: The sensor head activates a gas generator. This generator produces a tiny amount of the target gas. A micro pump feeds this gas in front of the sensor. Now the sensor must respond within a certain time window to the gas present. As soon as the signal is within specifications, the gas generator switches off, and the system is purged until the signal is zero. This self – test takes less than 2 minutes. Of course the test does not start, when gas is present in the surrounding air, or other environmental parameters are altering the usual composition of ambient air.

If the sensor fails to respond in time, the sensor head transmits a “system failure” or “maintenance request” signal to the control room, depending if it has still gas detecting capabilities and just needs some routine maintenance, or if it is out of function.

In case of doubt, for instance after an exposure, the self test can be triggered manually from the control room. This feature will save a lot of time when you need it most.

Construction

The electronics are well – protected in an Ex “d“ housing. This housing has a window for the display and control buttons. These are operated with a magnetic pin. Normally the Ex “d” part will stay closed all the time. It comes with an explosion – proof plug or a cable tail. Of course the plug counterpart or a suitable Ex “e” junction box are available from Compur Monitors.

Connected to the bottom of the Ex “d” housing is the intrinsically safe sensor module. It includes the sensor, gas generator and a micro – pump. This module is intrinsically safe, that means it can be worked on without a hot work permit.

Statox 560 operates with the field – proven Statox 505 sensor family. These sensors have an on – board F – RAM, holding all important sensor parameters, such as target gas, measuring range, calibration history, sensitivity and the parameters for the optimum operation of the gas generator. For maintenance this entire module as well as single parts can be replaced without special precautions. This means, a calibration in the field is possible, but not necessary. Pre – calibrated sensor modules can as well be replaced as plug – and – play devices.

Operation

The measured value and the system status are transmitted as a 4 – 20 mA analog signal to the control room. If you want to set up a self – contained gas detection system, it is recommendable to use the Statox 503 control module. This field – proven module also complies with SIL 2 requirements. It can be easily installed just by clipping it onto a DIN rail or even a power rail. It has a digital display, a 4 – 20 mA output and 3 relays for A1, A2, and system alarm, which can operate up to 8 A.

One more option is to operate the Statox 560 as a stand – alone unit. Without running the signal back and forth to the control room. Its open collector outputs can trigger peripheral alarm devices or other components such as ventilation flaps. Four digital signals are accessible to communicate the status on site: A1, A2, system alarm and maintenance request.

The main advantage for the user is: Without leaving the control room, he has 100 % peace of mind that his gas detection system is working. This saves lots of time and labor for preventive maintenance and inspection. An investment in a Statox 560 gas detection system will not only give you the best protection from toxic gas, but will also return the investment in a very short time.

Technical Data

Product name:	Statox 560
Manufacturer:	COMPUR Monitors GmbH & Co. KG, D-81539 Munich
Power supply:	24 (16-30) VDC
Power consumption:	max. 2,7 W (8,7 W für $COCl_2$) at input voltage ≤ 26 VDC
Operating temperature:	-30° C to +60° C
Storage temperature:	-30° C to +60° C
Pressure:	700 to 1300 hPa
Humidity:	0% to 99% r. F. (non condensing)
Application:	II 2G
Explosion protection:	Ex d ib IIC T4 Gb (U_m = 30 VDC for all connections)
EC type examination certificate:	BVS 16 ATEX E 065 X
Protection class N60529:	IP 66 (gas intake IP54)
Display:	2 x 16 Digits backlit
Housing:	Cast aluminum epoxide varnished / stainless steel
Connections:	10-core cable tail (1 m) or 7-pin eXLink plug
Open-Drain-outputs:	2 x alarm, 1 x system failure, 1 x maintenance request Characteristic values max. 30 VDC / 2.7 A / 0.5 W
SF-Open-Drain- output:	In normal operation active (conductive)
Analog output:	0 mA in case of system failure 2 or 4 mA in the service mode, programmable 4 - 20 mA in the measuring mode 22 mA when full scale is exceeded max. burden: 450 Ohm
EMV:	EN 61000-6-4:2007 + A1:2011 / EN 50270:2015 (Typ 2)
Functional safety:	SIL 2 compliant according to IEC 61508:2010
Automatic self-test:	every 24 hours, time is user programmable
Weight:	ca. 4800 g
Dimensions:	121 x 294 x 138 mm (B x H x T)
Gas:	Phosgene $COCl_2$ Chlorine Cl_2 Hydrogen cyanide HCN Hydrogen sulphide H_2S Carbon monoxide CO Hydrogen chloride HCl Ammonia NH_3 More gases upon request

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