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Gasdetection for your Safety



Stationary Gas detectors



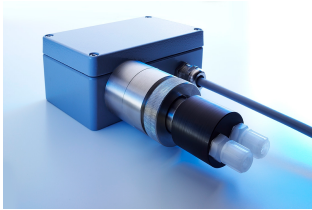
Stattox 560

Utmost reliability and user comfort: Self test with gas



SIL 2 Control Module Stattox 502

The control module for all kinds of sensor heads



Stattox 501 PID

The stationary gas detection system for VOC and other hazardous gases



Stattox 505

The stationary gas detection system compliant with SIL 2 standard



Stattox 501

The fixed gas detection system for toxic and combustible gases. The Stattox 501 Controller operates with 4 – 20 mA transmitters as well as with catalytic sensors.



Stattox 501 Infratox

The fixed gas detection system for combustible gases uses the infrared absorption method of gas detection. It features on site display and non intrusive one- man calibration. The reliability of this system is unmatched. The measuring range varies from ppm to % LEL.



Stattox 501 IR LC

The low - cost version fixed gas detection system for combustible gases uses the infrared absorption method of gas detection in. The Stattox 501 IR LC sensor heads are backward compatible to systems using catalytic sensors. They can be used to upgrade such systems without replacing existing hardware.



Stattox 501 Infratox CO2

The fixed gas detection system for carbon dioxide using the infrared absorption method of gas detection features on site display and non intrusive one - man calibration. The reliability of this system is unmatched.



Stattox 4120

The fixed gas detection system with automatic self test.

Portable Instruments



Monitox

This personal gas monitor for toxic gases provides maximum safety with the optional 10 second gas bump test.



Gasgenerator

The Compur gas generator bump tests personal gas detectors with gas in only 10 seconds.



Tracer

The ultra - sensitive leak detector

The detector testing itself with gas

Stattox 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.

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.



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



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 502 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:	Stattox 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 ₂ S More gases upon request



The All-Rounder in Gas Detection

Compur Statox 502

Control- and Common Alarm Module

SIL 2

Functional Safety



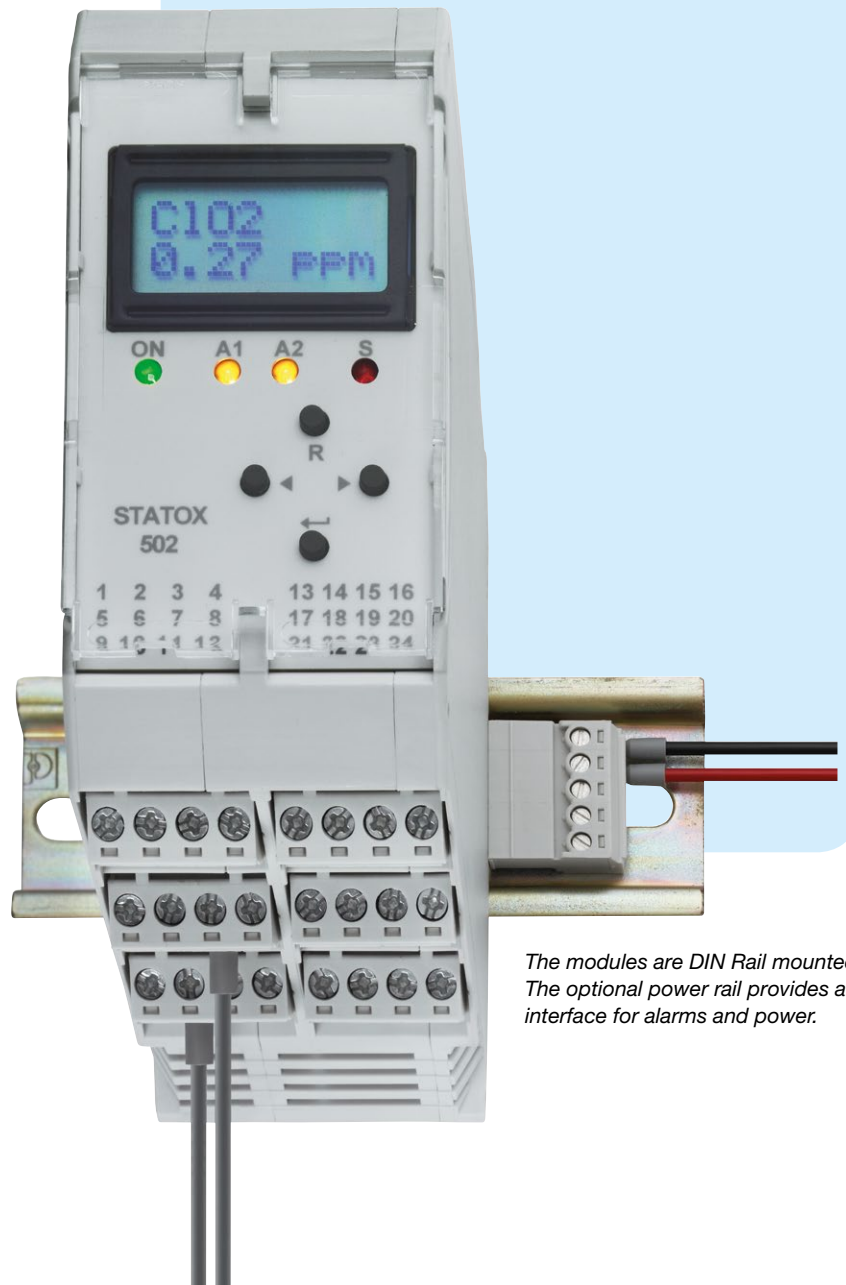
Compur Statox 502

No matter if you want to detect toxic or combustible gases: This control module works with any sensor head. It provides the power supply and processes the signal. Three highly rated relays and a 4-20 mA output are the interfaces to peripheral instrumentation.

Potential front ends may be the Statox 501 or Statox 505 transmitters with electrochemical or infrared sensors, or sensor heads with a Wheatstone bridge signal such as Statox 501 PID, catalytic or the Statox 501 LC and MC series with infrared sensors.

Just by the push of a button you can program the module to handle 4-20 mA sink or source. Even the bridge voltage can be set to any value between 2 and 5.2 V, it even works with sensor heads of other manufacturers. So there is no restriction at all when selecting the appropriate sensor head for your application. With its two "sense" lines it can even compensate the voltage drop in the cable for very remote sensor heads or if there are extreme temperature variations.

For maximum flexibility the measuring range is user programmable. You can also select the unit, no matter if it is ppb, ppm, % LEL or % volume.



The modules are DIN Rail mounted. The optional power rail provides an interface for alarms and power.

Easy installation

The control module is mounted on a standard DIN rail. With an optional power rail you can interface the 24 V DC power and the alarm signals. This way you can program one of the modules to operate as a common alarm module. Even this function can be programmed just by push button. The application of a control module as a common alarm module is a very useful feature. It displays when any of the modules goes into Alarm 1, 2 or system alarm, and controls peripheral alarm devices.

All electrical contacts are located easily accessible on the front side. The terminals for alarm signals, analog output, sensor head connection run into 6 pluggable terminal blocks. This makes not only the first installation quick and easy, but also any service event or system modification. A module can easily be removed out of its row, without interrupting its neighbors or disconnecting wires.

Intuitive User Interface

You want a gas detection system that needs little or no attention. No matter if setting the initial parameters or performing scheduled calibrations or proof tests: The handling shall be safe, quick and easy. The password-protected Statox 502 software structure is so clear that most menu items are self-explanatory. The "Reset" button brings you back into the measuring mode at any time. Even if you have to interrupt your work and forget to reset, the watchdog function returns the system into the measuring mode, if no button has been pushed for a while.

Functional safety paired with utmost system flexibility

The Statox 502 complies with the standards DIN EN 61508 and 61511 functional safety, level SIL 2. In context with the Statox 505 transmitters, or the HRC or ARE sensor heads you can create a complete gas detection system for toxic and combustible gases complying with SIL 2 standard.

In larger installations signals of gas detectors often run into SIL certified process control systems, in smaller plants there is a need for a control module complying with SIL requirements.

As any combination sensor head/control module forms a complete gas detection system, this system closes the gap. It is expandable without limits, and there is no restriction to the mix of sensor heads connected.

Connecting other front ends

The versatility of the Statox 502 does not end with gas detection. You can connect any front end providing a 4-20 mA analog signal or a Wheatstone bridge signal. So you can create your own compact control system for a variety of sensors with just one type control device.

Accessories

Useful accessories such as calibration adapters, intrinsically safe repeaters, power supplies etc. complete the system.



The keys are well protected against unintended operation by a cover.

Pluggable terminals make installation quick and easy.



Technical Data

Compur Statox 502

Product name:	Statox 502 Control Module
Manufacturer:	COMPUR Monitors GmbH & Co. KG, D-81539 Munich
Operating with:	Sensor heads with Wheatstone bridge 2 to 5.2 V 24 V/4 - 20 mA Transmitters source 24 V/4 - 20 mA Transmitters sink
Power supply:	24 ±2 VDC Max. 200 mA
Power consumption:	Max. 5 W
Temperature of operation:	-10° C to +60° C (14°F to 140°F)
Storage temperature:	-30°C to +60°C (-22°F to 140°F)
Pressure:	900 to 1100 hPa
Humidity:	0% to 99% r. H. (non condensing)
Display:	Two lines, 16 segments
Connections:	2- , 3- , or 4- wire (current mode) 3- or 5-wire (voltage mode)
Relays:	2xAlarm; 1 xSystem failure
Relays rating:	250 VAC, 8 A Min. breaking capacity ≥ 12 V, 10 mA; Silver-Nickel 90/10
System failure relay:	Nomally active (coil energized)
Analog output:	0 mA in case of a failure 2 or 4 mA in service mode, programmable 4-20 mA in measuring mode, tolerance ±2 % at -10°C to +50°C 22 mA at over range
Max. Burdon:	700 Ohm
Installation:	35 x 7,5 mm DIN-Rail
Dimensions (HxWxD):	45 x 99 x 114,5 mm
CE-Marking:	EN 61326-1:2013

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Compur Statox 501 PID **Detector for Volatile Organic Compounds - VOC**



Compur Statox 501 PID

Statox 501 PID The Allrounder

PIDs (Photo – Ionisation – Detectors) detect VOCs (Volatile Organic Compounds) in the ppm range, which other sensor types are unable to monitor, like solvents and fuels.

A PID sensor uses high energy ultra violet light radiation to break gas molecules into radicals, which are discharged while passing a condenser. The discharge current increases proportional to the number of molecules, i. e. the gas concentration.

The standard Statox 501 PID will detect all substances with a ionization energy below 10.6 eV.

PIDs are easily calibrated with Isobutene. This substance is easily accessible and not dangerous in low concentrations. Other substances will be detected with different sensitivity. The response factors to these substances must be allowed for calibration. Therefore every sensor interface is individually hardware – programmed to its specific application.

The Statox 501 PID is operated with a magnetic pin, activating Hall sensors inside the interface. A multi – color LED leads the user through an easy to understand menu.

The Statox 501 PID output is a linear voltage signal, similar to the signal of a catalytic sensor. Its Control Module transforms it into a standard 4 - 20 mA signal. Three powerful relays can trigger external alarm devices or control ventilation systems.

Technical Data	
Detectable Gases	Volatile substances with a ionisation potential below 10,6 eV
Measuring programs	0 – 10.0, 0 - 100, 0 - 1000, 0 – 10,000 ppm
Measuring principle	Photo - ionisation
Response time	Isobutene: $t_{90} < 10$ s
Operating temperature	- 30 - + 60°C
Humidity	0 - 95 % r. H. , non condensing
Pressure	700 - 1300 hPa
Power supply	4,6 - 5,6 VDC
Current	50 mA, initial current max. 150 mA for max. 0,3 sec.
Connection	3 - Wire
Operation	With Statox 501 Control Module
Weight	1,0 kg, 2,2 lbs
Dimensions	160 x 130 x 60 mm HxWxD 6,3 x 5,1 x 2,36 in
Material: Housing Interface	Cast aluminium coated stainless steel
Protection class	IP 54
Approval	Ex e mb [ib] IIC T4 Gb
Approval No.	BVS 12 ATEX E 014



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You always know what is going on in your plant: Gas detection system **Stattox 505**



SIL 2

Safety Integrity Level
EN 50402

The Statox 505 is a 4-20 mA Transmitter for toxic gases and oxygen. It features everything that a new instrument generation needs: State of the Art components (hardware and software), smart sensor technology, “heartbeat” sensor control, complete system diagnostics on board.

Reliability: feedback included



What makes the Statox 505 so reliable

In process monitoring, status information of plant components in case of a failure is becoming more and more a critical issue. The standards DIN EN 61508 as well as the product standard DIN EN 50402 are powerful tools to calculate the probability of a failure on demand. The Statox 505 complies with all of the requirements of these standards. It complies with safety integrity level SIL 2. This provides a reliable database for the user to calculate the safety standard of his plant. If the Statox 505 is operated as a SIL 2 component, a so called “proof test” in certain time intervals is mandatory.



All OK

All important parameters such as sensor „heartbeat“, signal output, calibration, zero, sensitivity, temperature, sensor memory, amplifier, CPU, power supply etc. are continuously monitored for proper function. In case of a failure, an alarm will be triggered. Thus **the system cannot fail without the error being noticed**. A green LED signalizes the system status. The display and the controls are located at the inside of the housing and well protected from the elements.

Trouble-free wall- or pipe-mounting

The Stattox 505 sensor head comes with a mounting plate for either wall- or pipe-mounting. No need to open the sensor head for plant installation.



Minimum time and work in the field

The sensors of the Stattox 505 are plug and play technology. Each sensor has a F-RAM on board which communicates all relevant parameters to the sensor head: gas, measuring range, last calibration, ex works calibration, response time etc.

The sensors can easily be calibrated in the shop. For the user this means that he never ever will have to do

calibration work in the harsh elements (wind, rain, cold, heat). No more lugging heavy test equipment and gas cylinders into the field. All the user has to do in the field is plug the sensor back in. To do that, you don't even need a tool! While the sensor is getting calibrated in the shop, the sensor cartridge stays in place and protects the sensor head from dust and rain.

Technical data **Statox 505**

Product name	Statox 505 Transmitter
Type	5375 . . .
Manufacturer	COMPUR Monitors GmbH & Co. KG, 81539 München
Detectable gases	AsH ₃ , Cl ₂ , ClO ₂ , CO, COCl ₂ , H ₂ S, HCl, HCN, NH ₃ , N ₂ H ₄ , NO ₂ , O ₂ , O ₃ , PH ₃ , SO ₂
Measuring principle	Electrochemical
Operating temperature	-30°C to +60°C
Storage temperature	-30°C to +60°C
Humidity	0 to 99% r.h. (non condensing)
Pressure	900 to 1100 hPa
Power supply	12 - 28 VDC, max. 22 mA
Wiring	2- or 3-Wire
Output	4 - 20 mA, max. load 700 Ohm
· Service Mode	2 or 4 mA adjustable
· System Fail Mode	0 mA 3-Wire-, 2 mA 3-Wire operation
· Overrange	22 mA
Display	8-digit, 14 Segments
Dimensions (H x W x D)	200 x 120 x 90 mm without mounting plate
Weight	0,75 kg
Material	Chromium plated ABS, mounting plate stainless steel
Protection class	IP 65
Approval	Ex ib IIC T4
Application	II 2 G
Certificate No.	BVS 09 ATEX E 104
Engineering data	Voltage U _i max. 28 VDC Current I _i max. 93 mA Internal capacity C _i negligible Internal inductance L _i negligible
RMI	EN 50270 compliant
Safety Integrity Level	SIL 2 compliant to EN 50402



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Compur Statox 501 Control Module

Compur Statox 501 Control Module – One for all

The Statox 501 control module works with all types of sensor heads. No matter which sensing technology is used in the field, the Statox 501 control module can always process the signal. One control module together with a sensor head forms a complete gas detection system.

Everything on board

Great in performance, modest in requirements: Statox 501 is small in size and energy efficient. It is DIN rail – mounted, so there is no need for a rack. It needs only 5 W at 24 V DC. It has three powerful relays, of which each can handle 2 A, as well as an analog 4 – 20 mA output to be connected to a recording device or process control system.

Each control module provides a half bridge, display unit, relay station, and calibration interface for catalytic and infrared sensors. It is also a control module for toxic gas sensor heads with electrochemical sensors, or even PID sensor heads.

In case of extensive distance between sensor head and control room, it even provides two “sense” contacts to compensate for the voltage drop in the cable.

It is not only a display unit for combustible gas sensors, it is also a relay station for transmitters operating as ‘source’ or as ‘sink’.



Easy Installation and handling

Sensor heads and peripheral devices are very easy to connect, as all terminals are accessible from the front. The 24 V DC power supply and alarm signals run on a bus connector from one controller to the next. This bus structure supports also common alarm modules forming alarm groups, each with three relays of which the audible alarm relay that can be separately reset.

An optional intrinsically safe repeater converts the 24 V DC loop power supply for transmitters into an intrinsically safe voltage.

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Compur Statox 501 Common Alarm module

One common alarm module for up to 25 sensor heads

The common alarm module coordinates the alarm signals generated by the single control modules.

Easy installation

The single alarm signals and the 24 V DC power supply are looped through a hardware bus, to which the common alarm module is connected too. As the control module, it is clipped onto the same DIN – rail.

Common alarms, resettable audible alarm with alarm update function

Every single alarm will generate a common alarm, and activate the audible alarm relay. This can be reset, but will be re - activated as soon as an additional or new alarm occurs. The common alarm can only be reset, when all single alarms are extinct.

The alarms can be reset directly on the common alarm module, or by a remote switch.



Technical Data	Statox 501 Control Module	Statox 501 Common Alarm Module
Sensor heads:	Statox 501, Statox 505	
Measuring method:		
- Electrochemical	Statox 501, Statox 505	Statox 501, Statox 505
- Catalytic	Statox 501 HRC, ARE, LRC	Statox 501 HRC, ARE, LRC
- Infrared	Statox 501 IR, LC IR, MC IR	Statox 501 IR, LC IR, MC IR
- PID	Statox 501 PID	Statox 501 PID
Power supply:	24 V/DC	24 V/DC
Power consumption:	max. 5 W / Sensor head	5 W
Alarms:	2 Alarm thresholds, adjustable	Common alarm 1 and 2, audible alarm, updating
Relays/ Contact power:	Alarm 1, alarm 2, system failure/ 230 V/AC 2 A	Alarm 1, alarm 2, horn, system failure/ 230 V/AC 2 A
LED-display:	Alarm 1 and 2: red S (system failure): yellow	Power: green Common alarm 1 and 2: red S (system failure): yellow
Concentration display:	Three digit LED	
Output signal:	4 – 20 mA, max. burden 700 Ohm	
Installation:	DIN-rail	DIN-rail
Dimensions: H x W x D	75 x 65 x 75 mm	75 x 65 x 75 mm
Weight:	0,33 kg	0,33 kg
EMV:	CE compliant	CE compliant

**They are here –
Their Mission: Safety
Stattox 501 IR**





Infrared gas detection – Theory of operation

Some gases absorb light at a certain wavelength (colour). This absorption band is specific to the gas. The rate of the absorption depends not only on the substance to be detected but also on the number of gas molecules (i. e. the concentration of the gas) This effect can be used to detect gases: The oscillation of the C – H bond in hydrocarbon molecules for instance absorbs light at 3,4 μm .

A light beam is directed through a cuvette filled with the gas to be detected. The more hydrocarbons are present in its way the more light will be absorbed. A photo detector at the other end of the cuvette measures the remaining light intensity. The ratio between original and remaining light intensity is corresponding to the gas concentration.

A reference beam with a different wavelength compensates for potential interferences of dust, humidity or variations of intensity from the light source.

Fail-safe technology

Failure of important components such as the light source or photo detector will trigger a “system fail” alarm. Most local authorities will accept this as self diagnostic feature. Systems including a self check require less frequent maintenance and calibration, thus saving time and money.

Stattox 501 IR – Utmost flexibility

The sensor head works as an independent transmitter using the industry proven 4 – 20 mA current loop to transmit the signal to a control unit. This can be the dedicated Stattox 502 controller or any process control system. The signal circuit is electrically isolated from the power supply.

Maximum reliability. Minimum maintenance.

Easy installation

No separate connection box is required. The mounting bracket serves as terminal box. It features increased safety (EEx e).

Simple maintenance: Easy to read display and non-intrusive calibration

The digital display of **Statox 501 IR** shows the gas concentration in percent L.E.L. (Lower Explosion Limit). An important accessory is the calibration adapter featuring Hall-sensor control buttons.

The service menu is password protected preventing unauthorised access. All parameters can be checked, changed or a calibration can be done without opening the



Statox 502 Control Module



Statox 501 IR with opened terminal box

transmitter. The adapter is also equipped with a gas outlet so that it can be used for flow-through applications too.

Rugged design

The dimensions of the **Statox 501 IR** are small and compact. The sensor compartment is completely sealed, not allowing dust or insects to enter.

The sensor head is rated protection class IP 67 (6 = protection even against fine dust, 7 = submerged 1 m deep in water for 30 minutes).

You can have confidence that this system will safely operate even in the harshest environment.

Value for money

The **Statox 501 IR** combines the advantages of an infrared gas detection system such as nearly unlimited lifetime and long maintenance intervals with low investment cost.

Compare the **Statox 501 IR** total cost of ownership to any other manufacturer!

Reliable safety at a competitive price!



Statox 501 IR with adapter for non-intrusive one-man calibration

Technical data **Statox 501 IR**

Detectable gases	combustible gases and vapors
Measuring range	0 – 100% L.E.L.
Measuring principle	Infrared absorption, NDIR 2-channel
Detection limit	3% L.E.L. Methane
Response time	$t_{50} < 10$ s, $t_{90} < 25$ s
Accuracy (Full Scale)	± 2% L.E.L. at room temperature
Warm up time	20 s, full specifications after 30 min
Operating temperature	-20°C to +44°C (-4°F to + 112°F)
Storage temperature	-20°C to +60°C (-4°F to + 140°F)
Humidity	0 – 99% r. H. non condensing
Pressure	800 – 1100 hPa
Power supply	18 – 29 V DC/1 W
Connection	4 Wire
Output	4 – 20 mA, electrically isolated, max. load 220 Ω in the service mode 2 or 4 mA programmable, system fail 0 mA
Display	LED three digits
Dimensions	Height: 150 mm (5,9 in.) Width: 120 mm (4,7 in.) Depth: 120 mm (4,7 in.)
Weight	app. 3,1 kg (6,8 pounds)
Material	stainless steel fiber reinforced polyamide
Protection class	IP 67 (NEMA 4 and 6)
Ex-Approval ATEX Standard	II 2 G EEx de IIC T5
Approval #	BVS 04 ATEX E 006 X

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Statox 501 LCIR CO₂



Bedienungsanleitung / Manual

Statox 501 Messkopf LCIR CO₂ Bedienungsanleitung

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7. **Technische Daten**
8. **Konformitätserklärung**

1. Sicherheitshinweise

- Die Sensoren sind explosionsgeschützt ausgeführte Betriebsmittel der Gruppe II Kategorie 2 zur Messung von CO₂. Sie weisen damit ein hohes Sicherheitsmaß auf und sind für den Einsatz in Zone 1 und Zone 2 geeignet.
- Der Anschluss und die Installation des Sensors müssen unter Beachtung der Zündschutzart EEx de IIC T4 gemäß den einschlägigen Errichtungsvorschriften von einem unterwiesenen Fachmann erfolgen.
- Der Sensor ist für den Anbau an Gehäuse der Zündschutzart Erhöhte Sicherheit „e“ verwendbar. Dabei sind die Anforderungen nach 4.3 (Tabelle 1) der EN 50019 (VDE 01070/0171 Teil 6/3.96) einzuhalten. Die Verlegung und der Anschluss der Aderleitungen des Sensors muss nach 4.2, 4.5.1 und 4.8 der EN 50019 mechanisch geschützt und entsprechend der Temperaturbeständigkeit (80°C) der Leitung erfolgen.
- Der Sensor ist gegen Selbstlockern gesichert in den Klemmenkasten einzuschrauben.
- Der Sensor darf nur unter den angegebenen Umgebungsbedingungen betrieben werden. Widrige Umgebungsbedingungen (z.B. auch die Anwesenheit korrosiver Gase) können zur Beschädigung des Sensors und damit zu einer evtl. Gefährdung des Benutzers führen.
- Die vorgeschriebenen Betriebsbedingungen, insbesondere der Temperaturbereich, sind einzuhalten.
- Beachten Sie die Vorschriften für den Umgang mit elektrostatisch gefährdeten Bauteilen.
- Nichtbeachtung der vorgenannten Punkte stellt eine Gefahr für Menschen und Sachwerte dar.

Statox 501 Sensor Head LCIR CO₂ Manual

Contents

1. **Safety Instructions**
2. **System Components**
3. **Installation**
4. **Electrical Connection**
 - 4.1 Connection to a Statox 501 Control Module
 - 4.2 Connection to a PCS
5. **Calibration**
6. **Sensor Replacement**
7. **Technical Data**
8. **Declaration of Conformity**

1. Safety Instructions

- The sensors are an explosion-proof safety equipment certified for group II category 2. Their intended use is the measurement of CO₂. Designed with increased safety they are applicable in zone 1 and zone 2.
- Please observe the safety relevant guidelines concerning both the type of protection EEx de IIC T4 and the characteristic values of the sensor. The installation should be done by trained personnel only.
- The sensor may be attached to a housing with protection type increased safety “e”. Please observe the relevant requirements, e.g. EN 50019, 4.3, table 1 (VDE 01070/0171 part 6/3.96). The sensor connections should be mechanically protected and comply with temperature specifications (80 °C). Relevant guidelines are included in EN 50019, 4.2, 4.5.1, and 4.8.
- The sensor must be securely fastened to the terminal box.
- The equipment may only be used in the specified environmental conditions. Adverse conditions (e.g. corrosive gases) might damage the device and thus endanger the user.
- Please observe all operating conditions. In particular the temperature range for the device must not be exceeded.
- Please observe precautions for handling electrostatic sensitive devices.
- Improper use or adverse conditions might damage the device and thus endanger the user.

2. Systemkomponenten

Die 501 LCIR CO₂ Messköpfe sind zum direkten Anschluss an ein Stattox 501 Control Modul (ab software-Version 2.1) geeignet.

Die Messköpfe bestehen aus:

- 1 IR-CO₂-Sensor
- 2 Messkopfgehäuse aus Aluminium
- 3 Schraubklemmen für Versorgung und Signalübertragung.

5a	nc
4a	blau / blue
3a	schwarz / black
2a	rot / red
1a	nc

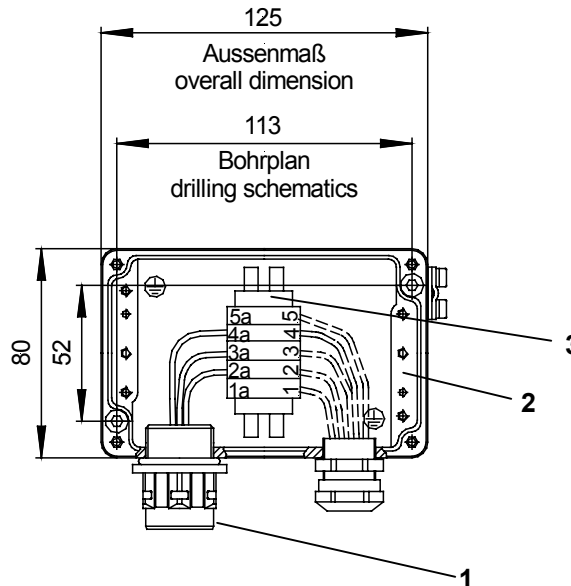


Bild 1 / Picture 1: Stattox 501 LCIR CO₂ Messkopf / Stattox 501 LCIR CO₂ Sensor head

3. Montage

Die Messköpfe werden mit 2 Schrauben Ø 4 mm an der Wand befestigt und zur Vermeidung von EMV-Einflüssen über ein abgeschirmtes Kabel mit dem Stattox 501 Control Modul verbunden.

Bei der Verkabelung sind die einschlägigen Ex- oder VDE- Vorschriften zu beachten! Angeschlossene Leitungen müssen zur Montage oder Demontage spannungsfrei sein! Einbaulage: senkrecht (+ / - 15°). Der Sensor ist zusammen mit dem Gehäuse so zu montieren, dass er gegen mechanische Beschädigungen und widrige Umgebungsbedingungen geschützt ist. Abgehende Leitungen sollten gegen mechanische Beschädigung und Korrosion sowie chemische Einwirkungen und Beeinträchtigungen durch Wärme geschützt sein. Hinweise hierzu finden Sie in der DIN EN 60079-14.

2. System Components

The 501 LCIR CO₂ sensor heads can be connected directly to a Stattox 501 Control Module with software version 2.1 or higher.

The sensor heads consist of:

- 1 IR CO₂- sensor
- 2 Aluminum sensor head housing.
- 3 Contact terminals for power supply and signal transmission.

3. Installation

The sensor heads are designed for wall mounting via 2 screws Ø 4 mm. They are connected via shielded cable to a Stattox 501 Control Module or to an intrinsically safe repeater to avoid any electromagnetic interference. Please observe your local regulations for installations of electric apparatus in classified areas. During installation the power supply must be disconnected! Install the sensor head in upright position (+ / - 15°). The sensor and the housing must be protected against mechanical damage and adverse environmental conditions. Cables should be protected against mechanical damage, corrosion, chemicals and heat. Please refer to the relevant literature; e.g. DIN EN 60079-14.

4. Elektrischer Anschluss

Es sollten geschirmte Leitungen $\geq 0,75 \text{ mm}^2$ verwendet werden. Die Messköpfe können im Drei-Draht-oder im Fünf-Drahtanschluss betrieben werden.

Drei-Drahtanschluss: Bei Leitungslängen bis 750 m und geringen Temperaturschwankungen. Wenn die Versorgungsspannung am Messkopf kleiner ist als 3,0 V, dann wählen Sie den Fünf-Drahtanschluss.

Fünf-Drahtanschluss: Bei Leitungslängen über 750 m oder großen Schwankungen der Umgebungstemperatur. Mit den beiden zusätzlichen Senseleitungen kompensiert das Control Modul alle leitungs- und temperaturbedingten Schwankungen der Messkopfversorgung selbstständig. Die maximale Leitungslänge beträgt 3000 m.

Achtung:

Beachten Sie unbedingt die Bedienungsanleitung des Control Moduls, Punkt 2, bei der Inbetriebnahme! Wählen Sie vor dem Anschluss das entsprechende Betriebsprogramm (siehe Kapitel 4.1). Ein falsch eingestelltes Betriebsprogramm kann zur Zerstörung des Sensors führen!
Bei großen Potentialdifferenzen zwischen einzelnen Anlagenteilen sollte der Schirm nur einseitig am Control Modul aufgelegt werden.
Nach dem Anschluss muss eine Kalibrierung (siehe Kapitel 5) durchgeführt werden.

4.1 Anschluss an das Statox 501 Control Modul

Wählen Sie das entsprechende Betriebsprogramm am Statox 501 Control Modul (ab Software-Version 2.1):

- Messkopf für 0-10 Vol% CO₂: Prog. Nr. 70
- Messkopf für 0-100 Vol% CO₂: Prog. Nr. 71

Schließen Sie nun den Messkopf an (siehe Bild 2). Ist die Versorgungsspannung am Messkopf an den Klemmen 2 (+) und 4 (-) kleiner als 3,0 V, dann wählen Sie den Fünf-Drahtanschluss.

4.2 Anschluss an ein PLS

Wenn Sie den Statox 501 LCIR CO₂ direkt an einem Prozessleitsystem betreiben, dann beachten Sie folgende Kenndaten:

- Versorgungsspannung 3,0 – 5,0 VDC
- Stromaufnahme ca. 80 mA.

Der Messkopf darf nicht mit Konstantstrom betrieben werden, dies kann zur Zerstörung des Sensors führen!

Anschlusschema siehe Bild 3.

4. Electrical Connection

Use shielded cable with at least $0,75 \text{ mm}^2$. The sensor heads can be operated in a three or a five - wire mode.

3 wire mode: For cable lengths up to 750 m and little variations of ambient temperature.
If the voltage at the sensor head supply is lower than 3,0 V select 5 wire mode.

5 wire mode: In case of cable length above 750 m or significant variations of ambient temperature. Two additional sense wires measure the actual sensor supply voltage. The controller will compensate supply voltage variations automatically if required. The maximum cable length is 3000 m.

Attention:

To start up we recommend to observe the operating instructions of the Control Module, point 2!
First of all select the appropriate operating program (see chapter 4.1).
Selecting the wrong program can destroy the sensor!
If significant ground potential differences are present, it might be a better choice to isolate the sensor head housing from the shield. After the installation the sensor head must be calibrated (see chapter 5).

4.1 Connection to a Statox 501 Control Module

Select the relevant program at the Statox 501 Control Module (software version 2.1 or higher):

- Sensor head CO₂ 10 % Vol.: prog. no. 70
- Sensor head CO₂ 100 % Vol.: prog. no. 71

Then connect the sensor head (see pct.2).
If the supply voltage at terminals 2 (+) and 4 (-) is lower than 3,0 V select 5 wire mode.

4.2 Connection to a PCS

If connecting the Statox 501 LCIR CO₂ directly to a PCS, observe the following data:

- Supply voltage 3,0 – 5,0 VDC
- Power input approx. 80 mA

Never supply constant current to the sensor head, it might damage the sensor.

Connection diagram see picture 3.

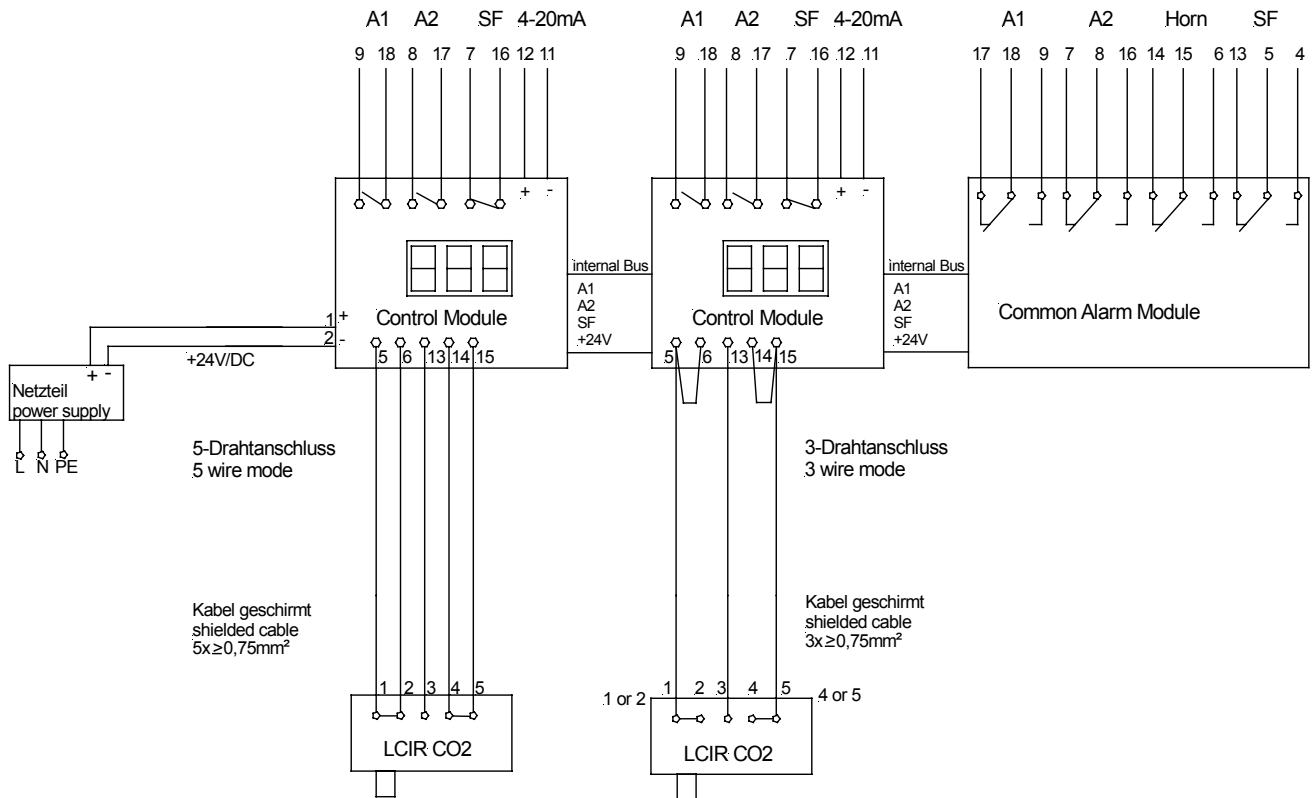


Bild 2: Anschluss des Statox 501 LCIR CO₂ an das Statox 501 Control Modul
Picture 2: Connection of the Statox 501 LCIR CO₂ to the Statox 501 Control Module

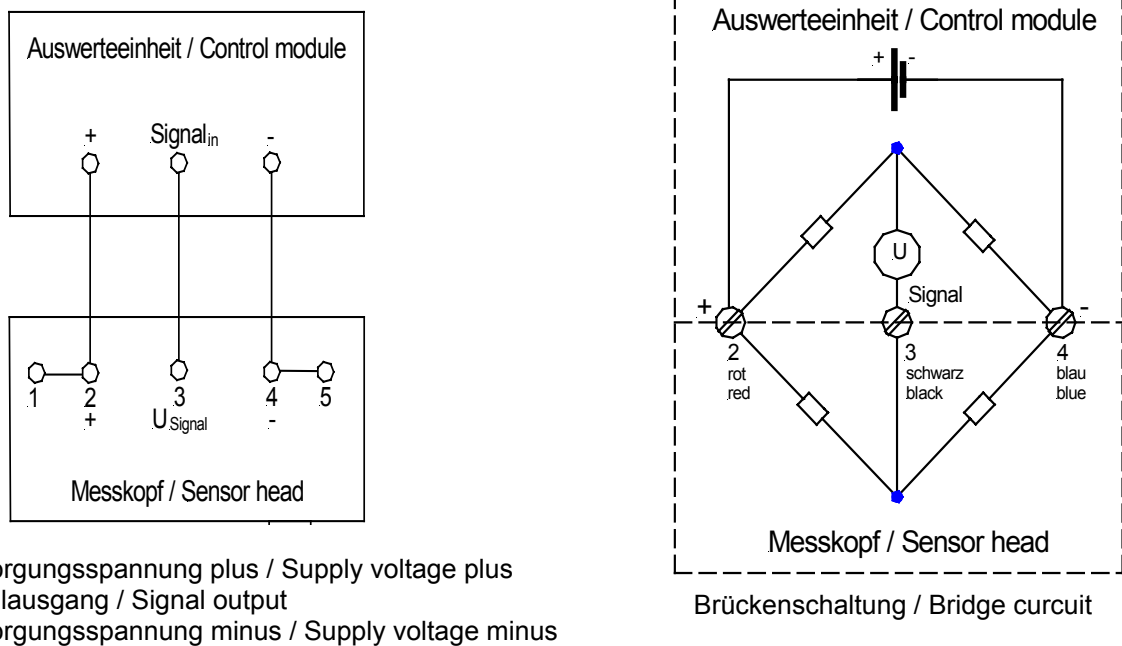


Bild 3: Anschluss des Statox 501 LCIR CO₂ an ein PLS
Picture 3: Connection of the Statox 501 LCIR CO₂ to a PCS

5. Kalibrierung / Justierung

Die Justierung ist nach der Inbetriebnahme, nach einem Sensorwechsel und in regelmäßigen Abständen gemäß Merkblatt T 021 der BG Chemie durchzuführen.

Zur Kalibrierung wird benötigt:

- Kalibrier/Durchflussadapter (Artikelnummer 569804) oder Kalibrier/Diffusionsadapter (Artikelnummer 501047)
- Reduzierventil mit Durchflussmesser und Schlauch
- Prüfgas 10-100 Vol% für Messbereich 0-100 Vol% bzw. 2-10 Vol% für Messbereich 0-10 Vol%.

Vorgehensweise (siehe Bedienungsanleitung des Control Moduls):

- Menu Kalibrierung am Control Modul wählen.
- Gleichen Sie den Nullpunkt in reiner Umgebungsluft oder mit synthetischer Luft ab.
- Geben Sie Kalibriergas auf (250 - 350 ml / min).
- Geben Sie die Kalibriergaskonzentration in Vol% ein.

6. Sensorwechsel

Die Sensoren können durch korrosive Gase, Alterung der Komponenten oder Verschmutzung einen Empfindlichkeitsverlust erleiden. Ist dieser nicht mehr durch eine Neujustierung zu kompensieren, muss der Sensor gewechselt werden.

Ersatzsensor 501 LCIR CO₂ 100 Vol%: Art.nr. 531250

Ersatzsensor 501 LCIR CO₂ 10 Vol%: Art.nr. 531500

Zum Sensorwechsel muss der Messkopf spannungsfrei geschaltet werden! Öffnen Sie den Gehäusedeckel, lösen Sie die Anschlussdrähte und schrauben Sie den Sensor heraus. Den neuen Sensor in umgekehrter Reihenfolge montieren. Um die Schutzart IP54 sicherzustellen, ist zwischen Sensor und Gehäuse der beiliegende O-Ring vorzusehen. Der O-Ring muss auf ein Maß zwischen 2,1 mm und 2,3 mm gestaucht sein.

Führen Sie anschließend eine Justierung des neuen Sensors nach Kapitel 5 durch.

7. Technische Daten

Typ / Type:

Hersteller / Manufacturer:

Messgas / Measuring gas:

Messbereiche / Measuring ranges:

Anwärmzeit / Warm-up time:

Betriebstemperatur / Operating temperature:

Betriebsspannung / Operating voltage:

Explosions-Schutz / Ex certificate:

Leistung / Electrical power:

Einsatzbereich / Operating environment:

rel. Luftfeuchte / rel. Humidity:

Lagertemperatur / Storage temperature:

Druck / Pressure:

Schutzart / Protection class:

5. Calibration

After installation, sensor replacement or in regular intervals according to local safety regulations the sensor heads need recalibration.

This procedure requires the following items:

- Calibration / flow adapter (Art.# 569804) or calibration/diffusion adapter (Art.#. 501047)
- Flow regulator with tubing
- Span gas 10-100 %Vol for measuring range 0-100 %Vol or 2-10 %Vol for measuring range 0-10 %Vol.

Proceeding (see Control Modul manual):

- Go to Control Module menu calibration
- Adjust zero in clean air. If gas present use synthetic air.
- Apply span gas (flow rate 250 – 350 ml / min).
- Program span gas concentration in %Vol.

6. Sensor Replacement

The sensors may lose sensitivity if exposed to corrosive gases, because of component aging or contamination. If a recalibration is no longer possible the sensor must be replaced.

Spare Sensor 501 LCIR CO₂ 100 %Vol: Art.no. 531250

Spare Sensor 501 LCIR CO₂ 10 %Vol: Art.no. 531500

For sensor replacement disconnect sensor supply voltage! Open the housing, loosen the sensor wires and unscrew the sensor. Install the new sensor in reverse sequence. To obtain protection class IP 54, the enclosed O-ring must be mounted between sensor and terminal box. The O-ring should be compressed to 2,1 to 2,3 mm thickness. Calibrate the new sensor as specified in chapter 5.

7. Technical Data

5803 363

COMPUR Monitors, München

CO₂

0-10 Vol%, 0-100 Vol%

60s

-20°C - +60°C

3,0 – 5,0 VDC

EEx de IIC T4

bis / up to 0,4 W

II 2 G

0 - 95 % (nicht kondensierend / not condensing)

0°C - +40°C

800 - 1200 hPa

IP 54

DECLARATION OF CONFORMITY

KONFORMITÄTSEKTLÄRUNG



Compur Monitors GmbH & Co.KG
 Weißenseestraße 101
 D 81539 München

Compur Monitors GmbH & Co.KG
 Weißenseestraße 101
 D 81539 München

as the manufacturer hereby declares, that the

Sensor

Type 5803 363

Sensor Typ 5803 363

complies with the essential requirements of the following directives and has been tested according to European standards:

den Schutzzielen folgender Richtlinien entspricht:

1. der EMV-Richtlinie 89/336/EG ¹⁾

- EN 50081-1
- EN 55022
- EN 50082-2
- EN 61000-4

¹⁾ in Verbindung mit dem Statex 501 Kontrollmodul (Art. Nr. 556959)

2. der Explosionsschutzrichtlinie 94/9/EG

EN 50014 : 1997+A1+A2 EN 50018 : 2000 + A1 EN 50019 : 2000


2. Directive 94/9/EC

EN 50014 : 1997+A1+A2 EN 50018 : 2000 +A1 EN 50019 : 2000

Baumusterprüfbescheinigung: BVS 06 ATEX E 015 X
 Benannte Stelle: DMT / 0158

EC Type Examination Certificate: BVS 06 ATEX E 015 X
 Notified Body: DMT / 0158

München, 24. Februar 2006


 Dr. H. Schmidt

Munich, 02-24-2006


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Statox 501 IR CO₂ Messkopf Statox 501 IR CO₂ Sensor Head



Bedienungsanleitung / Manual

Statox 501 IR CO₂ Messkopf

Bedienungsanleitung

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10. **CE-Konformitätserklärung**

1. Sicherheitshinweise

Der explosionsgeschützte Statox 501 IR CO₂ Transmitter der Gruppe II Kategorie 2 dient zur Konzentrationsmessung von Kohlendioxid. Er weist ein hohes Maß an Sicherheit auf und ist für den Einsatz in Zone 1 und Zone 2 geeignet.

Nachstehende Warn- und Sicherheitshinweise sind besonders zu beachten:

- Der Anschluß und die Installation des Transmitters muss unter Beachtung der angegebenen Zündschutzarten und der vorgeschriebenen einschlägigen Errichtungsvorschriften (z.B. DIN EN 60079-14, Abschnitte 6, 9 und 10) durch einen unterwiesenen Fachmann erfolgen.
- Der Transmitter darf nur an der vorgeschriebenen Schutzkleinspannung (SELV) angeschlossen und betrieben werden.
- Vor dem Öffnen des Transmitters muss dieser spannungsfrei geschaltet werden.
- Es dürfen ausschließlich Original-Zubehör und Original-Ersatzteile verwendet werden.
- Unvollständige Verschraubungen sind unzulässig.
- Ein sicherer Betrieb ist nicht mehr gewährleistet, wenn das Gehäuse beschädigt ist.
- Die vorgeschriebenen Betriebsbedingungen sind einzuhalten.
- Die Messfunktion gemäß EN 61779-1 und -4 ist nicht Gegenstand der Baumusterprüfung für dieses Gerät.
- Bei Nichtbeachtung der vorgenannten Punkte sind die Sicherheit und der Explosionsschutz des Transmitters nicht mehr gegeben. Er stellt dann eine Gefahr für Menschen und Sachwerte dar.

Statox 501 IR CO₂ Sensor Head

Manual

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 - 4.5 Selecting the measuring range
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7. **Accessories and spare parts**
8. **Status and error messages**
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10. **CE-Declaration of conformity**

1. Safety instructions

The Statox 501 IR CO₂ is an explosion proof transmitter rated for use in group II category 2 areas. It measures the concentration of carbon dioxide. It has a high degree of safety and can be installed in zone 1 and 2.

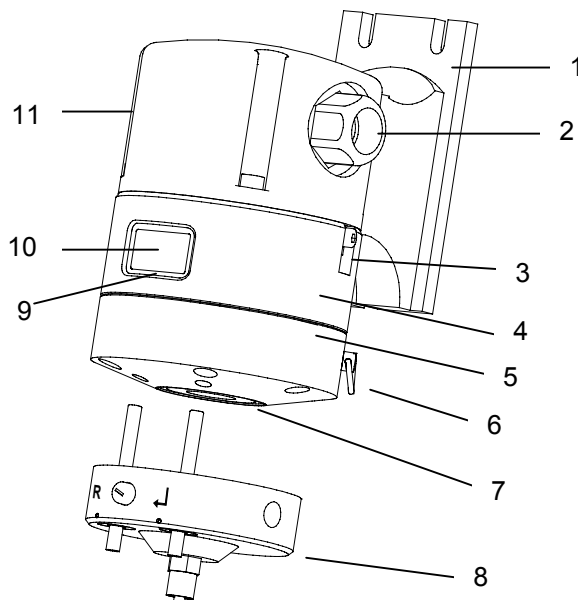
Please observe the following instructions:

- The transmitter is an explosion proof device. All regulations regarding installation of explosion proof equipment (i. e. DIN EN 60079-14, section 6, 9 and 10) should be observed.
- The transmitter must be exclusively operated with 18 – 29 V DC (safety extra-low voltage).
- The transmitter may not be opened unless it is disconnected from the power supply.
- Only original Compur spare parts and accessories must be used.
- All screws must be tightened before operating the transmitter.
- Operating the transmitter with a damaged housing is unsafe.
- The transmitter must not be operated in any environment outside of the approval rating.
- The certificate of conformity does not include a performance approval.
- All of the above warnings must be observed. Incorrect installation or connection will void the explosion proof rating and thus be dangerous to life and assets.

2. Aufbau und Funktionsbeschreibung

2. Construction and Function

- 1 Wandhalterung
- 2 Kabelverschraubung
- 3 Erdungsklemme
- 4 Mittelteil inkl. Typenschild mit Seriennummer / Baujahr
- 5 Unterteil mit Sensor
- 6 Öse für Halteband
- 7 Spritzschutz
- 8 Kalibrieradapter (Zubehör)
- 9 Service-LED
- 10 Anzeige
- 11 Verschlusschraube



- 1 Mounting bracket
- 2 Cable gland
- 3 Grounding terminal
- 4 Electronic compartment with type plate, serial number / date code
- 5 Sensor compartment
- 6 Ring for holding strap
- 7 Splash guard
- 8 Calibration adapter
- 9 Service LED
- 10 Display
- 11 Plug screw

Der Statox 501 IR CO₂ misst Kohlendioxid im Bereich von 0-2 Vol. % bzw. 0-5 Vol.%. Der Messkopf ist als 4-20 mA Transmitter ausgeführt. Er kann sowohl in Verbindung mit dem Statox 501 Controller als auch direkt an einem Prozessleitsystem betrieben werden.

The Statox 501 IR detects carbon dioxide in the the range of 0-2 % or 0-5 %. The sensor head is a 4 - 20 mA transmitter. It can be used in combination with the dedicated Statox 501 controller or any process control system.

Wandhalterung

Die Wandhalterung besteht aus elektrisch leitendem, glasfaserverstärktem Polyamid. Sie dient zur Befestigung des Messkopfes und ist gleichzeitig Klemmenkasten in der Schutzart "Erhöhte Sicherheit". Sie ist serienmäßig mit einer Kabelverschraubung M 20 und einer Verschlusschraube ausgestattet, die durch eine zweite Kabelverschraubung ersetzt werden kann.

Mounting bracket

The mounting bracket / terminal box is made of conductive fiber re-enforced polyamide. It features increased safety for use in explosive environments (EEx e), and comes with one cable gland (M 20) and one screw plug on the other side. An optional second cable gland can replace this.

Transmittergehäuse

Das Transmittergehäuse, bestehend aus Mittelteil und Unterteil, ist in der Schutzart "Druckfeste Kapselung" ausgeführt und aus Edelstahl gefertigt. Es beinhaltet die Elektronik, den Sensor und eine dreistellige LED-Anzeige. Die Sensoröffnung ist durch einen wechselbaren Spritzschutz vor Schmutz und Wasser geschützt.

Transmitter Housing

The stainless steel transmitter housing consists of a top and bottom part, which are rated as explosion proof. It contains the electronics, the sensor and the three-digit LED display. The sensor orifice is protected from water damage by a disposable splash guard.

Sensor

Es wird ein Zweikanal-NDIR-Sensor mit Infrarot-Strahlungsquelle und zwei pyroelektrischen Detektoren verwendet. Der Messdetektor ist auf die CO₂ Absorptionsbande (4,3µm) abgestimmt. Mit zunehmender Gaskonzentration steigt die IR-Absorption im Messstrahl durch die Gasmoleküle in der Küvette. Die Empfindlichkeit des Referenzdetektors liegt dagegen in einem Bereich ohne Strahlungsabsorption. Er dient zur Kompensation von Alterungserscheinungen der IR-Quelle und anderen Effekten.

Sensor

The sensor is a NDIR sensor consisting of a light source and two photo detectors. The measuring wavelength is calibrated to the absorption wavelength of the CO₂ bond (4,3 µm). The more gas molecules are in the way of the light beam (i.e. the higher the gas concentration is) the more infrared light will be absorbed. The reference detector works at a wavelength in which no absorption takes place to compensate for dust, humidity and variations of light source intensity.

Kalibrieradapter

Der Kalibrieradapter ist als Zubehör erhältlich und wird von unten an den Messkopf aufgesteckt. Er hat einen Gasanschluss für 6mm-Schläuche und 2 integrierte Magnetstifte. Er wird benötigt für die Justierung bzw. Kalibrierung des Sensors und zur Bedienung des Passwortmenüs.

Für den Betrieb im Durchfluss kann ein zweiter 6mm-Gasanschluss montiert und der Kalibrieradapter an den Messkopf geschraubt werden. Achten Sie darauf, dass der integrierte O-Ring in der vorgesehenen Nut sitzt und unbeschädigt ist.

Calibration adapter

The optional calibration adapter can be connected to the bottom side of the sensor head. It has a gas intake for a 4 x 6 mm tube and two magnetic pins. The pins operate Hall sensors allowing you to access the password-protected menu, for calibration and setting parameters.

Used with an optional gas outlet, it can serve as a gas adapter for flow applications. To avoid leaks, the integrated O-ring must be undamaged and always be fitted securely in its groove. The calibration adapter can permanently be fixed to the transmitter with 2 screws.

3. Montage und Anschluss

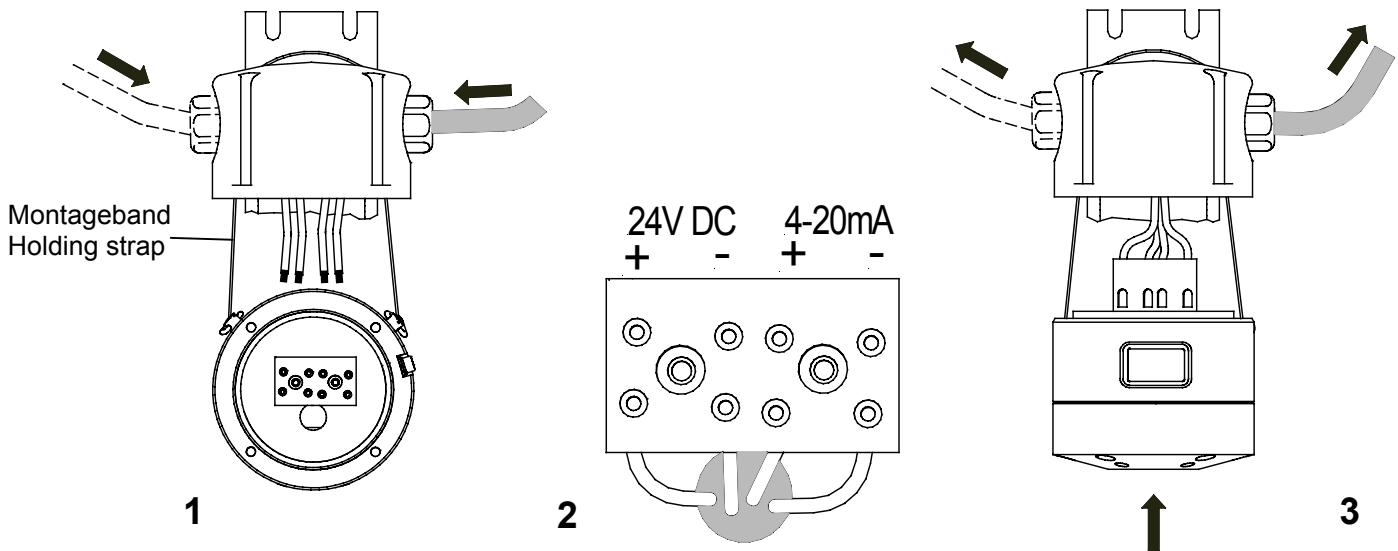
3.1 Montage der Wandhalterung

Bohrlöcher mit Hilfe der beiliegenden Bohrschablone anbringen. Wandhalterung vom Transmittergehäuse trennen und an der Wand befestigen. Wir empfehlen 6mm Schrauben in geeigneter Länge mit Beilagscheiben.

3.2 Anschluss des Transmitters

Das Montageband in die Ösen einklinken und den Transmitter an die Wandhalterung hängen. Das 4adrige, geschirmte Anschlusskabel durch die Kabelverschraubung ziehen (1). Nach Anschlusschema (2) die Kabel anklemmen. Soll eine separate Signalleitung angeschlossen werden, so muss die Verschlusschraube durch eine zusätzliche Kabelverschraubung (Art. 561051) ersetzt werden.

Transmittergehäuse von unten an die Wandhalterung führen, dabei die Anschlusskabel von außen nachziehen (3). Wandhalterung mit Transmittergehäuse verschrauben. Kabelverschraubung festziehen. Montageband wieder entfernen.



Beachten Sie unbedingt folgende Punkte:

- Verwenden Sie nur geschirmte Kabel mit einem Außendurchmesser von 8-13 mm, Leitungsquerschnitt $> 0,75\text{mm}^2$. Schirm einseitig in der Zentrale auflegen.
- Der O-Ring darf nicht beschädigt oder verschmutzt sein und muss in der dafür vorgesehenen Ringnut liegen.
- Die 4 Inbusschrauben müssen mit den mitgelieferten Beilagscheiben handfest verschraubt werden. Wir empfehlen ein Anzugsdrehmoment von ca. 1 Nm.
- Es darf kein sichtbarer Spalt zwischen Wandhalterung und Mittelteil verbleiben.

3. Mounting and Connections

3.1 Wall Mounting

Use the enclosed drilling plan to position the mounting holes. Remove the mounting bracket / terminal box from the transmitter. Fasten it to the wall with 6 mm screws.

3.2 Connecting the Transmitter

Connect the holding strap to the rings located on the back side of the transmitter, allowing it to hang on the mounting bracket. This will conveniently hold the transmitter in place while connecting the wires. Pull the cable through the gland. Connect the wires to the terminals according to the schematics. If two separate cables for signal and power supply are to be used, replace the plug screw with a second cable gland (part. # 561051).

Couple the transmitter to the bottom side of the terminal box, keeping the cable straight by pulling it outward while mounting. Fasten screws and cable gland(s).

Important note:

- Use only shielded cable with an outer diameter of 8 - 13 mm, sectional area $> 0,75\text{mm}^2$. Connect the shield to ground only in the control room.
- The O - ring must be clean and intact. It must stay in its groove.
- Fasten all 4 Allen screws hand tight. Recommended torque 1 Nm.
- No gap must be visible between the transmitter and terminal box.

3.3 Anschluss an das Stattox 501 Control Modul

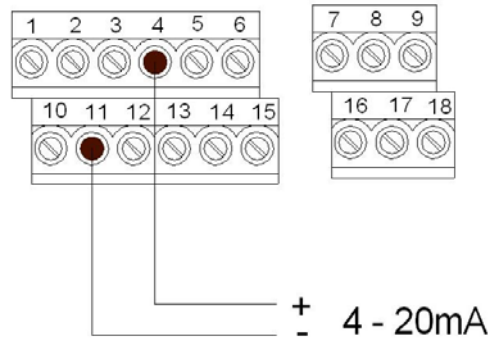
Beachten Sie hierzu die Bedienungsanleitung des Control Moduls!

Vor dem Anschluss des Transmitters an das Control Modul Betriebsprogramm Nr. 49 bzw. 50 wählen. Die Signalleitungen (4-20mA) des Transmitters an die Klemmen 4 (+) und 11 (-) des Control Moduls anklemmen (siehe Abb.).

3.3 Connection to the Stattox 501 Control Module

Read and observe the operations manual of the Stattox 501 controller!

Before connecting the transmitter, select program 49 or 50. Connect the signal cable (4 - 20 mA) to terminals 4(+) and 11(-) of the control module (see picture).



Klemmenbelegung / Terminals Controlmodule Statox 501

3.4 Anschluss an beliebige Controller oder ein PLS

Der Statox 501 IR Transmitter kann auch an einem beliebigen anderen Controller oder direkt an einem Prozessleitsystem betrieben werden. Dabei sind die unter Punkt 9 angegebenen Anschlussdaten zu beachten.

4. Inbetriebnahme und Passwort-Menü

Nach dem Anschluss an die 24 V-Versorgung zeigt der Messkopf zuerst die Software-Version und dann den gewählten Messbereich an (siehe 4.5). Nach einer kurzen Anwärmphase geht er in den Messbetrieb und zeigt die aktuelle Gaskonzentration an.

Das Menü ist nur über die Taster des aufgesteckten Kalibrieradapters zugänglich. Mit der Taste \downarrow (Enter) kommen Sie in den jeweils nächsten Menüpunkt oder treffen die Auswahl der Menucodes. Mit der Taste **R** (Reset) springen Sie jeweils vorzeitig in den Messbetrieb zurück.

Mit der Taste \downarrow kommen Sie als erstes in das Passwortmenü, anschließend wird die erste Stelle des zweistelligen Menucodes im Wechsel angezeigt. Mit \downarrow wählen Sie die gewünschte Zahl, die Anzeige springt auf die zweite Stelle und beginnt in 1er-Schritten zu rollieren. Mit \downarrow die gewünschte Zahl wählen. Das Ablaufdiagramm zeigt eine Übersicht über alle Menüpunkte.

4.1 Nullabgleich und Justierung mit Gas

Anwahl über Menucode 11.

Der Transmitter ist werkseitig justiert. Vor einer Neujustierung sollte der Transmitter mindestens eine Stunde in Betrieb sein. Nach dem Start des Menüpunktes **CAL** wird der Nullpunkt ermittelt (000 blinkt). Verwenden Sie dazu synthetische Luft oder Stickstoff, da der natürliche CO₂-Gehalt der Luft im Freien zwischen 0,04 und 0,07 Vol.% beträgt. In unbelüfteten Räumen können bis zu 0,5 Vol.% CO₂ vorhanden sein!

Sie können nach dem Nullpunktgleich mit **R** wieder in den Messbetrieb zurückkehren oder mit \downarrow eine Justierung mit Prüfgas durchführen. Für eine Justierung benötigen Sie Prüfgas folgender Konzentration: Messbereich 0-2 Vol.%: 0,20-1,50 Vol.%, Messbereich 0-5 Vol.%: 0,50-4,00 Vol.%. Der Durchfluss beträgt 10-30 l/h. Das Prüfgas wird am Gaseinlass des Kalibrieradapters angeschlossen und die Justierung mit \downarrow gestartet (Anzeige „Go“ leuchtet). Nach einiger Zeit blinkt die Anzeige „Go“, die Justierung hat begonnen. Im Anschluss an eine erfolgreich durchgeführte Justierung erscheint die Anzeige **OK**. Bis zu diesem Punkt können

3.4 Connection to any other Controller or a PCS

If you connect the Statox 501 IR to any other control device or PCS, observe the technical data in chapter 9.

4. Start-up and Password Menu

After being connected to the 24 V power supply, the Statox 501 IR will display the software index and then the selected measuring range (see list 4.5). After warm up it will go into the detection mode and start displaying the gas concentration.

To access the user menu, connect the calibration adapter to the sensor head. There are 2 keys that can be used on the calibration adapter. Pressing the Enter button \downarrow will bring you to the next menu point or selects a menu code. **R** (Reset) always brings you back into the measuring mode.

Push the Enter button \downarrow to access the password menu. The first digit will start alternating. Select the desired code by pushing the Enter button when the correct first digit appears. The second digit will start alternating in the same way. Select the secondary code by pushing the Enter button when the correct digit arrives. An illustrated menu diagram is available in this document.

4.1 Zero and Span Adjustment

Select code 11.

The transmitter is pre-calibrated. Before starting a calibration allow at least 1 hour to stabilize. After initiating the calibration program, the zero will be adjusted. During this process the display will flash "000".

Zeroing must be done with synthetic air or nitrogen. Even in fresh air the CO₂ concentration may be 0,04 to 0,07 %, indoors it may even be as high as 0,5 %!

After zeroing the instrument you can return to the measuring mode pushing the reset **R** button. Pushing Enter \downarrow button starts a gas calibration.

Span gas with a concentration from 0,2 to 1,5 % for the 0-2 % range and 0,5 to 4,0 % for the 0-5 % range should be used. Connect the gas to the intake of the calibration adapter, adjust flow to 10-30 l/h and start the procedure by pushing the Enter \downarrow button.

During a calibration "Go" will appear on the display. After a while "Go" will start flashing, indicating that the calibration gas has been detected. When the calibration has been successfully finished, the display will show **OK**. Up to this point no new data has been stored. Pushing the Reset

Sie mit **R** in den Messbetrieb zurückspringen, die alten Justierdaten bleiben erhalten.

Die verwendete Prüfgaskonzentration (in Vol.%) muss dem Transmitter nun mitgeteilt werden. Nach Drücken von **↵** rolliert die Anzeige in Schritten von 0,01 Vol.%, beginnend mit der zuletzt verwendeten Konzentration. Durch Drücken der Taste **R** wird das Rollieren beschleunigt. Wird die verwendete Prüfgaskonzentration angezeigt, kann der Wert mit der Taste **↵** übernommen werden.

Entfernen Sie nun den Kalibrieradapter. Der Messkopf zeigt blinkend die gemessene Konzentration an und kehrt nach dem Abklingen des Signals bzw. nach 2 min automatisch in den Messbetrieb zurück.

Alternativ können Sie mit der Taste **R** vorzeitig in den Messbetrieb zurückkehren.

4.2 Verstärkerabgleich

Anwahl über Menucode 44.

Zur Erzielung einer optimalen Auflösung muss nach jedem Sensorwechsel ein automatischer Verstärker- und Nullabgleich durchgeführt werden. Jeder Verstärkerabgleich erfordert eine Neujustierung. Dies wird durch die blinkende Anzeige **CAL** signalisiert (siehe Punkt 4.1).

4.3 Test des 4-20 mA Ausganges

Anwahl über Menucode 12.

Zu Testzwecken kann der Signalausgang auf die Werte 4, 12 oder 20mA gesetzt werden. Rücksprung in den Messbetrieb mit der Taste **R**.

Achtung: Mögliche Alarmauslösung beachten!

4.4 Wahl des Ausgangssignals im Servicemodus

Anwahl über Menucode 13.

Hier kann gewählt werden, ob der Signalausgang auf 2 oder 4 mA gelegt wird, wenn sich der Transmitter im Servicemodus (z.B. CAL, AbG) befindet.

Werkseitig sind 2 mA eingestellt.

4.5 Wahl des Messbereiches

Der werkseitig eingestellte Messbereich kann über den Menucode 45 verändert werden.

Messbereich 1: 0-2 Vol.% (Controllerprogramm 49)

Messbereich 2: 0-5 Vol.% (Controllerprogramm 50)

Jede Änderung des Messbereiches erfordert eine Neujustierung (siehe Punkt 4.1). Dies wird durch die blinkende Anzeige **CAL** signalisiert.

5. Sensorwechsel

Gerät von der Stromversorgung trennen. Transmitterunterteil sichern: Montageband in eine Öse einhängen, um die Wandhalterung legen und in die andere Öse einhängen. Die 6 Schrauben am Unterteil des Transmitters lösen und das Unterteil nach unten abziehen. Den alten Sensor nach unten herausziehen. Den neuen Sensor einstecken. Unterteil wieder anschrauben, die beiden Ösen müssen hinten sein!

Die Schrauben handfest anziehen, wir empfehlen ein Anzugsdrehmoment von 3 - 3,5 Nm. Es darf kein Spalt mehr sichtbar sein! Es müssen alle 6 Schrauben verwendet werden!

Anschließend sind ein Verstärkerabgleich (4.2) und eine Gaskalibrierung (4.1) durchzuführen!

button will return to the measuring mode and the transmitter will use the previous calibration data.

The final step for calibration is entering the span gas concentration. After pushing the **↵** button the last concentration (in % volume) used will appear on the display. If no change is needed, push the **↵** button. Otherwise the concentration displayed starts increasing in steps of 0,01 %. You can speed this process up pushing the **R** button. As soon as the correct span gas concentration appears on the display, confirm by pushing the **↵** button. Now the display flashes the actual gas concentration. Remove the gas adapter. When the concentration has ceased or after 2 min, the instrument will return to the normal detection mode.

Alternatively push the **R** button to return to the measuring mode immediately.

4.2 Amplifier Adjustment

Select code 44.

This feature is used to obtain the highest accuracy after sensor replacement, by automatically adjusting the amplifier gain. After this a gas calibration is mandatory. This will be indicated by **CAL** flashing on the display (see 4.1).

4.3 Testing the analog output

Select code 12.

This function allows the user to test the 4 - 20 mA output. You can simulate a 4, 12, or 20 mA signal by pressing the Enter button. Return to the measuring mode at any time by pushing the Reset button.

Caution: Disable peripheral alarm devices to avoid false alarms!

4.4 Selection of the output signal in the service mode

Select code 13.

Select the current value to which the analog output shall be set when in the service mode. Default setting is 2 mA.

4.5 Selecting the measuring range

The gas is set at the factory. It can be changed by the user in menu 45.

Measuring range 1: 0-2 % vol. (Control module program 49)

Measuring range 2: 0-5 % vol. (Control module program 50)

Each change of the measuring range requests a calibration with span gas (see 4.1).

This request is visualised by **CAL** flashing.

5. Sensor Replacement

Disconnect the transmitter from the power supply. Hold it in place by fastening the holding strap to the rings on the transmitters backside and hanging it around the mounting bracket. Remove the 6 screws from the bottom part and disconnect it. Plug the new sensor in and reattach the bottom housing, with rings on the backside.

Fasten the screws only hand tight. The recommended torque is 3 - 3,5 Nm. No gap must be visible between the two parts. All 6 screws must be used.

Following the sensor replacement, a gain adjustment (4.2) and gas calibration (4.1) must be performed.

6. Wartung

- Regelmäßige optische Kontrolle auf Unversehrtheit des Gehäuses und auf Verschmutzungen. Bei Bedarf muss der Spritzschutz erneuert werden.
- Nullpunktgleichung: Bei Bedarf
- Kalibrierung mit Prüfgas: Nach lokal gültiger Vorschrift
- Verstärkerabgleich

7. Zubehör und Ersatzteile

- 561006 IR-Sensor CO₂
- 561051 Kabelverschraubung
- 561055 Spritzschutz
- 561057 O-Ring-Set
- 562031 Kalibrieradapter
- 561059 6mm-Verschraubung für Kalibrieradapter

8. Status- und Fehlermeldungen

8.1 Statusmeldungen

- Die gelbe Leuchtdiode blinkt im Service- und Wartungsmodus.
- Der Stromausgang wird auf 2 bzw. 4 mA gesetzt.

Meldung	Beschreibung	Bemerkung
Ab5	Verstärkerabgleich wird durchgeführt	optimale Verstärkung wird ermittelt
CAL	Kalibrieroutine gestartet	Beim Nullabgleich und bei der Gaskalibrierung
Con	Aufforderung zur Konzentrationseingabe	Anzeige der zuletzt verwendeten Konzentration
don	Vorgang beendet	
Gas	Auforderung zur Gasaufgabe	Gaskalibrierung
Go	Gas aufgegeben. <i>Blinkt:</i> Gas erkannt	
I oE	Strom im Servicemodus	2 mA oder 4 mA
I St	Test der Stromschnittstelle	4, 12, 20 mA
PAS	Zugang zu den Menüpunkten	
000	Nullabgleich	nach Verstärkerabgleich oder in der Kalibrieroutine
1.22	Messwert blinkt	Abklingphase des Sensors nach der Gaskalibrierung

6. Maintenance

- Visual inspection of the housing to make sure it is intact and the splash guard is clean.
- Zero adjustment: Only if needed.
- Gas calibration: Interval according to local regulations.
- Kalibrierung mit Prüfgas
- Gain adjustment: Only if needed and after sensor replacement.

7. Accessories and Spare Parts

- 561006 IR-Sensor CO₂
- 561051 Cable gland
- 561055 Splash guard
- 561057 O-Ring-Set
- 562031 Calibration adapter
- 561059 6mm-Adapter gas outlet

8. Status and Error Messages

8.1 Status Messages

- The yellow LED will flash while the transmitter is in the service mode.
- The analog output is set to 2 resp. 4 mA.

Error code	Description	Remark
Ab5	Gain adjustment in process	Optimizing gain
CAL	Gas calibration startet	During gas calibration and zeroing
Con	Enter span gas concentration	Concentration used last time on display
don	Done	
Gas	Turn gas on	Start gas calibration
Go	When flashing span gas is detected	
I oE	Current output in the service mode	2 mA or 4 mA
I St	Current output test	4, 12, 20 mA
PAS	Access menu	
000	Zero adjustment	During gas calibration or after gain adjustment
1.22	Measuring value flashing	Decay phase after gas calibration

8.2 Fehlermeldungen

- Aus allen Fehlermeldungen gelangt man mit Reset oder Enter wieder zurück in das Passwortmenu.
- Fehler werden durch eine permanent leuchtende gelbe LED angezeigt.
- Der Stromausgang wird bei fatalen Fehlern auf 0 mA gesetzt, sonst auf 2 bzw. 4 mA.

8.2 Error Codes

- To go from an error code back to the measuring mode, press the Reset button.
- If an error has occurred, the yellow LED will go on.
- The analog output will be set to 0 mA in case of a fatal error, otherwise the output will be 2 or 4 mA for all other errors.

Fehlermeldung	Fehlerbeschreibung	mögliche Ursache	Fehlerbehebung
Er1	Sensor defekt	- Sensor fehlt - Sensor defekt	Fataler Fehler! Sensor wechseln.
Er2	Übersteuerung	- Sensorsignal zu hoch - evtl. Hardwarefehler	Fataler Fehler! Verstärkerabgleich durchführen, Kalibrierung wiederholen, ggf. Kundendienst benachrichtigen.
Er3	Timeout beim Kalibrieren	- Gas nicht aufgedreht - zu niedrige Konzentration - Sensor zu unempfindlich	Bis zur nächsten gültigen Kalibrierung bleibt die bisherige erhalten. Gas aufdrehen, evtl. Sensor wechseln.
Er4	Messwert < 0 % UEG	- Nullpunktdrift	Fataler Fehler! Nullabgleich durchführen.
Er5	EEPROM-Fehler	- Hardwarefehler	Fataler Fehler! Kundendienst benachrichtigen.
Er6	Fehler beim Nullabgleich	- schwankende Gaskonzentration während des Nullpunktabgleichs	Bisheriger Nullpunkt bleibt erhalten. Nullabgleich wiederholen, evtl. synthetische Luft verwenden.
CAL	Blinkt: Kalibrierung erforderlich	- keine erfolgreiche Kalibrierung nach Verstärkerabgleich (4.2) oder Messbereichsänderung (4.5)	Fataler Fehler! Kalibrierung durchführen (4.1).
CAL	blinkt im Wechsel mit dem aktuellen Messwert	- keine erfolgreiche Kalibrierung nach timeout	Kalibrierung durchführen (4.1).

Error code	Problem	Potential reason	Trouble shooting
Er1	Sensor defective	- Sensor missing - Sensor defective	Fatal Error! Replace sensor.
Er2	Amplifier overload	- Sensor signal too high - Hardware error	Fatal Error! Adjust gain and calibrate. If it still does not function, contact the factory.
Er3	Timeout during calibration	- No span gas - Span gas concentration too low - Sensor has lost sensitivity	Continuous operation with origin calibration data. Turn gas on, use proper gas. Replace sensor.
Er4	Negative zero	- Zero drift	Fatal Error! Adjust zero.
Er5	EEProm Error	- Hardware problem	Fatal Error! Contact factory.
Er6	Zero could not be attained	- Gas present during zero adjustment	Continuous operation with origin calibration data. Repeat zero, use synthetic air.
CAL	Flashing: Calibration request	- no successful calibration after amplifier adjustment (4.2) or change of measuring range (4.5)	Fatal Error! Calibrate (see 4.1).
CAL	flashing in change with actual measuring value	- no successful calibration after timeout	Calibrate (see 4.1).

9. Technische Daten

• Bezeichnung	Stattox 501 IR Transmitter
• Typ	5370 x18
• Hersteller	COMPUR Monitors, München
• Messbereich	0-2 bzw. 0-5 Vol. %
• Messprinzip	2-Kanal NDIR
• Nachweisgrenze	0,03 Vol. % CO ₂
• Messwertanzeige	LED, dreistellig
• Ansprechzeit	t ₅₀ < 15s, t ₉₀ < 45s
• Wiederholgenauigkeit	< ± 2 %
• Messbereitschaft nach	20 s
• Spezifikationen erreicht	nach 30 min
• Umgebungstemperatur	-20°C bis +44°C
• Lagertemperatur	-20°C bis +60°C
• Feuchtebereich	0 - 99% r.F.
• Druckbereich	800 - 1100 hPa,
• Abweichung	< ± 0,2 % / hPa
• Explosionsschutz	EEx de IIC T5
• Einsatzbereich	II 2 G
• Prüfbescheinigung	BVS 04 ATEX E 006 X
• Betriebsspannung	24VDC (18-29VDC)
• Anschlussleistung	1 Watt
• Stromaufnahme	max. 80 mA bei 24 V
• Ausgang	4-20 mA, max. Bürde 220 Ohm
• Signalisierung Service	gelbe LED blinkt, Ausgang 2 oder 4mA
• Signalisierung Fehler	gelbe LED leuchtet, Ausgang 2 oder 4mA, bei fatalen Fehlern 0 mA
• Schutzart nach EN 60529	IP 67
• Abmessungen (HxBxT)	ca. 150x120x120mm
• Gebrauchslage	Sensoröffnung nach unten ± 90°
• Masse	ca. 3,1 kg
• Gehäusematerial	PA und Stahl 1.4305
• EMV	nach EN 50270

9. Technical Data

• Product name	Stattox 501 IR Transmitter
• Type	5370 x18
• Manufacturer	COMPUR Monitors, Munich
• Measuring Range	0-2 % or 0-5 % volume
• Measuring principle	2-channel NDIR
• Detectable limit	0,03 % volume CO ₂
• Display	LED, three digit
• Response time	t ₅₀ < 15s, t ₉₀ < 45s
• Repeatability	< ± 2 %
• Warm up time	20 s
• Specifications reached	after 30 min
• Temperature	-20°C to +44°C (-4 to +112°F)
• Storage Temperature	-20°C to +60°C (-4 to +140°F)
• Humidity	0 - 99% r.F.
• Pressure range	800 - 1100 hPa,
• Deviation	< ± 0,2 % / hPa
• Approval	EEx de IIC T5
• Instrument class	II 2 G
• Certificate	BVS 04 ATEX E 006 X
• Voltage	24VDC (18-29VDC)
• Power	1 Watt
• Current	max. 80 mA at 24 V
• Output	4-20 mA, max. load 220 Ohm
• Service request	yellow LED flashing, output 2 or 4mA
• System failure	yellow LED on, output 2 or 4mA, fatal error 0 mA
• Protection class EN 60529	IP 67
• Dimensions (HxWxD)	ca. 150x120x120mm (5,9x4,7x4,7in)
• Installation instructions	upright position ± 90° , sensor downwards
• Weight	ca. 3,1 kg (6,8 pound)
• Material	PA and Steel 1.4305
• EMV	according to EN 50270

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Operation Manual

Compur Statox 4120



COMPUR
Monitors

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1. Important notice

Statox 4120 is an explosion proof system for the detection of toxic gases. It can be operated in hazardous areas classified division 1 and 2.

Before installing and putting Statox into operation read and observe this manual!

To operate the system safely, observe this manual carefully. It must be operated and maintained by qualified and authorised personnel. No other application than ambient air monitoring of the gas specified is authorised by the manufacturer.

Safety guidelines

- **Prior to connecting and installing the Statox 4120 system check if all any safety – relevant parameters of the system and its environment are in accordance with specifications and local regulations.**
- **If the Statox sensor head is installed in a potentially hazardous atmosphere the safety relevant parameters of the sensor head and the control module must be observed. Please use cable specified as recommended in this operation manual.**
- **Operating conditions must not exceed the specifications.**
- **The alarm relays of Statox 4120 are only safe to operate 24 V DC. Do not connect to mains.**
- **Maintenance work must be carried out by trained personnel only.**
- **Use exclusively original spare parts, accessories and consumables.**

If the safety guidelines are not observed, the Ex approval will be void!

The instrument has to be inspected and serviced in regular intervals by trained personnel. For service or training contact your local Compur Monitors representative. The maximum maintenance interval should be 6 months.

2. The Statox 4120 system: Purpose of use and description

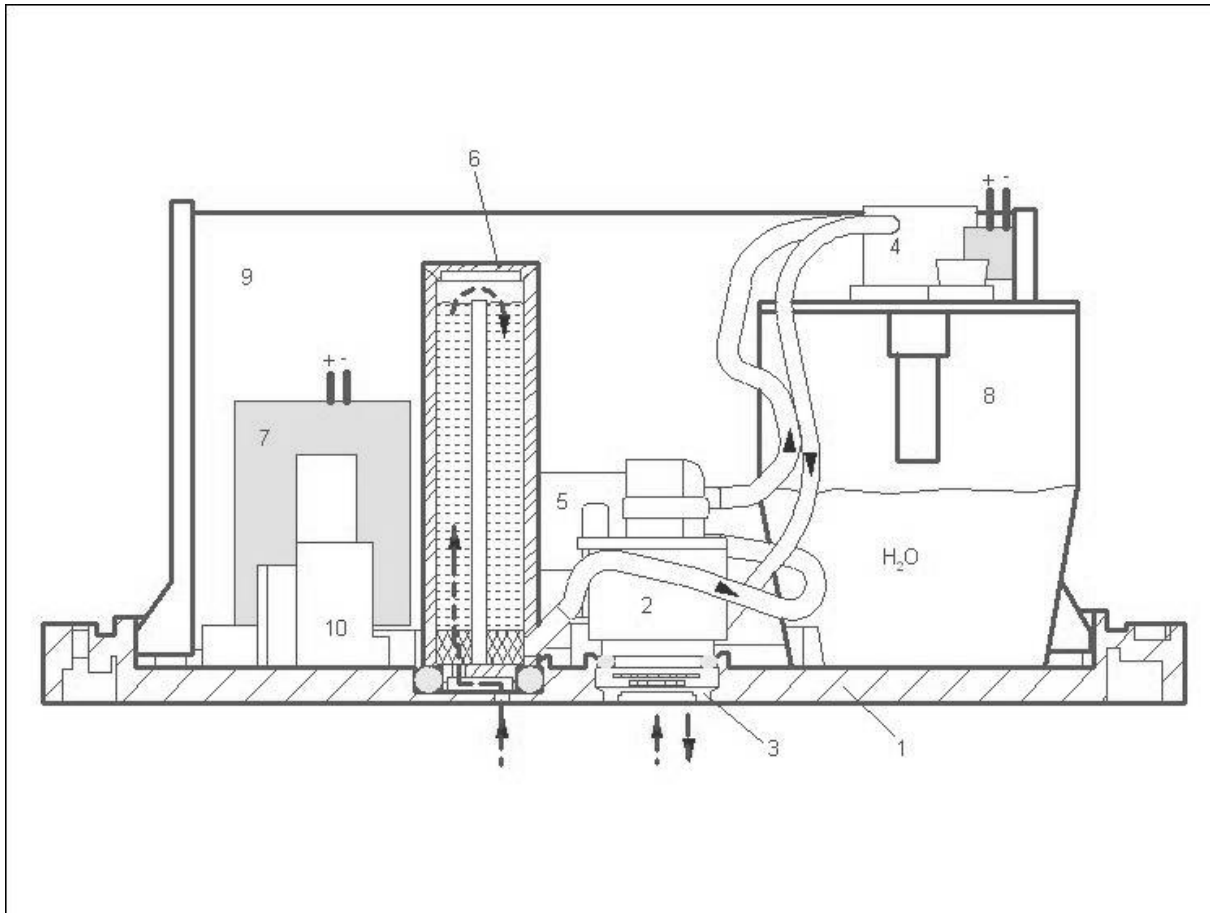
Compur Statox 4120 is a stationary toxic gas detection system. It monitors continuously ambient atmosphere indoor and outdoor. It's integrated self test provides maximum safety of operation. Two user - adjustable alarm thresholds A1 und A2 can be set to any value within the measuring range.

It consists of these components:

- ➡ Statox 4120 sensor head
- ➡ Statox 4120 rack
- ➡ Statox 4120 control module
- ➡ Diagnostic box

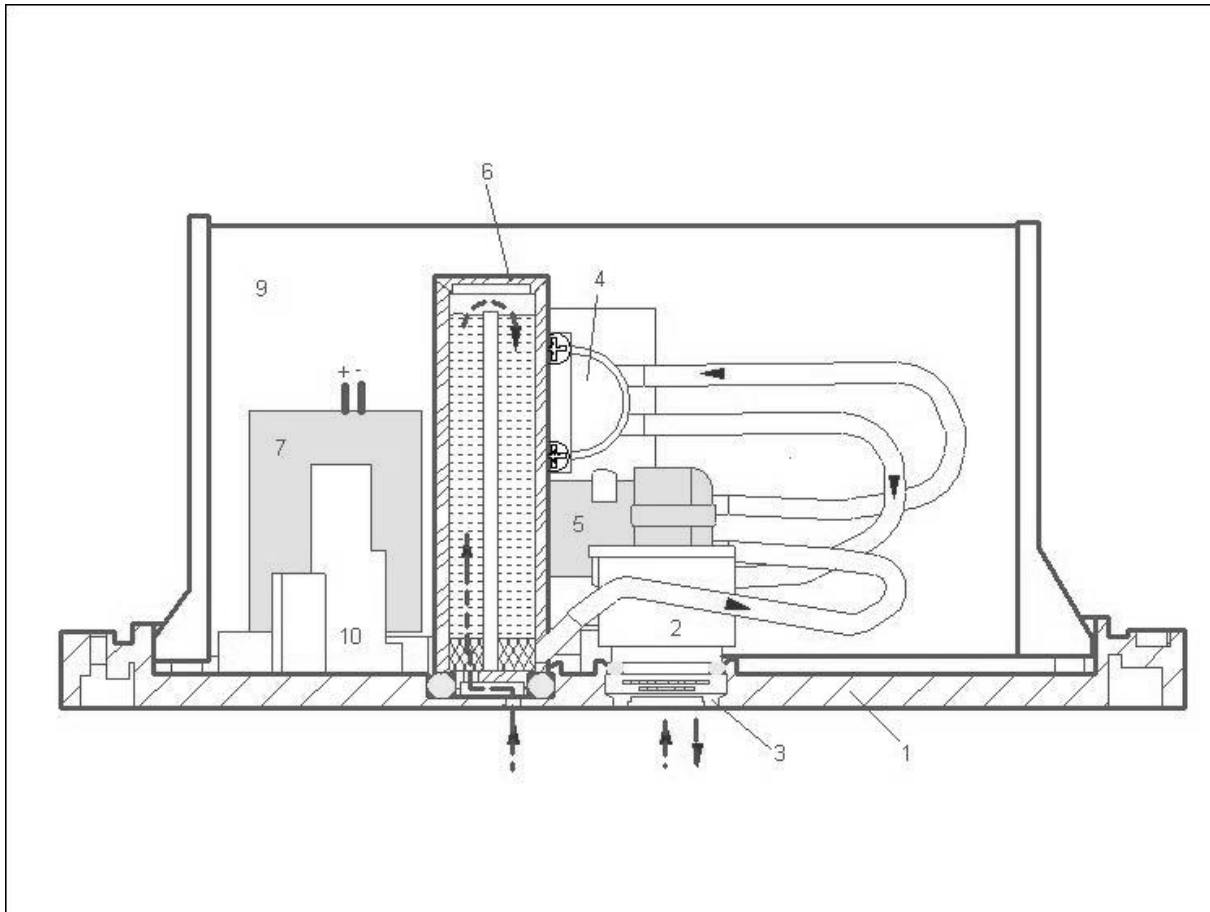
The Statox 4120 control module communicates a digital signal via a two-wire cable with the sensor head. It operates as power supply, alarm device and signal display. The system permanently checks itself for proper function and will alarm if any parameter is getting out of specifications. Sensor calibration and system fault diagnosis is easily achieved using the Statox portable diagnostic box.

2.1 Statox 4120 sensor head



pic. 1: Statox 4120 sensor head

- 1 Bottom part
- 2 Statox 4120 sensor
- 3 Statox 4120 dust filter
- 4 Gas generator
- 5 Statox 4120 pump
- 6 Statox 4120 filter cartridge
- 7 Buffer battery for pump operation
- 8 Water container
- 9 Electronics
- 10 Opto - coupler for communication with the diagnostic box



pic. 2: Statox 4120 sensor head for Cl₂ und ClO₂

Operation principle

Ambient air enters the sensor (2) by diffusion through an opening at the bottom. The sensor creates a current - signal proportional to the gas concentration. This signal is amplified, temperature compensated and linearised. As a digital signal it is transmitted to the control module.

To protect the sensor from being poisoned by a high gas concentration, the Statox features a built – in air purge. This is activated when the gas concentration exceeds 95 % of the measuring range and stops when it has dropped below 80 %.

The battery pack (7) buffers the energy demand of the built – in pump (5). It is on permanent trickle charge. The pump is activated in the protection mode and during the self test to purge the sensor and provide test gas from the gas generator (4) to the sensor.

2.2 Statox 4120 rack

The Statox 4120 rack and the Statox 4120 control module provide the power supply for the sensor head. They are certified explosion proof [EEx ib] IIC. **The rack must not be installed in certified areas!**

Construction:

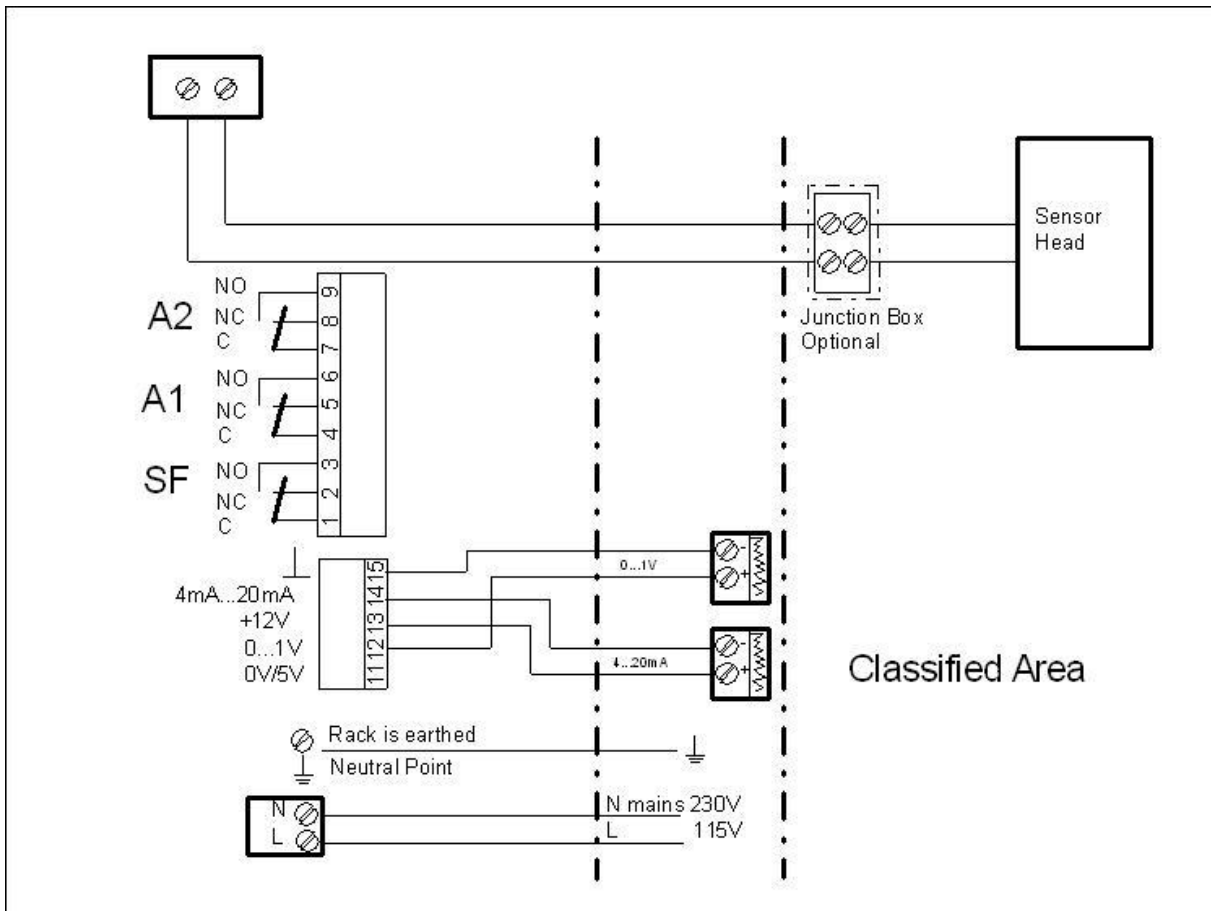
The system consists of a 19"-4-HE rack with backplane and up to nine Statox 4120 control modules. Each Statox 4120 sensor head is communicating with one control module. The Statox 4120 rack is available in following designs:

- STATOX 4120 Rack ½ x 19" for 4 Control modules
- STATOX 4120 Rack 19" for 9 Control modules
- STATOX 4120 Rack 19" for 9 Control modules / RFI shielded
- STATOX 4120 Desk case for 4 Control modules
- STATOX 4120 Desk case for 19" Rack with 9 Control modules

Connections:

On the backplane (pic. 3) you find the following terminals:

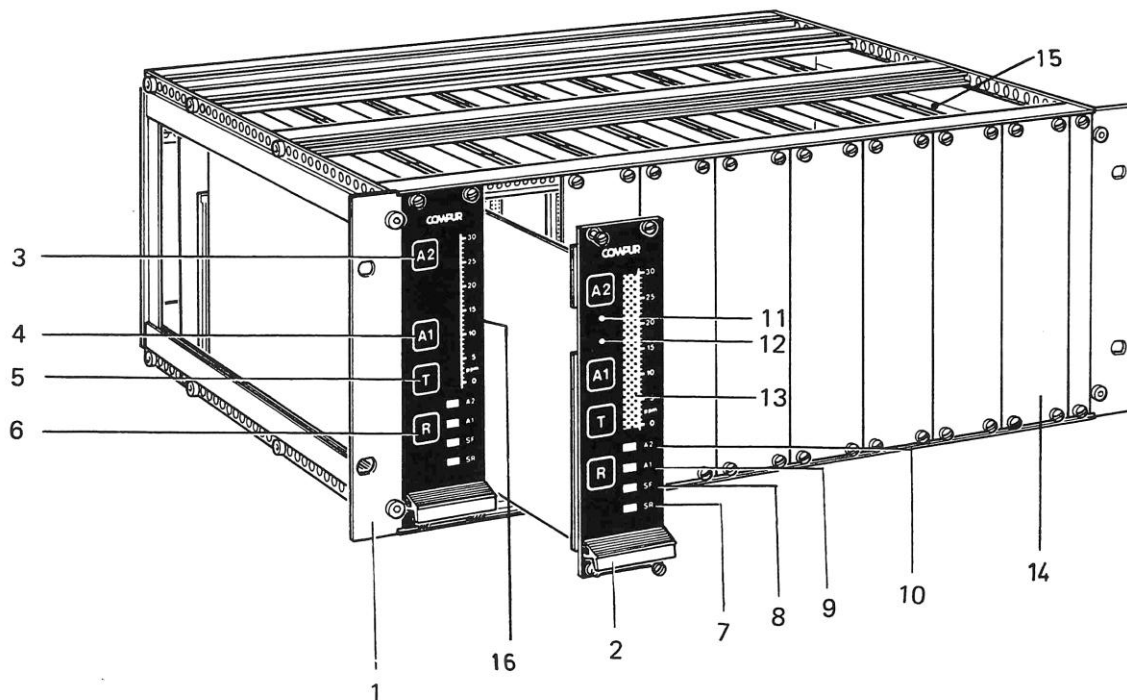
- ➔ power supply 230 V/AC (115V/AC)
- ➔ Intrinsically safe terminals (signal cable, 22V/DC, 50mA) for data transmission and sensor head power supply.
- ➔ Analog outputs:
 - 0-1V
 - 4-20 mA
- ➔ Potential free relays:
 - Pre-alarm A1
 - Main alarm A2
 - System alarm SF
- ➔ The A1 and A2 relay signal of the Statox 4120 control module is programmable.



pic.3: Electrical connections

2.3 Statox 4120 control module

Each Statox 4120 Control module has its own power supply. The intrinsically safe sensor head supply circuit is supplied by a separate secondary winding.



pic.4: Statox 4120 Rack

- | | | | |
|---|----------------------------|----|----------------------|
| 1 | 19" Rack | 9 | LED A1 |
| 2 | Statox 4120 control module | 10 | LED A2 |
| 3 | Button A2 | 11 | Potentiometer for A2 |
| 4 | Button A1 | 12 | Potentiometer A1 |
| 5 | Button T | 13 | Bar graph display |
| 6 | Button R | 14 | Blind panel |
| 7 | LED SR | 15 | Rail |
| 8 | LED SF | 16 | ppm Scale |

➔ Bargraph display (13)

- Actual measured concentration value.
- Flashing when measuring range is exceeded and pump is on.

➔ LED SR (7) „System ready“

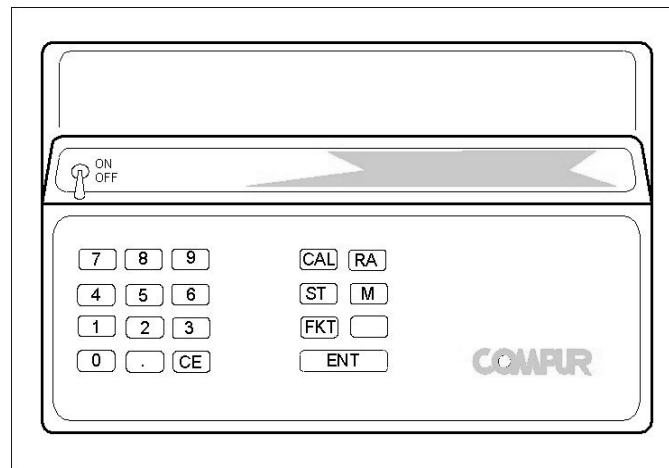
- On if system is working properly.
- Flashing after power up until system is communicating fault - free.
- Flashing while diagnostic box is connected.

➔ LED SF (8) „System Fail“

- On if a system failure has occurred. (Self test not passed, communication error, cable interrupted).

- ➔ **LED A1 (9)**
- On if pre - alarm threshold is exceeded
- ➔ **Display A2 (10)**
- On if main alarm threshold is exceeded
- ➔ **Button A1 (4)**
- Press and hold button A1 to display A1 threshold. Adjust with Pot. (12). A1 must be < A2.
- ➔ **Button A2 (3)**
- Press and hold button A2 to display A2 threshold. Adjust with Pot. (11).
- ➔ **Button T (5) „Test“**
- Initiates self test.
- ➔ **Button R (6) „Reset“**
- Rests Alarms A1, A2 und SF provided the reason for the alarm has disappeared. (If SF has been triggered by a not passed self test, only a successful self test will reset it).

2.4 Diagnostic box



pic.5: Diagnostic box

The diagnostic box must not be charged in classified areas or with other than charger Art.# 518850. It has the following purposes:

- ➔ Calibration
- ➔ Fault diagnosis
- ➔ On site display
- ➔ Function test

3. Installation and electrical connections

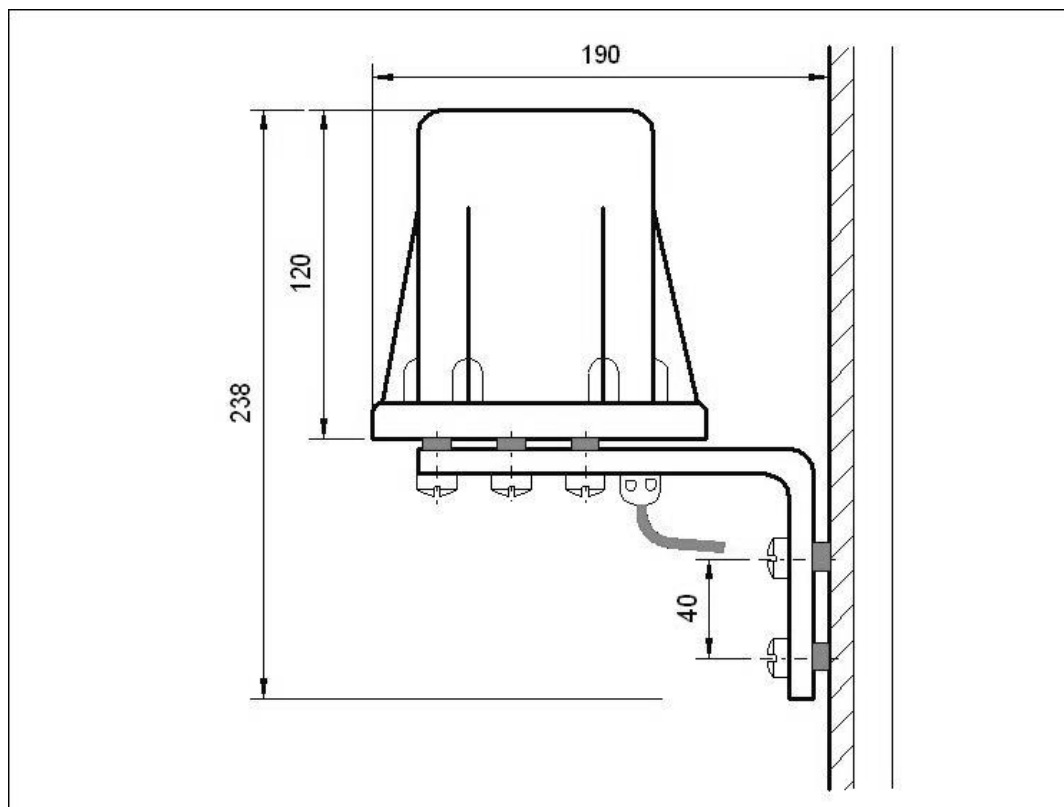
3.1. Statox 4120 sensor head

3.1.1. Mounting

The sensor head should be installed as close as possible to potential leaks. If it is used as industrial hygiene device it should be located between a potential leak and personnel working in the area. Parameters such as:

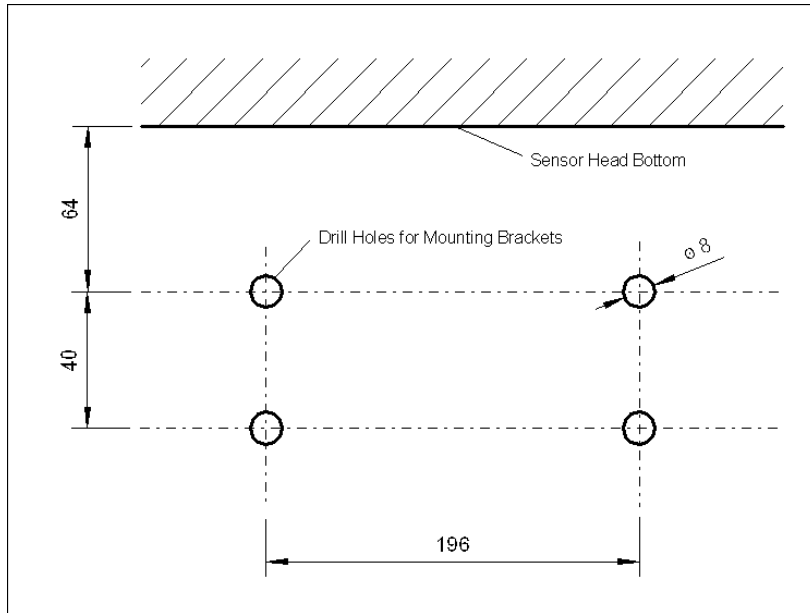
- Air flow (wind, ventilation, thermal conditions)
- Access from top (removing the cover) and bottom (loosening the screws)
- Specifications of the gas to be detected (specific weight)
- Protection from direct sunlight, splash water and dust must be taken care of.

Fasten the sensor head with three nylon screws on the mounting brackets using the rubber bearings as electrical isolation (these accessories are included).



pic.6: Mounting the sensor head

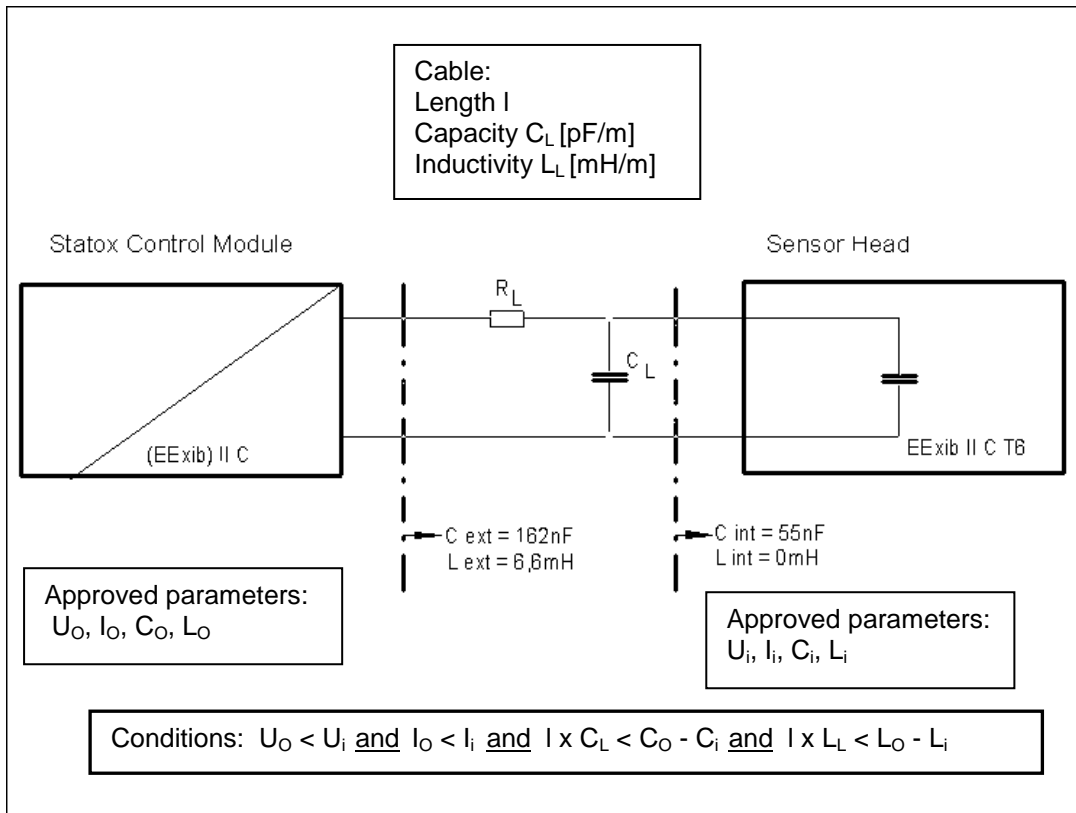
Mount the sensor head in horizontal position +/- 15%. Assure there is free gas access to the sensor.



pic.7: Drilling plan for the mounting brackets

3.1.2. Connecting the signal cable

The signal cable connects sensor head and control module. Use only shielded cable. The maximum cable length depends on the cable specifications.



pic.8: Two wire signal cable

Example of cable specifications:

Max. cable capacity:

$$l \times C_L = C_o - C_i = 107 \text{ nF}$$

Max. cable inductivity:

$$l \times L_L = L_o - L_i = 6,6 \text{ mH}$$

Diameter:

$$> 0,75 \text{ mm}^2$$

The Statox 4120 Systems will work reliably if the electrical resistance is : $R_L < 50 \Omega$.

Most commonly the maximum length is limited by the cable capacity.

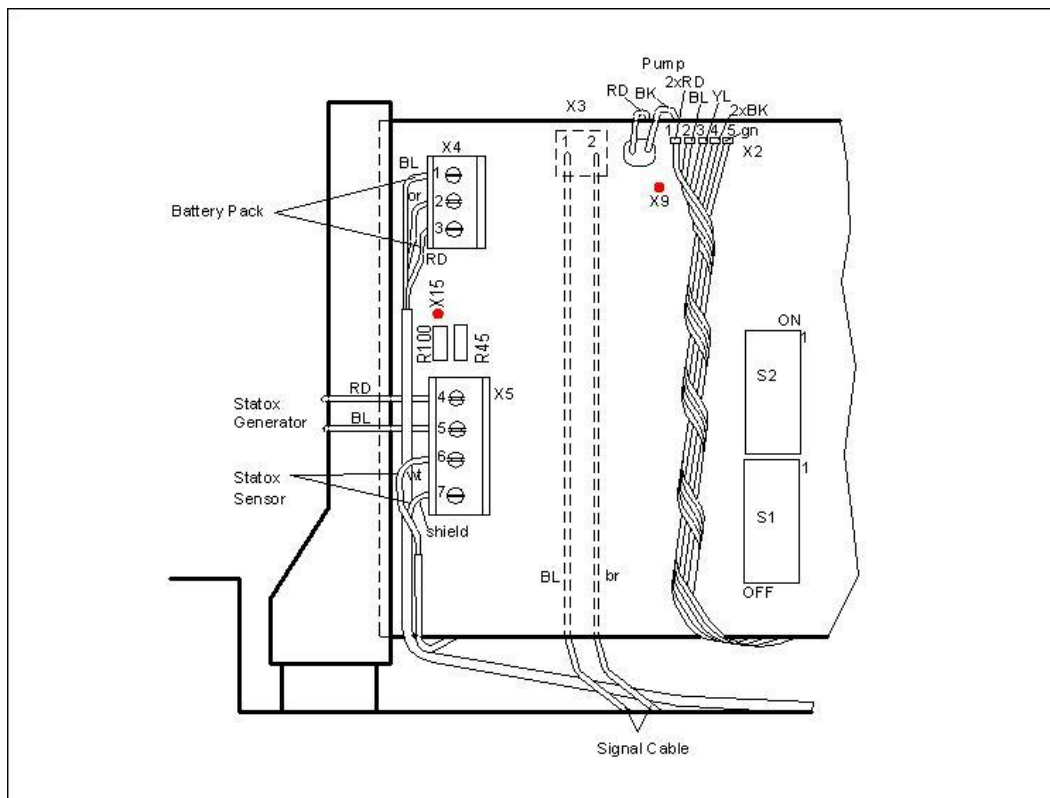
Example: Cable diameter is $1,0 \text{ mm}^2$ (0,04 in), $C_L = 90 \text{ pF/m}$, $L_L = 0.7\text{mH/km}$, $R_L / \text{km} = 19,5 \Omega$.
The maximum cable length results to be

$$l = \frac{C_o - C_i}{90 \text{ pF} / \text{m}} = 1189 \text{ m (3900 ft)}, \text{ the electrical resistance is}$$

$$R_L = 2 \times 1.189\text{km (0,738 miles)} \times 19,5 \Omega/\text{km} = 46,4\Omega. \text{ So } R_L < 50\Omega \text{ is OK.}$$

Sensor head connection procedure:

- Open sensor head, remove cable gland.
- Connect signal cable to terminals X3/1 und X3/2, polarity does not matter. (DIN EN 60079-14 chapter 12 is applicable)
- Fasten cable gland.
- Connect battery pack:
 - Blue to terminal X4/1
 - Orange to terminal X4/2
 - Red to terminal X4/3
- Connect signal cable to backplane of the rack. (See chapter 3.2)

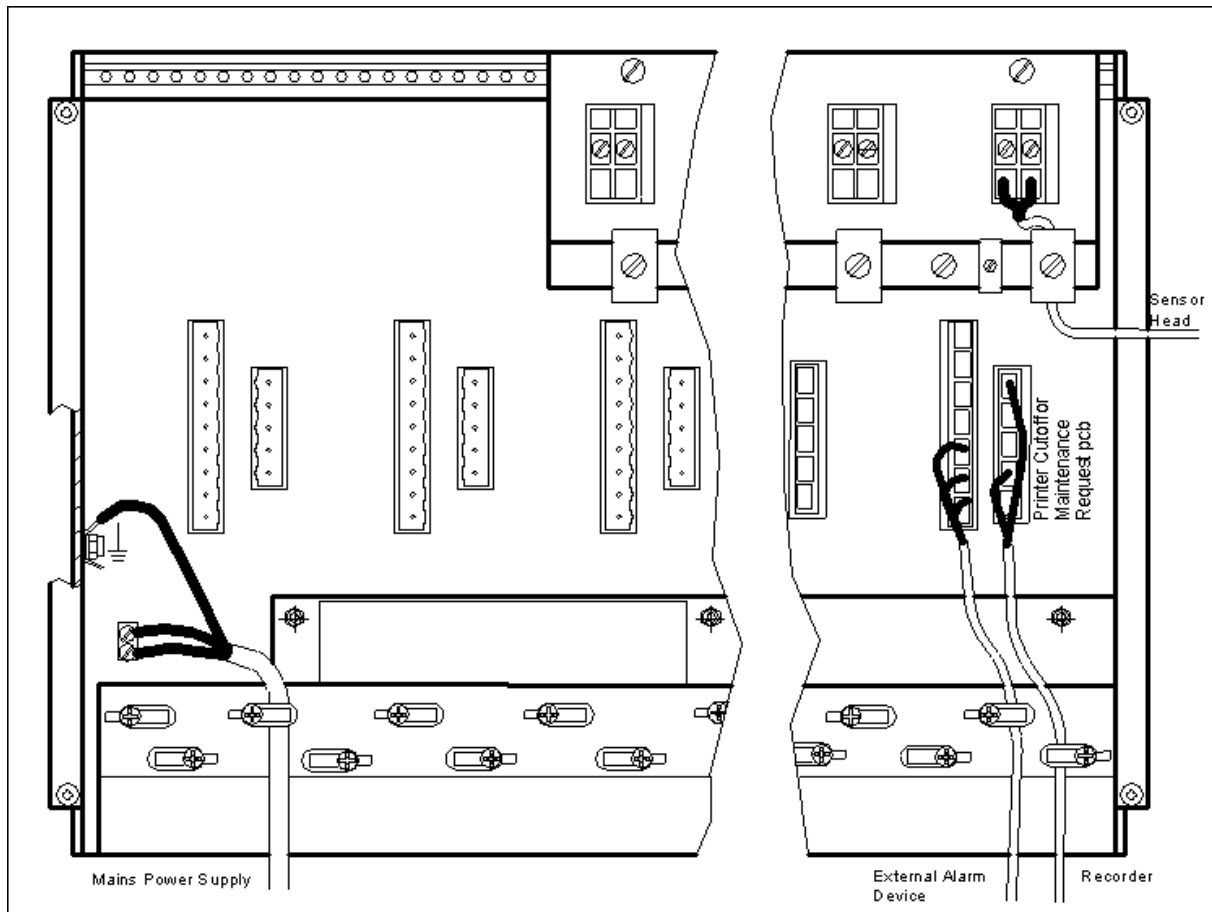


pic.9: Sensor head pcb terminals

3.2 Statox 4120 rack

Statox 4120 Rack must not be installed in hazardous areas. Observe local safety- and installation regulations.

Protect any cable from tensile strain. The five - and the nine - contact terminals are plugged in. They can be removed to ease wire connection.



pic.10: Backplane Statox 4120 Rack

Installation instructions:

- The signal cable from sensor head to backplane must be shielded. The shield must make good contact to the ground contact on the backplane as well as to the sensor head metal shield.
- Do not remove the conductive silicon bearing of the sensor head housing.
- The sensor head housing must be installed isolated from ground to avoid ground loops.
- The entire system must only be grounded by the mains ground wire.
- All control modules must be well connected and secured with the screws.

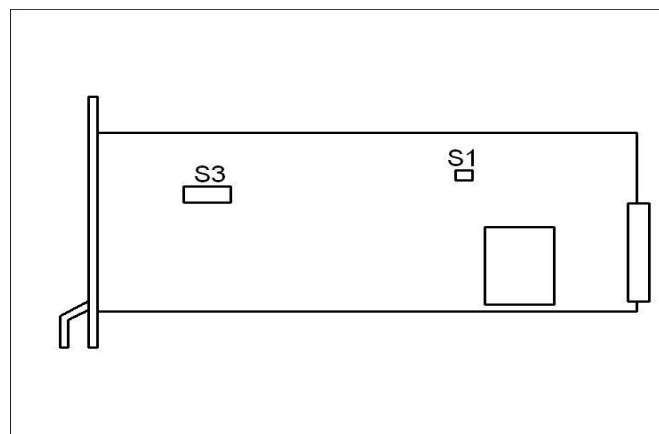
Connecting the mains cable initiates the system.

Installation instructions for the RFI-shielded Statox 4120 rack:

- Use well shielded signal cable. The shield must make good contact with the RFI resistant cable glands. It must not be interrupted by connection boxes. If the signal cable is run through such, these must also be equipped with RFI resistant cable glands. They must be installed isolated from ground, and the shield must make good contact with the metal housing of the box.
- Do not remove the conductive silicon bearing of the sensor head housing.
- The sensor head housing must be installed isolated from ground to avoid ground loops.
- The entire system must only be grounded by the mains ground wire.
- All control modules must be well connected and secured with the screws.
- Empty rack positions must be closed with blind panels.

3.3 Statox 4120 control module

- Control module Circuit board includes power supply, fuses, relays, microprocessor control electronics, DIP switches and a terminal connecting with the backplane.
- Front pcb with bar graph display.
- Foil keyboard.



pic.11: Control module Statox 4120

Each sensor head requires one control module. Before starting the system please check the DIP switch position. The following list comprises all possible DIP switch positions:

Slide switch S1:

S1	ON	OFF
1	Relay active during alarm A2	Relay inactive at alarm A2
2	Relay active during alarm A1	Relay inactive at alarm A1

Toggle switch S3:

S3	ON	OFF
1	Detection mode	-
2	Rest Alarm by resetbutton R	auto - reset
3	Detection mode	-
4	Detection mode	-
5	Measured value accepted if logic signal is 0V	-
6	Detection mode	-
7	Detection mode	Modem - and analog signal adjustment for service only!
8	Detection mode	Delete EPROM for service only!

Ex works settings

3.4 Switch positions of the sensor head pcb

DIP switch S2 (see pic. 9) programs the following parameters:

S2	ON	OFF
1	-	Detection mode
2	Measured value in ppm	Measured value in TLV
3	No self test after "power on"	Self test after "power on"
4	Cal. Factor =1	Factor information from control module
5	No self test	Self test in a 24 h interval
6	-	-
7	Detection mode	-
8	Detection mode	Modem "On" for service

Ex works setting

DIP switch S1 (see pic. 8) programs gas and measuring range. If you change your Statox to another gas or measuring range, a hardware modification may be required and the electronics must be re-adjusted. This must be done by authorised personnel.

Table 1: Switch position for H₂S

Measuring range:	0-30 ppm	0-50 ppm	0-100 ppm
S1/1	ON	OFF	OFF
S1/2	ON	ON	ON
S1/3	ON	ON	ON
S1/4	ON	ON	OFF
S1/5	ON	ON	OFF
S1/6	ON	OFF	ON
S1/7	ON	ON	OFF
S1/8	ON	ON	ON
E-PROM Index sensor head	12, 13, 14	12, 13, 14	12, 13, 14
E-PROM Index control module	≥ 02	≥ 02	≥ 02

Table 2: Switch position for HCN

Measuring range:	0-15 ppm	0-30 ppm	0-50 ppm	0-100 ppm
S1/1	ON	ON	OFF	OFF
S1/2	ON	ON	ON	ON
S1/3	ON	ON	ON	ON
S1/4	OFF	OFF	OFF	ON
S1/5	OFF	ON	ON	ON
S1/6	OFF	ON	OFF	ON
S1/7	OFF	ON	ON	ON
S1/8	ON	ON	ON	ON
E-PROM Index sensor head	13	12, 13, 14	12, 13, 14	15
E-PROM Index control module	≥ 02	≥ 02	≥ 02	≥ 02

Table 3: Switch position for COCl₂

Measuring range:	0-0,1 ppm	0-0,3 ppm	0-0,3 ppm	0-0,5 ppm	0-1,5 ppm	0-15 ppm	0-100 ppm
S1/1	OFF	ON	ON	OFF	OFF	OFF	OFF
S1/2	ON	ON	ON	ON	ON	ON	ON
S1/3	ON	ON	ON	ON	ON	ON	ON
S1/4	OFF	ON	ON	ON	OFF	ON	ON
S1/5	ON	OFF	ON	OFF	ON	OFF	OFF
S1/6	ON	ON	ON	OFF	OFF	OFF	ON
S1/7	ON	ON	ON	ON	OFF	OFF	ON
S1/8	ON	ON	ON	ON	ON	ON	ON
E-PROM Index sensor head	20	12, 13, 14	18	12, 13, 14	12, 13, 14	12, 13, 14	17
E-PROM Index control module	04	≥ 02	≥ 02	≥ 02	≥ 02	≥ 02	≥ 02

Table 4: Switch position for Cl₂

Measuring range:	0-1,5 ppm	0-3 ppm	0-10 ppm
S1/1	ON	ON	OFF
S1/2	ON	ON	ON
S1/3	ON	ON	ON
S1/4	ON	OFF	ON
S1/5	ON	ON	OFF
S1/6	ON	ON	ON
S1/7	OFF	OFF	OFF
S1/8	ON	ON	ON
E-PROM Index sensor head	12, 13, 14	12, 13, 14	12, 13, 14
E-PROM Index control module	02, 03	≥ 02	02, 03

Table 5: Switch position for CO

Measuring range:	0-150 ppm
S1/1	ON
S1/2	ON
S1/3	ON
S1/4	ON
S1/5	ON
S1/6	OFF
S1/7	OFF
S1/8	ON
E-PROM Index sensor head	12, 13, 14
E-PROM Index control module	≥ 02

Table 6: Switch position for HCl

Measuring range:	0-100 ppm
S1/1	OFF
S1/2	ON
S1/3	ON
S1/4	ON
S1/5	ON
S1/6	ON
S1/7	ON
S1/8	ON
E-PROM Index sensor head	19
E-PROM Index control module	≥ 02

Table 7: Switch position for ClO₂

Measuring range:	0-0,5 ppm
S1/1	OFF
S1/2	ON
S1/3	ON
S1/4	OFF
S1/5	ON
S1/6	ON
S1/7	ON
S1/8	ON
E-PROM Index sensor head	17
E-PROM Index control module	≥ 02

Table 8: Switch position for SO₂

Measuring range:	0-0,5 ppm
S1/1	OFF
S1/2	ON
S1/3	ON
S1/4	OFF
S1/5	ON
S1/6	ON
S1/7	ON
S1/8	ON
E-PROM Index sensor head	21
E-PROM Index control module	04

Table 9: Switch position for NO₂

Measuring range:	0-15 ppm
S1/1	ON
S1/2	ON
S1/3	ON
S1/4	ON
S1/5	ON
S1/6	ON
S1/7	ON
S1/8	ON
E-PROM Index sensor head	21
E-PROM Index control module	04

4. Compur Statox 4120 operation

4.1 Start - up

Connecting the Statox 4120 rack to mains (230 V/ 50 Hz or 115 V 60 Hz) activates the system.

- The green LED will be flashing until the initial data exchange with the sensor head has been finalised. It flashes also if the calibration box is connected.
- The green LED stays on as soon as the system is in the detection mode.

4.2 Alarm thresholds

A1: Push and hold button A1 for 5 s to obtain a display of the alarm threshold on the bar graph.

A2: Push and hold button A2 for 5 s to obtain a display of the alarm threshold on the bar graph.

4.3 Detection mode

The green SR LED is on and the actual measured value is displayed on the bar graph.

4.4 Self test of the system

Every 24 hours the entire system tests itself. During the test all LED`s are on and the bar graph displays full scale. The analog output goes to full scale. (How to avoid this see chapter 7 and 8). If an error is detected, the red LED SF goes on.

At temperatures below -20°C (-4°F) the self test can not be activated.

4.5 Manually triggered self test of the system

Push and hold button T for 2 s to initiate a self test.
The next self test will start automatically after 24 h.

4.6 System failure

As soon as the Statox detects a faulty system condition the LED SF goes on and relay SF is activated. This will be the case if:

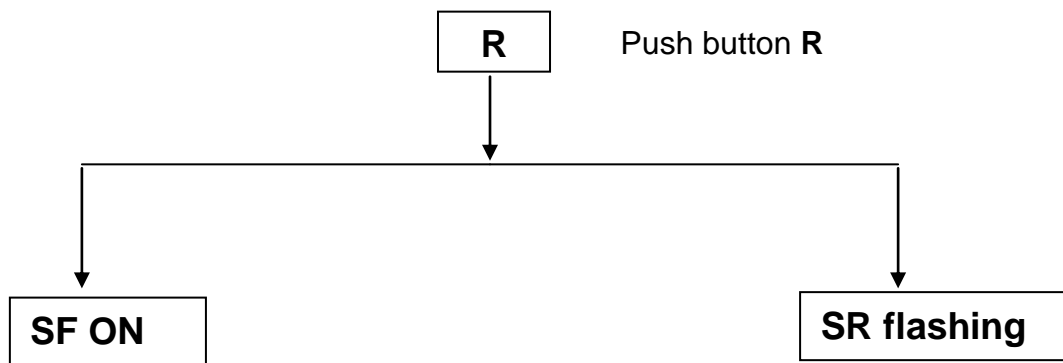
- Self test not passed
- Data transmission faulty
- No signal

5. Trouble shooting

As soon as the Statox detects a faulty system condition the LED SF goes on and relay SF is activated. To locate the problem follow this procedure:

Push the reset button **R** on the control module.

- If the green LED starts flashing now, there is a data transmission problem.
- If there is no reaction, there is a hardware problem in the sensor head (f. i. pump, sensor, gas generator, battery).
- Now push button **T** to initiate a new self test. If **SF** goes off, the system is now ready again. If **SF** stays on, the sensor head must be checked with the diagnostic box.



Connect diagnostic box to sensor head. Potential errors:

- Sensor defective
- Pump defective
- Battery defective
- Amplifier defective

Data transmission problem. Potential errors:

- Signal cable interrupted
- Wrong connection(SF goes on again after 4 min)
- Data transmission faulty
- Duty cycle needs adjustment

5.1 Using the diagnostic box

Switch the diagnostic box on. Then connect it to the opto- coupler receptacle on sensor head bottom. Keep the LED's and the phototransistors of the opto- coupler clean for proper data transmission.

5.1.1 Operation and error codes of the diagnostic box

Note: If a combination of push button operations is requested (f. i. ST + ENT), the buttons must be operated in a short time distance.

Example: ST + ENT initiates a self test. The display says „WAIT-TEST RUN“ until the self test is finished.

Diagnostic box queries:

Button	Display
M	Measured value in ppm
M + ENT	WAIT; after a while reading of actual measured value in ppm
RA	Sensor head measuring range
RA + ENT	Gas
ST	Status passed (System OK) or error message (see 5.1.2)
ST + ENT	(initiates self test), TEST Run
FKT	Calibration factor
ZERO + ENT *	ZERO RUN (start zero adjustment)

* only available with systems with zero adjustment

Diagnostic box error messages:

ERR INPU	⇒	Faulty or too slow input. Repeat.
ERR KONZ	⇒	Calibration gas concentration out of range.
ERR FACT	⇒	Calibration factor is out of range.
DS.W.POS	⇒	Measuring range or gas not correctly programmed.
WARN TIM	⇒	Time error during data transmission.
WARN DTE	⇒	Faulty data transmission.
WARN CHE	⇒	No self test due to too low temperature.
TEMP.OU	⇒	Temperature out of the admissible range.
TEMP.IN	⇒	Temperature is back in the admissible range.
CH.BATT (audible alarm)	⇒	Charge calibration box battery.
NO ZERO	⇒	Zero adjustment not possible. Wrong EPROM in sensor head and control module.
PUMP RUN	⇒	Sensor is flushed with air because the gas concentration is too high.
CAL END	⇒	Calibration routine has been cancelled with CE button.
NO CALIB	⇒	Calibration not possible within the time limit.

5.1.2 Status messages of the sensor head

Button **ST** scans the system status:

Code	Status and action required
Passed	⇒ System OK.
Error A1	⇒ Amplifier defective: Repeat adjustment or replace pcb.
Error B1	⇒ Check battery pack connection. Battery pack discharged or defective, replace. If battery pack discharges frequently, check charging circuit.
Error B2	⇒ Battery pack voltage drops under load.
Error PU	⇒ Pump energy consumption too high. Replace.
Error T2	⇒ Temperature is out of compensation range. Measured values are corrected with the end of range - value.
Error C1	⇒ Zero not found at start of self test (or sensor signal is too high for zero adjustment). - check filter cartridge: Fresh? Tight? - Filter cartridge gas intake at the bottom of the sensor head dirty - Filter cartridge exhausted - Dust filter dirty - Sensor too slow
Error C2	⇒ Zero not found at end of self test: Sensor too slow, replace.
Error C3	⇒ Test peak not achieved: - Sensor too slow - Sensor lost sensitivity - Gas generator expired - Sensor too slow - Pump defective - Filter cartridge polluted
Error C4	⇒ Zero not found at end of self test: - Sensor too slow, replace. - Filter cartridge polluted - Pump defective

Caution:

Disconnect the diagnostic box first and then switch it off. Don not forget to protect the opto - coupler with the plug. To preserve battery power, the diagnostic box display goes off after 2 minutes. Operate any key to switch it on again.

6. Maintenance and calibration

6.1 Inspection Statox 4120 Sensor head

The following maintenance intervals are general recommendations. Specific applications may request different intervals.

- Splash guard, visual inspection every 4 weeks
- Dust filter, visual inspection every 4 weeks
- Statox 4120 sensor, replace after expiration of the „best before“ – date (calendar week / year)
- Statox 4120 generator, replace after expiration of the „best before“ – date (calendar week / year)
- Filter cartridge replace after 6 months
- Water container visual inspection of liquid level every 6 months
- Battery pack, replace after 18 months

Information on sensor and generator labels:

- Serial No.
- Gas
- Current output at test gas concentration (sensor only)
- Test gas concentration (sensor only)
- Calibration factor (sensor only)
- Best before (week / year)
- Initial quality control personnel

Water container

Remove container. Fill level up to the marking. Non - foaming anti - freeze agents are OK to be used.

Statox 4120 dust filter

This filter protects the sensor from dirt. It must be in proper condition to allow the target gas to enter the sensor. It must be replaced whenever it is dirty.

Splash guard

The splash guard at the sensor head bottom protects the dust filter from particles and water. It is fastened with two screws.

Caution! The type plate must be next to the dust filter to allow gas access to the filter cartridge.

Sensor replacement

- Disconnect old sensor
- Remove tube and sensor by turning it sideward
- Replace dust filter
- Replace bearing
- Replace sensor
- Connect new tube
- Connect cable
- Proceed factor calibration, see 6.2.2

Filter cartridge replacement

- Remove tube
- Remove filter cartridge and bearing
- Clean air access opening
- Replace filter cartridge and bearing
- Replace tube

Generator cell replacement

- Disconnect generator cell, remove tube to pump
- Remove generator cell
- Replace generator cell
- Replace tube
- Connect generator cell

6.2 Sensor head calibration

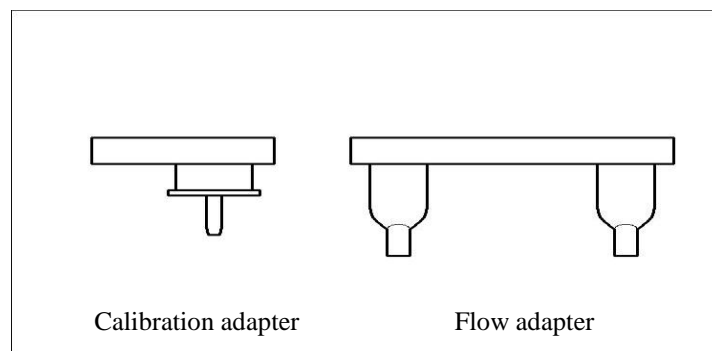
6.2.1 Using span gas

What you need:

- Span gas
- Regulator
- Flow meter
- Gas calibration adapter
- Gas tube (clean, dry, chemical resistant)
- Diagnostic box

Caution:

- The test gas adapter is not part of the ex-certified sensor head.
- The gas flow should be adjusted to 500 ml/min (30 l/h).
- Statox sensor heads working in the flow mode can be calibrated with the mounted flow adapter. Keep the working mode gas flow.



Compur Statox 4120

Procedure:

- Remove splash guard and replace it by test gas adapter.
- Connect span gas cylinder. **Do not open regulator yet!**
- Connect diagnostic box to sensor head.
➔ Reading diagnostic box: Red LED flashing; - "ready" – "x.xxx ppm"
- Push CAL button ➔ Reading diagnostic box: "CALIBR"
- Push ENT button ➔ Reading diagnostic box: "ppm = ?"
- Enter span gas concentration in ppm. ➔ Reading diagnostic box: ppm = „value“.
If you have entered a wrong value push button CE and repeat.
If you have entered an invalid concentration, the reading is "ERR KONZ": Push button CAL again and repeat.
- Now push button ENT ➔ Reading diagnostic box: "GAS ON!"
This is the last opportunity to abort the procedure!
- Open span gas regulator
- Push button ENT ➔ Reading diagnostic box: "WAIT"
Reading of a measured value after 2 minutes. ➔ Display diagnostic box: "x.xx ppm" (this not a calibration value yet).
- Wait 1 minute to obtain second measured value from sensor head. ➔ Reading diagnostic box: "x.xx ppm" (this not a calibration value yet).
- Wait 1 minute
This procedure will repeat until the difference between two measured values is within the specified range. Then the new calibration factor will be displayed for 10 seconds.
- Reading diagnostic box: "FKT = x.xx"; "GAS OFF!"
- Close span gas regulator
- Confirm gas is off by pushing ENT ➔ Display diagnostic box: "READY"
Disconnect diagnostic box and switch it off. Close receptacle for opto coupler with the plug. Mount splash guard.

6.2.2 Use ex – works calibration

Each sensor carries a calibration factor. This factor indicates how far its individual sensitivity differs from a theoretical value (=1). Values between 0.60 and 2.00 will be accepted by the system. The lower the factor, the higher its sensitivity. The sensor head microprocessor corrects the sensor signal with this factor to obtain the correct measured value.

Programming the calibration factor:

Action	Reading Diagnostic box
Switch diagnostic box on	
Connect diagnostic box to sensor head	Red LED flashing; READY-x.xxx ppm
Push FKT	FCT x.xx
Push FKT + ENT (no long break!)	FCT = ? ERR INPU
Enter factor If you have entered a wrong factor, push CE and repeat.	FCT = 1.20 (example) FCT = ?
Now push ENT twice immediately	Red LED flashing READY
Switch diagnostic box off, Factor will be transmitted.	
Disconnect diagnostic box	

7. The maintenance request option

Purpose:

This option can differentiate between fatal errors in the sensor head and maintenance requirements. It requires a Statox 4120 control module equipped with EPROM Index ≥ 03 . It also sets the analog output to 4 mA during the self test, if required.

Operation modes:

The Statox 4120 can operate in 9 different modes. The relevant mode can be seen by the control module LED`s and relays.

Operation mode Statox	Analog output	SR-LED Control module	SF-LED Control module	SF-Relay	MR-Relay	PCS-* Relay
● Self test	0mA / 4mA / 0V	„on“	„on“	active	passive	active
● Diagnostic box connected:	0mA / 4mA / 0V	flashing	„off“	active	passive	active
● Alarm threshold adjustment:	0mA / 4mA / 0V	„on“	„off“	active	passive	active
● Start-mode	4mA / 0V	flashing	„off“	active	passive	passive
● Detection mode:	Analog signal	„on“	„off“	active	passive	passive
● Maintenance request: B1 Battery Low B2 Battery low under load C1 Purge before test C2 Purge between test peaks C3 Sensitivity (programmable by S3) C4 Purge PU Pump current too high T2 Temperature out of specs	Analog signal	flashing	„off“	active	active	passive
● System failure: A1 Amplifier C3 Sensitivity (programmable by S3)	4mA / 0V	„off“	„on“	open	passive	passive
● Data transmission error	4mA/0V	„off“	„on“	open	passive	passive
● Power failure	0mA/0V	„off“	„off“	open	passive	passive

*(PCS=Process control system)

Error C3 (Too low sensitivity during self test):

S3/3 on the control module offers the option to choose if C3 shall be a maintenance request (position ON) or system failure (position OFF).

The system failure messages A1 and C3 (both defined as SF):

The sensor head still transmits measured values to the control module, but these measured values will not be displayed on the bar graph display nor be transmitted to the analog output. For safety reasons they will still be compared to the alarm thresholds and an alarm will be activated if they are exceeded. Also the sensor protection feature will be activated if the measuring range is exceeded.

Mounting the maintenance request pcb

Connect the the pcb to the 5 contact terminal on the Statox 4120 rack backplane. (see pic. 10). Shorting plugs program the analog output to 4-20 mA or 0-1V (see pic.12). Ex works setting is 4-20 mA.

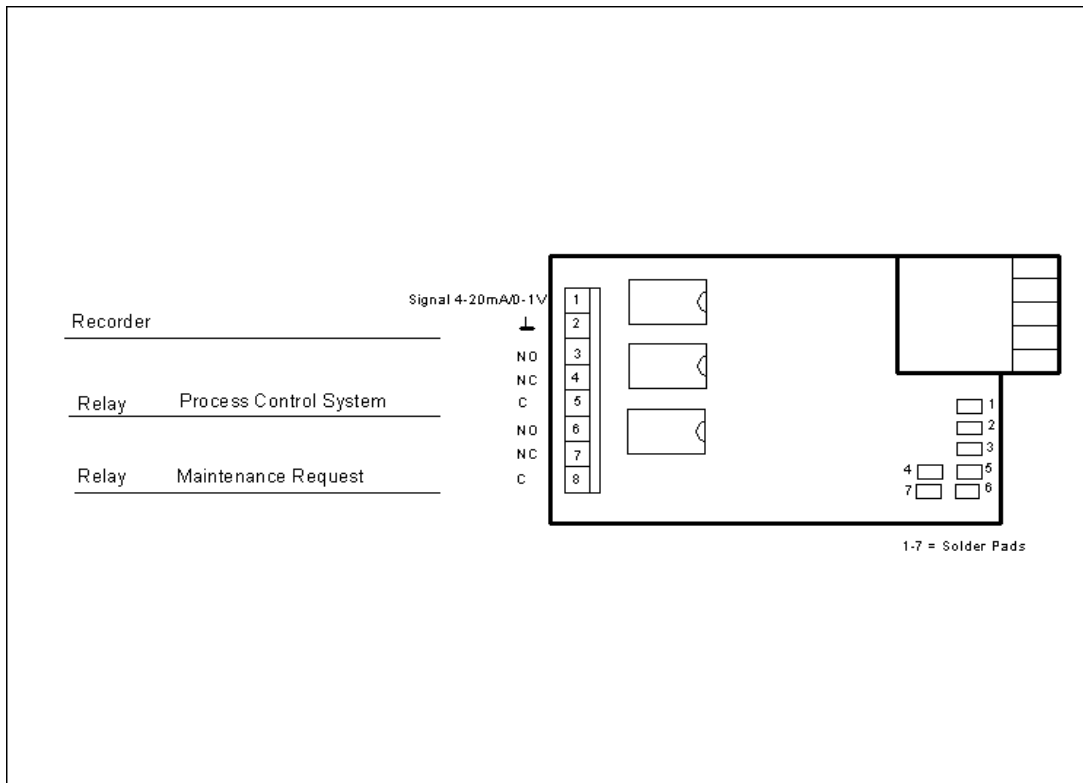
As an option the 4-20 mA output can be set to 0 mA during the self test, the alarm threshold programming and when the diagnostic box is connected (measured value not valid).

On the terminals 1 to 8 the relays MR and PCS as well as the analog signal can be accessed. The maximum load of the relays is 24V/100mA.

Service mode control module

Set the service switch on the control module (S3/7) to „OFF“ to simulate the mode „normal“, „WB“ and „PCS“. Select by the following keys:

Key	mode	Relay PCS	Relay WB	Analog signal	Reading
T	Detection mode	passive	passive	4 mA / 0V	0%
A1	Self test/Maintenance, Adjusting A1 und A2	active	passive	4 mA / 0V	50%
A2	Maintenance request	passive	active	20 mA / 0V	100%



pic.12: Electrical connections and short circuit contacts

Short circuit contacts on the maintenance request pcb:

Bridge	Analog 0-1V	Analog 4-20 mA	Analog 4(0)-20mA*
1		•	
2		•	•
3	•		
4		•	•
5	•		
6		•	•
7	•		

* Analog output 0 mA, if PCS-relay active, f. i. during self test, alarm threshold adjustment and if the diagnostic box is connected. In any other case 4-20 mA.

8. The option analog output inhibition

This option inhibits the analog output if the logic signal of the control module (see pic. 3, terminal 11) is set to 5 V instead of 0 V. This is the case if the system is unable to provide a valid measured value, for instance if:

- Alarm thresholds are adjusted or displayed
- During self test
- During the diagnostic box is connected
- During system start.

As soon as the sensor head provides the next valid data telegram, the analog output is activated again. This option will work with control module equipped with EPROM 02!

The analog output is programmed by solder straps. The terminals 23 and 24 provide an additional relay, closing when the analog signal is switched off.

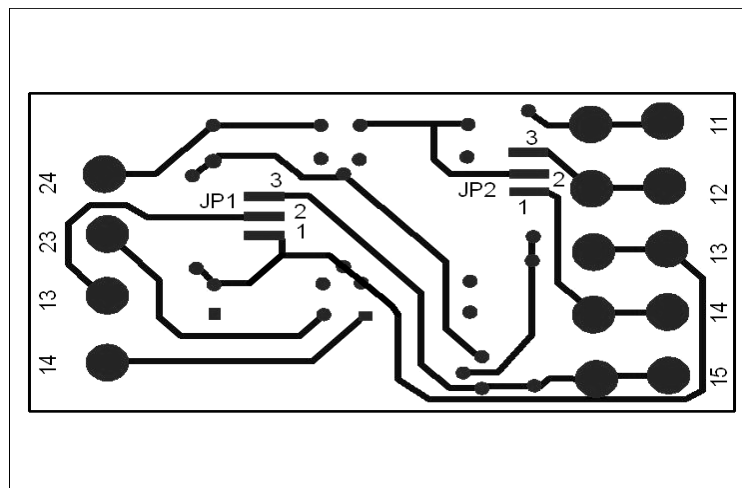


Abb. 13: Solder straps on the pcb analog output inhibitor

Analog	Terminal		Solder straps		Analog	
	13	14	JP1	JP2	23	24
4-20 mA	+	-	1-2	1-2	 NO	
0 – 1 V	Gnd	+	2-3	2-3		

9. The option zero adjustment

This option is available for COCl₂ sensor heads with measuring range 0.3 ppm only. The zero adjustment of the sensor is started via diagnostic box.

System requirements:

Sensor head EPROM index 18c, control module EPROM index 03a, diagnostic box EPROM index 02.

- A zero adjustment must only be done in clean air. It is started with the buttons ZERO + ENT. It should be done **before** starting a calibration.
- The set zero value is not visible.
- If no zero adjustment has been done ever, the default value is 0.
- After replacing a control module, a new zero setting has to be carried out. The zero value is stored in the control module and is transmitted to the sensor head.
- An error message C1 caused by a too high sensor zero current will only be cancelled after a successful self test.

10. Technical data

General:

Gas	Measuring range
Cl ₂	0-1.5 ppm, 0-3 ppm, 0-10 ppm
CO	0-150 ppm
COCl ₂	0-0.1 ppm, 0-0.3 ppm, 0-0.5 ppm, 0-1.5 ppm, 0-15 ppm, 0-100 ppm
HCN	0-15 ppm, 0-30 ppm, 0-50 ppm, 0-100 ppm
HCl	0-100 ppm
H ₂ S	0-30 ppm, 0-50 ppm, 0-100 ppm
ClO ₂	0-0.5 ppm
NO ₂	0-15 ppm
SO ₂	0-5 ppm

Accuracy at TLV: +/- 10 %
 Alarms: 2 adjustable alarm thresholds, system alarm
 RFI: CE conform
 Manufacturer: Compur Monitors, Munich

Sensor head:

Type: 5330 xxx (xxx: measuring range / gas)
 Weight: 1.9 kg
 Dimensions (mm, HxBxT): 180x300x180
 Operating temperature: -20 to +40 °C
 Storage temperature: -30 to +50°C
 Humidity: 20-95 % r.H. (not condensing)
 Pressure: 800-1200 hPa
 Protection class: IP53
 Approvals (div.countries): Cl₂, COCl₂, H₂S
 Explosion protection: EEx ib IIC T6
 Operating environment : II 2 G
 Operating voltage U_i: max. 22 VDC
 Operating current I_i: max. 50 mADC
 Internal capacity C_i: 55 nF
 Internal inductivity L_i: 0 mH

Control module:

Type:	5331 0x0 (115 / 230 VAC)
Operating temperature:	-20 to +40 °C
Storage temperature:	-30 to +60°C
Explosion protection :	[EEx ib] IIC
Operating environment:	II 2 G
power:	15 W per control module
Supply voltage:	115 / 230 VAC
Max. operating voltage U_o :	22 V DC
Max. operating current I_o :	50 mA DC
Max. external capacity C_o :	162 nF
Max. external inductivity L_o :	6.6 mH
Display:	Bargraph
Analog output:	4-20 mA / 400 Ω max. 0-1 V / $R_i = 1k \Omega$
Relays:	24 V 100 mA

Rack:

Type:	5332 xxx (xxx: ½ 19" and 19" , 115 / 230 V AC)
Explosion protection:	[EEx ib] IIC
Operating environment:	II 2 G
Dimensions (HxBxT)	½ x 19": 180x270x420 mm 19": 180x485x420 mm RFI : 180x485x505 mm

Diagnostic box:

Temperature range:	-20 to +40 °C
Weight:	0,9 kg
Dimensions (HxBxT)	50x190x160 mm
Explosion protection:	EEx ib IIC T6
Protection class:	IP30
Operation time:	max. 3 h
Charging time:	max. 14 h

11. Accessories and spare parts

Art. Nr.	STATOX 4120 ACCESSORIES
508885	STATOX Diagnostic box
518876	STATOX Diagnostic box charger 115 V
518850	STATOX Diagnostic box charger 230 V
509115	STATOX Control module service adapter
508588	STATOX Sensor head flow adapter
500223	STATOX Head Splash guard plug
500224	STATOX Head Calibration gas adapter plug
500225	STATOX Head plug adapter
508638	STATOX Sensor head rain shield
508539	STATOX Sensor head splash guard stainless
507283	STATOX Sensor head Splash guard PTFE
551869	STATOX Analog output inhibitor (for EPROM 02)
551703	STATOX Maintenance request (for EPROM ≥ 03)
561165	STATOX Upgrade COCl ₂ 0,1 ppm

Art.Nr.	STATOX 4120 SPARE PARTS
508950	STATOX Diagnostic box battery
508778	STATOX Diagnostic box Lpcb inkl.LED
508836	STATOX Diagnostic box opto- coupler
509000	STATOX Diagnostic box mould
508415	STATOX Diagnostic box EPROM "02"
553030	STATOX Control module EPROM "02"
551711	STATOX Control module EPROM "03"
508410	STATOX Control module EPROM "03a"
561207	STATOX Control module EPROM "04"
505550	STATOX Control module front plate incl.LED
505543	STATOX Control module pcb
821155	STATOX Control module quartz 1,0 MHZ
508075	STATOX Control module scale 3 PPM
508083	STATOX Control module scale 5 PPM
508067	STATOX Control module scale 10 PPM
507994	STATOX Control module scale 15 PPM
508000	STATOX Control module scale 30 PPM
508018	STATOX Control module scale 50 PPM
507978	STATOX Control module scale 0,3 PPM
508042	STATOX Control module scale 0,5 PPM
507986	STATOX Control module scale 1,5 PPM
508059	STATOX Control module scale 100 PPM
508091	STATOX Control module scale 150 PPM
561215	STATOX Control module scale 0,1 PPM
507820	STATOX Control module T1 power supply
507804	STATOX Control module T2 transducer
505931	STATOX Control module alarm relay
534295	STATOX Manual -D-

558435	STATOX Manual -E-
518330	STATOX Sensor head battery
506947	STATOX Sensor head bearing 236 mm
557874	STATOX Sensor head EPROM "12"
562197	STATOX Sensor head EPROM "13"
502052	STATOX Sensor head EPROM "14"
550700	STATOX Sensor head EPROM "15"
551695	STATOX Sensor head EPROM "17"
554483	STATOX Sensor head EPROM "18"
508413	STATOX Sensor head EPROM "18c"
558856	STATOX Sensor head EPROM "19"
561199	STATOX Sensor head EPROM "20"
562544	STATOX Sensor head EPROM "21"
506921	STATOX Sensor head mould upper part
506897	STATOX Sensor head mould bottom
551976	STATOX Sensor head hybrid A 525 -ICL 8022-
503845	STATOX Sensor head hybrid A 526 -ICL 8023-
577849	STATOX Sensor head pcb
505311	STATOX Sensor head plug opto coupler opening
507036	STATOX Sensor head water container
532828	STATOX TRITOX M pump

Art. Nr.	SENSORS & GENERATOR CELLS
507770	STATOX Generator cell ClO2
517084	STATOX Generator cell Cl2
532570	STATOX Generator cell COCl2
516961	STATOX Generator cell H2S/HCN/CO/HCl/SO2
562379	STATOX Generator cell NO2
538791	STATOX Sensor Cl2 10 PPM
516201	STATOX Sensor Cl2 1,5/3 PPM
507630	STATOX Sensor ClO2 0,5 PPM
516128	STATOX Sensor CO 150 PPM
533719	STATOX Sensor COCl2 15 PPM
531200	STATOX Sensor COCl2 1,5 PPM
516060	STATOX Sensor COCl2 0,3/0,5 PPM
551687	STATOX Sensor COCl2 100 PPM
560845	STATOX Sensor COCl2 0,1 PPM
516003	STATOX Sensor H2S 30/50/100 PPM
558849	STATOX Sensor HCl 100 PPM
562106	STATOX Sensor HCN 15 PPM
504918	STATOX Sensor HCN 100 PPM
516086	STATOX Sensor HCN 30/50 PPM
562361	STATOX Sensor NO2 15 PPM
562411	STATOX Sensor SO2 5 PPM

Declaration of Conformity

Compur Monitors GmbH & Co.KG

Weißenseestraße 101

D 81539 München

as the manufacturer hereby declares, that the

Sensor Head

Statox 4120 Type 5330

complies with the essential requirements of the following directives and has been tested according to European standards:

1. Directive **89/336/EC** ¹⁾

EN 50081-1

EN 55011

EN 50082-2

EN 55024

¹⁾ in connection with Statox 4120 plug in unit type 5331 0x0 and EMC-rack type 5332 200

2. Directive **94/9/EC**

EN 50014 : 1997+A1+A2

EN 50020 : 1994

EC Type Examination Certificate: DMT 02 ATEX E 216

Notified Body: DMT / 0158

Munich, 03-20-2003



Dr. H. Schmidt pott

Declaration of Conformity

Compur Monitors GmbH & Co.KG

Weißenseestraße 101

D 81539 München

as the manufacturer hereby declares, that the

Racks **Statox 4120 Type 5332 xxx**

and the Plug In Unit **Statox 4120 Type 5331 0x0**

complies with the essential requirements of the following directives and has been tested according to European standards:

3. Directive **89/336/EC** ¹⁾

EN 50081-1 EN 55011

EN 50082-2 EN 55024

¹⁾ in connection with Statox 4120 sensor head type 5330 and EMC-rack type 5332 200

4. Directive **94/9/EC**

EN 50014 : 1997+A1+A2

EN 50020 : 1994

EC Type Examination Certificate: DMT 02 ATEX E 238

Notified Body: DMT / 0158

5. Directive **73/23/EC**

EN 61010-1

Munich, 03-20-2003



Dr. H. Schmidtpott

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Compur Monitox plus

The portable gas warning system for toxic gases and oxygen



Reliability is everything

AsH₃
Cl₂
ClO₂
CO
COCl₂
HCl
HCN
H₂S
N₂H₄
NO₂
O₂
PH₃
SO₂
O₃

With decades of outstanding performance, this latest version of the Monitox is the best yet. The Monitox plus provides unmatched performance and value. It shows the actual gas concentration on a recessed LCD display and responds to hazardous concentrations within seconds giving an audible and a visual alarm.

The electrochemical sensors manufactured by Compur Monitors undergo strict quality control and calibration at TLV concentration. This assures best measurement technology and reliable alert.

Monitox plus is very small and lightweight. Its housing is made of sturdy, galvanized ABS, withstanding the harshest industrial environments. The chromium plated surface protects it from electromagnetic interference. Handling the Compur Monitox plus is quick and easy. Sensor replacement is a breeze since a plug-in socket sensor allows replacement without even opening the instrument.

A recessed button on the front side of the instrument allows easy access to a menu for automatic zero and calibration. Thus, even calibrations can be done without opening the instrument.

Two alarms can easily be set to any value within the measuring range of the instrument by push-button.

For added safety the Monitox plus features smart technology such as a „missing sensor-alarm” which detects if the electrical connection to the sensor has been damaged.

Despite all these advantages, the Monitox plus is inexpensive to purchase and maintain.

With the optional Compur gas generator a 100 % performance test can be done within 10 seconds, without a gas cylinder.

Your safety should be worth it.



Technical data	
Monitox	
Measuring range	typ. 0 – 10 * TLV, O ₂ : 1 – 35 %
Alarm thresholds	adjustable
Measuring principle	electrochemical
Accuracy	±10 %
Temperature of operation	-20°C to +40°C
Humidity	typ. 20 – 90 % r. H.
Power supply	Lithium batteries ca. 1000 h per set
Alarms	audible 80 dB(A), LED
Display	LCD four digit
Dimensions	115 x 62 x 24 mm
Weight	130 g
Protection	II 2 G EEx ib IIC T6
Generator	
Power supply	1 x 9 V Mallory for ca. 800 Tests
Dimensions	220 x 100 x 42 mm (H x W x D)
Weight	400 g

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New Gas Generator to check personal Gas Detectors A 100% Test in just 10 Seconds

Personnel working in chemical plants protect themselves with personal gas detectors from gas exposure. Gas leaks are very unlikely to occur, so the gas detector will always display „0“.

An instrument displaying zero can do so for two reasons:

- a) The concentration is zero.
- b) The instrument is defective.

For good reasons a daily check of the instrument is mandatory. It would be too time consuming to perform a complete calibration every day. Regulations allow calibration intervals of up to six months.

The daily functional test with the gas generator makes sure that no instrument failure caused by abuse or wear and tear will go unnoticed. To perform a test it is sufficient to expose the sensor to a short puff of gas and see if the instrument gives an alarm. To make this test as fast, easy and cheap as possible, no accurate gas concentration is used, but approximately twice the value of the alarm threshold.

The quality criterion for the detector is not reaching a certain value, but the response time: A good sensor is also a fast sensor. So the gas generator stops gas generation after 10 seconds automatically. If the detector fails to alarm within this time interval it is not safe to be used. Thus the generator test reliably indicates the following potential errors:

- Defective electronics
- Alarm buzzer or lamp defective
- Sensor defective
- Sensor too slow
- Sensor not sensitive enough

Compur Monitors introduces a new gas generator model with the following features:

The flow of the built-in pump is adjusted to perfectly simulate the operating conditions of the gas detector.

The gas generator itself consists of an electrochemical cell filled with an electrolyte paste. This cell will only generate gas when it is activated by putting a gas detector on the receptacle.

The amount of gas produced when activated is very small. Therefore no restrictions regarding transportation and storage of the gas generator apply.

The gas generator is very easy to use. The gas detector operates a switch when put onto the receptacle. Gas production stops automatically after 10 seconds, or if the detector is removed.

The new test gas generator is compatible to Monitox, Monitox plus Minitox, Dositox and Tracer. It will replace the well known model 4100.

With this new product Compur Monitors contributes to safe operation of gas detectors.



Compur Monitors gas generator. The gas detector must be positioned into the red receptacle. Red and green LED's indicate the status of operation.

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Tracer

Leak Detector for Gases in the ppb – and ppm Range



Tracer – Leak detection in the ppb range

Application

The Tracer has its strength where other methods of leak detection would fail because of their cross sensitivities to other gases. Such selectivity is requested in plants using or producing extremely toxic substances. These plants always have a „Zero Emission Policy“ in force. Here high sensitivity in combination with good selectivity is required.

Sensor technology

Electrochemical sensors can be designed to be very selective and sensitive at the same time by the right material choice for electrodes and electrolyte. These sensors will not respond to less dangerous substances that might be around in the plant such as hydrocarbons, carbon monoxide, hydrogen or even humidity. A detection limit as low as 2 ppb is no problem for this sensor technology!

A disadvantage of electrochemical sensors compared to physical methods has been their comparatively slow response. The working electrode must transform analyte to confer a response – and this takes its time.

Tests in Compur's laboratories have shown that the material transformation process at the working electrode can be speeded up by increased mass transfer of analyte to sensing surface compared to gas access by diffusion. It was a short step from there to develop an instrument with a built-in pump and a special measuring chamber with optimized flow characteristics. In this way the response time of the instrument is almost as short as would be obtained with a physical detection method.

Which gases can be detected with the Tracer?

The Tracer is available for the following gases:
COCl₂, HCN, HCl, Cl₂, NO₂, ClO₂ and H₂S.

The Tracer is capable to detect even traces of toxic gases. The detection limit is in the low ppb range depending on the substance to be detected. As a leak detector might be exposed to very high concentrations, it must not be used as a personal monitor. To avoid it being abused as such, the detector displays no concentration, but only a dimensionless figure or a bar graph.

The "HIGH- Range" Tracer

Some applications such as leak detection in containments or analyser cabinets do not require an ultra- low measuring range. For these your Tracer can be converted to the high – range version by just replacing the low by the high range sensor. This can be done in minute – no tools and no adjustment required.

Using the Tracer

To locate a leak, move the sample intake along the surface to be inspected. The measured value will increase when a leak is approached. The display can be selected between bar graph and digital. A control tone and LED will increase in frequency with mounting measured value similar to a Geiger counter.

The Tracer will protect itself from poisoning. If the measured value goes out of range the pump will go off and start again when it drops below 95% of the range.

The graphic display is easy to read. At night or in dark places in the plant a backlight can be switched on.

Consumables such as sensor, filter or sampling probe can easily be replaced without tools.

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Technical Data

Product name	COMPUR Tracer
Type	5910 100
Measuring principle	electrochemical
Response time	≤ 2 s
Operating temperature	-20°C to +40°C -4°F to 104°F
Storage temperature	short term to +60°C/140°F -25°C to +40°C -13°F to 104°F short term to +60°C/140°F
Humidity	0 - 99% r.H., non condensing
Flow	200 ml/min
Battery	4 x AA Alkaline battery
Operating time	48 hours
Power	20 mA - with backlight on: 140 mA
Dimensions (LxWxD)	450 x 60 x 50mm 17,7 x 2,4 x 1,9 in
Weight	0,55 kg / 19,4 oz
Housing material	conductive PP
EMV: EN 61326:1997 (+A1/A2)	Emission threshold B and general impact protection

ATEX-Version with NiMH battery

Ex approval	EEx ia IIC T4
Scope of application	II 2 G
Certificate	BASEEFA 03 ATEX 0742
Battery	NiMH
Operating time	2 hours
Charger	IN: 100-240 VAC OUT: 9 VDC





Potravinářský průmysl
Farmaceutický průmysl
Biotechnologie
Petrochemie
Chemický průmysl
Energetika
Úprava vody
Papírenství a zpracování celulózy
Plynárenský průmysl
Keramický průmysl
Zpracovatelský průmysl



Firma s tradicí od r. 1990 se při svém vzniku zaměřila na dodávky základních komponent, přístrojové a měřicí techniky a dodávky technologií pro farmaceutický a potravinářský průmysl. Cílem bylo zajistit kompletní dodavatelsko - inženýrské služby, včetně servisu. V roce 1998, který byl pro firmu velmi významným mezníkem, proběhla transformace společnosti do nynější formy. V dalších letech činnosti společnosti dochází k rozšíření portfolia a je navazována spolupráce s partnery v oblasti armatur, komponent, ventilů, procesní měřicí techniky a čerpadel.

Oblastí působnosti je potravinářský, farmaceutický průmysl, biotechnologie, chemický průmysl, petrochemie, úprava vody, papírenství a celulóza, energetika, keramický průmysl a zpracovatelský průmysl.

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