

Stattox 501 PID Sensor Head

no ATEX



Stattox 501 PID Sensor Head

Operation Instructions

1	SAFETY ADVICE	3
2	INTRODUCTION	3
2.1	Measuring principle	3
2.2	Operation mode	3
2.3	Different models	4
3	DRILLING PLAN, DIMENSIONS, CONSTRUCTION, SCOPE OF DELIVERY	4
4	INSTALLATION AND ELECTRICAL CONNECTION	5
4.1	Caution	5
4.2	Installation	5
4.3	Electrical connection	5
5	START UP AND MEASURING MODE	6
6	CALIBRATION WITH GAS	7
7	TROUBLESHOOTING	8
8	MAINTENANCE / REPLACEMENT OF CONSUMABLES	8
8.1	Lamp cleaning / replacement of consumables	9
8.1.1	Removing the sensor	9
8.1.2	Polishing the lamp	10
8.1.3	Electrode stack and lamp replacement	10
8.1.4	Assembly and installation of the sensor	10
8.2	Sensor replacement	11
8.3	Replacing the filter membrane inside the sensor protection cap	11
8.4	Maintenance and cleaning of the sensor head housing	11
9	SPARE PARTS AND ACCESSORIES	12
10	TECHNICAL DATA	12
11	DECLARATION OF CONFORMITY	13

1 Safety advice

The following safety guidelines must be observed in particular:

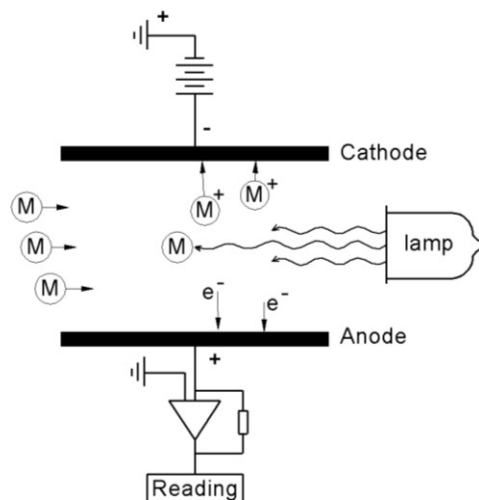
- Read and observe this manual.
- This Statox 501 PID version is not safe to be used in explosive areas!
- Please observe precautions for handling electrostatic sensitive devices during sensor replacement.
- The interface is exclusively designed to operate MiniPID sensors with unfilled solder well. For details see chapter 10: Technical Data.
- The retaining nut must be fastened at all time. It may only be removed for sensor replacement or maintenance.
- While connecting the sensor head to the signal cable, power must be off.
- The sensor head may only be operated within the specified environmental conditions.
- Damaged or not tightly closed housings may cause malfunction or loss of accuracy.

2 Introduction

The intended use is the measurement of VOC (Volatile Organic Compounds).

2.1 Measuring principle

The target gas passes a membrane and enters the measuring chamber, where it is ionized by a high – energy UV lamp. This produces ions, which are discharged at the electrodes. The discharge current produced depends on the number of molecules entering, i.e. the concentration.



A PID will detect all substances with an ionization potential smaller than < 10.6 eV. Non detectable, and also not interfering are O_2 , N_2 , CO , CO_2 and CH_4 . Very high humidity will quench the signal.

For calibration use Isobutene as reference gas (see chapter 6).

2.2 Operation mode

The Statox 501 PID sensor head operates in the diffusion mode.

If you want to operate the Statox 501 PID in the flow mode, please contact your Compur Monitors expert.

2.3 Different models

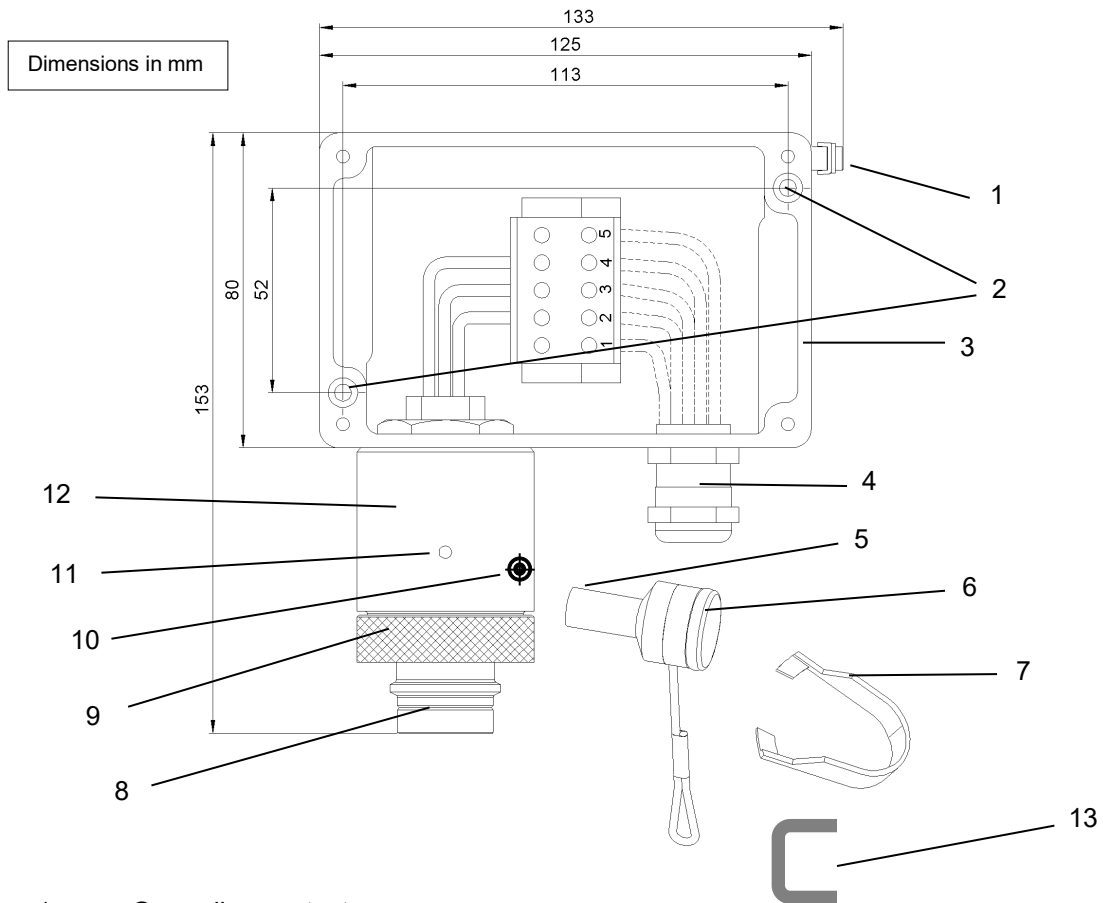
The parameters of the Statox 501 PID interface are set ex works to the requirements of your application. Target gas and measuring range are hardware programmed and noted on the type plate.

The sensor type is labeled on the sensor:

PID-A1 or MP3SM6FC = ppm Sensor, PID-AH or MP3SB6FC = ppb Sensor.

It is important to know which sensor type is in use, in case you need to order spare parts or consumables (see chapter 9).

3 Drilling plan, dimensions, construction, scope of delivery



- | | |
|----|---|
| 1 | Grounding contact |
| 2 | Mounting drill holes for Φ 4 mm bolts |
| 3 | Aluminum housing |
| 4 | Cable gland for cable Φ 6-11 mm |
| 5 | Magnetic pin |
| 6 | Blind plug |
| 7 | Plastic tool to open sensor |
| 8 | Sensor protection cap with gas access through filter membrane |
| 9 | Nut holding the protection cap |
| 10 | Hall sensor, contact area for the magnetic pin |
| 11 | LED |
| 12 | Interface |
| 13 | 2 bridges for 3-wire operation (to be installed on the Statox Control Module) |

Function of the blind plug:

- The thinner end is a magnetic pin, triggering the internal hall sensor. Hold it close to the contact area on the interface housing to enter the calibration routine.
- The bigger end can be used to seal the sensor head, once the sensor has been removed for service.

4 Installation and electrical connection

4.1 Caution

The sensor head must be protected from mechanical damage and from ambient conditions outside its specifications. Mount it to the wall at a location where it is easily accessible for service.

Place the sensor head close to potential gas leaks considering the specific gravity of the target gas, when selecting the installation level.

Position: gas access downwards (+ / - 15°).

Use a shielded cable to transmit the signal to the Statox 501 control module. The sensor head housing must be grounded. Observe local regulations for electrical installations.

4.2 Installation

The housing has two pocket holes for wall installation. You need two screws Ø 4mm.

4.3 Electrical connection

Recommended cable: 3 x or 5 x $\geq 0,75 \text{ mm}^2$, with dense-mashed shield. Outer diameter ca. 6 mm (e.g. type Oelflex 415 CP3 X 0.75).

The Statox 501 PID sensor head can be operated in the 3-wire or 5-wire mode.

Select **3-wire mode** if the electrical resistance of the cable loop is $< 5 \Omega$.

Select **5-wire mode** if the electrical resistance of the cable loop is $\geq 5 \Omega$. In this mode the two additional „sense“ leads measure the voltage directly on the sensor head and the control module compensates for the voltage drop in the cable.

If there are high potential differences in your plant, ground the shield only on the Control Module side.

The Statox 501 PID needs a Statox 502 or 503 Control Module for operation. Select the appropriate program prior to connecting the sensor head (if the couple sensor head / control module does not have an ex-works calibration).

For this purpose, observe the manual of the control module and the corresponding program listing (programs 80 - 83).

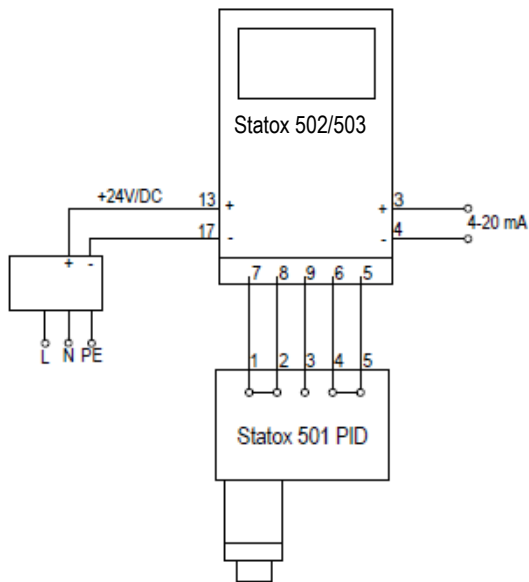
Selecting the wrong program might destroy the sensor or cause malfunction!

If you have purchased an ex-works calibration sensor head plus control module, the devices are labeled as calibrated pairwise. In this case do not change the program of the control module! Otherwise, the calibration parameters will be lost! Ex-works-calibrated components do have labels with all relevant information on them.

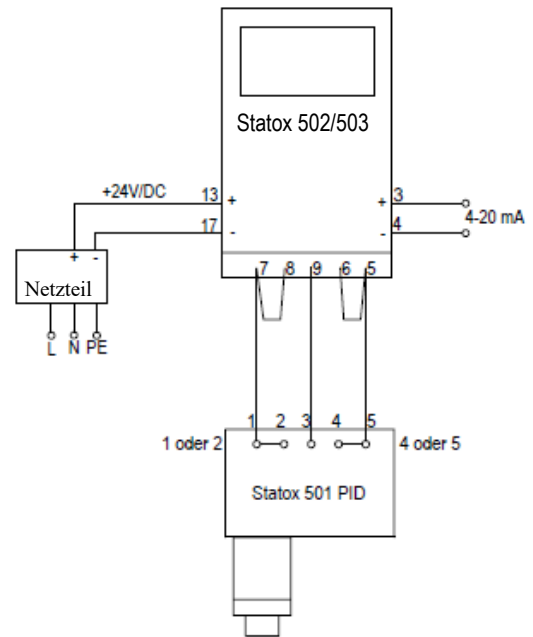
If you want to form group alarms, you can operate a Statox 502/503 control module in the common alarm mode. For more information read the manual of the control module.

Connecting the interface:

Terminal	Wire	Assignment
4 or 5	blue	Power supply -
3	black	Signal
1 or 2	red	Power supply +



5-wire mode



3-wire mode

Electrical connections for Stattox 501 PID sensor heads to Stattox 502/503 control modules. Faulty connection may destroy the interface!

5 Start up and measuring mode

- When connected to power, the LED is flashing green / red alternatingly.
- Steady green light indicates the sensor head is in the measuring mode.
- After start up, allow 30 min warm up time. Then perform a calibration. The calibration can be neglected if an ex-works calibration sensor head and its control module has been purchased. In this case the devices are labeled pairwise.
- To enter or exit the calibration mode hold the magnetic pin on to the contact area on the type plate.
- **After any change of program or change of control module a calibration is mandatory.**

Different modes of operation:

LED	mode	Control Module display	activity
LED flashing green / red alternatingly	initial phase	First PLEASE WAIT, then actual concentration	---
green	measuring mode	actual concentration	---
flashing green	calibration mode	see Control Module manual	calibrate or return to measuring mode
short red flash, then off	Error: sensor defective or missing	Er 5	see chapter 7
off	Error: power supply voltage too low	Er 5	see chapter 7
LED flashing green / red alternatingly longer than 1 minute	Error: wrong program or voltage too low	actual concentration	check program and wiring

6 Calibration with gas

A calibration can only be performed together with a Statox 502 or 503 Control Module (linecalibration). After an ex-works linecalibration, the mated devices are labeled pairwise.

A calibration is required

- after installation (other than ex-works line calibration)
- after replacement of the control module
- after changing the program
- after sensor replacement
- in time intervals as required by local regulations.

Before calibrating, allow 30 min warm up time.

Calibration to liquid substances in the field is labor intensive and prone to error. Use Isobutene as reference gas and apply the response factors (noted on the type plate) provided by Compur Monitors. The tools required for calibration are: span gas in appropriate concentration, a regulator and a gas adapter.

The interface will accept set points between 10 and 100 % of the end of scale value.

To achieve best accuracy Compur Monitors recommends to calibrate at the desired alarm threshold value. Calculate the most suitable span gas concentration with this formula:

$$C_{\text{Isobutene}} = \frac{\text{Alarm threshold}}{\text{Response factor}}$$

Example: Measuring range 0 - 1000 ppm methyl methacrylate, Response factor = 1,6

minimal Isobutene concentration: $100 \text{ ppm} / 1,6 = 62,5 \text{ ppm Isobutene}$
maximum Isobutene concentration : $1000 \text{ ppm} / 1,6 = 625 \text{ ppm Isobutene}$

Procedure:

- Hold the magnetic pin on to the contact area to start the calibration routine. The green LED will start flashing. If there is no further activity, the sensor head will automatically return to the measuring mode after 30 minutes.
- Enter the menu "CALIB. ROUTINE" on the Control Module. Adjust zero.
- Connect the gas tube to one of the fittings of the gas adapter. If you want to avoid gas emissions, you may connect an active carbon filter to the outlet. (Art.no. 806 488) Do not bend or twist the tube to avoid overpressure in the gas adapter.
- As soon as the Control Module displays „APPLY SPAN GAS“, connect the gas adapter to the sensor and open the valve. Press „Enter“. The recommend flow is 20 l/h (300 ml/min).
- As soon as „CALIB. FINISHED“ is displayed, press „Enter“ again.
- Now enter the product of span gas concentration multiplied by the response factor.

Example: Calibration to methyl methacrylate with 100 ppm Isobutene.
You have to enter $100 \text{ ppm} * 1,6 = 160$ (The response factor of methyl methacrylate is 1,6)

In case the sensor signal is too low, you will get the message „GAS CONC ERROR“ or „CALIBR. FAILED“ on the Control Module. Proceed as described in the next chapter.

- Remove the gas adapter and switch the gas off.
- Leave the calibration menu on the Control Module.
- Touch the contact area on the PID with the magnetic pin to enter the measuring mode. The LED should be green then.

7 Troubleshooting

The LED going off and the Control Module displaying Err 5, may have the following reasons:

- Sensor missing
- Incorrect wiring
- The voltage at the terminals 1/2 and 4/5 is < 4.6 V. Check the program.
- Sensor defective
- Interface defective.

If calibration is not possible (Control Module displays “GAS CONC ERROR” or “CALIBR. FAILED” after entering the gas concentration), **follow this procedure:**

- Check if there is enough gas in the cylinder. Is the regulator open? Is the tube free?
- Check the filter membrane for proper gas access.
- Polish the sensor lamp (see 8.1).
- Replace the lamp (see 8.1).
- Replace the electrode pack (see 8.1).
- Check the voltage at the terminals 1/2 and 4/5. It must be > 4.6 V.
- Replace the sensor (see 8.2).

If all this does not help, call Compur Monitors technical service.

8 Maintenance / Replacement of consumables

A PID sensor will gradually lose sensitivity over time. This process depends on the ambient conditions and the target gas. Therefore, regular calibration, lamp cleaning and replacement of consumables is necessary to guarantee accurate measurement. Compur Monitors recommends to hold stock of consumables.

Terms of warranty

PID sensor electronics: 12 months after delivery date. The delivery date is declared as “QC week/year” on the sensor label.

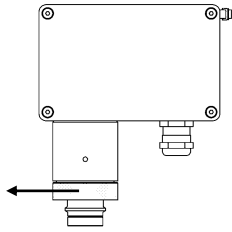
No warranty on consumables such as sensor lamps and electrodes.

Observe the general precautions for handling electrostatic voltage sensitive electronic components and breakable glass.

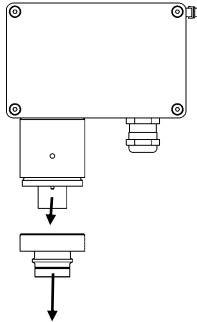
It is safe to install and remove the sensor while the sensor head is connected to the control module.

8.1 Lamp cleaning / replacement of consumables

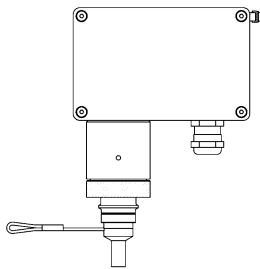
8.1.1 Removing the sensor



Open the retaining nut counter clockwise until you can remove it, by pulling it downwards.



Unplug the sensor pulling it downwards. Work on the sensor should be performed in a clean environment.



Protect the sensor slot by re-installing the retaining nut (see chapter 8.1.4) and closing it with the blind plug.



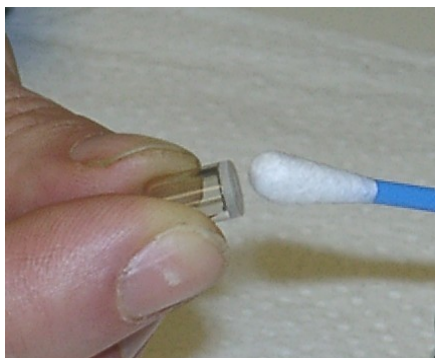
Place the sensor on clean soft cloth, pins upward.

Insert the plastic pliers into the two ports on the sensor and press until you hear a click.



Carefully lift the sensor. If the electrode stack and lamp do not come loose easily, apply the pliers again.

8.1.2 Polishing the lamp



Pull the lamp carefully out of the electrode stack. Never touch its polished front side.

Polish the front side with a cotton swap and the polishing powder. Apply tender pressure until you hear a silent squeak. Remove loose polish particles with a fresh swap until the lamp front is absolutely clean.

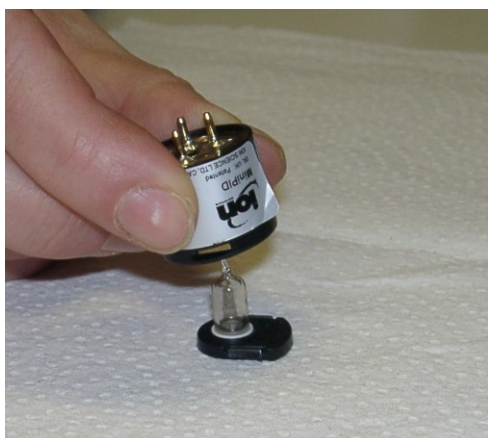
8.1.3 Electrode stack and lamp replacement

- Make sure to select the correct spare parts (ppm- or ppb-version)!
The ppb - electrode stack is white, the ppm - electrode stack is blue.
- Do not touch the front side of the lamp or the metallic parts of the electrodes.

8.1.4 Assembly and installation of the sensor



Push the lamp slightly rotating into the O - ring up to the stop.
The lamp must flush with the electrode.

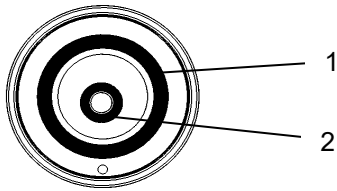


Place the electrode stack with the lamps front side downwards on the table. Now place the sensor on it. Make sure the two parts match in correct position.

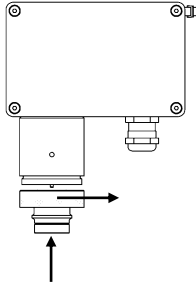
Push the sensor downwards until the springs snap in.

Check for tight and flushing assembly.

The sensor is now ready to be connected to the interface.



Installation of the sensor protection cap: The O-Rings (1+2) must be properly positioned in their seats on the sensor protection cap.



Take the sensor protection cap in one hand, make the positioning pin of the interface match its rest in the cap, press it upwards and tighten the nut hand tight.

Incorrect positioning may affect the sensors protection from dirt and humidity!

- To restart the sensor head, push the „Enter“ - button on the Control Module.
- After any opening of the sensor, a calibration is mandatory.

8.2 Sensor replacement

Observe the general precautions for handling electrostatic voltage sensitive electronic components!

- Make sure to select the correct spare parts. The sensor article codes are marked on its type plate: PID-A1 or MP3SM6FC = ppm sensor, PID-AH or MP3SB6FC = ppb sensor.
- Observe chapter 8.1.1 and 8.1.4 for removing or installing the sensor.

8.3 Replacing the filter membrane inside the sensor protection cap

- The gas access opening is protected from dust and humidity intrusion by a Teflon membrane. Whenever the membrane has been damaged or polluted, it must be replaced. (Art. No. 511206).
- Remove the clamping ring using a small screw driver. Install a new membrane and clamp ring by pressing both in their position.

8.4 Maintenance and cleaning of the sensor head housing

- Clean the sensor head with a damp cloth. Do not use detergents or solvents. No high pressure cleaning!
- Perform visual inspections on a regular basis. Check the gas access for pollution and damage.

9 Spare parts and accessories

Description	Article number
STATOX 501 Sensor head PID flow adapter	511101
STATOX 501 Spare sensor PID ppm	511214
STATOX 501 Spare sensor PID ppb	511215
STATOX 501 Sensor head PID interface (no Atex)	511001
STATOX 501 Sensor head PID sensor blind plug	511205
STATOX 501 Sensor head PID filter set	511206
STATOX 501 Sensor PID spare lamp	511218
STATOX 501 Sensor PID spare electrodes ppm	511223
STATOX 501 Sensor PID spare electrodes ppb	511224
STATOX 501 Sensor PID polishing set	511207
Statox 502 Control Module	557000
Statox 503 Control Module	555500
Span gas 58l Isobutene 10 ppm in air	556508
Span gas 58l Isobutene 100 ppm in air	569406
Calgas 58l regulator 715 flow = 300 ml/min	556637
Gas tube 1 m	556710
Active carbon filter	806488

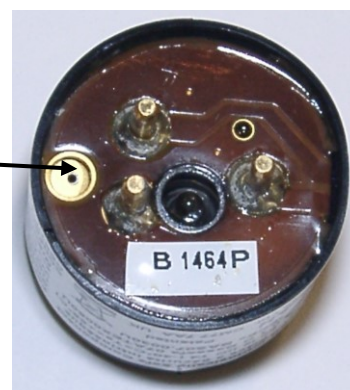
10 Technical data

- Instrument: Statox 501 PID Sensor head no Atex
- Type: 5366
- Manufacturer: COMPUR Monitors GmbH & Co. KG, D-81539 München
- Power supply: 5.2 V DC
- Max. current: 50 mA, start - up current 150 mA for max. 0,3 s
- Operation temperature: -30° - +60°C
- Protection class: min. IP54
- Humidity: 0-95 %, non condensing
- Accuracy at the calibration concentration: $\pm 10 \%$ at constant temperature and humidity

Use exclusively the following MiniPID sensors:

- MiniPID Reg. MP3SM6FC
- MiniPID Reg. MP3SB6FC
- MiniPID-A1
- MiniPID-AH

This solder well must be free from solder !



Signal interferences

- **Pressure:** Ambient pressure variations are neglectible. In the flow mode calibration under flow conditions is recommended.
- **Temperature:** Variations within specifications are neglectible.
- **Absolute humidity:** Humidity itself is not detected, but it may quench the signal.
- **Gas concentration:** Very high concentrations may partly absorb ionization energy and thus also quench the signal. Calibration at the alarm threshold will guaranty maximum accuracy.

11 Declaration of Conformity

**EU- KONFORMITÄT SERKLÄRUNG
EU-DECLARATION OF CONFORMITY
UE-DÉCLARATION DE CONFORMITÉ**

COMPUR
Monitors

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

erklärt in alleiniger Verantwortung, dass das Produkt
hereby declares in sole responsibility, that the product
déclare comme seul responsable, que le produit

**Messkopf Statox 501 PID no Atex, Typ 5366
Sensor Head Statox 501 PID no Atex, type 5366
Tête de détection Statox 501 PID no Atex, type 5366**

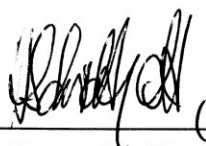
den folgenden EU-Richtlinien und den entsprechenden harmonisierten Normen entspricht.
complies with the following EU directives and corresponding harmonized standards.
correspond aux directives européennes suivantes et à leurs normes harmonisées.

Richtlinie/Directive 2014/30/EU

EN 50270:2015 (Typ 2 / type 2)

(in Verbindung mit / in connection with / en combinaison avec: Statox 501/502/503 Control Modul)

München, 29. 03. 2018
Munich, 2018-03-29



Dr. Hermann Schmidpott, Geschäftsführer

COMPUR Monitors GmbH & Co.KG
Postfach 900147
D-81501 München
DIN EN ISO 9001:2008 zertifiziert

Tel. Nr. ++49 89 62038268
Internet <http://www.compur.com>
E-mail: compur@compur.de

Geschäftsführer:
Dipl.-Ing. Bernd Rist
Dr. Hermann Schmidpott

Specifications are subject to change without notice, and are provided only for comparison of products. The conditions under which our products are used, are beyond our control. Therefore, the user must fully test our products and / or information to determine suitability for any intended use, application, condition or situation. All information is given without warranty or guarantee. Compur Monitors disclaims any liability, negligence or otherwise, incurred in connection with the use of the products and information. Any statement or recommendation not contained herein is unauthorized and shall not bind Compur Monitors. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or device or its use. No licence is implied or in fact granted under the claims of any patent. Instruments are manufactured by Compur Monitors GmbH & Co. KG, Munich.

The General Conditions of Supply and Service of Compur Monitors GmbH & Co. KG, Munich, are applicable.

COMPUR
Monitors

Compur Monitors GmbH & Co. KG
Weißenseestraße 101
D-81539 München
Tel.: ++49/89/ 6 20 38 268
Fax : ++49/89/ 6 20 38 184
<http://www.compur.com>
E-Mail: compur@compur.de