Getting started with the Statox 502 Control Module

1 Safety notes

- Read and observe this manual prior to installation and start-up.
- The Statox 502 Control Module must not be operated out of the specified ambient conditions (see Technical Data). In particular, it must not be operated in potentially explosive atmosphere!
- The Statox 502 Control Module must exclusively be operated, maintained and repaired by trained and authorized personnel. Use only Compur Monitors original parts for repair and maintenance.
- Do not connect the module directly to mains!
- Do not modify the product. Do not use if damaged or incomplete.
- When installing this product observe all local standards and regulations.
- Disregarding of the above instructions may cause danger to people and property.
- **Detailed manuals in several languages are available on our homepage www.compur.com**

2 Product description

The Statox 502 Control Module works together with 4-20 mA transmitters and the complete line of Statox 501 sensor heads. It provides a 4-20 mA analog output, 3 alarm relays, a display and LEDs for visible alarms. It can also be operated as Common Alarm Module to collect alarm signals via communication bus.

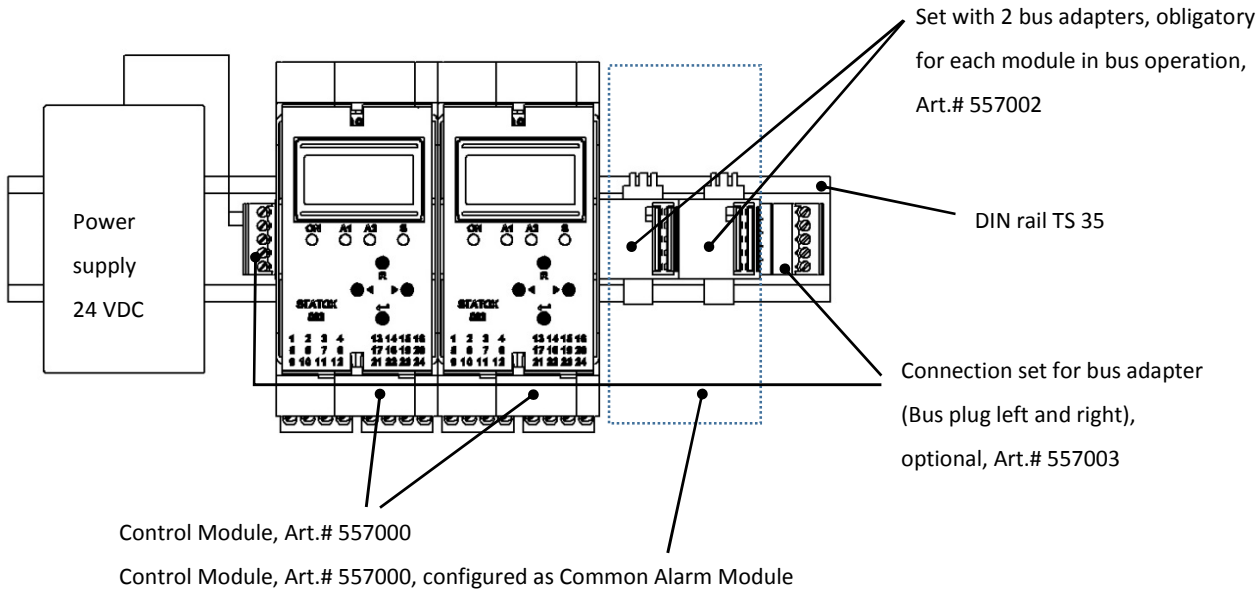


Figure 1: Requirements for bus operation, sample installation

3 Mounting and Dismounting

The Control Module can be operated without bus adapter, they will be mounted on the DIN rail as shown in figure 2. In this case every single module must be powered with 24 VDC.

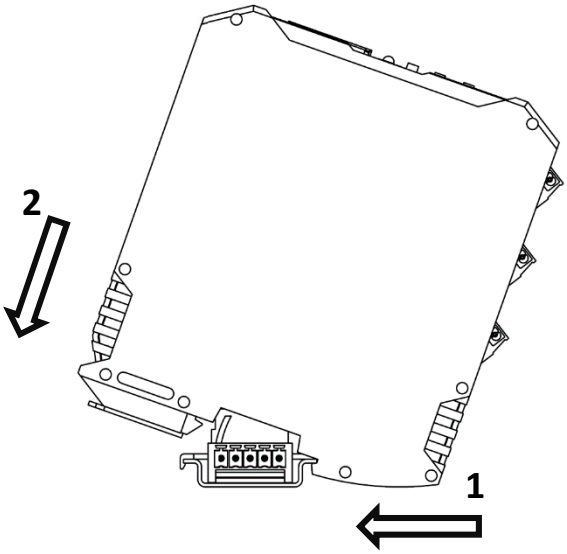


Figure 2: Mounting to DIN rail

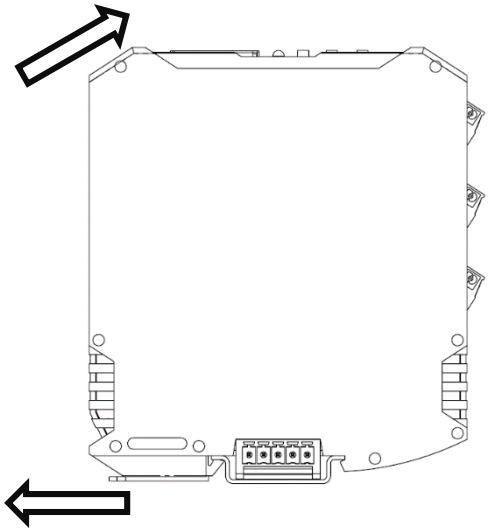


Figure 3: Dismounting from DIN rail

4 Connecting to power supply

Do not connect the module directly to mains! Do not short circuit terminals!
Both can destroy the module!

There are two options connecting the **24 VDC** power supply: via bus plug to the communication bus or directly to the relevant Statox 502 Control Module terminal. In both cases all subsequent modules are automatically connected to the power supply via bus. The terminals are rated to take a max. diameter of 2,5 mm^2.

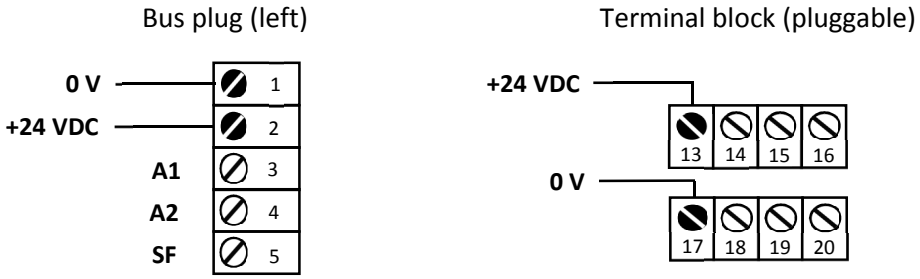


Figure 4: Connecting the power supply

After connection to power, the green LED is on. During the starting process the module displays the firmware version, then for 5 seconds the actual measuring program, then “PLEASE WAIT”.

5 Main menu structure

Push ◄- and ► -button together for 2 s. Select each digit of the password **1994** with the arrow keys and confirm with ENTER. Correct your inputs with the R key.

General time-out: if no button is pushed within 30 seconds, the module returns to measuring mode.

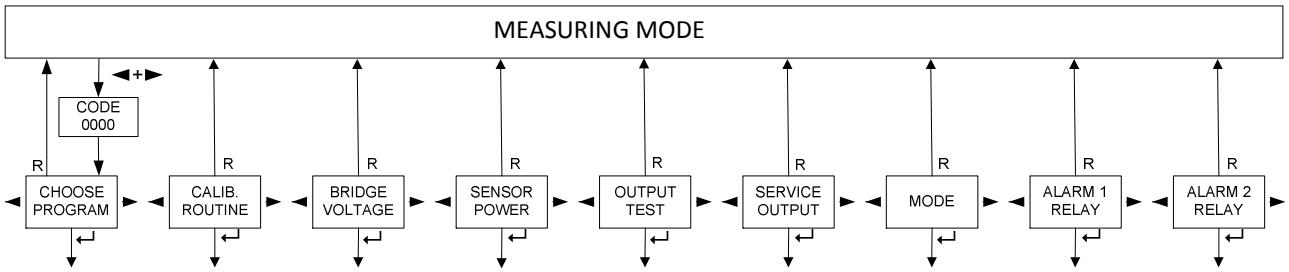
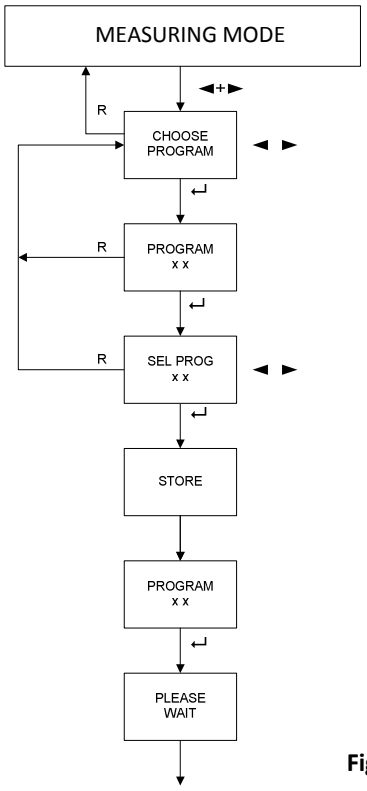


Figure 5: Main menu structure

6 Selecting the measuring program

In any case the first step is always to select the appropriate program. This must be done before the sensor head is connected, otherwise the sensor can be damaged! If a new program is selected, the alarm settings and relay configurations according to the program listing are valid and the calibration data for the sensor heads for combustible gases, type HRC, ARE, LCIR and MCIR will be lost. A new calibration is necessary.



In this menu the appropriate measuring program can be selected. The program defines the target gas, the measuring range, the concentration window for span gas and the ex - works settings of the relays. See an overview of all available programs in the program listing enclosed with each module.

Starting with menu SEL PROG the time-out is not active. In this menu a new program can be selected with the arrow keys.

After STORE the new program is displayed, push ENTER to start the new program.

Figure 6: Program selection diagram

7 Calibration

After connecting the sensor heads type Statox 501 HRC, ARE, LCIR, MCIR and PID to the Control Module a calibration is mandatory. Exception: a line calibration has been done ex works. The test gas concentration must be within the permitted range, see program listing.

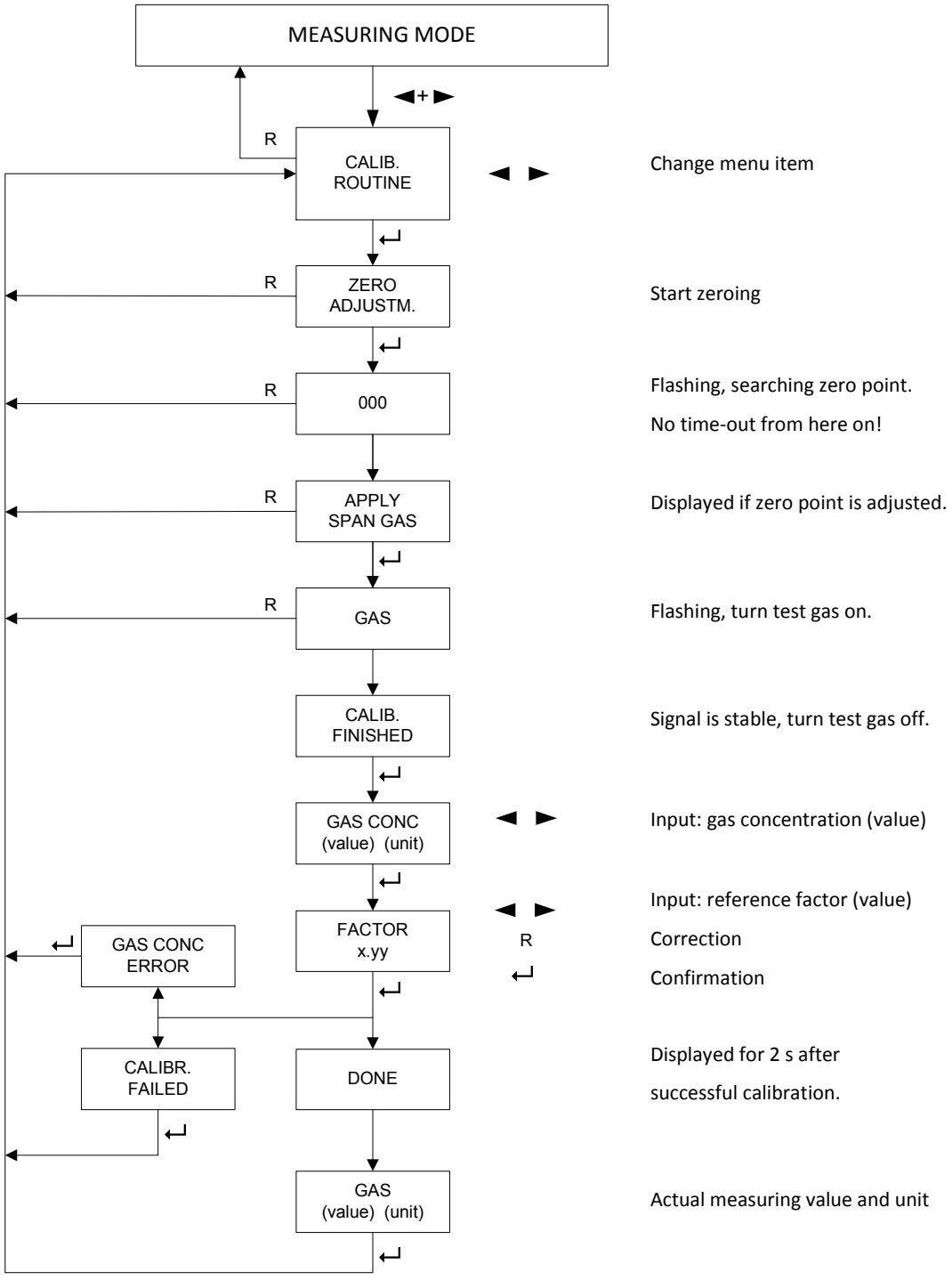


Figure 7: Calibration menu diagram

8 Programming the alarm relays

In this menu you can set parameters of the alarm relays A1 and A2:

- Alarm thresholds
- High or low alarm
- Latching (HOLD) or not latching (AUTO RESET)
- Coil active (ACTIVE) or not active (PASSIVE) in case of alarm

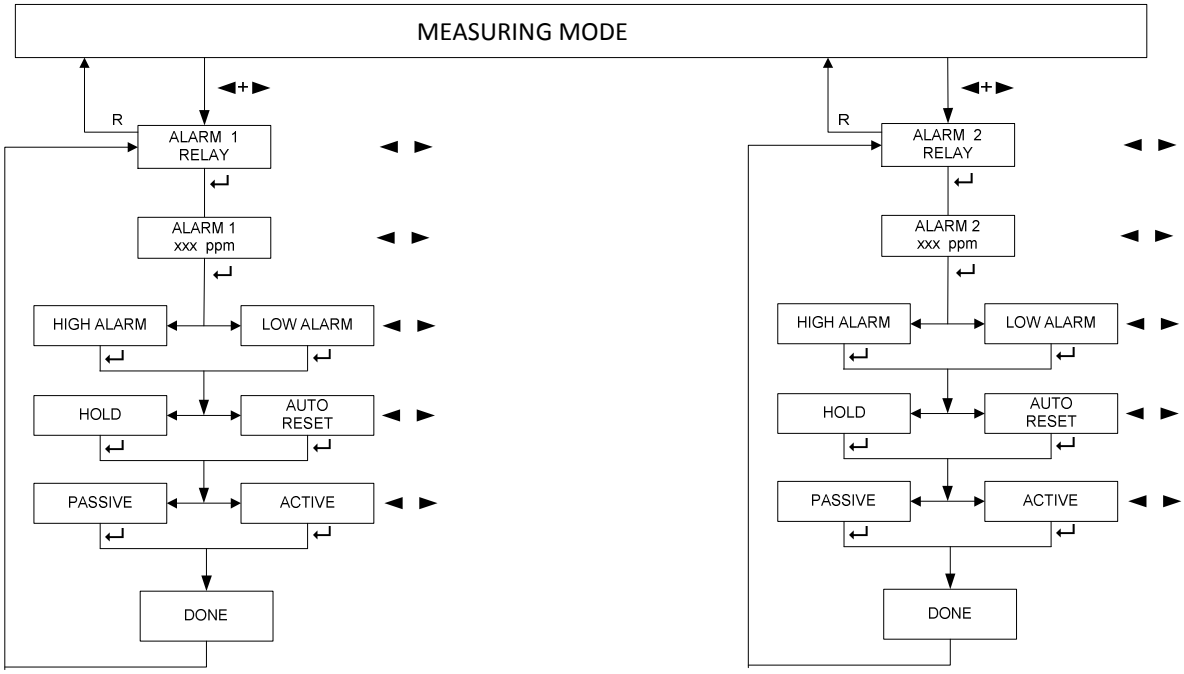


Figure 8: Alarm relay setting

9 Current output in Service Mode

> ! If you operate the module as a SIL device EN 50402 or IEC 61508, 2 mA output in the service mode is mandatory.

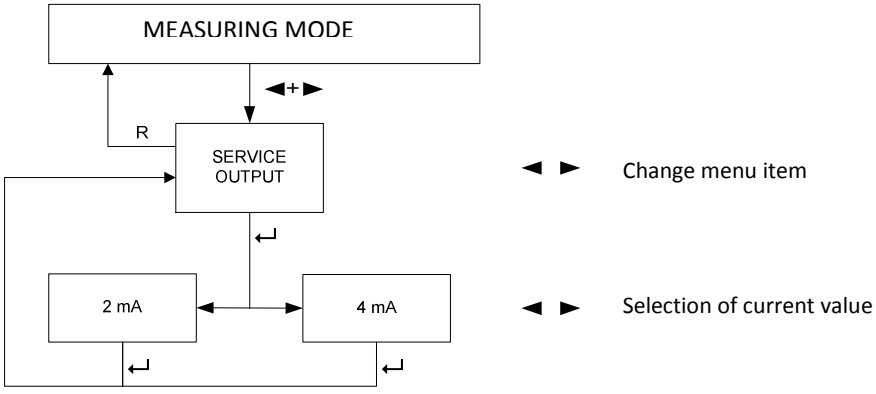
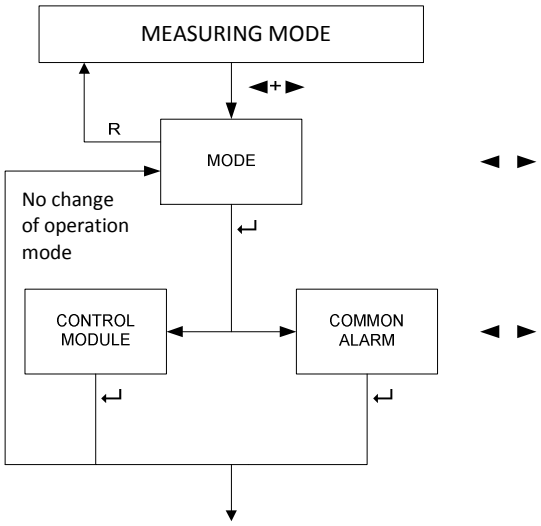


Figure 9: Diagram current output

10 Changing the operation mode - Control Module or Common Alarm Module

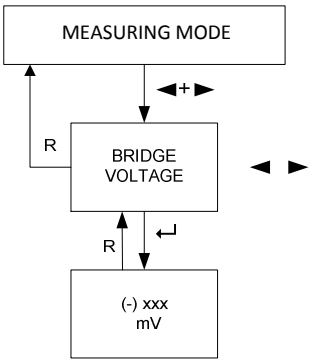


Change of operation mode: start-up

In this menu the operation mode of the Statox 502 can be selected. The ex - works setting of the Statox 502 is Control Module.

Please find detailed information for running the Statox 502 in Common Alarm mode in the detailed manual on our homepage www.compur.com!

11 Reading the bridge voltage

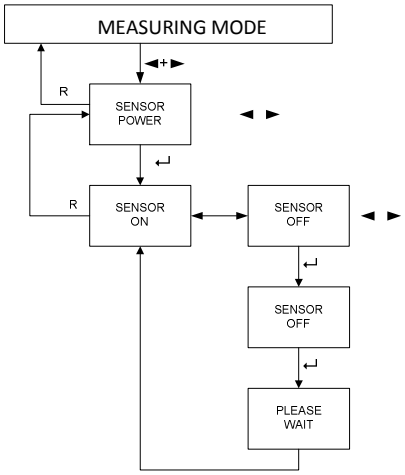


Active in the programs for Statox 501 HRC, ARE, LCIR, MCIR, PID sensor heads.

The current bridge voltage of the sensor can be displayed.

The time-out is not active!

12 Switching the sensor power supply off



Active in the programs for Statox 501 HRC, ARE, LCIR, MCIR, PID sensor heads.

It disconnects the sensor head for service purposes.

In this menu the time-out is not active!

13 Connecting the sensor head

The sensor head power supply must be OFF before connecting a sensor head!

Short circuits on the terminals or selection of a wrong program may destroy the sensor head.

The sensor heads **Statox 501/S** and **Statox 505** for toxic gases and oxygen are operated as 4 – 20 mA transmitters in 2 wire mode. The **Statox 505** sensor head can alternatively be operated in 3 wire mode. This way you can differentiate between service mode (2 mA) and system failure (0 mA).

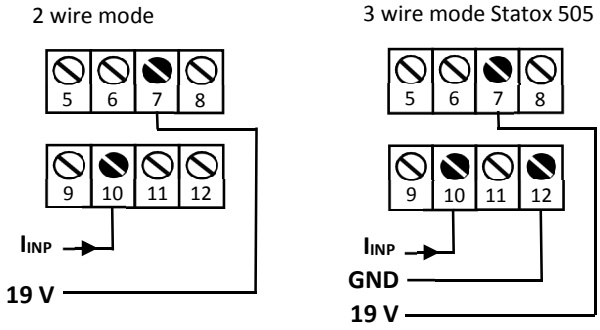


Figure 10: Connections sensor heads Statox 501/S and Statox 505

The sensor head **Statox 501 Infratox** for combustible gases and CO_2 requires 3 or 4 wires (2 ground wires) for proper operation.

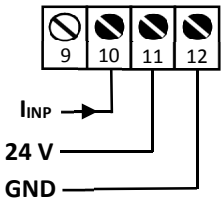


Figure 11: Connections sensor head Statox 501 Infratox

The standard application of sensor heads running in voltage mode is 3 wire mode. Starting with 750 m length of cable, Compur recommends to generally operate in the 5 wire mode. The two additional "sense" lines measure the sensor supply voltage and compensate for voltage drops due to long cable or extreme temperatures.

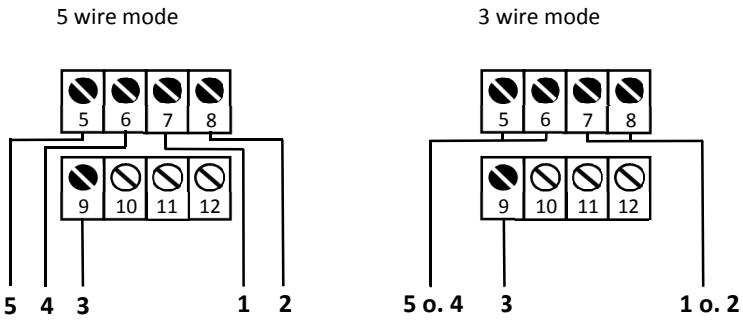


Figure 12: Connections sensor heads Statox 501 HRC, ARE, LCIR, MCIR and PID

The sensor heads **Statox 501/S** and **Statox 505** must be operated in connection with an intrinsically safe repeater if they are installed in classified area, zone 1 or zone 2. Detailed information regarding the operation with an intrinsically safe repeater can be found in the manuals of the corresponding sensor heads. Connect the shield of the sensor head cable to the grounding bar. Both, grounding bar and DIN Rail must be grounded.

14 Control Module – Status diagram

Input from Sensor or transmitter	System Status	Current output	Bus signal	Display	LEDs				Relays		
					A1	A2	S	ON	A1 1)	A2 1)	SF
4-20 mA or bridge voltage	Normal	4 – 20 mA	---	Measuring value	OFF	OFF	OFF	ON	active	active	active
4-20 mA or bridge voltage	Alarm 1	4 - 20 mA	A1	Measuring value	ON	OFF 2)	OFF	ON	passive	active 2)	active
4-20 mA or bridge voltage	Alarm 2	4 - 20 mA	A2	Measuring value	OFF 2)	ON	OFF	ON	active 2)	passive	active
22 mA or mV over range	Over Range	22 mA	2)	Full scale flashing	2)	2)	OFF	ON	2)	2)	active
0 mA or Error status	System failure	0 mA	SF	Error code	OFF	OFF	ON	ON	active	active	passive
2 mA or Service Mode	Service Mode 3)	2 mA 1)	---	SERVICE MODE or menu	OFF	OFF	flashing	ON	active	active	active

1) Ex-works setting, can be changed by user.
2) Depending on actual alarm status.
3) Priority ranking: Service Mode > SF > (A1 / A2 / Over range)

15 Common Alarm Module – Status diagram

Bus input	System status	Current output	Display	LEDs 4)				Relays 4)		
				A1	A2	S	ON	A1 1)	A2 1)	SF
---	Normal	4 mA	COMMON OK	OFF	OFF	OFF	ON	active	active	active
A1	Alarm 1	12 mA	COMMON ALARM 1	ON	OFF	OFF	ON	passive	active	active
A2	Alarm 2	16 mA	COMMON ALARM 2	OFF	ON	OFF	ON	active	passive	active
SF	System failure	0 mA	COMMON FAILURE	OFF	OFF	ON	ON	active	active	passive
---	Service 4)	2 mA 1)	Menu	OFF	OFF	flashing	ON	active	active	active

1) Ex-works setting, can be changed by user.
4) The listed LED and relay status describes an isolated alarm event. In case of multiple alarm events combinations are possible.
The priority ranking for display and current output is: Service Mode > A2 > A1 > SF

16 Error messages

In case the display stays dark, check the polarity and the voltage of the power supply. The internal fuse may be damaged. In any case critical errors lead to system failure.

Display	Nature	Description	Measures
ERROR 1	Critical	Short circuit in the sensor head cable (in voltage mode)	Check wiring and connections. Push Enter button.
ERROR 2	Critical	Cable interruption (in current mode)	Check wiring and connections. Automatic reset after error correction.
ERROR 3	Critical	Cable too long (only in voltage mode)	Check wiring and connections. Check selected program. Connect sensor head and push Enter button. Eventually change to 5 wire installation.
ERROR 4	Critical	Sensor power supply voltage cannot be controlled.	Push the Enter button. If error persists contact your Compur service partner.
ERROR 5	Critical	Cable interruption (only in voltage mode)	Check the sensor head power supply, connection and voltage. Connect sensor head and push Enter button.
ERROR 6	Non critical	Zero not found during time limit.	Check connections. If gas is present use zero gas. Push the Enter button and try again. The old zero value remains valid.
ERROR 7	Non critical	Zero shift out of specifications.	Check if gas is present. Push the Enter button and try again. The old zero value remains valid. Eventually replace the sensor.
ERROR 8	Non critical	Sensor sensitivity too low. No gas found during calibration.	Check if gas is on and gas adapter tightly connected. Push ENTER and try again. The old gain value remains valid. Eventually replace the sensor.
ERROR 10	Critical	EEPROM writing error	Contact your Compur service partner.
ERROR 11	Critical	EEPROM checksum error	Contact your Compur service partner.
ERROR 12	Critical	EEPROM reading error	Contact your Compur service partner.
GAS CONC ERROR	Non Critical	The result of gas concentration x response factor is out of range.	Check gas concentration and response factor entry. Eventually select another span gas concentration. Push the Enter button and try again. The old gain value remains valid. Eventually replace the sensor.
CALIBR. FAILED	Non Critical	The result of $\frac{\text{sensor signal}}{\text{gas concentration} \times \text{response factor}}$ is too low.	Check gas concentration and response factor entry. Eventually select higher span gas concentration. Push the Enter button and try again. The old gain value remains valid. Eventually replace the sensor.
OFF	Critical	Short circuit during ERROR 2.	Check connections and wiring. Push the Enter button.

17 Technical Data

Product name:	Statox 502 Control Module
Manufacturer:	COMPUR Monitors GmbH & Co. KG, D-81539 Munich
Power supply:	24 ± 2 VDC max. 200 mA
Power consumption:	max. 5 W
Current rating:	max. 8 A on communication bus
Operating temperature:	-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:	2 lines, 16 segments
Housing:	Polyamide, protection class IP 20
Connections:	24 terminals, can take cable diameters up to 2.5 mm^2
Relays:	2 x alarm, 1 x system failure
Relays contact:	250 VAC, 8A
	min. burden ≥ 12V, 10 mA (contact material: silver-nickel 90/10)
System failure relay:	In normal operation active (coil active), make contact (NO) is closed
Analog output:	0 mA in case of system 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 mm DIN-Rail
CE-Marking:	EN 61326-1:2013
Functional safety:	according to IEC 61508
Dimension:	45 x 103 x 115 mm (1.77 x 4.06 x 4.52 “)
Weight:	260 g