
# PolyGard®2 SGC6

## Stand-alone Gas Controller

**Serial No.** WSB2

# User Manual

September 24, 2018

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# 1 Notes and General Information

## 1.1 Applicability

PolyGard®2 SGC6.

## 1.2 Intended Use

The PolyGard®2 SGC6 is a stand-alone gas controller for measuring and warning of toxic, combustible & refrigerant gases and oxygen. The RS 485 interface allows also for the (optional) communication to the Gas Controller System DGC6 for larger systems.

The SGC6 must only be employed in areas within the environmental conditions as specified in the Technical Data (indoor application). The intended sites are all areas being directly connected to the public low voltage supply, e.g. residential, commercial and industrial environments as well as small enterprises (according to EN 50 082).

The PolyGard®2 SGC6 must not be used in potentially explosive atmospheres.

## 1.3 For Your Safety

The operating instructions must be read and strictly followed by all persons installing, using, servicing and inspecting the product. The product can only fulfil its intended functions if installed, used, serviced, maintained and controlled according to specifications.

## 1.4 Installer's and Operator's Responsibilities

It is the installer's and operator's responsibility to ensure that all PolyGard®2 devices are installed and used in compliance with all national and local regulations and requirements. The device must be checked by an expert for correct installation and functioning before starting the measuring operation.

The PolyGard®2 SGC6 has been tested for functionality at the factory before delivery. When starting up, however, you have to perform and document a function testing according to chapter 7.2.

## 1.5 Maintenance

Regular maintenance has to be performed according to the instructions in chapter 7.

## 1.6 Liability

IN*TEC* Controls will assume no liability if the device is not used properly or as intended. The installer and operator are solely responsible for the interpretation and the use of the product.
If the product is not used, maintained or repaired according to the specifications in the user manual, warranty and product liability claims as well as claims arising from any guarantees that IN*TEC* Controls assumes for the product will lapse.

# 2 General Description

## 2.1 General

The function of the sensor series SC2 and DR6 is not the subject of this manual but can be read in the operating instructions SC2.

The SGC6 board is equipped with three local bus interfaces for connecting up to three SC2 sensor cartridges. The connected sensors are monitored at the SGC6 for plausibility within the defined measuring, temperature and voltage range, etc.

Stand-alone operation:

The device monitors the measured values for up to four alarm thresholds and, if exceeded, activates two alarm relays, an optical and an acknowledgeable audible alarm. A fault activates the common alarm and fault relay and is signalled visually and acoustically.

DGC6 operation:

In bus mode, the DGC6 controller continuously monitors the measured values and sensor data for plausibility and alarms via the fieldbus interface. The SGC6 is integrated in the system as a slave with its base address. The addressing on the field bus level as well as the registration and assignment of the connected sensors on the local bus level is done via the Service Tool STL6 or with the DGC6 EasyConf Software, which is directly connected to the SGC6.

The detailed instructions can be found in the operating instructions for the DGC6 Controller, STL6 or DGC6 EasyConfig Software.

The cable topology for the RS-485 fieldbus can be found in the guidelines "Wiring and Commissioning DGC6 Hardware".

# 3 Installation

Check for completeness and accuracy using the delivery documents and the identification label on the device.

Electronics can be destroyed by electrostatic discharge (ESD). Therefore the installation work should be done only by persons connected to ground, e. g. with a wrist strap connected to ground or by standing on a conductive floor (acc. to DIN EN 100015).

## 3.1 Site of Installation

When choosing the mounting location, you have to consider the ambient conditions in order to get representative measurement results. Please pay special attention to the following factors:

- External heat sources are not allowed on the installation site.
- Choose mounting location according to the local regulations.
- Consider ventilation conditions! Do not mount next to air passages or suction holes.
- The sample gas must pass the sensor even under adverse flow conditions. A flow test can be performed for instance with smoke tubes.
- If the flow conditions are > 6 m/s, it is advisable to use a wind shield.
- Mount the device at a location with minimum vibration and minimum variation in temperature
- Provide adequate space around the sensor for maintenance and calibration work.
- The installation height depends on the relative gas density of the monitored gas type and can be read in the SC2 datasheet.

## 3.2 Installation Work

Assembly work must only be carried out under gas-free conditions.

The housing must neither be spot-drilled nor drilled through outside the knockouts.

The installation position of the gas detector is always with the sensor head downwards.

The housing comes in closed state. Therefore before mounting, break out the pre-embossed knockouts for inserting the cable glands and the SC2 / DR6. The housing types A, C and E offer different mounting options thanks to the knockout versatility depending on the number and types of Sensor Cartridge(s).

Prior to breaking out the knockouts it is essential to determine the exact position and size of the Sensor Cartridge(s) and cable glands.

The mounting is done through the pre-embossed holes at the backside by means of suitable screws. The exact dimensions are shown at the backside of the housing.

# 4 Electrical Connection

Assembly work must only be carried out under gas-free conditions!
Consider static electricity instructions (ESD)!

## 4.1 General Notes

- Installation and connection of the electrical installation should only be performed by a professional when de-energized, according to the connection diagram and in accordance to the relevant regulations!
- The technical requirements and regulations for wiring, electrical security, as well as project specific and environmental and local conditions etc. must be observed when mounting.
- All terminals are screw type. The permissible conductor cross section can be read in the Technical Data.
- When selecting and installing the cables you have to comply with the regulations concerning the RS 485 bus installation. See Commissioning Instructions DGC6. The installations have to be executed in line topology. Cable length and type have to be considered as well.
- Avoid any influence of external interferences by using shielded cables for the bus line, but do not connect the shield.
- Strip the cables as short as possible. It is important to ensure that bare wires, e.g. wire shields do not come into contact with the mounted PCB (risk of short-circuit).
- Low voltage wires and mains connected wires must be fixed separately by cable ties or similar to secure against looseness.
- Recommended cable for field/local bus: W202P-2288INTEC, contact your account executive.
- Use copper conductors only if the terminal is only for connection to copper wire.

[1] The max. cable lengths and our recommendation don't consider any local conditions, like fire protection, national regulations etc.

When choosing the option "Power Supply ≥ 90 V AC" you have to make sure that a switch or a circuit breaker is provided in the building automation especially for the Unit. It must be installed easily accessible near the Unit. It has to be marked as a disconnecting device for the Unit and shall meet the relevant requirements of UL/IEC 60947 and UL/IEC 60947-3.

## 4.2 Wire Connection

- Open the cover.
- Insert the cable from above and connect it.
- Remove terminal block X4, connect cable according to connection diagram fig. 1.
- Replug terminal carefully at X4.
- Non-pluggable terminals are available for the other inputs and outputs.
- For remote sensor:
  - Insert and connect local bus cable at the basic and remote sensor board.
  - Remove terminal block X7 from sensor board, connect cable acc. to connection diagram fig. 1.
  - Replug terminals carefully on both sensor boards.
- Close cover.

**Connecting the 24 V field bus voltage to the local bus terminal X7 can destroy the SGC6 (and chained devices) completely!**

# 5 Commissioning

## 5.1 General Notes

Before delivery all devices without exception run through a complete functional test.

However, transportation, storage, installation or other environmental conditions may lead to (mostly small) deviations. It is therefore necessary that a person authorized by the manufacturer or alternatively an expert puts the device properly into operation and performs a functional test.

Only trained technicians should perform the following when commissioning:

- Check for correct mounting location.
- Check that the board is firmly seated in the housing.
- Check if connection is correct according to connection diagram.
- Check power voltage.
- Install the SC2 / DR6 in the housing if not already installed ex works.
- Check Sensor Cartridge SC2 for correct engagement.
- Address the device if operated in DGC6 mode.
- Register the SC2 / DR6.
- Adjust application parameters.
- Calibrate (if not already factory-calibrated).

Required instruments for commissioning (calibration):

- Service Tool STL6 or
- DGC6 EasyConf Software incl. USB/RS-485 communication set:
- See document ***PolyGard®2 Sensor Calibration Procedure***.

## 5.2 Installation of Sensor Cartridge SC2 / DR6

The Sensor Cartridge is supplied in a separate packaging and should be installed on the housing only during commissioning to protect it against dirt and damage.

- Check gas type, range and calibration date of Sensor Cartridge.
- Define installation place on the housing and break out knockouts.
- Insert Sensor Cartridge and tighten it with M32 hexagon lock nut.
- Plug in the Sensor Cartridge SC2 at Local Bus_1 or Local Bus_2 of the sensor board. Observe plug polarity, the plug must engage.
- Connect Sensor Transmitter DR6 to Local Bus_3. The max distance is 16.4 ft (5m).

  Pin 1 = + 5 VDC
  Pin 2 = 0 VDC
  Pin 3 = L_Bus

### 5.3 Registration / Assignment of the SC2 / DR6

The device recognizes automatically the SC(s) physically connected to the device (unimportant whether directly on the device or on the Remote Sensor Board) via the gas type and the measuring range which are factory-integrated in the SC address bit. By selecting the signal type, analog or bus, the input is activated. The instructions can be read in the User Manuals of Service Tool STL6 or DGC6 EasyConfig Software.

Up to two SC2 and one DR6 can be connected to the board. The physical position of the SC2s/DR6 does not have to agree with the input in the menu. Any SC2/DR6 combination of the same gas type are not permitted.

Example 1: SGC6 with two SC2s for CO and $NO_2$, and one DR6 for $C_3H_4$, with basic address 01.
Note: The DR6 is registered as a SC2.

| Input | Mode | Field Bus Address | Gas Type | Measuring Range | Result |
|---|---|---|---|---|---|
| 1 | SC2 | DP 01 | CO | 250 ppm | CO SC assigned to input 1 and thus field bus address DP01 |
| 2 | SC2 | DP 02 | $NO_2$ | 20 ppm | $NO_2$ SC assigned to input 2 and thus field bus address DP02 |
| 3 | SC2 | DP 03 | $C_3H_4$ | 100 % LEL | $C_3H_4$ SC assigned to input 3 and thus field bus address DP03 |

Only the parameters with blue background have to be worked on for the SGC6 addressing and the SC registration.

Mode: SC2 CO: = SC2 assignment to input 1
SC2 $NO_2$: = SC2 assignment possible
SC2 $C_3H_4$: = SC2 assignment possible

Gas type and meas. range: Selection of gas type and measuring range of the connected SC2

The registration is only accepted if the assigned gas type/measuring range are identic in the device and in the SC2.

Example 2:

**Three different combination of SC2 + DR6 modules :**

SGC6 with two SC2s for CO and $NO_2$, and one DR6 for $C_3H_4$, with basic address01.

Local Bus_1 and Local Bus_2 for SC2 modules. Local Bus_3 for remote DR6 transmitter;
Note that the DR6 is registered as a SC2 in the system.

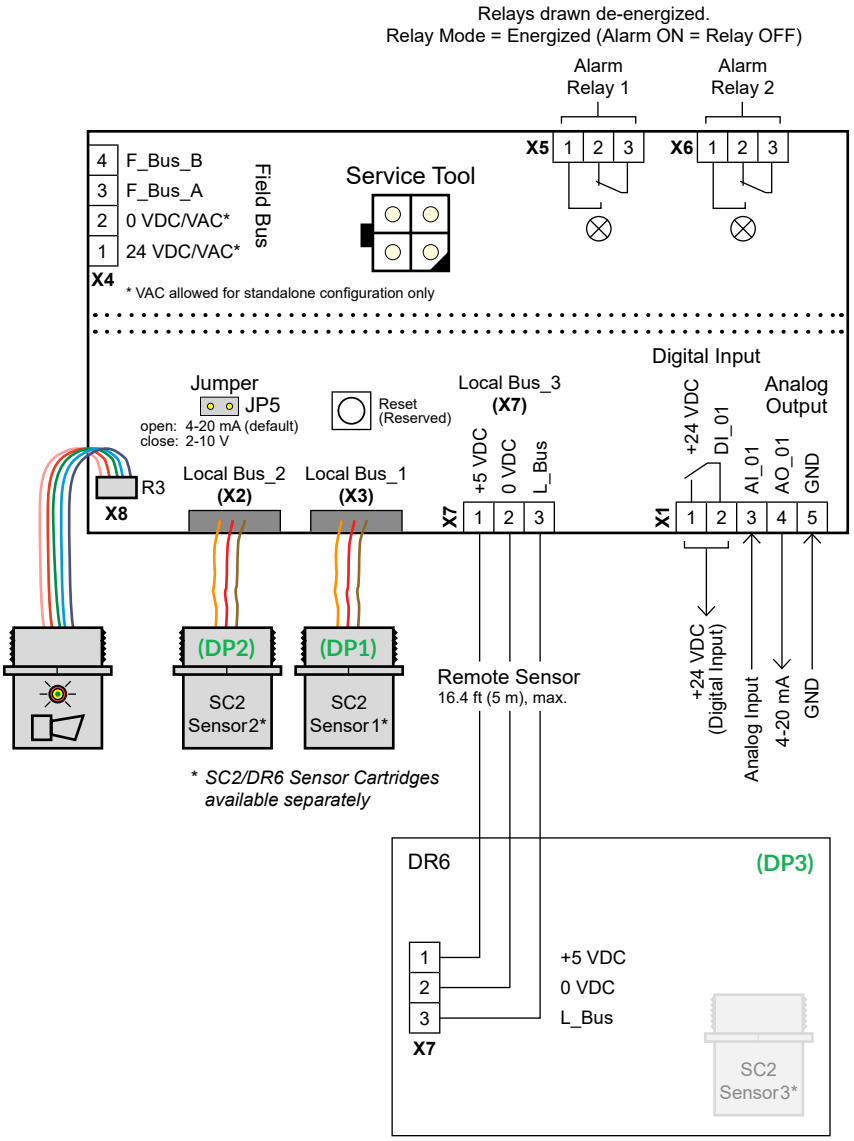
The SC2 module connected to Local Bus_1 (X3) ***must*** be configured as DP1.

The SC2 module connected to Local Bus_2 (X2) should be configured as DP2.

The DR6 transmitter connected to Local Bus_3 (X7) should be configured as DP3.

| Sensor | Connection | DP1 | DP2 | DP3 |
|---|---|---|---|---|
| SC2 CO 250 ppm | Local Bus_1 | o | x | x |
| SC2 $NO_2$ 20 ppm | Local Bus_2 | x | o | o |
| SC2 $C_3H_4$ 100% LEL | Local Bus_3 | x | o | o |

SGC6 Connections



### 5.4 Check / Change of Operating Parameters

The complete parameter set is stored in the SG6 in a fail-safe way and documented in the enclosed calibration and test record. Necessary changes of parameters for adaptation to the application should be done by qualified persons with the STL6 Service Tool, the DGC6 EasyConfig Tool or if available, with the display.

The parameter functions as well as the menu navigation and operation are described in the User Manual of Service Tool STL6 or DGC6_EasyConfig Software.

### 5.5 Stand-alone Mode

When using as a stand-alone controller: monitoring, evaluation and warning are carried out directly on the device. For this purpose, the alarm thresholds and the assignment of the alarms to the local alarm relays and outputs for a visual and audible warning must be parameterized directly on the device.
Alarm 1 = Relay 1;
Alarm 2 = Horn output via transistor;
Alarm 3 = Relay 2.

### 5.6 Addressing for DGC6 mode

The device is assigned a base communication address using the Service Tool STL6 or the DGC6_EasyConf Software. With this base address, the data of the Sensor Cartridge assigned to Input 1 are sent via the fieldbus to the Gas Controller. Each additional registered SC2 / DR6 automatically occupies the following address. The instructions can be found in the operating instructions of Service Tool STL6 or DGC6_EasyConfig Software.

### 5.7 Running-in Characteristics

After switching on or after an internal reset of the microcontroller, the device always runs through a start routine with defined status of the outputs. The start always begins with the diagnosis and warm-up stages. When they have succeeded and finished, measurement operation starts. External intervention is not possible during this start routine.

The states of analog output, relays, central bus and signal LEDs for all operating stages are shown in the following table.

| Start ↓ | LED | | | Analog Output | Relays | | Central Bus |
|---|---|---|---|---|---|---|---|
| | Power | Alarm | Fault | | Alarm | Fault | |
| Diagnosis (~ 0,5 sec) | | | | < 2 mA | OFF | Error[4] | Communication STOP |
| OK ↓ | | | | | | | |
| Warm-up period | | | | < 2 mA | OFF | Error[4] | Communication STOP |
| OK ↓ | | | | | | | |
| Measuring mode | [6] | [2] | | 4-20 mA[1] | [3] | OK[5] | Communication OK |
| Maintenance mess. | | [2] | | 4-20 mA[1] | [3] | OK[5] | Communication OK |
| Special mode | [6] | [7] | | 2 mA | [7] | Error[4] | Communication OK |
| Detected fault | [6] | [7] | | 2 mA | [7] | Error[4] | Communication OK |
| Processor failure | | | | < 1 mA | OFF | Error[4] | Communication STOP |

Table 5.1: Status operating modes

[1] Depends on the measured gas concentration
[2] Status depends on the gas concentration and the alarm threshold
[3] Status depends on the gas concentration, the alarm threshold and the operating mode
[4] Relay de-energized, contact open
[5] Relay energized, contact closed (OK state)
[6] Brightness cyclically flashing when message to central bus
[7] Previous status doesn't change.

### 5.8 Functional Test

The functional test must be carried out and documented in accordance with Chapter 9.2 "Functional Check / Calibration and Adjustment".

### 5.9 Calibration SC2 / DR6

Calibration of the SC2 / DR6 during commissioning is only required if the calibration date is no longer current. See operating instructions SC2 / DR6.

# 6 Operating Modes

## 6.1 Restart (Diagnostic and Warm-up Stage)

The device is designed so as to generally run through all internal device tests (diagnostics) in the SGC6 and the connected gas sensors after each power-up or processor reset before the measuring operation starts. That means that the processor's internal components and the associated program and working memories as well as the other components of the input and output units are tested. This process takes approximately 0.5 seconds.

When all diagnostics have been successful, the connected sensors start their warm-up phase. The warm-up is necessary for the connected gas sensors to assume a stable state after return of the voltage without triggering a pseudo alarm. The duration of the warm-up phase depends on the type of sensor used and can be read from document ***PolyGard®2 Sensor Calibration Procedure.***

During warm-up, the yellow LED flashes every 2 seconds and "Power ON" appears in the display. The device status during warm-up is given in Table 5.1 “Status operating modes”. The measuring operation starts after the end of the warm-up phase; the necessary diagnostic functions continue to run in the background.

## 6.2 Measuring Mode

In normal operating mode = **measuring mode** there are no faults present, the gas concentration of the active sensors is continuously polled, checked for plausibility, output on the analog output if active and provided on the central bus. The gas concentration is displayed on the optionally built-in display, if available.

When the alarm evaluation is activated, only with alarm threshold > 0, the gas signal is checked with each measurement cycle, if ≥ or ≤ alarm threshold and if exceeding, the alarm LED and the alarm relay are triggered. If the value falls again below the alarm threshold minus the set hysteresis, the alarm is automatically cancelled.

The device continuously monitors itself, the measurement signal, the analog output, the alarm relay and the communication to the sensor head.

If the measurement signal falls below the zero point, this will be tolerated up to a limit of minus 6 % of the measuring range, the analog output signal drops down to 3 mA and there will be still no error generated.

If the measurement signal exceeds the full-scale value, this will be tolerated up to a limit of plus 6 % of the measuring range, the analog output signal increases up to 21 mA and there will be still no error generated.

## 6.3 Special Mode

The operator may set the device in the special mode only when gas-free state is ensured (no alarm), because the alarm function is not available in this mode.

The special mode includes all operating states outside the measuring operation.

In special mode operation the query of the gas concentrations is slightly delayed, but there is no alarm evaluation. The fault relay switches to error status and the analog output delivers 2 mA. The flashing yellow LED and the optional display indicate the special mode.

The device goes into the special mode in the following cases:

- Internal device fault
- Measurement signal exceeds or falls below limit
- Diagnostic and warming-up phase after the return of voltage (Power On Status)
- Service mode activated by the operator.

The operator can activate the special mode on the internal (optional) display or via an external service tool or the PC software EasyConfig. This mode includes commissioning, calibration, inspection, repair and decommissioning.

Pending alarms are held in active special mode, but new alarms are not generated.

The operator can exit the special mode after completion of work; if there are no further entries or operations, the unit will automatically return to the measurement mode after 15 minutes.

### 6.4 Faults

The warning device includes a diagnostic module for the continuous monitoring of the relevant functions and parameters as well as a processor-independent watchdog. These features set the device into the safe mode "Fault" in case of an internal or external error. The following table shows 6.1 all possible errors, possible cause, the related troubleshooting and the resulting device status.

When the cause of the error has been eliminated, the device restarts with the diagnostic mode on its own. It isn't necessary to acknowledge the error message.

If an error occurs, it is output in the option with display instead of the measured value and in the menu error status in plain text. If there is more than one error, it is output with a cumulative, bit-coded error code.

| Error type | Cause | Remedy | Fault Relay | Analog Output | Centr. Bus | Display | |
|---|---|---|---|---|---|---|---|
| | | | | | | Error Code | Text Mess. |
| **Error Messages of connected Sensor SC2 / DR6** | | | | | | | DP1- |
| Sensor element defective | Internal | Replace SX1 sensor head | Error | < 2 mA | Error code is sent | 0x8 001 h | Sensor |
| Temperature < -25 °C > +60 °C | | | | | | 0x8 002 h | Overtemp. |
| Measured value processing | | | | | | 0x8 002 h | ADC error |
| System voltages <> | | | | | | 0x8 004 h | Voltage |
| RAM / ROM / µC error | | | | | | 0x8 008 h | CPU error |
| EEPROM error | | | | | | 0x8 010 h | EE error |
| Meas. value < -6 % of range | Sensor drift, calibration not correct | Perform calibration | | | | 0x8 100 h | Underrange |
| Meas. value > 106 % of range | | | | > 21.2 mA | | 0x8 200 h | Overrange |
| | Gas concentration > meas. range | | | | | | |
| Maintenance due | Maintenance date reached | Perform maintenance | No effect | | Mainten. message | 0x8 080 h* | Maintenance |
| **Error Messages from SGC6** | | | | | | | EP1- |
| Temperature < -25 °C > +60 °C | Ambient temp. | Temp.! | Error | < 2 mA | Error code is sent | 0x8 002 h | Overtemp. |
| Measured value processing | Internal | Replace device | | | | 0x8 002 h | ADC error |
| RAM / ROM / µC error | | | | | | 0x8 008 h | CPU error |
| EEPROM error | | | | | | 0x8 010 h | EE error |
| No response alarm relay | | | | | | 0x8 020 h | I/O error |
| Configuration error | Meas. range SC2 ≠ I/O unit | Adjust meas. range | | | | 0x8 010 h | EE error |
| Deviation of analog output signal < 5 % > | Short-circuit or Interruption at the analog output | Check wiring / load | Error | X mA | | 0x8 020 h | I/O error |
| | Internal | Replace device | | | | | |
| Communication error to sensor head | Sensor head not fitted correctly / wrong gas type | Check it , set correct gas type | Error | < 2 mA | | 0x9 000 h | Communic. error |
| | Internal | Replace SC2 sensor head | | | | | |
| Hardware Watch Dog triggered | Internal, < system voltage, µC defect. | Replace device | Error | < 1 mA | Comm. STOP | Reset | Reset |
| Operating voltage limits exceeded too high / too low | External | Check voltage | Error | < 2 mA | Comm. STOP | 0x8 008 h | Voltage |
| | Internal | Replace device | | | | | |
| Maintenance due | Maintenance date reached | Perform maintenance | No effect | | | 0x8 080 h* | Maintenance |

Table 6.1: Error messages

* Is only faded in if an error code is pending.

### 6.5 Exchange of Sensor Cartridge

Instead of the on-site calibration, the used SC can be easily and conveniently replaced by a calibrated one.

The communication of the local bus (Sensor Cartridge <> SGC6) is continuously monitored during operation and results in an immediate error message on the gas controller in case of fault or interruption. When replacing the sensor unit, the communication of the local bus is also interrupted when unplugging the SC connector which leads to an immediate triggering of the error message.

- Disconnect the SC connector from SGC6 (error message will be activated).
- Loosen the locknut.
- Remove used SC.
- Take calibrated SC out of the original packaging, check for gas type, measuring range and valid calibration date.
- Insert the SC and retighten with lock nut.
- Insert the SC plug into the socket at the SGC6. Check plug for proper engagement.

The local bus communication is automatically established and tested. At the same time the gas type and the measuring range of the "new" SC are compared with the data stored in the SGC6. If they match and the communication is correct, the error message will be automatically acknowledged at the Gas Controller.

## 7 Inspection and Service

It is obligatory to perform maintenance regularly in order to maintain safety, measuring and warning functions of the device. The maintenance includes visual, functional and system inspections and must only be carried out by appropriately qualified personnel.

When carrying out maintenance and repair work according to the user manual, only use original spare parts from IN*TEC* Controls. Repairs or changes of the warning devices not complying with the maintenance manual or carried out by unauthorized persons can affect proper equipment and safety features and always result in a termination of the manufacturer's warranty and certificates.

For regular maintenance und calibration of the sensor by trained technicians we recommend concluding a service contract with IN*TEC* Controls or one of their authorized partners.

According to EN 45544-4, inspection and service has to be executed at regular intervals. The maximum intervals have to be determined and observed by the person responsible for the gas warning system according to the legal requirements. IN*TEC* Controls recommends applying the inspection and maintenance intervals as prescribed in the general regulations of the gas measuring technique like EN50545, VDI-2053, EN 60079-29-1 etc. The inspection interval normally is three months. The recommended service intervals are listed in the datasheet of the SC2 Sensor Cartridges and DR6.

Inspections and services must be documented. The date for the next maintenance has to be affixed to the sensor.

### 7.1 Inspection

Gas sensors should be controlled regularly by a competent person according to EN 45544-4. The following has to be checked in particular:

- Maintenance / calibration interval not exceeded.
- Visual inspection of the device including cable for damage, vandalism etc.
- Remove dust deposits etc. with a dry cloth, especially at the gas inlet.
- The filter at the gas inlet has to be replaced if extremely dirty.

### 7.2 Service and Calibration

When performing the maintenance you have to do the calibration and the functional test in addition to the inspection. The procedure for the calibration and test gas application can be found in ***PolyGard®2 Sensor Calibration Procedure***.

Functional check alarm relay: (Only necessary if the alarm relay is used)

- Apply test gas with a concentration ≥ of the set alarm threshold. The alarm relay must change into the alarm status and the actuated device goes into alarm.

Functional check analog output: (Only necessary if the analog output is used)

- Apply test gas. Check the proper reaction of the connected actuator.

Functional check central bus: (Only necessary if the central bus is used)

- Apply test gas. Read the concentration of the test gas on the controller and check the corresponding reactions.

The functional control must be documented by a protocol stating at least:

Identification of the gas detector, type and concentration of the zero gas and test gases used, display before and after calibration with zero and test gas, response time, deficiencies fixed and measures started with the date and name of the person responsible for the functional check.

### 7.3 Repairs

Please always apply the operating and maintenance instructions when repairing and replacing parts of the gas warning device. For safety reasons replace parts only by original spare parts from the manufacturer.

Appropriate technical qualification is necessary for further repair work, which may only be carried out by the manufacturer or by trained and authorized service partners.

The responsibility for proper operation and condition of the gas detection device after repair lies with the technician who has done the work and/or with the entrepreneur.

After repair before restart you have to check the function and the system depending on the type of repair.

# 8 Technical Data

| | |
|---|---|
| **Electrical** | |
| Power supply | 24 VDC ±20%,<br>reverse polarity protected;<br>24 VAC -10%/+15%,<br>*VAC allowed for standalone configuration only* |
| Power consumption | 24 VDC |
| - base (with LCD) | 80 mA |
| - sensors | *See SC2 datasheet* |
| - horn & multi-status LED | 5 mA |
| - analog output | 22 mA |
| Alarm relays | Two (2), 30 VAC/VDC, 0.5 A,<br>potential-free, contacts (SPDT) |
| Digital input | One (1), 24 VDC for relay override |
| Analog input | One (1), 4-20 mA overload and short-circuit proof,<br>input resistance 200 Ω |
| Analog output signal | One (1), selectable, proportional,<br>overload and short-circuit proof,<br>load ≤ 500 Ω |
| - measuring range | 4-20 mA / 2-10 VDC |
| - tolerable under range | 2.4-4 mA / 1.2-2.0 VDC |
| - tolerable over range | > 20-21.2 mA / > 10.0-10.6 VDC |
| - error over range | ≥ 21.2 mA / ≥ 10.6 VDC |
| - fault | ≤ 2.0 mA / ≤ 1.0 VDC |
| Output for local bus | 5 VDC, 250 mA max.<br>Overload, short-circuit and polarity protected |
| Output signal for serial communication | Digital, RS-485,<br>Modbus-RTU and<br>DGC6 protocol,<br>19200 baud |
| **Sensors** | SC2 Series |
| - performance | *See SC2 datasheet for specific gases* |
| - coverage | See SC2 datasheet for specific *gases* |
| - storage time | 6 months (for sensor elements) |
| **Environmental** | |
| Permissible ambient | *See SC2 datasheet for specific gases* |
| **Horn & Status LED** | Configurable by local thresholds or remote DGC6 parameters |
| Horn | |
| - acoustic pressure | > 85 dB (A) (dist. 0.1 m / 0.3 ft) |
| - frequency | 2300 Hz |
| - protection class | NEMA 4X (IP65) |
| Status LED | |
| - color / mode | Red = Alarm;<br>Yellow = Fault;<br>Green = Power (Normal);<br>Green (flashing) = Service |
| - protection class | NEMA 4X (IP65) |
| **Liquid Crystal Display** | |
| LCD | Two lines, 16 characters each, illuminated |

| | |
|---|---|
| **Serial interface** | |
| - local bus | plug connector / 19200 Baud |
| - field bus | RS-485 / 19200 Baud |
| - tool bus | 2-wire / 19200 Baud |
| **Physical** | |
| Enclosure “C”, standard | |
| - material | Polycarbonate,<br>UL94 V-2, fire retardant |
| - color | Light gray |
| - protection | NEMA 4X (IP65) |
| - installation | Wall (surface) mounted,<br>or single gang electrical box |
| Dimensions (H x W x D) | |
| - base unit | 5.12 x 5.12 x 2.95 in<br>(130 x 130 x 75 mm) |
| Cable entry, knock outs | 3 holes for 1/2 in. conduit,<br>closed with silver “plugs” |
| Wire connection | |
| - local bus (SC2) | 3-pin removable connector |
| - remote sensor (DR6) | 3-wire, max. length 16.4 ft (5 m) |
| - analog output | Screw-type terminal;<br>24 AWG (0.25 $mm^2$), min.<br>16 AWG (1.3 $mm^2$), max. |
| - power supply, relays | Screw-type terminal;<br>24 AWG (0.25 $mm^2$), min.<br>14 AWG (2.5 $mm^2$), max. |
| Weight | 1.32 lb (0.6 kg) |
| **Certified to** | UL 2075 Listed, NRTL<br>performance tested for models<br>SGC6-02-CO, SGC6-02-CO-CO,<br>SGC6-02-CO-$NO_2$ |
| **Conforms to** | EMC Directive 2014/30/EU<br>LVD 2014/35/EU<br>CE<br>EN 50271<br>EN 61010-1:2010<br>ANSI/UL 61010-1<br>CAN/CSA-C22.2 No. 61010-1 |
| **Warranty** | Two years material and workmanship,<br>12 months normal exposure for sensor element |

## DEFAULT SETTINGS

**Trip/Setpoints**

Carbon Monoxide (CO)

| | |
|---|---|
| - stage 1 (R1) | 25 ppm |
| - stage 2 (R2) | 150 ppm |
| - stage 3 (R3) | 150 ppm |
| - stage 4 | 150 ppm |
| - hysteresis | 10 ppm |

Nitrogen Dioxide ($NO_2$)

| | |
|---|---|
| - stage 1 (R1) | 2 ppm |
| - stage 2 (R2) | 5 ppm |
| - stage 3 (R3) | 5 ppm |
| - stage 4 | 5 ppm |
| - hysteresis | 0.5 ppm |

# 9 Figures

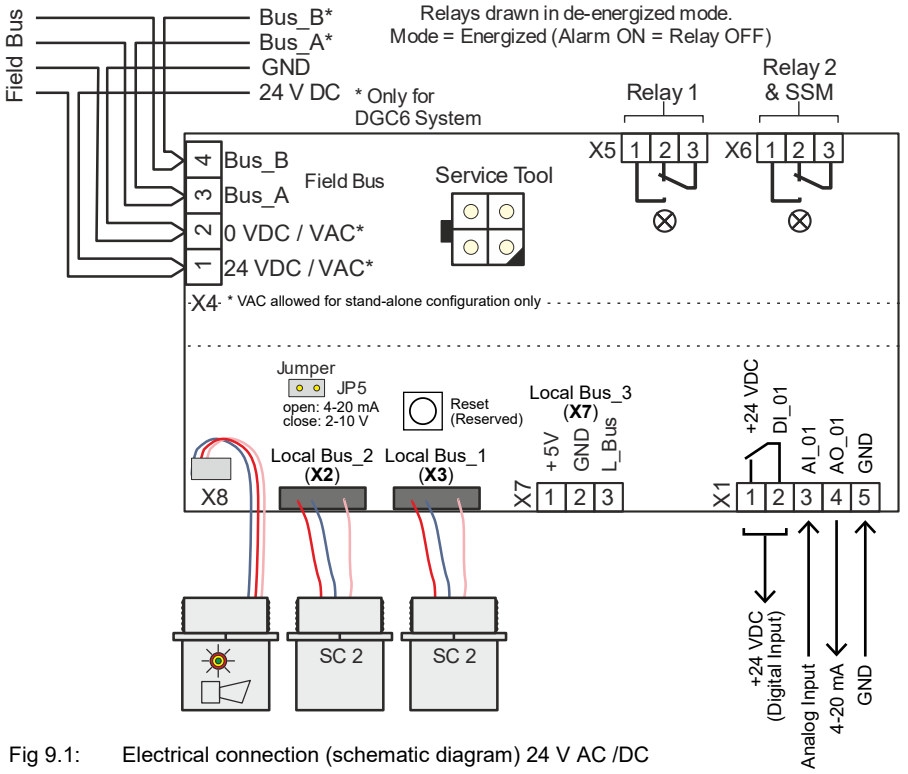



Fig 9.1: Electrical connection (schematic diagram) 24 V AC /DC

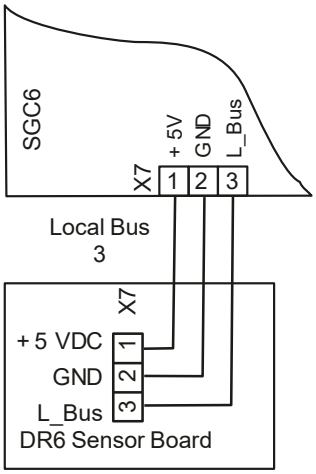



Fig 9.2 Remote Sensor Board

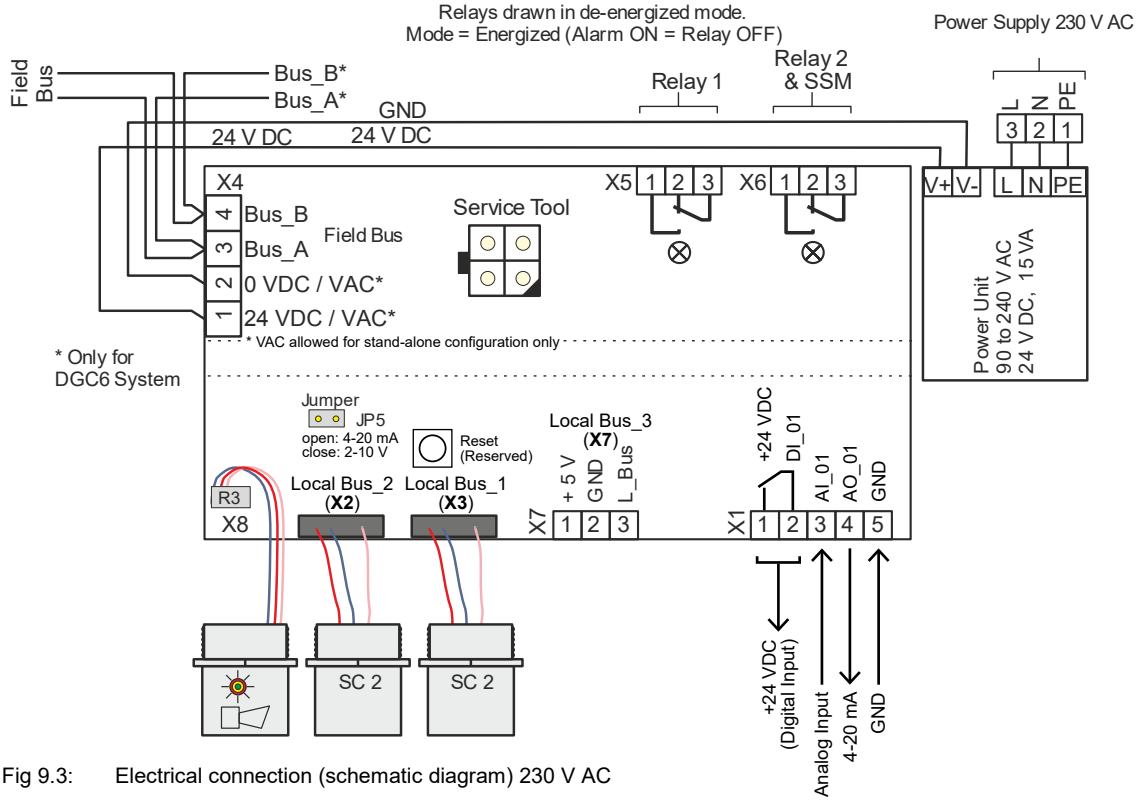



Fig 9.3: Electrical connection (schematic diagram) 230 V AC

## DIMENSIONS

inches (mm)

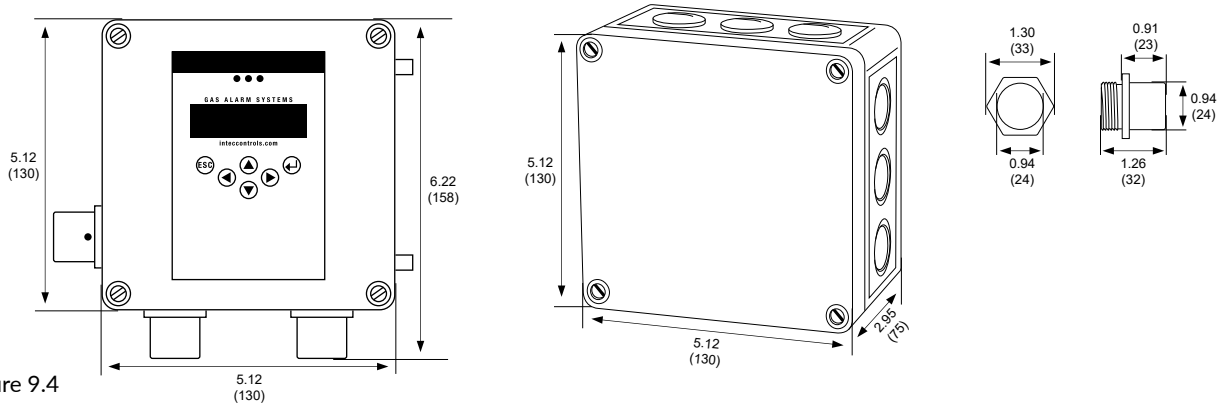
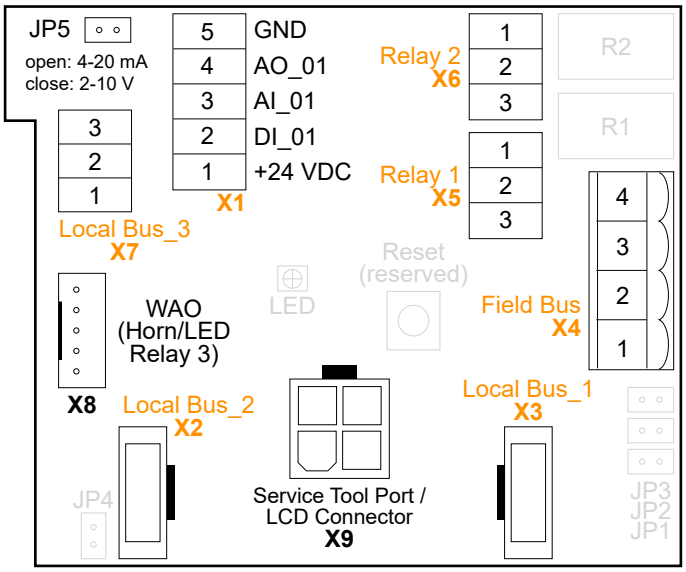



Figure 9.4

## SENSOR BOARD COMPONENTS

SGC6



# 10 Part Disposal

Appropriate to Federal, State, and local laws. Inside the EC, consider the corresponding additional directive:

Since August 2005 there are EC-wide directives defined in the EC Directive 2002/96/EC and in national codes concerning the waste electrical and electronic equipment and also regarding this device.

For private households there are special collecting and recycling possibilities. For this device isn't registered for the use in private households, it mustn't be disposed this way. You can send it back to your national sales organisation for disposal. If there are any questions concerning disposal please contact your national sales organisation.

# 11 Notes and General Information

It is important to read this user manual thoroughly and clearly in order to understand the information and instructions. The PolyGard®2 devices must be used within product specification capabilities. The appropriate operating and maintenance instructions and recommendations must be followed.

Due to on-going product development, IN*TEC* Controls reserves the right to change specifications without notice. The information contained herein is based upon data considered to be accurate. However, no guarantee is expressed or implied regarding the accuracy of these data.

## 11.1 Intended Product Application

The PolyGard®2 devices are designed and manufactured for control applications and air quality compliance in commercial buildings and manufacturing plants.

## 11.2 Installers' Responsibilities

It is the installer's responsibility to ensure that all PolyGard®2 devices are installed in compliance with all national and local codes and OSHA requirements. Installation should be implemented only by technicians familiar with proper installation techniques and with codes, standards and proper safety procedures for control installations and the latest edition of the National Electrical Code (ANSI/NFPA70).

The equipotential bonding required (also e.g. secondary potential to earth) or grounding measures must be carried out in accordance with the respective project requirements. It is important to ensure that no ground loops are formed to avoid unwanted interference in the electronic measuring equipment.

It is also essential to follow strictly all instructions as provided in the user manual.

## 11.3 Maintenance

It is recommended checking the PolyGard®2 device regularly. Due to regular maintenance any performance deviations may easily be corrected. Re-calibration and part replacement in the field may be implemented by a qualified technician and with the appropriate tools. Alternatively, the easily removable plug-in Sensor Cartridge with the sensor element may be returned for service to IN*TEC* Controls, service fee may apply.

## 11.4 Limited Warranty

IN*TEC* Controls warrants the PolyGard®2 devices for a period of one (1) year from the date of shipment against defects in material or workmanship. Should any evidence of defects in material or workmanship occur during the warranty period, IN*TEC* Controls will repair or replace the product at their own discretion, without charge; a pre-approved RMA number is required.

This warranty does not apply to units that have been altered, had attempted repair, or been subject to abuse, accidental or otherwise. The warranty also does not apply to units in which the sensor element has been overexposed or gas poisoned. The above warranty is in lieu of all other express warranties, obligations or liabilities.

This warranty applies only to the PolyGard®2 devices. IN*TEC* Controls shall not be liable for any incidental or consequential damages arising out of or related to the use of the PolyGard®2 devices.

# 12 Supplemental Programming Guide (from STL6 UserManual)

## Display Unit for Series AT6, PG2 and PX2

### 1 Intended Use

The Service Tool / Display is used as visual indication, operating, commissioning and calibration unit for gas detecting and measuring instruments of the series PolyGard®2 (AT6/DT6/DC6/SGC6/SCM6) and PolyXeta®2 (PX2). The intended use is defined in the user manuals for the individual devices.

### 2 Description

The parameters, gas types, units, etc. specified in the description are only examples, the actual values at the time of delivery are shown in the attached PolyXeta®2 configuration card.

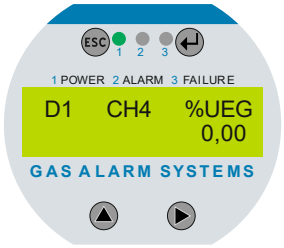
This description contains the maximum possible functionality of this tool.

Depending on the version some features described here are not available and therefore the menu items may be hidden.

### 3 Operation

The complete configuration and service are made via operating keys in combination with the LC display screen. Security is provided via four code levels against unauthorized intervention.


Version for PG2
(AT6/DC6/SGC6/SCM6/DT6)
Operation is done via 6 pushbuttons.




Version for PX2 series
The display is located behind a glass panel and is operated without opening the housing from the outside by briefly touching the control symbols using a magnetic pen.

#### 3.1 Function of the Keys and LEDs on the Keypad

ESC — Exits programming, returns to the previous menu level.

↵ — Enters sub menus and saves parameter settings.

▲ ▼ — Navigates within a menu, changes values.
PX2 only ▲ function

◀ ▶ — Changes cursor position.
PX2 only ▶ function

The status LEDs indicate the operating state.

| | | |
|---|---|---|
| Green: | Continuous: | = Operating voltage |
| | Flashing: | = Maintenance message |
| Yellow: | Continuous: | = Failure |
| | Slowly flashing: | = Warming-up |
| | Fast flashing: | = Special mode |
| Red: | | = Alarm |

The backlight of the display changes from green to red when an alarm is active.

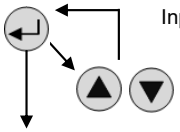
### 3.2 Setting / Changing of Parameters and Set Points

Open desired menu window.
Code input field opens automatically, if no code is approved.

After input of valid code, the cursor jumps onto the first position segment to be changed.

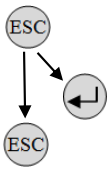
Push the cursor onto the position segment, which is to be changed.

Set the desired parameter / set point with the keys.



Input of value finished.

Change further parameters in the same menu.




Save the changed value?

YES, and back to higher menu level.

NO, (previous value isn't overwritten) and back to higher menu level.

### 3.3 Measuring Point

The term measuring point (MP) refers to the representation and processing (parameterization) of the measured value of a connected gas sensor head.

For a measuring head with digital communication (SC2 or SX1 series), the display shows DP = digital measuring point.

For a measuring head with analog 4-20 mA signal (AT6 series) the display shows AP = Analog measuring point.

The following number defines the bus address of the gas transmitter at DP. With AP, the number indicates the number of the analog input used.

DP21: This is the measured value of the digital sensor head with bus address 21.

AP11: This is the measured value of the analog sensor head connected to analog input 11.

### 3.4 Code Levels

All inputs and changes are protected by a four-digit numeric code (= password) against unauthorized intervention according to the regulations of all national and international standards for gas warning systems. The menu windows of status messages and measuring values are visible without entering a code.

The access to a code level is cancelled if no button is pushed within 15 minutes or if there is no data communication between display and basic board.

The code levels are classified in order of priority: Code level 1 has top priority.

**Code level 1: (code not changeable)**

Code level 1 is intended for the service technician of the installer to change parameters and set points. This password allows working on all settings. For opening the parameter menus, you must first activate the service mode after code release (see chapter 4.6).

- Project-based Service Tool Devices do NOT require a password. The authorization is transmitted via the internal device identifier. If the identifier is incorrect, 'Service not available' will be output if a non-compliance is detected.

**Code level 2: (code not changeable)**

With code level 2, it is possible to temporarily lock/unlock sensors. This code word is only released by the installer to the end user in problem situations. To lock/unlock, the service mode must always be activated first after code release. This functionality is **not** available in the service tool and display.

**Code level 3: (customer password is settable)**

Customer password is inactive in delivery state and is activated by entering a value. Same behaviour as code level 1, only changing the own customer password is not possible.

Only the service technician who has last changed it knows the code since it can only be changed individually via code level 1.

**Code level 4: (password 1234) (code not changeable)**

Code level 4 allows the **operator** after activation of the operation mode “Service Mode” to read all parameters as well as all test functions of the alarm relays, analog outputs and LCD.

- Manual test function of the alarm relays (functional test of the connected actuators),

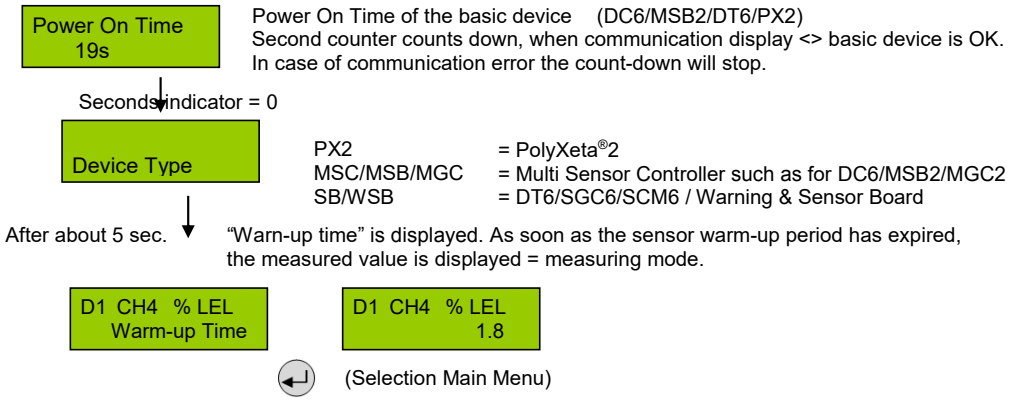
- Manual test function of the analog outputs (functional test of the connected actuators),

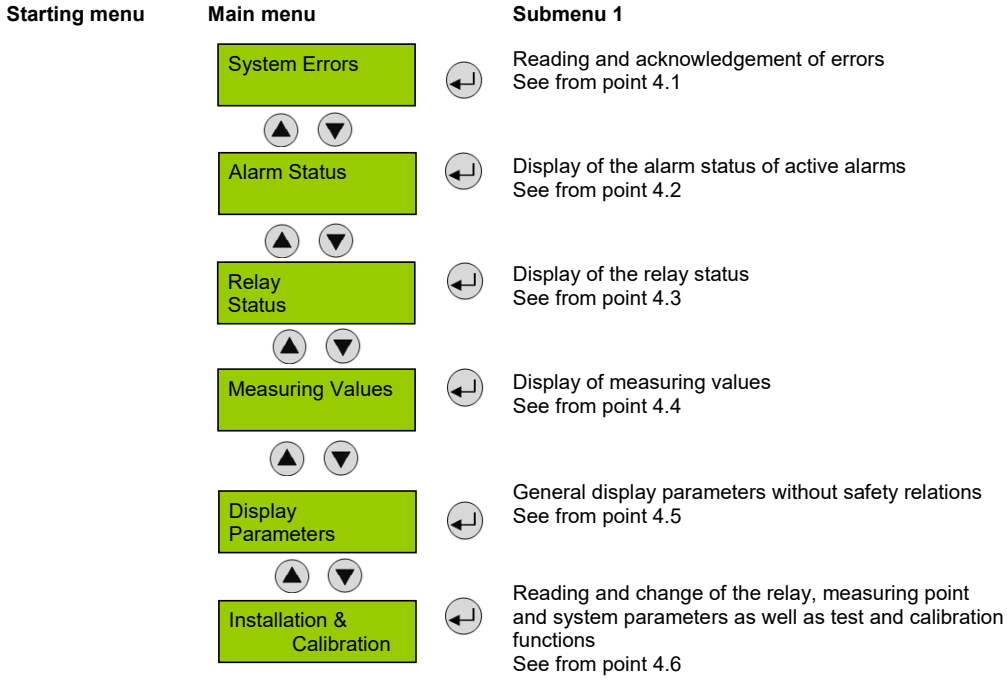
- Manual test function of the LCD (functional test of the LCD display and the LEDs).

## 4 Menu Overview

Menu operation is done via a clear, intuitive and logical menu structure. The operating menu contains the following levels:

- Starting menu with indication of the device type if no MP is registered. Otherwise scrolling display of the gas concentrations of all registered sensors in 5-second intervals. If alarms are active, only the values of the sensors currently in alarm status are displayed.
- Main menu
- Submenu 1 to 3



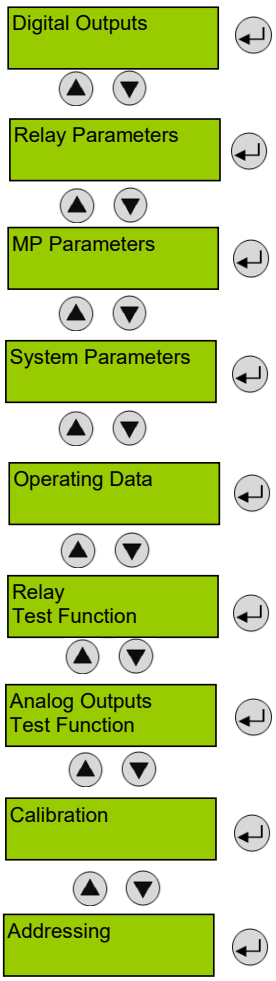



## STL6 – UserManual



**The following submenu items of "Installation & Calibration" are only accessible in Service ON mode (password protected)**

!! Service ON = Special mode = Fault message is active!!




See 4.7 (only available for AT6 display)

See from point 4.8

See from point 4.9

See from point 4.10

See from point 4.11

See from point 4.12

See from point 4.13

See from point 4.14

See from point 4.15

### 4.1 Fault Management

A pending fault activates the yellow LED (Fault).

The integrated fault management records the first 50 occurred faults with time stamps in the menu “System Errors”. The timestamp shows the days, hours and minutes that have elapsed since the fault has occurred.


Additionally, a record of the faults occurs in the “Error memory”, which can only be read and deleted by the service technician (code level 1 and 3).

#### 4.1.1 Error Memory

The errors in the error memory can be viewed on the displays without entering a code but cannot be changed. The menu “Error Memory” in the main menu “System Errors” can only be opened via the code level 1 and 3.

In the error memory, the first 50 faults that have occurred and have already been acknowledged in the menu “System Errors” are listed for the service technician in a power failure safe way.

**Attention:**

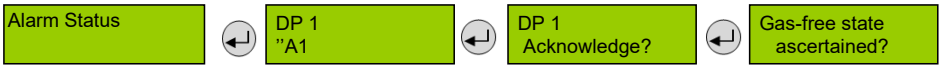
This memory should always be read during maintenance, relevant faults should be tracked and entered in the service logbook, and finally the memory should be emptied.

#### 4.1.2 System Messages and System Errors

For details about the error messages please refer to the respective User Manual.

### 4.2 Alarm Status

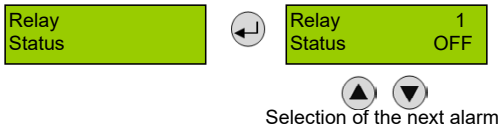
Display of the currently pending alarms in plain text in the order of their arrival. Only those measuring points are displayed, where at least one alarm is active.
Alarms in latching mode and the overrange message can be acknowledged in this menu via code levels 1, 3 and 4. (Acknowledgement only possible if the alarm isn’t generated anew.)
This menu is not available for AT6.




| Symbol | Description | Function |
|---|---|---|
| AP 1 | Measuring Point No. | Analog measuring point X = 1 - X, where an alarm is pending |
| DP 1 | Measuring Point No. | Digital measuring point X = 1 - X, where an alarm is pending |
| ‘A1<br>‘‘A1 | Alarm status | ‘A1 = Alarm 1 active<br>‘‘A1 = Alarm 1 in latching mode, can be acknowledged |

### 4.3 Relay Status

Reading of the current status of alarm relays.
The actual relay status is displayed, depending on the relay mode (energized <> de-energized).
This menu is not available for AT6.
Selection of the alarm relay 1 – X

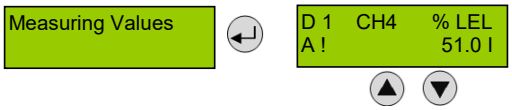



Selection of the next alarm relay

| Symbol | Description | Function |
|---|---|---|
| 1 | Alarm Relay | Alarm relay = 1 - X |
| OFF | Relay Status | Relay OFF |
| ON | Relay Status | Relay ON |

### 4.4 Menu Measuring Values

In this menu, the display shows the measuring value with gas type and unit. If the alarm evaluation is defined via the average, the display additionally shows the average value (A) to the left of the current value (C).




Selection of the next measuring point

| Symbol | Description | Function |
|---|---|---|
| A 1[1] | Meas. Point No. | Analog measuring point 1 = 1 - X |
| D 1[2] | Meas. Point No. | Digital measuring point 1 = 1 - X |
| CH4 | Gas type | Display of gas type (must comply with gas type of sensor head) |
| % LEL | Gas unit | Unit (depending on gas type) |
| 51,0 C<br>48,0 A | Measured value | C = Current measured value (current value) of the gas concentration<br>A = Arithmetic average of the gas concentr. (only if average is active) |
| A! | Alarm indication | At least one alarm has been released at this MP. |
| # | Maint. info | Sensor head: maintenance due (maintenance date exceeded) |
| ? | ConfigError | Gas type or meas. range doesn't agree with sensor head. |
| Comm. err. | Fault MP | Communication error, sensor head <> I/O board |
| Underrange | Meas. range monitoring | Meas. signal < admissible range (< zero point – 6 %) |
| Overrange[3] | | Meas. signal > admissible range (> full scale value + 6 %) |
| Gesperrt | MP Gesperrt | MP wurde vom Betreiber vorübergehend am Controller gesperrt. |
| Run-in | Run-in time | Running-in period of the sensor active |

[1] Analog input number in the measuring point where the analog sensor head is connected to
[2] Display of the address number the measuring range is registered under in the field bus
[3] Acknowledgement in the menu Alarm Status

### 4.5 Display Parameters

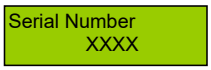
In the menu Display Parameters, you can find the general, security irrelevant parameters in the display device. These parameters can be changed in operating mode.


#### 4.5.1 Software Version


Software version of the display and of the basic board (factory set)

| Symbol | Description | Function |
|---|---|---|
| XXXXX<br>YYYYY | Software Version of the display<br>Software Version of the basic board | XXXXX Software Version<br>YYYYY Software Version |

#### 4.5.2 Serial Number




Menu only available with STL06 Tool.

Serial number of the Service Tool.

#### 4.5.3 Language


Selection of the menu language (only code level 1 and 3)

| Symbol | Description | Default | Function |
|---|---|---|---|
| English | Language | German | German<br>English<br>USA English<br>French<br>Italian |

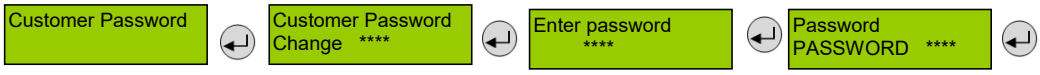
#### 4.5.4 Service Phone Number


The service phone no. can be individually defined (only code level 1 and 3).

| Symbol | Description | Default | Function |
|---|---|---|---|
| 0853.... | Phone No. | | Definition of the individual service phone no. |

#### 4.5.5 Customers password

Storage of an individual customer's password in the display for changing parameters. See 3.3 Code Level 3. Changing the password only via code level 1. This menu item will only appear after having entered the password of code level 1.



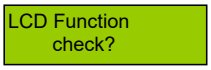

Code level 1

Enter new customer password

#### 4.5.6 Error Time Delay


| Symbol | Description | Default | Function |
|---|---|---|---|
| s | Delay | 120s | (Only code levels 1 and 3) Definition of a delay time after a communication error Display <> Basic Board has occurred (only fault indication on the display, no effect on the function or outputs) |

#### 4.5.7 LCD Function




Testing the LCD hardware. All LEDs light up for about two seconds. The backlight is yellow. (Green and red are activated at the same time). All points are displayed on the LCD.

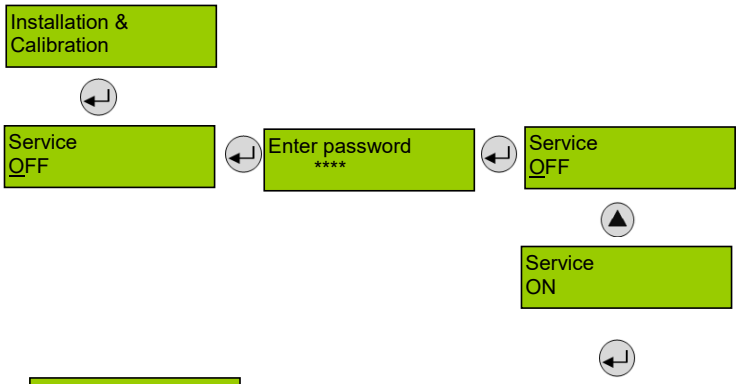
### 4.6 Installation and Calibration Section

**If parameters are changed with the Service or PC Tool, they must be checked again for correctness by reading them back!**

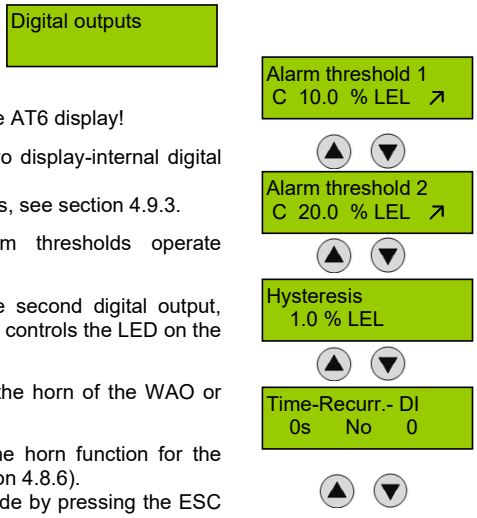
**The following menus are only accessible in the Service ON state (password protected)**
!! Service ON = Special mode = Fault signal is active!

With code level 4 for reading the parameters
With code level 1 or 3 for changing the parameters

Activate service mode.




### 4.7 Digital Outputs




This menu item is only available with the AT6 display!

Alarm thresholds can be set for the two display-internal digital outputs.
For setting the thresholds and hysteresis, see section 4.9.3.

Unlike MP parameters, these alarm thresholds operate independently of each other.

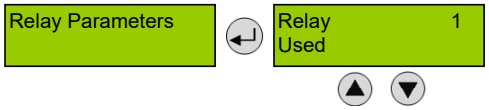
The first alarm threshold refers to the second digital output, since the first is reserved for the horn. It controls the LED on the WAO, if connected.

The second alarm threshold refers to the horn of the WAO or the optional internal horn.

In addition to the alarm thresholds, the horn function for the internal horn can be set here (see section 4.8.6).
Acknowledgement on the display is made by pressing the ESC key in the main menu. External acknowledgement of the horn via the DI is only possible if a digital input is available.

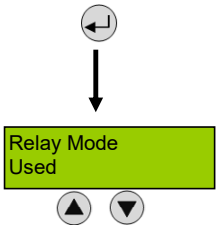
### 4.8 Menu Relay Parameters

Reading and changing of the parameters separately for each alarm relay. Changes only via code level 1. For devices of the PolyXeta®2 series, the parameter changes can only be done at the alarm relay 1.
This menu is not available for AT6.




#### 4.8.1 Relay Mode

Selection of alarm relay 1 - X

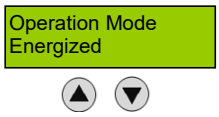



The fault relay (listed for PolyXeta®2 as relay 2; for SGC6, SCM6, DC6, MSB2, MGC2 as relay 3) can be registered here as an additional alarm relay. This registration has no influence on the function as fault relay.
No parameter changes possible here.
The relay switches off in addition when the assigned alarm is active.

| Symbol | Description | Default | Function | |
|---|---|---|---|---|
| Used | Mode | Used | Used<br>Not Used | = Relay is registered and can be assigned to an alarm<br>= Relay isn't registered |

#### 4.8.2 Relay Operation Mode

Changes to the following relays are not accepted by the base unit:
For PolyXeta®2 for relay 2,
for SGC6/SCM6 for relays 2 and 3,
for DC6, MSB2, MGC2 for relay 3.




The terms energized / de-energized come from the terms "energized / de-energized to trip" principle used for safety circuits. The terms refer to the activation of the relay coil, not to the relay contacts (as they are executed as changeover contacts and available in both principles).
The LEDs at the modules show the state in analogy. (LED off -> relay coil current-free)

| Symbol | Description | Default | Function | |
|---|---|---|---|---|
| De-energ. | Mode | De-energ. | De-energ.<br>Energ. | = Alarm OFF= Relay (and LED) current-free<br>Alarm ON = Relay (and LED) energized<br>= Alarm OFF = Relay (and LED) permanently energized<br>Alarm ON = Relay (and LED) current-free |

### 4.8.3 Relay Function Static / Flashing

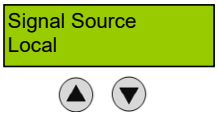

Changes to the following relays are not accepted by the base unit:
For PolyXeta®2 for relay 2,
for SGC6, SCM6, DC6, MSB2, MGC2 for relay 3.

The function "Flashing" offers a connection option for warning devices to improve visibility. The frequency is about 1 second with an impulse / pause rate of 1:1.
If “Flashing” is set, the output circuit mustn’t be used as a safe output anymore.
The combination of relay mode energized with flashing operation makes no sense and is therefore suppressed.

| Symbol | Description | Default | Function |
|---|---|---|---|
| No | Function | No | Yes = Relay function flashing in case of alarm<br>No = Relay function static in case of alarm |

### 4.8.4 Signal Source

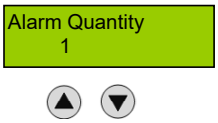
This menu item is not available for PolyXeta®2 device series.




The signal source determines whether the relay is triggered by an alarm in the I/O board (local) or from the central unit (remote).

| Symbol | Description | Default | Function |
|---|---|---|---|
| Local | Signal Source | Local | Local = The relay activation is based on local settings and alarms.<br>Remote = The relay is activated by the central unit. |

### 4.8.5 Alarm Trigger Quantity

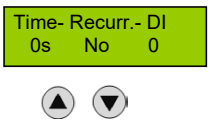



Changes to the following relays are not accepted by the base unit:
For PolyXeta®2 for relay 2,
for SGC6, SCM6, DC6, MSB2, MGC2 for relay 3.

In some applications it is necessary that the relay switches only at the $n^{th}$ alarm. Here you can set the number of active alarms necessary for relay tripping. For security applications, the relay must always switch on the first alarm. Therefore, the parameter cannot be changed in PolyXeta®2 device series.

| Symbol | Description | Default | Function |
|---|---|---|---|
| 1 | No. of Alarms | 1 | 1 = Number of pending alarms for triggering the alarm relay |

### 4.8.6 Horn Function




Changes to the following relays are not accepted by the base unit:
For PolyXeta®2 for relay 2,
for SGC6, SCM6, DC6, MSB2, MGC2 for relay 3.
The horn function of the alarm relay is activated if at least one of the two parameters (time or assignment to digital input) is set. The horn function retains its functionality even for alarms in latching mode.

This feature is not allowed for safety-related alarm messages because the output is resettable.

| Symbol | Description | Default | Function |
|---|---|---|---|
| Recurrence | Mode | No | No = Automatic reset of the relay after time has expired.<br>Yes = Recurrence function |
| Time | | 120 | Enter time for automatic reset function or recurrence function in s<br>0 = No reset function |
| DI | | 0 | 0 – X = Assignment, which digital input resets the relay |

Horn function resettable:

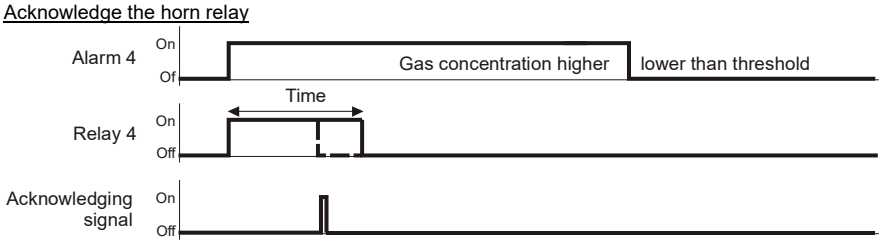
The activated horn can be reset with this function.

The following possibilities to acknowledge are available for the alarm relay as horn relay:

- By pressing the left button (ESC). Only available in main menu.
- Automatic reset at the end of the preset time (active, if value > 0).
- By a physically available internal/external pushbutton (assignment of the appropriate digital input DI 1-n).

Due to fixed polling cycles, external buttons must be pressed for a few seconds before the reaction occurs. After successful acknowledgment the horn remains permanently reset until all assigned alarms for this relay function are inactive again. Only then it is triggered anew in case of an alarm.

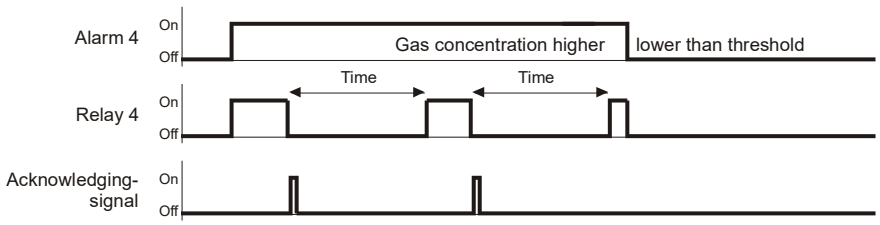
Acknowledge the horn relay




Reset command by timer, external push-button or one of the operating keys.

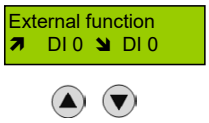
Recurrence of the horn relay

After an alarm has been triggered, the horn will remain active until a reset action is done. After acknowledgment of the horn relay (via a button or externally via digital input) a timer starts. When this time has run out and the alarm is still acting, the relay is set again. This process is repeated endlessly as long as the associated alarm remains active.




Reset command by external push-button or one of the operating keys.

### 4.8.7 External Override




This menu item is not available for PolyXeta®2 device series. Changes to the following relays are not accepted by the base unit: SGC6, SCM6, DC6, MSB2, MGC2 for relay 3.

| Symbol | Description | Default | Function |
|---|---|---|---|
| DI 0 | External ON | 0 | As long as DI 1-X is closed, relay switches ON |
| DI 0 | External OFF | 0 | As long as DI 1- X is closed, relay switches OFF. |

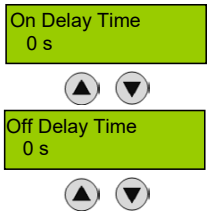
Manual operation of the alarm relays via DI does not start the "special mode", as this is a deliberate and configured functionality. The use of the override should be used with caution, particularly the function "External OFF".

Assignment of a digital input (DI) for the external switching on and off of the alarm relay.

This function has priority to gas alarm.

If External ON and External OFF are configured to the same relay and both are active at the same time, so in this state, the External OFF command has priority. In this mode, too, the relay works respecting the parameter settings "Static / Flashing" and "Energized / De-energized".

### 4.8.8 Delay Mode of Alarm Relay



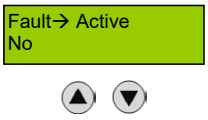

This menu item is not available for PolyXeta®2 device series. Changes to the following relays are not accepted by the base unit: SGC6, SCM6, DC6, MSB2, MGC2 for relay 3.

This menu item is not available for PolyXeta®2 device series.

Definition of the time for switch-on and switch-off delay of the alarm relays. The menu (function) of switch-on delay is not available for the PolyXeta®2 device series.

| Symbol | Description | Default | Function |
|---|---|---|---|
| 0 sec. | Switch-ON Delay Time | 0 | ≥ 1: Relay is only activated at the end of the defined time.<br>0 = No delay |
| 0 sec. | Switch-OFF Delay Time | 0 | ≥ 1: Relay is only deactivated at the end of the defined time.<br>0 = No delay |

### 4.8.9 Assignment to Fault



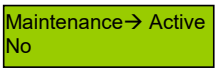

PolyXeta®2: The parameter setting for relay 2 cannot be changed.

In case of a device fault, the alarm relay is triggered in addition.

This relay output must not be used as a safe error output.

| Symbol | Description | Default | Function |
|---|---|---|---|
| No | No assignment | No | Relay is not activated in case of a device fault. |
| Yes | Assignment to fault | Yes | Relay is activated in case of a device fault. |

#### 4.8.10 Assignment to Maintenance Message




In case of a pending maintenance, the alarm relay is triggered in addition.

| Symbol | Description | Default | Function |
|---|---|---|---|
| No | No assignment | No | Relay is not activated in case of a maintenance message. |
| Yes | Assignment to maintenance | Yes | Relay is activated in case of a maintenance message. |

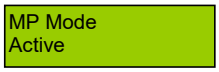
### 4.9 MP Parameters

Reading (code level 1) and changing (code level 1) of the parameters for each measuring point.
This menu is not available for AT6.

Selection of measuring point (1 – X)


#### 4.9.1 Activate – Deactivate MP

Deactivation not possible for PolyXeta®2 device series.

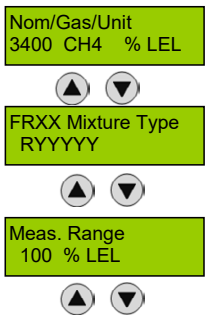



The physically present sensor head is registered at the basic device for its evaluation. After activation the measured gas signal is evaluated, and the sensor head specifications are monitored. Existing alarms and faults are cleared with deactivation of the sensor.

Attention: Deactivation of a sensor head does not cause a fault message.

| Symbol | Description | Default | Function |
|---|---|---|---|
| Active | MP Mode | Not active | Active = Measuring point activated in the controller.<br>Not active = Measuring point not activated in the controller. |

### 4.9.2 Selection of Gas Type and Measuring Range




Selectable additional information of freon type:
Menu only displayed if a Freon group has been selected as the gas type before and stored. In the second line then the actual Freon name is entered. These Freons are listed in the following table under the Freon groups in the column FORMULA.

| Symbol | Description | Default | Function |
|---|---|---|---|
| 3400 | Internal Type | ---- | Selection of gas type from internal list (must correspond with the sensor head). |
| CH4 | Formula of Gas Type | ---- | Formula (gas type) is firmly assigned to the type. |
| %LEL | Unit of Gas Type | ---- | Unit is firmly assigned to the type. |
| 100 | Measuring Range | ---- | Set measuring range (must correspond with the sensor head). |

The gas type to be monitored and the range are set in the two menus. The basic unit continuously checks the set gas type and the measuring range if they match with the gas type and the measuring range of the connected digital sensor head. If they don't match, an error message is output.

In the analog sensor head, control for compliance is not possible; nevertheless, the correct gas type and measuring range for the display and evaluation must be selected as well.

Select the 4-digit, internal type; then the type of gas and the associated unit will appear on the right next to it.

It should be noted that for some gases there are various sensor technologies and units, therefore the associated sensor head types with the respective unit are listed in the table column.

The presentation of measured values, alarm thresholds and hysteresis depends on the measuring range. If the measuring range is <10, there are three, if <100, there are two, if <1000, there is one decimal place. If => 1000, the display is without decimal place. The resolution and accuracy of the calculation is not affected by the different measuring ranges.

| Type | Sensor Head Type SC2-, SX1- AT6- | Gas Type | Formula | Meas. Range[1] | Unit |
|---|---|---|---|---|---|
| 1110 | E1110-X | Carbon monoxide | CO | 0-300 | ppm |
| 1130 | E1130-X | Nitrogen dioxide | $NO_2$ | 0-30 | ppm |
| 1129 | E1129-X | Nitrogen monoxide* | NO | 0-100 | ppm |
| 1195 | E1195-X | Oxygen | $O_2$ | 0-25 | % Vol |
| 1125 | E1125-X | Ammonia | $NH_3$ | 0-300 | ppm |
| I464 | I1464 | Carbon dioxide | $CO_2$ | 0-2000 | ppm |
| I564 | I1564 | Carbon dioxide | $CO_2$ | 0-2000 | ppm |
| S164 | I1164-A | Carbon dioxide | $CO_2$ | 0-2000 | ppm |
| I464 | I1464 | Carbon dioxide | $CO_2$ | 0-5 | % Vol |
| I564 | I1564 | Carbon dioxide | $CO_2$ | 0-5 | % Vol |
| S164 | I1164-B; -C | Carbon dioxide | $CO_2$ | 0-5 | % Vol |
| 3400 | P3400-A | Methane | $CH_4$ | 0-100 | % LEL |
| I400 | I3400-A | IR-Methane | $CH_4$ | 0-100 | % LEL |
| I400 | | IR-Methane | $CH_4$ | 0-100 | % Vol |
| I500 | | IR-Methane | $CH_4$ | 0-100 | % UEG |
| I500 | | IR-Methane | $CH_4$ | 0-100 | % Vol |

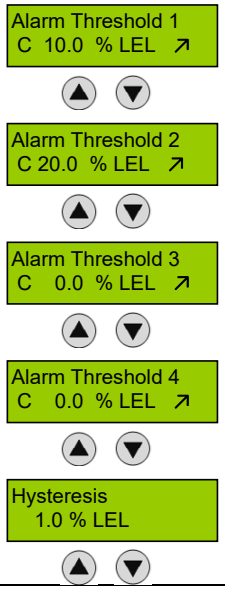
| | | | | | |
|---|---|---|---|---|---|
| 3480 | P3480-A | Propane | $C_3H_8$ | 0-100 | % LEL |
| I480 | I3480-A | IR-Propane | $C_3H_8$ | 0-100 | % LEL |
| I480 | | IR-Propane | $C_3H_8$ | 0-100 | % Vol |
| I580 | | IR-Propane | $C_3H_8$ | 0-100 | % UEG |
| I580 | | IR-Propane | $C_3H_8$ | 0-100 | % Vol |
| 3440 | P3440-A | Hydrogen | $H_2$ | 0-100 | % LEL |
| 3408 | P3408-A | Ammonia | $NH_3$ | 0-100 | % LEL |
| 3485 | P3485-A | Acetone | $(CH_3)_2CO$ | 0-100 | % LEL |
| 3430 | P3430-A | Benzene | $C_6H_6$ | 0-100 | % LEL |
| 3425 | P3425-A | Ethyl alcohol | $C_2H_5OH$ | 0-100 | % LEL |
| 3427 | P3427-A | Ethyl acetate | $CH_3COOC_2H_5$ | 0-100 | % LEL |
| 3410 | P3410-A | Ethylene | $C_2H_4$ | 0-100 | % LEL |
| 3460 | P3460-A | n-Butane | $C_4H_{10}$ | 0-100 | % LEL |
| 3491 | P3491-A | n-Heptane | $C_7H_{16}$ | 0-100 | % LEL |
| 3435 | P3435-A | n-Hexane | $C_6H_{14}$ | 0-100 | % LEL |
| 3482 | P3482-A | Isopropyl alcohol | $(CH_3)_2CHOH$ | 0-100 | % LEL |
| 3498 | P3498-A | JP8* | JP8 | 0-100 | % LEL |
| 3450 | P3450-A | Methanol | $CH_3OH$ | 0-100 | % LEL |
| 3458 | P3458-A | Methyl ethyl ketone MEK | $C_4H_8O$ | 0-100 | % LEL |
| 3470 | P3470-A | n-Octane | $C_8H_{18}$ | 0-100 | % LEL |
| 3475 | P3475-A | n-Pentane | $C_5H_{12}$ | 0-100 | % LEL |
| 3490 | P3490-A | Toluene | $C_7H_8$ | 0-100 | % LEL |
| 3448 | P3448-A | Butyl acetate | $C_6H_{12}O_2$ | 0-100 | % LEL |
| 3415 | P3415-A | Cyclohexane | $C_6H_{12}$ | 0-100 | % LEL |
| 3472 | P3472-A | Cyclopentane | $C_5H_{10}$ | 0-100 | % LEL |
| 3420 | P3420-A | Ethane | $C_2H_6$ | 0-100 | % LEL |
| 3468 | P3468-A | Isobutanol / Isobutyl alcohol | $C_2H_6\ O_2$ | 0-100 | % LEL |
| 3473 | P3473-A | Methyl acetate | $C_3H_6O_2$ | 0-100 | % LEL |
| 3495 | P3495-A | Nonane | $C_9H_{20}$ | 0-100 | % LEL |
| 3402 | P3402-A | LPG | LPG | 0-100 | % LEL |
| 3496 | P3496-A | Petrol Vapours | Petrol | 0-100 | % LEL |
| 3497 | P3497-A | Styrene* | $C_8H_8$ | 0-100 | % LEL |
| 3493 | P3493-A | Xylene | $C_8H_{10}$ | 0-100 | % LEL |
| 3405 | P3405-A | Acetylene* | $C_2H_2$ | 0-100 | % LEL |
| I495 | | Acetylene | $C_2H_2$ | 0-100 | % UEG |
| I595 | | Acetylene | $C_2H_2$ | 0-100 | % UEG |
| C160 | | VOC | VOC | 0-2000 | ppm |
| 2189 | | Ethylene | $C_2H_4$ | 0-1000 | ppm |
| 2125 | | Ammonia | $NH_3$ | 0-3000 | ppm |
| 2053 | | Xylene | $C_8H_{10}$ | 0-300 | ppm |
| D184 | | Sulphur hexafluoride | $SF_6$ | 0-1000 | ppm |
| 1199 | E1199-X | Ethylenoxid | $C_2H_4O$ | 0-10 | ppm |
| 1135 | E1135-X | Bromine | $Br_2$ | 0-2 | ppm |
| 1182 | E1182-X | Hydrogen fluoride* | HF | 0-10 | ppm |
| 1192 | E1192-X | Nitrous oxide | $N_2O$ | 0-2000 | ppm |
| 1183 | E1183-X | Hydrogen cyanide | HCN | 0-100 | ppm |
| 1185 | E1185-X | Formaldehyde | $CH_2O$ | 0-10 | ppm |
| 1186 | E1186-X | Hydrogen chloride | HCL | 0-20 | ppm |
| 1188 | E1187-X | Silane* | $SiH_4$ | 0-50 | ppm |
| 1189 | E1189-X | Ethylene | $C_2H_4$ | 0-200 | ppm |
| 1190 | E1190-X | Ozone | $O_3$ | 0-200 | ppm |
| 1193 | E1193-X | Chlorine | $CL_2$ | 0-20 | ppm |
| 1196 | E1196-X | Sulphur dioxide | $SO_2$ | 0-100 | ppm |
| 1197 | E1197-X | Hydrogen sulphide | $H_2S$ | 0-200 | ppm |
| 1198 | E1198-X | Fluorine* | $F_2$ | 0-2 | ppm |
| 1187 | E1187-X | Phosphine* | $PH_3$ | 0-5 | ppm |
| 1194 | E1194-X | Hydrogen* | $H_2$ | 0-1000 | ppm |

| | | | | | |
|---|---|---|---|---|---|
| 1181 | E1181-X | Chlorine dioxide* | $ClO_2$ | 0-1 | ppm |
| 1147 | E1147-X | Phosgene* | $COCl_2$ | 0-1 | ppm |
| 2059 | | FR01* | R12 | 20 - 2000 | ppm |
| 2061 | 2061-XX | FR02 | R23<br>R508b | 20 - 2000 | ppm |
| 063 | 2063-XX | FR03 | R1234yf<br>R452a<br>R513a<br>R454c<br>R455a<br>R454b<br>R1234ze | 20 - 2000 | ppm |
| 2064 | 2064-XX | FR04 | R123<br>R1233zd* | 20 - 2000 | ppm |
| 2066 | | FR05 | R11 | 20 - 2000 | ppm |
| 2070 | 2070-XX | FR06 | R22<br>R401a<br>R401b<br>R402a<br>R402b<br>R403a<br>R408a<br>R409a<br>R411a | 20 - 2000 | ppm |
| 2077 | 2077-XX | FR07 | R134a<br>R407a<br>R416a<br>R417a<br>R422a<br>R422d<br>R427a<br>R437a<br>R438a<br>R449a<br>R407f<br>R450a | 20 - 2000 | ppm |
| 2080 | 2080-XX | FR08 | R125<br>R32<br>R404a<br>R407c<br>R410a<br>R434a<br>R507a<br>R448a<br>R452b<br>R143b | 20 - 2000 | ppm |
| 1184 | | Arsine* | $AsH_3$ | 0 -1 | ppm |
| EXT | Connection option for sensors with 4- 20 mA signal | Temp | Temp | | °C |
| EXT | | Temp | Temp | | °F |
| EXT | | Humidity | Hum. | | % RH |
| EXT | | Pressure | Press | | mbar |
| EXT | | TOX | TOX | | ppm |
| EXT | | Comb. | Comb | | % LEL |
| EXT | | External | External | | % |
| EXT | | Digital[3] | Digital | | % |

*Not available yet.

[1] Different measuring ranges are possible, but not listed here.
[3] The use with the measuring range value: 1 results in a binary value output of the values 0 or 1

### 4.9.3 Alarm Thresholds / Hysteresis




| Symbol | Description | Default | Function |
|---|---|---|---|
| C | Evaluation | C | C = Alarm evaluation with current value of MP<br>A = Alarm evaluation with average value of MP |
| 10 % LEL | Threshold 1<br>Threshold 2<br>Threshold 3<br>Threshold 4<br>Hysteresis | XX<br>XX<br>XX<br>XX<br>XX | Gas concentration > Threshold 1 = Alarm 1<br>Gas concentration > Threshold 2 = Alarm 2<br>Gas concentration > Threshold 3 = Alarm 3<br>Gas concentration > Threshold 4 = Alarm 4<br>Gas concentration < (Threshold X –Hysteresis) = Alarm X OFF |
| ↗ | | ↗ | ↗= Alarm release at increasing concentrations<br>↘= Alarm release at falling concentrations |

Note:

Alarm evaluation: For monitoring flammable gases and oxygen, alarm evaluation via the average value (A) is not permitted. The type examination certificate according to EN60079-29-1 is only valid when the alarms are triggered by the current value (A) for the above-mentioned gases.

For each measuring point four alarm thresholds are available for free definition. If the gas concentration is higher than the set alarm threshold, the associated alarm is activated. If the gas concentration falls below the alarm threshold minus the hysteresis the alarm is reset again. In the mode “Alarm at falling” the corresponding alarm is set in case of falling below the set alarm threshold and reset again when exceeding the threshold plus hysteresis.

The presentation of the alarm thresholds depends on the set measuring range: See chapter Gas Type and Measuring Range.

The alarm thresholds are freely selectable in the range from 0 to 100 % of the measuring range.

The alarm threshold is only stored, if the value is ≥ the low-order alarm threshold.

Unused alarm thresholds have to be defined with 0, in order to avoid undesired alarms.

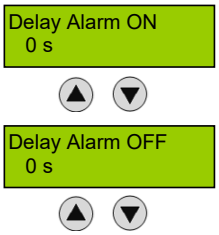
In case of a higher-level alarm the lower-level alarm remains triggered, too.

Lowest possible hysteresis: 3 % of the lowest alarm threshold

Highest possible hysteresis: 50 % of the lowest alarm threshold

### 4.9.4 Delay for Alarm ON and/or OFF

Menu item (function) “Delay Alarm ON” is not available for PolyXeta®2 device series.

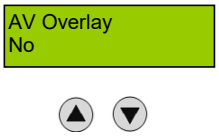



| Symbol | Description | Default | Function |
|---|---|---|---|
| 0 s | Delay Alarm | 0 sec. | Gas concentration > alarm threshold + set time = Alarm ON<br>Gas concentration < alarm threshold – hysteresis + set time = Alarm OFF |

Function only active in Current Value Mode.

### 4.9.5 Average Overlay

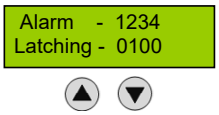
Menu (function) not available for PolyXeta®2 device series.




The alarm evaluation of the operation mode “Average” is overridden by the current value, if this one exceeds the alarm threshold and delay time defined in the menu "System Parameters AV Overlay". The overlay is delayed by the time factor entered in the local menu. The function of the average overlay is only activated for the gas type CO.

| Symbol | Description | Default | Function |
|---|---|---|---|
| No | Overlay of alarm release by current value | No | No = Average overlay not active.<br>Yes = Average overlay active |

### 4.9.6 Latching Mode Assigned to Alarm

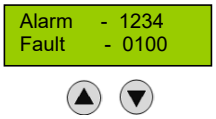



In this menu you can assign the latching mode to each alarm.

| Symbol | Description | Default | Function |
|---|---|---|---|
| Alarm | | | Presentation of the alarms 1 to 4; under each alarm you can activate the latching with 1. |
| SBH | Assignment of latching function yes/no | 0 0 0 0 | 0 = no latching; alarm resets automatically if gas concentration again < alarm threshold minus hysteresis<br>1 = latching; alarm remains active, if gas concentration < alarm threshold minus hysteresis, until reset by the operator. |

The acknowledgment of an alarm in latching mode is carried out in the menu Alarm status. See chapter 4.2.

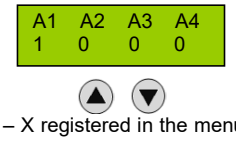
### 4.9.7 MP Fault Assigned to Alarm




In this menu you can define, which alarms should be activated by a fault at the measuring point. If the fault is remedied, the alarm is automatically reset.

| Symbol | Description | Default | Function |
|---|---|---|---|
| Alarm | | | Presentation of the alarms 1 to 4; you can define with 1 for each alarm that the alarm should be activated in case of MP fault. |
| Fault | Assignment of MP fault to alarm | 0 0 0 0 | 0 = Alarm isn't activated in case of MP fault.<br>1 = Alarm is activated in case of MP fault. |

### 4.9.8 Alarm Assigned to Alarm Relay

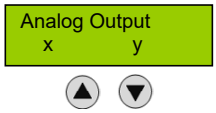



Each of the four alarms can be assigned to any alarm relay 1 – X registered in the menu Relay Parameters by entering the relay address right under the alarm. One alarm relay can be assigned to multiple alarms. Unused alarms aren't assigned. The number of physically present alarm relays depends on the device type.

For PolyXeta®2 devices there is only one alarm relay (address 1), the fault relay can also be used for alarm message (address 2). When doing so, the relay has to be registered in the menu Relay Parameters. The fault message function, however, remains unaffected.

| Symbol | Description | Default | Function |
|---|---|---|---|
| Alarm | A1 A2 A3 A4 | | Presentation of the alarms 1 to 4; you can assign an alarm relay to each alarm by setting a relay address. |
| | Assignment of alarm relay | A1 = X<br>A2 = X<br>A3 = X<br>A4 = X | X = Assignment of an alarm relay (relay address) to an alarm |

### 4.9.9 MP Assigned to Analog Output

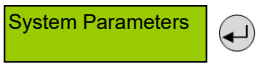



The measuring signal can be assigned to two analog outputs by entering the address of the analog output instead of x and y. The number of physically available analog outputs depends on the device type. If 0 is set here, there is no assignment and no output monitoring. If there is only one analog output as with the PolyXeta®2 device, no parameter input is possible for y.

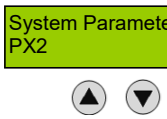
The analog outputs are configured in the menu System Parameters, AO Function.

| Symbol | Description | Default | Function |
|---|---|---|---|
| X y | Address AO | | X = Assignment of an analog output by entering the AO address<br>Y = Assignment of a second analog output by entering the AO address |

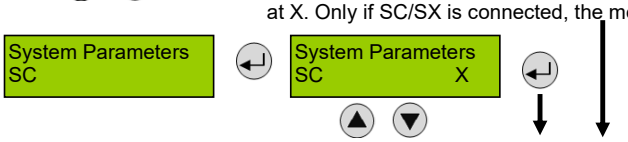
### 4.10 Menu System Parameters




Selection of the device, sensor head or basic device whose data should be processed.
SX, SC = Sensor head
PX2; DC6; DT6; SGC6; SCM6; EP = Basic device
The display automatically recognizes the connected basic unit.



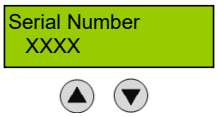

If the basic unit can manage more than one SC/SX, the selection is done at X. Only if SC/SX is connected, the menu “Serial Number” will open.



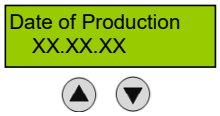

System parameters of the sensor heads can only be read, not changed.
This menu is not available for AT6.

#### 4.10.1 System Information

Menu not shown for sensor heads SC/SX
(info only by laser engraving).

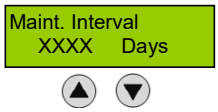



Menu not shown for sensor heads SC/SX
(info only by laser engraving).




| Symbol | Description | Defa | Function |
|---|---|---|---|
| XXXX | Serial Number | | Serial number (factory set) |
| XX.XX.XX | Date of Production | | Date of production (factory set) |

#### 4.10.2 Maintenance Interval




Input of the maintenance interval in days. If you enter < 10 days, the function is not active

The maintenance interval can be set on the basic unit for maintenance information on the connected analog inputs and individually adjusted downwards in each sensor head. This means that several maintenance messages are possible for each complete unit. If the maintenance interval is active, the accumulated maintenance message can only be acknowledged by a calibration (at the analog input or at the head).

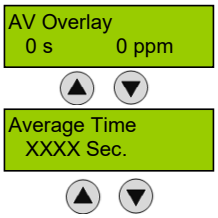
See also description Maintenance Concept in the user manual of the corresponding device.

| Symbol | Description | Default | Function |
|---|---|---|---|
| XXXX | Days | 0 | Maintenance interval |

### 4.10.3 Average Function

Menu (function) not available for PolyXeta®2 devices.
Menu not displayed with SC/SX sensor heads.

Value cannot be changed for SC.




In the menu “Average Time” you can define the time base for the calculation of the arithmetic average value (30 measurements within the time base). This average value can be used for alarm evaluation as an alternative to the current value. The selection which value should be used for evaluation is defined separately for each alarm in the menu “Alarm Threshold X”. In the average mode, the average value is indicated in the menu “Measuring Values” next to the current value.

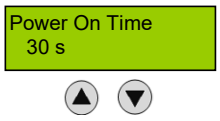
The alarm evaluation of the operating mode “Average Value” is overlaid by the current value, when the current value exceeds the alarm threshold defined in the menu “AV-Overlay”. The overlay is delayed by the time factor defined in this menu. The average overlay function is only available for the gas type CO.

Both menus are available and operable in the basic device. The menu "Average Time" is also available in the sensor head for reading the time base.

| Symbol | Description | Default | Function |
|---|---|---|---|
| XXXX | Seconds | 900 | Time base for average calculation |
| 0 s | Seconds | 120 | Delay time in case of overlay by the current value |
| 0 ppm | Alarm Threshold | 100 | Alarm threshold that triggers the overlay by the current value |

### 4.10.4 Power On Time

Value can be read with sensor head SC/SX but cannot be changed.



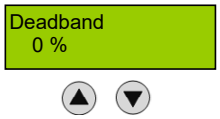

Gas sensors need a running-in period, until the chemical process of the sensor reaches stable conditions. During this running-in period the sensor signal can lead to an unwanted triggering of a pseudo alarm. Therefore, the Power On time is started at each basic unit and each sensor head after power-on or voltage recovery. While this time is running out, the device is in special mode and doesn’t activate alarms. The Power On time appears in the starting menu. During this phase the sensor head transmits "Warm-up time" instead of the measured value.

The Power On Time of the individual components may be different. Only when the longest time has expired, the system starts the measuring operation.

The recommended Power On Time is also dependent on the type of gas and can be found in the respective user manual. On SC and SX, the factory-set maintenance intervals can only be read out.

| Symbol | Description | Default | Function |
|---|---|---|---|
| XX | Seconds | 30 | Power On time |

### 4.10.5 Deadband




Menu not available for sensor heads SC/SX.

The unwanted noise of the measured value around the zero point, caused by the basic drift of the sensor, can be suppressed by activating a deadband.

With PolyXeta®2, the dead band is adjustable within ± 2 % of the measuring range for oxygen and ± 5 % for all other gases.

In the PolyGard®2 series, the dead band is adjustable up to ± 10 %.

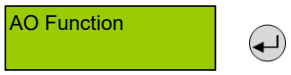
If the default value is 0, the suppression is switched off.

If the measured value is within the set % value, the display shows 0. Natural zero-point fluctuations of sensors downwards or upwards can thus be suppressed in the display. If the measured value is smaller than the dead band but still larger than -10 % of the measuring range, the measured value is displayed and the corresponding analog value is output. If the measured value is greater than -10 % of the measuring range, the fault message is triggered.

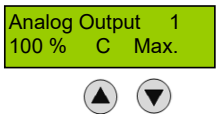
The suppression also affects the analog output, because the measured value must not have a different display depending on the output.

When the calibration mode is opened, the dead band function switches off automatically.

### 4.10.6 AO Function




Menu not available for sensor heads SC/SX.




For PolyXeta®2 devices, deviating values aren't accepted.

Next analog output

This menu is for the configuration of the analog outputs. The number of physically available analog outputs depends on the device type. PolyXeta®2 devices only have one AO.

After registration each analog output checks the current signal for plausibility. Signal deviations of more than 5% from the nominal value will generate an error message (causes: short circuit or interruption of cable, actuator not connected).

The analog output can be activated by the local device as well as by a higher-level controller. With the PX2 series, only the local control is possible.

The steepness of the current signal can be adjusted in the range of 10 to 100% in case of local control.

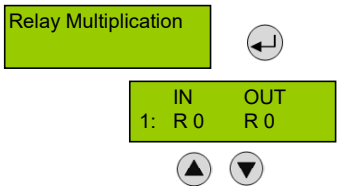
If several measuring points are assigned, you can define whether the minimum, the maximum or the average of all the assigned signals is output. It is likewise possible to define which signal of the measuring points (source) is output.

**If the 4 - 20 mA signal is used as a safe signal (SIL level), the following mandatory parameters must be used:**

| | | |
|---|---|---|
| Selection of analog signal: | **100**: | 100 % gas signal = 20 mA (standard signal) |
| Selection source: | **CF**: | Source current value signal with fault message |
| Selection of operating mode: | **Max**: | Output of the maximum value of the assigned MP |

| Symbol | Description | Default | Function |
|---|---|---|---|
| Analog Output 1 | Selection of channel | | Selection of the analog output 1 - X |
| 0<br>1<br>10-100 % | Selection of output signal | 100 % | 0 = Analog output is not used, no monitoring of the feedback<br>1 = Control by central controller<br>≥ 10 = Local control and definition of the signal slope<br>10 = 10 % gas signal = 20mA (high sensitivity)<br>100 = 100 % gas signal = 20mA (standard signal)<br>For PolyXeta®2, the fixed setting is 100 and cannot be changed. |
| C | Selection of source | A | C = Source is current value<br>A = Source is average value<br>CF = Source is current value and additional fault message at AO<br>AF = Source is average value and additional fault message at AO<br>For PolyXeta®2, the fixed setting is CF and cannot be changed. |
| Max. | Selection of mode | Max. | Min. = Displays the minimum value of all assigned MP<br>Max. = Displays the maximum value of all assigned MP<br>Average = Displays the average value of all assigned MP<br>For PolyXeta®2, the fixed setting is Max. and cannot be changed. |

### 4.10.7 Relay Multiplication




Menu only available for GC06, DC6, MSB2 and MGC2.

With the relay multiplication table, it is possible to assign an additional alarm relay to an alarm. This corresponds in the end to one multiplication of the source alarm situation per entry.

The additional relay follows the alarm status of the source but uses its own relay parameters to allow different needs of the doubled relay. So, the source relay can be configured, for example, as safety function in de-energized mode, but the doubled relay can be declared with flashing function or as horn function.

There is a maximum of two entries for IN relays and OUT relays. Thus, it is possible, for example, to expand one relay to two others or to double max. two relays.

In the column IN (source), you can set the relay assigned to an alarm in the menu MP Parameter.

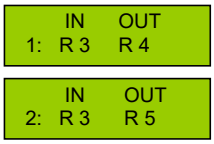
In the column OUT (target), you can enter the relay needed in addition.

Note:

Manual intervention in the menu Relay Status or override in external ON or OFF by external DI do not count as alarm status, so they do only affect the IN relay. If this is also desired for the OUT relays, it has to be configured separately for each OUT relay.

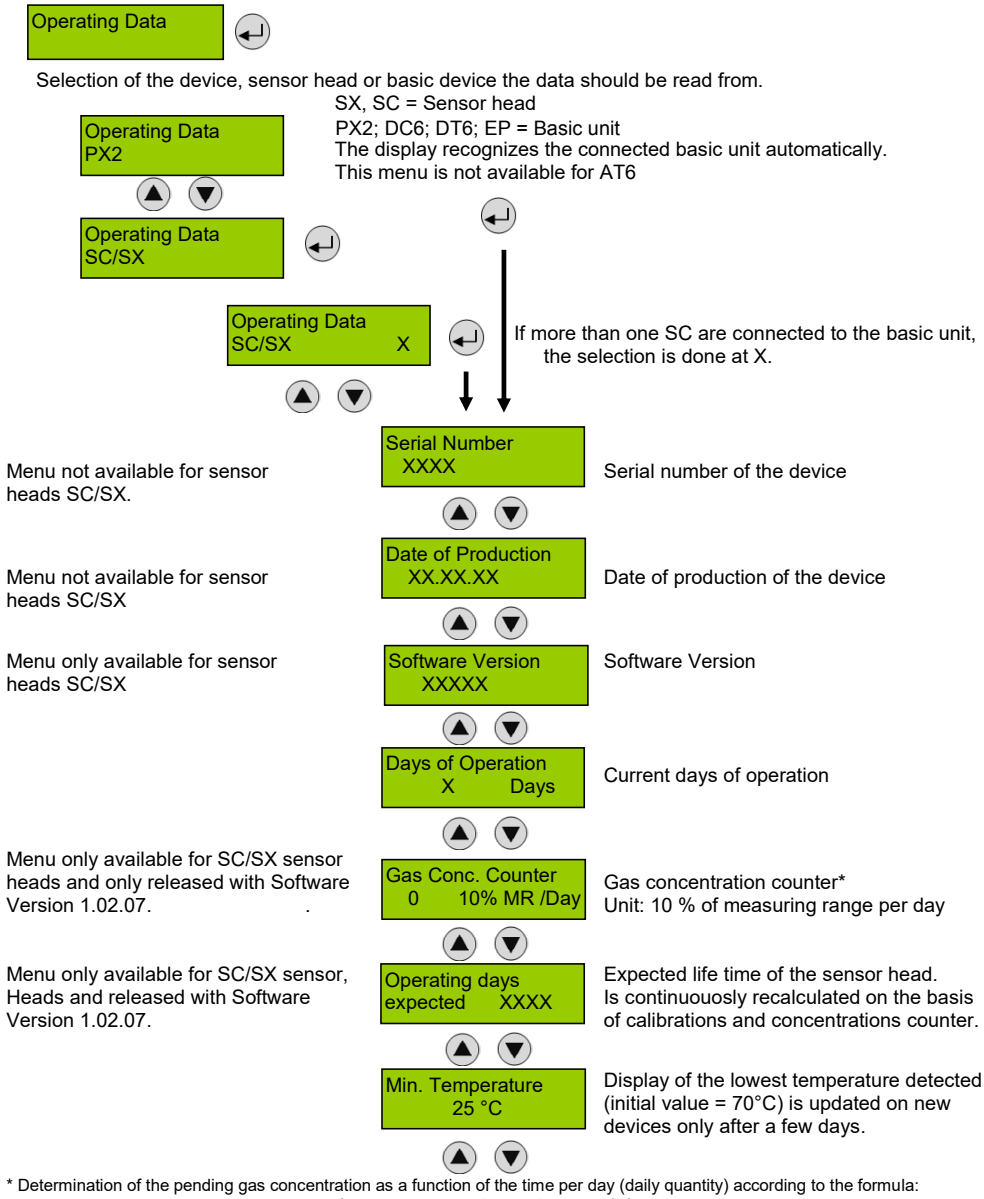
| Number | Description | Default Status | Function |
|---|---|---|---|
| 0-5 | IN AR Relay | 0 | 0 = Function off<br>X = Relay X should be multiplied (information source). |
| 0-5 | OUT AR Relay | 0 | 0 = Function off<br>X = Relay X (target) should switch together with IN relay. |

**Example:**
2 relay contacts are needed with the same effect as relay 3, (see assignment of the relays in chapter MP Parameters.)
Entry: 1: IN R3 OUT R4
Entry: 2: IN R3 OUT R5
If relay 3 is activated via an alarm, the relays R3, R4 and R5 will switch at the same time.



### 4.11 Operating Data

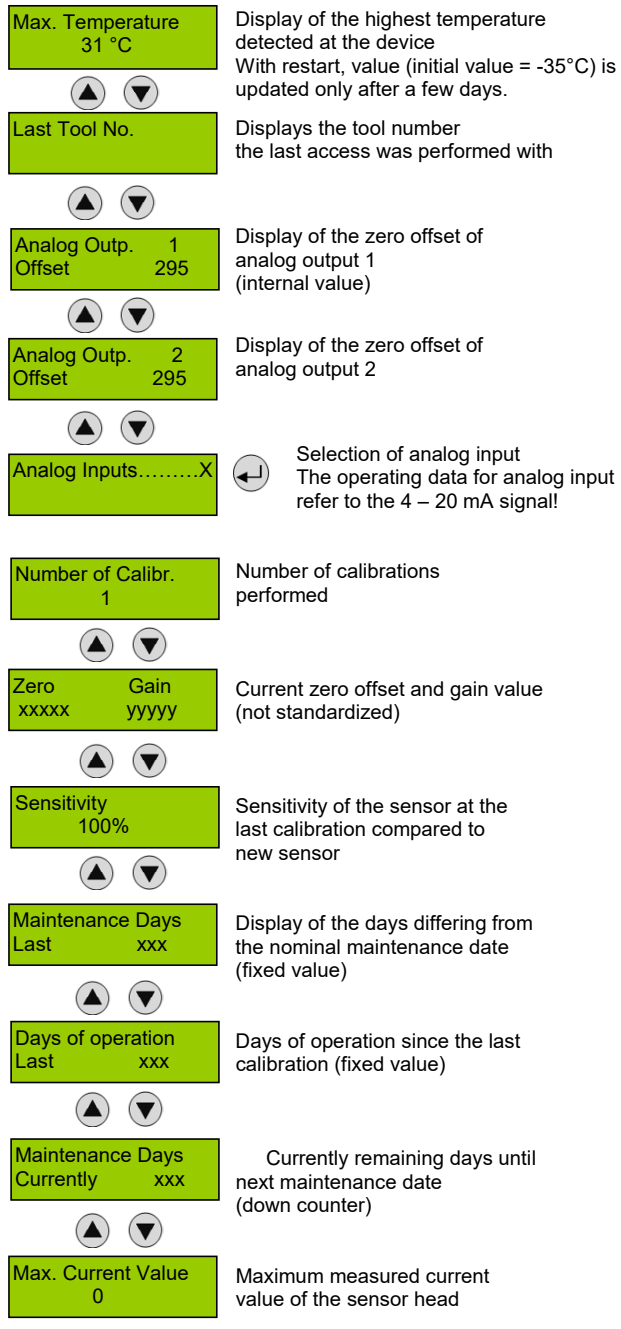
This menu is for retrieving relevant operational data of the sensor head and the basic unit. No changes or interventions are possible.




* Determination of the pending gas concentration as a function of the time per day (daily quantity) according to the formula:

(gas concentration x time unit) / 24

The total gas concentrates result from the addition of 10 % of all calculated daily quantities.
Gas concentration = % of measuring range
Time unit = Duration of exposure in h
24 = factor conversion into days


Max. Temperature 31 °C
Display of the highest temperature detected at the device With restart, value (initial value = -35°C) is updated only after a few days.
Last Tool No.
Displays the tool number the last access was performed with
Analog Outp. 1 Offset 295
Display of the zero offset of analog output 1 (internal value)
Menu only available with EP06.
Analog Outp. 2 Offset 295
Display of the zero offset of analog output 2
Menu not available for PolyXeta®2 and SC/SX sensor head.
Analog Inputs.....X
Selection of analog input The operating data for analog input refer to the 4 – 20 mA signal!
Menu only available for SC/SX sensor head
Number of Calibr. 1
Number of calibrations performed
Menu only available for SC/SX sensor head
Zero xxxxx Gain yyyyy
Current zero offset and gain value (not standardized)
Menu only available for SC/SX sensor head
Sensitivity 100%
Sensitivity of the sensor at the last calibration compared to new sensor
Menu only available for SC/SX sensor head
Maintenance Days Last xxx
Display of the days differing from the nominal maintenance date (fixed value)
Menu only available for SC/SX sensor head
Days of operation Last xxx
Days of operation since the last calibration (fixed value)
Menu only available for SC/SX sensor head
Maintenance Days Currently xxx
Currently remaining days until next maintenance date (down counter)
Menu only available for SC/SX sensor head
Max. Current Value 0
Maximum measured current value of the sensor head

### 4.12 Test Function for Relays

In this menu, the alarm relays can be manually turned on and off in order to test their function.

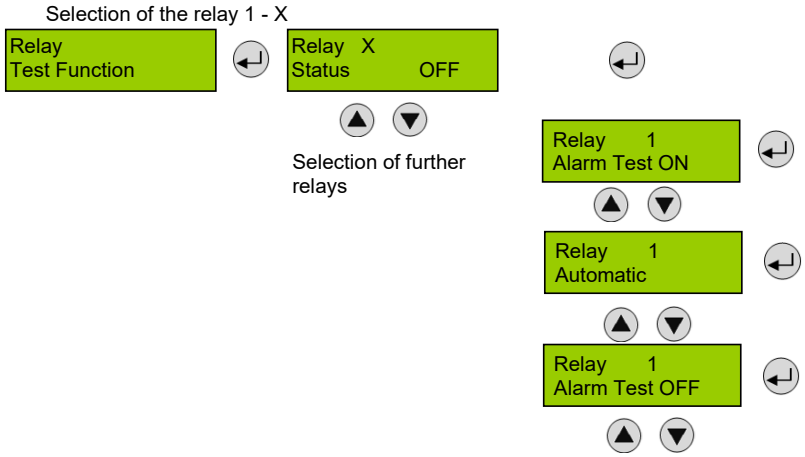
This menu is only available in special mode and only for the locally controlled relays. The relays in remote mode must be tested from DGC06.

The manual operation takes priority over activation by a gas alarm. However, the external activation of the alarm relays via a digital input takes priority over the manual test function.

The test mode simulates an alarm for the relay and the relay accepts the alarm status. The test function is deleted by selecting "Automatic" or by exiting the Special Mode.

The testing is possible via code levels 1, 3 and 4.

This menu is not available for AT6.




| Symbol | Description | Default | Function |
|---|---|---|---|
| Status | Relay No. X | | X = 1 – X Select the relay |
| OFF | Relay Status | OFF | Status OFF = Relay off (no gas alarm)<br>Status ON = Relay on (alarm) |
| Test ON | Test of the alarm message | Autom | Alarm Test ON = Relay manually set in alarm status<br>Alarm Test OFF = Relay manually set in “no alarm“ status<br>Automatic = Reset of manual intervention, relay in automatic mode |

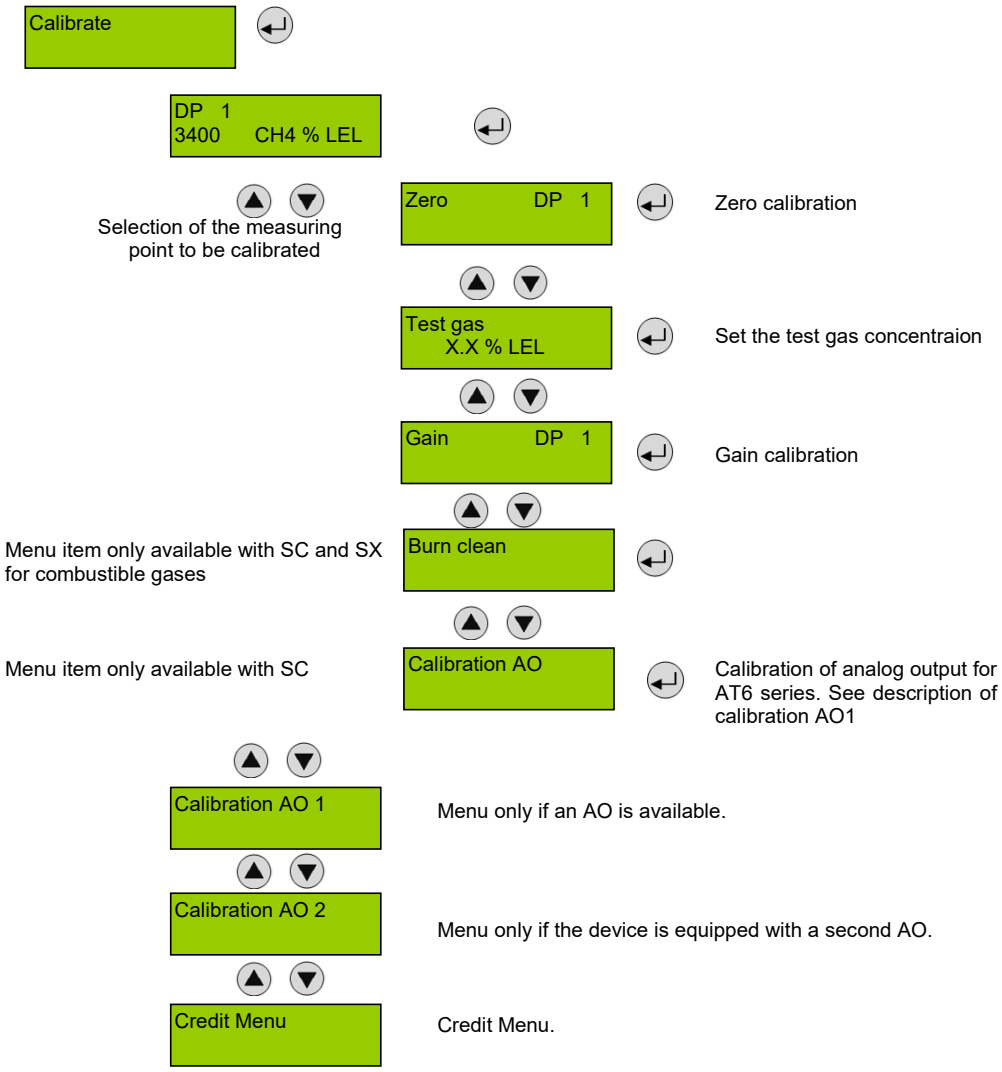
### 4.13 Test Function for Analog Output

In this menu, you can define a desired value in mA for the analog output in order to test its function. This value is then directly available at the output.
This menu is only available in special mode.
The manual operation has priority over the activation by the gas concentration.
The testing is possible via code level 1, 3 and 4.
When the menu is exited, the actual current signal is immediately output again. The entry field shows 0 meaning test function inactive.
The test function is only possible for an active analog output.
This menu is not available for AT6.

| | | |
|---|---|---|
| Analog Output<br>Test Function | AO 1 Set Value<br>4.02 mA 0.00 mA | On the left you can see the current set-point as calculated from the gas concentration. |
| | AO 1 Set Value<br>4.02 mA 12.00 mA | Enter the required current under “Set Value”, e.g. 12 mA |
| | AO 1 Set Value<br>12.00 mA 12.00 mA | The set value is accepted as set-point (by displaying it on the left) and is physically output. |

### 4.14 Calibration

On this page there is the menu overview of the calibration. The calibration description can be found on the following pages.



### 4.14.1 Zero Calibration

The gas application with the defined calibration adapter, the allowable gas pressure and flow rate and the zero gas to be used can be found in the operating instructions of the respective sensor head. The specified warm-up times etc. must be strictly observed.



Step 1: Display of the current value

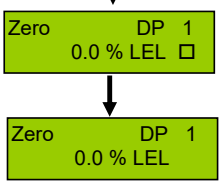
Apply test gas according to instructions.

Start calibration process.


Step 2: Calculation of the new zero offset
During calculation an underscore in line 2 runs from left to right and the current value drops to zero.

When the current value is stable, press for terminating the calculation of the new value.


Step 3: Save the newly calculated zero offset
„SAVE“ is displayed, as long as the function is executed.




After the value has been successfully stored, a square appears on the right for a short time = Zero point calibration is finished and new zero offset has been stored with success.

The display automatically goes to step 1: Display of new zero point

During the calculation phase, the following messages may occure:

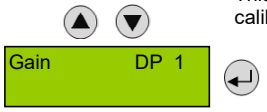
| Message | Description |
|---|---|
| Current value too high | Wrong gas for zero point calibration (>10 %) |
| Current value unstable | Is displayed as long as the deviation between two measuring cycles (100mS) is > 3 %. It automatically extinguishes when the sensor signal becomes stable. |
| Time too short | The message "value unstable" starts an internal timer (20 s). Once the timer has run out and the current value is still unstable, the text is displayed. The process starts over again. If the value is stable, the current value is displayed and the calibration procedure is continued. If the cycle is repeated several times, an internal error is present. Stop the calibration process by exiting the calibration menu and replace the sensor head. |

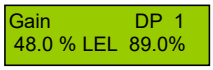
When aborting the zero-offset calibration, the offset value will not be updated. The sensor head continues to use the "old" zero offset.

#### 4.14.2 Gain Calibration

The gas application with the defined calibration adapter, the allowable gas pressure and flow rate and the test gas to be used can be found in the operating instructions of the sensor head. The specified warm-up times etc. must be strictly observed.


Enter concentration of the test gas used.
Special case Cross calibration for combustible gases: For combustible gases, a sensitivity factor related to methane is given in the operating instructions for each gas.The concentration of the methane test gas is multiplied by this factor (factor ZP). The product thereof is entered as test gas value.
This value isn't cleared when exiting the menu, therefore before restarting calibration, always check if the value is correct.

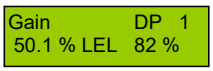



Step 1: Display of the current value and of the sensitivity from the last calibration

Apply test gas according to instructions.

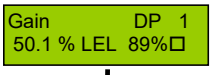
Start calibration process.



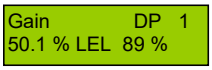

Step 2: Calculation of the new gain
During calculation an underscore in line 2 runs from left to right and the current value adapts to the set test gas concentration. The sesitivity is recalucated, too.

When the current value is stable, press for terminating the calculation of the new value.


Step 3: Save the newly calculated gain
‚SAVE' is displayed as long as the function is executed.




After the value has been successfully stored, a square appears on the right for a short time.= Gain calibration is finished and new gain offset has been stored with success.



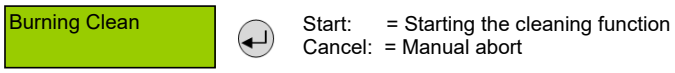

The display automatically goes to step 1: Display

During the calculation phase, the following messages may occure:

| Message | Description |
|---|---|
| Current value too high | Test gas concentration > than set value<br>Internal error → Replace sensor head. |
| Current value too low | No test gas or wrong test gas applied to the sensor |
| Test gas too high | The set test gas concentration must be between 30% and 90% of the measuring range. |
| Test gas too low | |
| Current value unstable | Appears when the sensor signal does not reach the zero point within the target time. Disappears automatically when the sensor signal is stable. |
| Time too short | The message "value unstable" starts an internal timer. Once the timer has run out and the current value is still unstable, the text is displayed. The process starts over again. If the value is stable, the current value is displayed and the calibration procedure is continued. If the cycle is repeated several times, an internal error is present. Stop the calibration process and replace the sensor head. |
| Sensitivity < | Sensitivity of the sensor head < 30 %, calibration no longer possible→ Replace sensor head. |
| Interner Fehler | Internal , unrecoverable error → Replace sensor head. |

### 4.14.3 Burning Clean

With the function "Bunrnig Clean", the Pellistor sensor is operated with a higher heating temperature for a limited period in order to remove any soiling on the heating wire which may adversely affect the sensitivity.




The menu is only displayed for SC2 and SX2 Pellistor sensors.

Before the start and during the complete burning process, test gas must be applied in the middle LEL range, preferably hydrogen, in order to achieve an increased combustion.

The gas supply is carried out with the specified calibration adapter, the permissible gas pressure and the flow rate can be found in the operating manual of the sensor head.

The operation can be stopped at any time with abort.

The special mode is activated when burning clean is active.

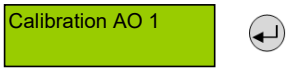
Note:

**The cleaning cannot reverse or improve a natural aging!**

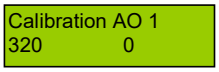
### 4.14.4 Zero-point Calibration of Analog Output

With this menu item you can correct the zero-point of the analog output (4mA). The zero-point correction is only possible when the analog output is in active mode.

The error message of the output monitoring is suppressed as long as the menu Calibration AO is open. Therefore, connect the amperemeter (measuring range 20 mA DC) to the analog output only after having opened the menu.

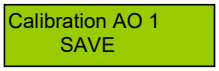



Connect amperemeter to the analog output.

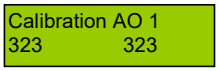



Display of the current zero offset on the left.


Adjust the zero offset on the right by changing the offset value slowly, until the amperemeter shows 4 mA.




Save the adjusted zero offset.

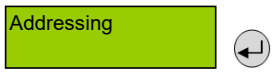



Return to the display of the current zero offset.

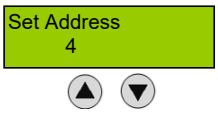
#### 4.14.5 Credit Menu

This menu item is reserved.

### 4.15 Addressing




Assignment of the basis slave address of the device for field bus operation

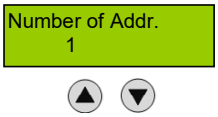



Define the basis slave address

The data of the sensor head (SC, SX) assigned at input 1 are sent with this basis slave address to the gas controller via the fieldbus.
The base unit requires / occupies a slave address for each connected sensor head. In the next menu, you can enter the number of occupied addresses. When the number is > 1, the address(es) following the basis address is / are automatically occupied.

If an address is assigned, it is displayed in the menu Measurement Values next to the letter D (digital measuring point).

For PolyXeta®2, parameter only readable, not changeable.




Define the number of occupied slave addresses.

| Symbol | Description | Default | Function |
|---|---|---|---|
| 4 | Basis Slave Address | 0 | 0 = Device is not addressed, bus not used.<br>The admissible address range depends on the device to be addressed.<br>DT6/PX2/DC6 = 1 – 96<br>EP06 = 1 – 7 |
| 1 | Number of Occupied Addresses | 1 | The number of addresses depends on the number of connected sensor heads.<br>Permitted number max.<br>PX2 = 1<br>DT6; DC6 = 3<br>EP06 = 4 |

Example:
DT6 with two sensor heads (SC2 1110 at Input 1 and SC2 3400 at Input 2).

Slave address 4 was assigned to the DT6 Board. The number of occupied addresses is 2. Thus, the SC2 1110 occupies Address 4 and SC2 3400 Address 5. The next available address of the system is Address 6.

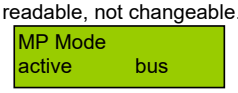
No intervention is possible for devices with fixed number of occupied addresses (e.g. PX2 with only one sensor head).

Note: The system doesn't prevent the addresses to be assigned twice.

Registration of the sensor head at the basic device and defintion of the communication (bus or analog)
For PolyXeta®2, parameter only readable, not changeable.


This menu appears for each set address.
From example above: DP4 = SC2 1110
DP5 = SC2 3400

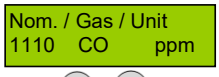
For PolyXeta®2, parameter only readable, not changeable.



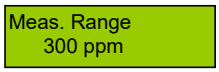

Define the MP mode.

| Symbol | Description | Default | Function |
|---|---|---|---|
| active | MP mode | inactive | active = Measuring point is activated on the device.<br>inactive = Measuring point is not activated on the device. |
| bus | Connection mode | bus | bus = Measured value comes from the connected SC.<br>analog = Measured value comes from 4 – 20mA input. |

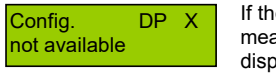
Selection gas type and range (see also chapter 4.9.2)




Define gas type.




Define measuring range.
See 4.9.2




If the number of addresses is less than the number of possible measurement points, the remaining measuring points are displayed as 'not available". No intervention is possible here.