

**ONE LIFE.
PROTECT IT.**



SENTRO X»

USER MANUAL

General Purpose

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1. PRODUCT OVERVIEW

TX6310 SENTRO X Controller with integral gas sensor

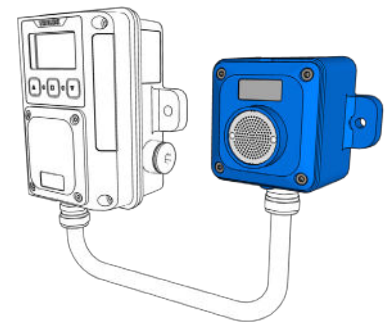
This is the main control unit within the **SENTRO X Gas Detector** suite, housing the central intelligence of the gas detection system. Designed to the rugged standards for direct operation in heavy industrial applications.



TX6310
SENTRO X Controller

TX6320 Remote Gas Sensor

Data from the Remote Gas Sensor is transmitted to the **SENTRO X Controller**, which can be mounted in a more accessible and convenient location, up to 10 metres away from the gas detection area.



TX6320 Remote Gas
Sensor interfacing with a
SENTRO X Controller

TX6310 SENTRO X Controller with integrated audio/ visual (A/V) alarm

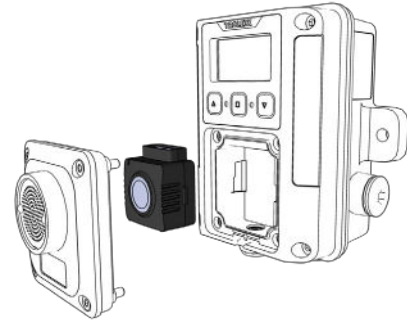
Local area A/V alarm, with high brightness LEDs and loud sounder.



SENTRO X Controller
with an A/V
alarm fitted

TX6301 gBloc Gas Sensor

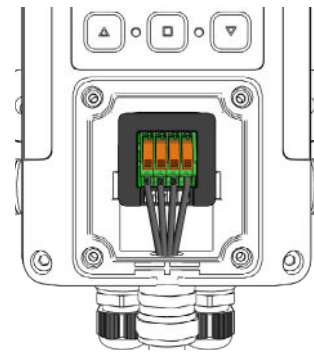
Hot-swappable smart gBloc sensors can be inserted into the **SENTRO X Controller** or the Remote Sensor. Various gas types and ranges are available for oxygen, toxic and flammable gases.



gBloc

TX6302 rBloc Remote Connection

rBloc interface connection to permit cable termination of the Remote Sensor to the **SENTRO X Controller**.



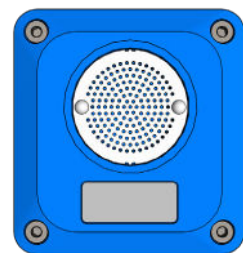
rBloc fitted in Bloc bay

Gas inlet cover

The gas inlet cover features 2 custom designed EPDM sealing gaskets to prevent ingress from the operating environment.

At the centre of the gas inlet cover is the gas inlet grille; a corrosion resistant stainless steel grille fitted above a gas permeable membrane, offering a high level of ingress protection in severe operating environments.

The complete assembly is available as a quick-change service replacement after exposure to extreme levels of contamination.



Gas inlet cover

Test gas hood

Push fit onto the gas inlet port of the **SENTRO X** for gas application test routines.

Accepts standard flexible 6 mm OD plastic flexible tubing and is vented to atmosphere.

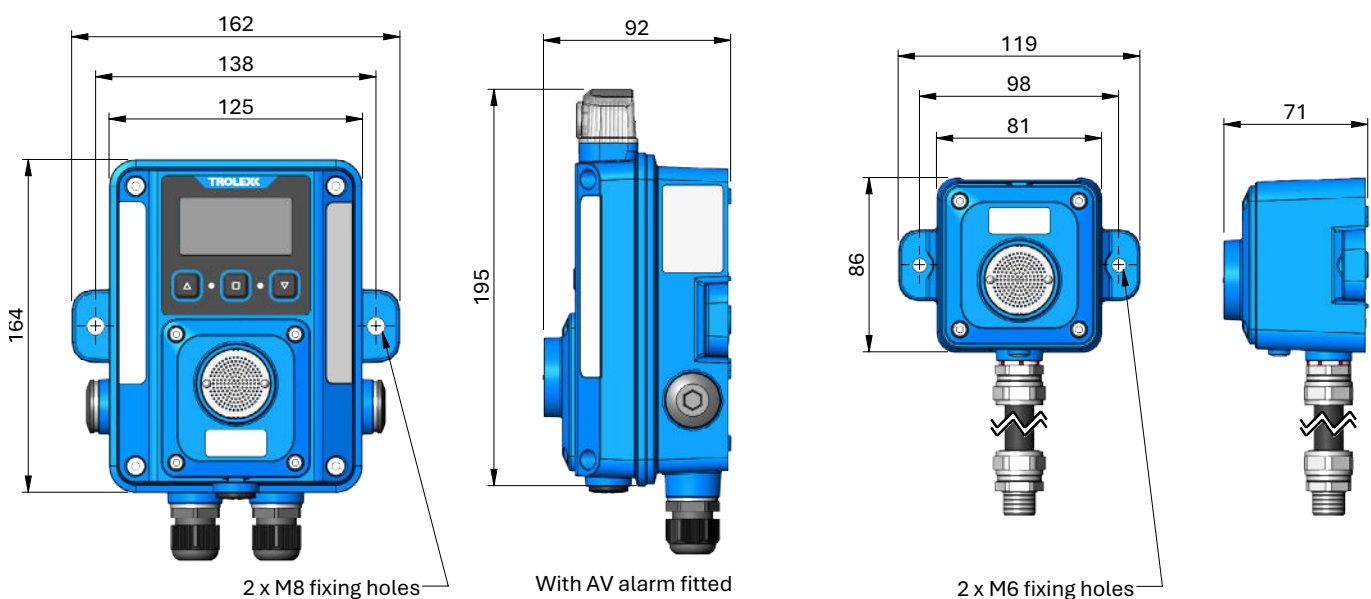


Test gas hood

1.1 Features

- Main programmable **SENTRO X Controller** with OLED graphic display and keypad
- Integral output signals: RS485 MODBUS, 4 mA to 20 mA and 0.4 V to 2 V
- Optional dual relay output relay cards with programmable alarm functions
- Optional power-over-ethernet (PoE) ethernet card
- Optional integrated A/V alarm beacon for local area warning
- Programmable Setpoint monitoring functions with assignable warnings and alarm
- Programmable STEL and TWA monitoring functions on selected toxic gas sensors
- Plug-in calibrated gas sensing gBlocs for a range of oxygen, toxic and flammable gas
- Optional remote gas sensor configuration with interconnecting flexible armoured conduit with 4-core cable

1.2 Dimensions



1.3 Order options

TX6310 SENTRO X Controller

| Option | Option | Cover | Option | A/V alarm | Option | Extension card |
|-----------|--------|-------------|--------|------------|--------|--------------------------------|
| TX6310.00 | 01 | Gas inlet | 00 | Not fitted | 00 | None |
| | 02 | Blank cover | 01 | Fitted | 01 | 1 x Dual relay |
| | | | | | 02 | 2 x Dual relay |
| | | | | | 03 | 1 x Ethernet |
| | | | | | 04 | 1 x Dual relay 1 x Ethernet |

TX6320 Remote Sensor

Gas sensors may be required to operate in restrictive and inaccessible locations. gBloc sensors can be mounted remotely from the **SENTRO X Controller** in a compact housing constructed to the same rugged standards as the **SENTRO X Controller**.

The Remote Sensor can be equipped with any standard gBloc in the range and uses the identical gas inlet cover with the same stainless-steel grille and moisture resistant membrane.

| Option | Option | Flex conduit/cable |
|-----------|--------|--------------------|
| TX6320.00 | 000 | Not fitted |
| | 050 | 5 m |
| | 100 | 10 m |

1.4 Technical specification

| | |
|-----------------------------------|---|
| Operating temperature | -20 °C to +40 °C |
| Storage temperature limits | -20 °C to +60 °C |
| Humidity | 90% RH non-condensing |
| Housing materials | Reinforced PC/ABS polymer EMC protected and proof against surface electrostatic discharge |
| Ingress protection | TX6310 SENTRO X Controller : IP65 TX6320 Remote Sensor: IP65 A/V alarm: IP65 |
| Net weight | TX6310 SENTRO X Controller : 775 g (maximum weight) TX6320 Remote Sensor: 215 g |
| Mounting | TX6310 SENTRO X Controller : <ul style="list-style-type: none"> • 2 x M8 fixing holes (unistrut compatible) TX6320 Remote Sensor: <ul style="list-style-type: none"> • 2 x M6 fixing holes (unistrut compatible) |
| Connections | TX6310 SENTRO X Controller : <ul style="list-style-type: none"> • 4 x threaded M20 cable entries provided with 2 x PVC cable glands and 2 x blanking plugs • 1 x threaded M16 cable entry (for Remote Sensor) TX6320 Remote Sensor: <ul style="list-style-type: none"> • M16 cable entry provided with stainless steel cable gland (for connection to SENTRO X Controller) |
| Information display | Graphic OLED |
| PoE Supply voltage | 16 V to 30 V DC |

1.5 Electrical details

| | |
|-------------------------------------|--|
| Electrical connections | 5 mm pitch lever lock terminals |
| Conductors | Max. 2 per terminal |
| Conductor size | Nominal 2.5 mm ² , 14 AWG (4 mm ² maximum) |
| Supply voltage | Maximum: 30 V Minimum: 16 V |
| 4 mA to 20 mA max. line load | Maximum: 526 Ohms |
| 0.4 V to 2 V min. line load | Minimum: 140 Ohms |

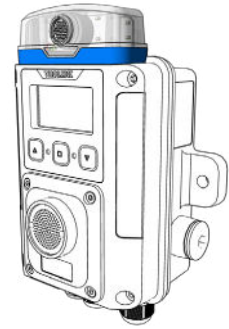
Current consumption details

| Component list | Input voltage | Typical current draw |
|-------------------------------------|----------------------|-----------------------------|
| SENTRO X Controller | Minimum 16 V | +25 mA |
| SENTRO X with Remote Sensor | Minimum 16 V | +70 mA |
| Additional | | |
| A/V alarm (active) | Minimum 16 V | +55 mA |
| 1 x Relay card (2 Relays energised) | Minimum 16 V | +80 mA |
| Ethernet card (10 Mbs) | Minimum 16 V | +40 mA |
| gBlocs (Gas) | | |
| Electrochemical | Minimum 16 V | +25 mA |
| Pellistor | Minimum 16 V | +45 mA |
| Infrared | Minimum 16 V | +65 mA |

Note: Current consumption details are based on minimum input voltage.

1.6 A/V alarm

SENTRO X can be supplied with an integrated A/V alarm, pre-fitted and internally connected, ready for operation as a local area warning. The A/V alarm can be menu-configured for preferred alarm functions and warnings.



SENTRO X Controller
with an A/V alarm
fitted

| | |
|-----------------------|--|
| Audio warning | 86 dB peak at 1 m, sweeping frequency 3 kHz to 4 kHz |
| Visual warning | Colour red, multi-point flashing high-brightness LED |
| Protection | IP65 |

1.7 Dual relay card

Up to 2 x dual relay cards may be fitted into connector slots provided on the **SENTRO X Controller** processor PCB; 1 dual relay card into **Slot A** and a second dual relay card into **Slot B**.

The relay card has 2 x independent relays, each relay having one isolated changeover output contact, which can be used for switching external circuits.

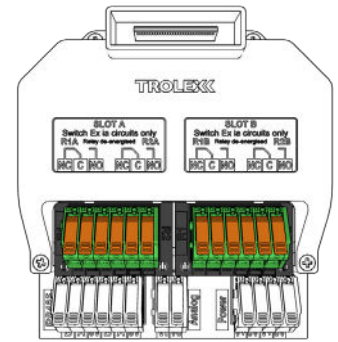
Each relay function can be independently menu-configured for preferred functional characteristics, alarm drivers and fault alerts.

1.8 Power-over-Ethernet (PoE) card

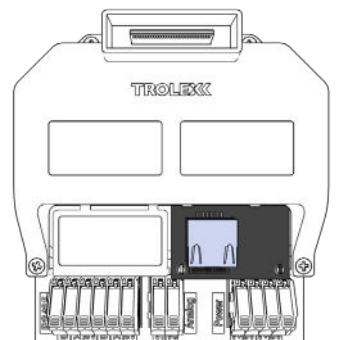
Alternatively, **Slot B** on the **SENTRO X Controller** processor PCB can accept a dedicated PoE card which allows the Controller to be powered and exchange data with wide area remote monitoring systems and SCADA networks.

In this case, only 1 Relay card can be fitted.

Note: The ethernet card can be configured for PoE or powered from a local source.



Dual relay card



Ethernet card

2. INSTALLATION

2.1 Safety precautions

It is recommended that users refer to EN/IEC 60079-29-2 for guidance on the selection, installation, use and maintenance of detectors for flammable gases and oxygen.

The installation of the product must only be carried out by competent personnel.

Each installation needs to be considered with reference to the local safety regulations and authorities.

Commissioning/verification tests prior to first use

Prior to commissioning and first use, the product should be inspected for any visible damage and integrity of the enclosure. Never use a product with a damaged housing.

Installation

Do not disassemble the sensor, or use a sensor that has a damaged housing. Irrespective of the gas being monitored, the equipment must not be installed where there is possibility of an oxygen enriched atmosphere.

Evacuation

If a dangerous level of gas concentration is detected by the instrument, leave the area immediately.

2.2 Siting recommendations

Location of gas detectors

Each installation needs to be considered in its own right, with reference to safety authorities and in compliance with mandatory local safety regulations. The sensor must be operated in accordance with the user manual to maintain safety, reliability and to preserve safety integrity where applicable.

It is important that sensors are located in positions determined in consultation with those who have specialised knowledge of the plant or installation and of the principles of gas dispersion. Reference should also be made to those responsible for the engineering layout and topology of the plant as they will be most familiar with the nature of the potential dangers and the most likely sources of gas release.

It is also important to recognise that the characteristics of the gas source can be influenced by many factors; including the relative density or buoyancy of the gas, the pressure at the point of release, the ambient temperature and the ventilation of the site.

Sensor coverage cannot be simply expressed in terms of 'number per unit area'. Sensors need to be sited where they are capable of monitoring those parts of a plant where gas may accumulate or where a source of gas release is expected to occur. This way, the earliest possible warning of a gas release can be given to initiate shutdown functions, alarm functions or safe evacuation of the area.

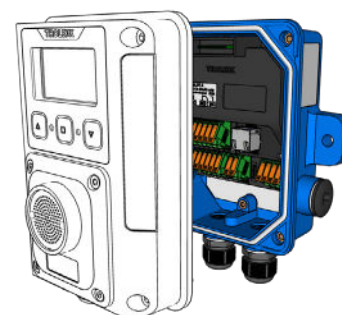
2.3 Tools and equipment

| | |
|-----------------------|---|
| 3 mm hex key | Required to remove M5 fixing screws |
| 2.5 mm hex key | Required to remove M4 fixing screws |
| Test gas | A range of test gases from 0.5 L/min source Flow regulators are available from Trolex on request |
| Test gas hood | A test gas hood is available from Trolex for application of test gas on to the SENTRO X gas sensor |

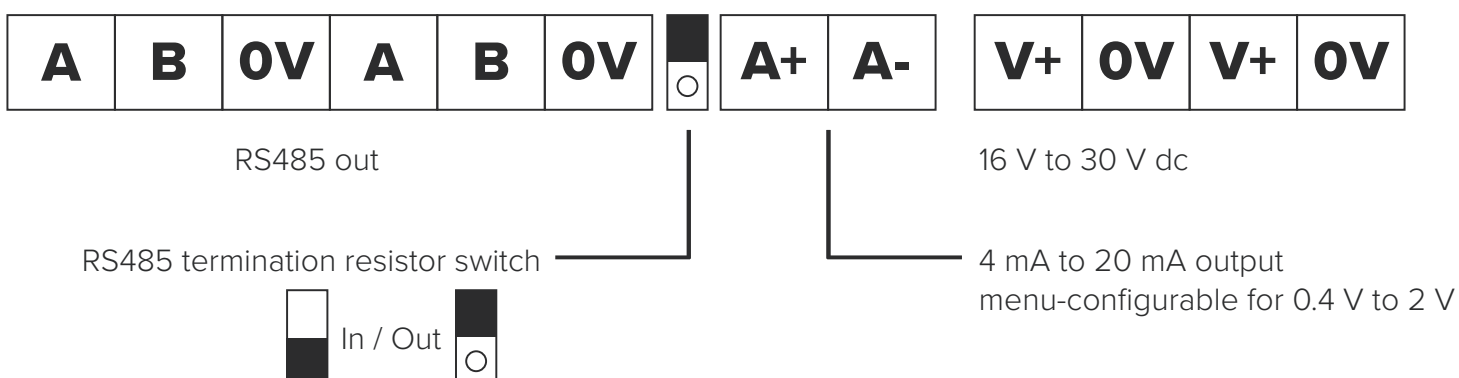
2.4 Connections

TX6310 SENTRO X Controller with integral gas sensor

- Release the 4 x outer M5 screws
- Detach the upper compartment by pulling it outwards and set aside



Removal of upper compartment



- Connect to the required terminals using the M20 cable gland entries provided
- Replace the upper compartment, docking it in-line into position
- Tighten the 4 x M5 screws to 1 Nm

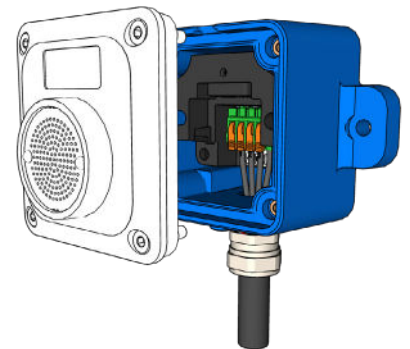


Re-assembled
Controller with cable

TX6310 SENTRO X Controller with TX6320 Remote Sensor

Wiring into the Remote Sensor

- Release the 4 x outer M4 screws
- Remove the gas inlet cover
- Remove the gBloc and cover plate to reveal the connecting terminals

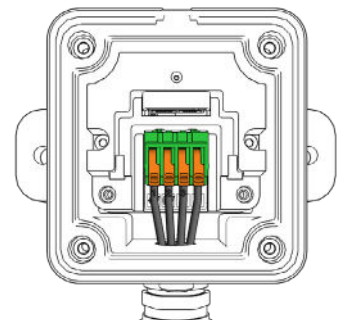


Remote Sensor
terminals

| | | | |
|-----------|-----------|----------|----------|
| +V | 0V | B | A |
|-----------|-----------|----------|----------|

- Connect to the required terminals using the M16 cable gland provided
- Replace cover plate and insert gBloc
- Replace the gas inlet cover
- Tighten the 4 x M4 screws to 0.7 Nm

Note: Connect directly to the quick-connect terminals or remove the inner module for even greater ease of connection.



Wire into
Remote Sensor
terminals

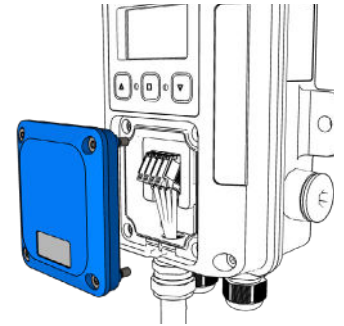
Wiring into the SENTRO X Controller

- Release the 4 x corner M4 screws
- Remove the blank cover to reveal the connecting terminals or to insert a TX6302 rBloc

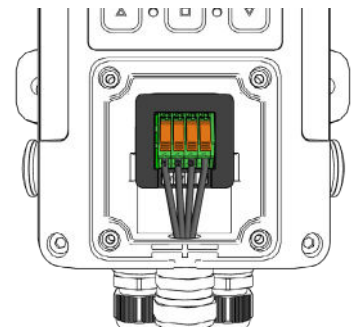


- Connect to the required terminals using the M16 cable gland provided
- Replace the blank cover
- Tighten the 4 x M4 screws to 0.7 Nm

Note: Cable connections can be installed on site using a standard 4-core data cable. Alternatively, the **SENTRO X Controller** and Remote Sensor will be supplied with flexible armoured conduit/cable.



Access to rBloc



Wire into rBloc



SENTRO X Controller
wired to
Remote Sensor

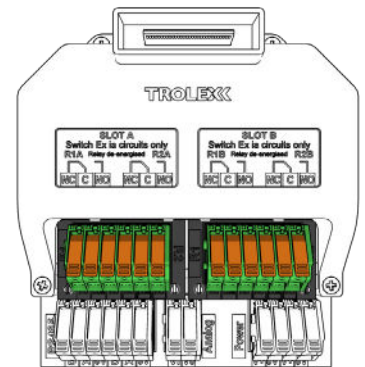
Cable connections

| | | | | |
|-------------------------|---|-----|----------------------|----|
| Cable | 0.5 mm ² 4-core, flexible data cable | | | |
| Length | Up to 10 m (where specified) | | | |
| Wire connections | TX6310 SENTRO X Controller | | TX6320 Remote Sensor | |
| | +V | 1 | 1 | +V |
| | 0 V | 2 | 2 | 0V |
| | B | 3 | 3 | B |
| | A | GND | GND | A |

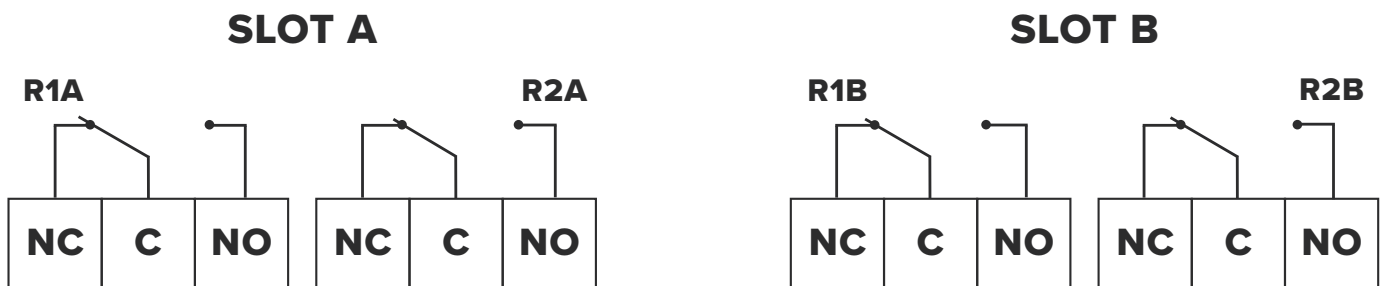
Relay cards

SENTRO X provides 2 slots for additional functions; Slot A and Slot B. Up to 2 x Dual Relay cards can be fitted to specification.

- Maximum contact voltage: 230 V ac
- Maximum switching current: 2 A



Relay card



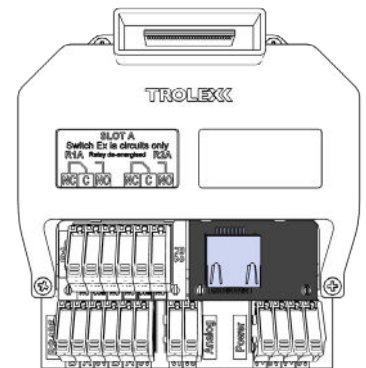
Note: SENTRO X is configured to always de-energise relay coils when power is absent as a fail-safe condition.

| SENTRO X · Power off | | SENTRO X · Power on | |
|----------------------|----------------|------------------------|--------------------|
| | | Setpoint not activated | Setpoint activated |
| Coil de-energised | Coil energised | Coil energised | Coil de-energised |
| | | | |

PoE Ethernet card

An ethernet card can be fitted to specification and will occupy **Slot B** only.

- Address: Static or dynamic assignment
- ~10 Mbps to 100 Mbps operation
- Max distance: ~100 m



Ethernet card

3. gBLOC GAS SENSING

The gBloc is an intelligent gas sensing module that offers a selection of gas measuring ranges for toxic, flammable and oxygen gas types, for use with the **SENTRO X Controller** or Remote Sensor.



gBloc

Any gBloc can be inserted into the bloc bay, with the specific characteristics of that gBloc being automatically adopted by the **SENTRO X Controller**. Each gBloc can be hot-swapped with the power applied to the **SENTRO X** at any time.

3.1 gBloc types

SENTRO X approved gBlocs.

| Gas type | Ranges up to | Cell technology |
|--------------------------------------|--------------|-----------------|
| Carbon Monoxide (CO) | 1000 ppm | Electrochemical |
| Hydrogen (H ₂) | 1000 ppm | Electrochemical |
| Hydrogen Sulphide (H ₂ S) | 50.0 ppm | Electrochemical |
| Ammonia (NH ₃) | 500 ppm | Electrochemical |
| Nitric Oxide (NO) | 50.0 ppm | Electrochemical |
| Nitrogen Dioxide (NO ₂) | 100.0 ppm | Electrochemical |
| Oxygen (O ₂) | 25.0% v/v | Electrochemical |
| Sulphur Dioxide (SO ₂) | 20.0 ppm | Electrochemical |
| Methane (CH ₄) | 5% v/v | Pellistor |
| Methane (CH ₄) | 100% v/v | Infrared |
| Carbon Dioxide (CO ₂) | 100% v/v | Infrared |

Note: See gBloc data sheet (P5600.1603) for full technical details.

3.2 Gas ID description

Each gBloc is programmed with pre-defined, default Gas ID parameters that are loaded into the **SENTRO X Controller** on first install.

- Gas type
- Gas measurement range
- Serial number
- Setpoint 1, Setpoint 2 and Setpoint 3
- Setpoint levels
- STEL and TWA Setpoint information

Pre-programmed default alarm setpoints also contain functional characteristics.

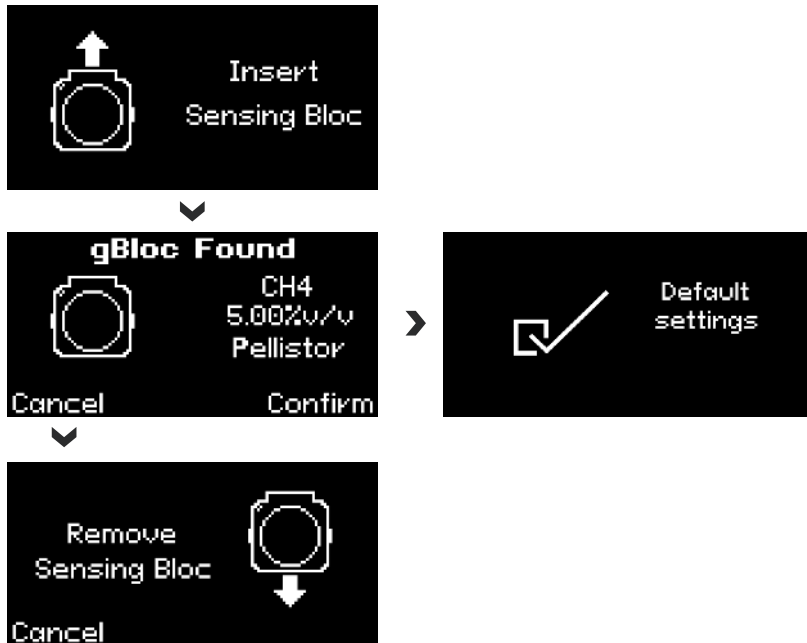
- Activate OVER the setpoint
- Activate UNDER the setpoint
- Hysteresis

Customised settings

Operating parameters can be customised as required within main menu > 'Functions'. Any changes will be permanently retained by the **SENTRO X Controller**.

3.3 gBloc installation and replacement

The **SENTRO X Controller** is agnostic and will accept any gBloc type. On first installation, the **SENTRO X Controller** accepts the default Gas ID information dictated by the gBloc.



If a direct replacement gBloc is installed (like-for-like) the **SENTRO X Controller** will accept it and immediately function in the normal way.

Change of duty

If a gBloc of differing gas type or range is installed (change-of-duty) the **Controller** will display a comparison screen and ask the user to confirm the intent. If “Change of duty” is accepted, **SENTRO X** will load the default gas ID settings from the new gBloc.



Change of gas identity

A spare gas identity label will be supplied with a change-of-duty gBloc to replace the original gas identity label located on the gas inlet cover. We will also supply a spare gas ID label with all gBlocs.

4. OPERATION

4.1 Controls and indicators



- | | |
|-------------------------------------|-------------------------|
| 1. OLED display | 7. M20 cable entry |
| 2. Keypad | 8. M16 cable entry |
| 3. Mounting foot | 9. A/V alarm (optional) |
| 4. Gas identity label | 10. Indicator lights |
| 5. Stainless steel gas inlet grille | 11. Reflective strip |
| 6. Removable gas inlet cover | 12. gBloc |

4.2 Power on

1. Splash screen



2. Insert sensing bloc

Note: Timeout fault will occur if no sensing bloc is inserted within 5 minutes of operation.



3. Sensor warmup



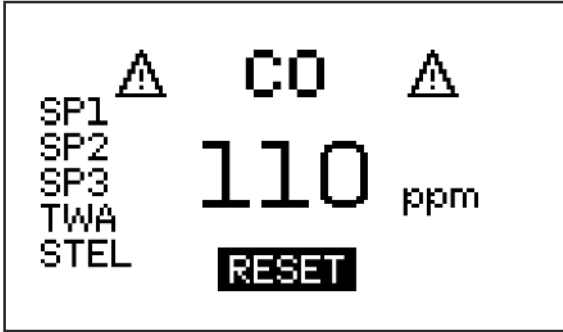
4. Gas value screen


SENTRO X is operating.



4.3 Main display

The display shown below shows the **SENTRO X** main display unit when active.

| | | |
|--|--|--|
| <p>Setpoint 1 Setpoint 2 Setpoint 3 TWA alarm state STEL alarm state</p> |  | <p>Alarm state overlay Gas type Gas concentration Gas units Instruction bars</p> |
|--|--|--|



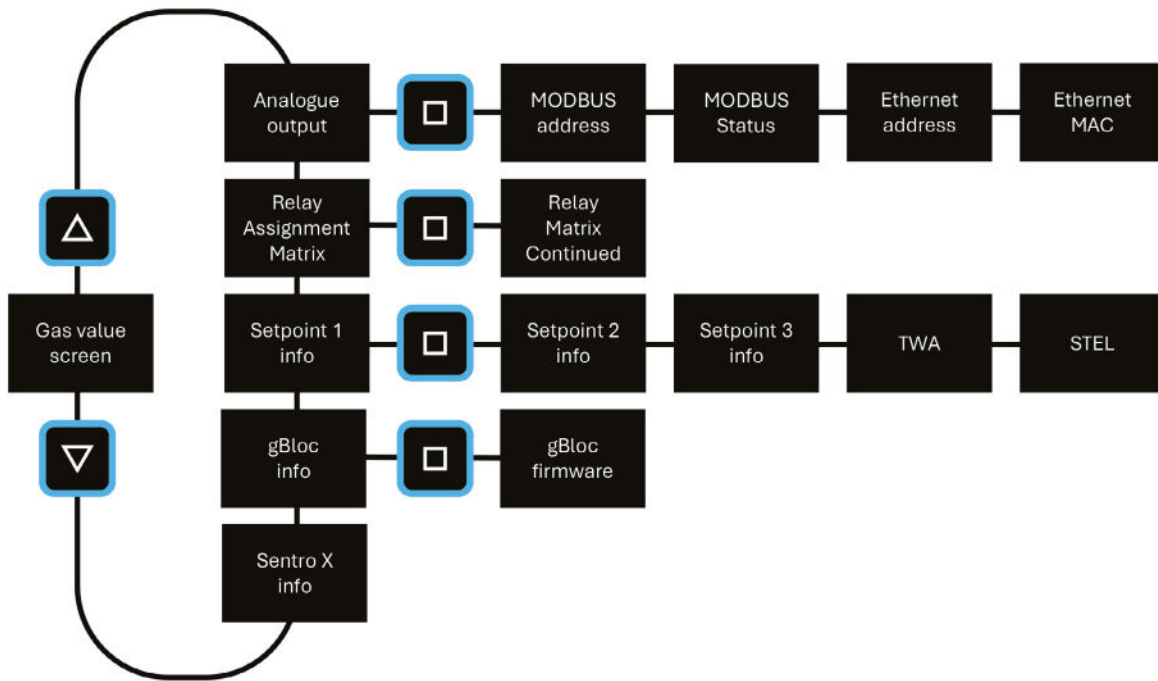
1. Scroll Up (hold to return)
2. Scroll Down (hold to mute)
3. Select/Confirm (hold for main menu) or (hold for value entry)
4. Monitor LED green
 Pulse: 'Gas Sensing' mode
 Solid state: Power on
5. LED red: 'Alarm'/'Fault'
 LED yellow: 'Maintenance Mode'

4.4 User interface

Device information overview

Passive review of firmware and settings information. Step through the information pages using the keypad.

Note: No settings or outputs will be affected. The screen will return to main display if the device times out.



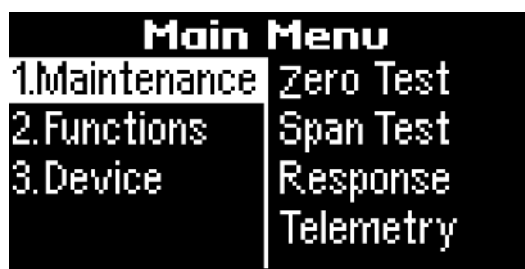
Note: The specific default information shown on each display screen will be determined by which gas type gBloc has been installed and will vary accordingly.

Any user changes subsequently applied to the default settings will be shown.

4.5 'Main Menu'

The main facilities menu is divided into 3 sections:

SENTRO X has a dynamic menu structure based on the inserted gBloc and its associated features.



Note: **SENTRO X** will automatically return to the main gas sensing screen if no commands or a period of inactivity takes place within 3 minutes. This time limit is extended to 10 minutes during maintenance routines, where the test will be cancelled.

5. MAINTENANCE

Periodic maintenance and device checking functions. All tests must be performed in accordance with local governing maintenance standards.

Note: **SENTRO X** display will be moved from an ACTIVE gas detection state, to a MAINTENANCE state during maintenance and calibration routines.

5.1 Equipment required

- Gas from a reliable source, this is typically:
 - a) 100% Nitrogen for oxygen and infrared gBlocs
 - b) A clean source of air for all other gBlocs
 - c) Standard test gas
- Regulator with a flow limit of 0.5 L/min to 1 L/min
- **SENTRO X** test gas hood

5.2 'Zero Test'

The Zero test is used to check the zero offset of the gas cell. The zero value (the value that **SENTRO X** reports at zero target gas) can drift by a small amount over time, this is a property of all gas cell technologies. Follow the steps below to carry out a Zero test:

1. Navigate to the 'Main Menu' > 'Maintenance' > 'Zero Test'
2. Follow on screen instructions to perform test
3. Use the 'Adjust' option if necessary and save

5.3 'Span Test'

The 'Span Test' is used to check the validity of the reported reading of a gBloc by the **SENTRO X**. This value can also drift slowly over time. Follow the steps below to carry out a Span test:

1. Navigate to the 'Main Menu' > 'Maintenance' > 'Span Test'
2. Follow on screen instructions to perform test
3. Wait for the gas reading to stabilise
4. Use the 'Adjust' option if necessary
5. Save the adjusted value

Note: All gas sources have error tolerances, this should be taken into account when performing a Span test.

5.4 'Response' test

The 'Response' test is used to verify the time taken to reach 90% of the target gas value (t90). Excessive response time can indicate an aged or contaminated gBloc.

To ensure accurate results, this test should be performed after successful Zero and Span tests. Follow the steps below to carry out the Response test:

1. Navigate to the 'Main Menu' > 'Maintenance' > 'Response'
2. Follow on screen instructions to perform test
3. Start the on screen timer at the same time as gas application
4. Record the t90 value at the end of the test

5.5 'Telemetry' test

SENTRO X provides several Telemetry test options, which are primarily used for testing **SENTRO X** outputs such as relays, MODBUS and 4 mA to 20 mA/0.4 V to 2 V output values.

Additionally individual **SENTRO X** functions can be tested (e.g. Setpoint 1 - All outputs assigned to Setpoint 1 will be activated). Follow the steps below to carry out a Telemetry test:

1. Navigate to the 'Main Menu' > 'Maintenance' > 'Telemetry'
2. Select your required test (e.g. relay 1A)
3. Activate test timer (the test will automatically end after 2 minutes)
4. Observe that the external equipment acts accordingly

5.6 'Linearity' test

The Linearity test will verify the linearity of the installed gBloc. This test requires more than 2 target gases. This **SENTRO X** test supports up to 5 points of linearity checking. Perform Zero and Span tests to confirm accurate gBloc operation before executing this test.

Note: Important calibration should be performed by accredited personnel only.

Follow the steps below to carry out a Linearity test:

1. Navigate to the 'Main Menu' > 'Maintenance' > 'Linearity Test'
2. Follow the on screen instructions
3. Ensure that the gas reading has stabilised before confirming the test
4. A summary table will be presented at the end of the test for recording

5.7 Dynamic 'Range' test

This test verifies the accuracy of the **SENTRO X** 4 mA to 20 mA or 0.4 V to 2 V output values. The output type (current or voltage) tested will be the type that is currently active.

For output value accuracy confirmation, a typical method is to connect a multi-meter at the connected equipment end of the system. Follow the steps below to carry out the Dynamic 'Range' test:

1. Navigate to the 'Main Menu' > 'Maintenance' > 'Range'
2. Follow the on-screen instructions. The automatic sweep can be paused at any time and the sweep continued using manual push-button increments.
3. Ensure that the values on the multimeter match the outputted value indicated on the **SENTRO X** screen.

5.8 Remove bloc

Safe removal of a gBloc is required to avoid the possibility of data corruption.

'Main Menu' > 'Maintenance' > 'Remove'

6. FUNCTIONS

6.1 gBloc parameters

Default monitoring parameters are automatically loaded into the **SENTRO X** when a gBloc is installed.

On first installation **SENTRO X** will load the default monitoring parameters defined by the chosen gBloc type. Users can customise detection parameters as required, which will be saved by the **SENTRO X Controller**.

Note: Any changes to factory default settings will be permanently retained by the **SENTRO X Controller**. If a replacement gBloc of the same type is fitted, the previously modified settings will continue to be used, not the replacement gBloc default settings.

All settings can be reset to default values in 'Main Menu' > 'Device' > 'Reset'

Note: When a gBloc of a differing type is inserted in to the **SENTRO X**, a confirm change of type sequence is activated.

6.2 Setpoints: SP1, SP2 and SP3

SENTRO X generates up to 3 independent Setpoint signals and the various operating characteristics of each Setpoint can be changed if required.

'Main Menu' > 'Functions'

1. Enable or disable Setpoint
2. Adjust the operating level
3. Apply hysteresis to the Setpoint Level
4. Set the trigger mode for OVER or UNDER the setpoint
5. Latching or auto-reset mode
6. Any setpoint can be assigned to operate a WARNING or an ALARM
7. Any relay can be ASSIGNED to be controlled by a selected Setpoint

6.3 Setpoint, fault and output assignment

SENTRO X will generate signals which can be assigned to the following outputs and indicators.

| Signal | Alarm severity | | Alarm | R1A | R1B | R2A | R2B |
|------------|----------------|----|-------|-----|-----|-----|-----|
| | Warning | | | | | | |
| SP1 | ✓ | or | ✓ | ✓ | ✓ | ✓ | ✓ |
| SP2 | ✓ | or | ✓ | ✓ | ✓ | ✓ | ✓ |
| SP3 | ✓ | or | ✓ | ✓ | ✓ | ✓ | ✓ |
| STEL | ✓ | or | ✓ | ✓ | ✓ | ✓ | ✓ |
| TWA | ✓ | or | ✓ | ✓ | ✓ | ✓ | ✓ |
| FAULT | - | or | - | ✓ | ✓ | ✓ | ✓ |
| Over-range | - | or | - | ✓ | ✓ | ✓ | ✓ |

Output assignment settings are user-customisable, any changes will be retained by the **SENTRO X Controller**.

The **SENTRO X** is programmed with the following default A/V assignment settings, when fitted.

| | Sounder | Beacon |
|--|---------|--------|
| Warning | Off | Off |
| Alarm | On | On |
| Over-range (including 'Pellistor Protect') | On | On |
| Fault | On | On |

Note: All setpoints have a unique MODBUS status flag. All alarm generators can be assigned to an alarm severity. 'Warning' or 'Alarm'.

The following default settings are defined by the gBloc Gas ID.

- Setpoint 1: Warning severity
- Setpoint 2: Alarm severity
- Setpoint 3: Disabled
- TWA: Alarm severity
- STEL: Alarm severity

6.4 STEL and TWA functions

Variants of **SENTRO X** gBlocs generate STEL and TWA setpoint signals when default or custom values are exceeded. Default values are set in accordance with EH40 standards.

Ensure local guidelines and legislation are consulted where applicable. If STEL or TWA function is enabled, ensure that all accumulated data is reset to Zero before the commencement of a working period.

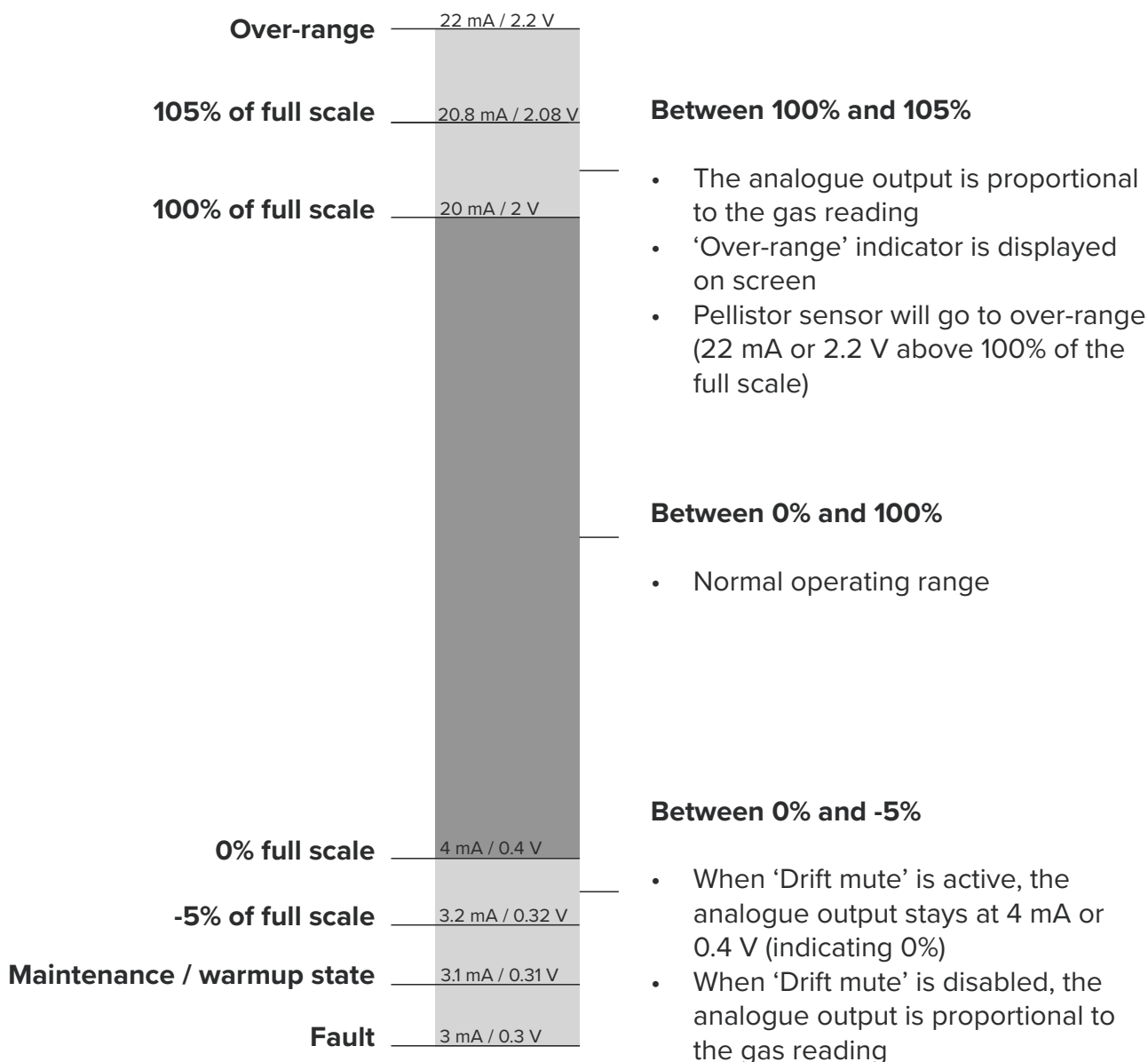
7. DEVICE

Settings for background support of **SENTRO X Controller**.

| | |
|--------------------|--|
| Output type | Select between 4 mA to 20 mA or 0.4 V to 2 V output mode |
| Trim | Analogue values are factory calibrated; however, a trim option is offered to allow adjustment |
| Reset | Reset the analogue output trim data to default settings This will remove all factory set trim calibration |

7.1 Output characteristics

Analogue data



RS485 MODBUS data

Set the MODBUS address and configuration. Refer to the supporting **SENTRO X** MODBUS documentation for a list of all registers and parameters.

Protocol information

| Property | Value | Default |
|---------------|---|----------|
| Electrical | RS485 2 Wire, Half Duplex | - |
| Protocol | MODBUS RTU | - |
| Address range | 1 to 255 | 1 |
| Data length | 8 bits | - |
| Parity | Even/Odd/None | Even |
| Stop bits | 0.5 to 2 | 1 |
| Baud rates | 1200, 4800, 9600, 19200, 38400, 57600, 115200 | 115200 |
| Endianness | Big/Little | Big |
| Byte swap | Supported | Disabled |

Ethernet

SENTRO X supports static and dynamic configuration.

| | |
|----------------------|--|
| Configuration | Choose between 'Dynamic' or 'Static' options. 'Dynamic' uses DHCP to retrieve IP information from your DHCP server. Selecting the 'Static' option will enable 'IP address', 'Subnet mask' and 'Gateway' address settings |
| IP address | Set the static IP address. This should be defined in your network router |
| Subnet mask | Set the Subnet mask |
| Gateway | Used only by the DHCP server |

7.2 A/V alarm

| | |
|-------------------|---|
| LED beacon | Assign the LED beacon to different types of system functions; 'Warning', 'Alarm', 'Fault', 'Over-range' |
| Sounder | Assign the sounder to different types of system functions; 'Warning', 'Alarm', 'Fault', 'Over-range' |

7.3 Field firmware updates

SENTRO X Controller can be updated in the field with the latest firmware as required using a programming Bloc (pBloc) where required.



pBloc

Note: Trolex will notify users and Distributors of the need to firmware upgrade infield devices.

7.4 Passcode protection

SENTRO X main menu is passcode protected by default. It is recommended this is changed to a unique code based on user requirements via the 'Device Settings' menu.

Passcode protection can be disabled as required.

Note: Default Passcode: 0000

7.5 Drift mute

Automatic suppression of gas values that have drifted below zero. Drift mute can be enabled or disabled as required. This setting does not affect under-range alarms or faults.

7.6 Display

| | |
|--------------------|---|
| ESD refresh | This option allows for a periodic full screen refresh |
| Sleep | A setting to allow the screen to fully turn off after 2 minutes (recommended) |

7.7 'Watchdog'

A test function is provided to test the independent watchdog. Clear instructions are given on device. Your device will reboot as part of the test.

7.8 'Reset'

This option resets the **SENTRO X Controller** to default settings. The following stored information will be deleted/restored to default:

- Gas ID information
- All setpoint information
- All TWA/STEL information
- All relay assignments
- All A/V alarm assignments
- MODBUS settings
- Ethernet settings
- Analogue out is reset to 4 mA to 20 mA
- Any previously remembered maintenance function gas values

Factory programmed information such as serial numbers will be retained. The password is not reset to default.

7.9 'Reboot'

Perform a software reboot of the internal micro-controller. This does not power cycle the **SENTRO X**.

8. CERTIFICATION OF CONFORMITY

Commissioning / verification tests prior to first use.

Prior to commissioning and first use, the product shall be inspected for any visible damage and integrity of the enclosure. Never use product with damaged housing in hazardous locations.

Maintenance

The maintenance of the product must only be carried out by competent personnel. Maintenance shall be considered with reference to the local safety regulations and authorities. Refer to the following standard for additional guidance:

- IEC/EN 60079-17

It is recommended to periodically check the condition of the product.

Repair

The product shall only be serviced and repaired by Trolex Ltd or a local Trolex service agent approved by Trolex Ltd in order to maintain the safety integrity of the product. Refer to the following standard for additional guidance:

- IEC/EN 60079-19

9. DIAGNOSTICS AND MAINTENANCE

9.1 Diagnostic messages

SENTRO X is programmed to provide on-device diagnostic messages in the event of 'Fault' activation.

Diagnostic or fault messages will take priority based on order of severity in the case that multiple events occur.

| On-screen message | Reason | Priority |
|------------------------|--|----------|
| Settings checksum | Error in boot sequence | 1 |
| Info checksum | Error in boot sequence | 2 |
| Card configuration | Error in boot sequence | 3 |
| Ethernet card MAC | No MAC address found | 4 |
| System program corrupt | Program/Flash error | 5 |
| RAM health critical | Uncorrectable RAM error | 6 |
| Watchdog test fail | Under performed watchdog test fail | 7 |
| Low supply voltage | Supply voltage below specified limit | 8 |
| No Bloc signal | No signal received from gBloc | 9 |
| Cell Bloc error | Problem reported with gBloc | 10 |
| No Bloc timeout | 3-minute timeout on 'Insert Bloc' screen | 11 |
| Configuration timeout | 3-minute timeout on user activity during configuration | 12 |
| Under-range | Gas concentration is below -10% of full scale | 13 |

Diagnostic messages can be cleared via the 'Clear' prompt following resolution of the Fault condition.

If the fault condition remains, please contact Trolex for further information.

Fault states

SENTRO X ‘Fault’ states overwrite any other product state such as ‘Gas Sensing’, ‘Maintenance’, ‘Warning’ or ‘Alarm’, ‘Pellistor Lockout’ and ‘Over-range’.

If any previous state was in a latched mode prior to ‘Fault’ occurrence, then clearing the fault will return to the previously latched state.

Clearing a ‘Fault’ will clear all the faults that may have occurred previously.

9.2 Sensor Under or Over-range

9.2.1 Electrochemical and infrared sensors

| % of detection range | Screen | Latching | Green LED | Yellow LED | Red LED | A/V Assign | Relay Assign | Sensor Power |
|----------------------|--------|----------|-----------|------------|---------|------------|--------------|--------------|
| 100% FS | | ✓ | On | - | Flash | ✓ | ✓ | Off |
| 0 | | x | Pulse | - | - | - | - | On |
| -5% FS | | x | Pulse | - | - | x | x | On |
| -10% FS | | x | Pulse | - | - | x | x | On |
| -10% FS | | ✓ | On | Flash | - | ✓ | ✓ | On |

- ✓ Assigned/assignable
- N/A
- x Not assigned/assignable

9.2.2 Pellistor sensors

| % of detection range | Screen | Latching | Green LED | Yellow LED | Red LED | A/V Assign | Relay Assign |
|----------------------|--------|----------|-----------|------------|---------|------------|--------------|
| 105% FS | | x | Pulse | - | Flash | ✓ | ✓ |
| | | x | Pulse | - | Flash | ✓ | ✓ |
| 100% FS | | x | Pulse | - | - | x | x |
| | | x | Pulse | - | - | x | x |
| -5% FS | | ✓ | Pulse | - | - | x | x |
| -10% FS | | ✓ | On | Flash | - | ✓ | ✓ |

- ✓ Assigned/assignable
- N/A
- x Not assigned/assignable

9.3 ‘Pellistor Protect’

SENTRO X will deploy the ‘Pellistor Protect’ state in the event that the measured gas values exceeds 100% of full scale.

Transmitted output signals

| | |
|-------------------|---|
| Display | Pellistor Lockout alarm |
| 4 to 20 mA | Clamped at 22 mA |
| 0.4 to 2 V | Clamped at 2.2 V |
| MODBUS | Gas value reads -10,000 and over-range flag set |
| Relays | Active when assigned |
| A/V | Active when assigned |

The pellistor in the gBloc will be switched into a ‘Protect’ state to prevent oxidisation damage.

Ensure gas concentration has receded, then reset the pellistor using the on-screen prompt. Failure to reset in normal gas concentrations may cause cell damage and the gBloc should be replaced.

It is recommended that the cell is calibrated following exposure to excessive gas concentrations.

9.4 Maintenance

Output signals

Check the accuracy of the sensor output signal at pre-determined intervals by injecting a test gas.

gBlocs

SENTRO X gBlocs may be changed at regular intervals to ensure the accuracy of response.

Troxex ‘Calibration Recommendation’ statement

SENTRO X performs an important safety function and periodic calibration is an essential part of maintaining safety integrity.

Gas sensors have a known Zero and Span movement related to time, level of exposure to gas and the nature of the operating environment.

Troxex recommend that the sensors are tested with suitable test gas at regular intervals. This should always be carried out in compliance with local standards and legislations. Following a Zero test and

Span test, adjust or calibrate the sensor if necessary, or as a minimum, every 6 months, to ensure correct operation.

Calibration must be carried out by competent personnel, with the appropriate accreditation. Always consult local standards and legislation for best practice.

9.5 Recommended test gas concentrations

| Gas sensor type | Zero gas | Calibration/balance gas |
|--------------------------------------|----------------------------|--|
| CH ₄ (Pellistor) 100% LEL | Clean air | 2.2% v/v CH ₄ in air |
| CH ₄ Infrared | Clean air or Nitrogen 100% | 50% to 100% of range CH ₄ in N ₂ |
| CO | Clean air | 50% to 100% of range CO in air |
| H ₂ S | Clean air | 50% to 100% of range H ₂ S in air |
| NO | Clean air | 50% to 100% of range NO in air |
| NO ₂ | Clean air | 50% to 100% of range NO ₂ in air |
| SO ₂ | Clean air | 50% to 100% of range SO ₂ in air |
| CO ₂ | Nitrogen 100% | 50% to 100% of range CO ₂ in air |
| O ₂ | Nitrogen 100% | Clean air |

Standard test gas canisters are available from our Technical Services department or approved Distributor, and can be supplied in a range of capacities from 34 litres up to 110 litres.

Please call our sales engineers for advice regarding recommended test gas procedures and product support plans.

Note:

- Methane (CH₄) test gas must be combined with balance air if being used to calibrate catalytic pellistor-based devices
- Oxygen (O₂) test gas can only be supplied at a maximum concentration of 23%

10. DISPOSAL

10.1 Waste of Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU)



This symbol, if marked on the product or its packaging, indicates that this product must not be disposed of with general household waste.

In the European Union and many other countries, separate collection systems have been set up to handle the recycling of electrical and electronic waste.

At the end of the product's life, do not dispose of any electronic sensor, component or instrument in the domestic waste. Contact Trolex or the Distributor for disposal instructions.

DISCLAIMER

The information provided in this document contains general descriptions and technical characteristics of the performance of the product. It is not intended as a substitute for and is not to be used for determining suitability or reliability of this product for specific user applications. It is the duty of any user or installer to perform the appropriate and complete risk assessment, evaluation and testing of the products with respect to the specific application or use. Trolex shall not be responsible or liable for misuse of the information contained herein. When instruments are used for applications with technical safety requirements, the relevant instructions must be followed.

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At Trolex, we save lives.

We believe that no person should risk their life to earn a living.

Our aim is to become the world's leading name in health and safety technology, through pioneering products that provide real-world benefits to our customers, whenever workers operate in hazardous environments.

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