

**ONE LIFE.
PROTECT IT.**



SENTRO X«

USER MANUAL

Ex ia I Ma

CONTENTS

1. Product overview	3	6.3 Setpoint, Fault and Output assignments	28
1.1 Features	5	6.4 STEL and TWA functions	29
1.2 Dimensions	5	7. Device	30
1.3 Order options	6	7.1 Output characteristics	30
1.4 Technical specification	7	7.2 A/V alarm	32
1.5 Electrical details	8	7.3 Field firmware updates	32
1.6 Audio/visual (A/V) alarm	9	7.4 Password protection	32
1.7 Dual Relay card	10	7.5 ‘Drift mute’	32
1.8 I.S Ethernet card	10	7.6 Display	32
2. Installation	11	7.7 ‘Watchdog’	32
2.1 Safety precautions	11	7.8 ‘Reset’	33
2.2 Siting recommendations	11	7.9 ‘Reboot’	33
2.3 Tools and equipment	12	8. Certification of Conformity	34
2.4 Connections	12	9. Diagnostics and maintenance	37
3. gBloc gas sensing	17	9.1 Diagnostic messages	37
3.1 gBloc types	17	9.2 Sensor Under or Over-range functions	39
3.2 Gas ID description	18	9.2.1 Electrochemical and infrared sensors	39
3.3 gBloc installation and replacement	18	9.2.2 Pellistor sensors	40
4. Operation	20	9.3 ‘Pellistor Protect’	41
4.1 Controls and indicators	20	9.4 Maintenance	41
4.2 Power on	21	9.5 Recommended test gas concentrations	42
4.3 Main display	22	10. Disposal	43
4.4 User interface	22	10.1 Waste of Electrical and Electronic Equipment (WEEE) Directive	43
4.5 Main menu	23	Disclaimer	44
5. Maintenance	24	Trademark	44
5.1 Equipment required	24		
5.2 ‘Zero Test’	24		
5.3 ‘Span Test’	24		
5.4 ‘Response’ test	25		
5.5 ‘Telemetry’ test	25		
5.6 ‘Linearity’ test	25		
5.7 Dynamic ‘Range’ test	26		
5.8 ‘Remove’ bloc	26		
6. Functions	27		
6.1 gBloc parameters	27		
6.2 Setpoints: SP1, SP2 and SP3	28		

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 underground hazardous areas and heavy industrial applications.

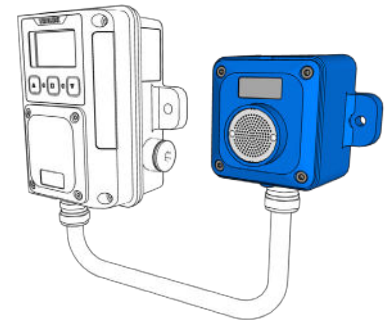
Certified to the latest Group I, M1 intrinsically safe standards and gas performance requirements, giving the highest possible safety protection.



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

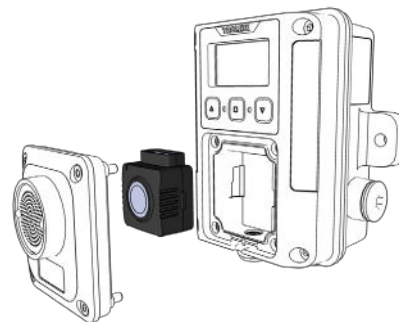
Local area A/V alarm, with high brightness LEDs and loud sounder.



SENTRO X Controller
with an A/V
alarm fitted

TX6301 gBloc Gas Sensor

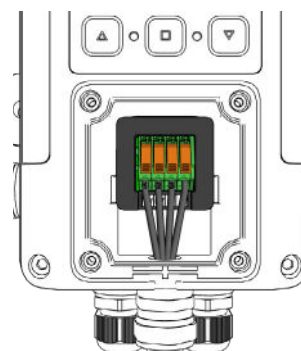
Hot-swappable smart gBloc sensors can be inserted into the **SENTRO X Controller** or the Remote Sensor. Various gas types and ranges are available for oxygen, toxic and flammable gases.



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.

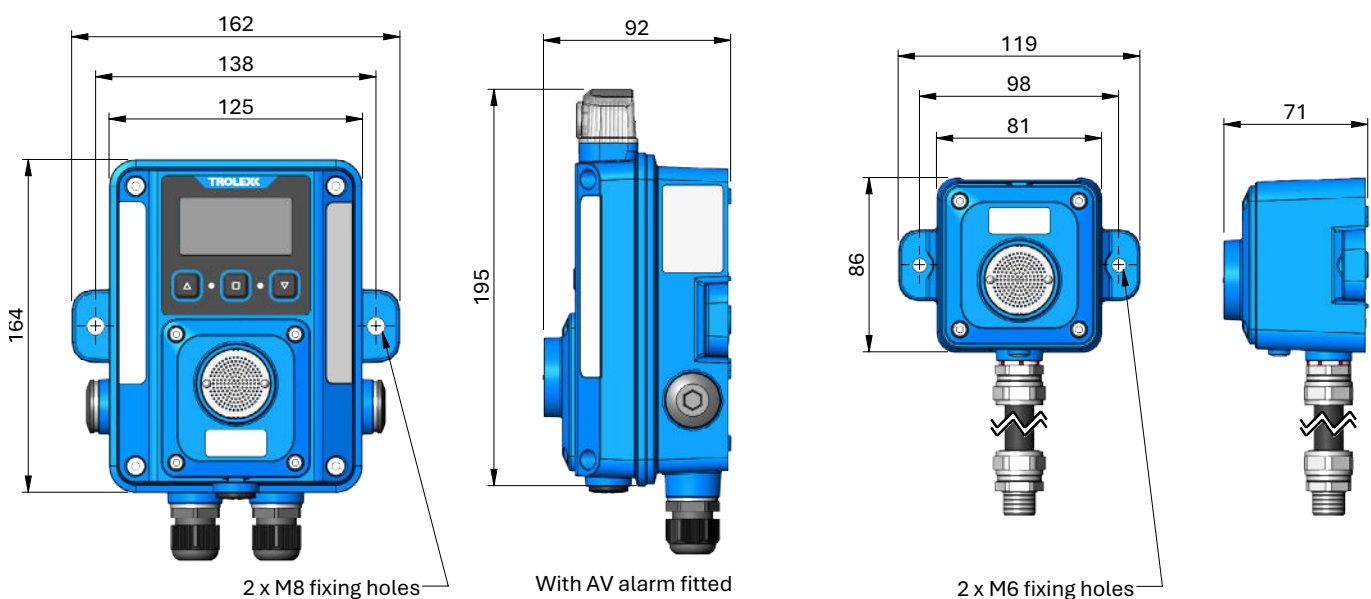


Test gas hood

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 intrinsically safe 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	Certification	Option	Cover	Option	A/V alarm	Option	Extension card
01	ATEX Grp I	01	Gas inlet	00	Not fitted	00	None
06	IECEX Aus Grp I	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	Certification	Option	Flex conduit/cable
01	ATEX Grp I	000	Not fitted
06	IECEX Aus Grp I	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
Supply voltage	9.5 V to 16 V DC from an approved intrinsically safe source
Certification	ATEX Grp I CAT. M1 and IECEx Grp I, EPL Ma See section 8 Certification of Conformity for full details

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: 16 V Minimum: 9.5 V
4 mA to 20 mA max. line load at 9.5 V	Maximum: 214 Ohms
0.4 V to 2 V min. line load	Minimum: 4 K Ohms

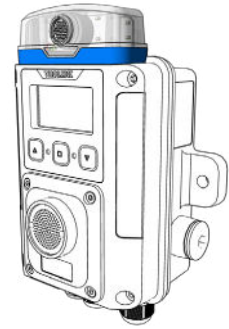
Current consumption details

Component list	Input voltage	Typical current draw
SENTRO X Controller	Minimum 9.5 V	+30 mA
SENTRO X with Remote Sensor	Minimum 9.5 V	+75 mA
Additional		
A/V alarm (active)	Minimum 9.5 V	+55 mA
1 x Relay card (2 x Relays energised)	Minimum 9.5 V	+45 mA
Ethernet card (10 Mbs)	Minimum 9.5 V	+40 mA
gBlocs (Gas)		
Electrochemical	Minimum 9.5 V	+25 mA
Pellistor	Minimum 9.5 V	+45 mA
Infrared	Minimum 9.5 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 intrinsically safe 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 encapsulated reed relays, each relay having one isolated changeover output contact, which can be used for switching external intrinsically safe circuits.

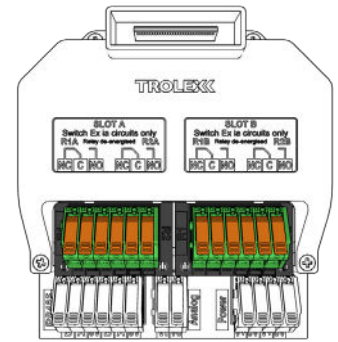
Each relay function can be independently menu-configured for preferred functional characteristics, alarm drivers and fault alerts.

Note: See **section 8 Certification of Conformity** for operating parameters.

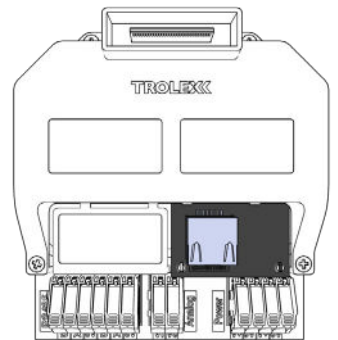
1.8 I.S Ethernet card

Alternatively, **Slot B** on the **SENTRO X Controller** processor PCB can accept an intrinsically safe ethernet card permitting data to be exchanged with wide area remote monitoring systems and SCADA networks. In this case, only one relay card can be fitted in **Slot A**.

Note: See **section 8 Certification of Conformity** for operating parameters.



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, when installed in hazardous areas.

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 in hazardous locations.

Hazardous areas

Do not disassemble the sensor, or use a sensor that has a damaged housing, in the hazardous area. 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.

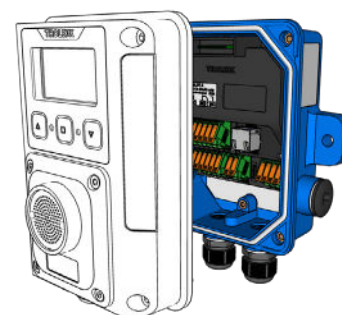
2.3 Tools and equipment

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

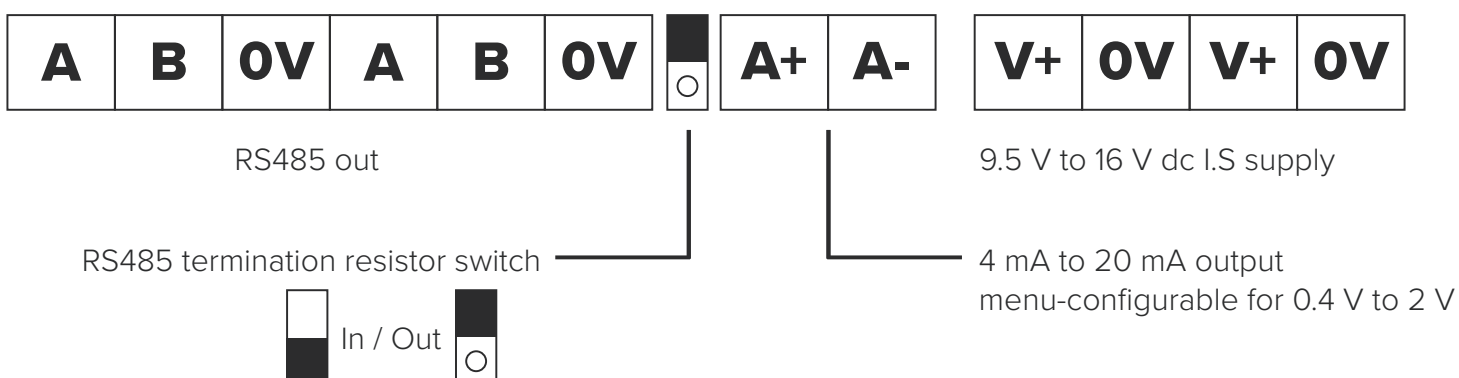
2.4 Connections

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

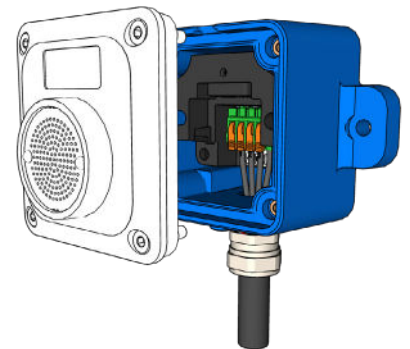


Re-assembled
Controller with cable

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

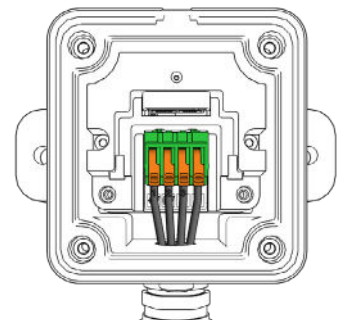


Remote Sensor
terminals

+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

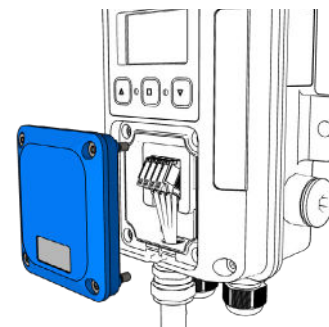
Wiring into the SENTRO X Controller

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

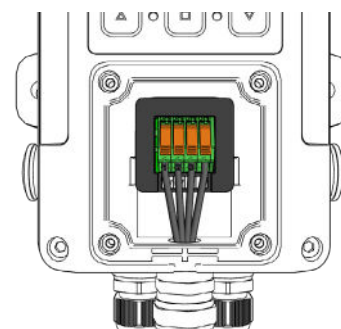


- Connect to the required terminals using the M16 cable gland provided
- Replace the blank cover
- Tighten the 4 x M4 screws to 0.7 Nm

Note: Cable connections can be installed on site using a standard 4-core data cable see **section 8 Certification of Conformity**. 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

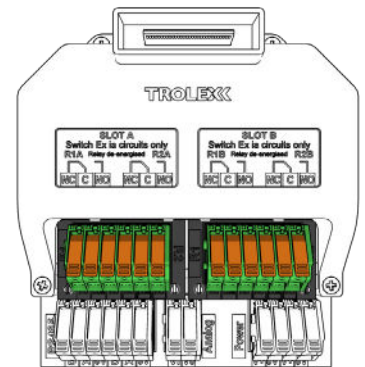
Cable connections

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

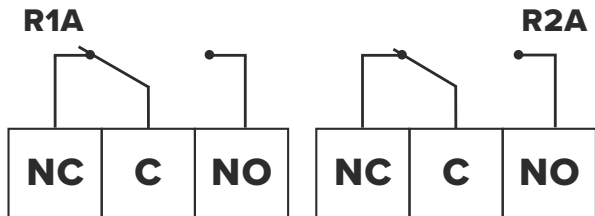
SENTRO X provides 2 slots for additional functions; Slot A and Slot B. Up to 2 x Dual Relay cards can be fitted to specification.

- Maximum contact voltage: 16 V dc
- Maximum switching current: 250 mA
- The contacts must only be used for switching approved intrinsically safe circuits
- The contacts are clearance compatible for switching different intrinsically safe circuits from other approved devices

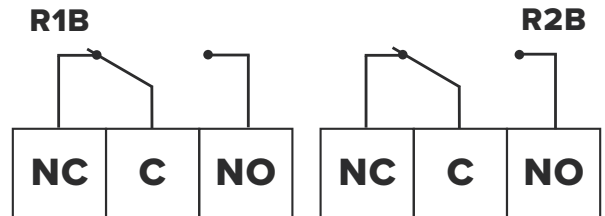


Relay card

SLOT A

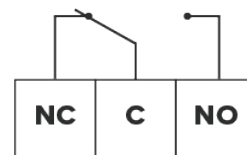
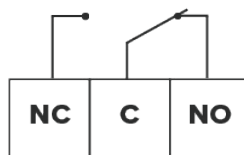
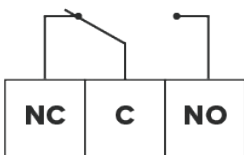


SLOT B



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 de-energised



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 is certified intrinsically safe and 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.

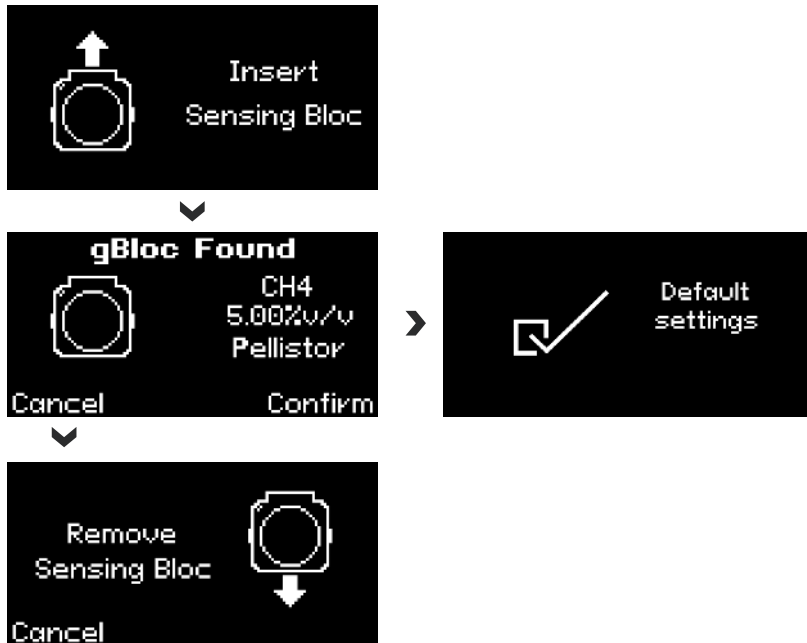
- Activate OVER the setpoint
- Activate UNDER the setpoint
- Hysteresis

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>
------------------------------------------------------------------------------------------	--	-------------------------------------------------------------------------------------------------------

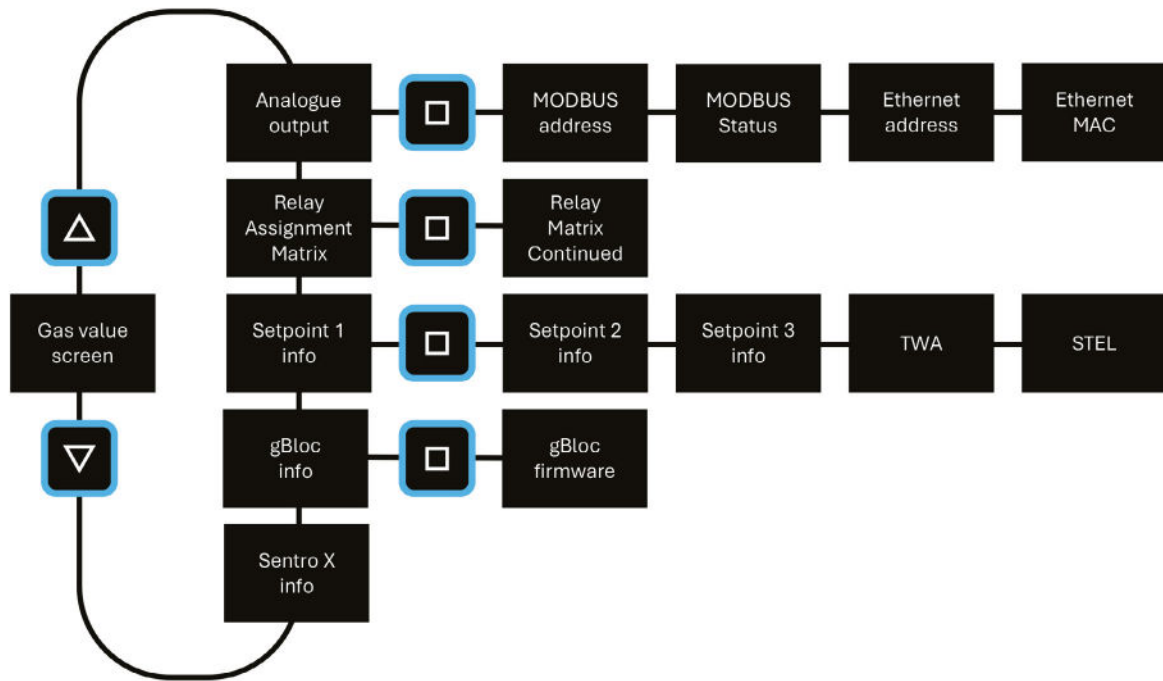
1. Scroll Up (hold to return)
2. Scroll Down (hold to mute)
3. Select/Confirm (hold for main menu) or (hold for value entry)
4. Monitor LED green
Pulse: 'Gas Sensing' mode
Solid state: Power on
5. LED red: 'Alarm'/'Fault'
LED yellow: 'Maintenance Mode'

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.

Main Menu	
1.Maintenance	Zero Test
2.Functions	Span Test
3.Device	Response
	Telemetry

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						
	Warning		Alarm	R1A	R1B	R2A	R2B
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.

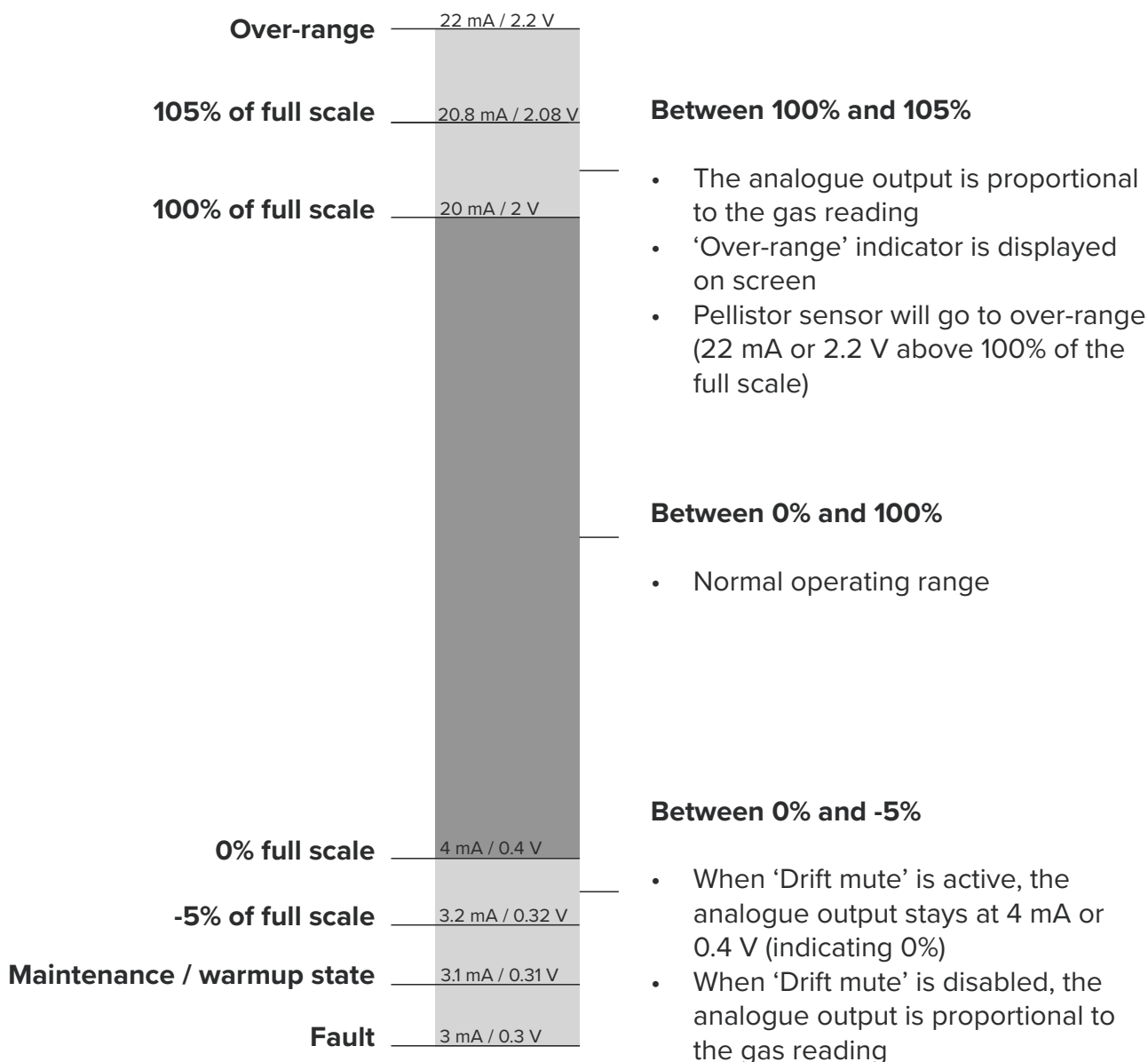
7. DEVICE

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 certified 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:

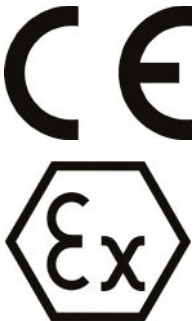

- Gas ID information
- All setpoint information
- All TWA/STEL information
- All relay assignments
- All A/V alarm assignments
- MODBUS settings
- Ethernet settings
- Analogue out is reset to 4 mA to 20 mA
- Any previously remembered maintenance function gas values

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

	<p>ATEX certification for use in underground mines (Group I) in European Union.</p> <p>Complies with the following EU Directives:</p> <p>ATEX Directive 2014/34/EU: - EN IEC 60079-0:2018 - EN IEC 60079-11:2024</p> <p>EMC Directive 2014/30/EU: - EN 50270:2015 - EN 61326-1:2013</p> <p>RoHS Directive 2011/65/EU</p>
	<p>IECEx (International) certification for use in underground mines (Group I) in Australia (including Queensland) and New Zealand.</p> <p>Standards: - IEC 60079-0:2017 - IEC 60079-11:2023</p>

Product Code:	Ex Certificate Number:	Ex Certification Code:
TX6310.01(.xx...)	CML 24ATEX2141X	I M1 Ex ia I Ma -20 °C ≤ Ta ≤ +40 °C
TX6320.01(.xx...)		
TX6301.01(.xx...)		
TX6302.01(.xx...)		
TX6303.01(.xx...)		
TX6304.01(.xx...)		

Product Code:	Ex Certificate Number:	Ex Certification Code:
TX6310.06(.xx...)	IECEX ExTC 24.0029X	Ex ia I Ma Ex da ia I Ma Ex db+ia ia I Ma -20 °C ≤ Ta ≤ +40 °C
TX6320.06(.xx...)		
TX6301.06(.xx...)*	IECEX ExTC 24.0029X	Ex ia I Ma -20 °C ≤ Ta ≤ +40 °C
		Ex da ia I Ma -20 °C ≤ Ta ≤ +40 °C
		Ex db+ia ia I Ma -20 °C ≤ Ta ≤ +40 °C
TX6302.06(.xx...)	IECEX ExTC 24.0029X	Ex ia I Ma -20 °C ≤ Ta ≤ +40 °C
TX6303.06(.xx...)		
TX6304.06(.xx...)		

* - Ex code dependant on the fitted gas cell

	TX6310 Controller						TX6320 Remote Sensor
	Power IN	Analog	RS485 (each data line)	Relays	Ethernet	Remote Bloc	
Ui	16 V	16 V	16 V	23 V	7.14 V	-	16 V
Ii	3.1 A	0.132 A	-	NOTE 1	-	-	3.13 A (peak) 0.238 A (continuous)
Pi	-	0.273 W	-	-	-	-	3.44 W
Ci	100 nF NOTE 3 465 nF NOTE 4	0	0	0	0	-	≤ 5 nF NOTE 5
Li	0 NOTE 3 10 μH NOTE 4	0	0	0	0	-	≤ 10 μH NOTE 5
Uo	-	15.75 V	5.4 V	0	5.5 V (pp-ac) 0 V (dc)	16 V	-
Io	-	0.35 A	13 mA	0	0.288 A (pp-ac) 0 A (dc)	3.13 A (peak) 0.238 A (continuous)	-
Po	-	1.04 W	17 mW	0	0.049 W	3.44 W	-
Co	-	15.8 μF NOTE 2	1000 μF NOTE 2	-	10 μF NOTE 2	≤ 5 nF NOTE 5	-
Lo	-	3.81 mH NOTE 2	2761 mH NOTE 2	-	1 mH NOTE 2	≤ 10 μH NOTE 5	-
Lo/Ro	-	338 μH/Ω	26 mH/Ω	-	-	-	-

NOTE 1 - See specific conditions of use

NOTE 2 - The values of inductance and capacitance shown above are allowed when:

- all inductance and capacitance are distributed, for example as in a cable; or
- the total inductance of the circuit (excluding the cable) is less than 1% of the allowed value of inductance; or
- the total capacitance of the circuit (excluding the cable) is less than 1% of the allowed value of capacitance.

Where both the total inductance and capacitance of the circuit (excluding the cable) are greater than or equal to 1% of the shown values of inductance and capacitance, the allowed values shall be halved. The reduced capacitance of the circuit (including cable) shall not be greater than 1 μF.

NOTE 3 - Applicable to the Fixed Gas Detector configuration.

NOTE 4 - Applicable to the Remote Gas Detector configuration (TX6310 Controller fitted with TX6302 Remote Bloc, TX6320 Remote Sensor and the interconnecting cable). The stated Ci parameter is equal to the internal capacitance and interconnecting cable (max 5 nF). The stated Li parameter is equal to the inductance of the interconnecting cable (max 10 μH).

NOTE 5 - The C and L Parameters represent the maximum allowed capacitance and inductance of the remote cable connected between the TX6302 Remote Bloc and TX6320 Remote Sensor, when the remote cable is selected by the user. If the remote cable is supplied by Trolex, it already meets those parameters.

Specific Conditions of Use (Special Conditions):

The following conditions relate to safe installation and/or use of the equipment:

- For TX6310 Controller fitted with the optional Relay Card, the end-user must ensure that the current supplied to the relay contacts in normal operation does not exceed the rated current of the relay, i.e. 0.25 A, and is from an intrinsically safe source.
- The TX6320 Remote Sensor, TX6301 Gas Sensing Bloc, TX6302 Remote Bloc, TX6303 Programming Bloc and TX6304 Potentiometer Bloc shall only be used as part of a Sentro X Gas Detector with a TX6310 Controller.

The TX6303 Programming Bloc and the TX6304 Potentiometer Bloc are intended for occasional use as part of a brief installation or maintenance routine when the front cover of the TX6310 Controller or TX6320 Remote Sensor is removed. The TX6310 Controller and the TX6320 Remote Sensor do not maintain the minimum IP54 rating without the front cover - the front cover must always be reinstalled after completing these routines.

Installation of equipment

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. Refer to the following standards for additional guidance:

- IEC/EN 60079-14
- IEC/EN 60079-25
- AS/NZS 2290.3

Refer to the Certification Section of this User Manual and to the relevant certificates for any installation parameters and specific conditions of use.

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 explosion protection 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
105% FS		x	Pulse	-	Flash	✓	✓
100% FS		x	Pulse	-	Flash	✓	✓
0		x	Pulse	-	-	x	x
-5% FS		x	Pulse	-	-	x	x
-10% FS		✓	Pulse	-	-	x	x
-10% FS		✓	On	Flash	-	✓	✓

- ✓ 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	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

9.3 ‘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.

All pertinent state, regional, and local safety regulations must be observed when installing and using this instrument. For reasons of safety and to help ensure compliance with documented system data, only Trolex or its affiliates should perform repairs to components.

Trolex Ltd. reserves the right to revise and update this documentation from time to time without obligation to provide notification of such revision or change. Revised documentation may be obtainable from Trolex.

Trolex Ltd. reserves the right, without notice, to make changes in equipment design or performance as progress in engineering, manufacturing or technology may warrant.

TRADEMARK

© 2025 Trolex[®] Ltd.

No part of this document may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without express written permission of Trolex.

Trolex is a registered trademark of Trolex Ltd. The use of all trademarks in this document is acknowledged.

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.

For more information about Trolex, please contact us at:

Website

www.trolex.com

Enquiries

sales@trolex.com

Telephone

+44 (0) 161 483 1435

@TrolexUK



Trolex Ltd

Newby Road, Hazel Grove
Stockport, Cheshire
SK7 5DY, United Kingdom