



**TX6353**  
SentrO P



**TROLEX**«

# User Manual



# TX6353 SentrO P

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## 1. Product Overview



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**TX6353.03**

SentrO P Open Protocol gas detector  
12 V dc - intrinsically safe Mining and Tunnelling

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**TX6353.04**

SentrO P Open Protocol gas detector  
24 V dc - General Purpose

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### 1.1 Operating Features

- High accuracy gas detector with serial data output configured for open network integration, on newly installed or existing data networks
- Pre-calibrated plug-in gas sensing eModule can be replaced in seconds for ease of calibration and maintenance
- Large backlit LCD screen provides concise menu driven calibration guide and sensor diagnostics
- Two inbuilt LED alarm indicators for General and High alarm with programmable setpoints
- Auxiliary analogue output signal to drive a local audio visual alarm unit when required
- Power supply voltage level data is transmitted over the RS485 Modbus for constant monitoring
- Certified intrinsically safe for 12 V dc operating areas

## 1.2 Application

Fixed point gas detection for safety monitoring in hazardous areas and general purpose applications; for applications on data communication networks.

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**Intrinsically Safe:**

TX6353.03

**Supply Voltage:**

12 V dc from an approved intrinsically safe power source

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**General Purpose:**

TX6353.04

**Supply Voltage:**

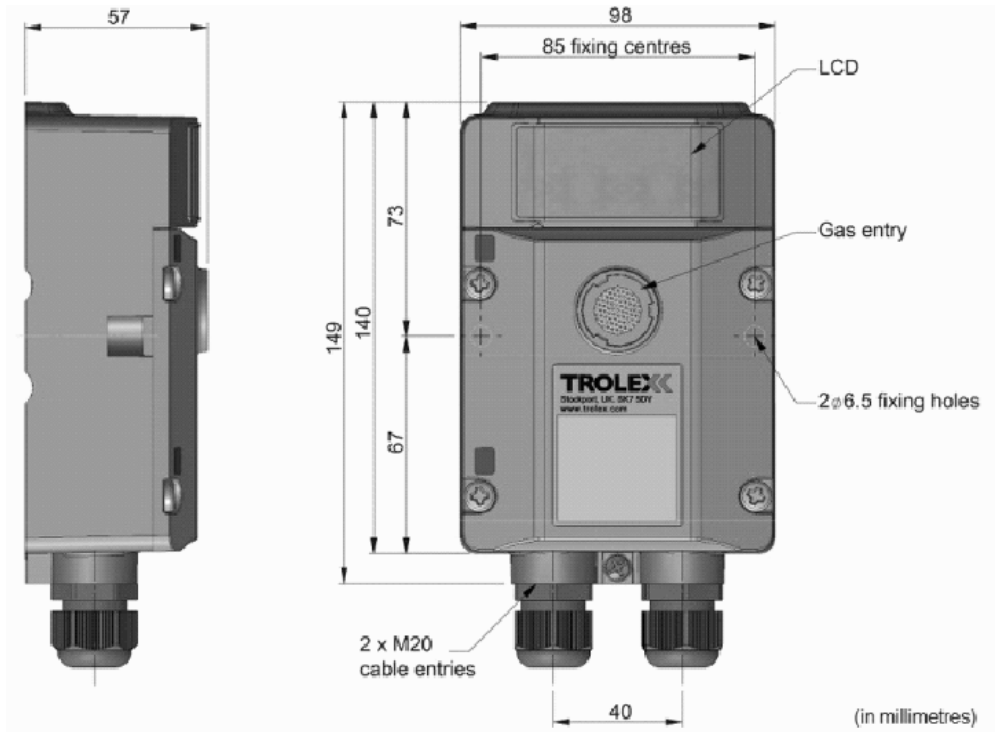
24 V dc

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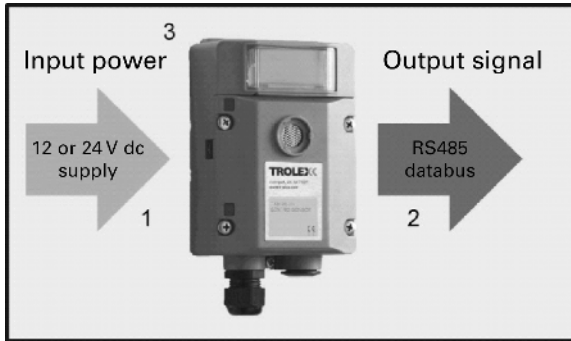
## 1.3 Product Options

TX6353 SentrO P	Intrinsically Safe Mining and Tunnelling Ex	General Purpose
12 V dc	TX6353.03	-
24 V dc	-	TX6353.04

## 1.4 Dimensions



## 1.5 Technical Information



Hazardous area

	<b>TX6353.03 Intrinsically Safe Mining and Tunnelling Ex</b>	<b>TX6353.04 General Purpose</b>
① Supply voltage	12 V dc	24 V dc
Supply voltage range	7.5 to 14.4 V dc	7.5 to 28 V dc
Current consumption	electrochemical cell 20 mA pellistor cell 55 mA	electrochemical cell 15 mA pellistor cell 30 mA
Current consumption with backlight	electrochemical cell 25 mA pellistor cell 60 mA	electrochemical cell 20 mA pellistor cell 35 mA
② Output signal	RS485 Modbus	
Auxiliary alarm output signal	0.4 to 2.0 V analogue output signal proportional to the measured gas concentration value, for powering a suitable local audio visual alarm unit	
Gases detected	Carbon monoxide at 0 to 50 ppm Hydrogen sulphide at 0 to 50 ppm Methane at 0 to 4% v/v Nitric oxide at 0 to 50 ppm Nitrogen dioxide at 0 to 20 ppm Oxygen at 0 to 25% v/v	
eModule working life	Minimum 2 years, dependent upon eModule type and monitoring conditions	

Operating temperature range	-10 to +40°C
Storage temperature	-20 to +60°C
Humidity	90% non-condensing
③ Housing materials	Reinforced polymer. EMC protected and proof against surface electrostatic charge
Protection classification	Housing dust and waterproof to IP65 Gas port protected to IP54
Weight	550 g
Mounting	Two 6.5 mm diameter fixing holes with Unistrut 6946 indents
Cable entries	2 x M20
Electrical connections	4 mm barrier/clamp terminals with circuit segregation barriers
Conductors	A maximum of two per terminal
Conductor size	A maximum of 2 x 2.5 mm <sup>2</sup>
Terminal torque	2.4 Nm maximum
Information display	128 x 65 dot graphic LCD screen (Backlit)
Vibration limits (EN 61779)	10 to 200 Hz, 7g peak
Impact limits	20 joules (housing)
Calibration and setup	Digitally controlled <b>Zero</b> and <b>Span</b> pushbutton setting
Signal fix	The transmitted output signal of the sensor is <b>Fixed</b> during calibration to prevent false alarms from being initiated
Fault indication	Under-range signal transmitted and <b>Fault</b> display for: <ul style="list-style-type: none"> <li>• Loss of communication between sensing eModule and transmitter</li> <li>• Critical reduction in sensor sensitivity</li> <li>• Sensor over-range protection</li> </ul>
Alarms	Inbuilt adjustable visual alarm LEDs for General and High alarms. Programmable setpoints and options selectable from the setup menus



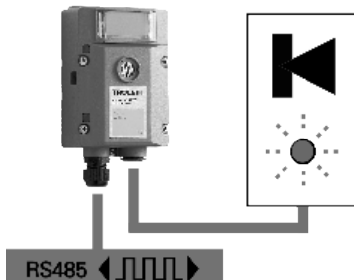
## 1.6 Electrical Details

	TX6353.03	TX6353.04
Output signal	RS485	
Supply voltage	7.5 to 14.4 V dc	7.5 to 28 V dc
Supply current no backlight:		
electrochemical sensor	20 mA	15 mA
pellistor sensor	55 mA	30 mA
RS485 protocol	Modbus to system requirements	



### Auxiliary Output for Powering a Local Audio Visual Alarm

Output signal	0.4 to 2 V for the measured gas concentration
Minimum line load	10 Kohm
Power for the audio visual alarm can be supplied from the sensor	



#### Checkpoint

The TX6353 12 V dc version of the sensor is certified intrinsically safe and may be located in the hazardous area when used in conjunction with approved intrinsically safe apparatus.

## 1.7 Sentro eModules

Plug-in pre-calibrated eModules with standardised output data.

- Each eModule stores all the necessary data about its type identification, sensing range and specific calibration. This data is automatically recognised by Sentro P when the eModule is loaded into the module bay.
- The eModules are pre-calibrated so can be substituted at any time by a replacement eModule – usually of the same type, but an alternative may be inserted if required.
- The sensing eModule will identify itself when plugged into the sensor housing and auto configuration will take place.
- All Sentro eModules have two output alarm signals for **General** alarm and **High** alarm. Default values are entered during manufacture and these can be changed to preferred values.
- The **General** and **High** alarm signals illuminate built-in flashing LED indicators located at the right hand side of the LCD screen window.



Sentro eModule  
Gas Sensor

## 1.7.1 Sentro eModules

For the full range of Sentro eModules contact the Trolex Sales Team:  
**sales@trolex.com**

### 1.7.1.1 Flammable Gases • Poison Resistant Catalytic Sensor

The sensor will respond to most flammable gases and vapours to varying degrees; it is calibrated to methane in terms of %volume.



<b>TX6350</b>	<b>.01.246.DP</b> Methane CH <sub>4</sub>
<b>Sensing element</b>	Poison resistant pellistor with active temperature/humidity compensation
<b>Sensing range</b>	0 to 4% v/v
<b>Linearity</b>	Linear to 3% v/v, 3% to 4% ±0.25% v/v
<b>Max. Drift @ 25°C</b>	±0.25% CH <sub>4</sub> v/v per month
<b>Response time (T63)</b>	<15 secs
<b>Response time (T90)</b>	<20 secs
<b>Sensing element life</b>	>5 years in clean atmosphere
<b>Warm up time</b>	<5 mins in air or 1% v/v CH <sub>4</sub> (to 95% of stated accuracy)
<b>GENERAL alarm</b>	10% LEL (0.44% v/v)
<b>HIGH alarm</b>	20% LEL (0.88% v/v)

#### Checkpoint

The pellistor is automatically protected against exposure to excessively high concentrations of gas.

## 1.7.1.2 Toxic Gases • Electrochemical Cells



TX6350	.01.250.50. DP	.01.251.DP	.01.257	.01.254.DP	.01.259.DP
	Carbon Monoxide CO	Hydrogen Sulphide H <sub>2</sub> S	Oxygen O <sub>2</sub>	Nitrogen Dioxide NO <sub>2</sub>	Nitric Oxide NO
<b>Sensing element</b>	Electrochemical cell				
<b>Sensing range</b>	0 to 50 ppm	0 to 50 ppm	0 to 25% v/v	0 to 20 ppm	0 to 50 ppm
<b>Linearity</b>	±2% FS	±2% FS	±5% FS	±2% FS	±5% FS
<b>Drift</b>	2% per month	2% per month	10% per year	2% per month	2% per month
<b>Repeatability</b>	±2%				
<b>Response time T63%</b>	<20 secs	<30 secs	N/A	<20 secs	<20 secs
<b>Operating life</b>	2 years	2 years	2 years	2 years	2 years
<b>Relative humidity</b>	15 to 90% non-condensing				
<b>Operating temperature</b>	-10 to +40°C				
<b>GENERAL alarm</b>	15 ppm	5 ppm	19% (under)	5 ppm	5 ppm
<b>HIGH alarm</b>	30 ppm	10 ppm	23% (over)	10 ppm	20 ppm

## Checkpoint

All values listed are nominal and slight variations may occur depending upon operating conditions.

- The natural level of oxygen available in the atmosphere is influenced by relative humidity and temperature. The oxygen sensor will react to these changes.
- Sudden changes in atmospheric pressure will also cause temporary instability in electrochemical sensors.
- Long periods of use in extremely high or low humidity may affect the response of the sensor and shorten the life of electrochemical sensors.
- Gas sensing eModule type TX6351.259.DP (nitric oxide) must be constantly powered-up to maintain calibration stability. If the eModule is powered-down for more than 10 minutes, it could take 24-48 hours before stability is restored. Do not calibrate until the output signal is steady.

## 2. Certification

### 2.1 Pennsylvania State



#### **Pennsylvania:**

Pennsylvania Department of Environmental Protection - Bureau of Mine Safety approved. Approval number: BOTE 63-13  
24 V variant only

### 2.2 MSHA



#### **Approved eModules:**

The TX6353 SentrO P can only be used with the following eModules:

#### **Electrochemical cells:**

TX6350.01.250.50.DP - Carbon Monoxide CO - 0 to 50 ppm

TX6350.01.251.DP - Hydrogen Sulphide H<sub>2</sub>S - 0 to 50 ppm

TX6350.01.257 - Oxygen O<sub>2</sub> - 0 to 25% v/v

TX6350.01.259.DP - Nitric Oxide NO - 0 to 50 ppm

TX6350.01.254.DP - Nitrogen Dioxide NO<sub>2</sub> - 0 to 20 ppm

#### **Poison resistant pellistor:**

TX6350.01.246.DP - Methane CH<sub>4</sub> - 0 to 4% v/v

#### **Conditions of Use:**

1. Power for the TX6353 SentrO-P must be derived from a supply previously evaluated by MSHA, a maximum output of 14.4 Vdc open-circuit voltage and 3.3 A short circuit current.
2. Do not disassemble the TX6353 SentrO P in an area where permissibility is required, except to change the eModule.
3. The TX6353 SentrO-P must not be used as an air quality detector.
4. Until such time it is tested for performance and listed by a Nationally Recognized Test Laboratory, the TX6353 SentrO P is not accepted by MSHA for compliance with 30 CFR 75.351 or 75.1103.

Intentionally blank

## 3. Installing

### 3.1 Safety Precautions

#### **Hazardous Areas**

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

#### **Evacuation**

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

#### **Operating Life of Gas Sensors**

Electrochemical cells contain an electrolyte that is gradually consumed during use. The average life is about two years, dependant upon the duty cycle. The response should be checked at regular intervals. Refer to Section 5 for details of Maintenance to be carried out on the SentrO P.

#### **Sensitivity**

Electrochemical cells for toxic gases can be affected by other interfering gases which may displace the subject gas being monitored. Steam laden atmospheres and condensation can also reduce the sensitivity.

#### **Flammable**

Be aware that some toxic gases are also 'flammable' at high percentage concentrations.

#### **Operating Limits of Catalytic Combustion Sensors**

Catalytic combustion gas sensors positively detect the presence of flammable gas. They rely upon the presence of oxygen in the atmosphere and should only be used for gas concentrations up to the Lower Explosive Limit (LEL).

After this point, the output becomes non-linear and may erroneously indicate that the gas concentration is below the LEL. They should not be used in oxygen enriched or deficient atmospheres.



## Discrimination

Catalytic combustion sensors can detect a wide range of flammable gases but they cannot discriminate between individual gases. They will respond to most, or all, of the flammable components present in the atmosphere without distinguishing between them.

Infrared sensors are highly specific to the defined gas type and may NOT respond to other similar gases.

## Contamination

The response of catalytic combustion gas sensors can be affected by air borne contaminants which will reduce the sensitivity. Substances such as silicones, tetraethyl lead, sulphur compounds and phosphate esters can cause permanent degradation (poisoning). Hydrocarbons may also cause temporary inhibition.

## Interference

If the atmosphere to be monitored contains a gas that dilutes or displaces the air, this may reduce the response of catalytic sensors. Similarly, steam laden atmospheres and condensation can reduce the stability.

## High Concentrations of Flammable Gas

Exposure of low concentration catalytic combustion sensors to concentrations of flammable gas greater than the LEL can affect the sensitivity and zero stability of catalytic elements and the calibration should be checked after such an exposure.

## Toxicity

Be aware that most flammable gases and vapours are also toxic at low concentrations of LEL.

## 3.2. Tools and Test Equipment Required

No special tools are needed.

## 3.3. 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 premises.

### **Sensor Management**

A very important part of an efficient gas monitoring system is the training of plant personnel in operation and maintenance of the sensors and the complete monitoring system. Training can be provided by qualified Trolex application engineers.

Once a sensor installation is complete, the sensor locations and types should be formally recorded and a planned test and maintenance procedure instituted.

### 3.4 Connections

#### 3.4.1 RS485 Data Output Signal

Use in conjunction with a PC for data display and setpoint alarm warnings. Up to 32 sensors acting as slaves can communicate with the master unit on a single data cable.

<b>Physical Layer</b>	RS485
<b>Protocol</b>	Troxel proprietary
<b>Connection Mode</b>	Modbus
<b>Number of points</b>	32
<b>Maximum Distance</b>	1000 m

Recommended cable for locally powered sensors:

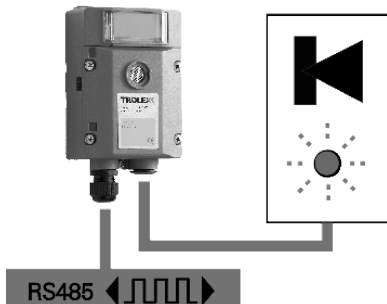
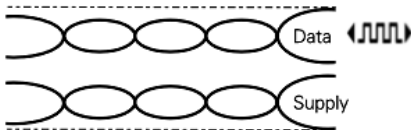
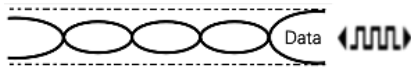
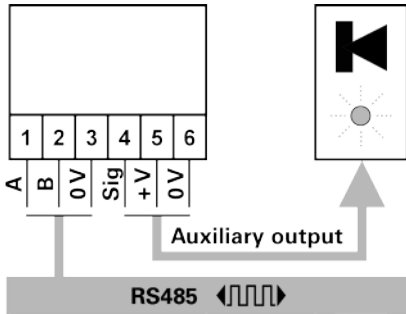
- 1 twisted pair
- 0.5 mm<sup>2</sup>
- Overall screen

Recommended cable for sensors that are powered through the data cable:

- 2 twisted pair
- 0.5 mm<sup>2</sup>
- Individual/overall screen

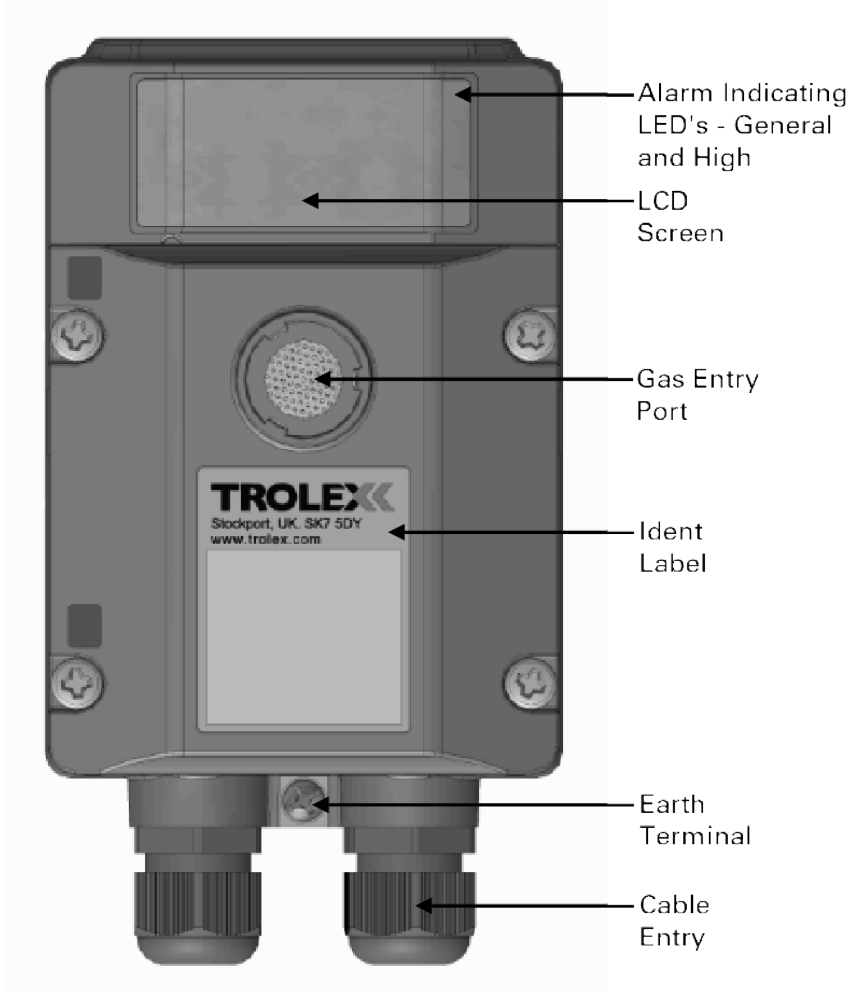
#### 3.4.2 Auxiliary Output Signal

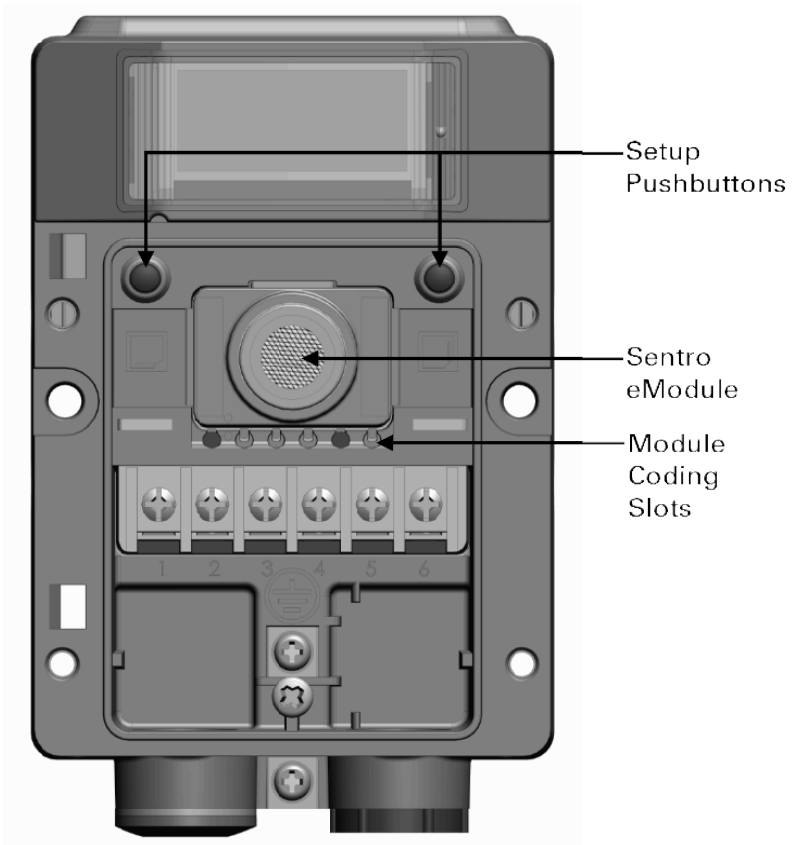
The 0.4 to 2 V output can be used to trigger an external audio/visual alarm. The output is proportional to the gas level detected.



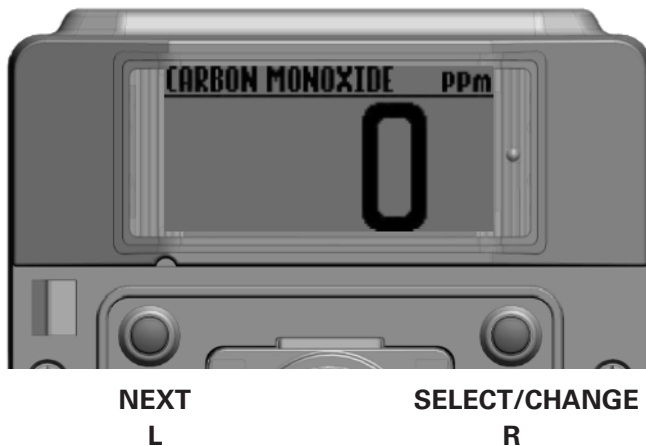
## 4. Setup and Calibration

### 4.1. Controls and Indicators





## 4.2 Main Display



### Checkpoint

To use the **SentrO P** software and navigate between Function menus you must press the setup keys:

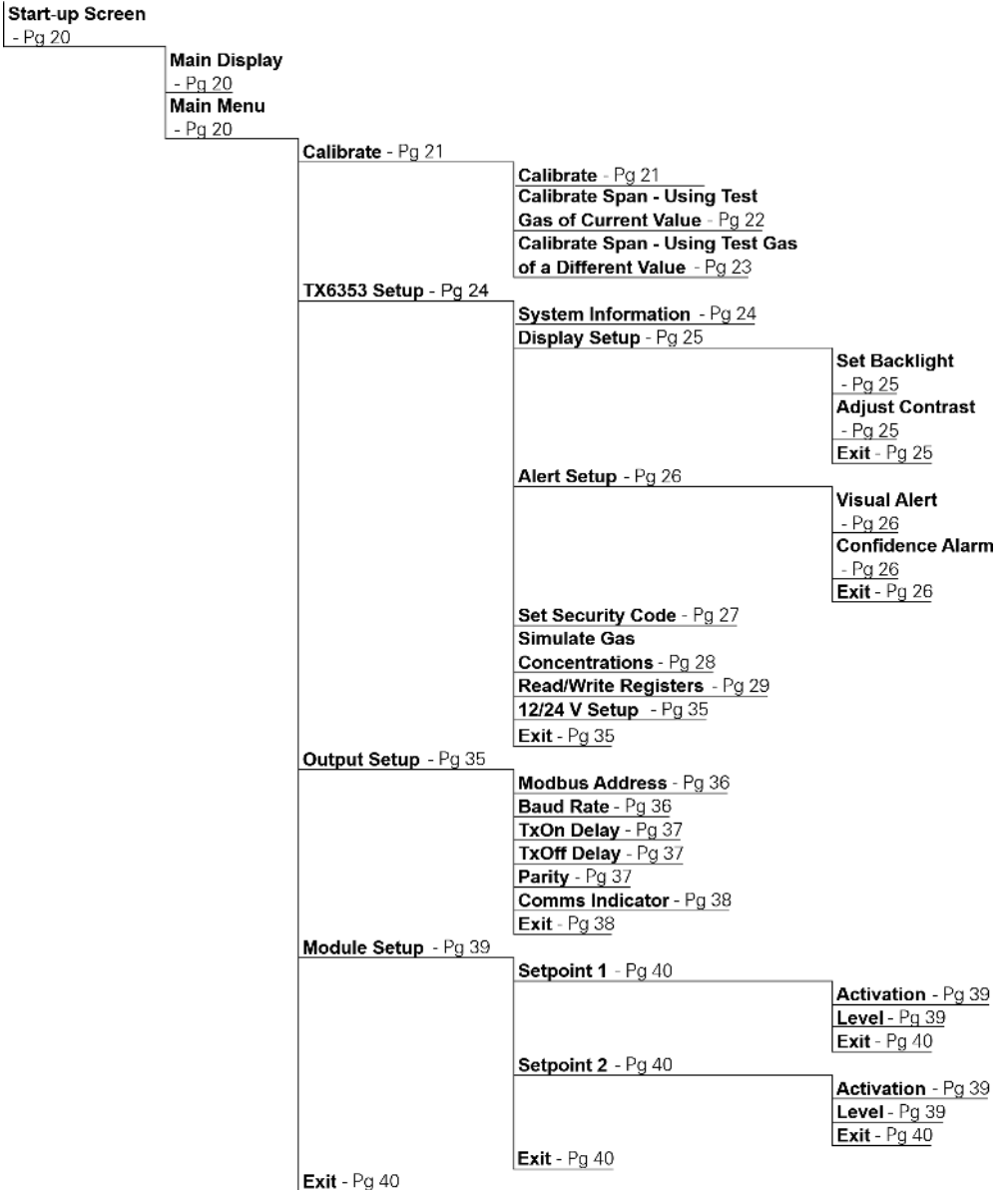
**Next** is the **Left** key - **L**

**Select/Change** is the **Right** key - **R**.

The use of these keys is abbreviated to **L** and **R** throughout this User Manual.

To access the **L (Next)** and **R (Select/Change)** buttons you need to remove the front cover. Use a cross head screwdriver to remove the four screws securing the front cover and hinge it out of the way.

## 4.3 Function Menus



## 4.4 Setup and Calibrate

### 4.4.1 Start-up Screen

When the **Sentro P** is initially powered-up, the **Start Screen** will be displayed for a few seconds. The **Start Screen** displays basic information about the **Sentro P** including the main software version, system date, system time, driver versions and output formats.



During initial power-up the **Sentro P** will gather system readings and interrogate the Sentro eModule to identify the type of gas and the calibrated measuring range.

### 4.4.2 Main Display

Once initial power-up is complete, the screen will show the **Main Display**.

The **Main Display** shows the gas type, level and measuring range of gas being detected.



### 4.4.3 Main Menu

From the **Main Display** press and hold **L**, this will display the **Main Menu**.

From the **Main Menu** the operating parameters of the sensor may be set up according to preference. The available menus are as follows:

- Calibrate
- TX6353 Setup
- Output Setup
- Module Setup
- Exit



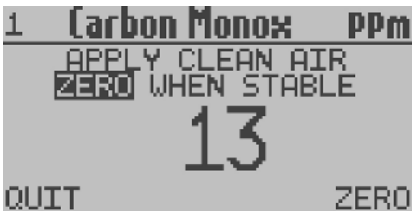


## Checkpoint

You can safely remove the front cover of the **SentrO P** for setup in a hazardous area, even with the power applied.

## Checkpoint

The **SentrO P** will automatically return to the **Main Display** if no keys are pressed within 30 seconds. The time limit is extended to 8 minutes during **Calibrate** to allow the gas value displayed on the LCD screen time to stabilise.



## 4.4.4 Calibrate

### Calibrate

Calibrate the **Zero** and **Span** values of the **SentrO P** using clean air and a test gas of a known concentration.

## Checkpoint

Ensure the area where the equipment is being calibrated is well ventilated. Observe appropriate Health and Safety legislation and applicable local procedures when handling test gases.

From the **Main Menu** press **L** to navigate to **Calibrate**. Press **R** to enter the **Calibrate Menu**.

The screen will show an arbitrary reading.



Using the appropriate Trolex test gases, connect the application tube from the clean air to the gas entry port.

Open the valve and apply clean air at a rate of 0.5 litre/min.

Wait for the reading to settle at a stable value.

Press **R** to **Zero** the displayed value.

Wait for the reading to stabilise at zero.

Shut the valve and stop the supply of clean air. Disconnect the application tube from the gas entry port.

Press **R** to go to **Calibrate Span**.

### Checkpoint

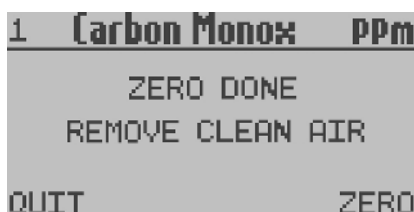
Press **L** at any time to **Quit** and return to the **Main Display**.

### Calibrate Span - Using Test Gas of Current Value

The screen will show the concentration of **Span Gas** that is expected to be used.

Check the value of **Span Gas** displayed and compare it against the value shown on the test gas cylinder. If the values match press **R**.

Using the appropriate test gas, connect the application tube from the test gas to the gas entry port.





Open the valve and apply **Span Gas** at a rate of 0.5 litre/min.

Wait for the reading to settle at the stable value (Not necessarily the **Span Gas** value).

Press **L** and **Span** the displayed value. If the displayed value continues to shift press **L** again.

Shut the valve and stop the supply of test gas. Disconnect the application tube from the gas entry port.



### Checkpoint

Press **L** and **R** together at any time to **Quit** and return to the **Main Menu**.



### Calibrate Span - Using Test Gas of a Different Value

The screen will show the concentration of **Span Gas** that is expected to be used.

Check the value of **Span Gas** displayed and compare it against the value shown on the test gas cylinder. If the values do not match press **L**.



Press **L** to increment each digit.

Press **R** to navigate to the next digit.



When the last digit is set, press **R** to select **Done** and return to the **Calibrate Menu**.

Continue with **Calibrate Span** as described in the previous section.

## Checkpoint

Indication will be given if a gas sensing eModule reaches the limit of available adjustment.

## 4.4.5 TX6353 Setup

Setup the basic operating functions of the **Sentro P** sensor.

From the **Main Menu** press **L** to navigate to **TX6353 Setup**. Press **R** to enter the **TX6353 Setup Menu**.

The available menus are as follows:

- System Information
- Display Setup
- Alert Setup
- Set Security Code
- Simulate Gas Concentrations
- Read/Write Registers
- 12 V/24 V Setup
- Exit

## System Information

This displays basic information about the system including the main software version, system date, system time, driver versions and output formats.

```
Main Menu
-----
Calibrate
TX6353 Setup
Output Setup
Module Setup
Exit
NEXT                SELECT
```

```
TX6353 Setup
-----
System Information
Display Setup
Alert Setup
Set Security Code
Simulate Gas Conc.
NEXT                SELECT
```

```
TX6353 Setup
-----
Read/Write Registers
12V / 24V Setup
Exit
NEXT                SELECT
```

```
System Information
-----
Main: V0.84v
May 16 2013 11:03:06
LCD Driver V0.12
Output: RS485 0.4-2.0V
DONE
```



## Display Setup Menu Set Backlight

The screen backlight illumination may be set to **On** or **Off**, to reduce power consumption.

From the **Display Setup Menu** press **L** to navigate to Set Backlight. Press **R** to enter the **Set Backlight Menu**.



From the **Set Backlight Menu** press **R** to set the Backlight Illumination to **On** or **Off** as required.

Press **L** to navigate to **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Display Setup Menu**.



## Adjust Contrast

The contrast of the screen may be set for best visual appearance.

From the **Display Setup Menu** press **L** to navigate to **Adjust Contrast**. Press **R** to enter the **Set Display Contrast Menu**.



Press **L** to navigate to **Increase** or **Decrease** as required. Press **R** to **Increase** or **Decrease** the contrast as required. Press **L** to navigate to **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Display Setup Menu**.

## Alert Setup Menu

### Visual Alert

The integral **General** and **High** visual alarms can be set to **On** or **Off**.

From the **Alert Setup Menu** press **L** to navigate to **Visual Alert**. Press **R** to enter the **Visual Alert Menu**.

From the **Visual Alert Menu** press **R** to set the **Visual Alert** to **On** or **Off** as required.

Press **L** to navigate to **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Alert Setup Menu**.

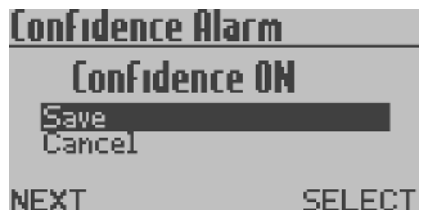
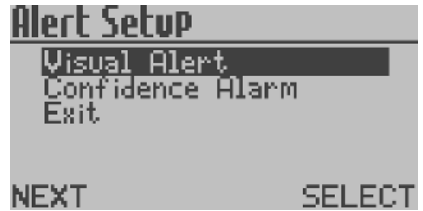
### Confidence Alarm

If the **Confidence Alarm** has been enabled it will flash every 15 seconds to indicate that the **SentrO P** is working normally. The **Confidence Alarm** flash can be set to **On** or **Off**.

From the **Alert Setup Menu** press **L** to navigate to **Confidence Alarm**. Press **R** to enter the **Confidence Alarm Menu**.

From the **Confidence Alarm Menu** press **R** to set the **Visual Alert** to **On** or **Off** as required.

Press **L** to navigate to **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Alert Setup Menu**.



## Set Security Code

A four digit security code can be entered to prevent unauthorised access to the **Main Menu**.

From the **TX6353 Setup Menu** press **L** to navigate to **Set Security Code**. Press **R** to enter the **Set Security Code Menu**.

From the **Set Security Code Menu** press **R** to increment the first digit. Press **L** to confirm the selection and navigate to the next digit.

Repeat for all four digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection and return to the **TX6353 Setup Menu**.



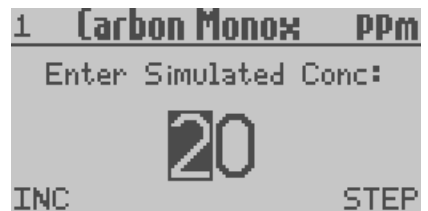
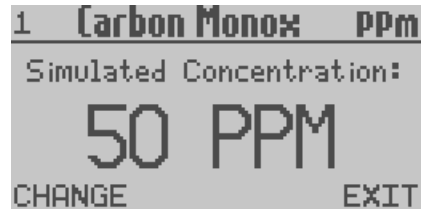
## Simulate Gas Concentration

For the purposes of system testing a simulated gas concentration value can be manually entered.

From the **TX6353 Setup Menu** press **L** to navigate to **Simulate Gas Conc.** Press **R** to enter the **Simulate Gas Concentration Menu**.

Press **L** to select the first digit. Press **L** to increment the first digit. Press **R** to confirm the selection and navigate to the next digit.

Repeat for all three digits and press **R** to confirm. Press **R** to save the entered values.



### Checkpoint

While the **Simulate Gas Concentration Menu** is displayed the simulated gas concentration value will be displayed and transmitted via the Modbus in place of the actual measured gas concentration value. This is a useful feature to prove that data transmission is working correctly.

### Checkpoint

The **Simulate Gas Concentration** screen will be displayed for 60 seconds. After 60 seconds of inactivity the screen will timeout and return to the **Main Display**.



## Read/Write Registers

```
40001: Raw gas readings
40002: Status 1
40003: Voltage
40004: Status 2
40005: Control
NEXT SELECT
```

## Read/Write Registers

**Read/Write Registers** describe the content of the RS485 Modbus communication. They are available to view. Some of the **Read/Write Registers** can also be adjusted to suit preference.

## Read/Write Registers

```
40006: Range
40007: Units
40008: Gas type
40009: Serial number 1
40010: Serial number 2
NEXT SELECT
```

### Checkpoint

Refer to the **SentrO P** Configuration Guide TX6353-CG-EN for full details of RS485 Modbus configuration

## Read/Write Registers

```
40011: User data 1
40012: User data 2
40013: Address
40014: User data 3
40015: User data 4
NEXT SELECT
```

From the **TX6353 Setup Menu** press **L** to navigate to **Read/Write Registers**. Press **R** to enter the **Read/Write Registers Menu**. The list of **Read/Write Registers** is as follows:

- 40001: Raw Gas Reading
- 40002: Status 1
- 40003: Voltage
- 40004: Status 2
- 40005: Control - adjustable
- 40006: Range
- 40007: Units
- 40008: Gas Type
- 40009: Serial Number 1
- 40010: Serial Number 2
- 40011: User Data 1 - adjustable
- 40012: User Data 2 - adjustable
- 40013: Address
- 40014: User Data 3 - adjustable
- 40015: User Data 4 - adjustable
- 40016: User Data 5 - adjustable
- 40017: Low Volt Thresh - adjustable
- Exit

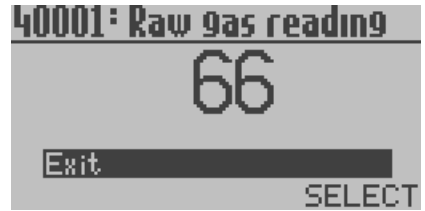
## Read/Write Registers

```
40016: User data 5
40017: Low Volt Thresh
Exit
NEXT SELECT
```

Press **L** to navigate through the **Read/Write Registers**. Press **R** to select the **Read/Write Register** and enter it for viewing.

## Raw Gas Reading

Displays the system **Raw Gas Reading**.



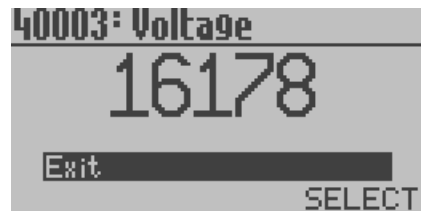
## Status 1

Displays **Status 1**. This is the setup of the functional characteristics of the sensor.



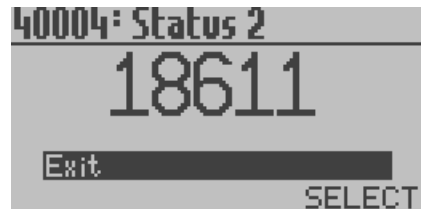
## Voltage

Displays the system measured **Voltage** in numerical form with a value between 0 and 32767 displayed. The value is proportional corresponding to the supply voltage between 0 and 30 V. A value of 0 = 0 V and a value of 32767 = 30 V dc



## Status 2

Displays **Status 2**. This is the setup of the basic configuration of the sensor.



## Control

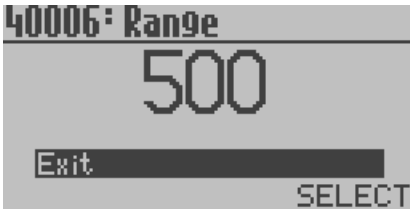
Displays the current system **Control**. User adjustable between -32768 and +32767.





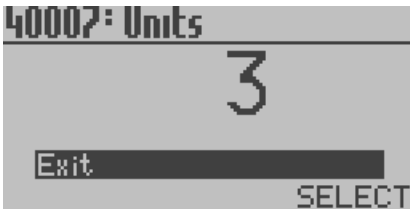
## Control - continued

Press **L** to navigate to **Adjust**. Press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.



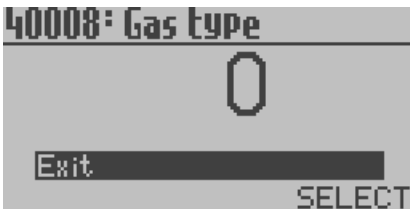
## Range

Displays the eModule gas measuring **Range**.



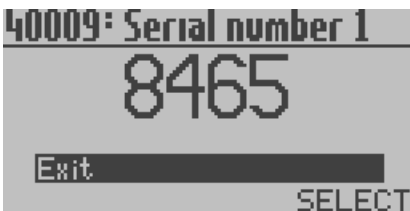
## Units

Displays the eModule **Units** of gas measurement.



## Gas Type

Displays the eModule **Gas Type** - 0 denotes carbon monoxide.

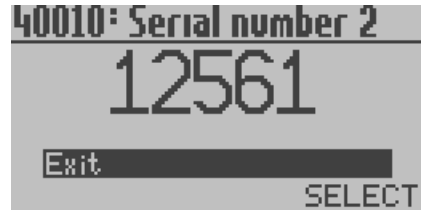


## Serial Number 1

Displays the eModule **Serial Number 1**.

## Serial Number 2

Displays the eModule **Serial Number 2**.



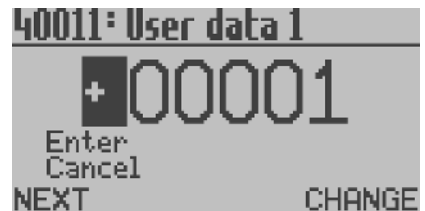
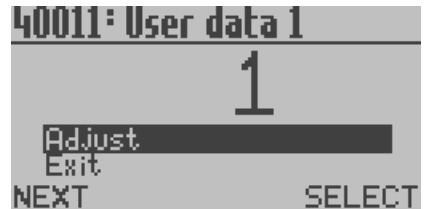
## User Data 1

Displays eModule **User Data 1**. User adjustable between -32768 and +32767.

### Checkpoint

User Data 1 to 5 are memory locations for entry of user defined data.

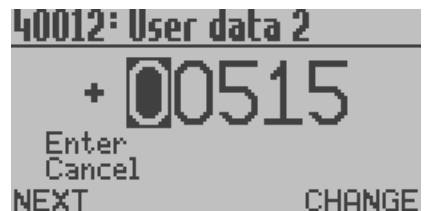
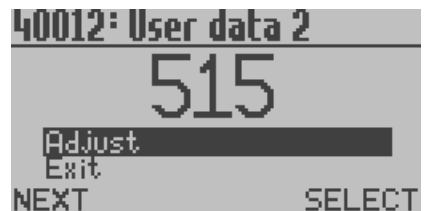
Press **L** to navigate to **Adjust** and press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.



## User Data 2

Displays eModule **User Data 2**. User adjustable between -32768 and +32767.

Press **L** to navigate to **Adjust** and press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.





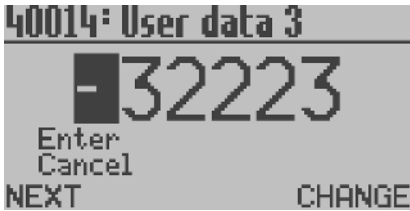
## Address

Displays the current **Address** of this sensor.

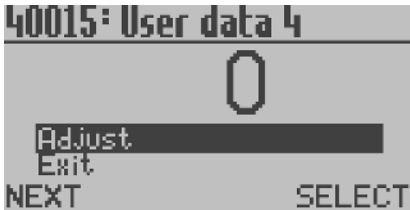


## User Data 3

Displays system **User Data 3**. User adjustable between -32768 and +32767.



Press **L** to navigate to **Adjust** and press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.



## User Data 4

Displays **User Data 4**. User adjustable between -32768 and +32767.



Press **L** to navigate to **Adjust** and press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.

## User Data 5

Displays **User Data 5**. User adjustable between -32768 and +32767.

Press **L** to navigate to **Adjust** and press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.

## Low Voltage Threshold

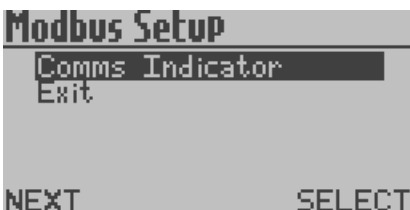
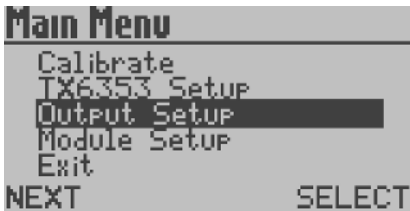
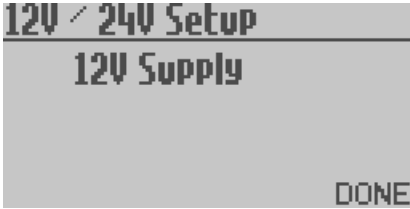
This sets the supply under-voltage threshold. By default this value is +32767 which disables this feature.

### Checkpoint

The value is ranged from 0 to +32767 corresponding to 0 to 30 V.

Press **L** to navigate to **Adjust** and press **R** to select **Adjust**. Press **L** to navigate the digits and press **R** to increment the digits. Press **L** to navigate to **Enter** or **Cancel** as required. Press **R** to confirm the selection.





## 12V / 24V Setup

This indicates over the Modbus and on the LCD screen if the unit is a 12 V or 24 V supply version.

From the **TX6353 Setup Menu** press **L** to navigate to **12V / 24V Setup**. Press **R** to enter the **12V / 24V Setup Menu**. The LCD screen will display if the unit is a 12 V or 24 V supply version. Press **R** to return to the **TX6353 Setup Menu**.

## Exit

From the **TX6353 Setup Menu** press **L** to navigate to **Exit**. Press **R** to confirm the selection and return to the **Main Menu**.

## 4.4.6 Output Setup

View information on and setup characteristics of the **Sentro P** output signal.

From the **Main Menu** press **L** to navigate to **Output Setup**. Press **R** to enter the **Output Setup Menu**.

The available menus are as follows:

- Modbus Address
- Baud Rate
- TxOn Delay
- TxOff Delay
- Parity
- Comms Indicator
- Exit

Data Protocol	Modbus
Format	Binary
Databits	8
Stopbits	1
Parity	None
Data rate	300/600/1200/2400/4800/9600/ 14400/19200/28800/38400/ 57600/115200
Address	1 to 99
TX On	0 to 99 ms
TX Off	0 to 99 ms
Duplex	Half

## Modbus Address

The **Modbus Address** can be set between 1 and 255 as required.

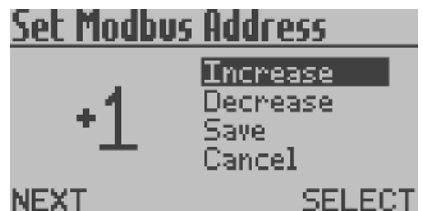
From the **Output Setup Menu** press **L** to navigate to **Modbus Address**. Press **R** to enter the **Set Modbus Address Menu**.

Press **L** to navigate to **Increase** or **Decrease** as required. Press **R** to **Increase** or **Decrease** the **Modbus Address** as required. Press **L** to navigate to **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Output Setup Menu**.

## Baud Rate

The Baud Rate can be set to 300/600/1200/2400/4800/9600/14400/19200/28800/38400/57600/115200 as required.

From the **Output Setup Menu** press **L** to navigate to **Baud Rate**. Press **R** to enter the **Set Baud Rate Menu**.







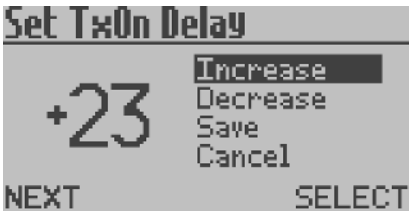
Press **R** to navigate to the required **Baud Rate**. Press **L** and select **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Output Setup Menu**.



### TxOn Delay and TxOff Delay

The **TxOn Delay** and **TxOff Delay** can be set between 0 and 99 ms.

From the **Output Setup Menu** press **L** to navigate to **TxOn Delay** or **TxOff Delay** as required. Press **R** to enter the **TxOn Delay** or **TxOff Delay Menu** as required.



Press **L** to navigate to **Increase** or **Decrease** as required. Press **R** to **Increase** or **Decrease** as required. Press **L** to select **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Output Setup Menu**.



### Parity

The **Parity** can be set to **None (0)**, **Odd (1)** or **Even (2)**.

From the **Output Setup Menu** press **L** to navigate to **Parity**. Press **R** to enter the **Set Parity Menu**.



Press **R** to set the **Parity** to **None (0)**, **Odd (1)** or **Even (2)** as required. Press **L** to select **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Output Setup Menu**.

## Comms Indicator

The **Comms Indicator** can be set to **On** or **Off** as required.

### Checkpoint

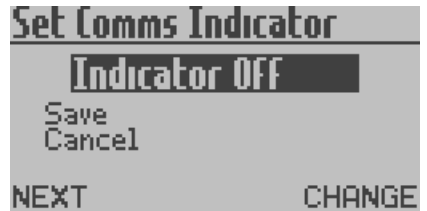
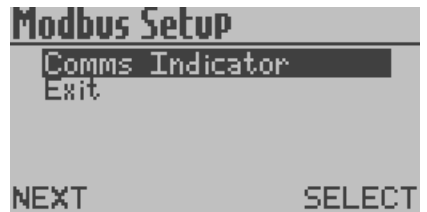
The **Comms Indicator** shows on the LCD screen if the **SentrO P** is transmitting (**T**) or receiving (**R**) information from the Modbus.

From the **Output Setup Menu** press **L** to navigate to **Comms Indicator**. Press **R** to enter the **Set Comms Indicator Menu**.

Press **R** to set the **Comms Indicator On** or **Off** as required. Press **L** to select **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Output Setup Menu**.

### Exit

From the **Output Setup Menu** press **L** to navigate to **Exit**. Press **R** to confirm the selection and return to the **Main Menu**.





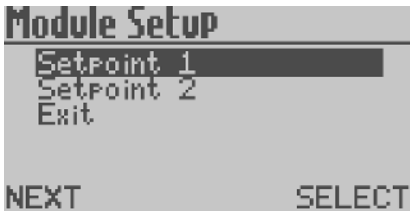
## 4.4.7 Module Setup

Setup the functional values of the Sentro eModule.

From the **Main Menu** press **L** to navigate to **Module Setup** press **R** to enter the **Module Setup Menu**.

The available menus are as follows:

- Setpoint 1
- Setpoint 2
- Exit



## Setpoint 1 and Setpoint 2

From the **Module Setup Menu** press **L** to navigate to **Setpoint 1**. Press **R** to enter the **Change Setpoint 1 Menu**.

### Activation

**Setpoint 1** and **Setpoint 2** can be configured to be activated by a gas concentration value going **Over** or falling **Under** a user-defined level.

#### Checkpoint

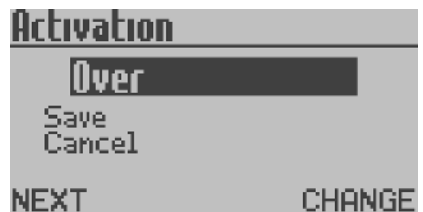
**Setpoint 2** activation is configured in exactly the same way as **Setpoint 1** activation.

From the **Change Setpoint 1 Menu** press **L** to navigate to **Activation**. Press **R** to enter the **Activation Menu**.

Press **R** to select **Under** or **Over** as required. Press **L** to select **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Change Setpoint 1 Menu**.

### Level

The level at which **Setpoint 1** and **Setpoint 2** are activated can be configured.

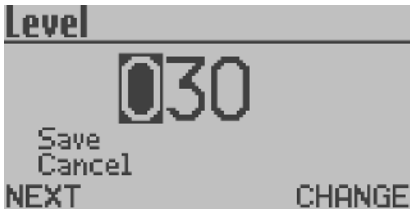


## Checkpoint

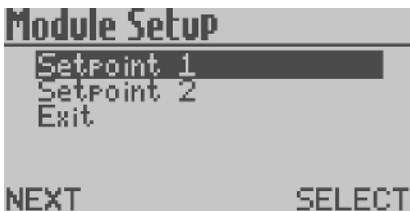
**Setpoint 2** activation level is configured in exactly the same way as **Setpoint 1**.



From the **Change Setpoint 1 Menu** press **L** to navigate to **Level**. Press **R** to enter the **Level Menu**.



Press **R** to increment the digits as required. Press **L** to navigate to the next digit. Repeat for all three digits and press **L**.

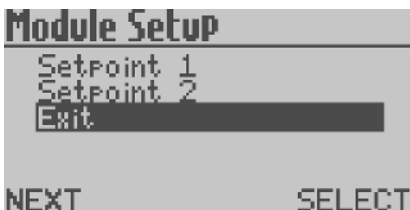


Press **L** to select **Save** or **Cancel** as required. Press **R** to confirm the selection and return to the **Change Setpoint 1 Menu**.



## Exit

From the **Change Setpoint 1 Menu** press **L** to navigate to **Exit**. Press **R** to confirm the selection and return to the **Module Setup Menu**.



## Exit

From the **Module Setup Menu** press **L** to navigate to **Exit**. Press **R** to confirm the selection and return to the **Main Menu**.

## 4.4.8 Exit

From the **Main Menu** press **L** to navigate to **Exit**. Press **R** to confirm the selection and return to the **Main Display**.

## 4.5 Support

If you need technical support to operate this product, or would like details of our after sales technical support packages, please contact your local Trolex service agent or [service@trolex.com](mailto:service@trolex.com).

## 5. Diagnostics and Maintenance

### 5.1 Diagnostic Messages

#### Sensor Over-range

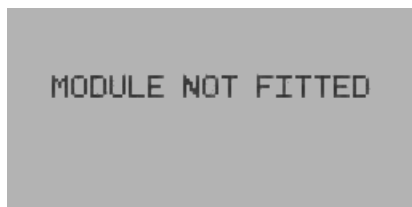
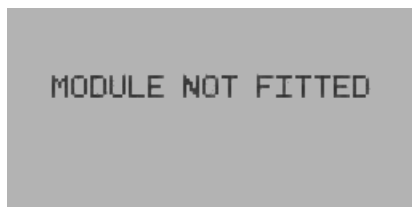
If the **SentrO P** detects gas levels above its prescribed range an error message will be shown.

#### Loss of Signal From the Sensor

If there is a loss of signal from the eModule to the **SentrO P** an error message will be shown.

#### Module Not Fitted

If the eModule has been removed from the **SentrO P** and is out for more than 10 seconds an error message will be shown.



## 5.2 Maintenance

### 5.2.1 Introduction

To keep your **SentrO P** in the best possible condition and minimise downtime, Trolex strongly recommends that you carry out regular planned preventative maintenance and keep records of the maintenance carried out. The planned preventative maintenance for **SentrO P** consists of a number of tasks carried out at regular intervals on a cumulative basis, ie at 12 months do the 1 month jobs **AND** the 12 month jobs. These tasks are listed in the maintenance schedule below:

Equipment Name	Task Type	Task Number	Interval
SentrO P gas inlet port	Check and Clean	5.2.2	1 month
SentrO P	Bump Test	5.2.3	1 month
Sentro eModules	Calibrate	5.2.4	6 months
SentrO P	Safety Check	5.2.5	12 months
Sentro eModules	Replace	5.2.6	
	Carbon monoxide		24 months
	Hydrogen sulphide		24 months
	Methane - pellistor		60 months
	Nitric oxide		24 months
	Nitrogen dioxide		24 months
	Oxygen		24 months

#### Checkpoint

After the completion of all maintenance, update the maintenance records.

## 5.2.2 SentrO P Gas Inlet Port - Check and Clean

1. Check the condition of the gas inlet port and repair or replace as necessary.
2. Clean the gas inlet port with a small brush to remove dust and debris.
3. After the completion of all maintenance, update the maintenance records.



## 5.2.3 SentrO P - Bump Test

1. With the **SentrO P** powered-up, note the background gas level on the LCD screen.
2. Spray a 10 second burst of test gas on to the gas port.
3. On the LCD screen check that the gas concentration reading rises and then falls back to the background level. This may take up to 25 seconds from the end of the burst of test gas.
4. After the completion of all maintenance, update the maintenance records.



### Checkpoint

If the **SentrO P** fails the above test, replace the defective eModule with a working eModule of the same type and repeat the bump test on the replaced eModule.





## 5.2.4 Sentro eModules - Calibrate

1. Calibrate the Sentro eModules in accordance with the instructions in section 4.4.4.
2. Replace any eModules that fail the calibration.
3. After the completion of all maintenance, update the maintenance records.

## 5.2.5 SentrO P - Safety Check

1. Check the exterior of the **SentrO P** for any signs of damage. If the **SentrO P** shows any signs of damage, deformation or missing parts, immediately remove it from service and replace it with a working **SentrO P**. Return the defective **SentrO P** to your local Trolex service agent for repair and testing.

OR

1. Return you **SentrO P** to the Trolex Product Support Department for a safety check.
2. After the completion of all maintenance, update the maintenance records.

## 5.2.6 Sentro eModules - Replace

1. The Sentro eModule should be changed at regular intervals to ensure the accuracy of response.
2. Service history is logged within the eModule and this data is used to periodically assess its condition whenever it is returned for servicing.
3. Simply undo the screws, open the front cover, remove the old eModule, insert the new eModule into the **Sentro P**, fit the cover, tighten the screws and return the removed eModule for checking and calibration.
4. After the completion of all maintenance, update the maintenance records.

### **Checkpoint**

The periodicity for eModule replacement is approximate and depends upon the eModule type and monitoring conditions. Gaining knowledge and experience of the condition of an eModule when it is replaced will enable you to fine tune this periodicity to suit your location.

### 5.3 Recommended Test Gas Concentrations

<b>eModule Type and Range</b>	Carbon monoxide 0 to 50 ppm	Hydrogen sulphide 0 to 50 ppm	Methane 0 to 4% v/v	Methane 0 to 100% v/v	Oxygen 0 to 25% v/v
<b>Zero Gas</b>	Clean air	Clean air	Clean air	Clean air	Clean air
<b>Span Gas</b>	CO 50 ppm	H <sub>2</sub> S 50 ppm	CH <sub>4</sub> 4% v/v in balanced air	CH <sub>4</sub> 5% v/v	O <sub>2</sub> 25% v/v

Standard test gas canisters are available from our Product Support department and can be supplied in a range of capacities from 34 litres up to 110 litres.

Please contact your local Trolex service agent or **service@trolex.com** for advice regarding recommended test gas procedures and product support plans.

#### Checkpoint

The calibration gas shown is the recommended level of concentration. Any concentration gas down to 50% of full scale can be utilised for accurate calibration.

#### Checkpoint

25% Oxygen cannot be shipped by air transport, so a concentration below 23% would be supplied.

## 5.4 Disposal

Part of the ethos of Trolex is sustainable design. **SentrO P** contains materials that can be recovered, recycled and reused. At the end of its useful life ensure that the **SentrO P** is recycled in accordance with local laws and bylaws for the geographic area where it is located. The end of its useful life is to be determined by the owner/operator of the equipment and not Trolex. Ensure that the **SentrO P** is recycled by licenced waste contractors with the appropriate licences for handling electronic waste in the geographic area where the **SentrO P** is located.

### Checkpoint

Consult your local Trolex service agent or the Trolex Product Support Department if you require assistance with disposal:

**service@trolex.com**

## 5.5 Maintenance Records

Implement a planned preventative maintenance process and keep good maintenance records.

Consult your local Trolex service agent or the Trolex Product Support Department: [service@trolex.com](mailto:service@trolex.com) for help in implementing a planned preventative maintenance process.

The 'Maintenance Log' gives an example of a typical maintenance record system.

**5.6 Maintenance Log**

Order Reference: TX	
Serial Number:	Date Purchased:
Gas Type:	Location:

Date	Scheduled Check	Fault	Recalibrate	Change eModules	Return to Trolex	Comments

## Disclaimers

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 analysis, evaluation and testing of the products with respect to the relevant specific application or use. Trolex shall not be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments, or find errors in this publication, please notify us at [marketing@trolex.com](mailto:marketing@trolex.com).

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

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

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