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Sentro eModules
Intelligent plug-in gas sensing modules for use in Trolex Sentro gas detectors

Environments: Mining • Tunnelling • Underground storage areas • Underground transportation • Conveyor systems • Water utilities • Pump stations • Machine monitoring • Ventilation systems

Features

- Intelligent plug-in sensing modules for on-board gas detection

- Compatible with Trolex Sentro products

- Multiple gases can be simultaneously monitored locally or remotely without the need for complex system design

- Each eModule stores all the necessary data about its type, identification, sensing range and specific calibration. This data is automatically recognised by Sentro when the eModule is loaded into the module bay

- Can be combined with Sentro rModules in a Sentro 8 Sensorstation for a wide range of sensing options

- 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

- Insert coding stops to prevent invalid eModule combinations

- The sensing module will identify itself when plugged into the module bay and auto configuration will take place

- eModules are ingress protected to IP54 standard

Benefits

- eModule replacement and servicing can be completed with power applied and housing cover removed

- Significant cost savings and safety improvements make a real impact on expenditure when applied across an entire industrial installation or throughout a global system structure

- 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

- Selected electrochemical cells are equipped with automatic STEL/TWA calculation

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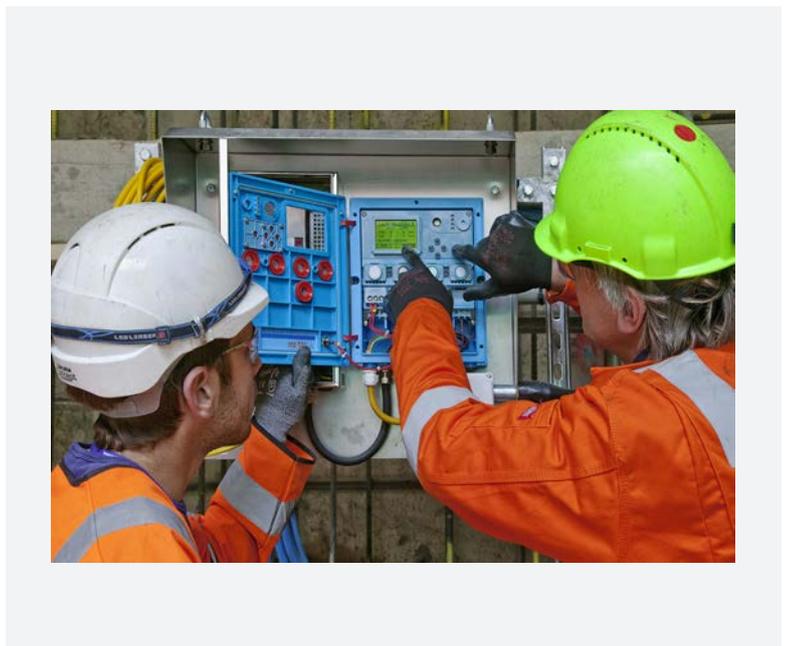
Functional Overview

The Sentro eModule is at the heart of the Sentro system. The Sentro eModule is an intelligent standardised gas sensing module that detects a range of toxic and flammable gases. Dynamic data is stored within the eModule, together with the condition of the gas sensing element and its service history.

eModule - fitted inside Sentro detection systems

You can easily service and calibrate the Sentro system, or change to a different gas, by simply changing the eModule, even with the power still applied.

Technical Information

Supply current:	Electrochemical - 5 mA at 12 V dc Infrared - 60 mA at 12 V dc LED Infrared - ?? mA at 12 V dc Pellistor - 40 mA at 12 V dc
eModule output:	Proprietary Trolex format
Alarm output:	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 to suit local conditions and operations.
Operating temperature range:	-10 to +40°C
Humidity:	15 to 90%RH, non-condensing
Storage temperature limts:	-20 to +60°C
Housing materials:	Reinforced polymer
Electrical protection:	EMC protected and proof against surface electrostatic charge
Protection classification:	Protected to IP54
Weight:	50 g
Mounting:	Secured mechanically in the module bay of Trolex Sentro

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Sentro eModule Sensing

A wide choice of interchangeable sensing eModules is available, each with its own processor for intelligent data storage and signal conditioning circuits. They will detect most of the common toxic and flammable gases. Single or multiple eModule sensors can be fitted depending upon which Sentro has been purchased.

The eModules are already calibrated so you can substitute them at any time with a replacement eModule in a matter of seconds. Each eModule contains its type identification and stores its full service history including gas identity, measuring range, data logging, predicted life span, calibration history, set points, failure modes and alarm setting. All the acquired data stays with the eModule throughout its functional life.

There is no danger of inserting the wrong eModule. You can configure up to 20 insert codes and your Sentro automatically identifies the module that is inserted. Security coding is used to ensure that the same type of Sentro eModule is always used.

eModule

Sentro eModules are used to monitor for environmental gas concentrations. Four types of eModule are available, they are detailed on pages 4 to 7:

- **Electrochemical cells** to detect toxic gases
- **Catalytic combustion sensors** to detect flammable gases
- **Infrared sensors** to detect carbon dioxide or methane
- **LED infrared sensors** to detect carbon dioxide or methane

Sentro eModules and rModules can be combined in a Sentro multigas detector, eg. Sentro 8, in almost any format and in any position. Your Sentro will recognise the eModule or rModule when it is inserted and will quickly configure itself for immediate operation. Selected electrochemical cells are equipped with automatic STEL/TWA calculation in accordance with EH40.

Note that eModules have separate order numbers and must be ordered as well as the required Sentro model.

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Sentro eModules

Electrochemical Cells to Detect Toxic Gases

Electromechanical cells monitor the concentration of toxic gases present in the environment. These cells combine good sensitivity at low gas concentration with high-range capability and excellent stability. Automatic STEL/TWA calculation is available on selected eModules.

Carbon Monoxide (CO):	0 to 50 ppm	TX6350.xx.250.50
	0 to 250 ppm	TX6350.xx.250.250
	0 to 300 ppm	TX6350.xx.300.300
	0 to 500 ppm	TX6350.xx.250.500
	0 to 1000 ppm	TX6350.xx.250.1000
Hydrogen Sulphide (H_2S):	0 to 50 ppm	TX6350.xx.251
Sulphur Dioxide (SO_2):	0 to 20 ppm	TX6350.xx.252
Nitrogen Dioxide (NO_2):	0 to 20 ppm	TX6350.xx.254
Nitrogen Dioxide (NO_2):	0 to 10 ppm	TX6350.xx.254.10
Chlorine (CL_2):	0 to 10 ppm	TX6350.xx.255
Oxygen (O_2):	0 to 25% v/v	TX6350.xx.257
Nitric Oxide (NO):	0 to 50 ppm	TX6350.xx.259
Hydrogen (H_2):	0 to 1000 ppm	TX6350.xx.261

Remember to order the eModules you require when you order your Sentro. Replace xx with 01 for Group 1 eModules and with 03 for General Purpose eModules.

TX6350.xx	.250.50 Carbon Monoxide CO	.250.250 Carbon Monoxide CO	.250.300 Carbon Monoxide CO	.250.500 Carbon Monoxide CO	.250.1000 Carbon Monoxide CO	.251 Hydrogen Sulphide H_2S
Sensing element	Electrochemical cell					
Sensing range	0 to 50 ppm	0 to 250 ppm	0 to 300 ppm	0 to 500 ppm	0 to 1000 ppm	0 to 50 ppm
Linearity	±2% FS					
Drift	2% per month					
Repeatability	±2%					
Response time T63%	<20 secs	<20 secs	<20 secs	<20 secs	<20 secs	<30 secs
Operating life	2 years					
Relative humidity	15 to 90% non-condensing					
Operating temperature	-10 to +40°C					
GENERAL alarm	15 ppm	30 ppm	30 ppm	30 ppm	30 ppm	5 ppm
HIGH alarm	30 ppm	100 ppm	120 ppm	200 ppm	200 ppm	10 ppm
STEL & TWA	200 ppm	200 ppm	200 ppm	200 ppm	200 ppm	10 ppm
	30 ppm	30 ppm	30 ppm	30 ppm	30 ppm	5 ppm

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Electrochemical Cells for Toxic Gas Detection - continued

TX6350.xx	.252 Sulphur Dioxide SO_2	.254 Nitrogen Dioxide NO_2	.254.10 Nitrogen Dioxide NO_2	.255 Chlorine CL_2	.257 Oxygen O_2	.259 Nitric Oxide NO	.261 Hydrogen H_2
Sensing element	Electrochemical Cell						
Sensing range	0 to 20 ppm	0 to 20 ppm	0 to 10 ppm	0 to 10 ppm	0 to 25%	0 to 50 ppm	0 to 1000 ppm
Linearity	±2% FS	±2% FS	±2% FS	±5%	±5%	±5%	2% FS
Drift	2% per month	2% per month	2% per month	2% per month	10% per year	2% per month	2% per month
Repeatability	±2%						
Response time T63%	<20 secs	<20 secs	<20 secs	<20 secs	N/A	<20 secs	<70 secs
Operating life	2 years	2 years	2 years	2 years	1 year	2 years	2 years
Relative humidity	15 to 90% RH non-condensing						
Operating temperature	-10 to +40°C						
GENERAL alarm	5 ppm	5 ppm	2.5 ppm	2.5 ppm	19% (under)	5 ppm	250 ppm
HIGH alarm	10 ppm	10 ppm	5 ppm	5 ppm	23% (over)	20 ppm	500 ppm
STEL & TWA	5 ppm	5 ppm	5 ppm	N/A	N/A	10 ppm	N/A
	2 ppm	3 ppm	3 ppm	0.5	N/A	3 ppm	N/A

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 conditions of very low humidity will shorten the life of electrochemical sensors.
- Gas sensing module type TX6350.xx.259 (Nitric Oxide) requires continuous power to maintain calibration stability. If power is removed from the module for more than 10 minutes, it could take 24-48 hours before stability is restored. Do not calibrate until the output signal is steady.

Other gases and ranges may be available, please contact the Trolex Sales Team for further information and advice:

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Catalytic Combustion Sensors to Detect Flammable Gases

This sensor uses a poison-resistant catalytic combustion sensor, a Pellistor, to monitor flammable gases present in the atmosphere. The sensor responds to most flammable gases and vapours to varying degrees. It is normally calibrated to Methane or Propane in terms of % LEL or % volume, although calibration for other gases can be supplied, contact Trolex for further information and advice.

Methane (CH_4):	0 to 100% LEL (4.4% v/v)	TX6350.xx.240
Methane (CH_4):	0 to 5% v/v	TX6350.xx.244
Methane (CH_4):	0 to 4% v/v	TX6350.xx.246
Propane (C_3H_8):	0 to 100% LEL (1.7% v/v)	TX6350.xx.282
Methane (CH_4):	0 to 100% LEL (5% v/v)	TX6350.xx.295

Remember to order the eModules you require when you order your Sentro. Replace xx with 01 for Group 1 eModules and with 03 for General Purpose eModules.

Sensing element:	Poison resistant pellistor with active temperature/humidity compensation
Linearity:	Linear to 3% v/v and 3% to 5% ±0.25% v/v
Max. Drift @ 25°C:	±0.25% CH_4 v/v per month
Response time (T63):	<15 secs
Response time (T90):	<20 secs
Sensing element life:	>5 years in clean atmosphere
Warm up time:	<5 mins in air or 1% v/v CH_4 (to 95% of stated accuracy)
GENERAL alarm:	10% LEL (0.44 or 0.5% v/v)
HIGH alarm:	20% LEL (0.88 or 1.00% v/v)

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

Other gases and ranges may be available, please contact the Trolex Sales Team for further information and advice:

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Infrared Sensors to Detect Carbon Dioxide or Methane

This infrared sensor monitors environmental concentrations of either Carbon Dioxide or Methane. It is highly specific to the selected gas and exhibits consistent sensing accuracy with superior long term stability, minimising calibration and maintenance.

Methane (CH$_4$):	0 to 100% v/v	TX6350.xx.242
Methane (CH$_4$):	0 to 5% v/v	TX6350.xx.243
Methane (CH$_4$):	0 to 100% LEL (4.4% v/v)	TX6350.xx.245
Methane (CH$_4$):	0 to 100% LEL (5% v/v)	TX6350.xx.249
Carbon Dioxide (CO$_2$):	0 to 2% v/v	TX6350.xx.253
Carbon Dioxide (CO$_2$):	0 to 5% v/v	TX6350.xx.278
Carbon Dioxide (CO$_2$):	0 to 100% v/v	TX6350.xx.279
Methane (CH$_4$):	0 to 4% v/v	TX6350.xx.300

Remember to order the eModules you require when you order your Sentro. Replace xx with 01 for Group 1 eModules and with 03 for General Purpose eModules.

TX6350.xx	.242	.243	.245	.249	.253	.278	.279	.300
	Methane CH$_4$	Methane CH$_4$	Methane CH$_4$	Methane CH$_4$	Carbon Dioxide CO$_2$	Carbon Dioxide CO$_2$	Carbon Dioxide CO$_2$	Methane CH$_4$
Sensing element	Infrared							
Sensing range	0 to 100% v/v	0 to 5% v/v	0 to 100% LEL (4.4% v/v)	0 to 100% LEL (5% v/v)	0 to 2% v/v	0 to 5% v/v	0 to 100% v/v	0 to 4% v/v
Zero drift	±0.5% v/v per month	±0.05% v/v per month	±1% LEL per month	±1% LEL per month	±0.5% v/v per month	±0.5% v/v per month	±1% v/v per month	±0.05% v/v per month
Repeatability	±2% v/v	±0.1% v/v	±2% LEL	±2% LEL	±0.05% v/v	±0.05% v/v	±2% v/v	±0.1% v/v
Response time T63%	<15 secs							
Response time T90%	<30 secs							
Operating life	<5 years							
Relative humidity	15 to 90% condensing							
Operating temperature	-10 to +40°C							
GENERAL alarm	25% v/v	1.25% v/v	10% LEL (0.44% v/v)	10% LEL (0.5% v/v)	0.5% v/v	1.25% v/v	25% v/v	1.25% v/v
HIGH alarm	50% v/v	2.5% v/v	20% LEL (0.88% v/v)	20% LEL (1.00% v/v)	1.0% v/v	2.5% v/v	50% v/v	2.5% v/v

Other gases and ranges may be available, please contact the Trolex Sales Team for further information and advice:

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LED Infrared Sensors to Detect Carbon Dioxide or Methane

This infrared sensor monitors environmental concentrations of either Carbon Dioxide or Methane. It is highly specific to the selected gas and exhibits consistent sensing accuracy with superior long term stability, minimising calibration and maintenance.

Methane (CH$_4$):	0 to 5% v/v	TX6350.xx.248
Methane (CH$_4$):	0 to 100% v/v	TX6350.xx.296
Methane (CH$_4$):	0 to 4% v/v	TX6350.xx.297
Methane (CH$_4$):	0 to 100% LEL (4.4% v/v)	TX6350.xx.298
Methane (CH$_4$):	0 to 100% LEL (5% v/v)	TX6350.xx.299
Carbon Dioxide (CO$_2$):	0 to 5% v/v	TX6350.xx.301
Carbon Dioxide (CO$_2$):	0 to 100% v/v	TX6350.xx.302

Remember to order the eModules you require when you order your Sentro. Replace xx with 01 for Group 1 eModules and with 03 for General Purpose eModules.

TX6350.xx	.248	.296	.297	.298	.299	.301	.302
	Methane CH$_4$	Methane CH$_4$	Methane CH$_4$	Methane CH$_4$	Methane CH$_4$	Carbon Dioxide CO$_2$	Carbon Dioxide CO$_2$
Sensing element				LED Infrared			
Sensing range	0 to 5% v/v	0 to 100% v/v	0 to 4% v/v	0 to 100% LEL (4.4% v/v)	0 to 100% LEL (5% v/v)	0 to 5% v/v	0 to 100% v/v
Zero drift							
Repeatability							
Response time T63%							
Response time T90%							
Operating life							
Relative humidity							
Operating temperature				-10 to +40°C			
GENERAL alarm	25% v/v	1.25% v/v	25% v/v	10% LEL (0.44% v/v)	10% LEL (0.5% v/v)	25% v/v	1.25% v/v
HIGH alarm	50% v/v	2.5% v/v	50% v/v	20% LEL (0.88% v/v)	20% LEL (1.00% v/v)	50% v/v	2.5% v/v

Other gases and ranges may be available, please contact the Trolex Sales Team for further information and advice:

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Applicability

The following table illustrates the range of Sentro eModules available, and their compatability with the Trolex range of Sentro gas detectors.

Gas Detected	Range	Sensor Type	Part Number	Trolex Sentro Type		
				Sentro 1	Sentro 8	Sentro Wireless
Carbon Dioxide	0 to 2% v/v	Infrared	TX6350.xx.253	✓	✓	✗
Carbon Dioxide	0 to 5% v/v	Infrared	TX6350.xx.278	✓	✓	✗
Carbon Dioxide	0 to 100% v/v	Infrared	TX6350.xx.279	✓	✓	✗
Carbon Dioxide	0 to 5% v/v	LED Infrared	TX6350.xx.301	✓	✓	✓
Carbon Dioxide	0 to 100% v/v	LED Infrared	TX6350.xx.302	✓	✓	✓
Carbon Monoxide	0 to 50 ppm	Electrochemical	TX6350.xx.250.50	✓	✓	✓
Carbon Monoxide	0 to 250 ppm	Electrochemical	TX6350.xx.250.250	✓	✓	✓
Carbon Monoxide	0 to 300 ppm	Electrochemical	TX6350.xx.250.300	✓	✓	✓
Carbon Monoxide	0 to 500 ppm	Electrochemical	TX6350.xx.250.500	✓	✓	✓
Carbon Monoxide	0 to 1000 ppm	Electrochemical	TX6350.xx.250.1000	✓	✓	✓
Chlorine	0 to 10 ppm	Electrochemical	TX6350.xx.255	✓	✓	✓
Hydrogen	0 to 1000 ppm	Electrochemical	TX6350.xx.261	✓	✓	✓
Hydrogen Sulphide	0 to 50 ppm	Electrochemical	TX6350.xx.251	✓	✓	✓
Methane	0 to 4% v/v	Pellistor	TX6350.xx.246	✓	✓	✗
Methane	0 to 5% v/v	Pellistor	TX6350.xx.244	✓	✓	✗
Methane	0 to 100% LEL (4.4%)	Pellistor	TX6350.xx.240	✓	✓	✗
Methane	0 to 100% LEL (5%)	Pellistor	TX6350.xx.295	✓	✓	✗
Methane	0 to 4% v/v	Infrared	TX6350.xx.300	✓	✓	✗
Methane	0 to 5% v/v	Infrared	TX6350.xx.243	✓	✓	✗
Methane	0 to 100% v/v	Infrared	TX6350.xx.242	✓	✓	✗
Methane	0 to 100% LEL (4.4%)	Infrared	TX6350.xx.245	✓	✓	✗
Methane	0 to 100% LEL (5%)	Infrared	TX6350.xx.249	✓	✓	✗
Methane	0 to 4% v/v	LED Infrared	TX6350.xx.297	✓	✓	✓
Methane	0 to 5% v/v	LED Infrared	TX6350.xx.248	✓	✓	✓
Methane	0 to 100% v/v	LED Infrared	TX6350.xx.296	✓	✓	✓
Methane	0 to 100% LEL (4.4%)	LED Infrared	TX6350.xx.298	✓	✓	✓
Methane	0 to 100% LEL (5%)	LED Infrared	TX6350.xx.299	✓	✓	✓
Nitric Oxide	0 to 50 ppm	Electrochemical	TX6350.xx.259	✓	✓	✓
Nitrogen Dioxide	0 to 10 ppm	Electrochemical	TX6350.xx.254.10	✓	✓	✓
Nitrogen Dioxide	0 to 20 ppm	Electrochemical	TX6350.xx.254	✓	✓	✓
Oxygen	0 to 25% v/v	Electrochemical	TX6350.xx.257	✓	✓	✓
Propane	0 to 100% LEL (1.7%)	Pellistor	TX6350.03.282	✓	✓	✗
Sulphur Dioxide	0 to 20 ppm	Electrochemical	TX6350.xx.252	✓	✓	✓

Replace xx with 01 for Group 1 eModules and with 03 for General Purpose eModules. Other gases and ranges may be available, please contact the Trolex Sales Team for further information and advice:
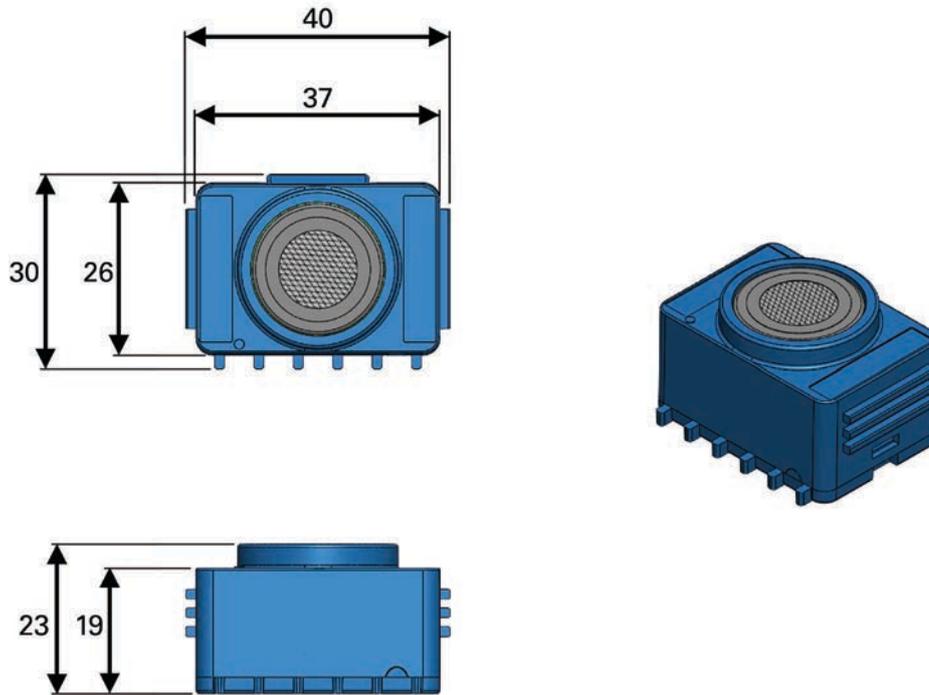
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Dimensions

Certifications

Please refer to the User Manuals for the equipment of which the eModules form part for certification details.

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