
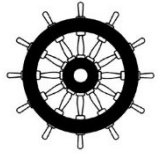




RTC SERIES EXPLORER

Combustible gases Sensors / Transmitters

- Ex aluminum case for 3/4" NPT cable gland
- For ATEX 94/9/EC security systems
- For naval applications RINA - MED
- Stainless steel sensor
- Complete set of accessories
- Excellent value for money
- High response speed

The RTC series sensors enables continuous monitoring of combustible gases (%LEL) in Exd classified areas. The watertight die-cast aluminium container complies with ATEX specifications.

The internal display, mounted on the Transmitter's PCB card, facilitates the periodic control procedures, verification and calibration, through the simple use of 3 keys.

These sensors are available in the standard version (VQ-01 type) and also in the "poison resistant" version (VQ-21 type) to resist aggressive chemicals such as solvents. The range of RTC sensors is completed with the thermal conductivity sensor (VQ-06 type) for measures up to 100% vol.

The output signal is 4-20mA with 3 conductors.

All RTC sensors are compatible with Explorer control units and any unit that accepts the 4-20mA signal.

The transmitters are equipped with a special circuit that automatically compensates for the zero point drift.

With the keys and the display it is possible to access a library of combustible gases with relative correction factors compared to the standard gas calibration (CH₄).

The catalytic sensors VQ-01 and VQ-06 for flammable gases, and the electrochemical oxygen, CO and H₂S sensors are approved for applications in the naval sector: RINA, MED.

The RTC series consists of the following sensors:

- RTC 1001:** Transmitter sensor of combustible gases 0-100%LEL, VQ-01, standard applications, CH calibration₄
- RTC 1002:** Transmitter sensor of combustible gases 0-100 %LEL, VQ-21 PR, resistant to atmospheres containing silicones, lead, sulphur compounds, and halogenated hydrocarbons
- RTC 1003:** Transmitter sensor 0-100 %VOL Thermal conductivity, VQ-06, for % volume measurement of Methane, Carbon Dioxide, Helium etc.
- RTC 1004:** Transmitter sensor of combustible gases 0-100%LEL, VQ-01, standard applications, calibration different from CH₄ (to be specified when ordering)
- RTC 1005:** Transmitter sensor of combustible gases 0-100%LEL, VQ-21 PR, calibration different from CH₄ (to be specified when ordering)

Order information		
	RTC 1001	1001700
	RTC 1002	1001710
	RTC 1003	1001730
	RTC 1004	1001705
	RTC 1005	1001715

Technical specifications	
Mechanical	
Container	Die-cast aluminum
Connection	Cable gland ¾ " NPT
Sizes	71 (H) x 40 (D) x 53 (W) mm
Weight	620 gr.
Protection degree	IP-6X
Electrical	
Power supply	12 - 24 Vdc
Absorption	3 W
Connection	4-20mA, 3 conductors
User interface	
Display	Internal 7 segments, 4 digits LCD
Buttons	No. 3 for programming and service operations
Sensor system	
Response time	T ₉₀ < 25 sec.
Sensitivity	0.1%
Linearity	100% on a scale of 0-100%LEL Methane
Maximum exposure	5%Vol. CH ₄
Measuring range	
• Catalytic VQ-01	0 - 100 % LEL
• Catalytic VQ-21 PR	0 - 100 % LEL
• Thermal conductivity VQ-06	0 - 100 % vol.
Operating conditions	
Temperature	-20°C/ + 55°C
Humidity	0% - 95% relative humidity (non-condensing)
Pressure	Atmospheric +/- 10%
Approvals	
Hazardous areas	ATEX II G Ex D IIC T6 Gb
Maritime	<ul style="list-style-type: none"> ▪ RINA ELE 272113CS ▪ MED 272113CS
Programmable parameters	<ul style="list-style-type: none"> ▪ Language (Italian, English) ▪ full scale, substance name, zero alignment and span

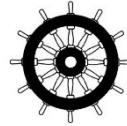
Gas	Range	Gas	Range
Methane CH ₄	0 ÷ 100% LEL	Helium He	0 ÷ 100% LEL
Propane C ₃ H ₈	0 ÷ 100% LEL	Chlorobenzene C ₆ H ₅ Cl	0 ÷ 100% LEL
n-Butane C ₄ H ₁₀	0 ÷ 100% LEL	Ethanol C ₂ H ₆ O	0 ÷ 100% LEL
Iso-Butane C ₄ H ₁₀	0 ÷ 100% LEL	Ethane C ₂ H ₆	0 ÷ 100% LEL
n-Pentane C ₅ H ₁₂	0 ÷ 100% LEL	Ethyl acetate C ₄ H ₈ O ₂	0 ÷ 100% LEL
Petrol vapours	0 ÷ 100% LEL	Ethylene C ₂ H ₄	0 ÷ 100% LEL
n-Heptane C ₇ H ₁₆	0 ÷ 100% LEL	Ethyl mercaptan C ₂ H ₆ S	0 ÷ 100% LEL
n-Hexane C ₆ H ₁₄	0 ÷ 100% LEL	Iso-Butanol C ₄ H ₁₀ O	0 ÷ 100% LEL
n-Octane C ₈ H ₁₈	0 ÷ 100% LEL	Isopropyl alcohol C ₃ H ₈ O	0 ÷ 100% LEL
Toluene C ₇ H ₈	0 ÷ 100% LEL	Isobutylene C ₄ H ₈	0 ÷ 100% LEL
Ammonia NH ₃	0 ÷ 100% LEL	Methanol CH ₄ O	0 ÷ 100% LEL
Acetone C ₃ H ₆ O	0 ÷ 100% LEL	Methylmercaptan CH ₃ SH	0 ÷ 100% LEL
Acetylene C ₂ H ₂	0 ÷ 100% LEL	Methyl ethyl ketone C ₄ H ₈ O	0 ÷ 100% LEL
Acetic Acid C ₂ H ₄ O ₂	0 ÷ 100% LEL	Xylene C ₈ H ₁₀	0 ÷ 100% LEL
Benzene C ₆ H ₆	0 ÷ 100% LEL	Methylamine CH ₅ N	0 ÷ 100% LEL
Ethylbenzene C ₈ H ₁₀	0 ÷ 100% LEL		0 ÷ 100% LEL

RTE and RTS SERIES EXPLORER

Toxic Gas Sensors / Transmitters



- Electrochemical cell technology
- Ex aluminum case for 3/4" NPT cable gland
- For ATEX 94/9/EC security systems
- For naval applications RINA - MED
- Stainless steel sensor
- Complete set of accessories
- Excellent value for money
- High response speed



Toxic gas detection is based on the use of an electrochemical cell.

The RTE series sensors enable the continuous monitoring of these gases in Exd classified areas, and are supplied with watertight die-cast aluminium container according to ATEX specifications.

The RTS series sensors, on the other hand, can only be used in safe areas. Some sensors are available only in this version, whereas for the detection of other gases the two solutions are available.

Toxic gas detection is carried out in ppm (parts per million).

The internal display, mounted on the Transmitter's PCB card, facilitates the periodic control procedures, verification and calibration, through the simple use of 3 keys.

The catalytic sensors VQ-01 and VQ-06 for flammable gases, and the electrochemical oxygen sensors, CO and H₂S are approved for applications in the naval sector: RINA, MED.

The transmitters are equipped with a special circuit that automatically compensates for the zero point drift.

RTE Series				
Name	Gas	Formula	Range	Code
RTE 1003	Carbon monoxide	CO	0 ÷ 200 ppm	1001780
RTE 1004	Hydrogen sulphide	H ₂ S	0 ÷ 200 ppm	1001800
RTE 1005	Nitrogen dioxide	NO ₂	0 ÷ 50 ppm	1001810
RTE 1006	Nitrogen monoxide	NO	0 ÷ 100 ppm	1001820
RTE 1007	Hydrocyanic acid	HCN	0 ÷ 30 ppm	1001830
RTE 1008	Tetrahydrothiophene	THT	0 ÷ 50 mg/m ³	1001840
RTE 1011	Hydrofluoric Acid	HF	0 ÷ 10 ppm	1001805
RTE 1010	Hydrogen	H ₂	0 ÷ 10.000 ppm	1001790
RTS Series				
Name	Gas	Formula	Range	Code
RTS 1001	Ammonia	NH ₃	0 ÷ 100 ppm	1003020
RTS 1002	Sulphur dioxide	SO ₂	0 ÷ 20 ppm	1003030
RTS 1003	Ethylene oxide	ETO	0 ÷ 20 ppm	1001860
RTS 1004	Chlorine dioxide	ClO ₂	0 ÷ 1 ppm	1003040
RTS 1006	Carbon monoxide	CO	0 ÷ 200 ppm	1003060
RTS 1011	Hydrogen Sulphide	H ₂ S	0 ÷ 200 ppm	1003065
RTS 1008	Chlorine	Cl ₂	0 ÷ 50 ppm	1003080
RTS 1009	Phosphine	PH ₃	0 ÷ 5 ppm	1003090
RTS 1010	Hydrochloric Acid	HCl	0 ÷ 50 ppm	1003095

Technical specifications applicable to all electrochemical sensors	
Mechanical	
Container	Die-cast aluminum
Connection	Cable gland ¾ " NPT
Sizes	71 (H) x 40 (D) x 53 (W) mm
Weight	620 gr.
Protection degree	IP-6X
Electrical	
Power supply	12 - 24 Vdc
Absorption	330 mW
Connection	4-20mA, 2 conductors
User interface	
Display	Internal 7 segments, 4 digits LCD
Buttons	No. 3 for programming and service operations
Operating conditions	
Temperature	-20°C/ + 55°C
Humidity	0% - 95% relative humidity (non-condensing)
Pressure	Atmospheric +/- 10%

RTE 1003	CARBON MONOXIDE CO
Nominal measurement range	0 ÷ 200 ppm
Maximum full scale	2,000 ppm (Max. exposure)
Sensor's useful life	24 months in air
Calibration	50 ppm CO / air, cod. 5301216
Signal loss (drift)	< 2% signal / month
Resolution	0.5 ppm
Response time	T ₉₀ < 30 sec.
Approvals	ATEX II G Ex D IIC T6 Gb RINA ELE 272113CS MED 272113CS

RTE 1004	HYDROGEN SULPHIDE H ₂ S
Nominal measurement range	0 ÷ 200 ppm
Maximum full scale	1,000 ppm (Max. Exposure)
Sensor's useful life	24 months in air
Calibration	25 ppm H ₂ S / air, cod. 5301215
Signal loss (drift)	< 2% signal / year
Resolution	0.30 ppm
Response time	T ₉₀ < 30 sec.
Approvals	ATEX II G Ex D IIC T6 Gb RINA ELE 272113CS MED 272113CS

RTE 1005	NITROGEN DIOXIDE NO ₂
Nominal measurement range	0 ÷ 100 ppm
Maximum full scale	100 ppm (Max. Exposure)
Sensor's useful life	2 years occurrence in air
Calibration	10 ppm NO ₂ / air, cod. 5301219
Signal loss (drift)	< 2% signal / month
Resolution	0.1 ppm
Response time	T ₉₀ < 40 sec.
Approvals	ATEX II G Ex D IIC T6 Gb

RTE 1006	NITROGEN MONOXIDE NO
Nominal measurement range	0 ÷ 100 ppm
Maximum full scale	1500 ppm (Max. exposure)
Sensor's useful life	2 years occurrence in air
Calibration	10 ppm NO / air, cod. 5301200
Signal loss (drift)	< 2% signal / month
Resolution	0.5 ppm
Response time	T ₉₀ < 30 sec.
Approvals	ATEX II G Ex D IIC T6 Gb
RTE 1007	HYDROCYANIC ACID HCN
Nominal measurement range	0 ÷ 50 ppm
Maximum full scale	100 ppm
Sensor's useful life	2 years occurrence in air
Calibration	10 ppm HCN / air, cod. 5301218
Signal loss (drift)	< 2% signal / month
Resolution	0.2 ppm
Response time	T ₉₀ < 120 sec.
Approvals	ATEX II G Ex D IIC T6 Gb
RTE 1010	HYDROFLUORIC ACID HF
Nominal measurement range	0 ÷ 10 ppm
Maximum full scale	100 ppm
Sensor's useful life	18 months in air
Signal loss (drift)	< 2% signal / month
Resolution	
Response time	T ₉₀ < 120 sec.
Approvals	ATEX II G Ex D IIC T6 Gb
RTS 1001	AMMONIA NH₃
Nominal measurement range	0 ÷ 100 ppm
Maximum full scale	100 ppm (Max. Exposure)
Sensor's useful life	24 months in air
Calibration	25 ppm NH ₃ / air, cod. 5301210
Signal loss (drift)	< 2% signal / month
Resolution	0.1 ppm
Response time	T ₉₀ < 40 sec.
RTS 1002	SULPHUR DIOXIDE SO₂
Nominal measurement range	0 ÷ 20 ppm
Maximum full scale	150 ppm (Max. exposure)
Sensor's useful life	12 months in air
Calibration	10 ppm SO ₂ / air, cod. 5301217
Signal loss (drift)	< 2% signal / month
Resolution	0.2 ppm
Response time	T ₉₀ < 45 sec.
RTS 1003	ETHYLENE OXIDE ETO
Nominal measurement range	0 ÷ 20 ppm
Maximum full scale	100 ppm
Sensor's useful life	2 years occurrence in air
Signal loss (drift)	< 5% signal / year
Resolution	0.1 ppm
Response time	T ₉₀ < 120 sec.


RTS 1004	CHLORINE DIOXIDE ClO₂
Nominal measurement range	0 ÷ 1 ppm
Maximum full scale	10 ppm (Max. exposure)
Sensor's useful life	2 years occurrence in air
Signal loss (drift)	< 2% signal / month
Resolution	0.1 ppm
Response time	T ₉₀ < 60 sec.
RTS 1005	CHLORINE Cl₂
Nominal measurement range	0 ÷ 20 ppm
Maximum full scale	50 ppm (Max. exposure)
Sensor's useful life	2 years occurrence in air
Calibration	10 ppm Cl ₂ / air, cod. 5301220
Signal loss (drift)	< 2% signal / month
Resolution	0.1 ppm
Response time	T ₉₀ < 45 sec.
RTS 1010	HYDROCHLORIC ACID
Nominal measurement range	0 ÷ 50 ppm
Maximum full scale	100 ppm (Max. Exposure)
Sensor's useful life	2 years occurrence in air
Signal loss (drift)	< 2% signal / month
Resolution	1 ppm
Response time	T ₉₀ < 70 sec.

OTHER SENSORS AVAILABLE UPON REQUEST

RECOM INDUSTRIALE s.r.l.

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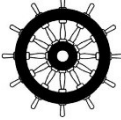


S. C. € 110.000,00 fully paid capital
 C.C.I.A.A. 38999 GE
 RE.A. 365226 GE
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EXPLORER O₂ series

Oxygen Transmitters / Sensors

- 3 detection technology
- For ATEX 94/9/EC safety systems in Ex aluminum case for ¾" NPT cable gland
- For naval applications RINA - MED
- For harsh environments and high temperatures
- Complete set of accessories
- Excellent value for money
- High response speed

The oxygen concentration is displayed in % volume.

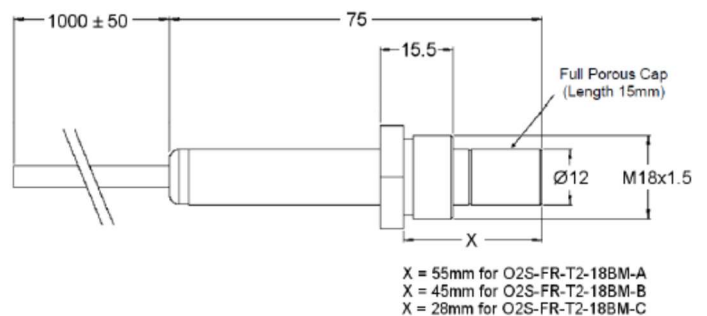
Depending on the application, three different sensors are available: The electrochemical sensor with a range of 0-30% vol, from the RTE series (enables continuous monitoring of oxygen in Exd classified areas, and is supplied with a watertight die-cast aluminium container according to ATEX specifications), the KE-25 type sensor for oxygen measurements up to 100% vol., in atmospheres rich in carbon dioxide (CO₂) and the Zirconium dioxide sensor for oxygen measurements at high temperatures.

The internal display, mounted on the Transmitter's PCB card, facilitates the periodic control procedures, verification and calibration, through the simple use of 3 keys.

Sensors for flammable gas, oxygen, CO and H₂S are approved for applications in the naval sector: RINA, MED and ABS Type approval.

The transmitters are equipped with a special circuit that automatically compensates for the zero point drift.

For the measurement in very hot environments or gas at high temperature, a special Zirconium dioxide (ZrO₂) sensor is used. In this case the 4-20mA transmitter is contained in a plastic container, while the sensor is positioned at the end of a 1 m long cable, and the probe containing the sensitive element is available in 3 different lengths: 28, 45, 55 mm.



Gas	Cell	Formula	Range	Code
Oxygen	Electrochemical	O ₂	0 ÷ 30 % vol.	1001760
Oxygen	KE-25 Type	O ₂	0 ÷ 100 % vol.	1003010
Oxygen	Zirconium dioxide	O ₂	0.1 ÷ 25 % vol. 0.1 ÷ 100 % vol.	1003075

	ELECTROCHEMICAL CELL	KE-25 TYPE CELL	ZIRCONIUM DIOXIDE CELL
Applications	Workplace safety	Measurements in % > of 30% vol.	Measurement of O₂ in high temperatures environments or gas mixtures

Technical specifications			
Mechanical			
Container	Die-cast aluminium	Die-cast aluminium	ABS plastic
Connection	Cable gland ¾ " NPT	Cable gland ¾ " NPT	Cable gland
Sizes	71 (H) x 40 (D) x 53 (W) mm	71 (H) x 40 (D) x 53 (W) mm	150 (W) x 110 (H) x 70 mm
Weight	620 gr.	620 gr.	490 gr.
Electrical			
Power supply	12 - 24 Vdc	12 - 24 Vdc	24 Vcc
Absorption	330 mW	330 mW	3 W
Connection	4-20mA, 2 conductors	4-20mA, 2 conductors	4-20mA, 3 conductors
User interface			
Display	Internal 7 segments, 4-digits LCD	Internal 7 segments, 4-digits LCD	Internal 7 segments, 4-digits LCD
Buttons	No. 3 for programming and service operations	No. 3 for programming and service operations	No. 3 for programming and service operations
Operating conditions			
Temperature	-20 °C ÷ + 55 °C	-20 °C ÷ 55 °C	- 100 °C ÷ +250 °C
Humidity	0% - 95% relative humidity (non-condensing)	0% - 95% relative humidity (non-condensing)	0% - 95% relative humidity (non-condensing)
Pressure	Atmospheric +/- 10%	Atmospheric +/- 10%	260 ÷ 1260 mbar
Measuring cell			
Nominal measurement range	0 ÷ 30 % vol.	0 ÷ 100 % vol.	0.1 ÷ 25 % vol. 0,1 ÷ 100 % vol *
Sensor's useful life	24 months in air	5 years	10 years (clean air)
Calibration	100% N ₂ cod. 5301025	100% N ₂ cod. 5301025	100% N ₂ cod. 5301025
Signal loss	< 5% signal / year	<10%signal / 6 months	-
Resolution	0.1 %	0.1 %	0.1 %
Response time	T ₉₀ < 15 sec.	T ₉₀ < 14 sec.	T ₉₀ < 4 sec.
Approvals			
Hazardous areas	ATEX II G Ex D IIC T6 Gb	-	-
Maritime	RINA ELE 272113CS MED 272113CS	-	-

* with digital Modbus RTU output only 0.1 rage is available ÷ 100 % vol.



SERIES RTI EXPLORER

Sensors / Transmitters with Infrared flow technology

- *Infrared Cell Technology*
- *Active gas flow system*
- *Complete set of accessories*
- *Excellent value for money*
- *High response speed*

The series RTI gas sensors are based on innovative InfraRED technology and are used for gas measurement such as CO₂, CH₄, N₂ They are also used to measure hydrocarbons and methane in nitrogen-rich mixtures.

The technology used is based on a "smart" long distance sensor and on an electronic card equipped with a powerful microprocessor for measurement management, I/O, diagnostics, with relative flow system with integrated pump, which ensures greater precision and better response time.

The sensor is supplied in an aluminium container with a hose connector for air inlet and outlet and a cable gland for the 4-20mA signal output.

Double-channel NDIR

The double-channel technique enables more stable measures over time of the gas concentration, compensating for variations in the IR source emission and minimizing the effects of ageing. The photodetectors are equipped with two optical interference bandpass filters, the first centred on the wavelength in which the gas is absorbed while the second is used as a reference.

Pyroelectric infrared photodetector

Characterized by high performance in terms of responsiveness, low electronic noise and with integrated channel for temperature measurement (measurement compensation from 0-50 °C), the photodetectors used are state of the art for gas concentration monitoring applications.

Solid State IR Source

The sensors integrate MEMs IR emitters consisting of a resistive heating element integrated on a thin dielectric membrane. The spectral emission characteristics are "black body" with high emissivity, low power consumption and high average life with constant emission characteristics.

Gas analysis cell

The optical gas analysis cell has been designed using non-sequential ray tracing SW tools that have allowed to maximize the effective length of the optical path in the smallest possible size in order to achieve the required performance. The gas analysis cells are made of high reflectivity aluminium or AISI 316 steel (and with two optical windows made of calcium fluoride) for the versions used in aggressive industrial environments in order to limit corrosion.

RTI Series

Name	Gas	Available ranges	Accuracy	Zero res (ppm)	Full scale res	Zero repeatability (ppm)	Full scale (ppm)	Code
RTI 1001	Carbon Dioxide CO ₂	0 ÷ 5.000 ppm	±1 FS	1	2% FS	±10	±50	1003000
		0 ÷ 5 % vol.	±2 FS	1	2% FS	±25	±250	
		0 ÷ 10 % vol.	±2 FS	1	2% FS	±25	±250	
		0 ÷ 25 % vol.	±2 FS	1	1% FS	±50	±500	
		0 ÷ 100 % vol.	±2 FS	1	1% FS	±1000	±5000	
RTI 1002	Methane CH ₄	0 ÷ 2.000 ppm	±4 FS	5	4% FS	±15	±100	1003100
		0 ÷ 100 % LEL	±2 FS	15	4% FS	±50	±500	
		0 ÷ 100 % vol.	±2 FS	300	2% FS	±500	±3000	
RTI 1003	Hydrocarbons HC	0 ÷ 100 % LEL	±2 FS	15	4% FS	±50	±500	1003200
RTI 1004	Hydrocarbons HC	0 ÷ 2.000 ppm	±4 FS	5	4% FS	±15	±100	1003300
RTI 1006	Nitrous oxide N ₂ O	0 ÷ 2.000 ppm	±1 FS	1	1% FS	±10	±20	1003410

Technical specifications applicable to all infrared sensors

Mechanical

Container Die-cast aluminum with hose connector and cable gland

Sizes Depending on the model, sensor sizes range from 56mm x 48mm x 38mm to 306mm x 48mm x 43mm

Electrical

Power supply 9-24 Vdc, protected

Absorption Max 90mA @ 9 Vdc

Heating time

- < 30 sec @ 20°C operational
- < 30 min @ 20°C full spec

Source frequency 1 ÷ 2 Hz

Refresh 5 ÷ 10 sec.

Response time T₉₀ 15 ÷ 40 sec. @ 20°C and @ 1 l/min.

Analogue output

- 4-20mA
- 0-5 V

I/O

- 4 out: OPEN
- 4 in: 0-5 V

Connectors

- Digital I/O: 0015446810 Molex with
- Pump: SL 3.5/2/180G Weidmüller with
- Analogue I/O: SL 3.5/2/180G Weidmüller with
- Power Supply: SL 3.5/2/180G Weidmüller with

Operating conditions

Temperature 0°C / +50°C

Humidity 0% - 95% relative humidity (non-condensing)

Pressure 800 - 1150 hPa. Variation +/- 1.5% on reading per kPa