

Installation & User Manual





TABLE OF CONTENTS

	page
1. DURTOX-X. Electrochemical technology detectors	4
2. RELAY OUTPUT MODULE (optional)	4
3. CONNECTIONS.	5
4. ADDRESSING RS485 DETECTORS	7
5. OPTICAL INDICATORS (internal LEDs): signals and functioning	7
6. TEST	8
7. TECHNICAL CHARACTERISTICS.	8
8. INFORMATION ABOUT ATEX MARKING	9
9. WARRANTY.....	9
10. EU DECLARATION OF CONFORMITY.....	10

1. DURTOX-X. Electrochemical technology detectors

DURTOX-X is a detector using electrochemical technology for the detection of toxic gases and O₂.

Available gases	Standard range	**Installation height aprox.	**Coverage area aprox.
Carbon monoxide CO	0-300ppm	1,50 to 2m from floor	200 m ²
Hydrogen sulfide H ₂ S	0-100ppm	1,50m from floor	100 m ²
Ammonia NH ₃	0-100ppm	30cm from ceiling	75 m ²
Nitrogen dioxide NO ₂	0-20ppm	40/50cm from floor	100 m ²
Oxygen O ₂	0-25% vol	1,70 to 2m from floor	100 m ²
*Monoxide Nitrogen NO	0-100ppm	1m from floor	25 m ²
Chlorine Cl ₂	0-10ppm	1m from floor	100 m ²
Sulfur Dioxide SO ₂	0-20ppm	30/40cm from floor	75 m ²
Hydrogen H ₂	0-500ppm	30cm from floor	25 m ²

* This gas is extremely difficult to detect in air, due to its rapid conversion into NO₂ upon coming into contact with oxygen (O₂).

** Installation height and coverage apply the local regulations in force in each case.

Communication formats

- RS485 addressable, 4 wire connection, compatible with EUROSONDELCO and DURGAS control panels. Up to 16 detectors can be connected in parallel on the same loop.
- 4-20mA, 3 wire connection, compatible with any standard system provided with this type of input.

Applications

DURTOX-X flameproof detectors have been designed for environments in which the formation of explosive atmospheres due to gases or vapours, fogs or suspended dust may occur, assuring a high protection level.

(Group of apparatus II – ATEX Directive Category 2)

The H₂ model is specially designed for early detection of H₂ from lithium-ion batteries.

Special features

- Provided with a 12bit microprocessor allowing total control over the sensor status.
- Thermal compensation that allows a correct response from each of the electrochemical sensors when faced with temperature variations, except for DURTOX-X O₂, which due to its systems does not require such a feature.
- Self testing hardware.
- Digital filter based on variable samplings of the sensor average values
- Auto-Zero automatic adjustment This special feature monitors zero value in relation to sensor response and electronics. The following protocol is used for this: Every 30 minutes an automatic test is performed, if drift is +/- than 2% of the full scale, it will readjust itself to zero, otherwise it will be shown as a readout.
- Other features accessible with factory based methodology allow us to check on the sensor remaining useful life, date of manufacture, date of last calibration and serial number.

2. RELAY OUTPUT MODULE (optional)

The optional relay output for the RS485 models of DURTOX-X is programmed with the following default values:

Activated, instantaneous –no delay–

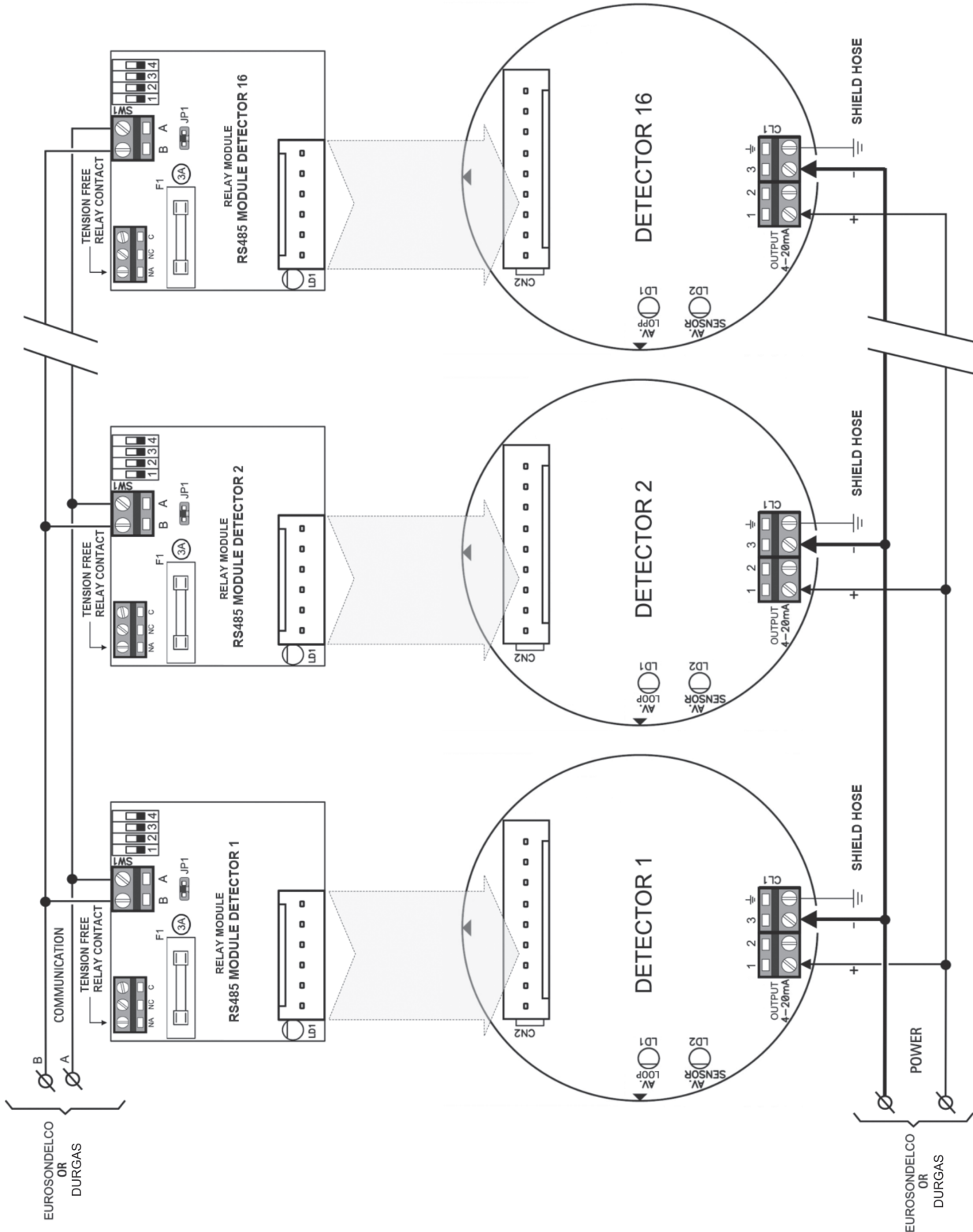
Alarm: 50ppm for CO, 5ppm for H₂S, 5ppm for NH₃, 5ppm for NO₂, <17% for O₂, 25ppm for NO, 2ppm for Cl₂, 2ppm for SO₂, 50ppm for H₂

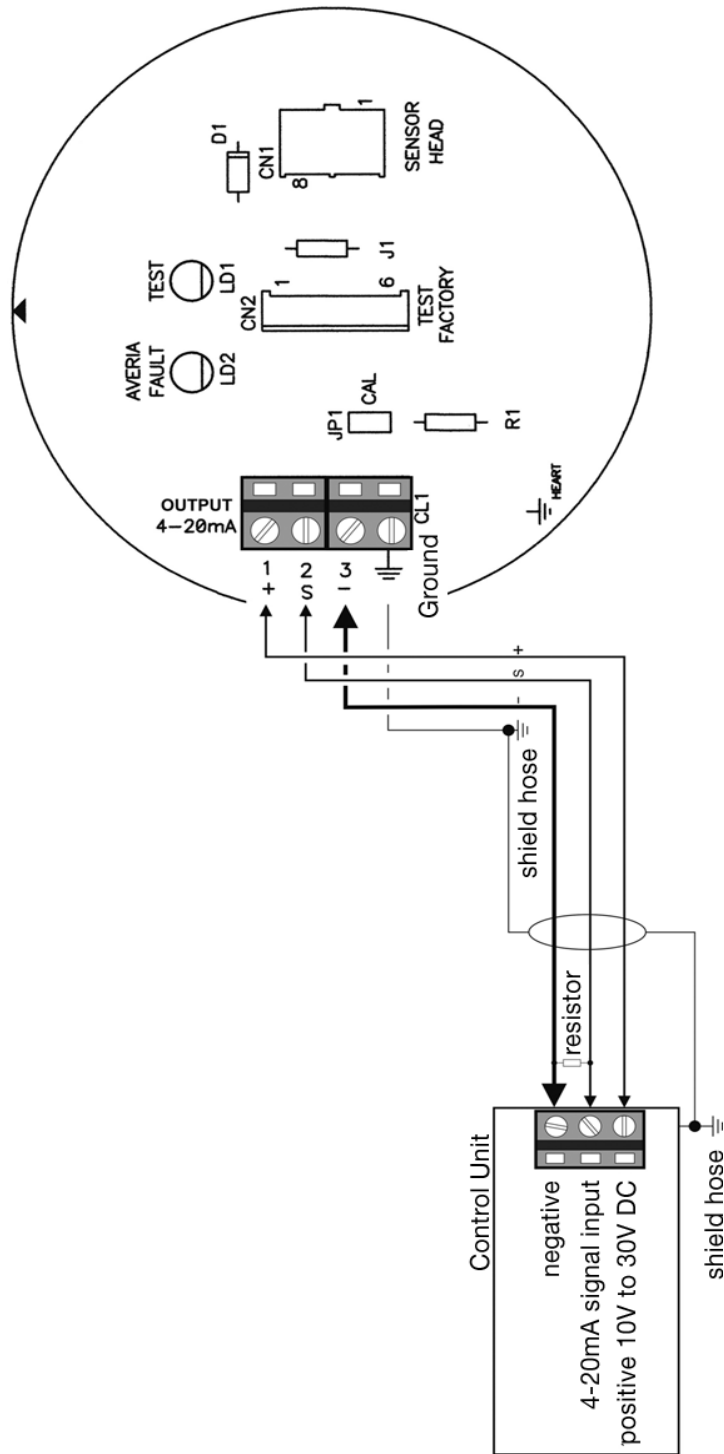
3. CONNECTIONS

IMPORTANT – Instructions regarding cable glands for ATEX detectors:

The user must ensure the cable is well anchored. The minimum torque setting applicable to the cap is 20 Nm. Check cable entry tightness after any maintenance operation: If cable has moved, tighten up the cap again. If tightening is not possible, send the detector back to factory for cable gland replacement.

DURTOX-X with RS485 communication:





IMPORTANT: If the system where detectors are to be connected does not have 4-20mA inputs, but 0-5 or 0-10V DC tension inputs, a resistance must be connected between negative (-) and signal (s), on the receptor device. Resistance value will depend on the detector power tension in accordance to the following table:

Detector Tension	Load Resistance	Tension Range (4-20mA)
Between 10V and 18V DC	250 Ω 1%	From 1V to 5V DC
Between 18V and 30V DC	500 Ω 1%	From 2V to 10V DC

4. ADDRESSING RS485 DETECTORS

Before connecting DURTOX-X detectors to EUROSONDELCO OR DURGAS, they must be addressed. If more than one detector is connected to the same loop, assign a number to each of them according to table 1.

Table 1- NUMBERING DETECTORS USING SW1 (addressing)

Detector nr.	1	2	3	4
01	On	On	On	On
02	Off	On	On	On
03	On	Off	On	On
04	Off	Off	On	On
05	On	On	Off	On
06	Off	On	Off	On
07	On	Off	Off	On
08	Off	Off	Off	On
09	On	On	On	Off
10	Off	On	On	Off
11	On	Off	On	Off
12	Off	Off	On	Off
13	On	On	Off	Off
14	Off	On	Off	Off
15	On	Off	Off	Off
16	Off	Off	Off	Off

5. OPTICAL INDICATORS (internal LEDs): signals and functioning

RS485 models – installed in vertical module –

- Fast intermittent: during initialization and recognition of the loop by the module line.
- Periodic intermittent: normal functioning. Time between blinking, in seconds, will correspond with the assigned number of the detector (1 to 16).
- 6-blink burst: Line failure. A-B communication cable is cut.
- 1 second cadence: failure or short circuit in the A-B communication lines. More than 5 minutes have passed without the detector being able to communicate with the module line.

4-20mA models –installed in main module–

- LD1: indicates the detector operational status.
- LD2: this LED will turn on in case of any internal failure in the detector as well as to indicate a positive or negative scale overflow.

6. TEST

Once connected, DURTOX-X begins to count a 60 second sensor stabilization time. During this time the 4-20mA model will have a current output of only 1,9mA, later increasing to 4mA.

Do not open these detectors while powered. Adjustments or calibrations on the installation are not allowed. Due to the technology applied, these operations can only be carried out at the factory.

Perform a check-up test at least once a year using gas tester containers with the right composition for each gas. Using any other means could poison or destroy the sensor and, therefore, the warranty would be invalidated.

All detectors manufactured by DURAN ELECTRONICA are factory calibrated with the appropriate target gas. Therefore do not need to be recalibrated during initial startup of the installation.

7. TECHNICAL CHARACTERISTICS

Technology	12bit Microprocessor and electrochemical sensors
Power	10 to 30V DC (4-20mA)/10 to 15V (RS485)
Maximum consumption	43mA to 12V DC
Useful life	>3 years CO, \pm 2 years other gases (in air)
Resolution	\pm 1% bottom of scale
Repeatability	\pm 2% bottom of scale
Initialization stabilization delay when connecting - all versions -	Approx. 5 minutes
T90 response time	CO, SO ₂ y NH ₃ \leq 30s - H ₂ S \leq 20s - O ₂ \leq 15s NO \leq 40s - Cl ₂ \leq 60s - NO ₂ \leq 20s - H ₂ \leq 70s
Temperature and humidity ranges	-10°C to +50°C 20-90% Hr
Working atmospheric pressure	90-110 KPa
Air velocity. Maximum allowed air velocity	<0.1-0.5m/s (depending gas)
Maintenance periods	Annual - recommended -
Regulation code for explosive atmospheres (gas/dust)	Ex db IIC T6 Gb / Ex tb IIIC T85°C Db
Housing material	Aluminium & Epoxy paint
Stopping plug material	Type PLG
Cable gland material and cable diameter	Natural brass & 6-10mm ² Santoprene gasket
Adaptor material & syntherized filter	Stainless steel.
Alarm relay module (optional)	Switched output dry contact 3A 250V AC fuse protected
Cable type (RS485)	4 wire shielded (power 2 x 1,5 + A and B communications 2 x 0,25 twisted pair)
Cable type (4-20mA)	3 X 1,5mm \varnothing hose, recommended minimum
Maximum installation distance	1000m (RS485) & 350/400m (4-20mA)
Dimensions (mm) & weight (gr)	155 x 180 x 110 / 1.700 Approx

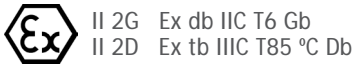
8. INFORMATION ABOUT ATEX MARKING



CE marking in conformity with Directive 2014/34/EU (ATEX).
(the number 0163 corresponds to the Notified Body, in this case the J.M.Madariaga Official Laboratory – LOM).



Materials with "d" enclosure protection (flameproof) for use in explosive gas atmospheres and with a "high" level of protection (Gb).



Materials with "d" enclosure protection (flameproof) for use in explosive gas atmospheres and with a "high" level of protection (Gb).

Materials with "t" enclosure protection for use in explosive dust atmospheres and with a "high" level of protection (Db).

LOM 10ATEX2076

EU Type Examination Certificate

9. WARRANTY

DURTOX-X detectors are guaranteed against any manufacturing defect for a 1 year period after the acquisition of the equipment. If, during this period of time, any anomaly was detected, please inform your provider or installer.

Warranty covers the full repair of the equipment which DURAN ELECTRONICA Technical Department considers to be defective, with the purpose of bringing them back to their normal use. This warranty will be valid as long as the equipment has been installed by a competent person, and always following the specifications contained in this manual. Negligent installation or use will exempt DURAN ELECTRONICA from any responsibility from damages caused to objects and/or people, and from the fulfillment of the terms of this warranty. In case of improper handling, or not respecting the conditions, characteristics and observations described in this manual, DURAN ELECTRONICA will not hold itself responsible for damages caused by improper use of this product.

Warranty does not include: installations, periodic tests and maintenance, damages caused by inadequate handling, inappropriate use, negligence, overload, inadequate power or equipment abandonment, tension deviations, defective installations and all other external causes, repairs or amendments made by personnel not authorized by DURAN ELECTRONICA and transportation costs of the equipments.

DURAN ELECTRONICA reserves the right to carry out improvements or to include modifications the equipment without prior notice.

10. EU DECLARATION OF CONFORMITY

DURAN ELECTRÓNICA, S. L.U.
Tomás Bretón, 50 - 28045 MADRID (Spain)

Declares the conformity of gas detector models DURTOX-X with the dispositions contained in the following European Parliament and Council directives:

2014/30/EU Electromagnetic compatibility

2014/34/EU Equipment and protective systems intended for use in potentially explosive atmospheres
conformity assumed in relation to the following standards:

EN IEC 60079-0:2018 EN 60079-1:2014 EN 60079-31:2014

Regulatory marking: Ex db IIC T6 Gb
 Ex tb IIIC T85 °C Db

EU Type examination certificate number LOM 10ATEX2076, Supplement 3

Product Quality assurance notification number: LOM 08ATEX9073

Issued by notified body number 0163: Laboratorio Oficial J. M. Madariaga (LOM)

C/ Eric Kandel, nº 1 28906 Getafe - MADRID (Spain), that authorizes the legal marking to be affixed on the product.

0163



II 2G



II 2G
II 2D

The LOM 10ATEX2076 certificate does not cover that indicated in the letter (b), paragraph 1, article 1 of the 2014/34/EU directive related to safety, controlling and regulating devices, nor the Essential Health and Safety Requirements indicated in the paragraphs 1.5.5, 1.5.6 and 1.5.7 of the Annex II of the Directive 2014/34/EU related to devices with a measuring function.

This declaration of conformity is issued under the sole responsibility of DURAN ELECTRONICA, S.L.U.

Sig. Rodrigo Matesanz. ATEX Coordinator



FS82426



DURAN[®]
electrónica

c/ Tomás Bretón, 50
28045 MADRID, Spain
Phone: +34 91 528 93 75
Fax +34 91 527 58 19
duran@duranelectronica.com
www.duranelectronica.com