PluraSens®

Solvent Vapor Detector-Transmitter

E2608-PID

User Manual

Evikon

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Acetone

A colorless organic solvent with a characteristic pungent odor that is volatile and flammable with the chemical formula $(CH_3)_2CO$.

Synonyms/Trade Names: Dimethyl ketone, Ketone propane, 2-Propanone.

Chemical formula		$(CH_3)_2CO$
Molar weight		58
Relative gas density (to air)		2.0
Conversion*		1 ppm = 2.38 mg/m^3
Boiling point		56.11 °C
Low explosive limit (LEL), % vol. in air		2.5
Upper explosive limit (UEL), % vol. in air		12.8
Odor		Characteristic pungent smell
Hazards		Highly flammable. Slightly toxic in normal use. Irritant causing mild skin irritation and moderate to severe eye irritation. At high vapor concentrations, it may depress the CNS.
Exposure limits	8 hours (2000/39/EC)	1900 mg/m^3 / 500 ppm
	NIOSH REL TWA	590 mg/m^3 /250 ppm
	IDLH (NIOSH)	2500 ppm [10%LEL]

Benzene

A colorless liquid with an aromatic odor that is highly flammable with the molecular formula C_6H_6.

Synonyms/Trade Names: Benzol, Phenyl hydride.

Chemical formula		 C_6H_6
Molar weight		78
Relative gas density (to air)		2.69
Conversion*		1 ppm = 3.19 mg/m^3
Boiling point		80 °C
Low explosive limit (LEL), % vol. in air		1.2
Upper explosive limit (UEL), % vol. in air		7.8
Odor		Hyacinth-like odor
Hazards		Highly flammable. Irritant. Carcinogen. May cause dizziness; headache, nausea, staggering gait; anorexia, lassitude. Target organs: eyes, skin, respiratory system, blood, central nervous system, bone marrow.
Exposure limits (NIOSH REL)	Ca TWA	0.319 mg/m^3 /0.1 ppm
	STEL 15 minutes	1 ppm
	Ca IDLH	500 ppm

Ethanol

A clear colorless liquid with a faintly sweet odor and pungent taste.

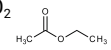
Synonyms/Trade Names: ethyl, alcohol.

Chemical formula		CH_3CH_2OH
Molar weight		46
Relative gas density (to air)		1,59
Conversion*		1 ppm = 1.89 mg/m^3
Boiling point		78.37°C
Low explosive limit (LEL), % vol. in air		3 - 3.3
Upper explosive limit (UEL), % vol. in air		19
Odor		The characteristic smell of alcohol
Hazards		Highly flammable. Gas/air mixtures are explosive. Inhalation of vapors leads to cough, headache, fatigue, and drowsiness. High concentrations may damage the fetus. Repeated high exposure may affect the liver and the nervous system.
Exposure limits according to Commission Directive 2006/15/EC	TWA 8 hours	1210 mg/m^3 / 1000 ppm
	STEL 15 minutes	-

Ethyl acetate

A colorless organic compound with a sweet pear-like smell that is highly flammable.

Synonyms/Trade Names: ethyl ester, acetic ester, EA, EtOAc.

Chemical formula		$C_4H_8O_2$ 
Molar weight		88
Conversion*		1 ppm = 3.60 mg/m^3
Boiling point		77.1 °C
Low explosive limit (LEL), % vol. in air		2
Upper explosive limit (UEL), % vol. in air		11.5
Odor		Sweet “pear” smell
Hazards		Flammable. Short-term exposure to high levels of ethyl acetate results first in irritation of the eyes, nose, and throat, followed by headache, nausea, vomiting, sleepiness, and unconsciousness.
Exposure limits (NIOSH)	TWA 8 hours	1400 mg/m^3 /400 ppm
	IDLH	2000 ppm [10%LEL]

Toluene

A clear, colorless liquid with a sweet smell that is highly flammable.

Synonyms/Trade Names: methylbenzene, phenylmethane.

Chemical formula		$C_6H_5CH_3$ 
Molar weight		92
Conversion*		1 ppm = 3.77 mg/m^3
Boiling point		110.7°C
Low explosive limit (LEL), % vol. in air		1.1 - 1.27
Upper explosive limit (UEL), % vol. in air		6.75–7.1
Odor		Characteristic “chemical” smell
Hazards		Highly flammable. Gas/air mixtures are explosive. Inhalation possible effects: irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paraesthesia; dermatitis; liver, kidney damage
Exposure limits according to Commission Directive 2006/15/EC	TWA	192 mg/mm^3 / 50 ppm
	STEL	384 mg/mm^3 / 100 ppm

Xylene

A colorless, flammable liquid with a chemical smell. Xylenes are produced by the methylation of toluene and benzene.

The term is used for any of three isomers of dimethylbenzene, or a combination thereof.

Synonyms/Trade Names: xylol, dimethylbenzene.

Chemical formula		$C_6H_4(CH_3)_2$		
Isomers		 *ortho*-xylene	 *meta*-xylene	 *para*-xylene
Molar weight		106		
Conversion*		1 ppm = 4.34 mg/m^3		
Boiling point		144.4 °C	139 °C	138.35 °C
Low explosive limit (LEL), % vol. in air		0.9 - 1.1		
Upper explosive limit (UEL), % vol. in air		6.0–7.0		
Odor		Characteristic “chemical” smell		
Hazards		Flammable. Inhaling can cause dizziness, headache, drowsiness, and nausea.		
Exposure limits according to Commission Directive 2000/39/EC	TWA 8 hours	221 mg/mm^3 / 50 ppm		
	STEL 15 minutes	442 mg/mm^3 / 100 ppm		

Conversion of ppm to mg/m^3 is calculated for 25°C and 1 atm.

Specifications

Detected gases	VOCs with ionisation potential < 10.6 eV	
Sampling method	Diffusion	
Sensor type	Photoionization detector	
Calibration	Isobutylene	
Order code	E2608-PID-40	E2608-PID-200
Typical detection ranges	0...40 ppm (isobutylene)	0...200 ppm (isobutylene)
Resolution / digital unit	1 ppb	1 ppm
Response time T90	< 3 s	
Sensor lifetime	5 years	
Calibration interval	Monthly or more frequently depending on operating conditions	
Signal update	Every 1 second	
Load resistance	R_L < (Us - 2 V) / 22 mA for 4-20 mA R_L > 250 kOhm for 0-10 V mode	
Digital interface	RS485, Modbus RTU protocol No galvanic isolation	
Power supply	12...36 VDC (default), 24 VAC or 230 VAC as options	
Power consumption	< 2 VA	
Analog outputs	2 × 4-20 mA / 0-10 V, user settable	
Outputs assignment	OUT1: Gas; OUT2: Gas	
Relay outputs	2 × SPST, max 5 A, 30 VDC / 250 VAC	
Alarm setpoints	Determined by the user within 5-95% of the detection range	
Cable connections	Screwless spring-loaded terminals	
Enclosure	Grey ABS, wall mount, protection class IP65	
Dimensions	H87 × W82 × D55 mm	
CE marking	According to 2014/30/EU and 2014/35/EU, EN 50491-4-1:2012 EN 61000-6-3:2020, EN 61326-1:2013(EMC, emissions) EN 61000-6-1:2019, EN 61000-6-2:2019(EMC, Immunity) EN 60079-29-1:2016, EN 60079-29-2:2015 and EN 60079-29-3:2014	

Operating conditions	-40...+65ºC; 0,9...1,1 atm 0...95% RH non-condensing, Explosion safe indoor areas, Non-aggressive atmosphere
Other options	
Remote probe	Protection IP65, default cable length 3.0 m; max height 80 mm, max diameter 65 mm

Product description

E2608 series detectors-transmitters belong to the PluraSens® family of multifunctional measurement instruments. The instruments utilize gas sensors of various types with excellent repeatability, stability, and long lifetime.

The E2608 series provides two independent analog outputs OUT1 and OUT2, user-selectable to 4-20 mA or 0-10 V. RS485 Modbus RTU digital communication interface allows easy instrument configuration and integration into various automation systems.

Two relays RE1 and RE2 with closing dry contacts can be used to switch alarm sirens, ventilation fans, shut-off valves, or other actuators. Remote probe, duct mount version and 24 VAC or 230 VAC power supply options are available.

The version of your detector-transmitter is marked on the package. If the symbol ⚠ is marked on the equipment, consult the documentation for further information.

Safety requirements

Misuse will impair the protection of the product. Always adhere to the safety provisions applicable in the country of use.

Do not perform any maintenance operation with the power on. Do not let water or foreign objects inside the device.

Removal of the PCB from the enclosure voids the warranty. Do not touch the electronic components directly, as they are sensitive to static electricity.

Connection diagrams can be found in the electrical connections section. The device might not perform correctly or be damaged if the wrong power supply is connected.

External circuits connected to the equipment should have sufficient insulation rating according to the environmental conditions and equipment power.

A disconnecting device that is marked as such and easily accessible should be included in the installation of this product.

PID (photoionization detector) technology

The gas under investigation diffuses into the sensor's testing cell, equipped with a source of high energy UV light (10.6 eV Krypton lamp) and electrodes. Exposed to UV light, organic molecules decompose to form ions, which are attracted by the electrodes. The measured resulting current is proportional to the VOC concentration.

Operating conditions

The device should be used both in a non-hazardous area and in a basic electromagnetic environment, where the latter is defined in EN 61326-1. Avoid strong mechanical shock and vibrations. Avoid corrosive atmosphere and areas highly contaminated with dust, oil mist, etc. Keep the instrument away from direct sunlight. A sudden temperature or humidity change might affect the sensitivity of the sensor.

Installation guidelines

Before proceeding with the installation it is mandatory to read the Safety requirements section and make sure to comply with all listed instructions. Installation standards EN 60079-29-2 and EN 45544-4 are also recommended for further instructions and related information about the installation. During the installation of the detector-transmitter the following points must be considered:

- Application (air quality control or leakage detection)
- Properties of the space under investigation (room geometry, direction, and velocity of airflows, etc.),
- Solvent vapors are heavier than air, so the gas detector-transmitter should be placed near the floor or potential leakage or formation source.
- The device should be accessible for maintenance and repair.

The aforementioned conditions above will affect the coverage area of the device. However, the coverage area for a detector-transmitter is usually between 2.5 to 5 meters radius.

For early leakage detection, install the sensor as close as possible to the potential leakage sources (flanges, valves, pressure reducers, pumps, etc.), taking into consideration other points listed above.

For general area monitoring without definite leakage sources, the detector-transmitters should be distributed evenly in the room.

For personal safety control, the detector-transmitters are installed in the breathing zone (at the height of the head of people or animals). The recommended sensor position is vertical, pointing downwards.

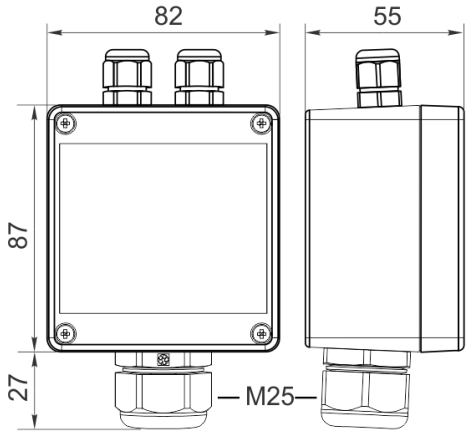
Wall mount version

Attach the mounting lugs to the back of the detector-transmitter using the provided screws. Screw the device to the wall through the mounting lug holes (for dimensions see the drawing in the next section).

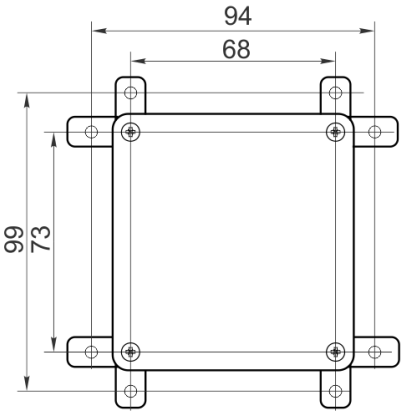
Duct mount version

Cut a hole with a diameter of 36...45 mm in the air duct at the chosen mounting place. Place the rubber flange aligning the holes in the flange and the air-duct and fix the flange with four self-tapping screws. Pass the sensor probe through the flange and adjust it to the appropriate depth. Unscrew four lid screws and detach the lid from the detector-transmitter.

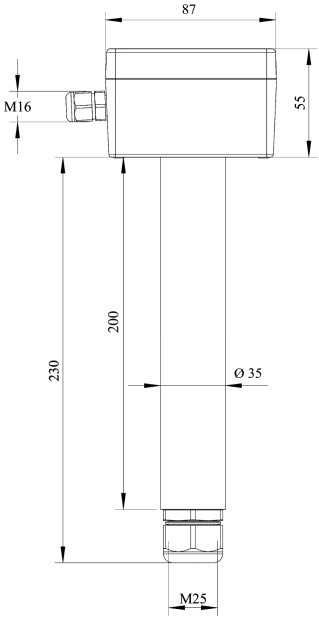
Mounting dimensions



Wall mount version



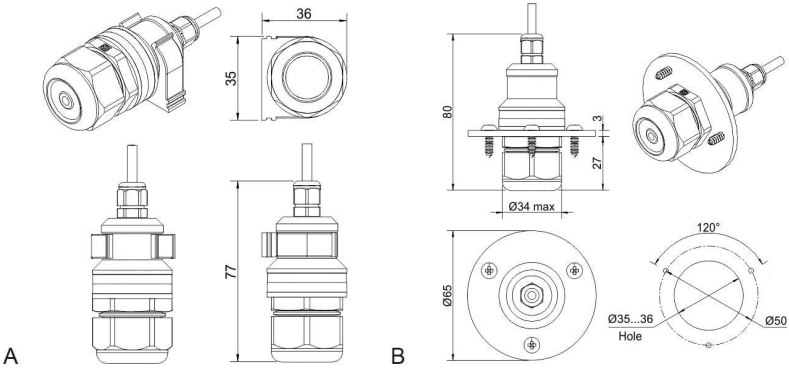
with mounting lugs



Duct mount version

Sensor probe handling

The wall-mount version of the detector-transmitter is available with a remote probe (see drawing below for dimensions). The remote probe is connected to the main unit with a shielded cable. The default remote probe cable length is 3 m.



A) Wall mount remote probe with fixing clamp (default version),
B) Remote probe with rubber flange and three self-tapping screws (on request)

The sensor probes of all types are equipped with a hydrophobic microporous PTFE filter to protect the sensor from dust, dirt, and water drops. The filter should be replaced if it gets strongly contaminated. To replace the PTFE filter, unscrew the sensor head cap and remove the old filter. Place a new filter into the cap and tighten it again.

NOTE! Never stab or press the filter near its center where the sensor is located since this may damage the sensor. Do not remove the filter as it may cause the device to show incorrect values and/or break the sensor.

The recommended orientation of the sensor probe is vertical with the sensor tip pointing downwards. This prevents the possible accumulation of condensed water on the sensor protection filter.

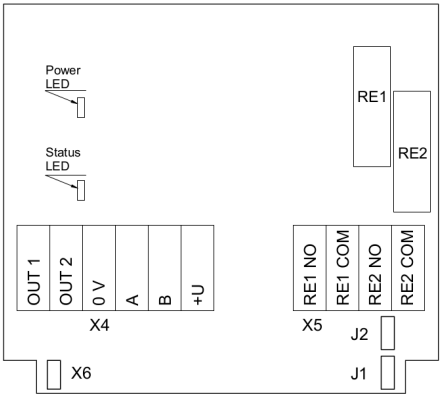
Gas sensor replacement procedures

1. Remove the sensor head cap from the device (or the remote probe),
2. Remove the PTFE filter (if it is not removed within the cap),
3. Remove the O-ring rubber,
4. Detach the PID sensor from the device,
5. Insert the new PID sensor inside,
6. Put back the O-ring rubber, PTFE filter, and the head cap, respectively.

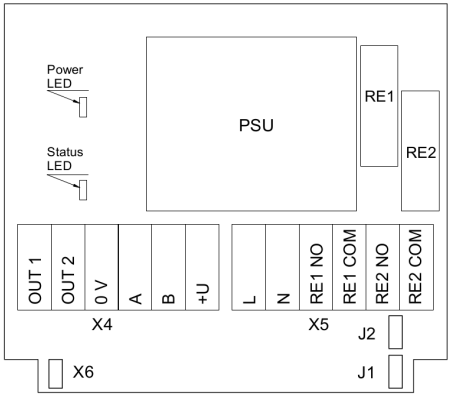
In most cases replacing the lamp and electrode stack can bring the sensor back to life.

Electrical connections

Unscrew four lid screws and detach the lid from the device. Use the M16 cable gland to let in cables of the power supply and of the external devices. Attach the power cable to the device without turning it on. Using the connection diagram below, connect the analog outputs and digital interface terminals to the relevant devices according to your tasks.



Version without PSU



Version with PSU

Jumpers	
J1	OUT1 type (open: 4-20 mA; closed 0-10 V)
J2	OUT2 type (open: 4-20 mA; closed 0-10 V)
X6	Reset Modbus network parameters to default
X4 terminals	
OUT1	4-20 mA / 0-10 V output
OUT2	4-20 mA / 0-10 V output
0V	0 V / 24 VAC Neutral (optional)
A	RS485 A / Data +
B	RS485 B / Data -
+U	+24 VDC / 24 VAC Phase (optional)

X5 terminals (optional)	
L	90…265 VAC Phase
N	90…265 VAC Neutral
RE1 NO	Relay 1, normally open terminal
RE1 COM	Relay 1, common terminal
RE2 NO	Relay 2, normally open terminal
RE2 COM	Relay 2, common terminal

The screwless quick connect spring terminals on the E2608 series devices are suitable for a wide range of wires with a cross-section of 0.2...1.5 mm^2. We recommend striping the wire end by 8...9 mm and using wire end sleeves.

To connect the wire, insert the wire end into the terminal hole. To disconnect, push the spring-loaded terminal lever, pull the wire out, and release the lever.

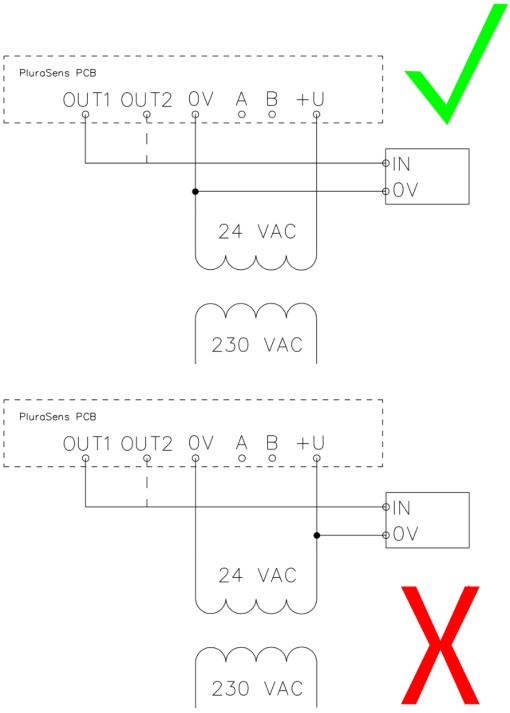
Use a twisted-pair cable, e.g. LiYY TP 2×2×0.5 mm^2 or CAT 5, to connect the device to the RS485 network. A and B on the device represent DATA+ and DATA- respectively, polarity must be respected when connecting to an external RS485 network.

Both analog outputs can be independently changed between 4-20 mA and 0-10 V type using jumpers J1 (OUT1) and J2 (OUT2). By closing pins on a specific jumper the related output is 0-10 V, with an open jumper the output is 4-20 mA. Power restart is required after changing the position of the jumpers.

NOTE! The outputs are not galvanically isolated from the external power supply and share a common 0V. Allowed load resistance limits are stated in the Specifications table. To power the instrument from an external power source, connect terminals 0V and +U to the source. If the integrated mains power supply module is used, connect terminals L and N to the mains.

NOTE! Actuator short-circuits should be avoided, to protect the instrument relays using external fuses or safety switches.

Correct and incorrect cabling for 24 VAC



Operation

Turn on the power. The instrument warm-up time takes ≤1 minute after switching on and the final sensor stabilization time to maximum accuracy takes <5 minutes. The operating status is indicated by the LED on the PCB of the device. The control LED (red) response to different processes is presented in the following table:

Mode	LED mode
During calibration mode or sensor heating period (if activated)	0.5 Hz (50% on, 50% off)
Relay 1 turned on	Blinking 1 Hz (50% on, 50% off)
Relay 2 turned on	Blinking 2 Hz (50% on, 50% off)
During the Modbus communication cycle	Short on-off pulses
Normal operating/measurement	Continuously on or off

Make sure that the detector-transmitter is properly mounted, the external devices connected, power LED (green) on, and the control LED (red) is constantly lit. Place the lid back and fix it with the screws. The device is ready to use.

Properties of VOC: ionization energy, the correction factor

Sensors used in E2608-PID are calibrated using isobutylene, but the PID is a broadband VOC detector, with a sensitivity that differs for each VOC. If you know what VOC you are measuring, then the table below will allow you to calculate the concentration for your specific VOC. Only the most common substances are listed in the table, if you can't find your compound of concern, please contact us.

NOTE! These are approximate values, so for the best accuracy, you should calibrate with the relevant VOC.

The table includes the following columns:

1. The most common name for the VOC or other substances,
2. CAS No; You can find the VOC using the CAS No,
3. Brutto-formula,
4. Ionization energy (IE), (eV)
5. Relative Response/ Correction Factor (CF), Also called the Response Factor (RF). Multiply the displayed concentration by the Relative Response/CF/RF to calculate the actual concentration of the VOC.
6. Minimum Detection Level (MDL) Also called Minimum Detectable Quantity (MDQ). The typical lowest concentration that can be detected. The sensor used in E2608-PID-40 has greater sensitivity than that in E2608-PID-200, so the MDL for the E2608-PID-40 will be much less than the MDL for the E2608-PID-200.

The Relative Response/CF/RF is measured in dry air; high humidity will reduce this factor by 30% to 50%, so the CF/RF should be increased in high humidities. Relative sensitivity is the inverse of the correction factor, specifying the percent response of the VOC, relative to isobutylene. If less than 100%, then the VOC is less responsive than isobutylene; if the relative sensitivity is greater than 100%, then the VOC is more responsive than isobutylene. Relative sensitivity (%) is specified in the same way as cross-sensitivity for toxic gas sensors.

VOC response

The PID can not measure all VOCs or gases, two types of VOCs are not measured:

NR: No response. The lamp does not ionize the VOC and the VOC cannot be measured.

NV: The vapor pressure of the VOC at 20°C is less than a few ppm, so this Semi-Volatile Organic Compound (SVOC) cannot be measured.

NA: Not available

Occasionally you will be measuring a mixture of VOCs. If the total concentration is within the linear range of your PID, then it is reasonable to assume that the concentrations are additive without interference between the different VOCs. Remember that if you are measuring a combination of VOCs, then the accurate measurement of one of these VOCs will be difficult; without careful data analysis, you will get only a CF averaged measurement. Be cautious when reporting actual VOC concentration if you know that there may be several VOCs present.

Balance gas

The relative response is measured in laboratory air, with 20.9% oxygen, balanced nitrogen. Some gases absorb UV light without causing any PID response (e.g. methane, ethane). In ambient atmospheres where these gases are present, the measured concentration of target gas will be less than is actually present.

Methane absorbs UV strongly, so for accurate measurements in methane containing atmospheres, calibrate with a calibration gas containing the expected methane concentration. 50% of LEL methane reduces the reading by up to 50%. Gases such as nitrogen and helium do not absorb UV and do not affect the relative response.

The correction factor for a gas mix containing PID detectable gases A, B, C… with response factors RF(A), RF(B), RF(C), in relative proportions a: b: c… is given by:

CF(mix) = 1 / [(a/CF(A) + b/CF(B) + c/CF(C)…]

Accuracy of the Table: This table is for indication only. Table accuracy is 1 to 2 digits only, so when calculating concentration for a specific VOC, only specify to 1 or 2 digits.

Index	Chemical name	Alternative name	Formula	CAS no.	IE, eV	Response Factor (RF) 10.6 eV	E2608-PID-40 MDL (ppb)	E2608-PID-200 MDL (ppb)
1	Acetaldehyde		C_2H_4O	75-07-0	10.23	5.5	25	480
2	Acetamide		C_2H_5NO	60-35-5	9.69	2		
3	Acetic acid		$C_2H_4O_2$	64-19-7	10.66	28	180	3615
4	Acetic anhydride		$C_4H_6O_3$	108-24-7	10.14	4	20	400
5	Acetone	2-propanone, dimethyl ketone	C_3H_6O	67-64-1	9.69	1.17	5	70
6	Acetonitrile		CH_3CN	75-05-8	12.2	NR		
7	Acetophenone	1-phenylethan-1-one, methyl phenyl ketone	C_8H_8O	98-86-2	9.29	0.6		
9	Acetylene	ethyne	C_2H_2	74-86-2	11.4	NR		
10	Acrolein	propenal	C_3H_4O	107-02-8	10.22	3.2	20	400

11	Acrylic Acid	propenoic acid	$C_3H_4O_2$	79-10-7	10.6	21	15	275
Index	**Chemical name**	**Alternative name**	**Formula**	**CAS no.**	**IE, eV**	**Response Factor (RF) 10.6 eV**	**E2608-PID-40 MDL (ppb)**	**E2608-PID-200 MDL (ppb)**
12	Acrylonitrile		C_3H_3N	107-13-1	10.91	NR		
13	Alkanes, n-, C6+		C_nH_{2n+2}	N/A	~10	1.2		
15	Allyl alcohol		C_3H_6O	107-18-6	9.63	2.3	10	200
16	Allyl bromide	3-bromopropene	C_3H_5Br	106-95-6	9.96	3		
17	Allyl chloride	3-chloropropene	C_3H_5Cl	107-05-1	10.05	4.5	20	450
18	Ammonia		NH_3	7664-41-7	10.18	8.5	40	850
19	Amyl acetate		$C_7H_{14}O_2$	628-63-7	9.9	1.8	10	180
20	Amyl alcohol		$C_5H_{12}O$	71-41-0	10	2.6	15	320
21	Amyl alcohol,tert-		$C_5H_{12}O$	75-85-4	9.8	1.5		
22	Aniline		C_6H_7N	62-53-3	7.7	0.5	3	50
23	Anisole		C_7H_8O	100-66-3	8.21	0.59	2	50
24	Arsine		AsH_3	7784-42-1	9.89	2.5	15	250
25	Asphalt, petroleum fumes			8052-42-4	~9	1	5	100
26	Benzaldehyde		C_7H_6O	100-52-7	9.49	0.7	5	85
27	Benzene		C_6H_6	71-43-2	9.24	0.5	3	50
28	Benzoic acid		$C_7H_6O_2$	65-85-0	9.3	0.7		
29	Benzyl acetate		$C_9H_{10}O_2$	140-11-4	~9	0.6		
30	Benzyl alcohol		C_7H_8O	100-51-6	8.26	1	6	125
31	Camphor		$C_{10}H_{16}O$	76-22-2	8.76	0.4		
32	Carbon dioxide		CO_2	124-38-9	13.77	NR	0	0
33	Carbon disulfide		CS_2	75-15-0	10.08	1.4	7	140
34	Carbon monoxide		CO	630-08-0	14.01	NR	0	0
35	Carbon tetrabromide	tetrabromomethane	CBr_4	558-13-4	10.31	3	15	300
36	Carbon tetrachloride	R-10, tetrachloromethane	CCl_4	56-23-5	11.47	NR		
37	Chloroform		$CHCl_3$	67-66-3	11.42	NR		
38	Acetaldehyde		$C_{14}H_{26}O_2$	97-89-2	~9	0.9		
39	Coumarin		$C_9H_6O_2$	91-64-5	~9	0.4		
40	Creosote		n/a	8021-39-4	~9	1		

41	Cresol, m-	3-methylphenol	C_7H_8O	108-39-4	8.36	2.2	5	105
42	Cresol, o-	2-methylphenol	C_7H_8O	95-48-7	8.14	1.1	5	105
43	Cresol, p-	4-methylphenol	C_7H_8O	106-44-5	8.31	1.1	5	105
44	Cycloalkanes		N/A	N/A	~10	1.5		
45	Cyclobutene		C_4H_6	822-35-5	9.43	3		
46	Cycloheptane		C_7H_{14}	291-64-5	9.82	1.1		
47	Cyclohexane		C_6H_{12}	110-82-7	9.98	1.3	7	130
48	Cyclohexanethiol		$C_6H_{12}S$	1569-69-3	~9	0.5		
49	Cyclohexanol		$C_6H_{12}O$	108-93-0	10	1.6	15	300
50	Cyclohexene		C_6H_{10}	110-83-8	8.95	0.9	5	75
51	Cyclopentadiene		C_5H_6	542-92-7	8.56	0.8		
Index	**Chemical name**	**Alternative name**	**Formula**	**CAS no.**	**IE, eV**	**Response Factor (RF) 10.6 eV**	**E2608-PID-40 MDL (ppb)**	**E2608-PID-200 MDL (ppb)**
52	Cyclopentane		C_5H_{10}	287-92-3	10.52	10	20	400
53	Cyclopentene		C_5H_8	142-29-0	9.01	1.5		
54	Decane, n-		$C_{10}H_{22}$	124-18-5	9.65	1.2	5	100
55	Decanol		$C_{10}H_{22}O$	112-30-1		1.2		
56	Diethyl ether	ethyl ether	$C_4H_{10}O$	60-29-7	9.53	1.1	4	90
57	Diethylamine		$C_4H_{11}N$	109-89-7	8.01	1.4	5	100
58	Diesel fuel			68334-30-5	8	0.8	4	75
59	Dimethylamine		C_2H_7N	124-40-3	8.24	1.5	7	140
60	Diphenyl ether	phenyl ether	$C_{12}H_{10}O$	101-84-8	8.09	1.5	4	80
61	Dodecane		$C_{12}H_{24}$	112-40-3	~8.8	1		
62	Dodecanol		$C_{12}H_{26}O$	112-53-8		0.9	5	90
63	Ethane		C_2H_6	74-84-0	11.56	NR		
64	Ethanol	alcohol,ethyl alcohol	C_2H_6O	64-17-5	10.43	11	45	870
65	Ethyl acetate		$C_4H_8O_2$	141-78-6	10.01	4.5	20	360
66	Ethyl acrylate		$C_5H_8O_2$	140-88-5	10.3	2.3	10	200
67	Ethyl benzoate		$C_9H_{10}O_2$	93-89-0	8.9	0.9		
68	Ethyl butyrate		$C_6H_{12}O_2$	105-54-4	~9.9	1.4	5	100
69	Ethylamine		C_2H_7N	75-04-7	8.86	1	5	100
70	Ethylbenzene		C_8H_{10}	100-41-4	8.76	0.56	3	50
71	Ethylcyclohexane		C_8H_{16}	1678-91-7	9.54	0.8		
72	Ethylene	ethene	C_2H_4	74-85-1	10.51	8	40	800

73	Ethylene glycol		$C_2H_6O_2$	107-21-1	10.16	9	100	2000
74	Ethylamine		C_2H_7N	75-04-7	8.86	1	5	100
75	Formaldehyde		CH_2O	50-00-0	10.87	NR		
76	Formamide		CH_3ON	75-12-7	10.2	2	10	200
77	Formic acid		CH_2O_2	64-18-6	11.05	NR		
78	Furan		C_4H_4O	110-00-9	8.88	0.4		
79	Hexanoic acid		$C_6H_{12}O_2$	142-62-1	10.12	4		
80	Hexanol		$C_6H_{14}O$	111-27-3	9.89	2		
81	Hexene, 1-		C_6H_{12}	592-41-6	9.44	0.98	5	90
82	Hydrazine		H_4N_2	302-01-2	8.93	3	15	300
83	Hydrazoic acid		HN_3	7782-79-8	10.72	NR		
84	Hydrogen		H_2	1333-74-0	15.43	NR		
85	Hydrogen bromide		HBr	10035-10-6	11.62	NR		
86	Hydrogen chloride		HCl	7647-01-0	12.74	NR		
87	Hydrogen cyanide		HCN	74-90-8	13.6	NR		
88	Hydrogen fluoride		HF	7664-39-3	15.98	NR		
89	Hydrogen iodide		HI	10034-85-2	10.39	5		
90	Hydrogen peroxide		H_2O_2	7722-84-1	10.58	4	20	400

Index	**Chemical name**	**Alternative name**	**Formula**	**CAS no.**	**IE, eV**	**Response Factor (RF) 10.6 eV**	**E2608-PID-40 MDL (ppb)**	**E2608-PID-200 MDL (ppb)**
126	Hydrogen selenide		H_2Se	7783-07-5	9.88	2		
127	Hydrogen sulfide		H_2S	7783-06-4	10.46	4		
128	Hydroquinone		$C_6H_6O_2$	123-31-9	7.94	0.8	4	80
129	Isooctane	2,2,4-trimethylpentane	C_8H_{18}	540-84-1	9.86	1.1	5	100
130	Isooctanol		$C_8H_{18}O$	26952-21-6	~9.8	1.7	9	170
131	Isopentane		C_5H_{12}	78-78-4	10.32	4	30	600
132	Isopentanol		$C_5H_{12}O$	137-32-6	9.86	2		
133	Isopentene		C_5H_{10}	563-46-2	9.12	0.8		
134	Iodoform	triiodomethane	CHI_3	75-47-8	9.25	1.5	8	150
135	Iodomethane	methyl iodide	CH_3I	74-88-4	9.54	0.4	2	40
136	Isoalkanes, C10-C13		$C_8H_{18}O$	68551-17-7	~9.6	1		
137	Isobutane		C_4H_{10}	75-28-5	10.57	8	40	800
138	Isobutanol		$C_4H_{10}O$	78-83-1	10.12	3	20	350
139	Isobutyl acetate		$C_6H_{12}O_2$	110-19-0	9.9	2	10	230

140	Isobutyl acrylate		$C_7H_{12}O_2$	106-63-8	~9.5	1.2	7	130
141	Isooctane	2,2,4-trimethylpentane	C_8H_{18}	540-84-1	9.86	1.1	5	100
142	Isooctanol		$C_8H_{18}O$	26952-21-6	~9.8	1.7	9	170
143	Isopentane		C_5H_{12}	78-78-4	10.32	4	30	600
144	Isopentanol		$C_5H_{12}O$	137-32-6	9.86	2		
145	Isopentene		C_5H_{10}	563-46-2	9.12	0.8		
146	Isoprene	2-methyl-1,3-butadiene	C_5H_8	78-79-5	8.85	0.8	3	70
147	Isopropanol	IPA, 2-propanol	C_3H_8O	67-63-0	10.17	4	22	440
148	Isovaleraldehyde		$C_5H_{10}O$	590-86-3	9.72	1.3		
149	Isovaleric Acid		$C_5H_{10}O_2$	503-74-2	~10.2	5.5		
150	Methane	natural gas	CH_4	74-82-8	12.51	NR		
151	Methanol		CH_4O	67-56-1	10.85	NR	1000	20000
152	Methyl ethyl ketone	MEK, Butan-2-one	C_4H_8O	78-93-3	9.51	0.96	4	80
153	Methyl ethyl ketone peroxides	MEKP	$C_8H_{18}O_6$	1338-23-4	~9	0.8	4	80
154	Methyl formate		$C_2H_4O_2$	107-31-3	10.82	NR		
155	Methyl mercaptan		CH_4S	74-93-1	9.44	0.7	4	70
156	Methylamine		CH_5N	74-89-5	8.97	1.5	7	140
157	Mineral oil			8042-47-5	~9	0.8	4	80
158	Mineral spirits	Stoddard solvent, Varsol, Viscor		64475-85-0	~9	0.8	4	80
159	Naphthalene		$C_{10}H_8$	91-20-3	8.14	0.4	2	45
160	Neopentane	tetramethylmethane	C_5H_{12}	207-343-7	10.21	3		
161	Neopentyl alcohol		$C_5H_{12}O$	75-84-3	9.72	2		
162	Nitric oxide		NO	10102-43-9	9.27	8	40	800
163	Nitrobenzene		$C_6H_5NO_2$	98-95-3	9.92	1.7	10	170
164	Nitroethane		$C_2H_5NO_2$	79-24-3	10.88	NR		
Index	**Chemical name**	**Alternative name**	**Formula**	**CAS no.**	**IE, eV**	**Response Factor (RF) 10.6 eV**	**E2608-PID-40 MDL (ppb)**	**E2608-PID-200 MDL (ppb)**
165	Nitrogen trichloride		NCl_3	10025-85-1	10.1	1	5	100
166	Nitrogen		N_2	7727-37-9	15.58	NR		
167	Nitrogen dioxide		NO_2	10102-44-0	9.58	10	50	1000
168	Nitrogen trifluoride		NF_3	7783-54-2	12.97	NR		

169	Nitromethane		CH_3NO_2	75-52-5	11.08	NR		
170	Nitropropane, 1-		$C_3H_7NO_2$	108-03-2	10.81	NR		
171	Nitropropane, 2-		$C_3H_7NO_2$	79-46-9	10.71	NR		
172	Nitrous oxide		N_2O	10024-97-2	12.89	NR		
173	Nonane		C_9H_{20}	111-84-2	9.72	1.4	6	130
174	Nonanol (mixed isomers)		$C_9H_{20}O$	143-08-8	~9.8	1.2		
175	Nonene (mixed isomers)		C_9H_{18}	27215-95-8	~9.3	0.6		
176	Nonene, 1-		C_9H_{18}	124-11-8	~9.4	0.6		
177	Octane		C_8H_{18}	111-65-9	9.8	1.6	8	160
178	Octanol (mixed isomers)	capryl alcohol, octyl alcohol	$C_8H_{18}O$	111-87-5	~9.8	1.5		
179	Octene (mixed isomers)		C_8H_{16}	25377-83-7	~9.4	0.7		
180	Octene, 1-		C_8H_{16}	111-66-0	9.43	0.7	3	70
181	Oxalic acid		$C_2H_2O_4$	144-62-7	11.2	NR		
182	Oxalyl bromide		$C_2Br_2O_2$	15219-34-8	10.49	5		
183	Oxydiethanol, 2,2-	diethylene glycol	$C_4H_{10}O_3$	111-46-6	~10.3	2	20	400
184	Oxygen		O_2	7782-44-7	12.07	NR		
185	Ozone		O_3	10028-15-6	12.52	NR		
186	Paraffins, normal			64771-72-8	~9.5	1	5	100
187	Paraldehyde		$C_6H_{12}O_3$	123-63-7	~9.7	2.2		
188	Pentane		C_5H_{12}	109-66-0	10.35	7	40	800
189	Pentanoic acid		$C_5H_{10}O_2$	109-52-4	10.53	8		
190	Pentanol, 2-		$C_5H_{12}O$	6032-29-7	9.78	2		
191	Pentanol, 3-		$C_5H_{12}O$	584-02-1	9.76	1.7		
192	Pentene, 1-		C_5H_{10}	109-67-1	9.49	0.92		
193	Pentyne, 1-		C_5H_8	627-19-0	10.1	3		
194	Peracetic acid		$C_2H_4O_3$	79-21-0	~10.5	2	10	200
195	Petroleum ether	ligroin, VM&P naphtha, benzine		8032-32-4	~10	0.9		
196	Phenol	hydroxybenzene	C_6H_6O	108-95-2	8.51	1.2	6	120
197	Phosgene		$COCl_2$	75-44-5	11.55	NR		
198	Phosphine		PH_3	7803-51-2	9.96	2	10	200
199	Propane-1,2-diol	propylene glycol	$C_3H_8O_2$	57-55-6	10	3	50	1000
200	Acetaldehyde		C_3H_9NO	156-87-6	~9.5	1.5		

201	Propene	propylene	C_3H_6	115-07-1	9.73	1.4	7	140
202	Propiolic acid	2-propynoic acid	$C_3H_2O_2$	471-25-0	10.45	8		
203	Propionaldehyde	propanal, propional	C_3H_6O	123-38-6	9.95	1.7	8	169
Index	**Chemical name**	**Alternative name**	**Formula**	**CAS no.**	**IE, eV**	**Response Factor (RF) 10.6 eV**	**E2608-PID-40 MDL (ppb)**	**E2608-PID-200 MDL (ppb)**
204	Propionic acid		$C_3H_6O_2$	79-09-4	10.44	8	40	800
205	Propyl acetate, n-		$C_5H_{10}O_2$	109-60-4	10.04	3	13	250
206	Propyl iodide	Iodopropane	C_3H_7I	107-08-4	9.26	1		
207	Propylamine, n-		C_3H_9N	107-10-8	8.5	1.1		
208	Propylbenzene (all isomers)		C_9H_{12}	74296-31-4	8.7	0.5		
209	Propylene carbonate		$C_4H_6O_3$	108-32-7	~10.5	15		
210	Propylene dinitrate		$C_3H_6N_2O_6$	6423-43-4	~11	NR		
211	Propylene glycol ethyl ether acetate	PGEEA	$C_7H_{14}O_3$	98516-30-4	~9.6	1.2		
212	Propylene oxide		C_3H_6O	75-56-9	10.22	6	35	700
213	Propyleneimine	2-methylaziridine	C_3H_7N	75-55-8	9	1.4	7	130
214	Propyl Nitrate, n-		$C_3H_7NO_3$	627-13-4	11.07	NR		
215	Propyne	methylacetylene	C_3H_4	74-99-7	10.36	4		
216	Pyrazine		$C_4H_4N_2$	290-37-9	9.29	3		
217	Pyridine		C_5H_5N	110-86-1	9.25	0.7	4	75
218	Pyrrole		C_4H_5N	109-97-7	8.02	0.6		
219	Pyrrolidine		C_4H_9N	123-75-1	8.77	4		
220	Pyruvaldehyde		$C_3H_4O_2$	78-98-8	9.6	0.7		
221	Rose oxide, cis-	Tetrahydro-4-methyl-2-(2-methylpropyl)-2H-pyran	$C_{10}H_{18}O$	16409-43-1	~9	0.8		
222	Sec-amyl acetate		$C_7H_{14}O_2$	626-38-0	~9.9	5		
223	Sevoflurane	1,1,1,3,3,3-hexafluoro-2-(fluoromethoxy)propane	$C_3H_3F_7O$	28523-86-6	11	NR		
224	Styrene	vinylbenzene	C_8H_8	100-42-5	8.4	0.45	2	50
225	Tetrafluoroethylene	R-1114	C_2F_4	116-14-3	10.12	15	5	100
226	Tetrafluoromethane	carbon tetrafluoride	CF_4	75-73-0	15.3	NR		

227	Tetrahydrofuran	THF	C_4H_8O	109-99-9	9.41	2.3	8	150
228	Toluene		C_7H_8	108-88-3	8.82	0.56	3	50
229	Triethylamine	TEA	$C_6H_{15}N$	121-44-8	7.5	1.3	5	90
230	Trifluoroacetic acid	TFAA	$C_2HO_2F_3$	76-05-1	11.46	NR		
231	Trifluoroethane	trifluoroethylene	C_2HF_3	359-11-5	10.14	5		
232	Turpentine		$C_{10}H_{16}$	9005-90-7	~8.5	0.6		
233	Turpentine oil	pinenes	$C_{10}H_{16}$	8006-64-2	~8	0.6	3	60
234	Undecane		$C_{11}H_{24}$	1120-21-4	9.56	1.1	5	100
235	Vanillin		$C_8H_8O_3$	121-33-5	~9	1		
236	Water	dihydrogen monoxide	H_2O	7732-18-5	12.61	NR		
237	Xenon		Xe	7440-63-3	12.13	NR		
238	Xylene mixed isomers	dimethyl benzenes	C_8H_{10}	1330-20-7	8.56	0.54	2	40
239	Xylene, m-		C_8H_{10}	108-38-3	8.56	0.5	2	50
240	Xylene, o-		C_8H_{10}	95-47-6	8.56	0.5	3	60
241	Xylene, p-		C_8H_{10}	106-42-3	8.44	0.55	3	50

Calibration and maintenance

Do not perform any maintenance operation with the power on.

Clean the device with a soft damp cloth. Do not use any abrasive cleaning agents. Do not immerse the device in water or any cleaning media.

NOTE! Cleaning instruments and spare parts are not included in the delivery set, Please contact your Seller for more information.

How often the PID needs maintenance?

The frequency of calibration and maintenance depends on operating conditions (VOC concentration, humidity, dust, and oil in the air, etc).

In clean indoor air with low VOC concentration, a monthly or less frequent calibration is recommended. When higher VOC concentrations are measured under harsh conditions, perform calibration and maintenance more frequently.

PID needs maintenance if:

- The baseline is climbing after you zero the PID – replace the electrode stack.
- The PID becomes sensitive to humidity – replace electrode stack.
- The PID cell shows signs of contamination after the lamp window has been cleaned – replace the electrode stack.
- The PID cell is known to have been subjected to severe contamination– replace the electrode stack
- The baseline is unstable or shifts when you move the PID – replace the electrode stack
- The sensitivity has dropped too much (note the change required when checking
- calibration) – clean the lamp
- The signal to noise ratio at low VOC concentrations becomes inadequate – replace the lamp

Cleaning of the PID lamp is recommended as the first action when a PID needs maintenance. It is recommended to recalibrate the device every time after stack replacement or lamp cleaning.

Removing the electrode stack and lamp

NOTE! Always use the Electrode Stack Removal Tool to remove the electrode stack; any other tools may damage your PID and invalidate your warranty.

To remove the electrode stack, proceed as follows:

1. Gently remove the sensor from the equipment.
2. Place the PID, pellet side down, onto a clean surface.
3. Locate the electrode stack removal tool into the two slots on the sides of the PID and squeeze together until the electrode stack and lamp are released.
4. Carefully lift the PID body away from the pellet and lamp.
5. Occasionally the lamp may be temporarily lodged in the cell and will need to be freed carefully with tweezers.
6. Occasionally the small spring behind the lamp will come out when the lamp is removed from the sensor. Simply place it into the sensor house.

Electrode stack removing tool

Electrode stack

Cleaning the PID Lamp

Inspection of the lamp may reveal a layer of contamination on the detection window that presents itself as a 'blue hue.' To check for contamination, hold the lamp in front of a light source and look across the window surface. To avoid contaminating the sensor and affecting accuracy, do not touch the lamp window with bare fingers. You may touch the body of the lamp with clean fingers.

NOTE! Always use the recommended cleaning kit to clean the lamp.

PID lamp cleaning kit

The vial of the cleaning compound contains alumina (CAS Number 1344-28-1) as a very fine powder. Please contact your Seller for a full material safety data sheet MSDS.

Key safety issues are identified below:

Hazard identification: May cause irritation of the respiratory tract and eyes.

Storage: Keep container closed to prevent water absorption and contamination

Handling:

- Do not breathe in the powder. Avoid contact with skin, eyes, and clothing;
- Wear suitable protective clothing;
- Follow industrial hygiene practices: Wash face and hands thoroughly with soap and water after use and before eating, drinking, smoking, or applying cosmetics.
- The powder carries a TVL (TWA) limit of 10 mg/m^3

PID lamp cleaning instructions:

1. Open the container of the alumina polishing compound;
2. With a clean cotton bud, collect a small amount of the powder;
3. Use this cotton bud to polish the PID lamp window. Use a circular action, applying light pressure to clean the lamp window. Do not touch the lamp window with fingers;
4. Continue polishing until an audible “squeaking” is made by the cotton bud moving over the window surface (usually within 15 seconds);
5. Remove the residual powder from the lamp window with a clean cotton bud. Care must be taken not to touch the tips of cotton buds that are to be used to clean the lamps as this may contaminate them with finger oil.
6. Ensure the lamp is completely dry and remove any visible signs of contamination before refitting.

Re-fitting the PID electrode stack and lamp

NOTE! Never refit a damaged lamp.

1. Place the lamp inside the O-ring seal in the pellet as illustrated below. Twisting the lamp slightly during insertion will help to ensure the lamp window is snug against the electrode stack's front electrode. The lamp should be freely supported by the O-ring.
2. Continuing to hold the electrode stack between forefinger and thumb, carefully insert the lamp into the recess in the sensor ensuring that the lamp remains in position. Press the electrode stack firmly, to ensure that the electrode stack wing clips are engaged, and the top faces of the electrode stack and sensor house are flush.
3. Refit the sensor into the sensing equipment.
4. Recalibrate the gas detector.

Discarding the PID electrode stack

The electrode stack does not have any toxic components, however, if it has been contaminated by toxic materials, show due care when disposing of.

Delivery set

- Detector-transmitter E2608 (wall mount or duct mount version)
- Mounting accessories:
    - 4 cross-shaped mounting lug with screws and 4 screws with plastic dowels for wall mount version
    - Square Rubber flange for Duct mount option
    - Round rubber flange for Remote probe option
    - Fixing clamp for Remote probe option



Order code for E2608-PID options

E2608 options	Order code
Remote probe, 3 m cable	E2608-PID-RP33-3
Remote probe, 10 m cable	E2608-PID-RP33-10
Duct mount option, stem Ø35×L230 mm	E2608-PID-DM
Integrated 90...265 V mains power supply module	E2608-PID-230
Integrated 24 VAC power supply module	E2608-PID-24VAC
Remote LCD single value display, wall mount box 115 × 65 × 40mm, 3 m cable	E2608-PID-RLCD3

Configuring

A standard configuration kit includes a USB-RS485 converter, fixed flow regulator, gas tubing with applicators, and a software pack. Please contact your Seller for more information.

Gas detector-transmitters E2608 share all functionalities of the PluraSens® multifunctional detector-transmitter platform. The features and options include:

- Digital output change rate-limiting filter
- Digital integrating (averaging) filter
- Free assignment of each analog output to the chosen parameter
- Flexible setting of analog output scales for each output
- Output zero and slope adjustment for calibration
- Free assignment of each of two relays to the chosen parameter
- Several relay control logic modes
- Switch delays and minimum on/off state durations for each relay

The output scales can be changed by Modbus commands by using the configuration software and the standard configuration kit (see Modbus RTU Communication).

Return to default settings

To reset the device's Slave ID, baud rate, and stop bit numbers to factory settings, proceed as follows:

1. De-energize the device
2. Connect the X6 jumper
3. Turn on the device
4. De-energize the device
5. Disconnect the X6 jumper
6. Turn on the device

Modbus RTU Communication

RS485 communication interface

Databits: 8 Parity: none / odd / even Stop bits: 1 or 2 Protocol: Modbus RTU	Supported Modbus functions: 03 – Read multiple registers 06 – Write a single register

Communication parameters

Parameter	Permitted values	Default
Supported baud rates	1200, 2400, 4800, 9600, 19200, 38400, 57600	9600
Data bits	8	8
Parity	none / odd / even	none
Stop bits	1, 2	1
Protocol	Modbus RTU	
Modbus functions	03 - Read multiple registers 06 - Write a single register	
Error codes	01 – Illegal function 02 – Illegal data address 03 – Illegal data value 04 – Slave device failure (details of last error 04 can be read from register 0x0008)	

Modbus holding registers

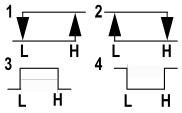
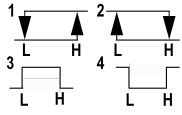
Register addresses are shown 0-based, Address in hexadecimal, Reg in decimal format. Modbus holding register numbers MHR are shown in the decimal 1-based format and may be addressed either from 00001 or 40001 base.

Address	Reg / MHR	RW	Description	Supported values (dec)	Default
0x0001	1 / 40002	R	Hardware version		-
0x0002	2 / 40003	R	Software version		-
0x0003	3 / 40004	R	Product serial number	1...65535	-
0x0004	4 / 40005	RW	Slave ID (net address) *	1...247 **	1

0x0005	5 / 40006	RW	Baud rate *	1200, 2400, 4800, 9600, 19200, 38400, 57600	9600
0x0006	6 / 40007	RW	Response delay, ms	1...255	10
0x0007	7 / 40008	RW	Stop bits, parity bit *	1 – No parity bit, 1 stop bit (default after factory reset) 2 – No parity bit, 2 stop bits 3 – Odd parity, 1 stop bit 4 – Even parity, 1 stop bit **NOTE**: 3 and 4 are available starting from the Software version 0x218 (dec. 536)	1
0x0008	8 / 40009	R	Last error code	1...255	-
0x0011	17 / 40018	RW	Technological: age of last data in seconds (read) / restart (write)	0...65535 s (read), writing 42330 restarts the instrument	-

Address	Reg / MHR	RW	Description	Supported values (dec)	Default
0x00A5	165 / 40166	RW	Zero adjustment for gas data, ADC	-32000...+32000 ADC units	0
0x00A6	166 / 40167	RW	Slope adjustment for gas data	1...65535	512
0x00A7	167 / 40168	RW	Change rate limit for gas data, units / s	1...32000, 0 - no limit	0
0x00A8	168 / 40169	RW	Integrating filter time constant, s	1...32000 (seconds), 0 - no filter	0
0x00C9	201 / 40202	RW	Parameter tied to analog output 1	0 – None 2 – Gas concentration 9 – Forced Modbus control, value set in MHR / 40204	2
0x00CA	202 / 40203	RW	Parameter tied to analog output 2	0 – None 2 – Gas concentration 9 – Forced Modbus control, value set in MHR / 40205	2
0x00CB	203 / 40204	RW	Forced value for analog output 1***	0...1000 (0.0%...100.0% of output scale)	0
0x00CC	204 / 40205	RW	Forced value for analog output 2***	0...1000 (0.0%...100.0% of output scale)	0

0x00D3	211 / 40212	RW	Parameter tied to relay RE1	0 –none 2 – gas concentration 9 – control by Modbus control, state set in MHR / 40214	2
0x00D4	212 / 40213	RW	Parameter tied to relay RE2	0 – none 2 – gas concentration 9- – control by Modbus control, state set in MHR / 40215	2
0x00D5	213 / 40214	RW	Forced state for relay RE1***	0 –off, 1 – on	0
0x00D6	214/ 40215	RW	Forced state for relay RE2***	0 – off, 1 – on	0
0x00D7	215 / 40216	RW	Switching delay for relay RE1	0...1000 (s)	0
0x00D8	216 / 40217	RW	Switching delay for relay RE2	0...1000 (s)	0
0x00D9	217 / 40218	RW	Minimal on/off time for relay RE1	0...1000 (s)	0
0x00DA	218 / 40219	RW	Minimal on/off time for relay RE2	0...1000 (s)	0

Address	Reg / MHR	RW	Description	Supported values (dec)	Default
0x00DB	219 / 40220	RW	Control logic for relay RE1	 0 – none 1 – relay on at high values 2 – relay on at low values 3 – relay on at values within the range 4 – relay on for the values out of the range	0
0x00DC	220 / 40221	RW	Control logic for relay RE2	 0 – none 1 – relay on at high values 2 – relay on at low values 3 – relay on at values within the range 4 – relay on for the values out of the range	0

0x00DD	221 / 40222	RW	LOW setpoint for relay RE1	0...65535 (gas units)	see Specifications
0x00DE	222 / 40223	RW	HIGH setpoint for relay RE1	0...65535 (gas units)	see Specifications
0x00DF	223 / 40224	RW	LOW setpoint for relay RE2	0...65535 (gas units)	see Specifications
0x00E0	224 / 40225	RW	HIGH setpoint for relay RE2	0...65535 (gas units)	see Specifications
0x00FF	255 / 40256	RW	Sensor, analog outputs, LED and buzzer status	bit[0]=0/1 – sensor present/absent, **RO** bit[1]=0/1 – analog outputs deactivated/activated bit[2]=0/1 – in case the sensor is absent, turn signaling off/on analog output1 bit[3]=0/1 – in case the sensor is absent, turn on signaling with low current/high current on analog output1; if bit[2]=0 this bit will be ignored bit[4]=0/1 – in case of sensor absent, turn signaling off/on analog output2 bit[5]=0/1 – in case of sensor absent, turn on signaling with low current/high current on analog output2; if bit[4]==0 this bit will be ignored bit[6]=0/1 – current/voltage output detected on output1, **RO** bit[7]=0/1 – current/voltage output detected on output2, **RO** bit[8]=0/1 – LED deactivated/activated bit[9]=0/1 – buzzer deactivated/activated bit[10]=0/1 - LED is on/off in normal condition bit[11]=0/1 - 1 Hz (50% on, 50% off) LED signal off/on if relay1 turned on bit[12]=0/1 - 2 Hz (50% on, 50% off) LED signal off/on if relay2 turned on	user defined

0x0101	257 / 40258	R	Raw gas sensor data	0...4095, ADC units	
0x0103	259 / 40260	R	Gas concentration, gas units	0...65535, gas units	
0x0105	261 / 40262	RW	0% value for analog output 1	-32000...+32000, gas units	User defined
0x0106	262 / 40263	RW	100% value for analog output 1	-32000...+32000, gas units	User defined
0x0107	263 / 40264	RW	0% value for analog output 2	-32000...+32000, gas units	User defined
0x0108	264 / 40265	RW	100% value for analog output 2	-32000...+32000, gas units	User defined

* – The new value is applied after restart.

** – Broadcast slave ID 0 can be used to assign a new ID to the instrument with an unknown ID. When addressing by ID 0 the device shall be the only Modbus instrument in the network. The device will not respond to the Master command when addressed by ID 0.

*** – This value is dynamic and not kept in EEPROM after a restart.

Warranty

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of the original sale. During this warranty period, the Manufacturer will, at its option, either repair or replace a product that proves to be defective. This warranty is void if the product has been operated in conditions outside ranges specified by the Manufacturer or damaged by customer error or negligence or if there has been an unauthorized modification.

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