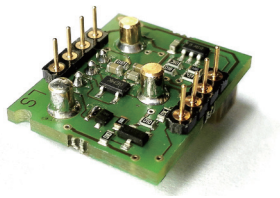
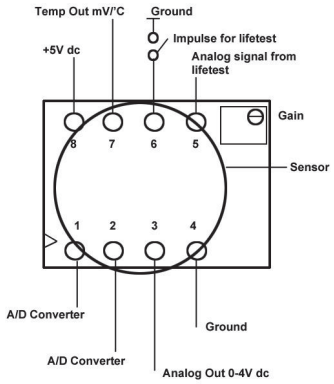
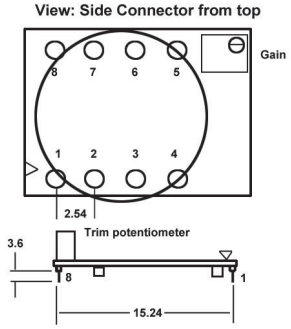
EasyBoard



View: Side Connector from top



View: Side Connector from top



Features

The Easy Board electronic transmitter offers the customer a quick means to use EC-Sense sensors. The sensors providing a stable voltage, digital result, onboard temperature measurement and self test capability.

Technical Specification

Part Number	Input Signal Range	Output Signal	Describe
03-EB-Pos-01-01	5µA	0.02-4.8V	For ES1, ES4, ,EC4 Positive signal sensor. Include Temperature sensor on the board. A functional Self Test of the sensor.
03-EB-Pos-02-01	25µA	0.02-4.8V	
03-EB-Pos-03-01	100µA	0.02-4.8V	
03-EB-Neg-01-01	5µA	0.02-4.8V	For ES1, ES4, ,EC4 Negative signal sensor. Include Temperature sensor on the board. A functional Self Test of the sensor.
03-EB-Neg-02-01	25µA	0.02-4.8V	
03-EB-Neg-03-01	100µA	0.02-4.8V	
03-EB-O2-03-01	100µA	0.02-4.8V	For ES1-O2, ES4-O2 Oxygen sensor

Performance

Sensor Type	Compatible with ES1, ES4 and EC4
Detectable Gases	See product range datasheet
Measuring Principle	Electrochemical with electronic amplification
Contacts	8 pins solderable with care
Standard Range	See sensor datasheet
Output Offset	0.002 V dc
Signal Out	0.002 - 4.8 V dc
Adjustment	3V dc = sensor measurement range (e.g. for CO, 3V=500 ppm)
Digital Output	Optional
Temperature Measurement	- 40 °C to 125 °C - 40 °C = 100 mV 125 °C = 1750 mV
Input Voltage	+5 V dc (see note)
Operating Temperature Range	-20 °C to 50 °C
Storage Conditions	0 °C to 20 °C
Operating Pressure Range	800 to 1200 hPa
Humidity Range	15-95% RH non-condensing
Weight	

The Easy Board can be used with a supply voltage of 2.4 – 5 V dc. If a supply voltage of <5 V dc is used, the output voltage will reduce correspondingly. Please advise EC-Sense if you like to use more than 5V dc supply voltage.

Electrochemical 3 Eletrode Sensor
EC4-NH_3-100 - Ammonia

Part Number:
01-EC4-NH_3-100-01

Features

- Zero bias
- High sensitivity
- High selectivity
- Excellent sensitivity at low temperatures
- Stable zero point
- Water based electrolyte
- Double sealed housing for advanced leakage protection

Typical applications

- Leakage detection
- TLV-monitoring
- General industry
- Semiconductor industry
- Livestock and poultry industry
- Cooling systems
- Emissions
- Indoor air quality
- Industrial safety
- Environmental monitoring
- Food and Refrigeration industry

Technical Specification

Performance

Sensitivity	110 ± 25 nA / ppm
Zero current	± 100 nA
Response time $-T_{50}$ $-T_{90}$	 < 20 s < 50 s
Range	100 ppm
Repeatability	2 %
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	200 ppm
Linear range	100 ppm

Environment

Temperature Range	-30 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric
Bias voltage	0 mV
Recommended load resistor	10 to 220 Ω
Warm up time	< 60 s

Lifetime

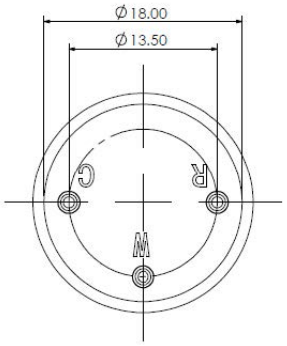
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 10 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	24 month
Warranty	12 month

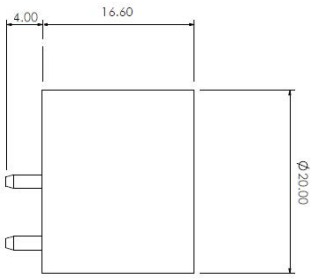
Housing

Housing material	ABS
Weight	< 6 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

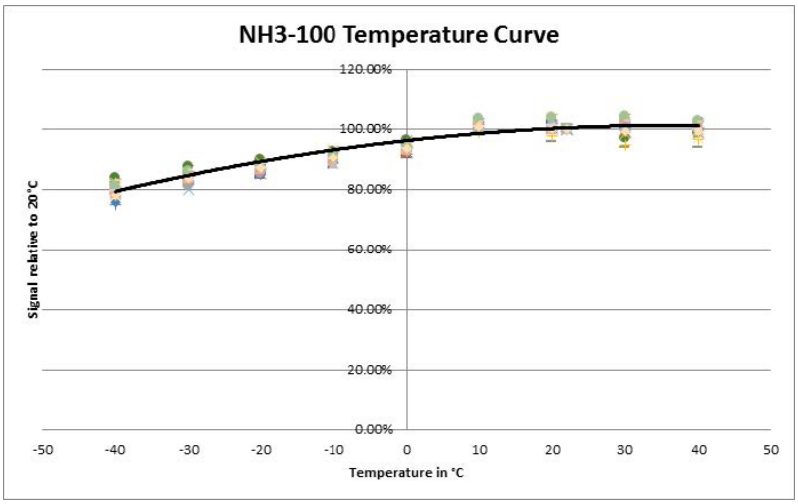
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Carbon Dioxide	CO_2	5000	0
Carbon Monoxide	CO	100	0
Chlorine	Cl_2	1.0	0
Hydrogen	H_2	100	0
Hydrogen Sulphide	H_2S	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.

Electrochemical 3 Electrode Sensor
EC4-NH_3-500 - Ammonia

Part Number:
01-EC4-NH_3-500-01

Features

- Zero bias
- High sensitivity
- High selectivity
- Excellent sensitivity at low temperatures
- Stable zero point
- Water based electrolyte
- Double sealed housing for advanced leakage protection

Typical applications

- Leakage detection
- TLV-monitoring
- General industry
- Semiconductor industry
- Livestock and poultry industry
- Cooling systems
- Emissions
- Indoor air quality
- Industrial safety
- Environmental monitoring
- Leakage detection
- Food and Refrigeration industry

Technical Specification

Performance

Sensitivity	35 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 20 s
$-T_{90}$	< 50 s
Range	100 ppm
Repeatability	< 2 %
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	1000 ppm
Linear range	500 ppm

Environment

Temperature Range	-30 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric
Bias voltage	0 mV
Recommended load resistor	10 to 220 Ω
Warm up time	< 60 s

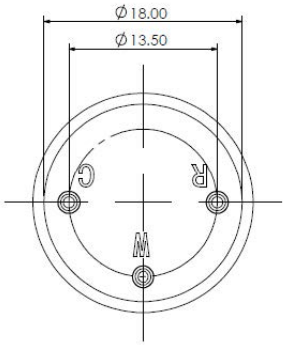
Lifetime

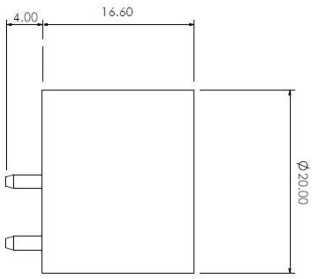
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 10 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 24 month
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

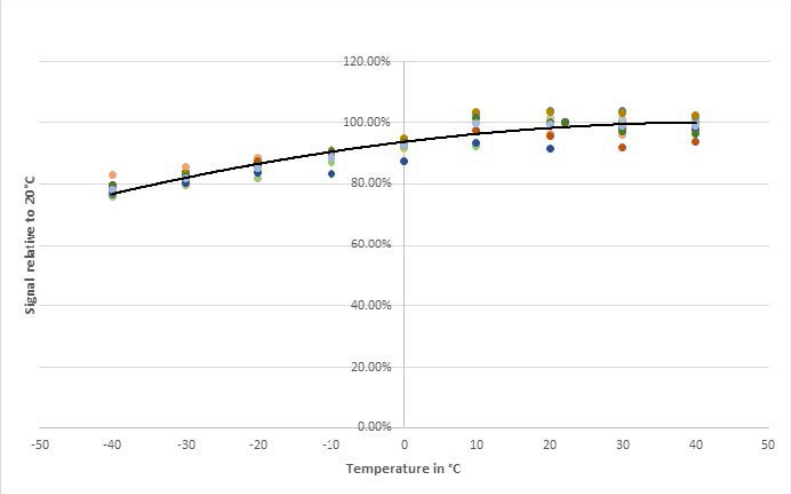
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Carbon Dioxide	CO_2	5000	0
Carbon Monoxide	CO	100	0
Chlorine	Cl_2	1.0	0
Hydrogen	H_2	100	0
Hydrogen Sulphide	H_2S	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.

Solid Polymer Sensor
ES1-AG1-10 - All Gas

Part Number:
01-ES1-AG1-10-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 90 / 60 s

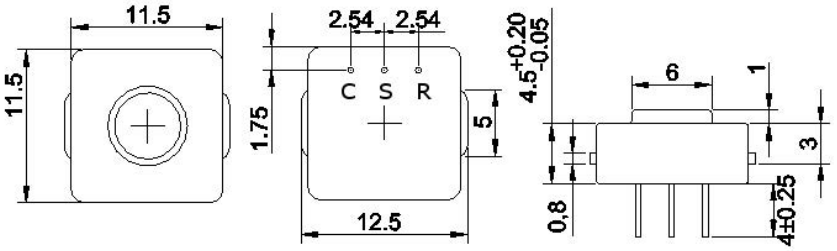
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

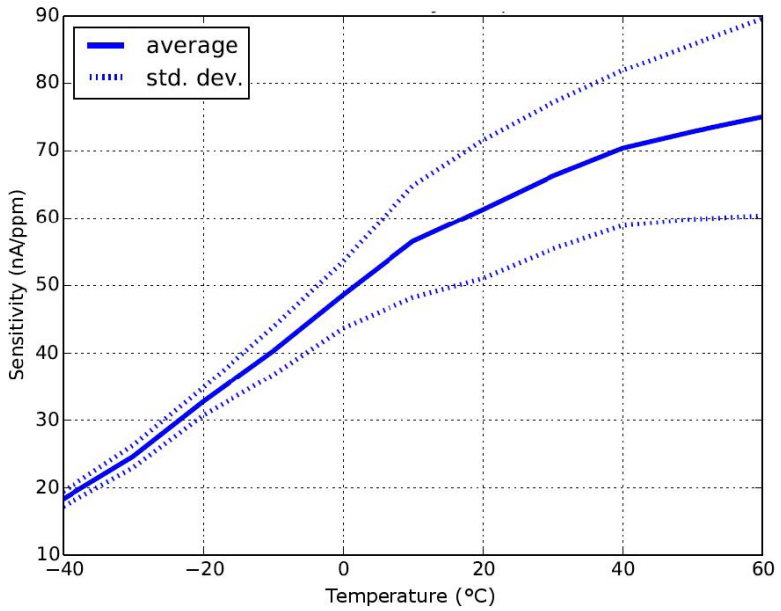
Housing material	ABS
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES1-AG1-200 - All Gas

Part Number:
01-ES1-AG1-200-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	200 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	1000 ppm
Linear range	1000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

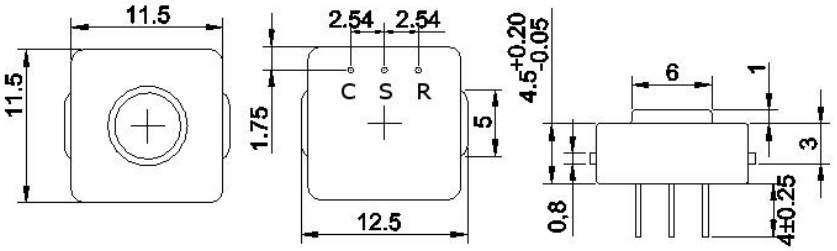
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

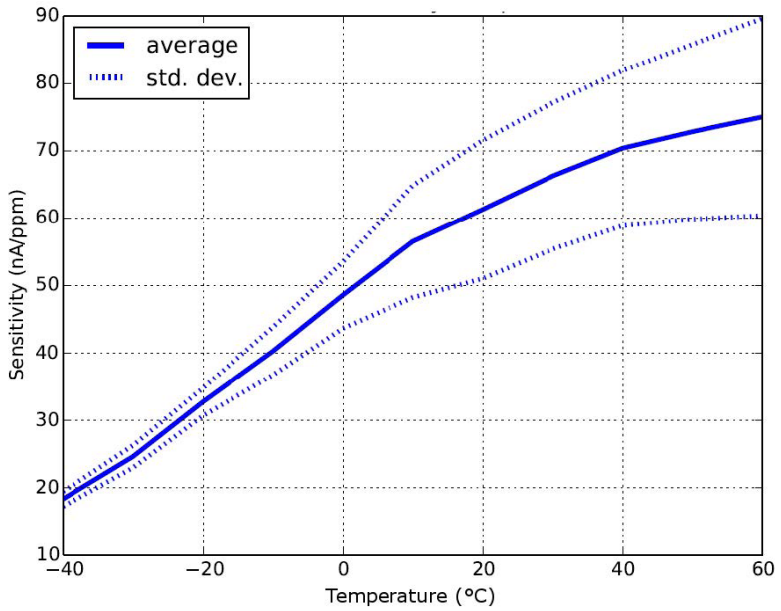
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES1-AG1-200 - All Gas

Part Number:
01-ES1-AG1-200-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	200 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	1000 ppm
Linear range	1000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

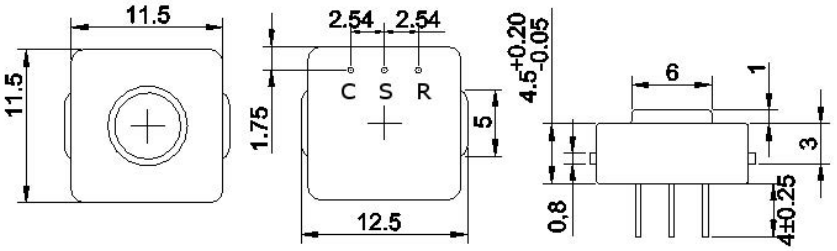
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

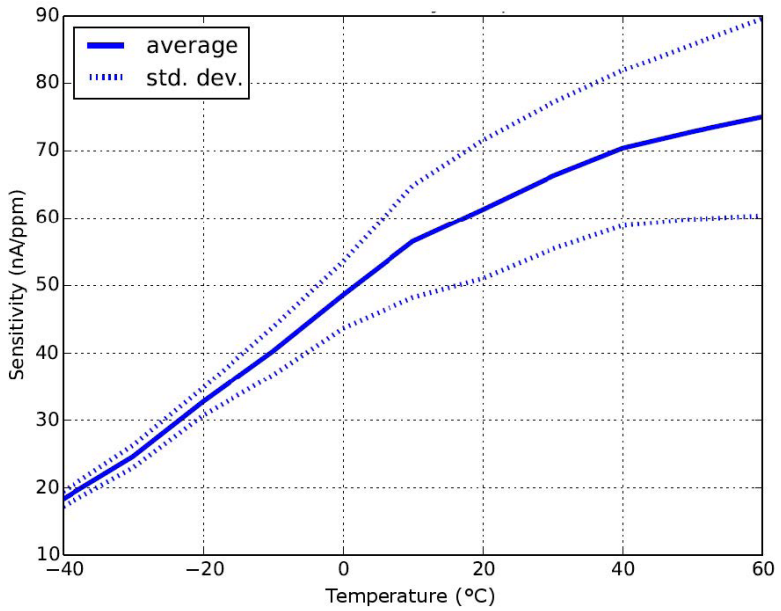
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES1-AG1-1000 - All Gas

Part Number:
01-ES1-AG1-1000-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

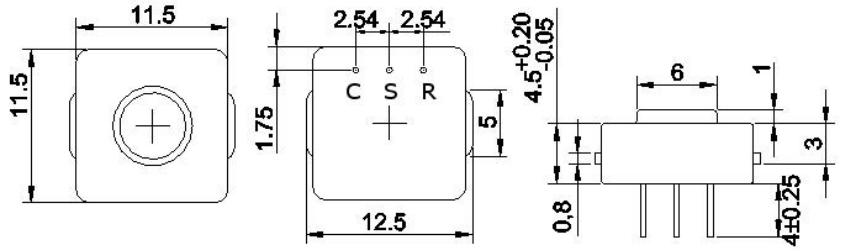
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

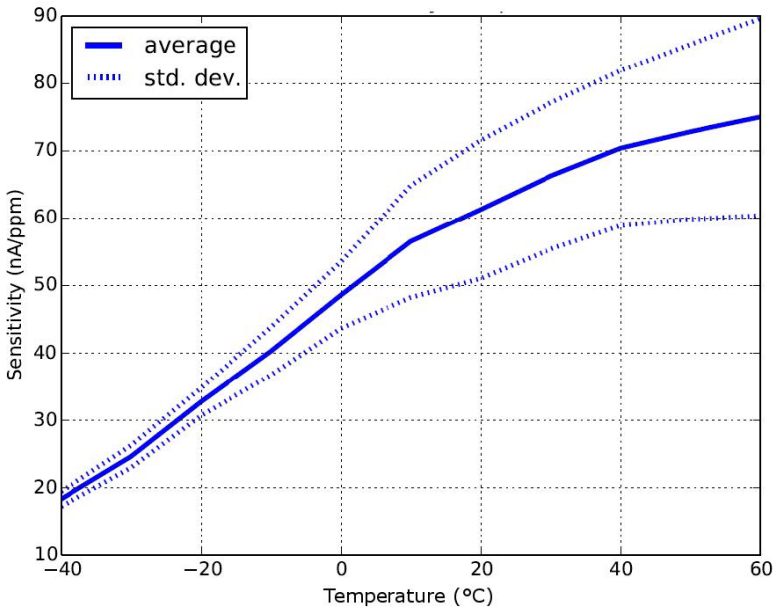
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES1-AG1-2000 - All Gas

Part Number:
ES1-AG1-2000-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	25 ± 15 nA /ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	2000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 4 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	5000 ppm
Linear range	5000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

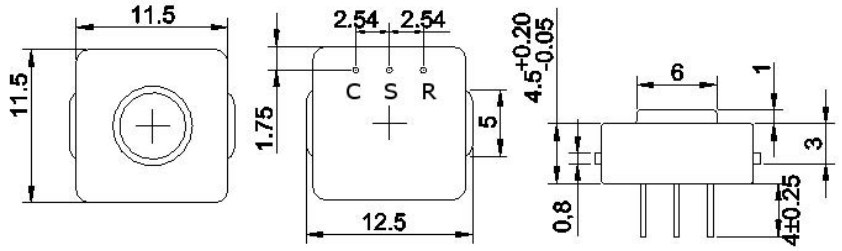
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Easy Gas Sensor
ES1-CO-100 - Carbon monoxide

Part Number:
01-ES1-CO-100-01

Features

- Extreme linear response up to high concentration
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report
- Strong signal to noise
- Smallest EC Sensor in the world

Typical applications

- TLV-monitoring, leakage detection
- Oil & Petrochemical Industry
- Steel Industry
- Parking garages

Technical Specification

Performance

Sensitivity	25 ±10 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	<10 s
$-T_{90}$	< 30 s
Range	100 ppm
Repeatability	<1 %
Lower Detectable Limit (LDL)	≤2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

Lifetime

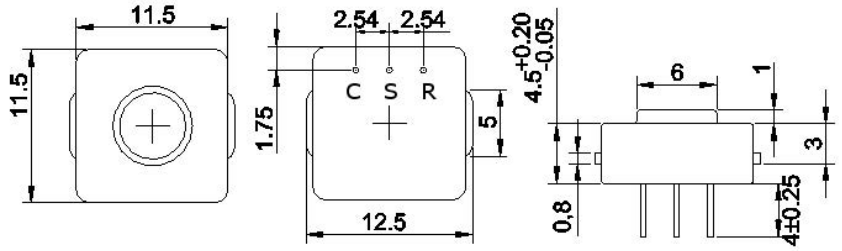
Long Term Sensitivity Drift	< 1 % / month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	24 month

Housing

Housing material	PPO
Weight	< 0.7 g

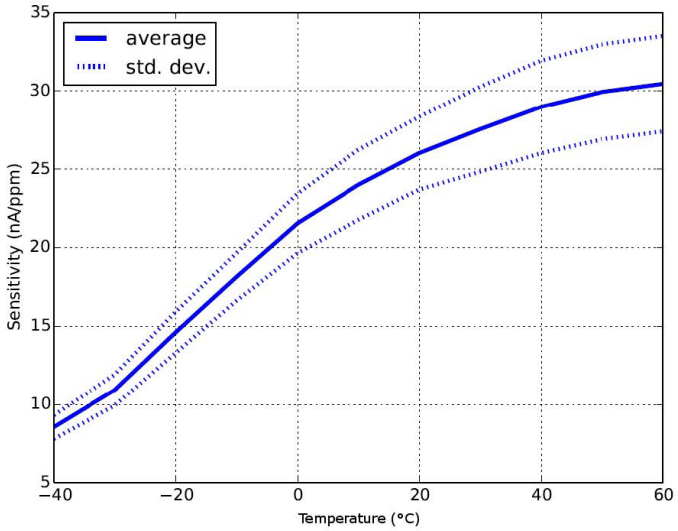
EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)	-		
Hydrogen	H_2	100	50
Hydrogen Sulphide	H_2S	50	0
Hydrogen Cyanide	HCN	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-CO-1000 - Carbon Monoxide

Part Number:
01-ES1-CO-1000-01

Features

- Extreme linear response up to high concentration
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report
- Strong signal to noise
- Smallest EC Sensor in the world

Typical applications

- TLV-monitoring, leakage detection
- Oil & Petrochemical Industry
- Steel Industry
- Parking garages

Technical Specification

Performance

Sensitivity	25 ±10 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	<10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	<1 %
Lower Detectable Limit (LDL)	≤2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

Lifetime

Long Term Sensitivity Drift	< 1 % / month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	24 month

Housing

Housing material	PPO
Weight	< 0.7 g

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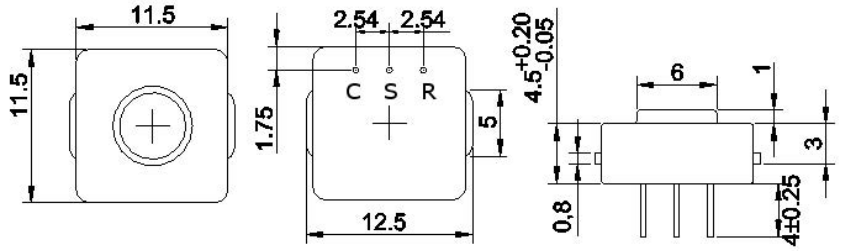
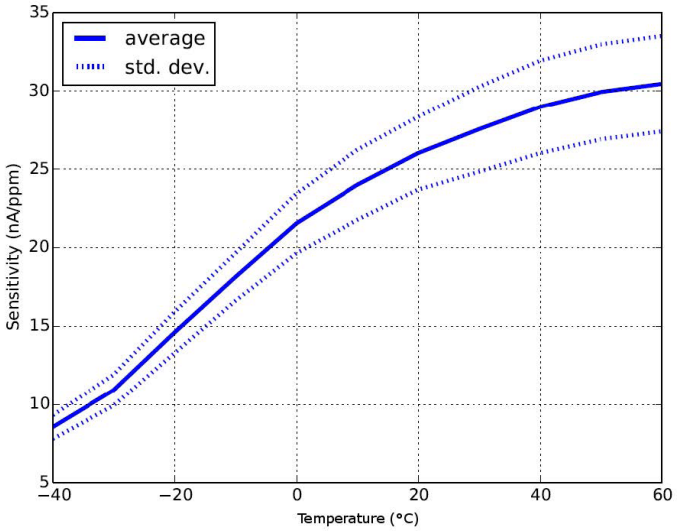
Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)	-		
Hydrogen	H_2	100	50
Hydrogen Sulphide	H_2S	50	0
Hydrogen Cyanide	HCN	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-CO-10000 - Carbon Monoxide

Part Number:
01-ES1-CO-10000-01

Features

- Extreme linear response up to high concentration
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- TLV-monitoring, leakage detection
- Oil & Petrochemical Industry
- Steel Industry
- Parking garages

Technical Specification

Performance

Sensitivity	10nA ± 3nA
Zero current	± 100 nA
Response time $-T_{50}$ $-T_{90}$	 <10s <30s
Range	10000 ppm
Repeatability	<1%
Lower Detectable Limit (LDL)	≤10 ppm
Resolution (16Bit ADC)	1 ppm
Maximum overload	30000 ppm
Linear range	30000 ppm

Environment

Temperature Range	-40°C to 50°C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

Housing material	PPO
Weight	< 0.7 g

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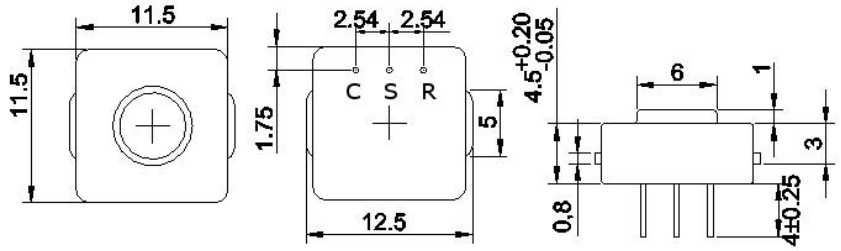

All dimensions in mm

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)	-		
Hydrogen	H_2	100	80
Hydrogen Sulphide	H_2S	50	0
Hydrogen Cyanide	HCN	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	100	0

Easy Gas Sensor
ES1-H_2-1000 - Hydrogen

Part Number:
01-ES1-H_2-1000-01

Features

- Strong signal to noise
- Smallest EC Sensor in the world
- Fast response

Typical applications

- Ambient monitoring
- Very sensitive leak detection

Technical Specification

Performance

Sensitivity	11 ± 3 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1 %
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 10 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	12 month

Housing

Housing material	PPO
Weight	< 0.7 g

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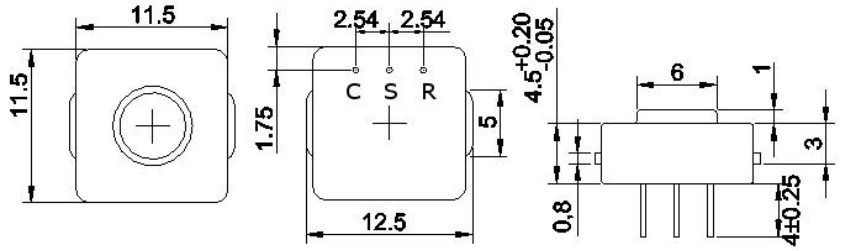
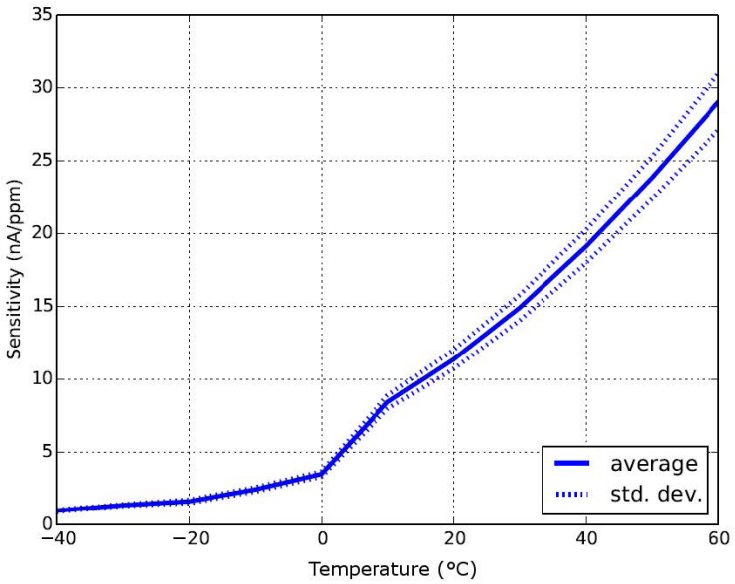


All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	n.e.
Carbon Monoxide	CO	50	46
Chlorine	Cl_2	10	0
Hydrocarbons (unsaturated)			n.a.
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-H_2-20000 - Hydrogen

Part Number:
01-ES1-H_2-20000-01

Features

- Strong signal to noise
- Smallest EC Sensor in the world
- Fast response

Typical applications

- Ambient monitoring
- Very sensitive leak detection

Technical Specification

Performance

Sensitivity	3±2 nA / ppm
Zero current	± 5 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	20000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 100 ppm
Resolution (16Bit ADC)	10 ppm
Maximum overload	40000 ppm
Linear range	40000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

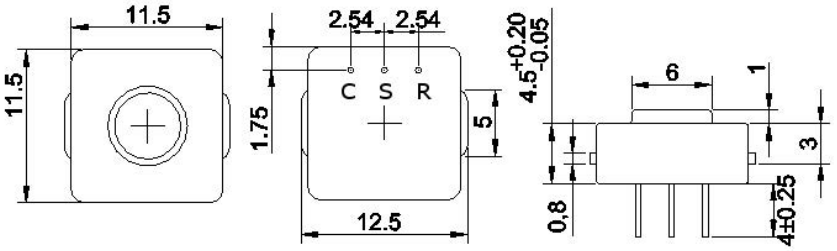
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 10 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	12 month

Housing

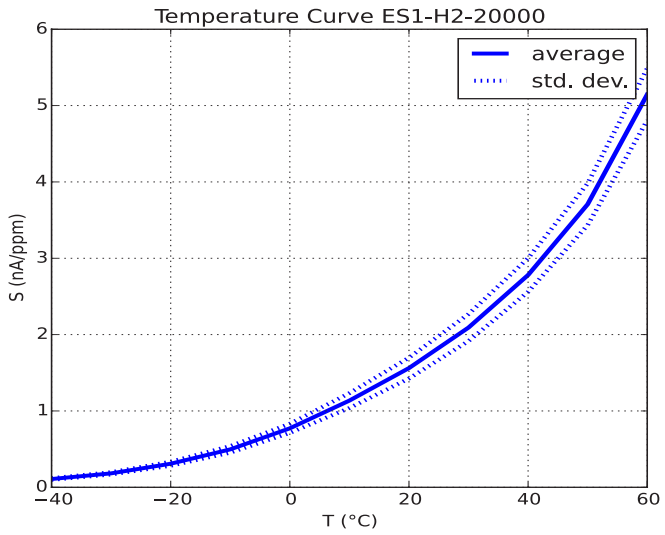
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	n.e.
Carbon Monoxide	CO	50	46
Chlorine	Cl_2	10	0
Hydrocarbons (unsaturated)			n.a.
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-H_2S-100 - Hydrogen Sulfide

Part Number:
01-ES1-H_2S-100-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Water treatment plants
- Biogas applications
- Portable & fixed point applications
- Leakage detection

Technical Specification

Performance

Sensitivity	90 ± 20 nA / ppm
Zero current	± 20 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	100 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	200 ppm
Linear range	200 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

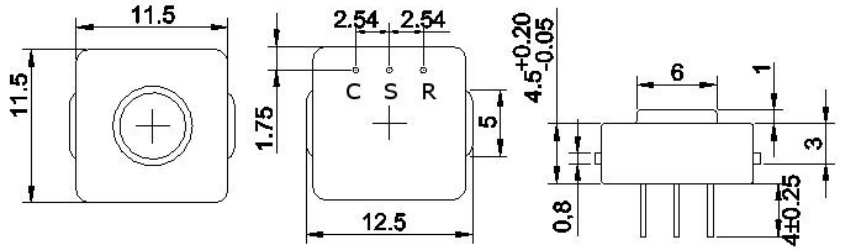
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

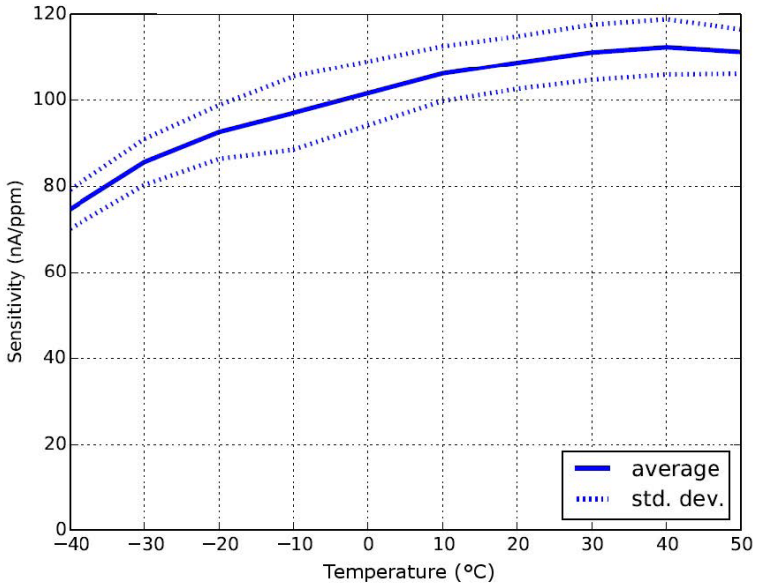
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	3
Chlorine	Cl_2	10	-1.5
Hydrocarbons (unsaturated)			n.e.
Hydrogen	H_2	100	3
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.e.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	-2.2

Easy Gas Sensor
ES1-H_2S-500 - Hydrogen Sulfide

Part Number:
01-ES1-H_2S-500-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Water treatment plants
- Biogas applications
- Portable & fixed point applications
- Leakage detection

Technical Specification

Performance

Sensitivity	90 ± 20 nA / ppm
Zero current	± 20 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	500 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	1000 ppm
Linear range	1000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

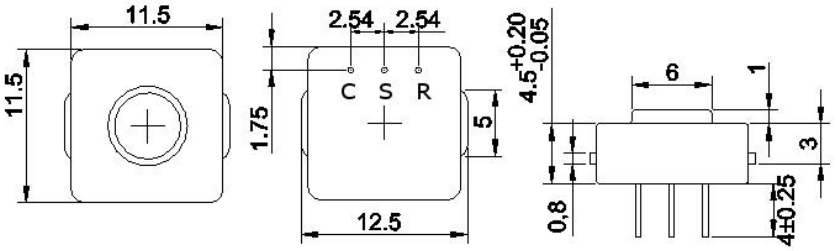
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

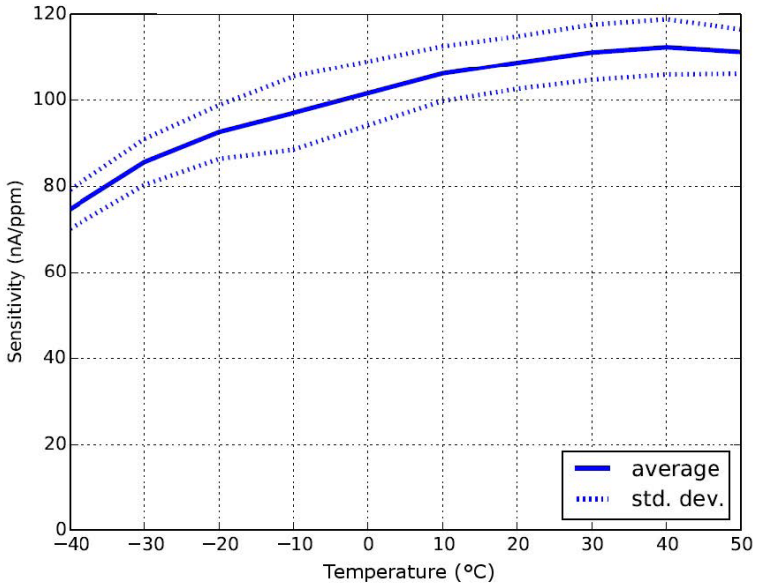
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	3
Chlorine	Cl_2	10	-1.5
Hydrocarbons (unsaturated)			n.e.
Hydrogen	H_2	100	3
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.e.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	-2.2

Easy Gas Sensor
ES1-H_2S-5000 - Hydrogen Sulfide

Part Number:
01-ES1-H_2S-5000-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Water treatment plants
- Biogas applications
- Portable & fixed point applications
- Leakage detection

Technical Specification

Performance

Sensitivity	10 ±3 nA / ppm
Zero current	± 20 nA
Response time	
-T_{50}	< 10 s
-T_{90}	< 30 s
Range	5000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 5 ppm
Resolution (16Bit ADC)	1 ppm
Maximum overload	10000 ppm
Linear range	10000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	PPO
Weight	< 0.7 g

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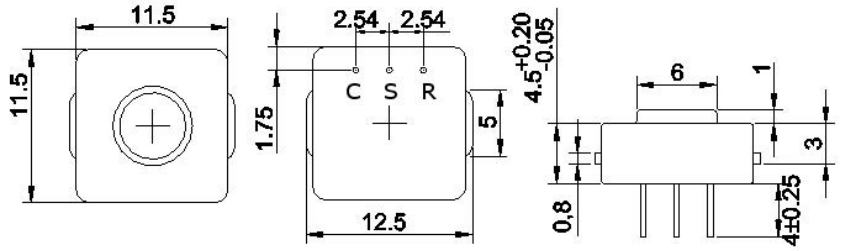
Dimensions



All dimensions in mm

Temperature curve

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	3
Chlorine	Cl_2	10	-1.5
Hydrocarbons (unsaturated)			n.e.
Hydrogen	H_2	100	3
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.e.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	-2.2

Easy Gas Sensor
ES1-NO_2-50 - Nitrogen Dioxide

Part Number:
01-ES1-NO_2-50-01

Features

- Extreme linear response up to high concentration
- Fast response
- Low cost alternative to PID
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report

Typical applications

- TLV monitoring
- Parking garages

Technical Specification

Performance

Sensitivity	-20 ± 10 nA / ppm
Zero current	± 2 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	50 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	500 ppm
Linear range	500 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	PPO
Weight	< 0.7 g

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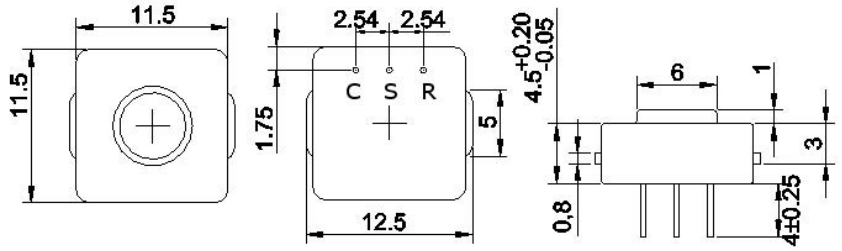
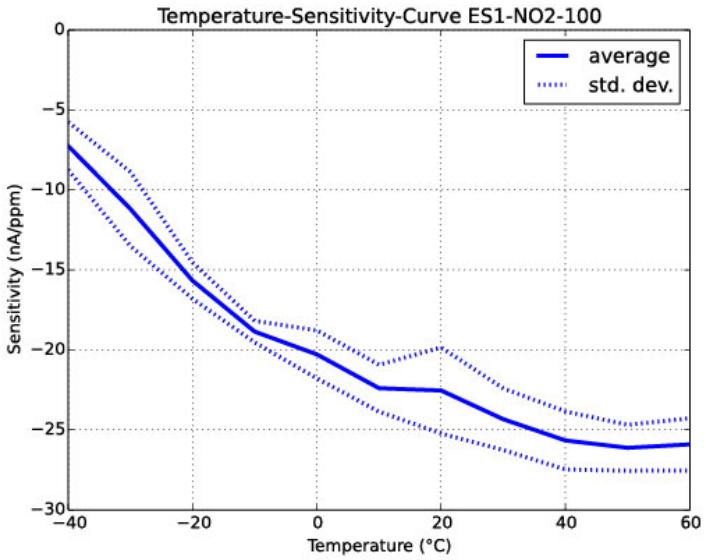


All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	10	10
Hydrocarbons (unsaturated)	-		n.a.
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-NO_2-100 - Nitrogen Dioxide

Part Number:
01-ES1-NO_2-100-01

Features

- Extreme linear response up to high concentration
- Fast response
- Low cost alternative to PID
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report

Typical applications

- TLV monitoring
- Parking garages

Technical Specification

Performance

Sensitivity	-20 ± 10 nA / ppm
Zero current	± 2 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	100 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	500 ppm
Linear range	500 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

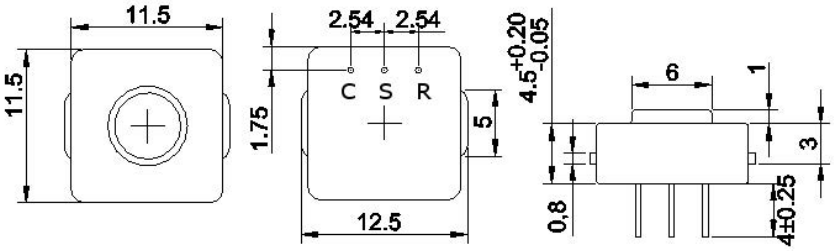
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	PPO
Weight	< 0.7 g

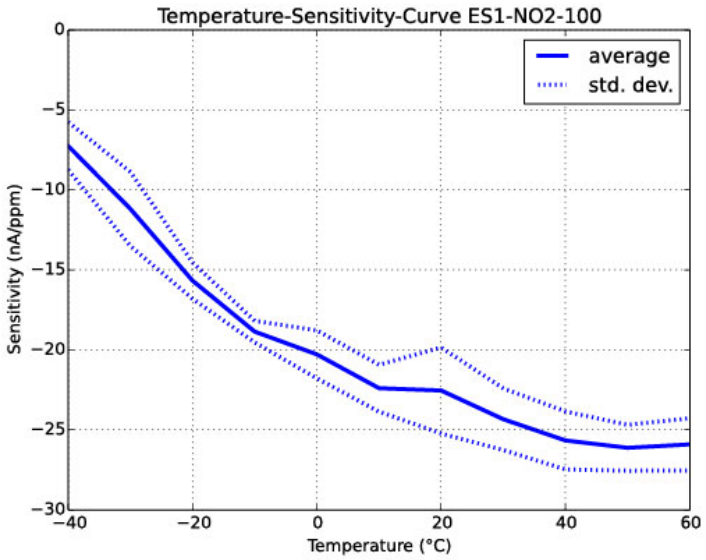
EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	10	10
Hydrocarbons (unsaturated)	-		n.a.
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-NO_2-1000 - Nitrogen Dioxide

Part Number:
01-ES1-NO_2-1000-01

Features

- Extreme linear response up to high concentration
- Fast response
- Low cost alternative to PID
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report

Typical applications

- TLV monitoring
- Parking garages

Technical Specification

Performance

Sensitivity	10 ± 3 nA / ppm
Zero current	± 2 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	5000 ppm
Linear range	5000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

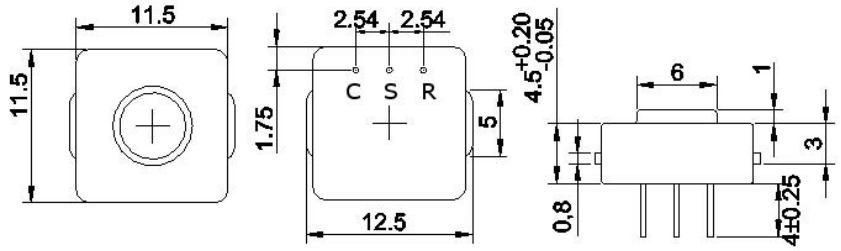
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	PPO
Weight	< 0.7 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

Dimensions



All dimensions in mm

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	10	10
Hydrocarbons (unsaturated)	-		n.a.
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES1-O_2-25% - Oxygen

Part Number:
01-ES1-O_2-25-01

Features

- Strong signal to noise
- Smallest EC Sensor in the world
- Capillary Sensor
- Response Time Typically 4s
- Low Power Consumption
- 400-600mV Bias Voltage
- Lead Free

Typical applications

- Industrial
- Medical
- Food Industry
- Combustion Control

Technical Specification

Performance

Sensitivity	0.2± 0.03 nA /ppm
Zero current	40-60 µA
Response time -T_{50} -T_{90}	 < 5 s < 10 s
Range	25 % O_2
Lower Detectable Limit (LDL)	≤ 0.5 %
Resolution (16 Bit ADC)	0.01% O_2
Maximum overload	30 % O_2

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

3 Electrode Electrochemical sensor Bias voltage	-400 to -600 mV
Warm up time	600s

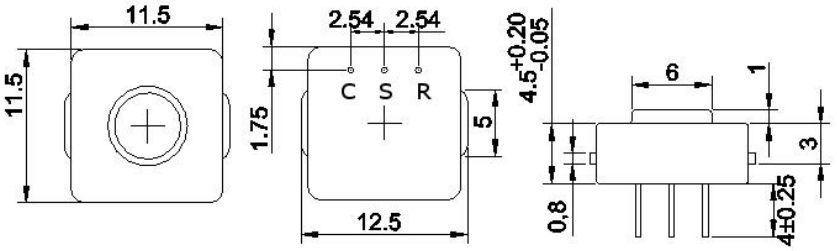
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 % O_2
Expected Life Time	> 3 years
Storage life	6 month
Warranty	24 month
Storage conditions	0-20 °C

Housing

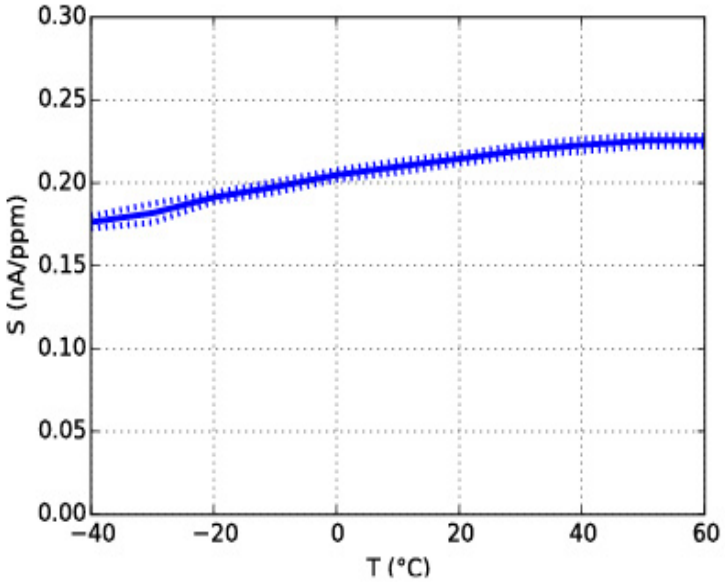
Housing material	PPO
Weight	< 0.7 g

Dimensions



All dimensions in mm

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	20	0
Carbon Dioxide	CO_2	5000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)		1 %	0
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	0
Nitrogen Dioxide	NO_2	10	0
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2	20	0

Solid Polymer Sensor
ES4-AG1-10 - All Gas

Part Number:
01-ES4-AG1-10-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 90 / 60 s

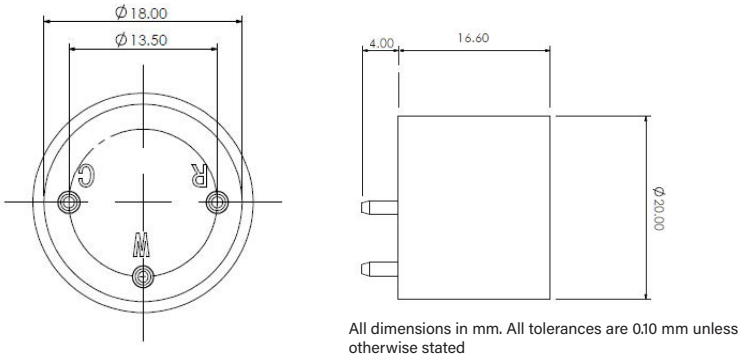
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

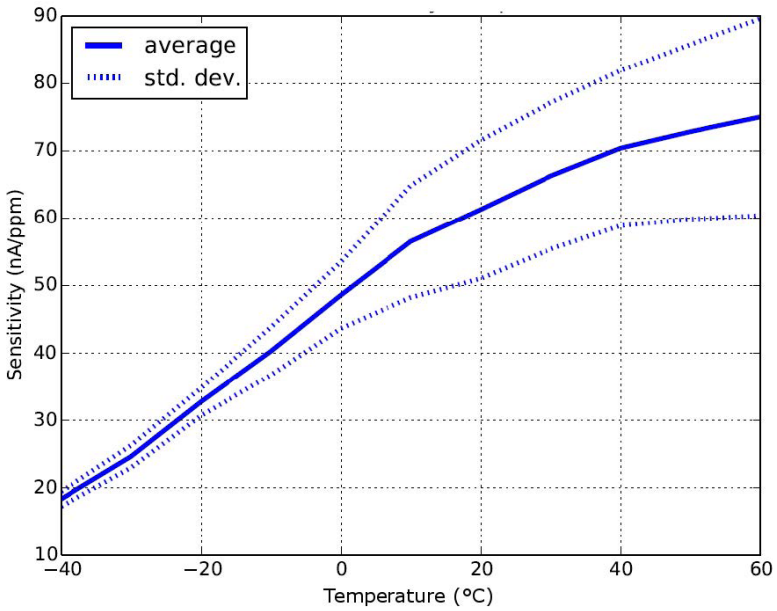
Housing material	ABS
Weight	< 6 g

Dimensions



All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve

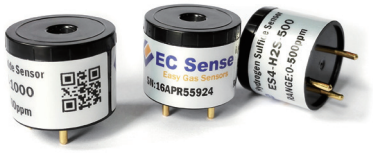


Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES4-AG1-200 - All Gas



Part Number:
01-ES4-AG1-200-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	200 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	1000 ppm
Linear range	1000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

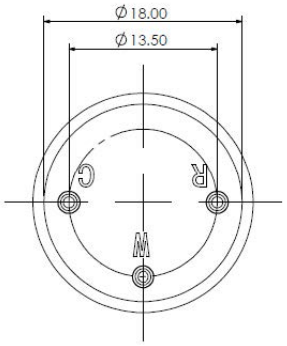
Lifetime

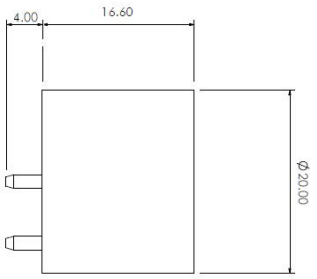
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

Housing material	ABS
Weight	< 6 g

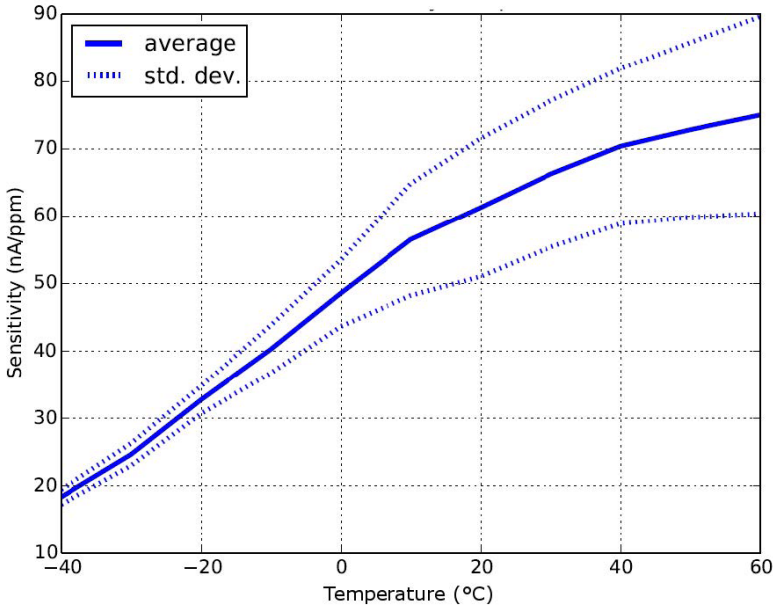
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES4-AG1-1000 - All Gas

Part Number:
01-ES4-AG1-1000-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	55 ± 15 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

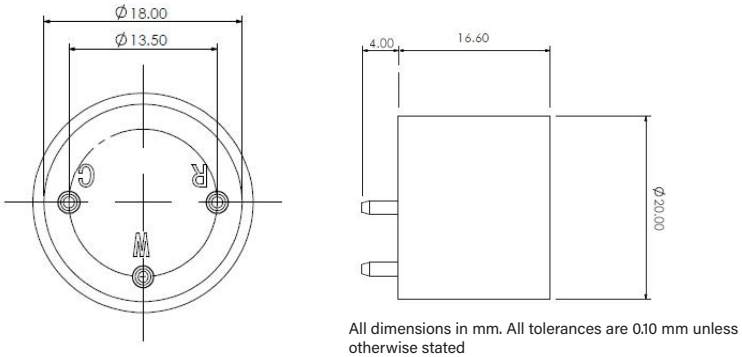
Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

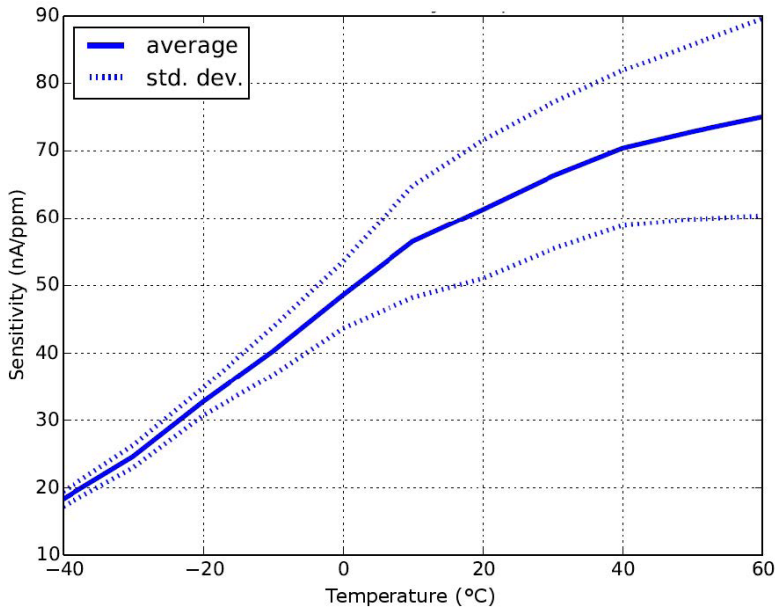
Housing material	ABS
Weight	< 6 g

Dimensions



All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve

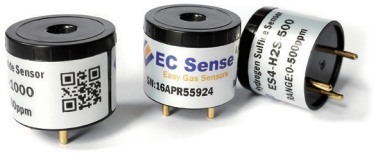


Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES4-AG1-2000 - All Gas



Part Number:
01-ES4-AG1-2000-01

Features

- High sensitivity
- Low cost alternative to PID
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report
- Detect to most VOC Gases
- Strong signal to noise
- Smallest EC Sensor in the world
- Fast Response time

Typical applications

- Consumer Market
- General Gas Detection
- VOC Gas Detection
- Low Power Nose
- Mobile Phone Nose
- Indoor Air Quality
- Outdoor Air Quality
- Breath Alcohol Detector

Technical Specification

Performance

Sensitivity	25 ± 10 nA /ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	2000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	5000 ppm
Linear range	5000 ppm

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

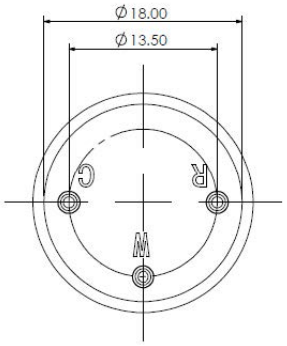
Lifetime

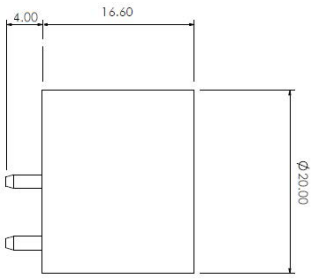
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

Housing

Housing material	ABS
Weight	< 6 g

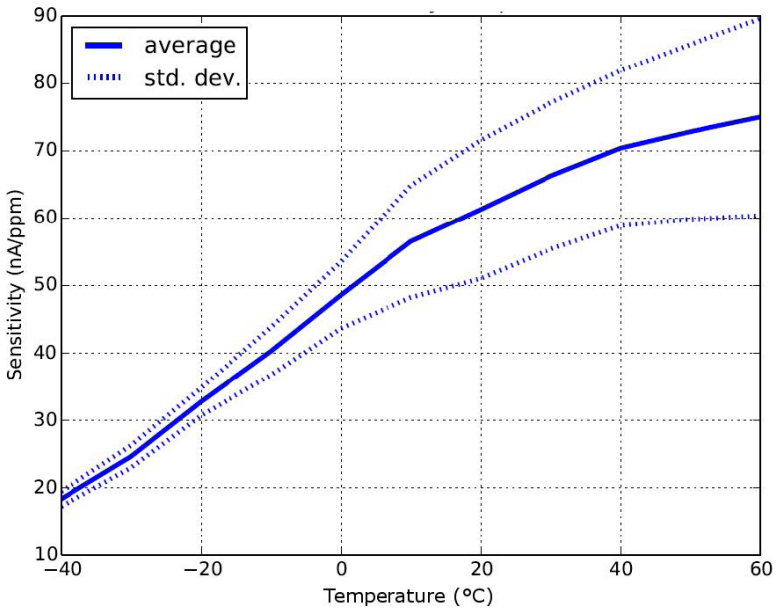
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0.1
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	100	100
Chlorine	Cl_2	1.0	-6
Dichlormethane	CH_2Cl_2	30	0
Ethanol	$C_2H_5Cl_2$	104	100
Ethylene oxide	C_2H_5OH	14	7
Ethyne	C_2H_2	80	250
Hydrogen	H_2	100	20
Hydrogen Sulphide	H_2S	10	400
Hydrogen Cyanide	HCN	10	9
Isopropanol	C_3H_7OH	< 4000	>750
Methan	CH_4	30000	0
Methanal	HCHO		ok
Methanol	CH_3OH		ok
Methylpropene	C_4H_8	15	18
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	-5
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2		ok
Toluene	C_7H_8		ok with bias
Xylene	C_8H_{10}		ok
Gasoline			ok

Sensor reading in ppm after calibration to CO. Cross sensitivities indicated with ok showed a signal response under a bump test.

Easy Gas Sensor
ES4-CO-100 - Carbon Monoxide

Part Number:
01-ES4-CO-100-01

Features

- Extreme linear response up to high concentration
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- TLV-monitoring, leakage detection
- Oil & Petrochemical Industry
- Steel Industry
- Parking garages

Technical Specification

Performance

Sensitivity	25 ±10 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	<10 s
$-T_{90}$	< 30 s
Range	100 ppm
Repeatability	<1 %
Lower Detectable Limit (LDL)	≤2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

Lifetime

Long Term Sensitivity Drift	< 1 % / month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	24 month

Housing

Housing material	ABS
Weight	< 6 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
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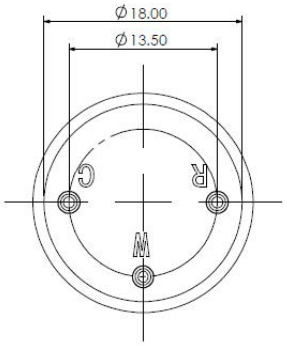
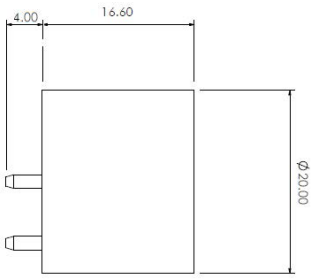
Email: info@ecsense.de www.ecsense.de

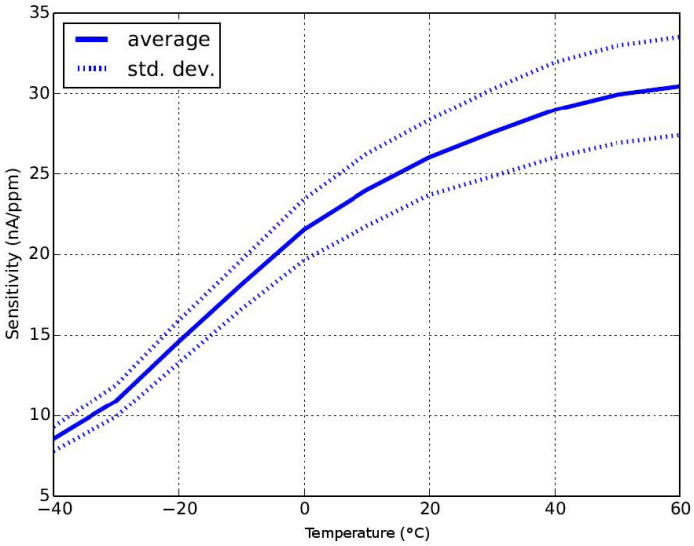
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)	-		
Hydrogen	H_2	100	50
Hydrogen Sulphide	H_2S	50	0
Hydrogen Cyanide	HCN	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-CO-1000 - Carbon Monoxide

Part Number:
01-ES4-CO-1000-01

Features

- Extreme linear response up to high concentration
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- TLV-monitoring, leakage detection
- Oil & Petrochemical Industry
- Steel Industry
- Parking garages

Technical Specification

Performance

Sensitivity	25 ±10 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	<10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	<1 %
Lower Detectable Limit (LDL)	≤2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

Lifetime

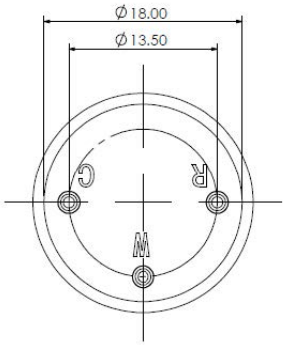
Long Term Sensitivity Drift	< 1 % / month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	24 month

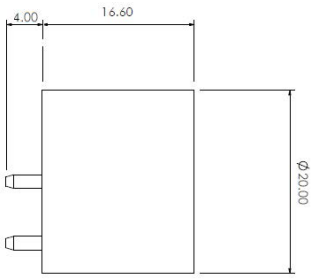
Housing

Housing material	ABS
Weight	< 6 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

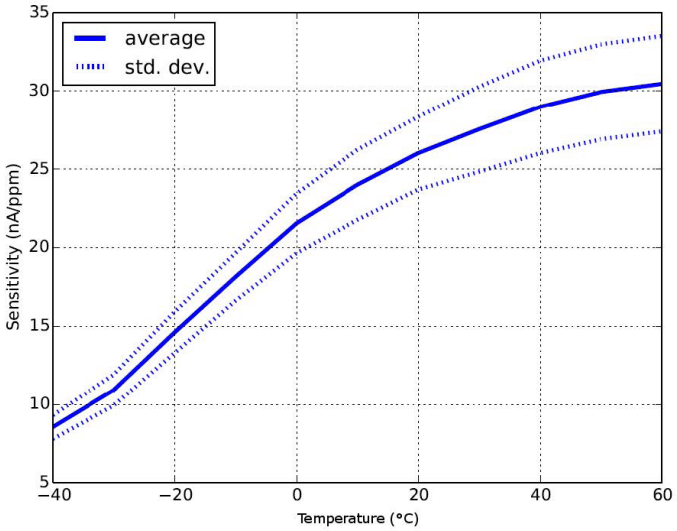
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)	-		
Hydrogen	H_2	100	50
Hydrogen Sulphide	H_2S	50	0
Hydrogen Cyanide	HCN	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-CO-10000 - Carbon Monoxide

Part Number:
01-ES4-CO-10000-01

Features

- Extreme linear response up to high concentration
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- TLV-monitoring, leakage detection
- Oil & Petrochemical Industry
- Steel Industry
- Parking garages

Technical Specification

Performance

Sensitivity	10nA ± 3nA
Zero current	± 100 nA
Response time $-T_{50}$ $-T_{90}$	 <10s <30s
Range	10000 ppm
Repeatability	<1%
Lower Detectable Limit (LDL)	≤10 ppm
Resolution (16Bit ADC)	1 ppm
Maximum overload	30000 ppm
Linear range	30000 ppm

Environment

Temperature Range	-40°C to 50°C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 60 s

Lifetime

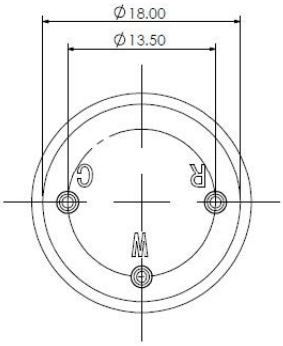
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	24 month

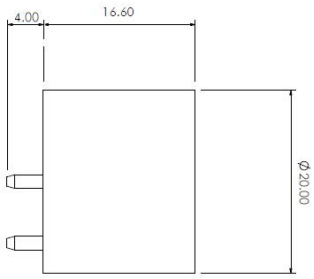
Housing

Housing material	ABS
Weight	< 6 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)	-		
Hydrogen	H_2	100	80
Hydrogen Sulphide	H_2S	50	0
Hydrogen Cyanide	HCN	50	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	n.e.
Nitrogen Dioxide	NO_2	100	0

Easy Gas Sensor
ES4-H_2-1000 - Hydrogen

Part Number:
01-ES4-H_2-1000-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Ambient monitoring
- Very sensitive leak detection

Technical Specification

Performance

Sensitivity	11 ± 3 nA / ppm
Zero current	± 100 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	2000 ppm
Linear range	2000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

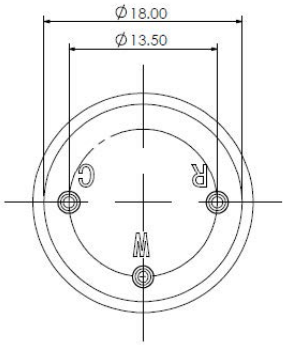
Lifetime

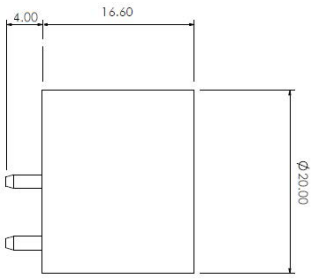
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 10 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

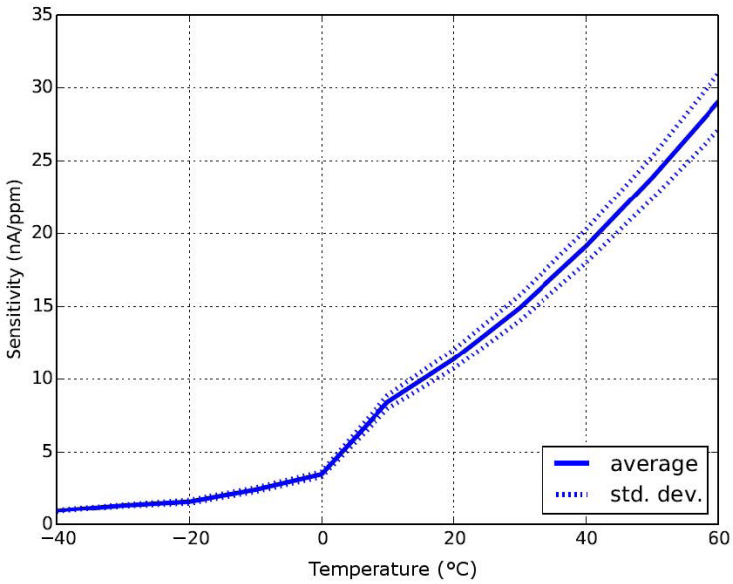
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	n.e.
Carbon Monoxide	CO	50	46
Chlorine	Cl_2	10	0
Hydrocarbons (unsaturated)			n.a.
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-H_2-20000 - Hydrogen

Part Number:
01-ES4-H_2-20000-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Ambient monitoring
- Very sensitive leak detection

Technical Specification

Performance

Sensitivity	3±2 nA / ppm
Zero current	± 5 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	20000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 100 ppm
Resolution (16Bit ADC)	10 ppm
Maximum overload	40000 ppm
Linear range	20000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

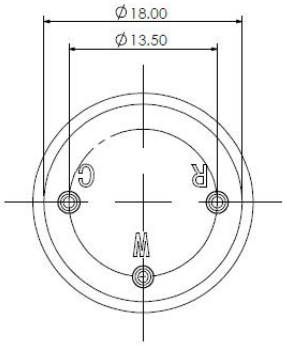
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 10 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 5 years
Warranty	12 month

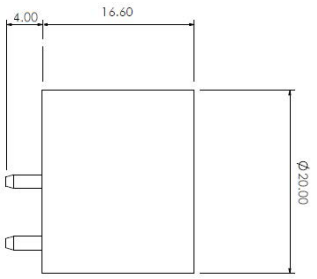
Housing

Housing material	ABS
Weight	< 6 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
Phone: +49 8178 9095130 Fax: +49 8178 9095131
Email: info@ecsense.de www.ecsense.de

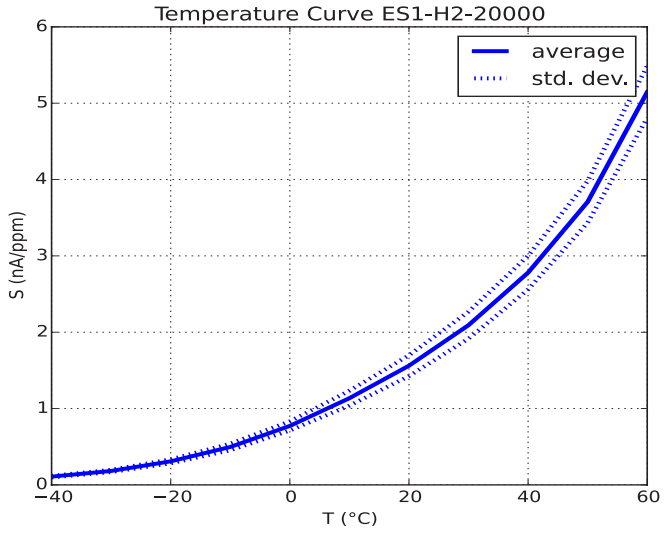
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	n.e.
Carbon Monoxide	CO	50	46
Chlorine	Cl_2	10	0
Hydrocarbons (unsaturated)			n.a.
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-H_2S-100 - Hydrogen Sulfide

Part Number:
01-ES4-H_2S-100-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Water treatment plants
- Biogas applications
- Portable & fixed point applications
- Leakage detection

Technical Specification

Performance

Sensitivity	90 ± 20 nA / ppm
Zero current	± 20 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	100 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	200 ppm
Linear range	200 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

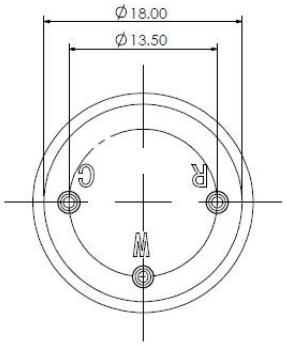
Lifetime

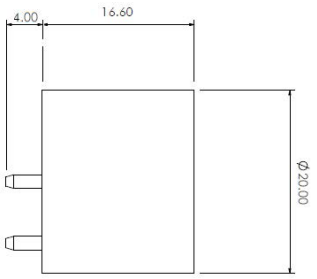
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

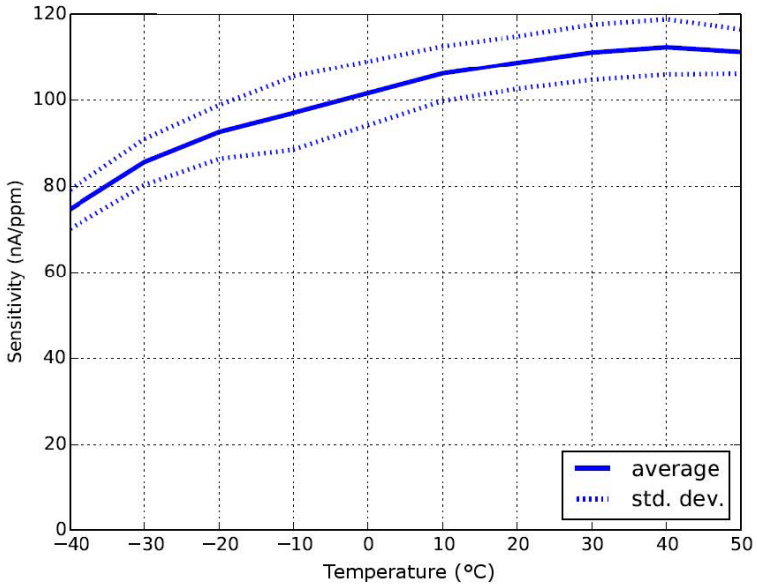
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

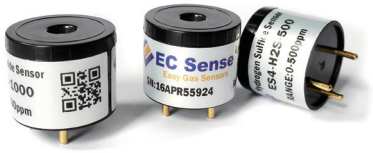
Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	3
Chlorine	Cl_2	10	-1.5
Hydrocarbons (unsaturated)			n.e.
Hydrogen	H_2	100	3
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.e.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	-2.2

Easy Gas Sensor
ES4-H_2S-500 - Hydrogen Sulfide



Part Number:
01-ES4-H_2S-500-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Water treatment plants
- Biogas applications
- Portable & fixed point applications
- Leakage detection

Technical Specification

Performance

Sensitivity	90 ± 20 nA / ppm
Zero current	± 20 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	500 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	1000 ppm
Linear range	1000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

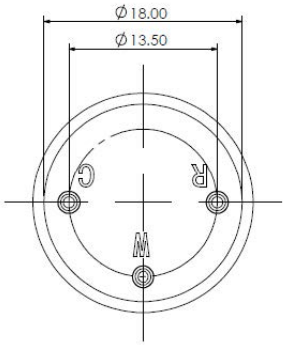
Lifetime

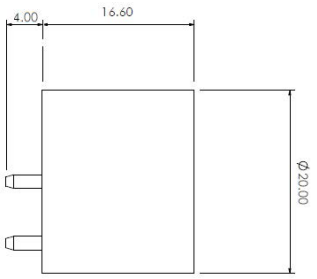
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

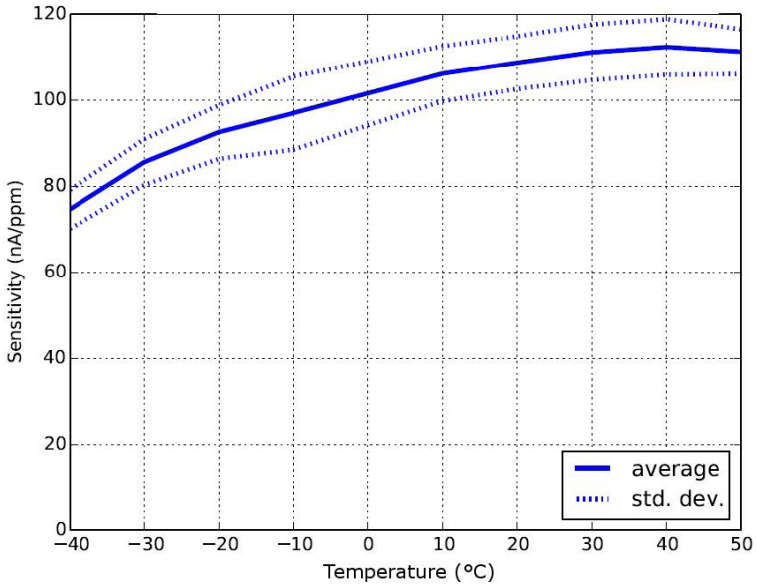
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	3
Chlorine	Cl_2	10	-1.5
Hydrocarbons (unsaturated)			n.e.
Hydrogen	H_2	100	3
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.e.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	-2.2

Easy Gas Sensor
ES4-H_2S-5000 - Hydrogen Sulfide

Part Number:
01-ES4-H_2S-5000-01

Features

- Extreme linear response up to high concentration
- Low noise
- Short warm up time
- No electrolyte leakage
- Low cost at large volumes
- Fast response
- Individually calibrated including test report

Typical applications

- Water treatment plants
- Biogas applications
- Portable & fixed point applications
- Leakage detection

Technical Specification

Performance

Sensitivity	10 ±3 nA / ppm
Zero current	± 20 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	5000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 5 ppm
Resolution (16Bit ADC)	1 ppm
Maximum overload	10000 ppm
Linear range	10000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

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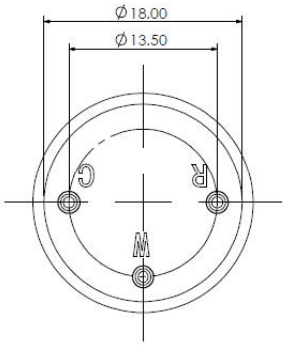
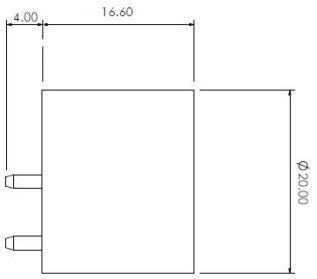
Email: info@ecsense.de www.ecsense.de

Dimensions





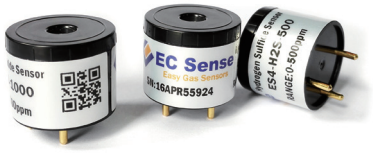
All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

Temperature curve

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	3
Chlorine	Cl_2	10	-1.5
Hydrocarbons (unsaturated)			n.e.
Hydrogen	H_2	100	3
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.e.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	-2.2

Easy Gas Sensor
ES4-NO_2-50 - Nitrogen Dioxide



Part Number:
01-ES4-NO_2-50-01

Features

- Extreme linear response up to high concentration
- Fast response
- Low cost alternative to PID
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report

Typical applications

- TLV monitoring
- Parking garages

Technical Specification

Performance

Sensitivity	-20 ± 10 nA / ppm
Zero current	± 2 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	50 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	500 ppm
Linear range	500 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

EC-Sense GmbH, Wolfratshauser Str. 53, 82067 Ebenhausen, Germany
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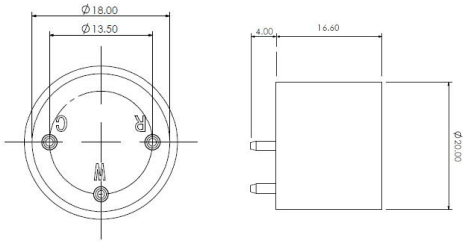
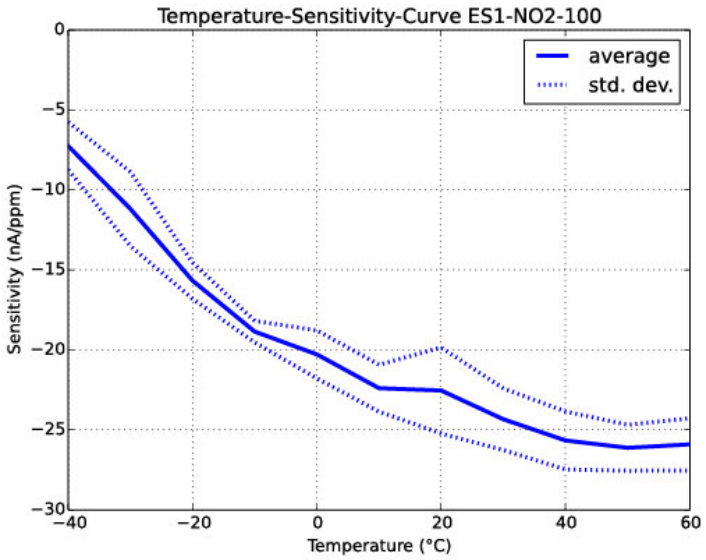
Email: info@ecsense.de www.ecsense.de

Dimensions



All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated,

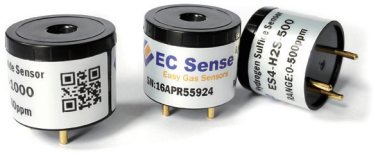
Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	10	10
Hydrocarbons (unsaturated)	-		n.a.
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-NO_2-100 - Nitrogen Dioxide



Part Number:
01-ES4-NO_2-100-01

Features

- Extreme linear response up to high concentration
- Fast response
- Low cost alternative to PID
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report

Typical applications

- TLV monitoring
- Parking garages

Technical Specification

Performance

Sensitivity	-20 ± 10 nA / ppm
Zero current	± 2 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	100 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 1 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	500 ppm
Linear range	500 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric, 3-electrode
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

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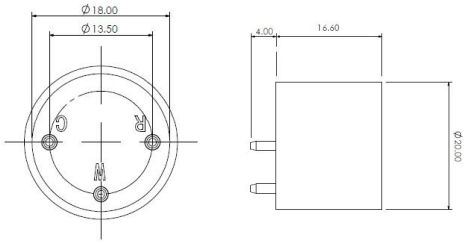

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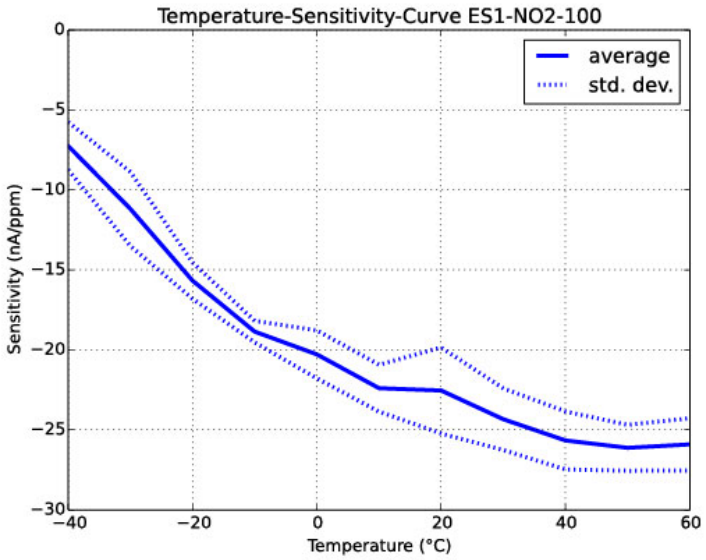
Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	10	10
Hydrocarbons (unsaturated)	-		n.a.
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-NO_2-1000 - Nitrogen Dioxide

Part Number:
01-ES4-NO_2-1000-01

Features

- Extreme linear response up to high concentration
- Fast response
- Low cost alternative to PID
- Low noise
- No electrolyte leakage
- Low cost at large volumes
- Individually calibrated including test report

Typical applications

- TLV monitoring
- Parking garages

Technical Specification

Performance

Sensitivity	10 ± 3 nA / ppm
Zero current	± 2 nA
Response time	
$-T_{50}$	< 10 s
$-T_{90}$	< 30 s
Range	1000 ppm
Repeatability	1%
Lower Detectable Limit (LDL)	≤ 2 ppm
Resolution (16Bit ADC)	0.1 ppm
Maximum overload	5000 ppm
Linear range	5000 ppm

Environment

Temperature Range	-40 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

Operating principle	amperometric
Bias voltage	0 mV
Recommended load resistor	100 Ω
Warm up time	< 20 s

Lifetime

Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 ppm
Storage conditions	0-20 °C
Storage life	6 month
Expected Life Time	> 3 years
Warranty	12 month

Housing

Housing material	ABS
Weight	< 6 g

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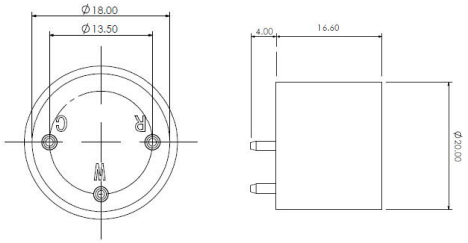


All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated,

Temperature curve

Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	50	0
Carbon Dioxide	CO_2	1000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	10	10
Hydrocarbons (unsaturated)	-		n.a.
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	n.a.
Nitric Oxide	NO	25	n.a.
Nitrogen Dioxide	NO_2	10	0

Easy Gas Sensor
ES4-O_2-25% - Oxygen

Part Number:
01-ES4-O_2-25-01

Features

- Strong signal to noise
- Smallest EC Sensor in the world
- Capillary Sensor
- Response Time Typically 4s
- Low Power Consumption
- 400-600mV Bias Voltage
- Lead Free

Typical applications

- Industrial
- Medical
- Food Industry
- Combustion Control

Technical Specification

Performance

Sensitivity	0.2± 0.03 nA /ppm
Zero current	40-60 µA
Response time -T_{50} -T_{90}	 < 5 s < 10 s
Range	25 % O_2
Resolution (16Bit ADC)	0.01 % O_2
Lower Detectable Limit (LDL)	≤ 0.5 %
Maximum overload	30 % O_2

Environment

Temperature Range	-20 to 50 °C
Humidity Range (non condensing)	10 to 95 % r.H
Pressure Range	800 to 1200 hPa

Operation

3 Electrode Electrochemical sensor Bias voltage	-400 to -600 mV
Warm up time	600s

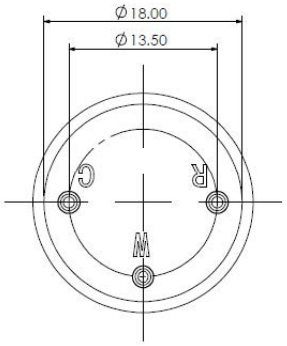
Lifetime

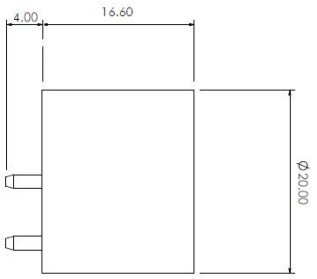
Long Term Sensitivity Drift	< 1 %/month
Zero Drift in clean air	< 0.2 % O_2
Expected Life Time	> 3 years
Storage life	6 month
Warranty	24 month
Storage conditions	0-20 °C

Housing

Housing material	ABS
Weight	< 6 g

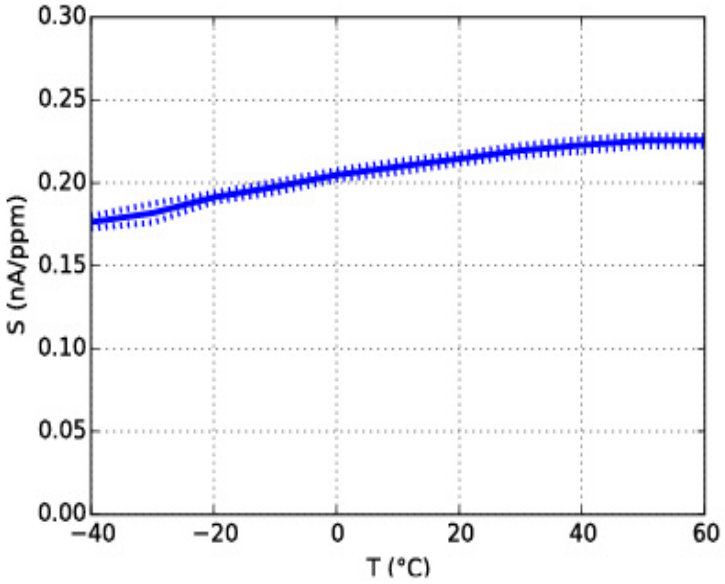
Dimensions





All dimensions in mm. All tolerances are 0.10 mm unless otherwise stated

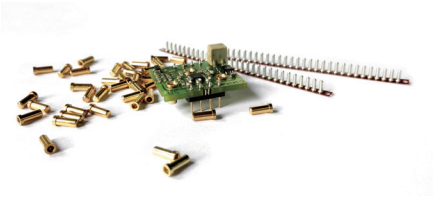
Temperature curve



Cross sensitivity

Gas	Formula	Test concentration (ppm)	Sensor reading (ppm)
Ammonia	NH_3	20	0
Carbon Dioxide	CO_2	5000	0
Carbon Monoxide	CO	50	0
Chlorine	Cl_2	1.0	0
Hydrocarbons (unsaturated)		1 %	0
Hydrogen	H_2	100	0
Hydrogen Cyanide	HCN	10	0
Isopropanol	C_3H_7OH	1000	0
Nitric Oxide	NO	25	0
Nitrogen Dioxide	NO_2	10	0
Ozone	O_3	0.5	0
Sulphur Dioxide	SO_2	20	0

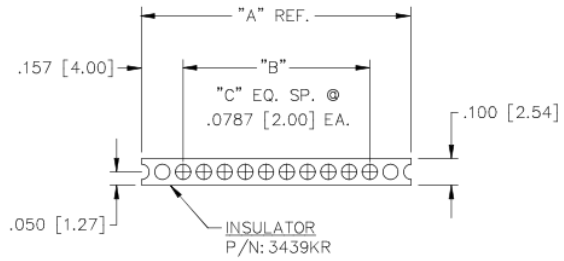
Sockets

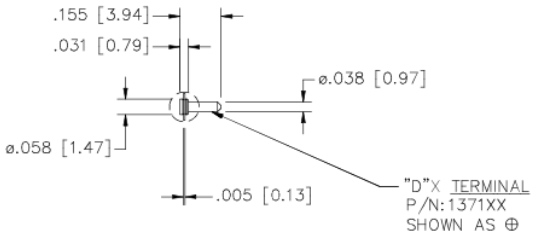


Part Number:
02-ES1-Sock-03-01

Notes

1. Materials
   - Insulator: Polyimide film
   - Terminal: Brass, C36000, ASTM-B-16
   - Contact: BeCu, C17200, ASTM-B-194
2. Plating
   - Terminal
     - G: .000010 [0.00025] MIN. Gold over .000050 [0.00127] MIN Nickel
     - M: 000100 [0.00254] MIN. Matte tin over 0.000050 [0.00127] MIN Nickel
     - T: .000200 [0.00254] MIN. 90% Tin, 10% [0.00127] MIN Nickel
   - Contact
     - G: .000030 [0.00076] MIN. Gold over .000050 [0.00127] MIN Nickel
     - T: .000150 [0.00381] MIN. 90% TIN. 10% lead over .000050 [0.00127] MIN Nickel





USB Stick

Description

The USB Stick is a very quick and comfortable solution for the detection of gas leaks. Likewise it makes inital testing of our sensors as simple as possible. We have adapted our sensors to an USB which can be directly connected to a PC. The USB is always delivered with software that allows online concentration view, trend graph and datafiling.

Framework requriements

Administrator rights to run the software.
Laptop, PC with free USB port.
Operation system Microsoft Windows 2000 or Windows XP, Microsoft Vista 07, Windows 7, Microsoft Excel has to be installed.

Part Number:

03-USB-Gas-01-01
03-USB-O2-01-01

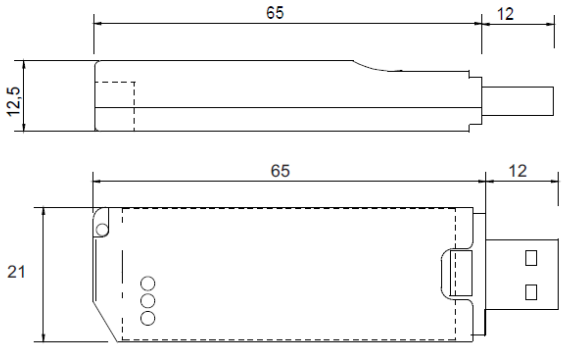
Option

USB stick extension cable, length up to 2m, helpful for typical customer application.

Features

- Online concentration view
- Trend graph and data filing in excel
- Simply and quick installation in 4 steps only

Dimensions



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