

## Sensor Modules

SENSOR	T	RH	CO2	CO2	CO	NO2
Phenomenon	Temperature	Relative Humidity	Carbon Dioxide	Carbon Dioxide	Carbon Monoxide	Nitrogen Dioxide
Sensor Type Used	Thermistor	Thin film capacitive	NDIR	NDIR	Electrochemical	Electrochemical
Range	0°C to +50°C (32° to 122° F)	0-100%	0-5,000 ppm standard	<sup>4)</sup> 0-10,000 ppm optional	<sup>1)</sup> 0 – 50 ppm	<sup>1)</sup> 0 – 5.0 ppm
Resolution	0.1C@25C	0.4% RH	1 ppm	1 ppm	0.3 ppm	0.05 ppm
Long Term Drift	+/- 0.5 °C (accuracy)	+/- 2% rH (accuracy)	+/- 20 ppm typical	+/- 100 ppm	<2 % / month in clean air	<3 % @ 3 months
Response time			< 60 seconds for 90% step change	> 1 min. for 90% step change	t <sub>90</sub> = < 25 seconds	t <sub>90</sub> = < 25 seconds
Warm up time at 22° C	5 min.	5 min.	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy
Recommended calibration interval	1 year for best accuracy	1 year for best accuracy	2 years, 1 year for best accuracy	2 years, 1 year for best accuracy	6 months for best accuracy	6 months for best accuracy
Operating Temp. Range	0°C to +50°C	-20C to +40C	0°C to +50°C	0°C to +50°C	-20 to +50 °C	-20 to +50 °C
Operating Humidity Range		0-100%	0% to 95% non- condensing	15% to 95%	15 to 90% continuous	15 to 90% continuous
Operating Life (expected)	3 years plus	> 2 years	10 years	10 years	2 years	2 years
Cross Sensitivities					*H2 400 ppm = <50 *C2H4 100 ppm = < 90 *Cl2 5 ppm = <2 *H2S / SO2 = 0	*SO2 20 ppm = <1 *H2S 20 ppm = -25 *CO / NO = 0 *H2 = 0

SENSOR	O2	NH3	Cl2	ClO2	F2	H
Phenomenon	Oxygen	Ammonia	Chlorine	Chlorine Dioxide	Fluorine	Hydrogen
Sensor Type Used	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical
Standard Range	0 – 25.0% Volume	<sup>1)</sup> 0 – 100 ppm	<sup>1)</sup> 0 – 5.0 ppm	0 – 1.0 ppm	0 – 1.0 ppm	<sup>1)</sup> 0 – 4000 ppm
Resolution	0.2 % Volume	1 ppm	0.02 ppm	0.02 ppm	0.02 ppm	<20 ppm
Long Term Output Drift	<3% @ 3 months	<5% @ 6 months	<10% @ 6 months	<5% @ 6 months	<5% per month	<10% @ 6 months
Response time	t <sub>90</sub> = < 10 seconds	t <sub>90</sub> = <60 seconds	t <sub>90</sub> = <30 seconds	t <sub>90</sub> = <120 seconds	t <sub>90</sub> = <80 seconds	t <sub>90</sub> = <60 seconds
Warm up time at 22° C	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	** 5 min operational 20 min. max. accuracy
Recommended calibration interval	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy
Operating Temp. Range	-20°C to +50°C	-20°C to +40°C	0°C to +40°C	-20°C to +40°C	0°C to +50°C	-40°C to +40°C
Operating Humidity Range	5% - 95%	10% to 95%	5% to 95%	10% to 95%	15% to 90%	5% to 90%
Operating Life (expected)	2 yrs in air	2 yrs in air	2 yrs in air	2yrs in air	2 yrs in air	2 yrs in air
Cross Sensitivities	*CO2 5% Vol. = < 0.5 % Vol.	*H2S 10 ppm = 0 *CO 1000 ppm = 0 *H2 1000 ppm = 25 *CO 300 ppm = 3	*H2S 10 ppm = -0.3 *NO2 10 ppm = 1.2 *F2 1.0 ppm = 0.44 *Bromine 1.0 ppm = 1.0 *ClO2 0.25 ppm = 0.05	*O3 0.1 ppm = 0.03 *Cl2 1 ppm = 0 dose < 100 ppm min.) *Phosphine 0.3 ppm = 0.3 *Arsine 1 ppm = 0.8 *CO 1000 ppm = 0 *H2 1% Vol. = 0	*H2S 1 ppm = -1.5 *Cl2 1 ppm = 1.3 *NO2 1 ppm = 0.05 *O3 0.1 ppm = 0.2 *SO2 2 ppm = 0 *CO 1000 ppm = 0 *Bromine = yes n/d	*Ethylene 500 ppm = 280 *Isopropanol 1100 ppm = 180 *CO 50 ppm = 6 *SO2 2 ppm = 0 *CH4 1% = 0 *CO2 1000 ppm = 0

Sensor Modules, Cont'd.....

SENSOR	HCl	HCN	H <sub>2</sub> S	NO	O <sub>3</sub>	SO <sub>2</sub>
Phenomenon	Hydrogen Chloride	Hydrogen Cyanide	Hydrogen Sulphide	Nitric Oxide	Ozone	Sulphur Dioxide
Sensor Type Used	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical	Electrochemical
Standard Range	0 – 30 ppm	0 – 30 ppm	<sup>1)</sup> 0 – 50 ppm	<sup>1)</sup> 0 – 100 ppm	0 – 1.00 ppm	<sup>1)</sup> 0 – 20 ppm
Resolution	0.5 ppm	0.3 ppm	0.05 ppm	0.1 ppm	0.02 ppm	0.1 ppm
Long Term Output Drift	<3% / month	<5% / month	<2% / month	<2% / month	<5% @ 6 months	<2% /month
Response time	t <sub>90</sub> <70 sec.	t <sub>90</sub> <40 sec.	t <sub>90</sub> <20 sec.	t <sub>90</sub> <10 sec.	t <sub>90</sub> ≤ 60 sec.	t <sub>90</sub> ≤ 25 sec.
Warm up time at 22°C	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	<sup>2)</sup> 5 min operational 20 min. max. accuracy	** 5 min operational 20 min. max. accuracy
Recommended calibration interval	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy	6 months for best accuracy
Operating Temp. Range	-20°C to +40°C	-40°C to +40°C	-40°C to +50°C	-5°C to +40°C	-10°C to +40°C	-30°C to +40°C
Operating Humidity Range	10% - 95%	5% to 95%	15% to 90%	20% to 90%	10% to 95%	15% to 90%
Operating Life (expected)	2 yrs in air	1.5 yrs in air	2 yrs in air	2yrs in air	1.5 yrs in air	2 yrs in air
Cross Sensitivities	*H <sub>2</sub> S 10 ppm = 2.75 *SO <sub>2</sub> 5 ppm = 2.5 *Cl <sub>2</sub> 5 ppm = 1 *HCN 15 ppm = 1 *H <sub>2</sub> 1% = 0 *CO 1000 ppm = 0 *CO <sub>2</sub> 5000 ppm = 0	*NO <sub>2</sub> 10 ppm = -12 *Cl <sub>2</sub> 5 ppm = -1 *H <sub>2</sub> S 10 ppm = 0 *SO <sub>2</sub> 2 ppm = 0 *NO 100 ppm = 0 *CO 1000 ppm = 0 *H <sub>2</sub> 1000 ppm = 0	*SO <sub>2</sub> 20 ppm = <20 *CO 400 ppm = < 0.05 *H <sub>2</sub> 400 ppm = 0 *NO/NO <sub>2</sub> /Cl <sub>2</sub> = n/d	*NO <sub>2</sub> 100 ppm = <0.01 *H <sub>2</sub> S 10 ppm = 0 *SO <sub>2</sub> 50 ppm = 0 *CO 1000 ppm = 0 *CO <sub>2</sub> 5000 ppm = 0 *Cl <sub>2</sub> 5 ppm = 0	*H <sub>2</sub> S 1 ppm = < 0.015 *H <sub>2</sub> 1% = -0.003 *Cl <sub>2</sub> 1 ppm = 1.4 +/- 50% *NO <sub>2</sub> 1 ppm = 0.70 *ClO <sub>2</sub> 0.1 ppm = 0.12	*H <sub>2</sub> S 20 ppm = 0.1 *H <sub>2</sub> 400 ppm = 0.2 *CO 400 ppm = 0 *NO 50 ppm = 0 *NO <sub>2</sub> /Cl <sub>2</sub> = n/d

- 1) Note: Other ranges available on special order.
- 2) Note: 5-minute warm-up is the minimum time to expect stable readings, however, for accurate readings allow at least 20 minutes
- 3) Consult factory for pricing
- 4) Until the first part of 2003, all ACR-205 instruments will be supplied with 0-10,000 ppm range CO<sub>2</sub> sensors. After that, the standard will be 0-5,000 ppm range.

**MODELS**

ACR-205: CO<sub>2</sub>, Temperature, Humidity

ACR-205-4: CO<sub>2</sub>, Temperature, Humidity, CO

ACR-205-5: CO<sub>2</sub>, Temperature, Humidity, CO, NO<sub>2</sub>

**Note-1:** Any of the above toxic gas sensors can be substituted for the CO and/or NO<sub>2</sub> sensors. Prices may vary depending on sensor type. When ordering, use part number ACR-205-4 or ACR-205-5 but specify type of extra one or two sensors desired.

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