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Guide to...

GAS DETECTION & AIR QUALITY MONITORING

Critical Environment Technologies™

$10 USD/ CND

www.critical-environment.com

Why choose CETCI?

Our pride is in quality, not quantity.

We are dedicated to manufacturing high quality gas detection systems, including self-contained systems, controllers and transmitters, and indoor air quality (IAQ) portable instruments.

All aspects of product design, development and manufacturing are done in-house. Therefore, we have complete control over the products we manufacture from concept to final assembly.

Our products carry either CSA, UL, CE, BTL, or C-Tick certification or a combination.

Our products are sold worldwide and have a proven track record.

Our products are thoroughly tested and always gas calibrated twice before leaving our facility.

We carry a large inventory of replacement parts, calibration gases and calibration kits.

The way we handle warranty issues, anywhere in the world, is second to none in any industry. We stand behind everything we sell. That's our promise to you!

Our devotion to great service and satisfied customers.

Our skilled team is dedicated to helping you find the right solution to your particular application. To back up what we say, we will be happy to provide customer references to anyone that is interested.

Our passion for innovation.

We design, develop, manufacture, sell, and service an extensive product range of hazardous gas detection systems and indoor air quality portable instruments suited for various types of applications.

Our product knowledge available at your fingertips.

We offer a library of product support documentations for all our products online at www.critical-environment.com. Our informative web site contains product manuals, datasheets, brochures, catalogs, specification sheets, engineering drawings, sample engineering specifications, and much more.

Want to be the first to be notified on updates? Simply visit **www.critical-environment.com**, subscribe to **CETCI Magazine Blog**, find us on **Facebook**, follow us on **Twitter: @cetci**, connect with us on **LinkedIn**, connect with us on **Flickr**, or subscribe to our **RSS feed**.

About CETCI

Critical Environment Technologies Canada Inc. (CETCI) is a leading global supplier of gas detection systems, including self contained systems, controllers and transmitters, and Indoor Air Quality (IAQ) portable instruments. With ongoing product development, CETCI's instruments are ensured to be leading edge.

CETCI products are sold through a network of authorized distributors around the world.

Applications include commercial, institutional, municipal, and light industrial markets worldwide. Areas of specialization include parking garages, refrigeration plants, commercial swimming pools, water purification, arenas, wineries and breweries, waste water treatment, and many more.

CETCI gas detectors are used to detect many different gases. Some of the most common are carbon monoxide, carbon dioxide, nitrogen dioxide, nitric oxide, ammonia, chlorine, ozone, combustible gases like methane and propane, oxygen, refrigerants and more.

Contents

OVERVIEW

Gas Detection

Categories of gas detection systems are defined by the technology they use: electrochemical and metal oxide semiconductor technologies generally detect toxic gases and catalytic and infrared sensors detect combustible gases.

ELECTROCHEMICAL

Toxic gas sensors & oxygen sensors

LIFE SPAN

2 - 5 years (sensor type & manufacturer dependent). Oxygen typically 2 years.

SPECIFICITY

Specific to target gas with known cross sensitivity to a small variety of gases.

RANGE

Typically 0 - 1.0 ppm to 0 - 2,000 ppm, sensor dependent.

POISONING / DAMAGING

- Oxygen depravation
- Exposure to high concentrations of solvent vapours
- Very high concentrations of target gas
- Reactive gases
- Environments with high temperatures, low temperatures (freezing)
- Very low levels of relative humidity (less than 10 - 15%)

APPLYING SPAN GAS

- Use span gas with air balance or nitrogen balance
- Flow rate should be a minimum of 0.5 LPM (lighter-than air gases) to a maximum of 1.0 LPM (heavier-than-air gases)
- Do NOT humidify span gas when flowing

SOLID-STATE

Toxic & combustible gas sensors

LIFE SPAN

3 - 8 years (sensor type & manufacturer dependent).

SPECIFICITY

Broad spectrum, non gas specific sensors with a wide range of interfering gases & chemicals.

RANGE

0 - 50% LEL (combustible gases), varies for target toxic gases (typically 0 - 100 ppm to 0 - 2,000 ppm).

POISONING / DAMAGING

High concentrations of target gas, silicon vapours, alkaline metals, salt water spray, environments with extreme temperatures (heat and freezing).

APPLYING SPAN GAS

- Use span gas with air balance ONLY. Nitrogen balance will cause negative sensor response.
- Flow rate should be a minimum of 0.5 LPM to a maximum of 0.75 LPM.
- Span gas MUST be humidified when flowing over sensor.

CATALYTIC

Combustible gas sensors, toxic gas sensors at very high concentrations (% volume)

LIFE SPAN

3 - 8 years (typically if not poisoned)

SPECIFICITY

Specific to combustible gases only in the LEL ranges

RANGE

0 - 100% LEL of target gas

POISONING / DAMAGING

High concentrations of target gas, lead vapours, silicon vapours, alkylated heavy metals.

APPLYING SPAN GAS

- Use span gas with air balance ONLY.
- Flow rate should be a minimum of 0.5 LPM (lighter-than air gases) to a maximum of 1.0 LPM (heavier-than-air gases)
- Do not humidify span gas when flowing

INFRARED

Toxic & combustible gas sensors

LIFE SPAN

10 years +

SPECIFICITY

Specific to target gas.

RANGE

0 - 1,000 ppm to 0 - 100% volume. Target gas, manufacturer dependent.

POISONING / DAMAGING

No known poisoning agents. Condensing humidity will damage sensor and distort readings.

APPLYING SPAN GAS

- Use span gas with air balance or nitrogen balance. Nitrogen balance ONLY for CO_2 sensors.
- Flow rate should be approximately 0.5 LPM. Some sensors are flow sensitive.
- Do NOT humidify span gas when flowing.

SENSOR SPECIFICATION CHART

Portable Indoor Air Quality

Sensor Target Gas	Sensor Type	Standard Range	Instrument Displayed Resolution	Sensor Resolution	Accuracy	Long Term Drift	Response Time
Ammonia (NH_3)	EC	0 - 50 ppm	0.1 ppm (100 ppb)	1 ppm	No Data Available	< 5% / 6 months	t_{90} = < 60 seconds calculated fr 5 minute exposure
Arsine (AsH_3)	EC	0 - 1 ppm	0.001 ppm (1 ppb)	< 15 ppb @ 20°C (68°F)	No Data Available	< 5% / 6 months	t_{90} = <30 seconds calc fr 2 minute exposure
Carbon Dioxide (CO_2)	IR	0 - 5,000 ppm	1 ppm	50 ppm fr 0 - 2,500 ppm, then 100 ppm up to FSD	± 2% full scale @ 20°C (68°F), 1 bar pressure, applied gas 2.5% volume CO_2	± 50 ppm / month @ 20°C (68°F) ambient, (max ± 150 ppm / yr)	t_{90} = > 30 seconds @ 20°C (68°F)
		0 - 10,000 ppm	1 ppm	100 ppm fr 0 - 5,000 ppm, then 200 ppm up to FSD		± 500 ppm / month @ 20°C (68°F) ambient	t_{90} = > 30 seconds @ 20°C (68°F)
		0 - 5% volume	0.1% volume	1% of measuring range for readings > 50% of range, 0.5% of measuring range for readings < 50% of range		± 500 ppm / month @ 20°C (68°F) ambient	t_{90} = > 30 seconds @ 20°C (68°F)
		0 - 20% volume	0.1% volume		No Data Available	± 1% volume / month @ 20°C (68°F) ambient	t_{90} = > 30 seconds @ 20°C (68°F)
		0 - 100% volume	0.01% volume		No Data Available	± 1% volume / month @ 20°C (68°F) ambient	t_{90} = > 30 seconds @ 20°C (68°F)
Carbon Monoxide (CO)	EC	0 - 50 ppm	1 ppm	0.5 ppm	No Data Available	zero: 0.2 ppm equiv change / yr in clean air. Sensitivity: 3% change / yr in clean air (value based on twice per month test)	t_{90} =< 25 seconds fr 0 - 400 ppm

Warm Up Time at Switch On	Recommended Calibration Frequency	Operating Temperature	Operating Humidity	Operating Life *(Estimated)*	Cross Sensitivities
Approx 2 - 2.5 min (warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 90% non-condensing	2 yrs	Alcohols @ 1,000 ppm = 0 ppm CO_2 @ 5,000 ppm = 0 ppm CO @100 ppm = 0 ppm Hydrocarbons @ % range = 0 ppm H_2 @ 10,000 ppm = 0 ppm H_2S @ 20 ppm = 2 ppm Cross sensitivity list not fully completed. Sensor maybe sensitive to other gases.
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	20 - 95% non- condensing	1.5 yrs	CO @ 85 ppm = 0 ppm H_2 @ 3,100 ppm = 0 ppm NO_2 @ 10 ppm = 2 ppm C_3H_5OH @ 25,000 ppm = 0 ppm H_2S @ 18 ppm = 10.8 ppm SO_2 @ 18 ppm = 5.4 ppm Cl_2 @ 0.85 ppm = 0.24 ppm HCl @ 7.8 ppm = 1 ppm HF @ 7.2 ppm = 0 ppm HCN @ 12.6 ppm = 0.7 ppm SiH_4 @ 4.3 ppm = 0.7 ppm H_2Se @0.8 ppm = 0.24 ppm B_2H_6 @ 0.2 ppm = 0.28 ppm PH_3 @ 0.2 ppm = 0.24 ppm
Approx 2 - 2.5 min (warm up delay time)	2 yrs, 1 yr for best accuracy	0°C to 50°C (32°F to 122°F)	0 - 95% non-condensing	5 - 10 yrs	None
Approx 2 - 2.5 min (warm up delay time)	2 yrs, 1 yr for best accuracy	0°C to 50°C (32°F to 122°F)	0 - 95% non-condensing	5 - 10 yrs	None
Approx 2 - 2.5 min (warm up delay time)	2 yrs, 1 yr for best accuracy	0°C to 50°C (32°F to 122°F)	0 - 95% non-condensing	5 - 10 yrs	None
Approx 2 - 2.5 min (warm up delay time)	2 yrs, 1 yr for best accuracy	0°C to 50°C (32°F to 122°F)	0 - 95% non-condensing	5 - 10 yrs	None
Approx 2 - 2.5 min (warm up delay time)	2 yrs, 1 yr for best accuracy	0°C to 50°C (32°F to 122°F)	0 - 95% non-condensing	5 - 10 yrs	None
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non-condensing	2 - 3 yrs	H_2S @ 20 ppm = < 0.1 ppm NO_2 @ 10 ppm = < 0.1 ppm Cl_2 @ 10 ppm = < 0.1 ppm NO @ 50 ppm = < 5 ppm SO_2 @ 20 ppm = < 0.1 ppm H_2 @ 20°C (68°F) @ 400 ppm = < 60 ppm C_2H_4 @ 400 ppm = < 25 ppm NH_3 @ 20 ppm = < .01 ppm

SENSOR SPECIFICATION CHART

Portable Indoor Air Quality

Sensor Target Gas	Sensor Type	Standard Range	Instrument Displayed Resolution	Sensor Resolution	Accuracy	Long Term Drift	Response Time
Carbon Monoxide (CO)	EC (for use in H_2 back-ground enviro-ment)	0 - 50 ppm	1 ppm	0.5 ppm	No Data Available	zero: 0.2 ppm equivalent change / yr in clean air. Sensitivity: 3% change / yr in clean air (value based on twice per month test)	t_{90} = < 30 seconds
Chlorine (Cl_2)	EC	0 - 5 ppm	0.1 ppm (100 ppb)	0.02 ppm	No Data Available	zero: < 0.2 ppm equivalent change / yr in clean air with monthly test. Sensitivity: < 0.4 ppm change / month in clean air with 2X / monthly test	t_{90} = < 40 seconds fr 0 - 5ppm
Chlorine Dioxide (ClO_2)	EC	0 - 1 ppm	0.01 ppm (10 ppb)	0.02 ppm	No Data Available	< 5% / 6 months	t_{50} = < 20 seconds calc fr 2 minute exposure time t_{90} = < 120 sec calc fr 2 minute exposure
Combustibles	CAT Pellistor	0 - 100% LEL	1% LEL	1% LEL	No Data Available	Minimal	t_{50} = < 10 seconds
	IR	0 - 5% vol CH_4	0.1% volume	1% vol CH_4	No Data Available	± 1% FSD / mth @ 20°C (68°F) ambient, (max ± 3% of full scale / yr)	t_{90} = <30 seconds @ 20°C (68°F) ambient
Ethylene (C_2H_4)	EC	0 - 500 ppm	1 ppm	1 ppm	No Data Available	< 5% / month	t_{90} = < 100 seconds
Ethylene Oxide (C_2H_4O)	EC	0 - 20 ppm	0.1 ppm (100 ppb)	0.1 ppm	No Data Available	< 5% signal loss / yr	t_{90} = < 120 seconds

Warm Up Time at Switch On	Recommended Calibration Frequency	Operating Temperature	Operating Humidity	Operating Life *(Estimated)*	Cross Sensitivities
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non-condensing	2 - 3 yrs	H_2 @ 900 ppm in 900 ppm CO @ 10°C (50°F) = < 2 ppm H_2 @ 900 ppm in 900 ppm CO @ 20°C (68°F) = < 4 ppm H_2 @ 900 ppm in 900 ppm CO @ 30°C (86°F) = < 6 ppm NO_2 @ 10 ppm = < 0.1 ppm Cl_2 @ 10 ppm = < 0.1 ppm NO @ 50 ppm = < 0.1 ppm SO_2 @ 20 ppm = < 0.1 ppm C_2H_4 @ 400 ppm = < 30 ppm NH_3 @ 20 ppm = < 0.1 ppm
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 90% non-condensing	2 - 2.5 yrs	H_2S @ 20 ppm= < -40 ppm NO_2 @ 10ppm= 100 ppm NO @ 50 ppm = < 0.5 ppm SO_2 @ 20 ppm = < -2.5 ppm CO @ 400 ppm = < 0.1 ppm H_2 @ 400 ppm = < 0.1 ppm C_2H_4 @ 400 ppm = < 0.1 ppm
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 95% non- condensing	2 yrs	Alcohols @ 1,000 ppm = 0 ppm CO @ 100 ppm = 0 ppm Cl_2 @ 1ppm = 0.6 ppm O_3 @ 0.25 ppm = 0.7 ppm H_2 @ 3,000 ppm = 0 ppm H_2S @ 20 ppm = -5 ppm
Approximately 2 - 2.5 min (instrument warm up delay time)	1 yr for best performance	0°C to 40°C (32°F to 104°F)	10 - 90% non- condensing	5 yrs +	Responds to most flammable gases & vapours
Approximately 2 - 2.5 min (instrument warm up delay time)	1 yr	0°C to 50°C (32°F to 122°F)	0 - 95% non-condencing	5 - 10 yrs	None
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non- condensing	2 - 3 yrs	CO = < 60%
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non- condensing	2 - 3 yrs	Ethanol ≈ 55% Toluene ≈ 20% Methyl-ethyl-ketone ≈ 10% CO ≈ 40%

SENSOR SPECIFICATION CHART

Portable Indoor Air Quality

Sensor Target Gas	Sensor Type	Standard Range	Instrument Displayed Resolution	Sensor Resolution	Accuracy	Long Term Drift	Response Time
Fluorine (F_2)	EC	0 - 2 ppm	0.01 ppm (10 ppb)	< 0.02 ppm @ 20°C (68°F)	No Data Available	< 5% / month	t_{90} = < 80 seconds calc fr 4 minute exposure with 1 ppm Cl_2
Formaldehyde (CH_2O) *(ref note 4)*	EC	0 - 10 ppm	0.01ppm (10 ppb)	0.01 ppm	No Data Available	< 2% signal loss / month	t_{50} = < 80 seconds
Hydrogen (H_2)	EC	0 - 2,000 ppm	1 ppm	2 ppm	No Data Available	< 2% / months	t_{90} = < 90 seconds
Hydorgen Chloride (HCl)	EC	0 - 30 ppm	0.1 ppm (100 ppb)	< 0.7 ppm @ 20°C (68°F)	No Data Available	< 3% / month	t_{90} = < 70 seconds calc fr 4 minute exposure

Warm Up Time at Switch On	Recommended Calibration Frequency	Operating Temperature	Operating Humidity	Operating Life *(Estimated)*	Cross Sensitivities
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 90% non- condensing	1.5 - 2 yrs	Alcohols @ 1,000 ppm = 0 ppm AsH_3 @ 0.2 ppm = -0.03 ppm Br = yes; n/d CO_2 @ 5,000 ppm = 0 ppm CO @ 100 ppm = 0 ppm Cl_2 @ 1 ppm = 1.4 ppm B_2H_6 @ 0.25 ppm = -0.01 ppm Hydrocarbons @ % range = 0 ppm HCl @ 5 ppm = -7 ppm H_2 @ 10,000 ppm = 0 ppm HCN @ 1 ppm = -0.05 ppm H_2S @ 1 ppm = -2 ppm N_2 @ 100% = 0 ppm NO_2 @ 10 ppm = 8 ppm O_3 @ 0.25 ppm = 0.3 ppm PH_3 @ 0.3 ppm = approx. -0.1 ppm; n/d SO_2 @ 20 ppm = -0.2 ppm
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non- condensing	2 - 3 yrs in air	H_2 = 1 - 3% CO = 10 - 18% Interference from other reducing gases such as alcohol.
Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non- condensing	2 yrs +	CO @ 300 ppm = ≤ 60 ppm H_2S @ 15 ppm = < 3 ppm SO_2 @ 5 ppm = 0 ppm NO @ 35 ppm ≈ 10 ppm NO_2 @ 5 ppm = 0 ppm Cl_2 @ 1 ppm = 0 ppm HCN @ 10 ppm ≈ 3 ppm HCl @ 5 ppm = 0 ppm C_2H_4 @ 100 ppm ≈ 80 ppm
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 95% non- condensing	2 yrs	Alcohols @ 1,000 ppm = 0 ppm NH_3 @ 100 ppm = 0 ppm AsH_3 @ 0.2 ppm = 0.7 ppm CO_2 @ 5,000 ppm = 0 ppm CO @ 100 ppm = 0 ppm Cl_2 @ 5 ppm = < ±0.1 ppm Hydrocarbons @ % range = 0 ppm H_2 @ 10,000 ppm = 0 ppm HCN @ 20 ppm = 7 ppm H_2S @ 20 ppm = 60 ppm NO @ 100 ppm = 45 ppm N_2 @ 100% = 0 ppm NO_2 @ 10 ppm = < ±0.5 ppm PH_3 @ 0.1 = 0.3 ppm SO_2 @ 20 ppm = 8 ppm

SENSOR SPECIFICATION CHART

Portable Indoor Air Quality

Sensor Target Gas	Sensor Type	Standard Range	Instrument Displayed Resolution	Sensor Resolution	Accuracy	Long Term Drift	Response Time
Hydrogen Cyanide (HCN)	EC	0 - 30 ppm	0.1 ppm (100 ppb)	0.2 ppm	No Data Available	< 5% / month	t_{90} = < 50 seconds calc fr 2 minute exposure
Hydorgen Fluoride (HF)	EC	0 - 10 ppm	0.1 ppm (100 ppb)	0.2 ppm @ 20°C (68°F)	No Data Available	< 10% in 6 months	t_{90} = < 90 seconds calc fr 4 minute exposure
Hydrogen Sulphide (H_2S)	EC	0 - 50 ppm	0.1 ppm (100 ppb)	< 0.05 ppm	No Data Available	Zero: < 0.1 ppm equivalent change / yr in clean air Sensitivity: < 4% change / yr in clean air with monthly test	t_{90} = < 25 seconds fr 0 - 20 ppm
Nitrogen Dioxide (NO_2)	EC	0 - 10 ppm	0.1 ppm (100 ppb)	0.1 ppm	No Data Available	< 2% signal loss / month	t_{90} = < 25 seconds
Nitric Oxide (NO)	EC	0 - 100 ppm	0.1 ppm (100 ppb)	< 0.2 ppm	No Data Available	Zero: 0.5 ppm equiv change fr -20°C to 20°C (-4°F to 68°F), 1 - 3 ppm equiv change 20°C to 50°C (68°F to 122°F) Sensitivity: 101 - 105% output change @ 50 ppm btw 20°C (68°F) & 50°C (122°F)	t_{90} = < 20 seconds fr 0 - 50 ppm

Warm Up Time at Switch On	Recommended Calibration Frequency	Operating Temperature	Operating Humidity	Operating Life *(Estimated)*	Cross Sensitivities
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 95% non- condensing	1.5 - 2 yrs	Alcohols @ 1,000 ppm = 0 ppm CO_2 @ 5,000 ppm = 0 ppm CO @ 100 ppm = 0 ppm Hydrocarbons @ % range = 0 ppm H_2 @ 10,000 ppm = 0 ppm NO @ 100 ppm = -5 ppm NO_2 @ 10 ppm = -7 ppm H_2S @ 20 ppm = 0 ppm (short gas exposure in minute range; after filter saturation: ca. 40 ppm reading)
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 90% non- condensing	1.5 yrs +	$C_2H_4O_2$ @ 100 ppm = 100 ppm Alcohols @ 1,000 ppm = 0 ppm CO_2 @ 5,000 ppm = 0 ppm CO @ 100 ppm = 0 ppm Cl_2 @ 1 ppm = 0.7 ppm Hydrocarbons @ % range = 0 ppm H_2 @ 3,000 ppm = < 1 ppm HCl @ 10 ppm = 6 ppm SO_2 @ 20 ppm = 16 ppm
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non- condensing	2 - 3 yrs	NO_2 @ 10 ppm = < -20 ppm Cl_2 @ 10 ppm = -25 ppm NO @ 50 ppm = < 4 ppm SO_2 @ 20 ppm = < 10 ppm CO @ 400 ppm = < 1.5 ppm H_2 @ 400 ppm = < 0.2 ppm C_2H_4 @ 400 ppm = < 0.5ppm NH_3 @ 20 ppm = < 0.1 ppm
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non-condensing	2 - 3 yrs	H_2S @ 20 ppm = < -40 ppm Cl_2 @ 10 ppm = 100 ppm NO @ 50 ppm = < 0.5 ppm SO_2 @ 20 ppm = < -2.5 ppm CO @ 400 ppm = < 0.1 ppm H_2 @ 400 ppm = < 0.1 ppm C_2H_4 @ 50 ppm = < 0.1 ppm NH_3 @ 20 ppm = < 0.1 ppm CO_2 @ 5% volume = < 0.1 ppm
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 50°C (32°F to 122°F)	15 - 90% non- condensing	2 - 3 yrs	H_2S @ 20 ppm = < 30 ppm NO_2 @ 50 ppm = < 5 ppm Cl_2 @ 10 ppm = < 15 ppm SO_2 @ 20 ppm = < 3 ppm H_2 @ 400 ppm = < 0.1 ppm CO @ 400 ppm = < 0.1 ppm NH_3 @ 20 ppm = < 0.1 ppm CO_2 @ 5% volume = < 0.1 ppm

SENSOR SPECIFICATION CHART

Portable Indoor Air Quality

Sensor Target Gas	Sensor Type	Standard Range	Instrument Displayed Resolution	Sensor Resolution	Accuracy	Long Term Drift	Response Time
Oxygen (O_2)	EC	0 - 25% volume	0.1% volume	0.1% volume	No Data Available	< 1% change in output over 3 months	t_{90} = < 15 seconds fr 0 - 20.9%
Ozone (O_3)	EC	0 - 1 ppm	0.01 ppm (10 ppb)	< 0.02 ppm @ 20°C (68°F)	No Data Available	< 10% / 6 months @ 20°C (68°F) and 30 - 50% RH	t_{90} = < 60 seconds calc fr 3 minute exposure @ 30 cc / min flow
Phosphine (PH_3)	EC	0 - 5 ppm	0.01 ppm (10 ppb)	Lower detection limit < 30 ppb	No Data Available	< 5% / 6 months	t_{90} = < 30 seconds
Relative Humidity (RH)	Thin film capacitive	0 - 100% RH	1%	2% RH	No Data Available	2% (±)	< 10 seconds
Silane (SiH_4)	EC	0 - 50 ppm	0.01 ppm (10 ppb)	0.05 ppm	No Data Available	< 5% / 6 months	t_{90} = < 60 seconds calc fr 2 min exposure

Warm Up Time at Switch On	Recommended Calibration Frequency	Operating Temperature	Operating Humidity	Operating Life *(Estimated)*	Cross Sensitivities
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 55°C (32°F to 131°F)	< 0.7% fr 0 - 95% RH @ 40°C (104°F)	2 yrs	CO_2 sensitivity: 0.1% change in O_2 reading per % CO_2 in 5% CO_2
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 90% non-condensing	1.5 - 2 yrs	Br, I_2 = yes; n/d CO_2 @ 5,000 ppm = 0 ppm CO @ 100 ppm = 0 ppm Cl_2 @ 1 ppm = 1.2 ppm ClO_2 @ 1 ppm = 1.5 ppm N_2H_4 @ 3 ppm = -3 ppm H_2 @ 3,000 ppm = 0 ppm H_2S @ 20 ppm = -1.6 ppm N_2 @ 100% = 0 ppm NO_2 @ 10ppm = 6 ppm
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	10 - 95% non- condensing	2 yrs	CO @ 85 ppm = 0 ppm H_2 @ 3,100 ppm = 0 ppm NO_2 @ 10 ppm = 2 ppm C_3H_5OH @ 25,000 ppm = 0 ppm H_2S @ 18 ppm = 13 ppm SO_2 @ 18 ppm = 6.5 ppm Cl_2 @ 0.85 ppm = 0.29 ppm HCl @ 7.8 ppm = 1.2 ppm HF @ 7.2 ppm = 0 ppm HCN @ 12.6 ppm = 0.84 ppm SiH_4 @ 4.3 ppm = 0.84 ppm H_2Se @ 0.8 ppm = 0.29 ppm B_2H_6 @ 0.2 ppm = 0.34 ppm AsH_3 @ 0.2 ppm = 0.16 ppm
5 min operational, 20 min max accuracy	1 yr for best performance	0°C to 50°C (32°F to122°F)	N/A	3 yrs +	N/A
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	20 - 95% non- condensing	1.5 yrs	CO @ 85 ppm = 0 ppm H_2 @ 3,100 ppm = 0 ppm NO_2 @ 10 ppm = 2.3 ppm C_3H_5OH @ 25,000 ppm = 0 ppm H_2S @ 18 ppm = 8 ppm SO_2 @ 18 ppm = 7.4 ppm Cl_2 @ 0.85 ppm = 0.1 ppm HCl @ 8 ppm = 0.45 ppm HF @ 7.2 ppm = 0 ppm HCN @ 12 ppm = 0.77 ppm AsH_3 @ 0.16 ppm = 0.2 ppm H_2Se @ 0.8 ppm = 0.2 ppm B_2H_6 @ 0.2 ppm = 0.27 ppm PH_3 @ 0.2 ppm = 0.35 ppm

SENSOR SPECIFICATION CHART

Portable Indoor Air Quality

Sensor Target Gas	Sensor Type	Standard Range	Instrument Displayed Resolution	Sensor Resolution	Accuracy	Long Term Drift	Response Time
Sulphur Dioxide (SO_2)	EC	0 - 20 ppm	0.1 ppm (100 ppb)	< 0.1 ppm	No Data Available	< 2% change / month in clean air	t_{90} = < 25 seconds fr 0 - 10 ppm
Temperature	Neg Coefficient Thermistor	-5°C to 55°C (23°F to 131°F)	0.1°C	0.1°C @ 25°C	No Data Available	0.5°C (±)	< 10 seconds
Total Volatile Organic Compounds (TVOC)	PID	0 - 30 ppm	0.01 ppm (10 ppb)	0.02 ppm	No Data Available	No Data Available	t_{90} = < 3 seconds
		0 - 300 ppm	1 ppm	0.1 ppm (100 ppb)	No Data Available	No Data Available	t_{90} = <3 seconds

Legend:

EC	Electrochemical
SS	Solid State
CAT	Catalytic
IR	Infrared
PID	Photolonization Detector

Additional chemical symbols not defined above:

Br	Bromine
ClF_3	Chlorine Trifluoride
C_2H_2	Acetylene
C_3H_8O	Isopropyl Alcohol
B_2H_6	Diborane

Warm Up Time at Switch On	Recommended Calibration Frequency	Operating Temperature	Operating Humidity	Operating Life *(Estimated)*	Cross Sensitivities
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	6 months	0°C to 40°C (32°F to 104°F)	15 - 90% non- condensing	2 yrs	H_2S @ 20 ppm = < 0.1 NO_2 @ 10 ppm = < -130 ppm Cl_2 @ 10 ppm = < -40 ppm NO @ 50 ppm = < ±2 ppm CO @ 400 ppm = < 1.6 ppm H_2 @ 400 ppm = < 0.3 ppm C_2H_4 @ 400 ppm = < 40 ppm NH_3 @ 20 ppm = < 0.1 ppm
5 minute operational, 20 minute max accuracy	1 yr for best performance	0°C to 50°C (32°F to 122°F)	N/A	3 yrs +	N/A
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	monthly to 4 months (usage dependent)	0°C to 40°C (32°F to 104°F)	0 - 95% non-condensing	5 yrs (excl replacable lamp & electrode stack)	Many chemicals & gases. Refer to manual.
2 minute Approximately 2 - 2.5 min (instrument warm up delay time)	monthly to 4 months (usage dependent)	0°C to 40°C (32°F to 104°F)	0 - 95% non-condensing	5 yrs (excl replacable lamp & electrode stack)	Many chemicals & gases. Refer to manual.

Important Notes:

1. Some sensors may be calibrated with correlation gases. If you prefer to have specific sensors calibrated with the target gas, contact our factory for availability and extra costs. Customer will have to bear the cost of the full cylinder of specialty gas plus incoming dangerous goods freight and take ownership of the cylinder of gas remaining.

2. These specifications have been developed from data considered accurate at the time. No warranty is implied or suggested based on this data. We accept no responsibility for errors or omissions.

3. Critical Environment Technologies Canada Inc. reserves the right to make design and specification changes without prior notice.

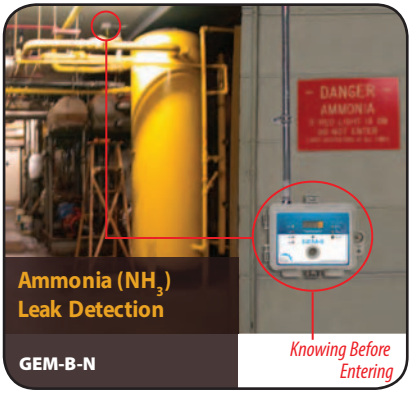
4. Formaldehyde sensor has high cross sensitivity to Carbon Monoxide, Alcohol & Hydrogen.

5. Combustible (flammable) gas sensors (catalytic) can be calibrated for a number of target gases. Please specify the target gas desired & we will evaluate your request.

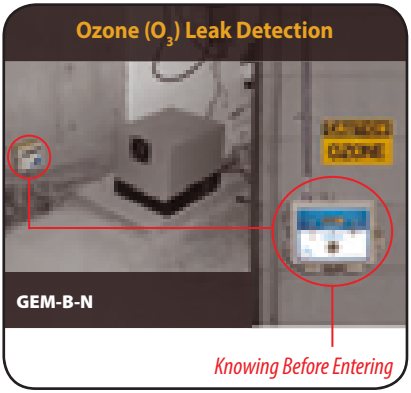
QUICK APPICATION GUIDE

Fixed Gas Detection Systems

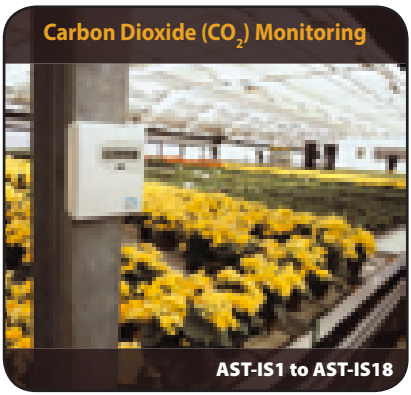
Arenas - Ammonia Compressors



Hatcheries - Ozone Generators



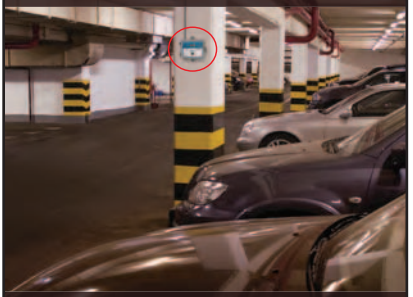
Green Houses



Pools - Chlorination Equipment

Parkades - Gas & Diesel Engine Exhaust

$CO + NO_2$ Monitoring



GEM-EECO-END or **GEM-DECO-END**

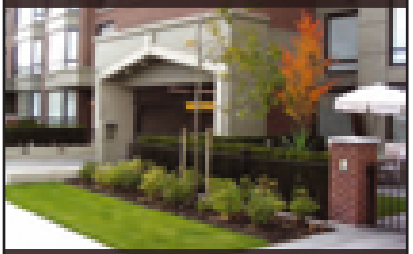
Repair Shops - Gas & Diesel Engine Exhaust

$CO + NO_2$ Monitoring

GEM-EECO-ENO

Building on Old Landfill Sites

Methane (CH_4) Monitoring



PDC-D + DST-SCB

Peace of Mind...

Wineries & Breweries

$CO_2 + O_2$ Leak Detection

AST-ICD-BW + PDC-A

Laboratories & Research Facilities

$CH_2O + O_2$ Monitoring

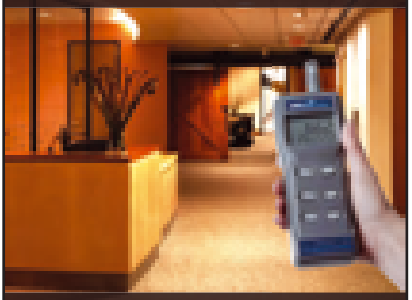
PET-EFO-OO2-N

QUICK APPICATION GUIDE

Portable Indoor Air Quality Monitors

Office Buildings

CO_2 + RH + Temperature



*Breathe easy with...***YESAIR *Junior***

Warehouses - Gas & Diesel Engine Exhaust

CO_2 + CO + NO_x + RH + Temperature

*Know the Air You're Breathing...***YESAIR**

Commercial Pools

CO_2 + O_3 + RH + Temperature

*Know the Air You're Breathing...***YESAIR**

Research Facilities

CO_2 + VOC + CH_2O + RH + Temperature

*Know the Air You're Breathing...***YES Plus LGA**

Commercial & Residential Buildings

CO_2 + Methane + RH + Temperature

*Know the Air You're Breathing...***YES Plus LGA**

by Application

APPLICATIONS / GAS TYPE	SENSOR TYPE	Arenas	Battery Recharging Areas	Boiler Rooms	Breweries	Chiller Rooms	Indoor Air Quality	Laboratories	Loading Bays	Parking Structures	Pools	Pump Stations	Vehicle Repair Shops	Warehouses	Wastewater Facilities	Water Treatment Facilities	Wineries
Ammonia (NH_3)	EC / IR	✓			✓	✓									✓	✓	✓
Carbon Dioxide (CO_2)	IR	✓			✓		✓	✓			✓				✓	✓	✓
Carbon Monoxide (CO)	EC	✓		✓	✓		✓	✓	✓	✓		✓	✓	✓			✓
Chlorine (Cl_2)	EC							✓			✓	✓			✓	✓	
Combustibles	CAT	✓	✓	✓				✓				✓	✓		✓		
Combustibles	SS	✓	✓	✓					✓	✓			✓	✓			
Hydrogen (H_2)	SS	✓	✓										✓				
Hydrogen (H_2)	CAT	✓	✓														
Hydrogen (H_2)	EC							✓									
Hydrogen Sulphide (H_2S)	EC							✓				✓			✓		
Nitrogen Dioxide (NO_2)	EC	✓					✓		✓	✓			✓	✓			
Ozone (O_3)	EC							✓			✓	✓				✓	
Refrigerants	SS					✓											
Refrigerants	IR					✓											
Sulphur Dioxide (SO_2)	EC							✓				✓	✓	✓		✓	
TVOCs	SS						✓										

Legend

SS Solid State **EC** Electrochemical **CAT** Catalytic **IR** Infrared

SENSOR SELECTION MATRIX

by Product

FIXED GAS DETECTION SYSTEMS

PRODUCTS	AST-I	AST-IS	DST	LPT	GEM-II	PET
Ammonia (NH_3)			✓			✓
Carbon Monoxide (CO)			✓	✓	✓	✓
Carbon Dioxide (CO_2)	✓	✓				
Combustible Gases *(solid state)*			✓		✓	✓
Combustible Gases *(catalytic)*						
Chlorine (Cl_2)			✓			
Ethylene (C_2H_4)						✓
Ethylene Oxide (ETO)			✓			
Formaldehyde (CH_2O)						✓
Hydrocarbon Gases (CH_4)	✓					
Hydrogen (H_2)			✓			✓
Hydrogen Sulphide (H_2S)			✓			
Methane (CH_4)	✓		✓		✓	✓
Nitrogen Dioxide (NO_2)			✓	✓	✓	✓
Nitric Oxide (NO)			✓		✓	✓
Nitrious Oxide (N_2O)	✓					
Oxygen (O_2)			✓		✓	✓
Ozone (O_3)			✓			
Propane (C_3H_8)	✓		✓		✓	✓
Sulphur Dioxide (SO_2)			✓		✓	✓
Refrigerants					✓	✓
TVOCs *(solid state)*						✓
TVOCs *(PID)*						

PORTABLE INDOOR AIR QUALITY MONITORS

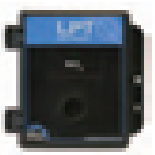
PRODUCTS	YESAIR	YES Plus LGA
Ammonia (NH_3)	✓	✓
Arsine (AsH_3)	✓	✓
Carbon Monoxide (CO)	✓	✓
Carbon Dioxide (CO_2)	✓	✓
Combustible Gases *(catalytic)*	✓	✓
Chlorine (Cl_2)	✓	✓
Chlorine Dioxide (ClO_2)	✓	✓
Ethylene (C_2H_4)	✓	✓
Ethylene Oxide (C_2H_4O)	✓	✓
Fluorine (F_2)	✓	✓
Formaldehyde (CH_2O)	✓	✓
Hydrogen (H_2)	✓	✓
Hydrogen Chloride (HCl)	✓	✓
Hydrogen Cyanide (HCN)	✓	✓
Hydrogen Fluoride (HF)	✓	✓
Hydrogen Sulphide (H_2S)	✓	✓
Nitrogen Dioxide (NO_2)	✓	✓
Nitric Oxide (NO)	✓	✓
Oxygen (O_2)	✓	✓
Ozone (O_3)	✓	✓
Particulates *(remote)*	✓	✓
Phosphine (PH_3)	✓	✓
Relative Humidity	✓	✓
Silane (SiH_4)	✓	✓
Sulphur Dioxide (SO_2)	✓	✓
Temperature	✓	✓
TVOCs *(PID)*	✓	✓

Gas Detection Transmitters

		DST
Features Available	Single or Dual Sensor	Single
	Remote Sensor	Yes
Options	Display	No
	Relay	No
	Watertight	Yes
	Splash Guard	Yes
Sensor Technology	Electrochemical	Yes
	Solid State	Yes
	Catalytic	No
	PID	No
Electrical	Power Requirement	24 VDC supplied by PDC controller
	Current Draw	80 - 120 mA
	Output	Proprietary scaled linear digital signal RS485 communication bus
	Wiring	Daisy chain config only. 16 - 18 gauge stranded, 4-conductor, shielded
	Relay	-
	Fuse	Automatic resetting thermal
Environmental	Operating Temperature	-20°C to 40°C (-4°F to 104°F)
	Humidity	15 - 95% RH non-condensing
Certifications	CSA	No
	CE	No
	UL	No
	C-Tick	No
	BTL	No

Note: All CETCI's instruments consist of RoHS compliant circuit boards.

[1] Watertight: Use optional splash guard to protect sensor from direct water spray.



LPT	PET	GEM-II
Single	Single & Dual	Single & Dual
No	Yes	Yes
No	Yes	Yes
No	No	2 Included
Yes (w/ splash guard)[1]	Yes	Yes
Yes	Yes	Yes
Yes	Yes	Yes
No	Yes	Yes
No	No	No
No	No	No
2-wire mode: 16 - 30 VDC 3-wire mode: 16 - 30 VDC 4-wire mode: 12 - 30 VAC or 16 - 30 VDC	24 VDC	15 - 30 VDC or 12 - 28 VAC
25 mA maximum	30 mA; 90 mA (with display)	Approximately 125 mA
Linear 4 - 20 mA	BACnet® MS / TP up to 76,800 bps MAC address 0 - 127 DIP switch settable.	Linear 4 - 20 mA (single)
VDC two or three conductor shielded; VAC four-conductor shielded	18 gauge, 4-conductor, shielded network wiring (daisy-chained)	VDC three-conductor shielded VAC four-conductor shielded
-	-	Two (2) dry contact SPDT, 5 amps @ 250 V each
Automatic resetting thermal	Automatic resetting thermal	Automatic resetting thermal
-20°C to 40°C (-4°F to 104°F)	Sensor dependant	-20°C to 50°C (-5°F to 120°F)
15 - 90% RH non-condensing	Sensor dependant	15 - 90% RH non-condensing
No	No	Yes
Pending	Pending	No
No	No	Yes
No	Pending	Yes
No	Yes	No

QUICK SELECTION GUIDE

Portable Indoor Air Quality Monitors

		YESAIR
Features Available	Relative Humidity Sensor	Yes
	Temperature Sensor	Yes
	YESDUST Compatible	Yes
Sensor Technology	Carbon Dioxide (CO_2)	Yes
	Electrochemical	Yes
	Catalytic	Yes
	Infrared	Yes
	PID	Yes
Electrical	Power Requirement	Alkaline, AA x 3 Rechargeable NiMH battery pack: 8 hours of continuous operation time *(dependent upon the sensor array installed)* c/w plug-in battery charger / wall adapter (6 VDC)
	Display	Backlit, multi-line , alphanumeric LCD display
	Resolution	*sensor dependent*
	Sampling	*Standard:* Internal, automatic sample pump for "active" sampling of target environment *Optional:* Diffusion for quick, direct reading.
	Memory	Removable Internal SD Flash Card
	Warm-Up Time	Approximately 3 minutes
Environmental	Operating Temperature	5°C to 50°C (41°F to 122°F)
	Humidity	0% to 95% RH non-condensing
Certifications	CE	Yes

Note: All CETCI's instruments consist of RoHS compliant circuit boards.

YES Plus LGA
Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes
Rechargeable NiMH battery pack: 18 - 24 hours of continuous operation time *(dependent upon sensor array installed)* c/w plug-in battery charger / wall adapter 12 VDC (100 - 240 VAC; 50 - 60 Hz)
Back-lit, multi-line LCD, alphanumeric display
sensor dependent
Internal, automatic sample pump for "active" sampling of target environment
Removable Internal SD Flash Card
Approximately 3 minutes
5°C to 50°C (41°F to 122°F)
0% to 95% RH non-condensing
No

QUESTSIONS TO ASK

A Customer Looking for Gas Detectors

1. Exactly what is your application?
   Eg. Underground vehicle parking, plant safety, etc. This will help you determine if you need to meet OHS standards and allow you to select the right sensor and controller.

2. What is the source of the target gas?
   Eg. Vehicle exhaust, containers of stored chemicals, etc.

3. What gas(es) are you wanting to detect?

4. Are there any other sources of toxic or combustible gases in the area to be monitored?
   This will determine the potential for cross-sensitivty of the toxic sensor and false alarms.

5. Are there extremes of temperature and humidity in the area to be monitored?

6. Do you require some type of control? Such as dry relay contacts, analog output signal or quantitative digital display?

7. What do you want to do when the sensor detects the presence of unsafe levels of the target gas?
   Eg. Activate exhaust or make-up air fans, activate visual and / or audible alarms, etc.

8. Is the target environment indoors or outdoors?

9. Is the target environment explosion rated (classified area)?

10. What is the size of the area to be monitored?

11. Do you prefer a central control panel or smaller self-contained systems?

Product Overview & Datasheet

GAS DETECTION CONTROLLERS

PDC Multi-Channel Controller — 32

» Up to 32 channels on base controller, expandable to 128 channels
» RS485 communication with digital transmitters
» Eight 5-amp SPDT relays
» Optional analog inputs (up to eight)
» Optional BACnet® output module

SELF CONTAINED GAS DETECTORS

GEM-II Multi-Purpose Gas Detector — 36

» Single or dual channel
» Two 5-amp SPDT relays
» Integral plug-and-play "smart" sensors or remote sensors
» 4 - 20 mA linear output signal

GAS DETECTION TRANSMITTERS

AST-I Industrial Analog Transmitter — 44

» Dual temperature compensated pyroelectric infrared detectors
» Lower power consumption
» Target gases include CO_2, Hydrocarbons (including Methane) & Nitrous Oxide
» Water / dust tight / corrosion resistant polycarbonate enclosure

Product Overview & Datasheet

PORTABLE INDOOR AIR QUALITY MONITORS

YESAIR Eight Channel Air Quality Monitor — 66

» 8 sensor capacity
» > 30 plug & play sensor choices
» Data logging to SD flash card
» Lightweight, contoured & comfortable handheld device

YES Plus LGA Fifteen Channel Air Quality Monitor — 68

» 15 sensor capacity
» > 30 plug & play sensor choices
» Data logging to SD flash card
» Internal sample pump with inline filter

YESDUST Affordable Particulate Sensor — 71

» Low cost and long life
» Quick response and light weight
» Rechargeable nickel hydride battery pack
» Real time display on YESAIR or YES PIus LGA LCD

PDC Multi-Channel Controller

PDC multi-channel controller is a programmable analog or digital controllers designed to handle a large number of remote transmitters and perform a wide range of control functions. The micro-controller based circuit provides the user with an almost unlimited range of configuration possibilities including simple or complex zoning, changing alarm set points, time delays and relay addressing. The PDC controller can accept inputs from up to 8 analog transmitters or can handle up to 128 digital transmitters on a RS485 communication bus.

Functions that can be set include relay assignment, time delays on make or break, complex zoning, sensor types and ranges, alarm set points and much more. The controller has a two line backlit LCD display that actively scrolls through all programmed channels and displays the gas name, concentration and alarm status. The PDC features LED alarm indicators, audible alarm with silence button, and RoHS compliant circuit boards.

Use with any CETCI analog transmitters, AST or ATW series, or digital transmitters, DST series. Each PDC is pre-programmed at the factory, and is completely field adjustable using a boardmounted push button keypad.

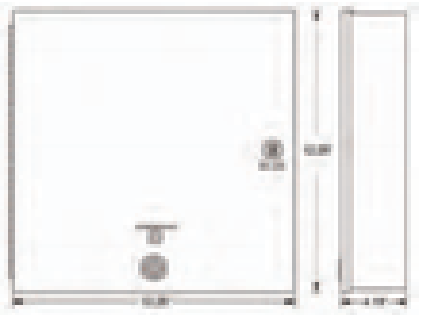
KEY FEATURES

» Up to 8 analog transmitters or up to 128 digital transmitters
» RS485 communication with digital transmitters
» RoHS compliant circuit boards
» Relay output modules
» Scrolling, two line LCD display
» LED alarm indicators
» Completely field programmable
» Low, mid and high alarm setpoints
» Audible alarm with silence button
» Four wire daisychain wiring
» Eight onboard SPDT relays
» Optional BACnet® output module
» CSA & UL certified

APPLICATIONS

» Parking Garages
» Repair Shops
» Arenas
» Pools
» Food Processing Plants
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Digital Multichannel Gas Detection System for Freight Handling Areas

Provide a wall mount, self-contained, field programmable control panel with digital display, LED alarm indication, and door mounted 90 dB audible alarm with silence / acknowledge switch. There shall be a scrolling LCD display of gas, concentration, and alarm status. System controller shall be capable of supporting up to 128 digital transmitters on a RS485 communication bus. System shall support analog output modules (eight 4 - 20 mA outputs per module) and relay output modules (eight 5 A SPDT relays per module). The controller shall have 8 on board relays. System wiring shall be 4 wire digital network (2 low voltage power wires and a twisted pair for the communication bus). System power requirement is 90 - 240 VAC, 47 to 63 Hz. The system shall be CSA / UL tested for electrical safety.

Provide remote mount sensor / transmitters for CO, with an HVAC electrochemical sensor for CO with a detection range of 0 - 200 ppm. The sensor / transmitter for CO shall be housed in a wall mount, rugged, break resistant, PVC junction box with a secured, hinged door. An optional watertight Polycarbonate enclosure shall be available. The remote mount CO sensor / transmitter shall operate on power supplied by the control panel, and shall provide a digital output signal to the control panel. Install the CO sensor at approximately 4 - 6 ft from the floor. Model DST-ECO. Supply one sensor / transmitter for every 5,000 - 7,000 ft^2 of exposure area. The electrochemical CO sensor shall be capable of meeting government Occupational Health and Safety measurement standards for workplace exposure to toxic gases & vapours.

Provide remote mount sensor / transmitters for NO_2 with an electrochemical sensor with a range of 0 - 10 ppm. The sensor / transmitter for NO_2 shall be housed in a wall mount, rugged, break resistant, PVC junction box with a secured, hinged door. An optional watertight Polycarbonate enclosure shall be available. The remote mount NO_2 sensor / transmitter shall operate on power supplied by the control panel, and shall provide a digital output signal to the control panel. Install the NO_2 sensor at approximately 4 - 6 ft from the floor. Model DST-END. Supply one sensor / transmitter for every 5,000 - 7,000 ft^2 of exposure area. The NO_2 gas sensor shall be capable of meeting government Occupational Health and Safety measurement standards for workplace exposure to toxic gases and vapours.

System operation shall be as follows: Upon detection of 25 ppm CO in air or 0.7 ppm NO_2, the system shall illuminate the Low alarm LED, the Low alarm relays (exhaust fans) will be activated immediately.The system shall keep the fans running for a minimum of 10 minutes to avoid cycling. Upon detection of 50 ppm CO in air or 1.0 ppm NO_2, the system shall illuminate the Mid alarm LED and the Mid alarm relays will be activated, (Mid alarm only available with LCD display). The system shall keep the Mid relays active for a minimum of 10 minutes. Upon detection of 100 ppm CO in air or 1.5 ppm NO_2, the system shall illuminate the High alarm LED, the High alarm relays and audible alarm will be activated. The system shall keep the High relays active for a minimum of 10 minutes. Audible alarm can be silenced from the front panel push button.

The contractor shall provide all wiring, conduit and interconnection required for a successful installation.

More specification samples are available at **www.critical-environment.com.**

PDC Multi-Channel Controller

TECHNICAL SPECIFICATIONS

CONTROLLER PACKAGES

Up to 2 analog inputs	A02
Up to 8 analog inputs	A08
Up to 8 digital inputs	D08
Up to 16 digital inputs	D16
Up to 24 digital inputs	D24
Up to 32 digital inputs	D32
Up to 64 digital inputs	D64
Up to 96 digital inputs	D96
Up to 128 digital inputs	D128

MECHANICAL

Enclosure	Lockable, powder painted 18 gauge steel
Weight	4.3 kg (9.4 lbs)
Size	12.3" x 12.3" x 4.2" (311 mm x 311 mm x 106 mm)

ELECTRICAL

Power Requirement	90 - 240 VAC, 47 - 63 Hz
Current Draw	500 mA (controller only)
Outputs	4 - 20 mA signals
Relay	8 dry SPDT contact, 5 amps @ 240 V each
Wiring	Analog 3 wire shielded Digital daisychain only, shielded 2 wire 14 gauge stranded power 2 wire 18 gauge twisted pair network
Fuse	Automatic resetting thermal

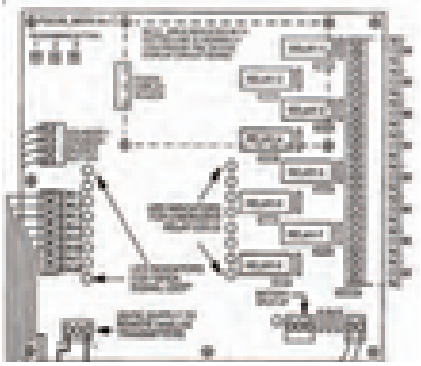
ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	0°C to 40°C (32°F to 100°F)
Humidity	10 - 95% RH non-condensing

CERTIFICATION

CSA	Certified
UL	Certified

WIRING



PRODUCT CODES

ANALOG INPUT MODEL

Up to 2 inputs	PDC-A02
Up to 8 inputs	PDC-A08

DIGITAL INPUT MODEL

Up to 8 inputs	PDC-D08
Up to 16 inputs, 1 only CNB-2	PDC-D16
Up to 24 inputs, 1 only CNB-2 & 1 only RPS-24 V	PDC-D24
Up to 32 inputs, 2 only CNB-2 & 1 only RPS-24 V	PDC-D32
Up to 64 inputs, 4 only CNB-2 & 2 only RPS-24 V	PDC-D64
Up to 96 inputs, 5 only CNB-2 & 3 only RPS-24 V	PDC-D96
Up to 128 inputs, 6 only CNB-2 & 4 only RPS-24 V	PDC-D128

OPTIONS *(to be added to the end of the product code)*

Industrial horn, 103 dB, remote	H
BACnet® output module	BAC
Strobe light, 4" diameter, remote	L

ACCESSORIES

Relay module, 8 relays each, remote	RRM-8
Analog output module, 8 4 - 20 mA outputs each	RAO-8
Power supply, 24 V, remote	RPS-24V
CAN network bridge	CNB-2
Strobe & horn combo, remote	RSH-24
Annunciator, remote	RAP-128
Metal protective guard, large, 16 gauge, galvanized metal guards for controllers	SCS-8000-SPG

DATASHEET

PDC-W Multi-Channel Controller

PDC multi-channel controllers are programmable analog or digital controllers designed to handle a large number of remote transmitters and perform a wide range of control functions. The micro-controller based circuit provides the user with an almost unlimited range of configuration possibilities including simple or complex zoning, changing alarm set points, time delays and relay addressing. The PDC controller can accept inputs from up to 8 analog transmitters or can handle up to 128 digital transmitters on a RS485 communication bus.

Functions that can be set include relay assignment, time delays on make or break, complex zoning, sensor types and ranges, alarm set points and much more. The controller has a two line backlit LCD display that actively scrolls through all programmed channels and displays the gas name, concentration and alarm status. The PDC features LED alarm indicators, audible alarm with silence button, and RoHS compliant circuit boards.

Use with any CETCI analog transmitters, AST or ATW series, or digital transmitters, DST series. Each PDC is pre-programmed at the factory, and is completely field adjustable using a boardmounted push button keypad.

KEY FEATURES

» Up to 8 analog transmitters or up to 128 digital transmitters
» RS485 communication with digital transmitters
» RoHS compliant circuit boards
» Relay output modules
» Scrolling, two line LCD display
» LED alarm indicators
» Completely field programmable
» Low, mid and high alarm setpoints
» Audible alarm with silence button
» Four wire daisychain wiring
» Eight onboard SPDT relays
» CSA & UL certified

APPLICATIONS

» Parking Garages
» Repair Shops
» Arenas
» Pools
» Food Processing Plants
» ... and many more

TECHNICAL DRAWING

Coming soon...

SAMPLE ENGINEERING SPECIFICATIONS

Carbon Monoxide & Combustible Gas Transmitters for Parking Garages
Provide digital transmitters with continuous, linear, signal capable of being connected to model PDC series controller on a RS-485 communication bus. The transmitter shall be a CETCI model DST-ECO for Carbon Monoxide and a model DST-SCB for combustible gases. The transmitters shall provide a digital signal representing a Carbon Monoxide measurement range of 0 - 200 ppm CO or 0 - 50% LEL Propane (or other Combustibles gases / vapours). The circuit shall incorporate a long-life HVAC electrochemical sensor for CO or a long life solid-state sensor for combustibles with temperature compensation and an automatic resetting thermal fuse for fault protection.

The transmitter circuit shall be housed in a wall mount, rugged, break resistant, corrosion resistant, PVC junction box with a secured, hinged door. The PVC junction box shall have conduit entry ports on the top, bottom, right side and rear. The circuit shall operate from 24 VDC input voltage supplied from the controller. Wiring shall be 2 conductors for low voltage power, and a two wire shielded twisted pair for the communication bus. Wiring shall be shielded or in conduit. An optional watertight Polycarbonate enclosure shall be available.

Provide digital signal readings to the controller to allow accurate settings for fan control at 25 ppm CO or 10% LEL Propane and a secondary alarm condition at 100 ppm CO or 20% LEL Propane.

The contractor shall provide all wiring, conduit and interconnection required for a successful installation. System should be tested and commissioned after installation, with a report provided after the site visit.

More specification samples are available at **www.critical-environment.com.**

PDC-W Multi-Channel Controller

TECHNICAL SPECIFICATIONS

CONTROLLER PACKAGES	
Up to 2 analog inputs	A02
Up to 8 analog inputs	A08
Up to 8 digital inputs	D08
Up to 16 digital inputs	D16
Up to 24 digital inputs	D24
Up to 32 digital inputs	D32
Up to 64 digital inputs	D64
Up to 96 digital inputs	D96
Up to 128 digital inputs	D128

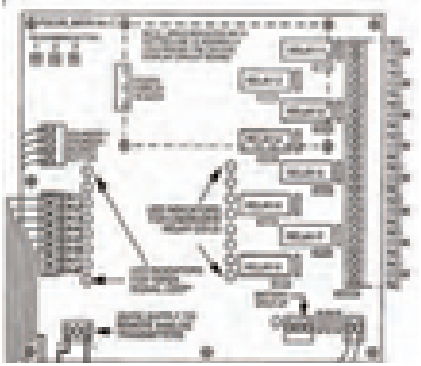
MECHANICAL	
Enclosure	Watertight fiberglass reinforced polyester
Weight	4.5 kg (9.8 lbs)
Size	14" x 12" x 8" (356 mm x 305 mm x 203 mm)

ELECTRICAL	
Power Requirement	90 - 240 VAC, 47 - 63 Hz
Current Draw	500 mA (controller only)
Outputs	4 - 20 mA signals
Relay	8 dry SPDT contact, 5 amps @ 240 V each
Wiring	Analog 3 wire shielded Digital daisychain only, shielded 2 wire 14 gauge stranded power 2 wire 18 gauge twisted pair network
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*	
Operating Temperature	0°C to 40°C (32°F to 100°F)
Humidity	10 - 95% RH non-condensing

CERTIFICATION	
CSA	Certified
UL	Certified

WIRING



PRODUCT CODES

ANALOG INPUT MODEL	
Up to 2 inputs	PDC-A02-W
Up to 8 inputs	PDC-A08-W

DIGITAL INPUT MODEL	
Up to 8 inputs	PDC-D08-W
Up to 16 inputs, 1 only CNB-2	PDC-D16-W
Up to 24 inputs, 1 only CNB-2 & 1 only RPS-24 V	PDC-D24-W
Up to 32 inputs, 2 only CNB-2 & 1 only RPS-24 V	PDC-D32-W
Up to 64 inputs, 4 only CNB-2 & 2 only RPS-24 V	PDC-D64-W
Up to 96 inputs, 5 only CNB-2 & 3 only RPS-24 V	PDC-D96-W
Up to 128 inputs, 6 only CNB-2 & 4 only RPS-24 V	PDC-D128-W

OPTIONS *(to be added to the end of the product code)*	
Industrial horn, 103 dB, remote	H
BACnet® output module	BAC
Strobe light, 4" diameter, remote	L

ACCESSORIES	
Relay module, 8 relays each, remote	RRM-8
Analog output module, 8 4 - 20 mA outputs each	RAO-8
Power supply, 24 V, remote	RPS-24V
CAN network bridge	CNB-2
Strobe & horn combo, remote	RSH-24
Annunciator, remote	RAP-128
Metal protective guard, large, 16 gauge, galvanized metal guards for controllers	SCS-8000-SPG

DATASHEET

GEM-II Multi-Purpose Gas Detector

GEM-II multi-purpose gas detector represents excellent value for the end user. They are available in one or two channel configurations accommodating accurate "smart" sensors and providing a wide range of features. These features include CSA, UL and C-Tick certifications, RoHS compliant circuit boards, two 5-amp dry contact relays, electronic adjustable set points, audible alarm, time delays, analog output, pluggable wiring terminal, rugged polycarbonate enclosure with hinged door, Lexan label, and optional 4-digit display.

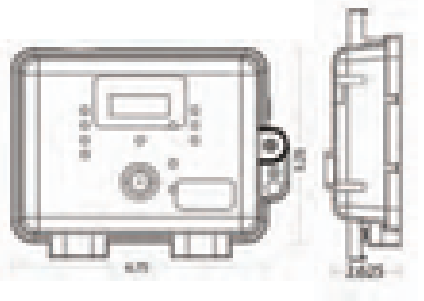
KEY FEATURES

» Single or dual channel operation
» Network multiple units
» Integral or remote sensors
» Integral plug and play "smart" sensors
» 4 - 20 mA linear output signal
» Three conduit entry ports
» Thermal resetting fuse
» LED light indicators
» Two 5-amp SPDT relays
» RoHS compliant circuit boards
» Economical
» CSA, UL & C-Tick certified

APPLICATIONS

» Parking Garages
» Repair Shops
» Ice Cleaning Machine Rooms
» Manufacturing Plants
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Vehicle Exhaust Detection System for Carbon Monoxide & Nitrogen Dioxide
Supply a dual channel, self-contained gas detection system, model GEM-EECO-END, for the monitoring of carbon monoxide (gas engine exhaust) and nitrogen dioxide (diesel engine exhaust), housed in a rugged, wall mount, dripproof PVC enclosure with hinged, secured door. System power shall be 24 VAC nominal. The system shall have two integral electrochemical sensors, one CO with measurement range of 0 - 200 ppm CO in air and one NO_2 with measurement range of 0 - 10 ppm NO_2 in air. Area of monitoring coverage is up to 5,000 - 7,000 ft^2 per sensor.

The monitor shall provide an LED indicating light for power, low alarm, high alarm, and fault condition plus channel indication LEDs, one audible alarm with silence push-button and two SPDT dry contact alarm relays, each rated 5 A at 240 VAC. The system must be accurate enough to measure to government workplace hazardous gas exposure standards. The system shall also provide field adjustable time delays for "delays on make" and "delays on break" for each sensor to allow custom configuration of fan control by the system relays, if desired.

The controller shall provide a circuit test button to allow the user to confirm system operation and exhaust fan control from the panel. The controller shall also provide a push-button to allow the user to override the system control and operate exhaust fans continuously for 15-minute segments to evacuate air from specific parts of the parking garage. Installation height for the gas detection controller with integral CO & NO_2 sensors is 4 - 6 ft from the floor.

System operation shall be as follows: System relays are normally energized in non-gas-alarm state so they act in failsafe operation. Upon detection of 25 ppm CO in air or 0.5 ppm NO_2 in air, the system shall illuminate the Low alarm LED (amber) and the low gas alarm relay shall de-energize activating single-speed exhaust fans or low speed of twospeed exhaust fans plus make up air fans. Upon detection of 100 ppm CO in air or 2 ppm NO_2, the system shall illuminate the High alarm LED (red), the system audible alarm will be activated and the high gas alarm relay shall deenergize activating high speed of two-speed exhaust fans or remote alarm devices. Audible alarm can be silenced from the front panel push button. In the event of a fail condition, the system audible alarm shall be activated and the fail LED on the front panel shall illuminate red.

The contractor shall provide all wiring, conduit and interconnection required for a successful installation. System should be tested and commissioned after installation, with a report provided after the site visit.

More specification samples are available at **www.critical-environment.com.**

DATASHEET

GEM-II Multi-Purpose Gas Detector

TECHNICAL SPECIFICATIONS

GAS TYPE

Carbon Monoxide (CO)	ECO
Combustibles (solid state)	SCB
Methane (CH_4)	SCB
Nitrogen Dioxide (NO_2)	END
Nitric Oxide (NO)	ENO
Oxygen (O_2)	EO2
Propane (C_3H_8)	SCB
Refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507)	SR2
Sulphur Dioxide (SO_2)	ESO
TVOCs (solid state)	SOS

MECHANICAL

Enclosure	General purpose PVC
Weight	600 g (1.2 lb)
Size	5.3" x 6.8" x 2.6" (135 mm x 173 mm x 66 mm)

ELECTRICAL

Power Requirement	15 - 30 VDC or 12 - 28 VAC
Current Draw	Approximately 125 mA
Outputs	Linear 4 - 20 mA (single)
Wiring	VDC three-conductor shielded VAC four-conductor shielded
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	-20°C to 50°C (-5°F to 120°F)
Humidity	15 - 90% RH non-condensing

CERTIFICATION

CSA	Certified
UL	Certified

PRODUCT CODES

SINGLE CHANNEL MODEL

Integral sensor, carbon monoxide (CO)	GEM-AECO
Integral sensor, nitrogen dioxide (NO_2)	GEM-AEND
Integral sensor, nitric oxide (NO)	GEM-AENO
Integral sensor, sulphur dioxide (SO_2)	GEM-AESO
Integral sensor, oxygen (O_2)	GEM-AEO2
Remote sensor	GEM-B
Remote sensor, combustible gases (solid state)	GEM-BSCB
Remote sensor, methane (CH_4)	GEM-BSCB
Remote sensor, propane (C_3H_8)	GEM-BSCB
Remote sensor, refrigerants (solid state)	GEM-BSR2
Remote sensor, TVOCs (solid state)	GEM-BSOS

DUAL CHANNEL MODEL

Integral carbon monoxide (CO), remote combustible	GEM-DECO-SCB
Integral carbon monoxide (CO), remote methane (CH_4)	GEM-DECO-SCB
Integral carbon monoxide (CO), remote propane (C_3H_8)	GEM-DECO-SCB
Integral & remote sensors, carbon monoxide (CO)	GEM-DECO-ECO
Integral carbon monoxide (CO), remote nitrogen dioxide (NO_2)	GEM-DECO-END
Integral carbon monoxide (CO), remote nitric oxide (NO)	GEM-DECO-ENO
Integral & remote sensors, oxygen (O_2)	GEM-DEO2-EO2
Integral & remote sensors, nitrogen dioxide (NO_2)	GEM-DEND-END
Integral & remote sensors, nitric oxide (NO)	GEM-DENO-ENO
Integral, carbon monoxide (CO) & nitrogen dioxide (NO_2)	GEM-EECO-END
Integral, carbon monoxide (CO) & nitric oxide (NO)	GEM-EECO-ENO
Integral, carbon monoxide (CO) & oxygen (O_2)	GEM-EECO-EO2
Integral, carbon monoxide (CO) & sulphur dioxide (SO_2)	GEM-EECO-ESO
Integral, nitrogen dioxide (NO_2) & sulphur dioxide (SO_2)	GEM-EEND-ESO

OPTIONS *(to be added to the end of the product code)*

LED digital display	N
120 VAC powered version	J
Enclosed external transformer, 120 - 22 VAC	TIB-2250

ACCESSORIES

Calibration kit, 15 L or 17 L cylinder, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinder, 0.5 LPM flow regulator	CET-7150-CK1

DATASHEET

GEM-W Multi-Purpose Gas Detector

GEM-II multi-purpose gas detector represents excellent value for the end user. They are available in one or two channel configurations accommodating accurate "smart" sensors and providing a wide range of features. These features include CSA, UL and C-Tick certifications, RoHS compliant circuit boards, two 5-amp dry contact relays, electronic adjustable set points, audible alarm, time delays, analog output, pluggable wiring terminal, rugged polycarbonate enclosure with hinged door, Lexan label, and optional 4-digit display.

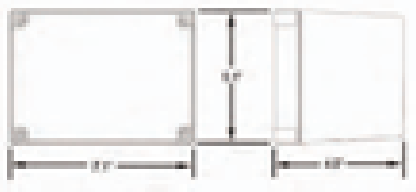
KEY FEATURES

» Single or dual channel operation
» Network multiple units
» Integral or remote sensors
» Integral plug and play "smart" sensors
» 4 - 20 mA linear output signal
» Three conduit entry ports
» Thermal resetting fuse
» LED light indicators
» Two 5-amp SPDT relays
» RoHS compliant circuit boards
» Economical
» CSA, UL & C-Tick certified

APPLICATIONS

» Parking Garages
» Repair Shops
» Ice Cleaning Machine Rooms
» Manufacturing Plants
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Vehicle Gas Detection System for Combustible Fuel Vapors
Supply a single channel, self-contained gas detection system, model GEM-B-SCB, for the monitoring of Propane fuel, gasoline vapours and other "heavier-than-air" fuel vapours, housed in a rugged, wall mount, drip-proof PVC enclosure with hinged, secured door. System power shall be 24 VAC nominal. The system shall have one remote solid-state sensor with measurement range of 0 - 50% LEL Combustibles in air. Area of monitoring coverage is 3,000 - 5,000 ft^2 / sensor.

The monitor shall provide an LED indicating light for power, low alarm, high alarm, and fault condition plus channel indication LED, one audible alarm with silence push-button and two SPDT dry contact alarm relays, each rated 5A at 240 VAC. The system must be accurate enough to measure to government workplace hazardous gas exposure standards. The system shall also provide field adjustable time delays for "delays on make" and "delays on break" for each sensor to allow custom configuration of fan control by the system relays, if desired.

The controller shall provide a circuit test button to allow the user to confirm system operation and exhaust fan control from the panel. The controller shall also provide a push-button to allow the user to override the system control and operate exhaust fans continuously for 15-minute segments to evacuate air from specific parts of the parking garage. Installation height for the gas detection controller is 4 - 6 ft from the floor. Installation height for the remote solid-state Combustibles sensors is 6" from the floor.

System operation shall be as follows: System relays are normally energized in non-gas-alarm state so they act in failsafe operation. Upon detection of 10% LEL fuel vapours in air, the system shall illuminate the Low alarm LED (amber) and the low gas alarm relay shall de-energize activating single-speed exhaust fans or low speed of two-speed exhaust fans plus make up air fans. Upon detection of 20% LEL fuel vapours in air, the system shall illuminate the High alarm LED (red), the system audible alarm will be activated and the high gas alarm relay shall de-energize activating high speed of two-speed exhaust fans or remote alarm devices. Audible alarm can be silenced from the front panel push button. In the event of a fail condition, the system audible alarm shall be activated and the fail LED on the front panel shall illuminate red.

The contractor shall provide all wiring, conduit and interconnection required for a successful installation. System should be tested and commissioned after installation, with a report provided after the site visit.

More specification samples are available at **www.critical-environment.com.**

GEM-W Multi-Purpose Gas Detector

TECHNICAL SPECIFICATIONS

GAS TYPE

Carbon Monoxide (CO)	ECO
Combustibles (solid state)	SCB
Methane (CH_4)	SCB
Nitrogen Dioxide (NO_2)	END
Nitric Oxide (NO)	ENO
Oxygen (O_2)	EO2
Propane (C_3H_8)	SCB
Refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507)	SR2
Sulphur Dioxide (SO_2)	ESO
TVOCs (solid state)	SOS

MECHANICAL

Enclosure	Water / dust tight polycarbonate
Weight	700 g (1.4 lb)
Size	5.1" x 7.1" x 4.0" (130 mm x 181 mm x 102 mm)

ELECTRICAL

Power Requirement	15 - 30 VDC or 12 - 28 VAC
Current Draw	Approximately 125 mA
Outputs	Linear 4 - 20 mA (single)
Wiring	VDC three-conductor shielded VAC four-conductor shielded
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	-20°C to 50°C (-5°F to 120°F)
Humidity	15 - 90% RH non-condensing

CERTIFICATION

CSA	Certified
UL	Certified

PRODUCT CODES

SINGLE CHANNEL MODEL

Integral sensor, carbon monoxide (CO)	GEM-AECO-W
Integral sensor, nitrogen dioxide (NO_2)	GEM-AEND-W
Integral sensor, nitric oxide (NO)	GEM-AENO-W
Integral sensor, sulphur dioxide (SO_2)	GEM-AESO-W
Integral sensor, oxygen (O_2)	GEM-AEO2-W
Remote sensor	GEM-B-W
Remote sensor, combustible gases (solid state)	GEM-BSCB-W
Remote sensor, methane (CH_4)	GEM-BSCB-W
Remote sensor, propane (C_3H_8)	GEM-BSCB-W
Remote sensor, refrigerants (solid state)	GEM-BSR2-W
Remote sensor, TVOCs (solid state)	GEM-BSOS-W

DUAL CHANNEL MODEL

Integral carbon monoxide (CO), remote combustible (solid state)	GEM-DECO-SCB-W
Integral carbon monoxide (CO), remote methane (CH_4)	GEM-DECO-SCB-W
Integral carbon monoxide (CO), remote propane (C_3H_8)	GEM-DECO-SCB-W
Integral & remote sensors, carbon monoxide (CO)	GEM-DECO-ECO-W
Integral carbon monoxide (CO), remote nitrogen dioxide (NO_2)	GEM-DECO-END-W
Integral carbon monoxide (CO), remote nitric oxide (NO)	GEM-DECO-ENO-W
Integral & remote sensors, oxygen (O_2)	GEM-DEO2-EO2-W
Integral & remote sensors, nitrogen dioxide (NO_2)	GEM-DEND-END-W
Integral & remote sensors, nitric oxide (NO)	GEM-DENO-ENO-W
Integral, carbon monoxide (CO) & nitrogen dioxide (NO_2)	GEM-EECO-END-W
Integral, carbon monoxide (CO) & nitric oxide (NO)	GEM-EECO-ENO-W
Integral, carbon monoxide (CO) & oxygen (O_2)	GEM-EECO-EO2-W
Integral, carbon monoxide (CO) & sulphur dioxide (SO_2)	GEM-EECO-ESO-W
Integral, nitrogen dioxide (NO_2) & sulphur dioxide (SO_2)	GEM-EEND-ESO-W

OPTIONS *(to be added to the end of the product code)*

LED digital display	N
Splash guard	S
120 VAC powered version	J
Enclosed external transformer, 120 - 22 VAC	TIB-2250

ACCESSORIES

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1

DATASHEET

AST-I Industrial Infrared Transmitter

AST-ICD, AST-IHC & AST-INI are analog transmitters with high quality, industrial grade, miniature infrared sensors. They are supplied, as a standard in a water / dust tight, corrosion resistant polycarbonate enclosure.

These instruments use high quality, long life, dual beam sensors.The infrared sensor is supplied with a microporous PTFE filter attached to provide splash protection only. This filter is not designed to provide protection to the sensor from application of pressurized water.

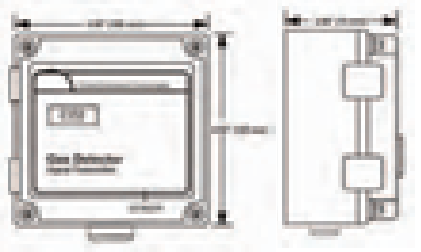
KEY FEATURES

» Dual temperature compensated pyroelectric infrared detectors
» Low power consumption
» RoHS compliant circuit boards
» Fast response
» Water / dust tight / corrosion resistant polycarbonate enclosure
» Linear analog (4 - 20 mA) output
» Target gases include CO_2, Hydrocarbons (including Methane), Nitrous Oxide
» Measurement ranges from 0 - 1,000 ppm up to 0 - 100% volume (sensor & gas dependent)

APPLICATIONS

» Commercial Buildings
» Institutional Buildings
» Waste Water Treatment Plants
» Oil & Gas Plants
» Manufacturing Plants
» ... and many more

TECHNICAL DRAWING



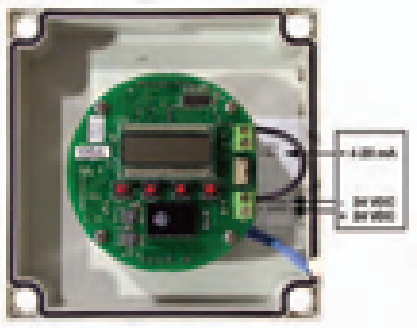
SAMPLE ENGINEERING SPECIFICATIONS

Coming soon...

DATASHEET

AST-I Industrial Infrared Transmitter

WIRING



TECHNICAL SPECIFICATIONS

GAS TYPE	
Carbon Dioxide (CO_2)	ICD
Hydrocarbon Gases	IHC
Nitrous Oxide (N_2O)	INI

MECHANICAL	
Enclosure	Water / dust tight polycarbonate
Weight	255 g (9 oz)
Size	4.9″ x 4.9″ x 2.9″ (125 mm x 125 mm x 74 mm)

ELECTRICAL	
Power Requirement	24 VDC nominal (12 - 30 VDC) (polarity protected) 5 W maximum
Current Draw	70 - 100 mA
Outputs	Linear 4 - 20 mA analog (10 bit resolution with current limit)
Fuse	500 mA anti-surge in-line fuse for supplied power

ENVIRONMENTAL *(sensor dependant)*	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Humidity	0 - 95% RH non-condensing

PRODUCT CODES

AST-ICD INDUSTRIAL CARBON DIOXIDE (CO_2)	
Industrial carbon dioxide (CO_2), watertight housing, 0 - 5% volume CO_2	AST-ICD-BW
Industrial carbon dioxide (CO_2), watertight housing, 0 - 100% volume CO_2	AST-ICD-CW
Industrial carbon dioxide (CO_2), watertight housing, 0 - 100% volume CO_2	AST-ICD-DW

AST-IHC INDUSTRIAL HYDROCARBON GASES (CH_4)	
Industrial hydrocarbon gases, watertight housing, 0 - 100% LEL CH_4	AST-IHC-BW
Industrial hydrocarbon gases, watertight housing, 0 - 100% volume CH_4	AST-IHC-CW

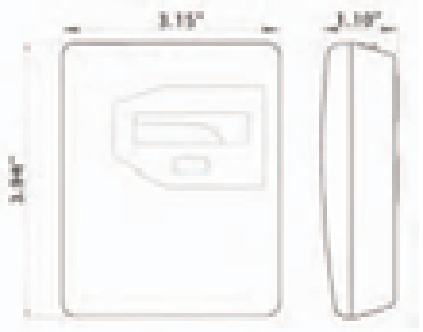
AST-INI INDUSTRIAL NITRIOUS OXIDE (N_2O)	
Industrial nitrious oxide (N_2O), watertight housing, 0 - 1,000 ppm N_2O	AST-INI-EW

ACCESSORIES	
Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

AST-IS Standard CO_2 Transmitter

Office wall mount with optional LED display

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Coming soon...

AST-IS transmitter contains an infrared sensor for accurate, reliable carbon dioxide (CO_2) detection.

AST-IS transmitters convert the raw signal from a sensor into a useful output that can be sent to a controller or building automation system.

Standard enclosure is an attractive PVC office mount for indoor use. Optional duct mount, LCD digital display, relay, IP54 enclosure, and temperature sensor are available.

AST-IS transmitters feature 4 - 20 mA or 0 - 10 VDC linear output signals, low 24 VDC / VAC nominal voltage, standard 0 - 2,000 ppm range and 0 - 4% volume available for winery applications, and CE certification.

Lifetime calibration. Field calibration not required.

KEY FEATURES

» 4 - 20 mA or 0 - 10 VDC linear output signal
» Operating power 24 VDC or 24 VAC nominal
» Lifetime calibration
» 0 - 2,000 ppm standard range
» Optional relay, LCD digital display & duct mount kit
» RoHS compliant circuit boards
» CE certified

APPLICATIONS

» Residential Buildings
» Commercial Buildings
» Greenhouses
» Schools / Educational Institutions
» Offices
» ... and many more

DATASHEET

AST-IS Standard CO_2 Transmitter

WIRING

TECHNICAL SPECIFICATIONS

GAS TYPE	
Carbon Dioxide (CO_2)	

MECHANICAL	
Enclosure	General purpose PVC (IP30 rated)
Weight	*tbd*
Size	3.9" x 3.1" x 1.1" (100 mm x 80 mm x 28 mm)

ELECTRICAL	
Power Requirement	24 VDC or VAC
Outputs	Linear 4 - 20 mA or 0 - 10 VDC signal

SENSOR	
Sampling Method	Non-dispersive infrared
Monitoring Method	Diffusion
Range	0 - 2,000 ppm
Accuracy	± 30 ppm, ± 3% of reading

ENVIRONMENTAL *(sensor dependant)*	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Humidity	0 - 95% RH non-condensing

CERTIFICATION	
CE	Certified

PRODUCT CODES

Carbon dioxide (CO_2), office wall mount	AST-IS1
Carbon dioxide (CO_2), office wall mount with LCD digital display	AST-IS2
Carbon dioxide (CO_2) & temperature sensor, wall mount with IP54 industrial enclosure, LCD digital display & relay	AST-IS5
Carbon dioxide (CO_2) & temperature sensor, duct mount with LCD digital display	AST-IS9
Carbon dioxide (CO_2) & temperature sensor, wall mount	AST-IS10
Carbon dioxide (CO_2) & temperature sensor, wall mount with LCD digital display	AST-IS11
Carbon dioxide (CO_2), relay & temperature sensor, wall mount with LCD digital display & relay	AST-IS12
Carbon dioxide (CO_2), wall mount with LCD digital display & audible alarm	AST-IS14
Carbon dioxide (CO_2), wall mount VAV with hidden LCD digital display	AST-IS15
Carbon dioxide (CO_2), wall mount VAV with LCD digital display	AST-IS16

DATASHEET

AST-IS Industrial CO_2 Transmitter

Duct mount
with optional LED display

AST-IS transmitter contains an infrared sensor for accurate, reliable carbon dioxide (CO_2) detection.

AST-IS transmitters convert the raw signal from a sensor into a useful output that can be sent to a controller or building automation system.

Standard enclosure is an attractive PVC office mount for indoor use. Optional duct mount, LCD digital display, relay, IP54 enclosure, and temperature sensor are available.

AST-IS transmitters feature 4 - 20 mA or 0 - 10 VDC linear output signals, low 24 VDC / VAC nominal voltage, standard 0 - 2,000 ppm range and 0 - 4% volume available for winery applications, and CE certification.

Lifetime calibration. Field calibration not required.

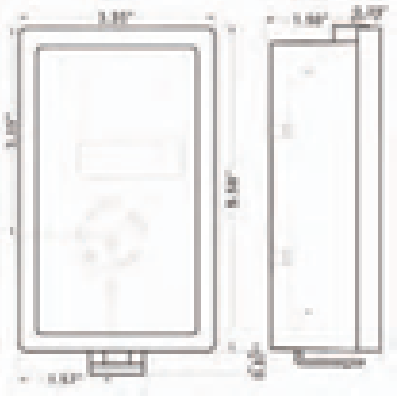
KEY FEATURES

» 4 - 20 mA or 0 - 10 VDC linear output signal
» Operating power 24 VDC or 24 VAC nominal
» Lifetime calibration
» 0 - 2,000 ppm standard range
» Optional relay, LCD digital display & duct mount kit
» RoHS compliant circuit boards
» CE certified

APPLICATIONS

» Residential Buildings
» Commercial Buildings
» Greenhouses
» Schools / Educational Institutions
» Offices
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Coming soon...

DATASHEET

AST-IS Industrial CO_2 Transmitter

WIRING

TECHNICAL SPECIFICATIONS

GAS TYPE	
Carbon Dioxide (CO_2)	

MECHANICAL	
Enclosure	General purpose PVC (IP54 rated)
Weight	*tbd*
Size	5.6" x 3.3" x 1.8" (142 mm x 84 mm x 46 mm)

ELECTRICAL	
Power Requirement	24 VDC or VAC
Outputs	Linear 4 - 20 mA or 0 - 10 VDC signal

SENSOR	
Sampling Method	Non-dispersive infrared
Monitoring Method	Diffusion
Range	0 - 2,000 ppm
Accuracy	± 30 ppm, ± 3% of reading

ENVIRONMENTAL *(sensor dependant)*	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Humidity	0 - 95% RH non-condensing

CERTIFICATION	
CE	Certified

PRODUCT CODES

Carbon dioxide (CO_2), duct mount	AST-IS3
Carbon dioxide (CO_2), duct mount with LCD digital display	AST-IS4
Carbon dioxide (CO_2), wall mount with IP54 industrial enclosure	AST-IS6
Carbon dioxide (CO_2), wall mount with IP54 industrial enclosure & LCD digital display	AST-IS7
Carbon dioxide (CO_2) & temperature sensor, duct mount	AST-IS8
Carbon dioxide (CO_2) & temperature sensor, wall mount with IP54 industrial enclosure & relay	AST-IS13
Carbon dioxide (CO_2), duct mount with LCD digital display	AST-IS17
Carbon dioxide (CO_2), wall mount with IP54 industrial enclosure, 0 - 4% volume	AST-IS18

DATASHEET

DST Digital Transmitter

The rugged, reliable DST digital transmitter offers a variety of sensor types to detect a wide range of gases, including solid state and electrochemical.

The standard enclosure is a rugged polycarbonate and an optional watertight polycarbonate enclosure is available to suit different applications.

DST transmitters output scaled linear signals on an RS485 communication bus, and feature a thermal resetting fuse, an LED indicator for power, alarm and fault, RoHS compliant circuit boards, and an internal "on line" LED.

Automated calibration and other maintenance procedures are simple and are easily performed in the field.

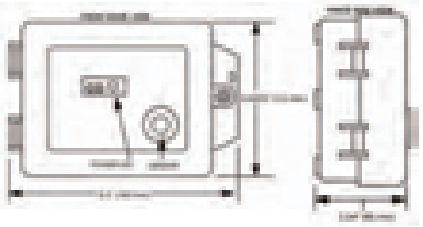
KEY FEATURES

» RS485 digital output signal
» Wide variety of sensors for all applications
» RoHS compliant circuit boards
» Configured for 4 wire multi-drop wiring
» Thermal resetting fuse
» LED indicator for power & alarm status
» Power requirement 24 VDC nominal
» Simple calibration procedure

APPLICATIONS

» Parking Garages
» Repair Shops
» Ice Cleaning Machine Rooms
» Pools
» Manufacturing plants
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Carbon Monoxide & Combustible Gas Transmitters for Parking Garages
Provide digital transmitters with continuous, linear, signal capable of being connected to a PDC controller on a RS485 communication bus. The transmitter shall be a CETCI model DST-ECO for Carbon Monoxide and a model DST-SCB for combustible gases. The transmitters shall provide a digital signal representing a Carbon Monoxide measurement range of 0 - 200 ppm CO or 0 - 50% LEL Propane (or other Combustibles gases / vapours). The circuit shall incorporate a long-life HVAC electrochemical sensor for CO or a long life solid-state sensor for combustibles with temperature compensation and an automatic resetting thermal fuse for fault protection.

The transmitter circuit shall be housed in a wall mount, rugged, break resistant, corrosion resistant, PVC junction box with a secured, hinged door. The PVC junction box shall have conduit entry ports on the top, bottom, right side and rear. The circuit shall operate from 24 VDC input voltage supplied from the controller. Wiring shall be 2 conductors for low voltage power, and a two wire shielded twisted pair for the communication bus. Wiring shall be shielded or in conduit.

An optional watertight Polycarbonate enclosure shall be available.

Provide digital signal readings to the controller to allow accurate settings for fan control at 25 ppm CO or 10% LEL Propane and a secondary alarm condition at 100 ppm CO or 20% LEL Propane.

The contractor shall provide all required wiring, conduit and interconnection required for a successful installation.

More specification samples are available at **www.critical-environment.com.**

DST Digital Transmitter

TECHNICAL SPECIFICATIONS

GAS TYPE	
Ammonia (NH_3)	EAM
Carbon Monoxide (CO)	ECO
Combustible Gases (solid state)	SCB
Chlorine (Cl_2)	ECL
Ethylene Oxide (ETO)	EET
Hydrogen (H_2)	EH2
Hydrogen Sulphide (H_2S)	EHS
Methane (CH_4)	SCB
Nitrogen Dioxide (NO_2)	END
Nitric Oxide (NO)	ENO
Oxygen (O_2)	002
Ozone (O_3)	E03
Propane (C_3H_8)	SCB
Sulphur Dioxide (SO_2)	ESO

MECHANICAL	
Enclosure	Polycarbonate
Weight	255 g (9 oz)
Size	4.4" x 6.5" x 2.5" (113 mm x 165 mm x 65 mm)

ELECTRICAL	
Power Requirement	24 VDC supplied by PDC controller
Current Draw	80 - 120 mA
Outputs	Scaled linear digital signal RS485 communication bus
Wiring	Daisy chain configuration only. Power: 14 gauge stranded, 2-conductor Signal: shielded twisted pair, 18 gauge, low capacitance. Network bridge every 1,000 feet or less.
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*	
Operating Temperature	-20°C to 40°C (-4°F to 104°F)
Humidity	15 - 95% RH non-condensing

WIRING

Electrochemical

Solid State

PRODUCT CODES

Ammonia (NH_3), 0 - 500 ppm	DST-EAM
Carbon monoxide (CO), 0 - 200 ppm	DST-ECO
Combustible gases (solid state), 0 - 50% LEL	DST-SCB
Chlorine (Cl_2), 0 - 5 ppm	DST-ECL
Ethylene oxide (ETO), 0 - 20 ppm	DST-EET
Hydrogen (H_2), 0 - 2,000 ppm	DST-EH2
Hydrogen sulphide (H_2S), 0 - 50 ppm	DST-EHS
Methane (CH_4), 0 - 50% LEL	DST-SCB
Nitrogen dioxide (NO_2), 0 - 10 ppm	DST-END
Nitric oxide (NO), 0 - 100 ppm	DST-ENO
Oxygen (O_2), 0 - 25% volume	DST-002
Ozone (O_3), 0 - 2 ppm	DST-E03
Propane (C_3H_8), 0 - 50% LEL	DST-SCB
Sulphur dioxide (SO_2), 0 - 20 ppm	DST-ESO

ACCESSORIES	
Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

DATASHEET

DST-W Digital Transmitter

The rugged, reliable DST digital transmitter offers a variety of sensor types to detect a wide range of gases, including solid state and electrochemical.

The standard enclosure is a rugged polycarbonate and an optional watertight polycarbonate enclosure is available to suit different applications.

DST transmitters output scaled linear signals on an RS485 communication bus, and feature a thermal resetting fuse, an LED indicator for power, alarm and fault, RoHS compliant circuit boards, and an internal "on line" LED.

Automated calibration and other maintenance procedures are simple and are easily performed in the field.

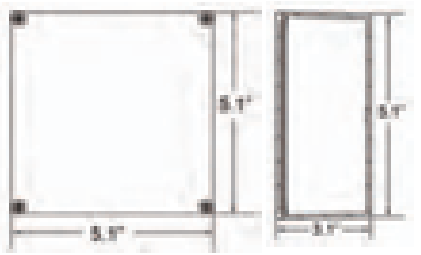
KEY FEATURES

» RS485 digital output signal
» Wide variety of sensors for all applications
» RoHS compliant circuit boards
» Configured for 4 wire multi-drop wiring
» Thermal resetting fuse
» LED indicator for power & alarm status
» Power requirement 24 VDC nominal
» Simple calibration procedure

APPLICATIONS

» Parking Garages
» Repair Shops
» Ice Cleaning Machine Rooms
» Pools
» Manufacturing plants
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Carbon Monoxide & Nitrogen Dioxide Transmitters for Parking Garages
Provide digital transmitters with continuous, linear, signal capable of being connected to a PDC controller on a RS485 communication bus. The transmitters shall be a CETCI model DST-ECO for Carbon Monoxide and a model DST-END for Nitrogen Dioxide. The transmitters shall provide a digital signal representing the Nitrogen Dioxide detection range of 0 - 10 ppm and the Carbon Monoxide detection range of 0 - 200 ppm. All transmitters shall incorporate accurate electrochemical sensors and automatic resetting thermal fuse for fault protection. The transmitters shall be installed 4 - 6 ft from the floor (breathing zone) and each unit shall be capable of monitoring an area of approximately 5,000 - 7,500 ft^2.

The transmitter circuit shall be housed in a wall mount, rugged, break resistant, corrosion resistant, PVC junction box with a secured, hinged door. The PVC junction box shall have conduit entry ports on the top, bottom, right side and rear. The circuit shall operate from 24 VDC input voltage supplied from the controller. Wiring shall be 2 conductors for low voltage power, and a two wire shielded twisted pair for the communication bus. Wiring shall be shielded or in conduit.

An optional watertight Polycarbonate enclosure shall be available. System operation shall be as follows: Upon detection of 0.7 ppm NO_2 or 25 ppm CO, the controller shall activate exhaust fans. Upon detection of 1.5 ppm NO_2 or 100 ppm CO, the controller shall activate audible and visual alarms.

The contractor shall provide all required wiring, conduit and interconnection required for a successful installation.

More specification samples are available at **www.critical-environment.com.**

DATASHEET

DST-W Digital Transmitter

TECHNICAL SPECIFICATIONS

GAS TYPE	
Ammonia (NH_3)	EAM
Carbon Monoxide (CO)	ECO
Combustible Gases (solid state)	SCB
Chlorine (Cl_2)	ECL
Ethylene Oxide (ETO)	EET
Hydrogen (H_2)	EH2
Hydrogen Sulphide (H_2S)	EHS
Methane (CH_4)	SCB
Nitrogen Dioxide (NO_2)	END
Nitric Oxide (NO)	ENO
Oxygen (O_2)	O02
Ozone (O_3)	EO3
Propane (C_3H_8)	SCB
Sulphur Dioxide (SO_2)	ESO

MECHANICAL	
Enclosure	Water / dust tight polycarbonate
Weight	340 g (12 oz)
Size	5.1″ x 5.1″ x 3.1″ (129 mm x 129 mm x 77 mm)

ELECTRICAL	
Power Requirement	24 VDC supplied by PDC controller
Current Draw	80 - 120 mA
Outputs	Scaled linear digital signal RS485 communication bus
Wiring	Daisy chain configuration only. Power: 14 gauge stranded, 2-conductor Signal: shielded twisted pair, 18 gauge, low capacitance. Network bridge every 1,000 feet or less.
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*	
Operating Temperature	-20°C to 40°C (-4°F to 104°F)
Humidity	15 - 95% RH non-condensing

WIRING

Electrochemical

Solid State

PRODUCT CODES

Ammonia (NH_3), 0 - 500 ppm	DST-EAM-W
Combustible gases (solid state), 0 - 50% LEL	DST-SCB-W
Carbon monoxide (CO), 0 - 200 ppm	DST-ECO-W
Chlorine (Cl_2), 0 - 5 ppm	DST-ECL-W
Ethylene oxide (ETO), 0 - 20 ppm	DST-EET-W
Hydrogen (H_2), 0 - 2,000 ppm	DST-EH2-W
Hydrogen sulphide (H_2S), 0 - 50 ppm	DST-EHS-W
Methane (CH_4), 0 - 50% LEL	DST-SCB-W
Nitrogen dioxide (NO_2), 0 - 10 ppm	DST-END-W
Nitric oxide (NO), 0 - 100 ppm	DST-ENO-W
Oxygen (O_2), 0 - 25% volume	DST-O02-W
Ozone (O_3), 0 - 2 ppm	DST-EO3-W
Propane (C_3H_8), 0 - 50% LEL	DST-SCB-W
Sulphur dioxide (SO_2), 0 - 20 ppm	DST-ESO-W

OPTIONS *(to be added to the end of the product code)*	
Splash guard	S

ACCESSORIES	
Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

DATASHEET

LPT Economical Transmitter

LPT is an economical, single sensor, "Low Power Transmitter". Sensors available include carbon monoxide (CO) and nitrogen dioxide (NO_2) which are ideal for vehicle exhaust type applications such as parkades.

LPT transmitter features a two-wire loop, three-wire VDC or four-wire VAC power; making installation a cinch. LPT transmitter also features a 4 - 20 mA linear output signal, automatic thermal resetting fuse, RoHS compliant circuit boards, temperature compensation, and visual LED indication for power and fault conditions and is all enclosed in a standard water / dust tight ABS / polycarbonate enclosure that is equivalent to IP62 (NEMA 12) rating.

Includes new sensor CEF (Calibration Extending Firmware) that takes into account the aging of the sensors so that less frequent calibrations are acceptable in non-critical applications.

Automated calibration and other maintenance procedures are simple and easily performed in the field.

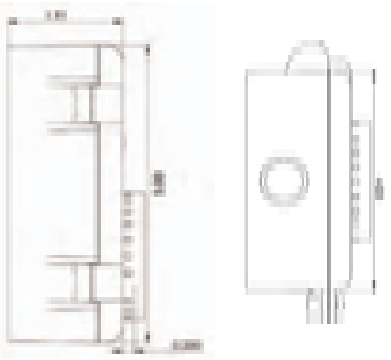
KEY FEATURES

» Linear 4 - 20 mA output signal
» Standard water / dust tight enclosure
» Single sensor: carbon monoxide (CO) or nitrogen dioxide (NO_2)
» RoHS compliant circuit boards
» 2-wire loop, 3-wire VDC or 4-wire VAC power
» Easy maintenance
» Economical
» Includes sensor CEF (calibration extending firmware)
» Auto resetting fuse
» Automated calibration procedure

APPLICATIONS

» Parking Garages
» Repair Shops
» Ice Cleaning Machine Rooms
» Manufacturing plants
» ... and many more

TECHNICAL DRAWING



Note: Drawings above are shown with an optional splash guard.

SAMPLE ENGINEERING SPECIFICATIONS

Coming soon...

DATASHEET

LPT Economical Transmitter

TECHNICAL SPECIFICATIONS

GAS TYPE

Carbon Monoxide (CO)	ECO
Nitrogen Dioxide (NO_2)	END

MECHANICAL

Enclosure	ABS / Polycarbonate
Weight	*tbd*
Size	5.0" x 4.0" x 1.9" (127 mm x 102 mm x 48 mm)

ELECTRICAL

Power Requirement	
2-wire mode	16 - 30 VDC
3-wire mode	16 - 30 VDC
4-wire mode	12 - 30 VAC or 16 - 30 VDC
Current Draw	Maximum 25 mA
Outputs	Linear 4 - 20 mA Maximum 216 Ω load (wiring plus termination resistor) at 16 VDC Maximum 316 Ω load (wiring plus termination resistor) at 12 VAC
Wiring	VDC two or three-conductor shielded; VAC four-conductor shielded
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	-20°C to 40°C (-4°F to 104°F)
Humidity	15 - 90% RH non-condensing

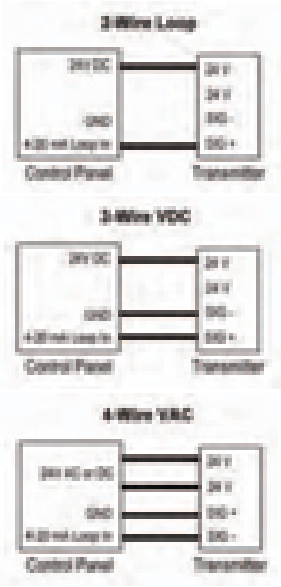
SENSORS

Range	CO: 0 - 200 ppm NO_2: 0 - 10 ppm
Repeatability	< 2% of signal
Maximum Zero Shift	CO: NIA NO_2: ± 0.2 ppm equivalent
Clean Air Output Drift	CO: < 10 ppm equivalent per year NO_2: < 12% signal loss / month
Response Time (T_{90})	CO: Within 60 seconds NO_2: < 25 seconds
Expected Life Span	CO: 6 - 7 years NO_2: 2 - 3 years
Operating Temperature	CO: -10°C to 60°C (14°F to 140°F) NO_2: -20°C to 50°C (-4°F to 122°F)
Operating Humidity	CO: 5 - 95% RH non-condensing NO_2: 15 - 90% RH non-condensing
Operating Pressure	CO: NIA NO_2: Atmospheric ± 10%
Calibration	Once a year

CERTIFICATION

CE	Pending

WIRING



PRODUCT CODES

Carbon monoxide (CO), 0 - 200 ppm	LPT-ECO
Nitrogen dioxide (NO_2), 0 - 10 ppm	LPT-END

OPTIONS *(to be added to the end of the product code)*

Splash guard	S

ACCESSORIES

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

DATASHEET

PET BACnet® Transmitter

Dual sensor
with optional LED display

PET BACnet® digital transmitter is a "Parkade Emissions Transmitter" that communicates via BACnet® protocol MS / TP. It is available with one or two electrochemical sensors or solid-state sensors and temperature sensor, enclosed in a general purpose ABS enclosure.

Featuring thermal resetting fuse, tri-color LED indicator for power and alarm, and an optional 4-digit LED display.

Includes new sensor CEF (Calibration Extending Firmware) that takes into account the aging of the sensors so that less frequent calibrations are acceptable in non-critical applications.

Calibration and maintenance procedures are easily performed in the field without requiring access to the controller.

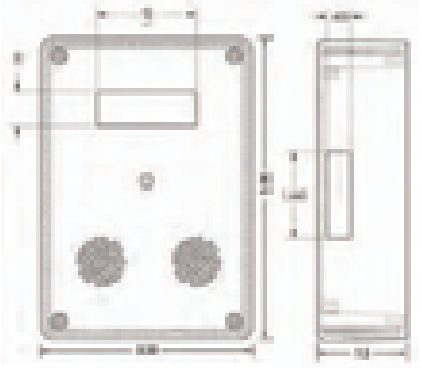
KEY FEATURES

» MS / TP BACnet® communication
» RoHS compliant circuit boards
» Thermal resetting fuse
» Tri-color LED light indicator
» Economical
» Easy maintenance
» Single or dual gas sensor
» Includes temperature sensor
» BTL certified

APPLICATIONS

» Parking Garages
» Repair Shops
» Commercial HVAC Buildings
» Light Industrial Plants
» Laboratories
» Schools / Educational Institutions
» ... and many more

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Coming soon...

DATASHEET

PET BACnet® Transmitter

TECHNICAL SPECIFICATIONS

GAS TYPE

Ammonia (NH_3)	EAM
Carbon Monoxide (CO)	ECO
Combustible Gases (solid state)	SCB
Ethylene (C_2H_4)	EC4
Formaldehyde (CH_2O)	EFO
Hydrogen (H_2)	EH2
Methane (CH_4)	SCB
Nitrogen Dioxide (NO_2)	END
Nitric Oxide (NO)	ENO
Oxygen (O_2)	OO2
Propane (C_3H_8)	SCB
Refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507)	SR2
Sulphur Dioxide (SO_2)	ESO
TVOCs (solid state)	SOS

MECHANICAL

Enclosure	General Purpose ABS
Weight	284 g (10 oz)
Size	5.0" x 3.5" x 1.5" (127 mm x 89 mm x 38 mm)

ELECTRICAL

Power Requirement	24 VDC
Current Draw	30 mA; 90 mA (with display)
Outputs	BACnet® MS / TP up to 76,800 bps MAC address 0-127 DIP switch settable
Wiring	4-conductor shielded network wiring (daisy-chained)
Fuse	Automatic resetting thermal

ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	Sensor dependant
Humidity	Sensor dependant

CERTIFICATION

BTL	Certified
CE & C-Tick	Pending

PRODUCT CODES

SINGLE CHANNEL MODEL

Ammonia (NH_3), 0 - 500 ppm	PET-EAM
Carbon monoxide (CO), 0 - 200 ppm	PET-ECO
Combustible gases (solid state), 0 - 50% LEL	PET-SCB
Ethylene (C_2H_4), 0 - 2,000 ppm	PET-EC4
Formaldehyde (CH_2O), 0 - 10 ppm	PET-EFO
Hydrogen (H_2), 0 - 2,000 ppm	PET-EH2
Methane (CH_4), 0 - 50% LEL	PET-SCB
Nitrogen dioxide (NO_2), 0 - 10 ppm	PET-END
Nitric oxide (NO), 0 - 100 ppm	PET-ENO
Oxygen (O_2), 0 - 25% volume	PET-OO2
Propane (C_3H_8), 0 - 50% LEL	PET-SCB
Refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507), 0 - 2,000 ppm	PET-SR2
Sulphur Dioxide (SO_2), 0 - 20 ppm	PET-ESO
TVOCs (solid state), 0 - 500 ppm	PET-SOS

DUAL CHANNEL MODEL

(Choose an electrochemical sensor above & add second electrochemical sensor below)

Nitrogen dioxide (NO_2), 0 - 10 ppm	END
Nitric oxide (NO), 0 - 100 ppm	ENO
Oxygen (O_2), 0 - 25% volume	OO2
Sulphur Dioxide (SO_2), 0 - 20 ppm	ESO

OPTIONS *(to be added to the end of the product code)*

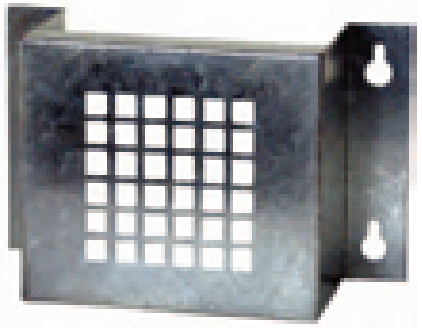
LED digital display	N
Remote housing *(solid state sensor only)*	R
4 - 20 mA analog input *(solid state sensor only)*	A
Water / dust tight enclosure	W
Splash guard *(for watertight enclosure only)*	S

ACCESSORIES

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

DATASHEET

Small Metal Protective Guard



The metal protective guard is heavy duty metal protective guard to help protect against abrasive damage, theft and vandalism to the transmitters. This is an added preventative in addition to the product enclosure.

It is made from 16-gauge galvanized steel and has ½" square openings in the front to allow gas and air to flow through to the sensor. With only four slotted mounting holes, installation and removal for gas detector servicing is easy.

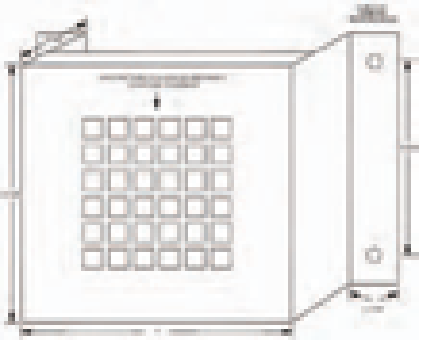
KEY FEATURES

» 16 gauge, clear anodized metal protective guards
» Large size for self-contained systems and controllers
» Smaller size for analog & digital transmitters
» Easy installation

APPLICATIONS

» Residential Buildings
» Commercial Buildings
» Hospitals
» Laboratories
» Research Facilities
» Parking Garages
» ... and many more

TECHNICAL DRAWING



TECHNICAL SPECIFICATIONS

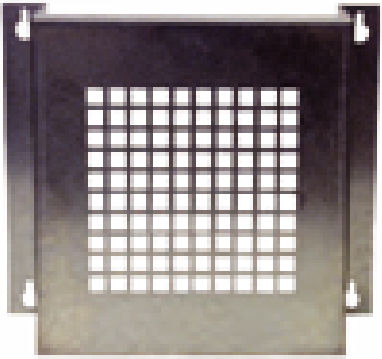
MECHANICAL	
Enclosure	16 gauge galvanized steel
Weight	800 g (28 oz)
Size	7.0" x 6.3" x 3.6" (178 mm x 160 mm x 91 mm)

PRODUCT CODES

Small, 16 gauge galvanized metal guards for transmitters	SCS-8000-RSG

DATASHEET

Large Metal Protective Guard



The metal protective guard is heavy duty metal protective guard to help protect against abrasive damage, theft and vandalism to the transmitters. This is an added preventative in addition to the product enclosure.

It is made from 16-gauge galvanized steel and has ½" square openings in the front to allow gas and air to flow through to the sensor. With only four slotted mounting holes, installation and removal for gas detector servicing is easy.

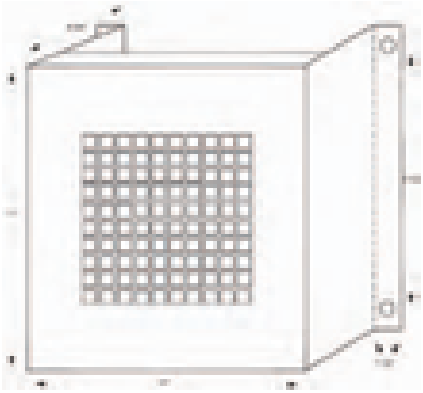
KEY FEATURES

» 16 gauge, clear anodized metal protective guards
» Large size for self-contained systems and controllers
» Smaller size for analog & digital transmitters
» Easy installation

APPLICATIONS

» Residential Buildings
» Commercial Buildings
» Hospitals
» Laboratories
» Research Facilities
» Parking Garages
» ... and many more

TECHNICAL DRAWING



TECHNICAL SPECIFICATIONS

MECHANICAL	
Enclosure	16 gauge galvanized steel
Weight	1.7 kg (3.8 lbs)
Size	10.0" x 9.5" x 4.8" (254 mm x 241 mm x 121 mm)

PRODUCT CODES

Large, 16 gauge galvanized metal guards for controllers	SCS-8000-RSG

DATASHEET

YESAIR 8-Channel IAQ Monitor

YESAIR offers more features, flexibility and functionality than any other IAQ instrument on the market today with multi-channel operation, more than 30 different plug and play sensors to select from, including a particulate sensor, huge capacity data logging to SD flash card and much more.

Featuring an eight channel sensor capacity including RH and temperature, YESAIR can handle up to five additional internal plug & play sensors consisting of a maximum of three electrochemical toxic gas or oxygen sensors plus two high current draw sensors such as an infrared PID or catalytic, and a remote particulate sensor such as the YESDUST.

Positive sampling with internal pump ensures good representative samples are taken from all target areas or with diffusion for a quick, direct reading. Eight sensors are viewed live on the multi-line, backlit, LCD display as well as battery and data logging status.

With a few simple mouse clicks, users can analyze and graph data using the optional YES Viewer PC software and an SD card reader. Alternatively, data could be downloaded through the instrument using a standard USB connection.

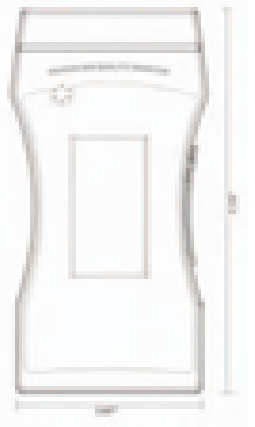
KEY FEATURES

» 8 sensor capacity
» > 30 plug & play sensors available to choose from, including electrochemical, catalytic, infrared & PID
» Multi-function, easy to use menu
» Light weight, contoured & comfortable handheld device
» LCD displays all sensors
» Sampling with internal sample draw pump or by diffusion
» High capacity data logging with built-in SD flash card
» Data logging software available
» RoHS compliant circuit boards
» CE certified

APPLICATIONS

» Residential Buildings
» Commercial Buildings
» Hospitals
» Laboratories
» Research Facilities
» Parking Garages
» ... and many more

TECHNICAL DRAWING



DATASHEET

YESAIR 8-Channel IAQ Monitor

TECHNICAL SPECIFICATIONS

MECHANICAL

Enclosure	Rugged ABS / Polycarbonate (UL94 rated)
Weight	567 g (20 oz)
Size	7.8" x 3.1" x 3.9" (197 mm x 78 mm x 98 mm)

ELECTRICAL

Power	*Standard*: Rechargable 3.6 V NiMH battery pack (8 hours continuous operation time c/w plug-in battery charger / wall adapter (100 - 240 V, 50 - 60 Hz) *Optional*: Alkaline AA batteries x 3
Sampling	*Standard*: Internal, automatic sample pump for "active" sampling of target environment *Optional*: Diffusion for quick, direct reading.
Memory	> 1 million data points data logging to SD flash card *(optional)*
Calibration	Automated through keypad
Information Recording	12 bit, multi-channel, user configurable with removable flash card 2 GB. YES Logger package option includes 2 GB SD flash card, USB cable, YES Viewer software, and SD flash card reader.
Communication	Miniature USB port for changing settings and configuring logging functions and auxiliary port for using additional sensors (i.e. YESDUST)
Audible	Internal 80 Db @ 4'. One set point adjustment. Audible can be switched off through menu.

ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	5°C to 50°C (41°F to 122°F)
Humidity	0 - 99% RH non-condensing

CERTIFICATION

CE Certified	CE standards for safety: I .S. EN61010-1:2001 (Ed.2) CE standards for emissions: EN 50270:2006 CE standards for immunity: EN 50270:2006

PRODUCT CODES

Temperature & RH sensors, internal pump, rechargeable batteries (3 x AA NiMH), battery charger, capacity for 5 gas sensors	YESAIR
Temperature & RH sensors, diffuser cap, rechargeable batteries (3 x AA NiMH), battery charger, capacity for 5 gas sensors	YESAIR-D

OPTIONS

Ammonia (NH_3) electrochemical, 0 - 50 ppm	PNP-H
Arsine (AsH_3) electrochemical, 0 - 2 ppm	PNP-R
Carbon dioxide (CO_2) infrared, 0 - 5,000 ppm	PNP-A+
Carbon dioxide (CO_2) infrared, 0 - 10,000 ppm	PNP-A1
Carbon dioxide (CO_2) infrared, 0 - 20% volume	PNP-A2
Carbon dioxide (CO_2) infrared, 0 - 5% volume	PNP-B
Carbon dioxide (CO_2) infrared, 0 - 100% volume	PNP-B1
Carbon monoxide (CO) electrochemical, 0 - 50 ppm	PNP-C
Carbon monoxide (CO) electrochemical, 0 - 50 ppm (H_2 compensated for use in H_2 background)	PNP-C1
Chlorine (Cl_2) electrochemical, 0 - 5 ppm	PNP-I
Chlorine dioxide (ClO_2), electrochemical, 0 - 1 ppm	PNP-J
Combustibles (catalytic), 0 - 100% LEL	PNP-X
Ethylene (C_2H_4), 0 - 500 ppm	PNP-E1
Ethylene oxide (C_2H_4O), 0 - 20 ppm	PNP-E2
Fluorine (F_2) electrochemical, 0 - 2 ppm	PNP-S
Formaldehyde (CH_2O) electrochemical, 0 - 10 ppm	PNP-Q
Hydrogen (H_2) electrochemical, 0 - 1,000 ppm	PNP-K
Hydrogen chloride (HCl) electrochemical, 0 - 30 ppm	PNP-M
Hydrogen cyanide (HCN) electrochemical, 0 - 100 ppm	PNP-N
Hydrogen fluoride (HF) electrochemical, 0 - 10 ppm	PNP-O
Hydrogen sulphide (H_2S) electrochemical, 0 - 50 ppm	PNP-L
Nitric oxide (NO) electrochemical, 0 - 100 ppm	PNP-E
Nitrogen dioxide (NO_2) electrochemical, 0 - 5 ppm	PNP-D
Oxygen (O_2) electrochemical, 0 - 25% volume	PNP-F
Ozone (O_3) electrochemical, 0 - 1 ppm	PNP-G
Phosphine (PH_3) electrochemical, 0 - 1 ppm	PNP-V
Silane (SiH_4) electrochemical, 0 - 1 ppm	PNP-W
Sulphur dioxide (SO_2) electrochemical, 0 - 20 ppm	PNP-P
TVOCs (PID), 0 - 300 ppm	PNP-Y+
TVOCs (PID), 0 - 50 ppm	PNP-Z+
External mounted nickel metal hydride pack	YESAIR BATT OPTION

ACCESSORIES

Hard shell carrying case for YESAIR	6010.20
YES logger package, 2 GB flash card, USB cable, YES Viewer software, SD flash card reader	YESAIR-LGRPKG
Handheld probe 10" with 30" of sample hose	YES-HHPROBE-10
External lead acid battery, in carrying case w charger	YES-AIR BATT EXT
YES Viewer information logging software CD	YES-SFTWRE

DATASHEET

YES Plus LGA 15-Channel IAQ Monitor

YES Plus LGA is a multi-gas air quality monitoring and information recording instrument that simultaneously measures and records up to fifteen sensors. With more than 30 different plug and play sensors to select from, users can accurately monitor more within a single, easy to carry instrument.

Featuring a fifteen channel sensor capacity including RH and temperature, YES Plus LGA can handle up to 12 additional plug & play sensors consisting of a maximum of eight electrochemical toxic gas or oxygen sensors, four high current draw sensors such as an infrared PID or catalytic, and a remote particulate sensor such as the YESDUST.

The large, backlit, multi-line scrolling LCD display indicates the sensor types installed and measured values for each gas, battery status and more. The system utilizes a long life rechargeable NiMH battery pack providing more than 24-hours of run time, depending on sensor array installed. The user can also set one alarm level for each gas to activate the internal audible alarm. The system is housed in a rugged ABS enclosure with swivel handle to act as a stand support or for carrying the instrument.

An air sample from the target environment is delivered to the sensors through "active sampling" by the internal sample draw pump. More than a million data points can be logged and stored on a built-in SD flash card for convenience. With a few simple mouse clicks, users can analyze and graph data using the optional YES Viewer PC software and an SD card reader. Alternatively, data could be downloaded through the instrument using a standard USB connection.

KEY FEATURES

» 15 sensor capacity
» > 30 plug & play sensor choices
» Extensive, easy to use menu system
» Rugged ABS enclosure with swivel handle acts as stand support
» Internal sample pump with inline filter
» Large, backlit, multi-line, LCD display
» Data logging to SD flash card
» Menu control positive sampling
» RoHS compliant circuit boards

APPLICATIONS

» Residential Buildings
» Commercial Buildings
» Hospitals
» Laboratories
» Research Facilities
» Parking Garages
» ... and many more

TECHNICAL DRAWING

DATASHEET

YES Plus LGA 15-Channel IAQ Monitor

TECHNICAL SPECIFICATIONS

MECHANICAL

Enclosure	Rugged ABS (UL94-HB rated) c/w multi-position, adjustable aluminum carrying hangle/stand
Weight	1.7 kg (3.6 lb)
Size	10.0" x 3.5" x 7.0" (254 mm x 89 mm x 178 mm)

ELECTRICAL

Power	Rechargeable NiMH battery pack: 18 - 24 hours of continuous operation time (dependent upon the sensor array installed) c/w plug-in battery charger / 12 VDC wall adapter (100 - 240 VAC; 50 - 60 Hz)
Circuit	Powerful microprocessor, user configurable
Sampling	Internal, automatic sample pump for "active" sampling of target environment

ENVIRONMENTAL *(sensor dependant)*

Operating Temperature	5°C to 50°C (41°F to 122°F)
Humidity	0 - 99% RH non-condensing

CERTIFICATION

CE	Pending

PRODUCT CODES

Temperature, RH sensors, internal pump, inline filter, rechargeable battery, internal data logging, capacity for 12 gas sensors	YES Plus LGA

OPTIONS

Ammonia (NH_3) electrochemical, 0 - 50 ppm	PNP-H
Arsine (AsH_3) electrochemical, 0 - 2 ppm	PNP-R
Carbon dioxide (CO_2) infrared, 0 - 5,000 ppm	PNP-A+
Carbon dioxide (CO_2) infrared, 0 - 10,000 ppm	PNP-A1
Carbon dioxide (CO_2) infrared, 0 - 20% volume	PNP-A2
Carbon dioxide (CO_2) infrared, 0 - 5% volume	PNP-B
Carbon dioxide (CO_2) infrared, 0 - 100% volume	PNP-B1
Carbon monoxide (CO) electrochemical, 0 - 50 ppm	PNP-C
Carbon monoxide (CO) electrochemical, 0 - 50 ppm (H_2 compensated for use in H_2 background)	PNP-C1
Chlorine (Cl_2) electrochemical, 0 - 5 ppm	PNP-I
Chlorine dioxide (ClO_2), electrochemical, 0 - 1 ppm	PNP-J
Combustibles (catalytic), 0 - 100% LEL	PNP-X
Ethylene (C_2H_4), 0 - 500 ppm	PNP-E1
Ethylene oxide (C_2H_4O), 0 - 20 ppm	PNP-E2
Fluorine (F_2) electrochemical, 0 - 2 ppm	PNP-S
Formaldehyde (CH_2O) electrochemical, 0 - 10 ppm	PNP-Q
Hydrogen (H_2) electrochemical, 0 - 1,000 ppm	PNP-K
Hydrogen chloride (HCl) electrochemical, 0 - 30 ppm	PNP-M
Hydrogen cyanide (HCN) electrochemical, 0 - 100 ppm	PNP-N
Hydrogen fluoride (HF) electrochemical, 0 - 10 ppm	PNP-O
Hydrogen sulphide (H_2S) electrochemical, 0 - 50 ppm	PNP-L
Nitric oxide (NO) electrochemical, 0 - 100 ppm	PNP-E
Nitrogen dioxide (NO_2) electrochemical, 0 - 5 ppm	PNP-D
Oxygen (O_2) electrochemical, 0 - 25% volume	PNP-F
Ozone (O_3) electrochemical, 0 - 1 ppm	PNP-G
Phosphine (PH_3) electrochemical, 0 - 1 ppm	PNP-V
Silane (SiH_4) electrochemical, 0 - 1 ppm	PNP-W
Sulphur dioxide (SO_2) electrochemical, 0 - 20 ppm	PNP-P
TVOCs (PID), 0 - 300 ppm	PNP-Y+
TVOCs (PID), 0 - 50 ppm	PNP-Z+

ACCESSORIES

Hard shell carrying case for YES Plus LGA	718
YES logger package, 2 GB flash card, USB cable, YES Viewer software, SD flash card reader	YESAIR-LGRPKG
Handheld probe 10" with 30" of sample hose	YES-HHPROBE-10
YES Viewer information logging software CD	YES-SFTWRE

DATASHEET

Industry Abbreviations & Product Acronyms

A	Amperes
A/C	Air Conditioning
ABS	Acrylonitrile-Butadiene-Styrene
amp	Amperes
AsH_3	Arsine
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
AST	Analog Signal Transmitter
ATW	Analog Two Wire
avg	Average
BACnet®	Building Automation and Control Networking
BMS	Building Management System
BST	BACnet® Signal Transmitter
BTL	BACnet® Testing Laboratories
BTU	British Thermal Unit
C	Celsius
C_2H_4	Ethylene
CAT	Catalytic
CH_2O	Formaldehyde
CH_4	Methane
CE	Communaute Europeenne
CEF	Calibration Extending Firmware
CET or **CETCI**	Critical Environment Technologies Canada Incorporated
cfm	Cubic Feet Per Minute
Cl_2	Chlorine
ClO_2	Chlorine Dioxide
cm	Centimeters
CO	Carbon Monoxide
CO_2	Carbon Dioxide
$COCl_2$	Phosgene
CSA	Canadian Standards Associaation
DC	Direct Current
DDC	Direct Digital Controller
DST	Digital Signal Transmitter
EC	Electrochemical
EEPROM	Electrically Erasable Programmable Read Only Memory
EMC	Electromagnetic Compatibility
EN	European Norm
ETO	Ethylene Oxide
EU	European Union
F	Fahrenheit
F_2	Fluorine
GB	Gigabyte
GEM	Gas Emissions Monitor
H_2	Hydrogen
H_2S	Hydrogen Sulphide
HCHO	Formaldehyde
HCN	Hydrogen Cyanide
HE	High Efficiency
HEPA	High Efficiency Particulate Air
HF	Hydrogen Fluoride
HPU	Heat Pump Unit
HVAC	Heating, Ventilation, and Air Conditioning
Hz	Hertz
IAQ	Indoor Air Quality
IP	Ingress Protection
IR	Infrared
kg	Kilograms

lbs	Pounds
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEL	Lower Explosive Limit
LGA	Landfill Gas Analyzer
LPM	Liters Per Minute
LPT	Low Power Transmitter
m	Meters
mA	Milliampere
MAC	Mini Analog Controller
max	Maximum
MB	Megabyte
ME	Medium Efficiency
MERV	Minimum Efficiency Reporting Value
min	Minimum
mm	Millimeters
MS / TP	Master-Slave / Token-Passing
N_2H_4	Hydrazine
N_2O	Nitrious Oxide
NDIR	Non-Dispersive Infrared
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
NH_3	Ammonia
NiMH	Nickel Metal Hydride
NIOSH	National Institute of Occupational Safety and Health
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NTC	Negative Temperature Coefficient
O_2	Oxygen
O_3	Ozone
PAC	Programmable Analog Controller
PDC	Programmable Digital Controller
PET	Parkade Emissions Transmitter
PH_3	Phosphine
PID	Photolonization Detector
PPM or **ppm**	Parts Per Million
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
QA	Quality Assurance
REL	Recommended Exposure Limit
RH	Relative Humidity
SCS	Self Contained System
SiH_4	Silane
SPDT	Single Pole, Double Throw
SO_2	Sulfur Dioxide
SS	Solid State
SSM	Smart Sensor Module
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TVOC	Total Volative Organic Compound
TWA	Time Weighted Average
UL	Underwriters Laboratories Inc.
USB	Universal Serial Bus
VAC	Volts Alternating Current
VDC	Volts Direct Current
VOC	Volatile Organic Compound
W	Watts
WWC	Wired Wireless Controller
ZEB	Zero Energy Building

Glossary of Terms

% Volume
The percentage of a gas in the total volume of air.

Breathing Zone
The breathing zone refers to the area 4 - 6 feet from the floor, where most human breathing takes place. This is a good default location for sensors.

Calibration
Instrument calibration refers to exposing the instrument to a known quantity of the measured substance (real or simulated) and resetting the instrument if required. This verifies that the instrument is operating properly and adjusts for any sensor drift. For gas detection equipment this involves exposing the sensor to a known concentration of the target gas, usually from a calibration gas cylinder, and resetting the instrument to adjust for sensor drift.

Combustible Gases
Combustible gases are those that are monitored because they present a risk of explosion or fire.

Cross-sensitivity
Cross-sensitivity refers to the response of a sensor to a gas other than the target gas (also called an interference gas).

Hazardous Area (Class-1)
An area in which flammable gas or vapour could exist under normal or abnormal operations in potentially explosive concentrations. Classified as probability of occurance (Class) and type of material (Group) in the NEC.

Indoor Air Quality (IAQ)
IAQ is the physical, chemical, and biological characteristics of indoor air. This environment is created by the interaction of the site, the climate, the building system, the potential contaminant sources (ie: furnishings, moisture sources, work processes and activities, and outdoor pollutants) and the building occupants.

Ignition-capable
Equipment that may have sparking contacts or hot surfaces that release sufficient energy in normal operation to ignite a flammable atmosphere.

Intrinsically safe
Equipment and wiring not capable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most easily ignited concentration (NEC 1978).

LEL
An abbreviation for Lower Explosive Limit, which is the minimum concentration of each gas in air that must be present for combustion or explosion to occur.

% LEL refers to a method of measuring the concentration of a combustible gas where the range of the sensor is set to correspond with the concentration of gas that is below the explosive range. In this case the Lower Explosive Limit equals 100% LEL.

National Electric Code (NEC)
A compilation of requirements for electrical installation practices, predominately employed in the USA as a criteria for such installations. Revised by the NEC Committee for the National Fire Protection Agency (NFPA).

National Electrical Manufacturer's Association (NEMA)
A trade association propagating standards for industrial electrical equipment, notably enclosure.

Nitrogen Oxides
A group of compounds most commonly found in vehicle exhaust, where nitrogen oxides are a byproduct of combustion formed from the nitrogen and oxygen in the air. In exhaust, the most common is nitric oxide (NO) followed by nitrogen dioxide (NO_2). Other nitrogen oxides found in much smaller quantities are N_2O, N_2O_3, N_2O_4, N_2O_5, N_3O_4, and NO_3.

Nonincendive
Equipment that will not release sufficient energy in its normal working condition to ignite a specfic hazardous atmospheric mixture.

Normally Open/Closed Relay Contacts
Condition of relay contacts, open or closed, when power to the equipment is off.

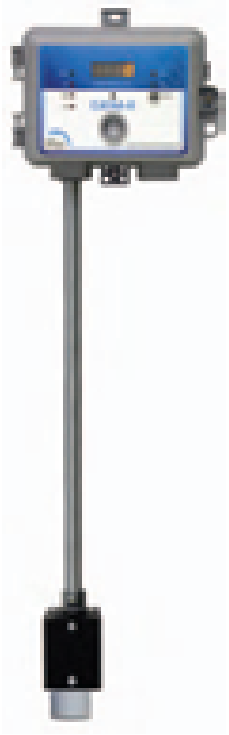
NO_x
An abbreviation for nitric oxide.

ppm
Parts Per Million. 100% volume equals 1,000,000 "parts" , 1% volume equals 10,000 "parts".

Refrigerant
The fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat at low temperature and low pressure and transfers heat at higher temperature and higher pressure, usually with changes of state.

Relay Contacts Dry
No power is supplied to be switched by the relay contacts. Opposed to powered contacts.

Heights & Location



The sensor mounting height depends on the density of the gas relative to air. Heavier than air gases should be detected 6 inches from the floor, lighter than air gas sensors should be placed on or near the ceiling, and gases which have a density close to that of air should have sensors installed in the "breathing zone" 4 - 6 ft from the floor. The breathing zone refers to the area 4 - 6 ft from the floor, where most human breathing takes place. This is a good default location for sensors, as many gases are often well dispersed in air.

Consideration should be given to accessibility for calibration when locating sensors. For example, a sensor mounted 30 ft off the floor will be difficult or even hazardous to service.

Sensors should be placed near the source of the gas if possible. For example, near the compressor or piping.

Sensors should not be placed near ventilation fans or openings to outside. They should be placed in areas where there is good air circulation, but not in the path of rapidly moving air. Pay particular attention to "dead air spots" where there is little or no air movement.

Mounting Heights for Common Gases:

Breathing Zone (4 - 6 ft above floor)

Carbon Monoxide	CO
Carbon Dioxide	CO_2
Oxygen	O_2
Nitric Oxide	NO
Nitrogen Dioxide	NO_2
Hydrogen Sulphide	H_2S

Near the Ceiling

Ammonia	NH_3
Methane (Natural Gas)	CH_4
Hydrogen	H_2

Near the Floor (6" above floor)

Carbon Dioxide *(Industrial or beverage applications)*	CO_2
Chlorine	Cl_2
Ozone	O_3
Propane	C_3H_8
Refrigerants *(Freons)*	

Fixed Gas Detection Systems

How far apart should the sensors be?
This depends on the application, but for most commercial vehicle exhaust applications, each sensor should "cover" 5,000 - 7,000 ft^2. This translates to about 70 - 80 ft apart, or a 35 - 40 ft radius. In more hazardous areas, the sensor coverage area should be reduced.

What should the mounting height of the sensors be?
This depends on the density of the gas relative to air. Heavier than air gases should be detected 6 inches from the floor, lighter than air gas sensors should be placed on or near the ceiling, and gases which have a density close to that of air should have sensors installed in the "breathing zone" 4 - 6 ft from the floor. Consider accessibility for calibration when locating sensors.

Are there other considerations for locating sensors?
Sensors should not be placed near ventilation fans or openings to outside. They should be placed in areas where there is good air circulation, but not in the path of rapidly moving air. Pay particular attention to "dead air spots" where there is little or no air movement.

What is the breathing zone?
The breathing zone refers to the area 4 - 6 ft from the floor, where most human breathing takes place. This is a good default location for vehicle exhaust monitoring and oxygen sensors.

Why are different kinds of sensors used?
Most gases can only be detected by 1 or 2 sensor types. Consideration is given to required accuracy and specificity, sensor life expectancy, and finally cost.

What gases can be detected with CETCI's fixed gas detection equipment?

Ammonia	NH_3
Carbon Dioxide	CO_2
Carbon Monoxide	CO
Chlorine	Cl_2
Combustible Gases	*multiple gases*
Ethylene	C_2H_4
Ethylene Oxide	C_2H_4O
Formaldehyde	CH_2O
Hydrogen	H_2
Hydrogen Sulphide	H_2S
Methane	CH_4
Nitric Oxide	NO
Nitrogen Dioxide	NO_2
Oxygen	O_2
Ozone	O_3
Propane	C_3H_8
Refrigerants	R12, R22, R114, R123, R134A, R401A, R401B, R402A, R404A, R407C, R408A, R409A, R410A, R422A, R422D, R438A, R500, R502, R507, R507A
Sulphur Dioxide	SO_2
TVOC	

Don't see what you're looking for? Contact us at www.critical-environment.com/contact.

Are some gases lighter than others?
All substances have a molecular weight determined by the number and type of atoms in the molecule. In a gaseous state, the larger and heavier the molecule, the heavier the gas.

What are the molecular weights of gases?
Molecular weight of some common gases:

Air	29
Ammonia (NH_3)	17
Carbon Monoxide (CO)	28
Carbon Dioxide (CO_2)	44
Chlorine (Cl_2)	71
Hydrogen (H_2)	2
Hydrogen Sulphide (H_2S)	34
Methane (CH_4)	16
Oxygen (O_2)	32
Ozone (O_3)	48
Nitric Oxide (NO)	30
Nitrogen Dioxide (NO_2)	46
Propane (C_3H_8)	44

Are there many types of sensors used for gas detection?
There are many sensors used to detect gases. Some gases can be detected by some sensors and not by others, and some sensors are more accurate or gas-specific than others. Types of sensors include Solid State (also known as Metal Oxide Semiconductor), Electrochemical, Catalytic, Infrared, PID and others.

What are advantages and disadvantages of...
Solid State (MOS)
Advantages
Low cost, long life, quite resistant to poisoning.
Disadvantages
Broad spectrum, non-specific, not as accurate as other types.

Electrochemical
Advantages
Accurate, repeatable, more gas specific, defined cross sensitivities.
Disadvantages
Relatively short life, moderately expensive.

Catalytic
Advantages
Range 0 - 100% LEL for many combustible gases, accurate, long life.
Disadvantages
Moderately expensive, can be poisoned.

Infrared
Advantages
Very gas specific, best way to detect CO_2, very accurate & stable, long life.
Disadvantages
Expensive.

Does gas detection equipment need maintenance and calibration?
Yes. Maintenance on a properly installed, quality system is minimal and need only consist of a visual inspection and verification of operation. Calibration frequency depends on sensor type and application.

Typical frequency for commercial applications is 1 - 2 times per year. For areas where health hazards may exist, 3 - 4 times per year.

Industrial applications 4 - 6 times per year or even monthly.

FREQUENTLY ASKED QUESTIONS (FAQ)

Fixed Gas Detection Systems

What is calibration?
Instrument calibration refers to exposing the instrument to a known quantity of the measured substance (real or simulated) and resetting the instrument if required.

This verifies that the instrument is operating properly and adjusts for any sensor drift. For gas detection equipment this involves exposing the sensor to a known concentration of the target gas, usually from a calibration gas cylinder, and resetting the instrument to adjust for sensor drift.

Can gas detection equipment produce energy savings?
Yes. A properly installed, maintained and calibrated gas detection system can produce significant energy savings by running ventilation fans only when required, minimizing energy usage and expense.

What is cross-sensitivity?
Cross-sensitivity refers to the response of a sensor to a gas other than the target gas (also called an interference gas).

What are combustible gases?
Combustible gases are those that are monitored because they present a risk of explosion or fire.

I get confused between CO and CO_2 - what's the difference?
CO is the chemical symbol for Carbon Monoxide which is a byproduct of combustion.
CO_2 is the chemical symbol for Carbon Dioxide which usually comes from human respiration in commercial applications and is used as an indicator for Indoor Air Quality.

Where does carbon monoxide (CO) come from?
Usually occurs as a product of combustion of an organic compound. Most commonly found in vehicle exhaust.

Where does CO_2 come from?
Carbon Dioxide is a naturally occurring gas in air (less than 1%) and since it is exhaled during respiration, it is often used as an indicator of Indoor Air Quality. CO_2 is produced in the combustion of organic compounds and it is also formed during fermentation. CO_2 is used in many industrial and food & beverage applications and may present a hazard if it leaks from cylinders.

What are Nitrogen Oxides?
A group of compounds most commonly found in vehicle exhaust, where Nitrogen Oxides are a byproduct of combustion formed from the Nitrogen and Oxygen in the air.

In exhaust, the most common is Nitric Oxide (NO) followed by Nitrogen Dioxide (NO_2). Other Nitrogen Oxides found in much smaller quantities are N_2O, N_2O_3, N_2O_4, N_2O_5, N_3O_4, and NO_3.

Where do NO and NO_2 come from?
Nitric Oxide (NO) and Nitrogen Dioxide (NO_2) usually occur as a byproduct of combustion, often from diesel fuel powered vehicle exhaust. (see Nitrogen Oxides).

What is NO_x?
NO_x is an abbreviation for Nitrogen Oxides. (see Nitrogen Oxides).

What does ppm mean?
Parts Per Million. 100% volume equals 1,000,000 "parts", 1% volume equals 10,000 'parts'.

Where does H_2S come from?
Hydrogen Sulphide is commonly produced from decay of organic matter and in industrial processes such as Pulp & Paper and Oil & Gas. It is often found in 'Sewer Gas'.

What does % volume mean?
The percentage of a gas in the total volume of air.

What does % LEL mean?
Combustible gases form flammable mixtures with air. For each gas there is an explosive range within which the fuel to air mixture will support combustion. LEL is an abbreviation for Lower Explosive Limit, which is the minimum concentration of each gas in air that must be present for combustion or explosion to occur.

% LEL refers to a method of measuring the concentration of a combustible gas where the range of the sensor is set to correspond with the concentration of gas that is below the explosive range. In this case the Lower Explosive Limit equals 100 % LEL.

What gases are present in arenas?
Zamboni exhaust gases: CO, Nitrogen Oxides

Combustible gases from Zamboni fuel leakage: Propane, Gasoline, Deisel, Methane

What gases are present in parking garages?
Vehicle exhaust gases: CO, Nitrogen Oxides

Combustible gases from fuel leakage: Propane, Gasoline, Methane

Interference gases: Solvent fumes from paint or sealer

What gases are present in chiller rooms?
Chiller room gases: Ammonia, Refrigerants

What gases are present in swimming pools?
Water purification chemicals: Chlorine, Ozone

What gases are present in warehouses?
Forklift or truck exhaust gases: CO, Nitrogen oxides

Interference gases: Solvent fumes from warehoused products

What gases are present in repair garages?
Vehicle exhaust gases: CO, Nitrogen Oxides

Combustible gases from fuel leakage: Propane, Gasoline, Methane

Interference gases: Solvent fumes

FREQUENTLY ASKED QUESTIONS (FAQ)

Portable Indoor Air Quality Monitors

Indoor air quality is the physical, chemical, and biological characteristics of indoor air. This environment is created by the interaction of the site, the climate, the building system, the potential contaminant sources (ie: furnishings, moisture sources, work processes and activities, and outdoor pollutants) and the building occupants.

What is an Indoor Air Quality Monitor and how can it help me?

An indoor air quality monitor samples the air continuously until downloaded; producing an analysis of the air quality based on the channels/gases supplied.

YES Monitors measure IAQ on 3 basic levels; Temperature, Relative Humidity and Carbon Dioxide. By recording samples from all three variables simultaneously over a period of time, one is able to analyze where and when the air quality is poor in the workplace. Once the source has been determined then proper ventilation can be installed or altered.

When should you purchase an IAQ Monitor?

Prior to introducing IAQ monitors into the investigation, one should have a comprehensive understanding of how the building operates and the nature of the complaints. An overview of the ventilation system will help to define where you should place the YES Air Quality Monitors to best address the issues at hand.

Who uses these monitors?

Initially these monitors were developed to assist property managers, building maintenance staff, health and safety officials, and consultants working in the occupational environment field. Although now various companies, corporations and schools use IAQ monitors to ensure proper air quality in the workplace.

What gases can be detected with CETCI's portable indoor air quality instruments?

Ammonia	NH_3
Arsine	AsH_3
Carbon Dioxide	CO_2
Carbon Monoxide	CO
Chlorine	Cl_2
Chlorine Dioxide	ClO_2
Combustible Gases	n/a
Ethylene	C_2H_4
Ethylene Oxide	C_2H_4O
Fluorine	F_2
Formaldehyde	CH_2O
Hydrogen	H_2
Hydrogen Chloride	HCl
Hydrogen Cyanide	HCN
Hydrogen Fluoride	HF
Hydrogen Sulphide	H_2S
Nitric Oxide	NO
Nitrogen Dioxide	NO_2
Oxygen	O_2
Ozone	O_3
Phosphine	PH_3
Silane	SiH_4
Sulphur Dioxide	SO_2
TVOC	

Don't see what you're looking for? Contact us at www.critical-environment.com/contact.

Why measure Temperature and Relative Humidity?
ASHRAE Standard 55-1992, Thermal Environmental Conditions for Human Occupancy, sets guidelines intended to achieve thermal conditions that at least 80% of the occupants would find comfortable.

ASHRAE's recommended RH levels are between 25 - 60%.

** Low RH causes skin to become dry leading to chapping and irritation, increases static electricity hindering computer operation.

** High RH levels can result in condensation and thus the development of molds and fungi.

High temperature and humidity levels can increase the concentrations of some pollutants.

To obtain an accurate reading of pollutants levels, it is necessary to take into account these levels and balance the temperature and relative humidity with the carbon dioxide levels.

Why use Carbon Dioxide levels to determine ventilation?
Carbon dioxide is an odorless, colorless gas produced through human metabolism.

CO_2 provides the most accurate readings for determining when ventilation should be increased and decreased. Saving energy and improving air quality concurrently. High CO_2 levels usually coincide with high indoor contaminates, due to a problem with the HVAC system.

Facts on CO_2
- Producers of CO_2: people and combustion of fossil fuels (gas & oil furnaces/heaters)
- The average person performing light office work produces CO_2 at a rate of 0.3L / min.
- Normal part of the atmosphere at 330 ppm to 350 ppm
- Acceptable Office levels 600 - 800 ppm

What problems does poor indoor air quality cause?
Many experience these symptoms without realizing that they can be alleviated through proper ventilation.

Sick Building Syndrome
A set of symptoms related to chemical, particulate or biological exposure that cannot be related to a specific cause but are alleviated when the occupant leaves the building. Individuals report symptoms such as headaches, nausea, fatigue and drowsiness, eye, nose, and throat irritation.

Building-Related Illness
A specific illness with a known cause that is a result of exposure to an indoor agent. Examples are Legionnaire's disease and Pontiac Fever.

Product Codes

GAS DETECTION CONTROLLER

PDC Multi-Channel Controller

PDC series, up to 2 analog inputs	PDC-A02
PDC series, up to 8 analog inputs	PDC-A08
PDC series, up to 8 digital inputs	PDC-D08
PDC series, up to 24 digital inputs	PDC-D24
PDC series, up to 16 digital inputs	PDC-D16
PDC series, up to 32 digital inputs	PDC-D32
PDC series, up to 64 digital inputs	PDC-D64
PDC series, up to 96 digital inputs	PDC-D96
PDC series, up to 128 digital inputs	PDC-D128

Options *(to be added to the end of the product codes above)*

Industrial horn, 103 dB, remote	H
BACnet® output module option	BAC
Strobe light, 4" diameter, remote	L
Water / dust tight enclosure	W

Accessories

Relay module, 8 relays each, remote	RRM-8
Analog output module, 8 4 - 20 mA outputs each	RAO-8
Power supply, 24 V, remote	RPS-24V
CAN network bridge	CNB-2
Strobe & horn combo, remote	RSH-24
Annunciator, remote	RAP-128
Metal protective guard, large, 16 gauge, galvanized metal guards for controllers	SCS-8000-SPG

SELF CONTAINED GAS DETECTORS

GEM-II Multi-Channel Controller

GEM series, integral sensor, carbon monoxide (CO)	GEM-AECO
GEM series, integral sensor, nitrogen dioxide (NO_2)	GEM-AEND
GEM series, integral sensor, nitric oxide (NO)	GEM-AENO
GEM series, integral sensor, oxygen (O_2)	GEM-AEO2
GEM series, integral sensor, sulphur dioxide (SO_2)	GEM-AESO
GEM series, remote sensor	GEM-B
GEM series, remote sensor, combustible gases (solid state)	GEM-BSCB
GEM series, remote sensor, methane (CH_4)	GEM-BSCB
GEM series, remote sensor, propane (C_3H_8)	GEM-BSCB
GEM series, remote sensor, refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507)	GEM-BSR2
GEM series, remote sensor, TVOCs (solid state)	GEM-BSOS

GEM series, integral & remote sensors, carbon monoxide (CO)	GEM-DECO-ECO
GEM series, integral carbon monoxide (CO), remote combustible gases (solid state)	GEM-DECO-SCB
GEM series, integral carbon monoxide (CO), remote methane (CH_4)	GEM-DECO-SCB
GEM series, integral carbon monoxide (CO), remote propane (C_3H_8)	GEM-DECO-SCB
GEM series, integral carbon monoxide (CO), remote nitrogen dioxide (NO_2)	GEM-DECO-END
GEM series, integral carbon monoxide (CO), remote nitric oxide (NO)	GEM-DECO-ENO
GEM series, integral & remote sensors, oxygen (0_2)	GEM-DEO2-EO2
GEM series, integral & remote sensors, nitrogen dioxide (NO_2)	GEM-DEND-END
GEM series, integral & remote sensors, nitric oxide (NO)	GEM-DENO-ENO
GEM series, integral, carbon monoxide (CO) & nitrogen dioxide (NO_2)	GEM-EECO-END
GEM series, integral, carbon monoxide (CO) & nitric oxide (NO)	GEM-EECO-ENO
GEM series, integral, carbon monoxide (CO) & oxygen (O2)	GEM-EECO-EO2
GEM series, integral, carbon monoxide (CO) & sulphur dioxide (SO_2)	GEM-EECO-ESO
GEM series, integral, nitrogen dioxide (NO_2) & sulphur dioxide (SO_2)	GEM-EEND-ESO

Options *(to be added to the end of the product codes above)*

LED digital display	N
120 VAC powered version	J
Water / dust tight enclosure	W
Splash guard *(for watertight enclosure only)*	S
Enclosed external transformer, 120 - 22 VAC	TIB-2250

Accessories

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

GAS DETECTION TRANSMITTERS

AST Analog Transmitters

AST series, ammonia (NH_3), 0 - 500 ppm	AST-EAM
AST series, carbon monoxide (CO), 0 - 200 ppm	AST-ECO
AST series, combustible gases (solid state), 0 - 50% LEL	AST-SCB
AST series, combustible gases (catalytic), 0 - 100% LEL	AST-CCB
AST series, chlorine (Cl_2), 0 - 5 ppm	AST-ECL
AST series, ethylene (C_2H_4), 0 - 2,000 ppm	AST-EC4
AST series, formaldehyde (CH_2O), 0 - 10 ppm	AST-EFO
AST series, hydrogen (H_2), 0 - 2,000 ppm	AST-EH2
AST series, hydrogen sulphide (H_2S), 0 - 50 ppm	AST-EHS
AST series, methane (CH_4), 0 - 50% LEL	AST-SCB
AST series, nitrogen dioxide (NO_2), 0 - 10 ppm	AST-END
AST series, nitric oxide (NO), 0 - 100 ppm	AST-ENO

Discontinued

Product Codes

AST series, oxygen (O_2), 0 - 25% volume	AST-O02
AST series, ozone (O_3), 0 - 2 ppm	AST-E03
AST series, propane (C_3H_8), 0 - 50% LEL	AST-SCB
AST series, refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507), 0 - 2,000 ppm	AST-SR2
AST series, sulphur dioxide (SO_2), 0 - 20 ppm	AST-ESO
AST series, TVOCs (solid state), 0 - 500 ppm	AST-SOS
AST series, TVOCs (PID), 0 - 50 ppm	AST-SPL
AST series, TVOCs (PID), 0 - 300 ppm	AST-SPH

Discontinued

Options *(to be added to the end of the product codes above)*

LED digital display	N
Relay, dry contact SPDT, 2 amps @ 28 V	R
Water / dust tight enclosure	W
Splash guard *(for watertight enclosure only)*	S

Accessories

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

AST-I Industrial Carbon Dioxide (CO_2) Transmitters

AST-I series, industrial carbon dioxide (CO_2), watertight housing, 0 - 5% volume CO_2	AST-ICD-BW
AST-I series, industrial carbon dioxide (CO_2), watertight housing, 0 - 100% volume CO_2	AST-ICD-CW
AST-I series, industrial carbon dioxide (CO_2), watertight housing, 0 - 100% volume CO_2	AST-ICD-DW
AST-I series, industrial hydrocarbon gases, watertight housing, 0 - 100% LEL CH_4	AST-IHC-BW
AST-I series, industrial hydrocarbon gases, watertight housing, 0 - 100% volume CH_4	AST-IHC-CW
AST-I series, industrial nitrious oxide (N_2O), watertight housing, 0 - 1,000 ppm N_2O	AST-INI-EW

Accessories

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

AST-IRT Refrigerant Transmitters

AST-IRT series, chiller room model, Refrigerants R12, 0 - 2,000 ppm	AST-IRT-C-R12
AST-IRT series, freezer room model, Refrigerants R12, 0 - 2,000 ppm	AST-IRT-F-R12
AST-IRT series, chiller room model, Refrigerants R22, 0 - 2,000 ppm	AST-IRT-C-R22
AST-IRT series, freezer room model, Refrigerants R22, 0 - 2,000 ppm	AST-IRT-F-R22

Discontinued

AST-IRT series, chiller room model, Refrigerants R114, 0 - 2,000 ppm	AST-IRT-C-R114
AST-IRT series, freezer room model, Refrigerants R114, 0 - 2,000 ppm	AST-IRT-F-R114
AST-IRT series, chiller room model, Refrigerants R123, 0 - 2,000 ppm	AST-IRT-C-R123
AST-IRT series, freezer room model, Refrigerants R123, 0 - 2,000 ppm	AST-IRT-F-R123
AST-IRT series, chiller room model, Refrigerants R134A, 0 - 2,000 ppm	AST-IRT-C-R134A
AST-IRT series, freezer room model, Refrigerants R134A, 0 - 2,000 ppm	AST-IRT-F-R134A
AST-IRT series, chiller room model, Refrigerants R401A (MP89), 0 - 2,000 ppm	AST-IRT-C-R401A
AST-IRT series, freezer room model, Refrigerants R401A (MP89), 0 - 2,000 ppm	AST-IRT-F-R401A
AST-IRT series, chiller room model, Refrigerants R401B (MP66), 0 - 2,000 ppm	AST-IRT-C-R401B
AST-IRT series, freezer room model, Refrigerants R401B (MP66), 0 - 2,000 ppm	AST-IRT-F-R401B
AST-IRT series, chiller room model, Refrigerants R402A (HP80), 0 - 2,000 ppm	AST-IRT-C-R402A
AST-IRT series, freezer room model, Refrigerants R402A (HP80), 0 - 2,000 ppm	AST-IRT-F-R402A
AST-IRT series, chiller room model, Refrigerants R404A (HP62), 0 - 2,000 ppm	AST-IRT-C-R404A
AST-IRT series, freezer room model, Refrigerants R404A (HP62), 0 - 2,000 ppm	AST-IRT-F-R404A
AST-IRT series, chiller room model, Refrigerants R407C (9000), 0 - 2,000 ppm	AST-IRT-C-R407C
AST-IRT series, freezer room model, Refrigerants R407C (9000), 0 - 2,000 ppm	AST-IRT-F-R407C
AST-IRT series, chiller room model, Refrigerants R408A (FX10), 0 - 2,000 ppm	AST-IRT-C-R408A
AST-IRT series, freezer room model, Refrigerants R408A (FX10), 0 - 2,000 ppm	AST-IRT-F-R408A
AST-IRT series, chiller room model, Refrigerants R409A (FX56), 0 - 2,000 ppm	AST-IRT-C-R409A
AST-IRT series, freezer room model, Refrigerants R409A (FX56), 0 - 2,000 ppm	AST-IRT-F-R409A
AST-IRT series, chiller room model, Refrigerants R500, 0 - 2,000 ppm	AST-IRT-C-R500
AST-IRT series, freezer room model, Refrigerants R500, 0 - 2,000 ppm	AST-IRT-F-R500
AST-IRT series, chiller room model, Refrigerants R502, 0 - 2,000 ppm	AST-IRT-C-R502
AST-IRT series, freezer room model, Refrigerants R502, 0 - 2,000 ppm	AST-IRT-F-R502
AST-IRT series, chiller room model, Refrigerants R507A (AZ50), 0 - 2,000 ppm	AST-IRT-C-R507A
AST-IRT series, freezer room model, Refrigerants R507A (AZ50), 0 - 2,000 ppm	AST-IRT-F-R507A

Discontinued

Options *(to be added to the end of the product codes)*

Water / dust tight ABS fiberglass enclosure	W
Stainless steel enclosure	*tbd*

AST-IS Carbon Dioxide (CO_2) Transmitters

AST-IS series, carbon dioxide (CO_2), office wall mount	AST-IS1
AST-IS series, carbon dioxide (CO_2), office wall mount with LCD digital display	AST-IS2
AST-IS series, carbon dioxide (CO_2), duct mount	AST-IS3
AST-IS series, carbon dioxide (CO_2), duct mount with LCD digital display	AST-IS4
AST-IS series, carbon dioxide (CO_2) & temperature sensor, wall mount with IP54 industrial enclosure, LCD digital display & relay	AST-IS5
AST-IS series, carbon dioxide (CO_2), wall mount with IP54 industrial enclosure	AST-IS6

Product Codes

AST-IS series, carbon dioxide (CO_2), wall mount with IP54 industrial enclosure & LCD digital display	AST-IS7
AST-IS series, carbon dioxide (CO_2) & temperature sensor, duct mount	AST-IS8
AST-IS series, carbon dioxide (CO_2) & temperature sensor, duct mount with LCD digital display	AST-IS9
AST-IS series, carbon dioxide (CO_2) & temperature sensor, wall mount	AST-IS10
AST-IS series, carbon dioxide (CO_2) & temperature sensor, wall mount with LCD digital display	AST-IS11
AST-IS series, carbon dioxide (CO_2), relay & temperature sensor, wall mount with LCD digital display & relay	AST-IS12
AST-IS series, carbon dioxide (CO_2) & temperature sensor, wall mount with IP54 industrial enclosure & relay	AST-IS13
AST-IS series, carbon dioxide (CO_2), wall mount with LCD digital display & audible alarm	AST-IS14
AST-IS series, carbon dioxide (CO_2), wall mount VAV with hidden LCD digital display	AST-IS15
AST-IS series, carbon dioxide (CO_2), wall mount VAV with LCD digital display	AST-IS16
AST-IS series, carbon dioxide (CO_2), duct mount with LCD digital display	AST-IS17
AST-IS series, carbon dioxide (CO_2), wall mount with IP54 industrial enclosure, 0 - 6% volume	AST-IS18

ATW Two-Wire Transmitters

ATW series, ammonia (NH_3), 0 - 500 ppm	ATW-EAM
ATW series, carbon monoxide (CO), 0 - 200 ppm	ATW-ECO
ATW series, chlorine (Cl_2), 0 - 5 ppm	ATW-ECL
ATW series, ethylene oxide (ETO), 0 - 20 ppm	ATW-EET
ATW series, formaldehyde (CH_2O), 0 - 10 ppm	ATW-EFO
ATW series, hydrogen (H_2), 0 - 2000 ppm	ATW-EH2
ATW series, hydrogen sulphide (H_2S), 0 - 50 ppm	ATW-EHS
ATW series, nitrogen dioxide (NO_2), 0 - 10 ppm	ATW-END
ATW series, nitric oxide (NO), 0 - 100 ppm	ATW-ENO
ATW series, oxygen (O_2), 0 - 25% volume	ATW-O02
ATW series, ozone (O_3), 0 - 2 ppm	ATW-EO3
ATW series, sulphur dioxide (SO_2), 0 - 20 ppm	ATW-ESO

Discontinued

Options *(to be added to the end of the product codes)*

Water / dust tight enclosure	W
Splash guard *(for watertight enclosure only)*	S

Accessories

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1

Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

DST Digital Transmitters

DST series, ammonia (NH_3), 0 - 500 ppm	DST-EAM
DST series, carbon monoxide (CO), 0 - 200 ppm	DST-ECO
DST series, combustible gases (solid state), 0 - 50% LEL	DST-SCB
DST series, chlorine (Cl_2), 0 - 5 ppm	DST-ECL
DST series, ethylene oxide (ETO), 0 - 20 ppm	DST-EET
DST series, hydrogen (H_2), 0 - 2,000 ppm	DST-EH2
DST series, hydrogen sulphide (H_2S), 0 - 50 ppm	DST-EHS
DST series, methane (CH_4), 0 - 50% LEL	DST-SCB
DST series, nitrogen dioxide (NO_2), 0 - 10 ppm	DST-END
DST series, nitric oxide (NO), 0 - 100 ppm	DST-ENO
DST series, oxygen (O_2), 0 - 25% volume	DST-OO2
DST series, ozone (O_3), 0 - 2 ppm	DST-EO3
DST series, propane (C_3H_8), 0 - 50% LEL	DST-SCB
DST series, sulphur dioxide (SO_2), 0 - 20 ppm	DST-ESO

Options *(to be added to the end of the product codes)*

Water / dust tight enclosure	W
Splash guard *(for watertight enclosure only)*	S

Accessories

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

LPT Economical Transmitters

LPT series, carbon monoxide (CO), 0 - 200 ppm	LPT-ECO
LPT series, nitrogen dioxide (NO_2), 0 - 10 ppm	LPT-END

Options *(to be added to the end of the product codes)*

Splash guard	S

Accessories

Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

Product Codes

PET BACnet® Transmitters

PET series, single channel, ammonia (NH_3), 0 - 500 ppm	PET-EAM
PET series, single channel, carbon monoxide (CO), 0 - 200 ppm	PET-TCO
PET series, single channel, combustible gases (solid state), 0 - 50% LEL	PET-SCB
PET series, single channel, ethylene (C_2H_4), 0 - 2,000 ppm	PET-EC4
PET series, single channel, formaldehyde (CH_2O), 0 - 10 ppm	PET-EFO
PET series, single channel, hydrogen (H_2), 0 - 2,000 ppm	PET-EH2
PET series, single channel, methane (CH_4), 0 - 50% LEL	PET-SCB
PET series, single channel, nitrogen dioxide (NO_2), 0 - 10 ppm	PET-END
PET series, single channel, nitric oxide (NO), 0 - 100 ppm	PET-ENO
PET series, single channel, oxygen (O_2), 0 - 25% volume	PET-OO2
PET series, single channel, propane (C_3H_8), 0 - 50% LEL	PET-SCB
PET series, single channel, refrigerants (R12, R22, R134A, R401A, R402A, R404A, R407C, R410A, R422A, R422D, R438A, R507), 0 - 2,000 ppm	PET-SR2
PET series, single channel, sulphur dioxide (SO_2), 0 - 20 ppm	PET-ESO
PET series, single channel, TVOCs (solid state), 0 - 500 ppm	PET-SOS
PET series, dual channel, ammonia (NH_3) & nitric oxide (NO)	PET-EAM-ENO
PET series, dual channel, ammonia (NH_3) & nitrogen dioxide (NO_2)	PET-EAM-END
PET series, dual channel, ammonia (NH_3) & sulphur dioxide (SO_2)	PET-EAM-ESO
PET series, dual channel, ammonia (NH_3) & oxygen (O_2)	PET-EAM-OO2
PET series, dual channel, carbon monoxide (CO) & nitric oxide (NO)	PET-TCO-ENO
PET series, dual channel, carbon monoxide (CO) & nitrogen dioxide (NO_2)	PET-TCO-END
PET series, dual channel, carbon monoxide (CO) & sulphur dioxide (SO_2)	PET-TCO-ESO
PET series, dual channel, carbon monoxide (CO) & oxygen (O_2)	PET-TCO-OO2
PET series, dual channel, ethylene (C_2H_4) & nitric oxide (NO)	PET-EC4-ENO
PET series, dual channel, ethylene (C_2H_4) & nitrogen dioxide (NO_2)	PET-EC4-END
PET series, dual channel, ethylene (C_2H_4) & sulphur dioxide (SO_2)	PET-EC4-ESO
PET series, dual channel, ethylene (C_2H_4) & oxygen (O_2)	PET-EC4-OO2
PET series, dual channel, formaldehyde (CH_2O) & nitric oxide (NO)	PET-EFO-ENO
PET series, dual channel, formaldehyde (CH_2O) & nitrogen dioxide (NO_2)	PET-EFO-END
PET series, dual channel, formaldehyde (CH_2O) & sulphur dioxide (SO_2)	PET-EFO-ESO
PET series, dual channel, formaldehyde (CH_2O) & oxygen (O_2)	PET-EFO-OO2
PET series, dual channel, hydrogen (H_2) & nitric oxide (NO)	PET-EH2-ENO
PET series, dual channel, hydrogen (H_2) & nitrogen dioxide (NO_2)	PET-EH2-END
PET series, dual channel, hydrogen (H_2) & sulphur dioxide (NO_2)	PET-EH2-ESO
PET series, dual channel, hydrogen (H_2) & oxygen (O_2)	PET-EH2-OO2
PET series, dual channel, nitric oxide (NO) & nitrogen dioxide (NO_2)	PET-ENO-END
PET series, dual channel, nitric oxide (NO) & sulphur dioxide (SO_2)	PET-ENO-ESO
PET series, dual channel, nitric oxide (NO) & oxygen (O_2)	PET-ENO-OO2
PET series, dual channel, nitrogen dioxide (NO_2) & sulphur dioxide (SO_2)	PET-END-ESO
PET series, dual channel, nitrogen dioxide (NO_2) & oxygen (O_2)	PET-END-OO2
PET series, dual channel, oxygen (O_2) & sulphur dioxide (SO_2)	PET-OO2-ESO

Options *(to be added to the end of the product codes)*	
LED digital display	N
Remote housing *(solid state sensor only)*	R
4 - 20 mA analog transmitter *(solid state sensor only)*	A
Water / dust tight enclosure	W
Splash guard *(for watertight enclosure only)*	S

Accessories	
Calibration kit, 15 L or 17 L cylinders, 0.5 LPM flow regulator	CET-8000-CK1
Calibration kit, 34 L, 58 L, 75 L, or 103 L cylinders, 0.5 LPM flow regulator	CET-7150-CK1
Metal protective guard, small, 16 gauge, galvanized metal guards for transmitters	SCS-8000-RSG

PORTABLE INDOOR AIR QUALITY MONITORS

YESAIR Eight Channel Air Quality Monitor	
YESAIR, temperature & RH sensors, internal pump, rechargeable batteries (3 x AA NiMH), battery charger, capacity for 5 gas sensors	YESAIR
YESAIR-D, temperature & RH sensors, diffuser cap, rechargeable batteries (3 x AA NiMH), battery charger, capacity for 5 gas sensors	YESAIR-D

Options *(to be added to the end of the product codes above)*	
Ammonia (NH_3) electrochemical, 0 - 50 ppm	PNP-H
Arsine (AsH_3) electrochemical, 0 - 2 ppm	PNP-R
Carbon dioxide (CO_2) infrared, 0 - 5,000 ppm	PNP-A+
Carbon dioxide (CO_2) infrared, 0 - 10,000 ppm	PNP-A1
Carbon dioxide (CO_2) infrared, 0 - 20% volume	PNP-A2
Carbon dioxide (CO_2) infrared, 0 - 5% volume	PNP-B
Carbon dioxide (CO_2) infrared, 0 - 100% volume	PNP-B1
Carbon monoxide (CO) electrochemical, 0 - 50 ppm	PNP-C
Carbon monoxide (CO) electrochemical, 0 - 50 ppm (H_2 compensated for use in H_2 background)	PNP-C1
Chlorine (Cl_2) electrochemical, 0 - 5 ppm	PNP-I
Chlorine dioxide (ClO_2), electrochemical, 0 - 1 ppm	PNP-J
Combustibles (catalytic), 0 - 100% LEL	PNP-X
Ethylene (C_2H_4), 0 - 500 ppm	PNP-E1
Ethylene oxide (ETO), 0 - 20 ppm	PNP-E2
Fluorine (F_2) electrochemical, 0 - 2 ppm	PNP-S
Formaldehyde (CH_2O) electrochemical, 0 - 10 ppm	PNP-Q
Hydrogen (H_2) electrochemical, 0 - 1,000 ppm	PNP-K
Hydrogen chloride (HCl) electrochemical, 0 - 30 ppm	PNP-M
Hydrogen cyanide (HCN) electrochemical, 0 - 100 ppm	PNP-N
Hydrogen fluoride (HF) electrochemical, 0 - 10 ppm	PNP-O

Product Codes

Hydrogen sulphide (H_2S) electrochemical, 0 - 50 ppm	PNP-L
Nitric oxide (NO) electrochemical, 0 - 100 ppm	PNP-E
Nitrogen dioxide (NO_2) electrochemical, 0 - 5 ppm	PNP-D
Oxygen (O_2) electrochemical, 0 - 25% volume	PNP-F
Ozone (O_3) electrochemical, 0 - 1 ppm	PNP-G
Phosphine (PH_3) electrochemical, 0 - 1 ppm	PNP-V
Silane (SiH_4) electrochemical, 0 - 1 ppm	PNP-W
Sulphur dioxide (SO_2) electrochemical, 0 - 20 ppm	PNP-P
TVOCs (PID), 0 - 300 ppm	PNP-Y+
TVOCs (PID), 0 - 50 ppm	PNP-Z+
External mounted nickel metal hydride pack	YESAIR BATT OPTION

Accessories

Hard shell carrying case for YESAIR	6010.20
YES logger package, 2 GB flash card, USB cable, YES Viewer software, SD flash card reader	YESAIR-LGRPKG
Handheld probe 10" with 30" of sample hose	YES-HHPROBE-10
External lead acid battery, in carrying case w charger	YES-AIR BATT EXT
YES Viewer information logging software CD	YES-SFTWRE

YES Plus LGA Fifteen Channel Air Quality Monitor

YES Plus LGA, temperature, RH sensors, internal pump, inline filter, rechargeable battery, internal data logging, capacity for 12 gas sensors	YES Plus LGA

Options *(to be added to the end of the product codes above)*

Ammonia (NH_3) electrochemical, 0 - 50 ppm	PNP-H
Arsine (AsH_3) electrochemical, 0 - 2 ppm	PNP-R
Carbon dioxide (CO_2) infrared, 0 - 5,000 ppm	PNP-A+
Carbon dioxide (CO_2) infrared, 0 - 10,000 ppm	PNP-A1
Carbon dioxide (CO_2) infrared, 0 - 20% volume	PNP-A2
Carbon dioxide (CO_2) infrared, 0 - 5% volume	PNP-B
Carbon dioxide (CO_2) infrared, 0 - 100% volume	PNP-B1
Carbon monoxide (CO) electrochemical, 0 - 50 ppm	PNP-C
Carbon monoxide (CO) electrochemical, 0 - 50 ppm (H_2 compensated for use in H_2 background)	PNP-C1
Chlorine (Cl_2) electrochemical, 0 - 5 ppm	PNP-I
Chlorine dioxide (ClO_2), electrochemical, 0 - 1 ppm	PNP-J
Combustibles (catalytic), 0 - 100% LEL	PNP-X
Ethylene (C_2H_4), 0 - 500 ppm	PNP-E1
Ethylene oxide (ETO), 0 - 20 ppm	PNP-E2
Fluorine (F_2) electrochemical, 0 - 2 ppm	PNP-S

Formaldehyde (CH_2O) electrochemical, 0 - 10 ppm	PNP-Q
Hydrogen (H_2) electrochemical, 0 - 1,000 ppm	PNP-K
Hydrogen chloride (HCl) electrochemical, 0 - 30 ppm	PNP-M
Hydrogen cyanide (HCN) electrochemical, 0 - 100 ppm	PNP-N
Hydrogen fluoride (HF) electrochemical, 0 - 10 ppm	PNP-O
Hydrogen sulphide (H_2S) electrochemical, 0 - 50 ppm	PNP-L
Nitric oxide (NO) electrochemical, 0 - 100 ppm	PNP-E
Nitrogen dioxide (NO_2) electrochemical, 0 - 5 ppm	PNP-D
Oxygen (O_2) electrochemical, 0 - 25% volume	PNP-F
Ozone (O_3) electrochemical, 0 - 1 ppm	PNP-G
Phosphine (PH_3) electrochemical, 0 - 1 ppm	PNP-V
Silane (SiH_4) electrochemical, 0 - 1 ppm	PNP-W
Sulphur dioxide (SO_2) electrochemical, 0 - 20 ppm	PNP-P
TVOCs (PID), 0 - 300 ppm	PNP-Y+
TVOCs (PID), 0 - 50 ppm	PNP-Z+

Accessories

Hard shell carrying case for YES Plus LGA	718
YES logger package, 2 GB flash card, USB cable, YES Viewer software, SD flash card reader	YESAIR-LGRPKG
Handheld probe 10" with 30" of sample hose	YES-HHPROBE-10
YES Viewer information logging software CD	YES-SFTWRE

YESAIR *Junior* Essential Air Quality Monitor

Discontinued

YESAIR *Junior*, carbon dioxide (CO_2), temperature & relative humidity sensors plus internal data logging, YES Viewer software, USB cable & carrying case	YESAIR Junior

Accessories

YES logger package, 2 GB flash card, USB cable, YES Viewer software, SD flash card reader	YESAIR-LGRPKG
YES Viewer information logging software CD	YES-SFTWRE

YESDUST Affordable Particulate Sensor

YESDUST, particulate sensor, 1 - 10 micro meters	YESDUST

Notes

Notes

Lai Chi Kok [Hong Kong, China] | **Canada Post** [across BC] | **Revenue Canada Surrey Taxation Centre** [Surrey, BC] | **British Columbia Ambulance Service** [across BC] | **Insurance Corporation of British Columbia** [across BC] | **Canada Place** [Vancouver , BC] | **Centre for Disease Control** [Vancouver, BC] | **Envirotest Canada** [Across Vancouver Lower Mainland] | **Hong Kong International Airport** [Hong Kong, China] | **International Bio Recovery** [North Vancouver, BC] | **Labatt Brewery** [New Westminster, BC] | **Purolator** [across Canada & USA] | **Johns Hopkins Hospital** [Baltimore, MD] | **Vancouver General Hospital Hyperbaric Chamber** [Vancouver, BC] | **Fedex** [across Canada & USA] | **University of Victoria** [Victoria, BC] | **CN Railway** [Richmond, BC] | **Lennox Industries** [Carrollton, TX] | **Pacific Centre** [Vancouver, BC] | **Saskatoon Airport** [Saskatoon, SK] | **Lulu Island Wastewater Treatment Plant** [Richmond, BC] | **Canadian Coast Guard** [Victoria, BC] | **BC Ferries Horseshoe Bay** [North Vancouver, BC] | **Canadian Springs** [Richmond, BC] | **Canadian Food Inspection Agency** [Burnaby, BC] | **Toronto International Airport** [Toronto, ON] | **Metro Commercial Building** [Seattle, WA] | **City Centre Mall** [Edmonton, AB] | **Coquitlam Aquatic** [Coquitlam, BC] | **Costco** [Burnaby, BC] | **University of British Columbia** [Vancouver, BC] | **Lucerne Foods** [Lethbridge, AB] | **Halliburton** [Offshore Rig, NL] | **Canadian Forces Base** [Comox & Esquimalt, BC] | **Metropolis at Metrotown** [Burnaby, BC] | **Seaspan International** [N Vancouver, BC] | **Marriott Hotel** [Whistler, BC] | **Harbor Yard Arena** [Bridgeport, CT] | **UBC TRIUMF** [Vancouver, BC]...

...and many more.

Critical Environment Technologies Canada Inc.

Unit 145, 7391 Vantage Way, Delta, BC, V4G 1M3, Canada

Toll Free: +1.877.940.8741

Tel: +1.604.940.8741

Fax: +1.604.940.8745

www.critical-environment.com