

4.0 Product Overview

4.1 Table of Detectable Gases Defined

The following is a partial list of gases which RKI Instruments can provide detectors for. Please keep in mind this is only a partial list, so if you do not see the particular gas or vapor that you need detected, please contact RKI for assistance in selecting the proper sensor type.

There are some terms used on this list that may need explanation. Please note the following:

4.1.1 TLV / TWA

On the TLV/TWA column for some gases the chart lists HCL, HF, or NO₂ before the gas concentration. This means that the target gas is converted to HCL, HF, or NO₂ in order to be detected. Some gases are very unstable in air, and they will spontaneously convert to another gas such as HCL or HF upon contact with air and moisture. In these cases then, the presence of the target gas can be detected by the presence of the gas it has been converted to.

4.1.2 Diffusion Detector

These are diffusion detector heads that can detect the corresponding gas.

4.1.3 Sample Draw

These are sample drawing detector head models that can detect the corresponding gas.

(See Table Of Detectable Gases on the following page.)

Measurable Gases	Symbol	TLV/TWA	Range	Diffusion Detector	Sample Draw
Acetic Acid	CH ₃ COOH	1.5 ppm	30 ppm	–	GD-K34PF
Ammonia	NH ₃	25 ppm	75 ppm	GD-K8A-NH ₃	GD-K7D2 / GD-K77D
Ammonia	NH ₃	25 ppm	1 ppm / 4 ppm	–	FP-270 / FP-300
Arsine	AsH ₃	0.05 ppm	0.2 ppm	–	GD-K7D2 / GD-K77D
Boron Trichloride	BCl ₃	HCl C 5 ppm	15 ppm	GD-K8A-BCl ₃	GD-K7D2 / GD-K77D
Boron Trifluoride	BF ₃	HF C 3 ppm	9 ppm	–	GD-K7D2 / GD-K77D
Bromine	Br ₂	0.1 ppm	1 ppm	GD-K8A-BR ₂	GD-K7D2 / GD-K77D
Butane	C ₄ H ₁₀	LEL = 1.9%	100% LEL	S-Series / GD-A8 / 61-1000RK / PS2	35-3000RK / GD-D8
Carbon Dioxide	CO ₂	5,000 ppm	2,000 ppm	RI-215A	RI-215D
Carbon Dioxide	CO ₂	5,000 ppm	5,000 ppm	RI-215A	RI-215D
Carbon Dioxide	CO ₂	5,000 ppm	10,000 ppm	RI-215A	RI-215D
Carbon Dioxide	CO ₂	5,000 ppm	5%, 20%, 60%	S-Series / M2 / RI-215A	RI-215D
Carbon Monoxide	CO	25 ppm	150 ppm	GD-K8A-CO	GD-K7D2 / GD-K77D
Carbon Monoxide	CO	25 ppm	300 ppm	M2 / S-Series / M-Series	35-3000RK-CO
Chlorine	Cl ₂	0.5 ppm	3 ppm	GD-K8A-CL ₂	GD-K7D2 / GD-K77D
Chlorine Trifluoride	ClF ₃	0.1 ppm	1 ppm	–	GD-K7D2 / GD-K77D
Combustibles LEL	LEL	–	100% LEL	M2 / S-Series / GD-A8 / 61-1000RK / PS2	35-3000RKA-MOS / GD-D8V
Combustibles PPM	PPM	–	500 ppm	S-Series / GD-A8V / PS2	–
Diborane	B ₂ H ₆	0.1 ppm	0.3 ppm	GD-K8A-B ₂ H ₆	GD-K7D2 / GD-K77D
Dichlorosilane	DCS	HCl 5 ppm	15 ppm	GD-K8A-DCS	GD-K7D2 / GD-K77D
Disilane	Si ₂ H ₆	5 ppm	15 ppm	GD-K8A-Si ₂ H ₆	GD-K7D2 / GD-K77D
Fluorine	F ₂	1 ppm	3 ppm	–	GD-K7D2 / GD-K77D
Germane	GeH ₄	0.2 ppm	0.8 ppm	–	GD-K7D2 / GD-K77D
Halocarbons	HCFC	Various	0 ~ 5,000 (typ)	–	RI-257
Hexane	C ₆ H ₁₄	–	500 ppm	S-Series / GD-A8V / PS2	35-3000RKA-MOS
Hexane	C ₆ H ₁₄	LEL = 1.1%	100% LEL	M2 / S-Series / GD-A8 / 61-1000RK / PS2	35-3000RK / GD-D8
Hydrocarbon LEL	LEL	–	100% LEL	M2 / S-Series / GD-A8 / 61-1000RK / PS2	35-3000RK-LEL / GD-D8
Hydrocarbon PPM	PPM	–	500% LEL	S-Series / GD-A8V / PS2	35-3000RKA-MOS / GD-D8V
Hydrogen LEL	H ₂	LEL = 4%	100% LEL	M2 / S-Series / GD-A8 / PS2 H ₂ Specific / 61-1000RK	35-3000RKA-H ₂ / GD-D8
Hydrogen PPM	H ₂	–	2,000 ppm	H ₂ Specific / GD-A8V-H ₂ / S-Series	GD-D8V-H ₂
Hydrogen Bromide	HBr	C 3 ppm	9 ppm	GD-K8A-HBR	GD-K7D2 / GD-K77D
Hydrogen Chloride	HCl	C 5 ppm	15 ppm	GD-K8A-HCL	GD-K7D2 / GD-K77D
Hydrogen Cyanide	HCN	STEL C 4.7 ppm	30 ppm	GD-K8A-HCN	GD-K7D2 / GD-K77D
Hydrogen Fluoride	HF	C 3 ppm	9 ppm	–	GD-K7D2 / GD-K77D
Hydrogen Iodide	HI	–	5 ppm	–	GD-K7D2H / GD-K77DH
Hydrogen Sulfide	H ₂ S	10 ppm	1 ppm	–	GD-K7D2 / GD-K77D
Hydrogen Sulfide	H ₂ S	10 ppm	30 ppm	GD-K8A	GD-K7D2 / GD-K77D
Hydrogen Sulfide	H ₂ S	10 ppm	100 ppm	M2 / S-Series / M-Series	35-3000RK-H ₂ S / RKA-H ₂ S
Iodine	I ₂	STEL C 0.1 ppm	1 ppm	–	GD-K7D2 / GD-K77D
Isopropyl Alcohol (IPA)	CH ₃ CHOHCH ₃	400 ppm	2,000 ppm	GD-A8V	GD-D8V
Methane	CH ₄	LEL = 5%	100% LEL	M2 / S-Series / GD-A8 / 61-1000RK / PS2	35-3000RK / GD-D8
Nitric Acid	HNO ₃	2 ppm	20 ppm	–	GD-K34PF
Nitric Oxide	NO	25 ppm	100 ppm	GD-K8A-NO	GD-K7D2 / GD-K77D
Nitrogen Dioxide	NO ₂	3 ppm	15 ppm	GD-K8A-NO ₂	GD-K7D2 / GD-K77D
Nitrogen Tetraoxide	N ₂ O ₄	NO ₂ 3 ppm	15 ppm	–	GD-K7D2 / GD-K77D
Nitrogen Trifluoride	NF ₃	10 ppm	30 ppm	–	GD-K8DG / GD-K77DG
Oxygen	O ₂	–	25% / 40%	M2 / S-Series / 65-2513RK / 65-2502RK	35-3000RK-OXY
Ozone	O ₃	0.1 ppm	1 ppm	GD-K8A-O ₃	GD-K7D2 / GD-K77D
Pentane	C ₅ H ₁₂	LEL = 1.5%	100% LEL	M2 / S-Series / GD-A8 / 61-1000RK / PS2	35-3000RK / GD-D8
Phosphine	PH ₃	0.3 ppm	1 ppm	GD-K8A-PH ₃	GD-K7D2 / GD-K77D
Propane	C ₃ H ₈	LEL = 2.1%	100% LEL	M2 / S-Series / GD-A8 / 61-1000RK	35-3000RK / GD-D8
Silane	SiH ₄	5 ppm	15 ppm	GD-K8A-SiH ₄	GD-K7D2 / GD-K77D
Silicon Tetrachloride	SiCl ₄	HCl C 5 ppm	15 ppm	GD-K8A-SiCl ₄	GD-K7D2 / GD-K77D
Silicon Tetrafluoride	SiF ₄	HF C 3 ppm	9 ppm	–	GD-K7D2 / GD-K77D
Sulfur Dioxide	SO ₂	2 ppm	30 ppm	GD-K8A-SO ₂	GD-K7D2 / GD-K77D
Sulfur Tetrafluoride	SF ₄	HF C 3 ppm	9 ppm	–	GD-K7D2 / GD-K77D
Tetraethyl Orthosilicate	TEOS	10 ppm	15 ppm	–	GD-S77DG-TEOS / GD-S8DG-TEOS
Trichlorosilane	TCS	HCl C 5 ppm	15 ppm	–	GD-K7D2 / GD-K77D / GD-S8DG-TCS
Trimethoxy Phosphate	TMP	2 ppm	15 ppm	–	GD-S77DG / GD-S8DG-TMP
Trimethoxyboron	TMB	–	500 ppm	–	GD-S77DG / GD-S8DG - TMB
Tungsten Hexafluoride	WF ₆	HF C 3 ppm	9 ppm	–	GD-K7D2 / GD-K77D
1,1,1-Trichloroethane	C ₂ H ₃ Cl ₃	350 ppm	0 ~ 2,000 ppm	GD-A8V	GD-D8V

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4.3 Components of a Gas Monitoring System:

A gas monitoring system consists of 3 parts: the sensor, transmitter, and controller.

4.3.1 Sensor

The sensor is the actual device that is sensing the gas. Many sensor types are described in the previous section on “Sensing Technologies Offered by RKI” of this manual. Sensors typically last 2 to 4 years, but can last longer or shorter time depending on the nature of the application. Solid State sensors, and Infrared sensors, typically last much longer and it is not uncommon for them to last for 5 to 10 years or more.

4.3.2 Transmitter

Many sensors require a transmitter to amplify the sensor signal, and to convert the gas sensor signals into a standardized output, such as 4-20 mA or modbus, for transmitting the signal to a controller. The transmitter is usually in close proximity to the sensor, and zero and span adjustments must be done at the transmitter. (Note that some sensors and controllers do not require the use of a transmitter for detection of certain gases. The Beacon 110, 200, Pioneer series, and RM-500 systems can accept many sensors directly connected without a 4-20mA transmitter). All RKI transmitters are operated from 24 VDC, and utilize either 2 or 3 wires. In general, even if a sensor can be used without a transmitter, use of a transmitter is often preferred for distances over 300' to 500' to simplify the calibration effort.

4.3.3 Controller

The controller is the device that receives and interprets the signals from the sensors and/or sensor/transmitters. The controller typically provides a readout of the gas concentration, audible and visual alarms for dangerous gas levels, and generally alarm relays for activating an external alarm or other action. RKI has a wide variety of controllers available. We have them for just one sensor, 2 sensors, 4 sensors, 8 sensors, and rack or wall mounting systems for 12 to 16 sensors. Additional controllers can be added to provide hundreds of points of detection.

In some applications it is preferred to send the transmitter signal (such as 4-20 mA or modbus) directly into a PLC (Programmable Logic Controller) or other similar control device. In this case, the alarm conditions and relays are activated by the PLC and the use of a “Gas Detection” controller supplied by RKI is not necessary.

Note: RKI offers a category of instruments called “Stand Alone” units. This is a single point gas monitor that includes the sensor and transmitter or sensor and controller in one enclosure. (In this case no additional transmitter is needed). This typically also has a readout of the gas concentration and the sensor/controllers also include alarm(s) with relays. Use of this type of unit is very convenient in situations where only one gas and one location needs to be monitored, since wiring and installation costs are reduced. This style may also have a 4-20 mA or other output, so that it can be connected to a controller or PLC, if desired.

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4.4 Fixed Systems Product Classifications

4.4.1 Controllers – CSA Classified to Canadian and US Standards

Beacon 110

72-2110RK-XX Single Channel Wall-Mount Pending - C/US

Beacon 200

72-2102RKTwo Channel Wall Mount C/US

Beacon 800

72-2108RK Eight Channel Wall MountCSA, NRTL/C

Pioneer 4W

72-2040RK Four Channel Wall MountCSA, NRTL/C

4.4.2 Explosion Proof Detector Assemblies - Class I Div. 1, Group B, C, D Hazardous Locations

M2 Series

65-2610RK	M2 % LEL sensor / transmitter with j-box	UL
65-2610RK-05	M2 % LEL sensor / transmitter with j-box	CSA
65-2611RK	M2 % LEL, hydrogen specific sensor / transmitter with j-box	UL
65-2611RK	M2 % LEL, hydrogen specific sensor / transmitter with j-box	UL
65-2613RK-05	M2 Oxygen (O2) 0 - 25% sensor (capillary type) / transmitter with j-box, explosion proof	CSA
65-2615RK-05	M2 Hydrogen Sulfide (H2S) 0 - 100 ppm sensor / transmitter with j-box	CSA
65-2616RK-05	M2 Carbon Monoxide (CO) 0 - 300 ppm sensor / transmitter with j-box	CSA
65-2619RK-CH4	M2 IR, % LEL Methane (CH4), sensor / transmitter, with j-box, UL version (available March 2006)	UL
65-2619RK-HC	M2 IR, % LEL Hydrocarbons (isobutane), sensor / transmitter with j-box	UL

S Series

65-2400RK	S-Series LEL sensor / transmitter with explosion proof j-box	UL
65-2400RK-05	S-Series LEL sensor / transmitter with explosion proof j-box	CSA
65-2440RK	S-Series LEL sensor / transmitter with explosion proof j-box	UL
65-2450RK	S-Series LEL Hydrogen (H2) specific sensor / transmitter with explosion proof j-box	UL
65-2450RK-05	S-Series LEL Hydrogen (H2) specific sensor / transmitter with explosion proof j-box	CSA
65-2460RK	S-Series PPM Hydrocarbon sensor / transmitter, MOS, (0-500 ppm typical) with linearizing amplifier and explosion proof j-box	UL
65-2422RK-05	S-Series Hydrogen Sulfide (H2S) sensor / transmitter with explosion proof j-box	CSA

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S Series (Continued)

65-2432RK-05	S-Series Carbon Monoxide (CO) sensor / transmitter with j-box	CSA
65-2390RK-CH4	S-Series IR, % LEL Methane (CH4), sensor / transmitter with j-box	UL
65-2390RK-HC	S-Series IR, % LEL Hydrocarbon (isobutane), sensor / transmitter with j-box, UL version	UL
65-2391RK-03	S-Series IR, 0-5% volume CO2, sensor/transmitter with j-box, UL version	UL

Direct Connect with J-Box

65-2427RK-05	Sensor, Hydrogen Sulfide (H2S) with j-box	CSA
65-2437RK-05	Sensor, Carbon Monoxide (CO) with j-box	CSA
61-1000RK	Sensor, LEL combustible with explosion proof j-box (no transmitter)	UL
61-1000RK-05	Sensor, LEL combustible with explosion proof j-box (no transmitter)	CSA
61-1001RK	Sensor, LEL Hydrogen (H2) specific with explosion proof j-box (no transmitter)	UL
61-1003RK-CH4	Sensor, LEL Methane (CH4), IR, with j-box, UL version	UL
61-1003RK-HC	Sensor, LEL HC (isobutane), IR, with j-box, UL version	UL
65-2515RK	Sensor, Oxygen (O2), capillary type, explosion proof with conduit mounting and j-box (no transmitter)	CSA

Direct Connect, No J-Box

65-2423RK-05	Sensor, Hydrogen Sulfide (H2S), direct connection (no transmitter, no j-box)	CSA
65-2433RK-05	Sensor, Carbon Monoxide (CO), direct connection (no transmitter, no j-box)	CSA
61-0140RK	Sensor, LEL combustible, direct connection (no transmitter, no j-box)	UL
61-0140RK-05	Sensor, LEL combustible, direct connection (no transmitter, no j-box)	CSA
NC-6234-01	Sensor, LEL Hydrogen (H2) specific, 1/2 NPT, with guard	UL
NC-6234-05	Sensor, LEL Hydrogen (H2) specific, 1/2 NPT, with CSA guard	CSA
61-0190RK-CH4	Sensor, IR, LEL Methane (CH4), direct connection (no transmitter, no j-box)	UL
61-0190RK-HC	Sensor, IR, LEL HC (isobutane), direct connection (no transmitter, no j-box)	UL
65-2514RK	Sensor, Oxygen (O2), capillary type, explosion proof, (no transmitter, no j-box)	CSA

