GasSens

Modular Gas Detector

D12Ex-IR Infrared Gas Transmitter

OVERVIEW

Infrared detection of methane and other combustible gases is a reliable technique that avoids potential sensor poisoning. In addition, IR sensors are inherently "failsafe" providing fast detection of a sensor failure. Model D12Ex-IR provides this IR detection capability in an explosion-proof package suitable for almost any industrial environment.

IR COMBUSTIBLE GAS OR CO_2 DETECTION

D12Ex-IR transmitters provide analog signals for remote interface and optional relays for local alarming functions. Two digital communication options, Modbus™ and Hart™, are also available. Certified for use in explosion hazard areas, the unit provides rapid and reliable detection of hazardous conditions so that protective measures can be activated.

The D12Ex-IR is also available with an infrared sensor designed for CO_2 measurements in ambient air or in pumped gas samples. Two carbon dioxide sensors may be specified, one for low range use and another for higher levels of CO_2. The low range sensor may be scaled from 0–1000 ppm minimum to 0–5% maximum, while the high range sensor covers ranges from 0–10% minimum to 0–50% maximum.

SENSOR SELECTION

The basic sensing element installed in the D12Ex-IR sensor housing is selected based on the measuring application. Four sensors are available as follows:

HC Low level hydrocarbon sensor designed for detecting methane, propane, and various other flammable gases in air, below their respective LEL. Also includes a high range setting for monitoring methane above its UEL.

HHC High range hydrocarbon sensor designed for 0–100 %VOL concentrations of propane, butane, LP gas and others for monitoring levels above the UEL.

CO_2-L Carbon dioxide sensor for ppm measurement or % levels of 5% or below.

CO_2-H Carbon dioxide sensor for high levels from 10% to a maximum of 50%.







PROGRAMMED HYDROCARBONS

In addition to methane, the D12Ex-IR may be used to monitor for a wide variety of combustible gases and vapors. The unit is factory programmed with response factors (K-factor) to adjust the unit for other combustibles. You simply select the gas from the menu contained in the transmitter. The table below is a list of gases and vapors for which the D12Ex-IR is factory-programmed.

Gas	LEL %VOL	UEL %VOL	Relative Density	K-factor
Acetone	2.50	12.80	1.2	3.280
Chloromethane	8.10	17.40	1.7	4.970
Cyclopentane	1.10	8.70	1.6	1.620
Dichloroethane	5.40	11.40	1.2	8.570
Ethane	3.00	12.40	1.05	1.010
Ethanol	3.30	19.00	1.6	1.650
Ethyl acetate	2.00	11.50	1.2	1.690
Ethylene	2.70	36.00	0.98	2.837
Ethylene oxide	3.00	100.00	1.5	0.845
Hexane	1.20	7.50	1.3	0.872
MEK	1.40	11.40	1.1	1.870
Methanol	6.00	36.00	1.01	2.220
n-Butane	1.60	8.40	2.11	0.970
Pentane	1.50	7.80	1.8	0.950
Propanol	2.00	12.70	1.02	1.430
Propylene	2.00	11.10	1.5	1.690
Toulene	1.10	7.10	1.01	1.180
Xylene	1.10	7.00	1.02	1.510

Badger Meter

ATI-DS-05524-EN-01 (July 2026)

Product Data Sheet

FEATURES

Combustible Sensor Options	For %LEL or high concentration hydrocarbons (up to 100% V/V).
Carbon Dioxide Sensor Options	For low or high level monitoring.
Three Internal Alarm Relays	For local alarm functions. All relays are programmable for setpoint, hysteresis, on-delay and off-delay.
Digital Communications	Options for either Hart™ or Modbus™ RTU.
Backlit LCD Graphics Display	Shows gas concentration in large, easy to read numbers. The display also provides alarm indication and complete menus for setting operating parameters.
Explosion-proof	Package with epoxy-coated cast aluminum enclosure and stainless steel sensor.
Internal Data Logger	Stores gas values at user definable intervals. Data can be recalled when needed on the LCD display or downloaded using an ASCII interface to terminal or printer.
Sensor Calibration History	Is stored each time a sensor is zeroed or spanned. Calibration history can be recalled and sensor condition reviewed whenever necessary.
Non-intrusive Operation	Allows calibration, alarm setup, alarm reset, data view and transmitter configuration using a magnetic tool.
Output Simulation	Provides easy testing of connected devices.

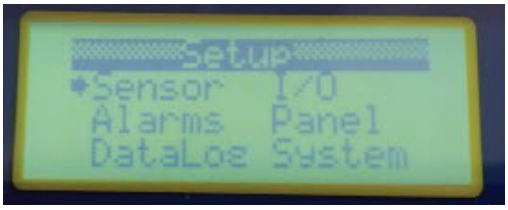


Figure 1: Setup

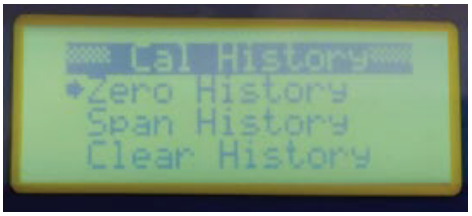


Figure 2: Cal history



Figure 3: D12Ex-IR remote sensor

Remote Sensor Option

The location of an IR sensor depends on the density of the target gas. For methane detection, sensors are often located near the ceiling while detection of heavier gases such as propane or liquified petroleum gas (LPG) require the sensor be mounted lower. D12Ex-IR systems are available with a remote sensor option for methane applications or with an integral sensor for heavier combustibles.

Using a remote sensor option allows the display and control unit to be located where it is convenient for operators. A remote calibration adapter and fixed tubing can be installed so that sensor testing and calibration can be done from floor level.

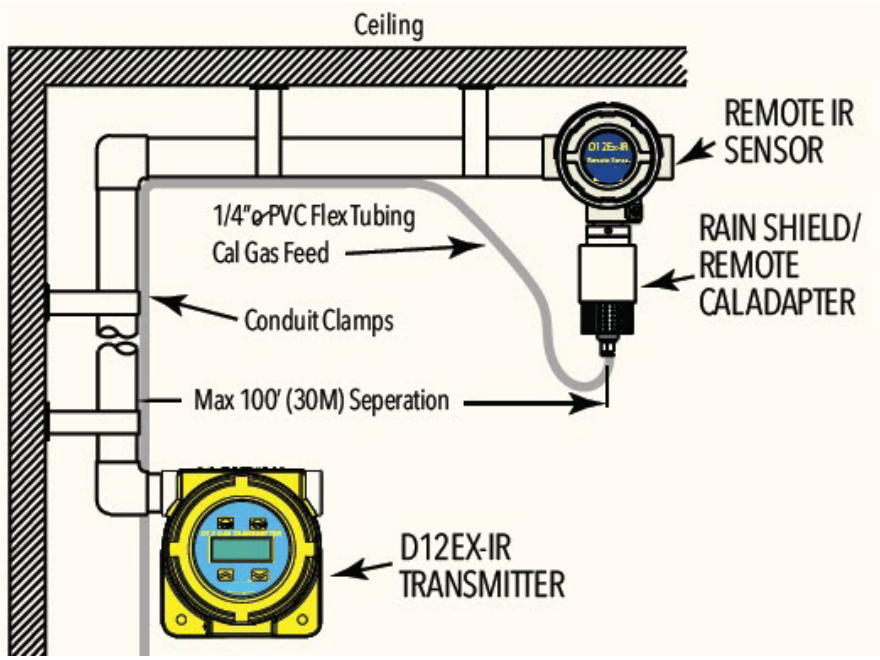


Figure 4: Location of the IR sensor

SPECIFICATIONS

Gas Type	Methane: 0–50/100% LEL (also 0–100% V/V CH4) Carbon Dioxide:0–1000 ppm/5% or 0–10/50% High Hydrocarbons: 0–10/100% V/V Nitrous Oxide: 0.1–1% or 0–1000 ppm	**Digital Output**	Hart™ (1200 baud modem interface) Modbus™ (1200-9600 – RS232 or RS485)
Sensor Type	Single path Non-dispersive Infrared (NDIR)	**Power**	12–30V DC, 250 mA maximum, 3/4-wire connection
Sensor Separation	Maximum 100 foot cable from remote sensor to transmitter	**Optional Relays**	Three SPST, 5 A @ 230V AC or 30V DC resistive
Response Time	T_{50} = 10 seconds, T_{90} = 20 seconds	**Relay Coil**	Programmable either normally energized or normally de-energized
Accuracy	2% for methane, propane, CO_2 and special orders +/-6% range for HC gases using k-factors	**Certifications**	Class 1, Div. 1, Groups B, C, & D, T6 Class 1, Zone 1, AEx d IIB T6 IEC Ex db IIC T6 Gb; ATEX II 2 G Ex db IIC T6 Gb 2014/30/EU – EMC Directive 2014/35/EU – Low Voltage Directive 2014/34/EU – ATEX Directive 2011/65/EU – RoHS Directive
Repeatability	±1%	**Temperature**	–20 to 60 °C
Zero Drift	Less than 1% full scale per month, non-cumulative	**Humidity**	0–99% Non-condensing
Span Drift	Dependent on environment, typically less than 1% per month	**Weight**	7.2 lb (2.3 kg)
Analog Output	4-20 mA, 600 ohms maximum at 24V DC		

ORDERING INFORMATION

D2-xx-xx-x D12Ex-IR Infrared Gas Transmitter

Suffix A – Number of Sensors	
S1	1 Sensor
XX	None

Suffix B – Enclosure	
1D	Integral sensor holder, no relays
2D	Integral sensor holder, with relays
3D	Remote sensor holder, no relays
4D	Remote sensor holder, with relays

Suffix C – Digital Outputs	
1	None
7	Modbus interface
8	Hart™ interface

Sensors		Measurement Range	
80	Carbon dioxide (CO_2)	P00F	1–5%
		P00B	10–50%
81	Combustible	P00C	10–100% LEL
		P00D	10–100% Vol Methane
82	HydroCarbon (High)	P00E	10–100% VOL
83	Nitrous oxide (N_2O)	P00A	0.1–1%
		P00G	0–1000 ppm

NOTE: Sensor selection is part of the ordering information. Sensor is shipped external to the transmitter.

Accessories

60-0068	Splash guard / remote calibration adapter
60-0069	Sensor flow cell/calibration adapter



Trademarks appearing in this document are the property of their respective entities. Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists. © 2026 Badger Meter, Inc. All rights reserved.