IR Combustible Gas Detection

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. ATI's Model D12Ex-IR provides this IR detection capability in an explosion-proof package suitable for almost any industrial environment.

ATI
ANALYTICAL TECHNOLOGY, INC.

Model **D12Ex-IR**

Gas Transmitter

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.

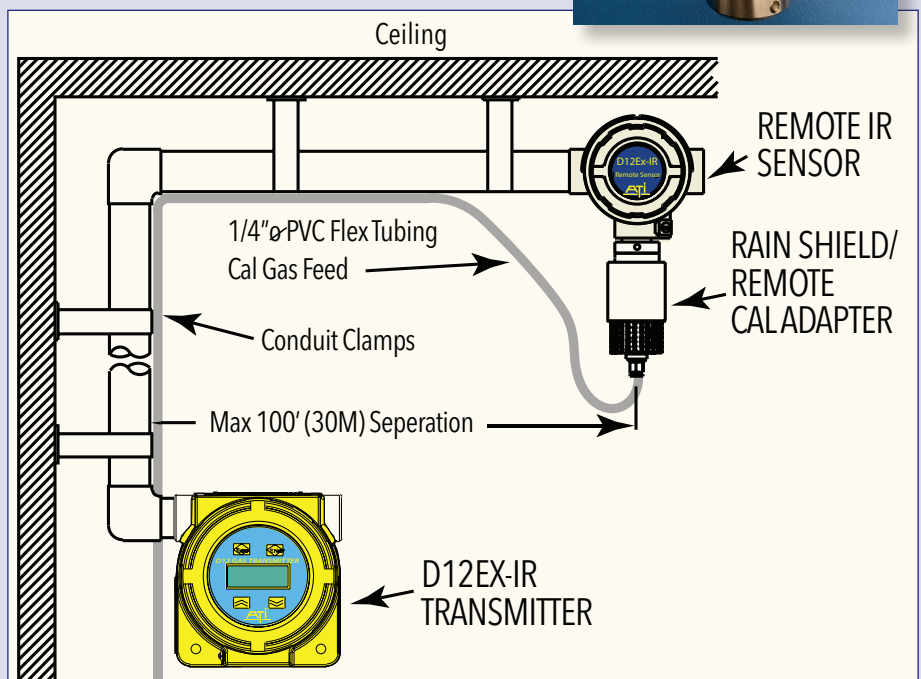| Gas	LEL %VOL	UEL %VOL	Relative Density	K Factor
Acetone	2.50	12.80	1.2	3.280
Chloromethane	8.10	17.40	1.7	4.970
Cyclopentane	1.10	8.70	1.6	1.620
Dichloroethane	5.40	11.40	1.2	8.570
Ethane	3.00	12.40	1.05	1.010
Ethanol	3.30	19.00	1.6	1.650
Ethyl acetate	2.00	11.50	1.2	1.690
Ethylene	2.70	36.00	0.98	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
Toluene	1.10	7.10	1.01	1.180
Xylene	1.10	7.00	1.02	1.510

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.
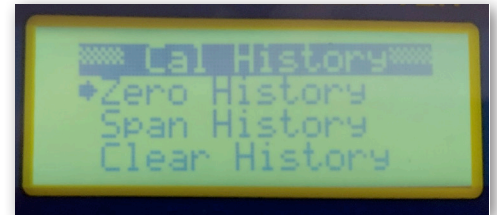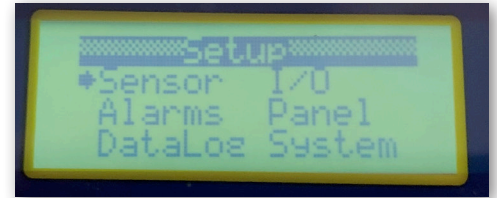
REMOTE SENSOR OPTION

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.

SPECIFICATIONS

Gas Type:	Methane: 0-50/100% LEL (also 0-100% V/V CH_4) Carbon Dioxide: 0-1000 PPPM/5% or 0-10/50% High Hydrocarbons: 0-10/100% V/V
Sensor Type:	Single path Non-dispersive Infrared (NDIR)
Sensor Separation:	Maximum 100' cable from remote sensor to transmitter
Response Time:	T_{50} = 10 seconds, T_{90} = 20 seconds
Accuracy:	2% for methane, propane, CO_2, and special orders +/-6% range for HC gases using k-factors
Repeatability:	±1%
Zero Drift:	Less than 1% full scale per month, non-cumulative
Span Drift:	Dependent on environment, typically less than 1% per month
Analog Output:	4-20 mA, 600 ohms maximum at 24 VDC
Digital Output:	HART™ (1200 baud modem interface) MODBUS™ (1200-9600 – RS232 or RS485)
Power:	12–30 VDC, 250 mA maximum, 3/4-wire connection
Optional Relays:	Three SPST, 5 A @ 230 VAC or 30 VDC resistive
Relay Coil:	Programmable either normally energized or normally de-energized.
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** ⟨Ex⟩ 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
Temperature:	-20° to +60° C
Humidity:	0-99% Non-Condensing
Weight:	7.2 Lbs (2.3 Kg.)

ORDERING INFORMATION:

MODEL D12Ex-IR – A – B Transmitter

SUFFIX A – TRANSMITTER TYPE

1 – Integral sensor holder, no relays

2 – Integral sensor holder, with relays

3 – Remote sensor holder, no relays

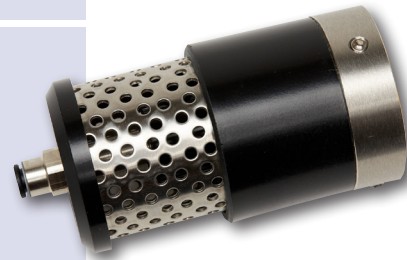4 – Remote sensor holder, with relays

SUFFIX B – DIGITAL OUTPUT

1 – None

2 – MODBUS™ interface

3 – HART™ interface

SENSORS (Order Separately)

00-1905 HC Combustible Gas

00-1906 HHC High Hydrocarbon

00-1904 CO_2-L, Low Carbon Dioxide

00-1903 CO_2-H High Carbon Dioxide

Accessories

60-0068 Splash guard / Remote calibration adapter

60-0069 Sensor Flow Cell/Calibration Adapter

Splash Guard/
Remote Cal Adapter

Flowcell/
Cal Adapter

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