3M™ Detcon™ Model IR-700-CO₂
Carbon Dioxide Sensor

Description

Detcon Model IR-700-CO₂ is a non-intrusive “Smart” sensor designed to detect and monitor carbon dioxide gas in air using miniature non-dispersive Infrared Optical (NDIR) sensor technology. Available in a low and a high range version, ranges of detection (by volume) are 0-0.3%, 0-1%, 0-3%, 0-5% (low range version) and 0-10%, 0-25%, 0-50%, and 0-100% (high range version). The plug-in, field replaceable detector provides a selective response to CO₂ and features over-sized gold-plated connections that help prevent corrosion. The Model 700’s rugged framework includes an electro-polished 316 stainless steel housing with fully encapsulated electronics and dual layer surge protection. This innovative design virtually eliminates sensor failure due to water ingress, corrosion, vibration, and transient spikes. A primary feature of the Model IR-700-CO₂ is embedded intuitive software that simplifies operator interface by guiding the user through routine calibration, configuration, and fault diagnostic functions using a built-in alpha/numeric display. The Model IR-700-CO₂ is equipped with standard analog 4-20mA, and Modbus™ RS-485 outputs. Additional integration options include a Remote Alarm Module (RAM) & HART. Detcon’s carbon dioxide gas sensor has an infinite shelf life and is supported by a 5-year pro-rated warranty.

Applications

- Chemicals
- Pesticides
- Agriculture & Horticulture
- Food & Beverage Bottling Plants
- Sewer Entry
- Waste Water Treatment Plants
- Coal Gasification
- Pulp & Paper Mills
- Enhanced Oil Recovery

Features

Failsafe User-Friendly Interface
- LED Display (With Antiglare Cover)
- Full Text Display Method
- Non-intrusive Interface
- Auto Zero/Auto Span
- Pre-emptive Fault Diagnostics

Environmentally Resistant
- Electropolished 316SS Construction
- 100% Epoxy Encapsulated Circuitry
- I/O Protection
- Water-Resistant, Corrosion-Resistant Vibration-Resistant

Modular and Serviceable
- Modular Design
- Plug and Play Components
- Quick Thread Release (For Sensor Replacement)
- Integral Calibration Port
System Specifications

Sensor Type
- Continuous diffusion/adsorption
- Non-dispersive Infrared Optical (NDIR) - CO₂
- Sub-miniature plug-in field replaceable

Sensor Life
- 5 years typical

Measurement Range (% by volume)
- 0-0.3, 0-0.5, 0-1, 0-3, 0-5 (low range version)
- 0-10, 0-15, 0-20, 0-25, 0-50, 0-100 (high range version)

Accuracy/Repeatability
- ±5% of range

Response Time
- T50 < 15 seconds, T90 < 40 seconds

Outputs
- Linear 4-20 mA DC
- RS-485 MODBUS-RTU

Electrical Classification
- Explosion proof
  - cCSAus
  - II G Ex d IIB + H2
  - ATEX
  - II 2 G Ex d IIB + H2 T4 Gb (Tamb = -40°C to +70°C)

Ingress Protection
- NEMA 4X, IP66

Safety Approvals
- cCSAus
- ATEX
- CE Marking

Warranty
- Plug-in detector - 5 year pro-rated
- Transmitter - 2 Years

Environmental Specifications

Operating Temperature Range
- -40°F to +167°F; -40°C to +75°C

Storage Temperature Range
- -40°F to +167°F; -40°C to +75°C

Operating Humidity Range
- 0-100% RH non-condensing

Specifications subject to change without notice

Order Guide
Specify junction box options (below)
PN 967-405520-005  IR-700-CO2 (5% Range) Sensor Assembly (no J-box)
PN 967-401520-005  IR-700-CO2 (5% Range) Sensor Assembly with Aluminum J-Box
PN 967-404520-005  IR-700-CO2 (5% Range) Sensor Assembly with 316 SS J-Box
PN 967-425520-025  IR-700-CO2 (25% Range) Sensor Assembly (no J-box)
PN 967-421520-025  IR-700-CO2 (25% Range) Sensor Assembly with Aluminum J-Box
PN 967-424520-025 IR-700-CO2 (25% Range) Sensor Assembly with 316 SS J-Box

Integration Options
Remote Alarm Module (Remote Operation and 2 Alarm Relays plus Fault)
Hart Integration Module (Hart Communication Protocol version 7.0, HART Registered)

Electrical Specifications

Power Input
- 11-30 VDC

Power Consumption
- Normal operation = 68mA (<1.7 watt)
- Maximum = 85mA (2 watts)

Inrush Current
- 0.67A @ 24V

RFI/EMI Protection
- Complies with EN50270

Analog Output
- Linear 4-20mA DC (1,000 ohms max loop load @ 24VDC)
  - 0mA  All Fault Diagnostics
  - 2mA  In-Calibration
  - 4-20mA  0-100% full-scale
  - 22mA  Over-range condition

Serial RS-485 Output
- RS-485 Modbus™ RTU

Baud Rate
- 9600 BPS (9600,N,8,1 Half Duplex)

Status Indicators
- 4-digit LED display with gas concentration
- Full-script menu prompts for AutoSpan, Set-up Options, and Fault Reporting

Faults Monitored
- Loop, Input Voltage, Zero, Sensor, Processor, Memory, Calibration

Cable Requirements
- Power/Analog
  - 3-wire shielded cable
  - Maximum distance is 13,300 feet with 14 AWG
- Serial Output
  - 2-wire twisted-pair shielded cable specifically for use with RS-485 installations
  - Maximum distance is 4,000 feet to last sensor

I/O Protection
- Over-voltage, Miswiring, EMI/RFI Immunity

Mechanical Specifications

Dimensions
- 7”H x 2.2” Dia.; 178mmH x 65mm Dia.  (sensor assembly only)
- 11”H x 6.1”W x 3.75”D; 280mmH x 155mmW x 96mmD  (with junction box)
- Mounting holes (J-box) 5.5”; 140mm center to center

Weight
- 2 lbs; 0.907kg (sensor only)
- 6 lbs; 2.72kg (w/aluminum j-box)
- 9 lbs; 4.08kg (w/stainless steel j-box)