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detcon

Model Series 700

Environmentally Bulletproof Gas Detection Sensors

Multi-Layer Surge Protection
Water-Proof
Corrosion-Proof



▼
CHEMFET MOS
Solid State H₂S Sensor

▼
CATALYTIC
Combustible Gas Sensor

▼
INFRARED
Combustible Hydrocarbons & CO₂ Sensors

▼
ELECTROCHEMICAL
Range of Toxic Compound Sensors

▼
OXYGEN
O₂ Deficiency Sensor

▼
PHOTO IONIZATION
Volatile Organic Compound Sensors

DC
detcon inc.

Catalog #700-0505

www.detcon.com

ISO 9001 • Certified

Model Series 700

Description

Detcon Model Series 700 industrial gas detection sensors are a new generation of intelligent sensor modules that incorporate and integrate several leading edge improvements. The sensors are specifically designed for harsh and extreme locations. This new and superior level of environmental durability in sensor design includes an electropolished 316 stainless steel housing, multi-layered transient spike protection circuitry and 100% epoxy encapsulated electronics. The sensor electronics are completely protected and immune to water ingress and corrosion. The gas detector sensor elements are all plug-in components and can easily be replaced in the field. Operator interface is non-intrusive via a small handheld magnet. Configuration and routine calibration is intuitive and menu driven with fully scripted instructions. Sensor status is displayed on a built-in alphanumeric LED display. Model Series 700 intelligent sensor modules feature dual redundant outputs, a linear 4-20 milliamp analog signal and a Modbus RS-485 serial output.

It is becoming increasingly important for safety systems to be able to meet the Safety Integrity Level (SIL) requirements of IEC 61508 and IEC 61511. The SIL rating can only be determined by considering the complete safety system. The Detcon 700 series sensor modules are designed with this in mind and feature a new and unmatched level of pre-emptive fault diagnostics. Application variables like input voltage range, operating temperature range, maintenance schedule, detector reliability and output integrity are all monitored and reported via the 4-20 mA and RS-485 serial output. As a component of a SIL rated system, the Safe Failure Fraction (SFF) of Detcon Model Series 700 sensors meet the requirements for any SIL 2 rated system.

Model Series 700 sensors utilize six distinctive gas detection technologies to satisfy a wide range of industrial applications that require monitoring of oxygen, toxic and flammable gases.

Sensors for Hydrogen Sulfide



CHEMFET MOS Solid State Technology

Harsh and Extreme Locations
Wide Temperature & Humidity Range
10-year Sensor Warranty



Electrochemical Technology

Quick Response Time
Long Term Calibration Stability
Low Power Consumption
Quick Response Time

Sensors for Combustible Gas



Catalytic Technology

Non-selective Combustible Gas Detector
3 to 5 Year Life Expectancy
Rugged Construction



Infrared Technology

Combustible Hydrocarbon Gas Detector
5-Year Warranty
Self Diagnostic Optical Detector

Sensors for Toxic Gases



Electrochemical Technology

Quick Response Time
Long Term Calibration Stability
Low Power Consumption



Photo Ionization Technology

Universal Non-Selective VOC Sensor
Miniature Plug-in Detector

Oxygen Sensors



Electrochemical Technology

Quick Response Time
Embedded Temperature Compensation
2-year Sensor Warranty

Anatomy of a Model 700 Series Sensor Assembly



T echnology Features

Environmentally Bulletproof

- ▶ **Electropolished 316SS Construction**
- ▶ **100% Epoxy Encapsulated Circuitry**
- ▶ **Bullet-Proof I/O Protection**
 - Over-voltage
 - Miswiring
 - EMI/RFI Immunity
- ▶ **Water-Proof, Corrosion-Proof**

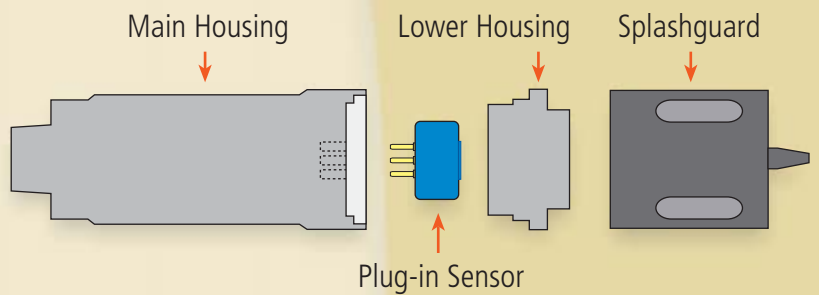


Oversized Gold Plated Mating Pins



Modular and Serviceable

- ▶ **Modular Design**
- ▶ **Plug and Play Components**
- ▶ **Limited Spare Parts**
 - Universal Design Concept
- ▶ **Quick Thread Release**
 - For Sensor Replacement
- ▶ **Integral Calibration Port**



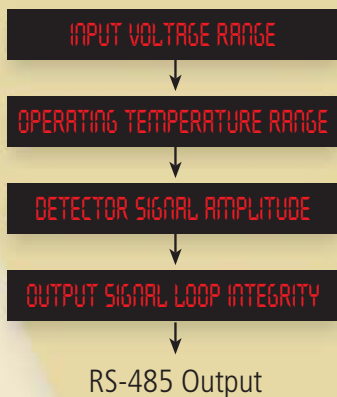
Failsafe User-Friendly Interface

- ▶ **LED Display**
 - With Antiglare Cover
- ▶ **Full Text Display Method**
- ▶ **Non-intrusive Interface**

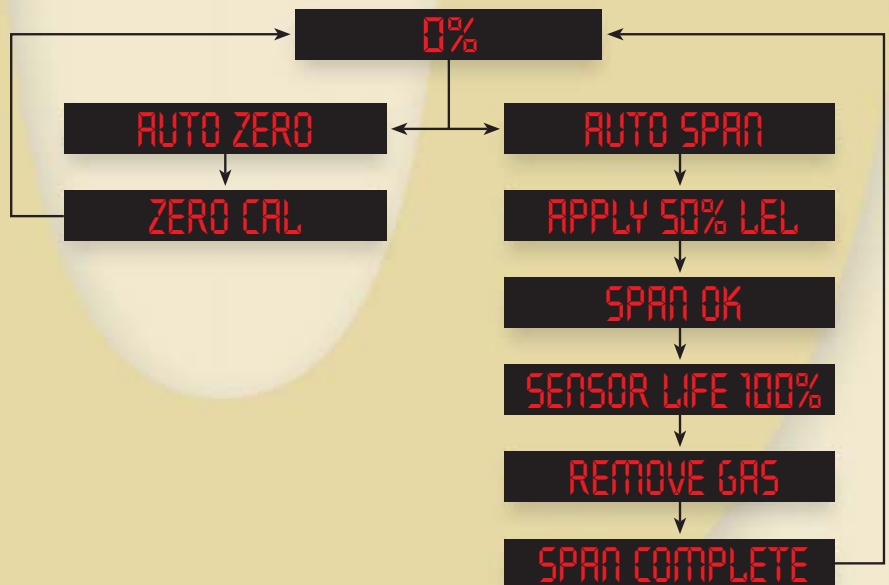
Scrolling Full Message/Text Display



**Pre-emptive
Fault Diagnostics**



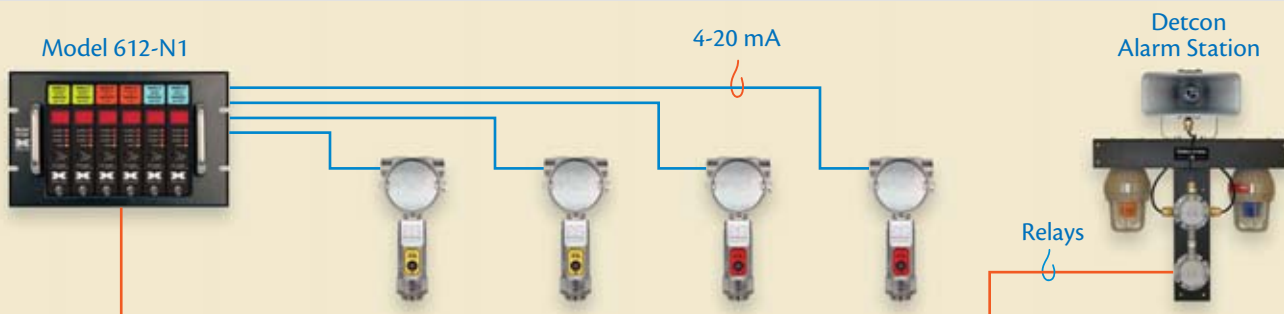
**Auto Zero/Auto Span
Sequence**



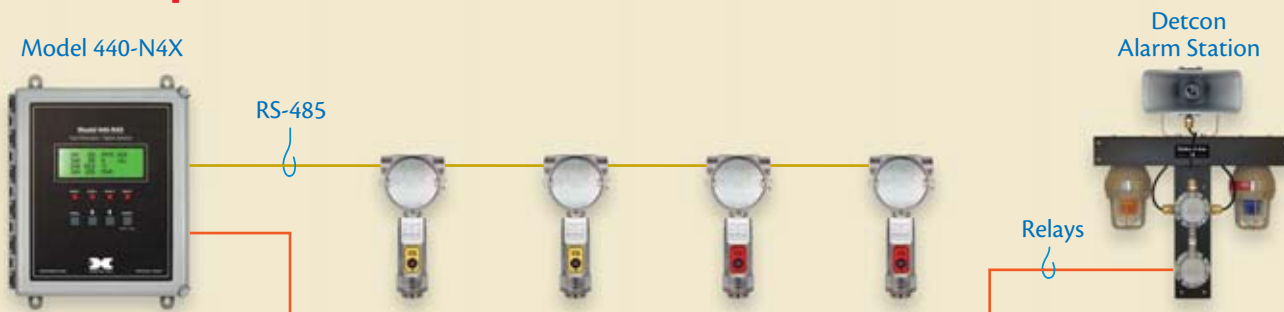
Installation & Integration Options

Model Series 700 gas detectors provide the end-user with a wide variety of output & integration options. The standard intelligent sensor module features an industry standard 4-20 mA output and a RS-485 MODBUS RTU interface. These outputs can be used simultaneously. Additional integration options include a Remote Display/Relay module and communication interface modules for HART, Foundation Fieldbus, Modbus TCP and, Profibus. Shown below are some typical system integration approaches.

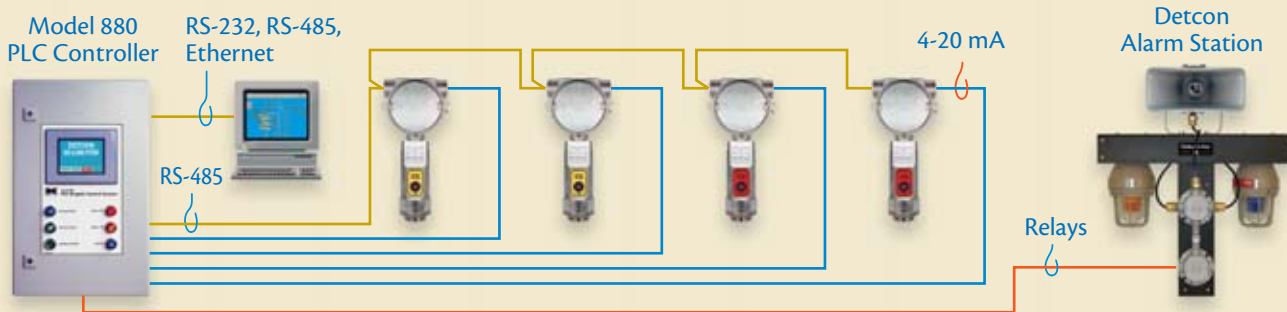
4-20 mA



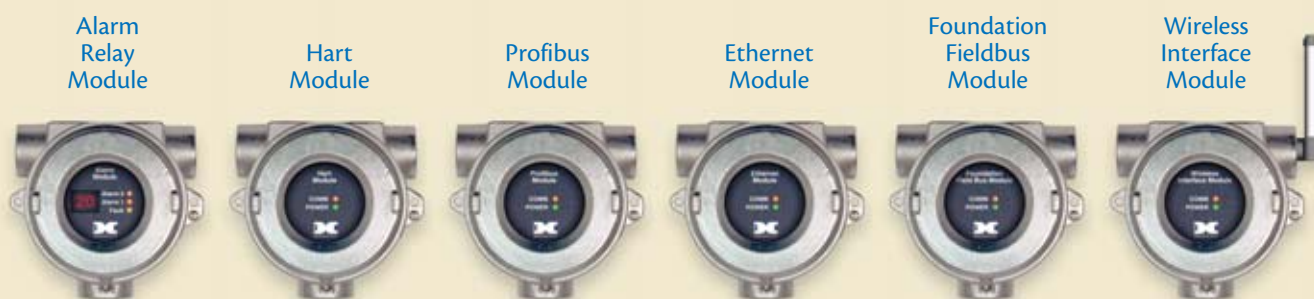
Serial Input



Redundant Interface - 4-20 mA & Serial



Wide Range DCS/DAS Integration Options



Ordering Information

Combustible Gas Sensor (matched pair catalytic bead)

Model #	Gas/Symbol	Range*	Temperature	Warranty**
FP-700	Combustible Gas	0-100 % LEL	-40°C to +75°C	2 Years

Hydrogen Sulfide Gas Sensor (solid state metal oxide semiconductor)

Model #	Gas/Symbol	Range*	Temperature	Warranty**
TP-700	Hydrogen Sulfide/H2S	0-100 ppm	-40°C to +75°C	10 Year conditional

Oxygen Gas Sensor (galvanic metal air battery)

Model #	Gas/Symbol	Range*	Temperature	Warranty**
DM-700-O2	Oxygen/O2	0-25 %	-20°C to +50°C	2 Years

Combustible Hydrocarbon & Carbon Dioxide Gas Sensors (non-dispersive infrared optical - NDIR)

Model #	Gas/Symbol	Range*	Temperature	Warranty**
IR-700-CH	Combustible Hydrocarbons	0-100 % LEL	-40°C to +75°C	5 Years pro-rated
IR-700-CO2	Carbon Dioxide/CO2	0-3 %	-40°C to +75°C	5 Years pro-rated

Volatile Organic Compound (VOC) Gas Sensors (photo ionization detector - PID)

Model #	Gas/Symbol	Range*	Temperature	Warranty**
PI-700-VOC	Volatile Organic Compounds	0-10 ppm	-20°C to +50°C	6 Months
PI-701-VOC	Volatile Organic Compounds	0-1,000 ppm	-20°C to +50°C	6 Months

Toxic Gas Sensors (electrochemical fuel cell)

Model #	Gas/Symbol	Range*	Temperature	Warranty**
DM-700-C2H3O	Acetaldehyde/C2H3O	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C2H2	Acetylene/C2H2	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C3H3N	Acrylonitrile/C3H3N	0-100 ppm	-20°C to +50°C	2 Years
DM-702-NH3	Ammonia/NH3	0-100 ppm	-40°C to +50°C	2 Years
DM-700-AsH3	Arsine/AsH3	0-1 ppm	-20°C to +40°C	1 1/2 Years
DM-700-Br2	Bromine/Br2	0-5 ppm	-20°C to +50°C	2 Years
DM-700-C4H6	Butadiene/C4H6	0-100 ppm	-20°C to +50°C	2 Years
DM-700-CS2	Carbon Disulfide/CS2	0-100 ppm	-20°C to +50°C	2 Years
DM-700-CO	Carbon Monoxide/CO	0-100 ppm	-40°C to +50°C	3 Years
DM-700-COS	Carbonyl Sulfide/COS	0-100 ppm	-20°C to +50°C	2 Years
DM-700-Cl2	Chlorine/Cl2	0-10 ppm	-20°C to +50°C	2 Years
DM-701-ClO2	Chlorine Dioxide/ClO2	0-1 ppm	-20°C to +50°C	2 Years
DM-700-B2H6	Diborane/B2H6	0-5 ppm	-20°C to +40°C	1 1/2 Years
DM-700-C2H6S	Dimethyl Sulfide/C2H6S	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C3H5OCl	Epichlorohydrin/C3H5OCl	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C2H5OH	Ethanol/C2H5OH	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C2H5SH	Ethyl Mercaptan/C2H5SH	0-100 ppm	-40°C to +50°C	2 Years
DM-700-C2H4	Ethylene/C2H4	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C2H4O	Ethylene Oxide/C2H4O	0-100 ppm	-20°C to +50°C	2 Years
DM-700-F2	Fluorine/F2	0-1 ppm	-10°C to +40°C	1 1/2 Years
DM-700-CH2O	Formaldehyde/CH2O	0-100 ppm	-20°C to +50°C	2 Years
DM-700-GeH4	Germane/GeH4	0-2 ppm	-20°C to +40°C	1 1/2 Years
DM-700-N2H4	Hydrazine/N2H4	0-1 ppm	-10°C to +40°C	1 Year
DM-700-H2	Hydrogen/H2	0-100 ppm	-20°C to +50°C	2 Years
DM-701-H2	Hydrogen/H2	LEL	-40°C to +40°C	2 Years
DM-702-H2	Hydrogen/H2	0-1%	-40°C to +40°C	2 Years
DM-700-HBr	Hydrogen Bromide/HBr	0-30 ppm	-20°C to +40°C	1 1/2 Years
DM-700-HCl	Hydrogen Chloride/HCl	0-30 ppm	-20°C to +40°C	1 1/2 Years
DM-700-HCN	Hydrogen Cyanide/HCN	0-30 ppm	-40°C to +40°C	2 Years
DM-700-HF	Hydrogen Fluoride/HF	0-10 ppm	-20°C to +35°C	1 Years
DM-700-H2S	Hydrogen Sulfide/H2S	0-100 ppm	-40°C to +50°C	2 Years
DM-700-CH3OH	Methanol/CH3OH	0-100 ppm	-20°C to +50°C	2 Years
DM-700-CH3SH	Methyl Mercaptan/CH3SH	0-100 ppm	-40°C to +50°C	2 Years
DM-700-NO	Nitric Oxide/NO	0-100 ppm	-20°C to +50°C	3 Years
DM-700-NO2	Nitrogen Dioxide/NO2	0-10 ppm	-20°C to +50°C	2 Years
DM-700-O3	Ozone/O3	0-1 ppm	-10°C to +40°C	2 Years
DM-700-COCl2	Phosgene/COCl2	0-1 ppm	-20°C to +40°C	1 1/2 Years
DM-700-PH3	Phosphine/PH3	0-5 ppm	-20°C to +40°C	1 1/2 Years
DM-700-SiH4	Silane/SiH4	0-50 ppm	-20°C to +40°C	1 1/2 Years
DM-700-SO2	Sulfur Dioxide/SO2	0-20 ppm	-20°C to +50°C	2 Years
DM-700-C4H8S	Tetrahydrothiophene/C4H8S	0-100 ppm	-10°C to +40°C	2 Years
DM-700-C4H4S	Thiophane/C4H4S	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C4H6O2	Vinyl Acetate/C4H6O2	0-100 ppm	-20°C to +50°C	2 Years
DM-700-C2H3Cl	Vinyl Chloride/C2H3Cl	0-100 ppm	-20°C to +50°C	2 Years

Accessories

Description	Part Number
NEMA 7 aluminum terminal J-box with solid cover - 3 Port	897-850000-000
NEMA 7 316 stainless steel terminal J-box with solid cover - 3 Port	897-850000-316

*Standard Range - contact factory for other ranges. **Replaceable plug-in sensor.
Contact the factory for other gases not on this list. Cross sensitivity data available on request.

Specifications

Common Specifications

Input Voltage

11.5-28 VDC standard

Power Consumption

<2 watts typical

Outputs

Linear 4-20 mA DC
RS-485 Modbus™-RTU

Electrical Classification

Explosion Proof
Class I, Division 1, Groups B, C, D
Class I, Zone 1, Group IIC

Safety Approvals (pending)

CSA/NRTL (US OSHA Certified)
ATEX

Dimensions

7" High x 2 1/8" Diameter

Weight

2 Lbs

Functional Safety Rating

Designed in Accordance with IEC 61508/61511
as a SIL 2 safety system component

Technology Specifications

Accuracy/Repeatability

FP-700: ±3% 0-50% LEL; ±5% 50-100%
TP-700: ±10% of reading or ±2 ppm (greater of)
DM-700-O2: ±2% full scale
IR-700-CH: ±3% 0-50% LEL; ±5% 50-100% LEL
IR-700-CO2: ±5% full scale
PI-700: ±10% of reading; ±2.5% of range (greater of)
DM-700 (toxics): ±2% full scale

Response/Clearing Time

FP-700: T50 <10 seconds; T90 <30 seconds
TP-700: T50 <30 seconds; T80 <60 seconds
DM-700-O2: T90 <20 seconds
IR-700-CH: T50 <10 seconds; T90 <30 seconds
IR-700-CO2: T50 <15 seconds; T90 <40 seconds
PI-700: T50 <10 seconds; T90 <30 seconds
DM-700 (toxics): Contact factory for specific gases

Operating Humidity Range (Continuous)

FP-700: 0-99% RH non-condensing
TP-700: 0-99% RH non-condensing
DM-700-O2: 0-99% RH non-condensing
IR-700-CH: 0-99% RH non-condensing
IR-700-CO2: 0-99% RH non-condensing
PI-700: 0-100% non-condensing
DM-700 (toxics): typically 10-90% RH
contact factory for specific gases

Warranty

Detcon Inc. warrants each new Model 700 Intelligent Sensor Module to be free from defects in material and workmanship under intended normal use for a period of two years from the date of shipment to the original purchaser. Detcon warrants each new plug-in replaceable sensor to be free from defects in material and workmanship under intended normal use for the period described in the table on the left. All warranties are FOB the Detcon factory located in The Woodlands, Texas, USA.