DETCON MODEL SERIES 700

GAS DETECTORS

Removing the Environmental Equation from your Gas Detection Decisions

316 SS Construction

Encapsulated Electronics

Water-Proof

Vibration-Proof

Corrosion-Proof

Multi-Layer Surge Protection

Preemptive Fault Diagnostics

Ex

CSA
C US

CE

exida

FM

PG

CV
CEPEL

detcon inc.

www.detcon.com

MODEL SERIES 700 GAS DETECTORS

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% 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 that safety systems 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 are designed to 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

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
Miniature Plug-in Optical Detector

Sensors for Toxic Gases

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

Photo Ionization
Universal Non-Selective VOC Sensor
Miniature Plug-in Detector

Oxygen Sensors

Electrochemical Technology
Quick Response Time
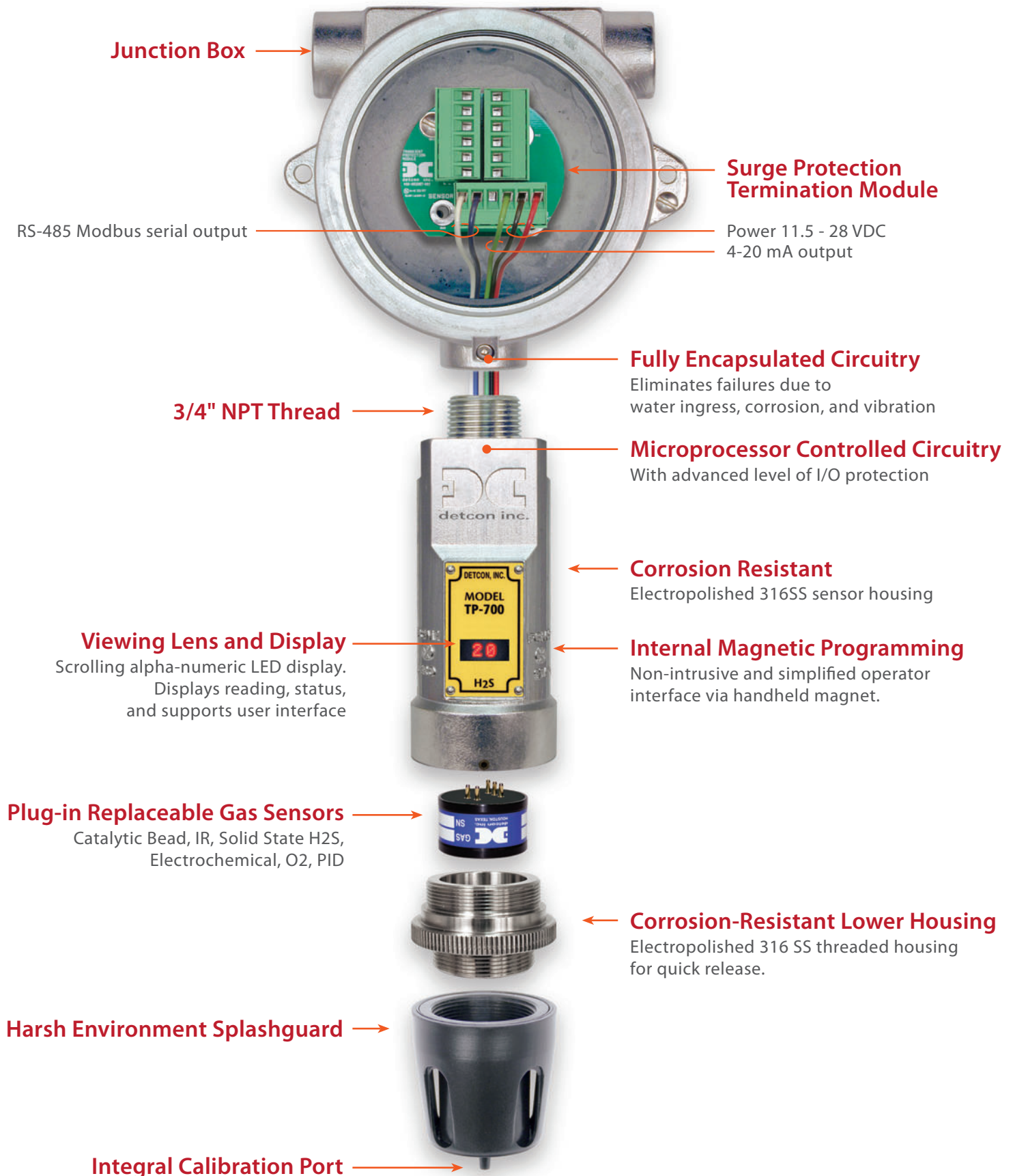Embedded Temperature Compensation
2-year Sensor Warranty

CO2 Sensors

Infrared Technology
CO2 Gas Detector
5-Year Warranty
Miniature Plug-in Optical Detector

ANATOMY OF A MODEL SERIES 700

Junction Box

Surge Protection Termination Module

RS-485 Modbus serial output

Power 11.5 - 28 VDC
4-20 mA output

Fully Encapsulated Circuitry
Eliminates failures due to
water ingress, corrosion, and vibration

3/4" NPT Thread

Microprocessor Controlled Circuitry
With advanced level of I/O protection

detcon inc.

DETCON, INC.
MODEL TP-700
20
H2S

Corrosion Resistant
Electropolished 316SS sensor housing

Viewing Lens and Display
Scrolling alpha-numeric LED display.
Displays reading, status,
and supports user interface

Internal Magnetic Programming
Non-intrusive and simplified operator
interface via handheld magnet.

Plug-in Replaceable Gas Sensors
Catalytic Bead, IR, Solid State H2S,
Electrochemical, O2, PID

Corrosion-Resistant Lower Housing
Electropolished 316 SS threaded housing
for quick release.

Harsh Environment Splashguard

Integral Calibration Port

TECHNOLOGY FEATURES

Environmentally Bulletproof

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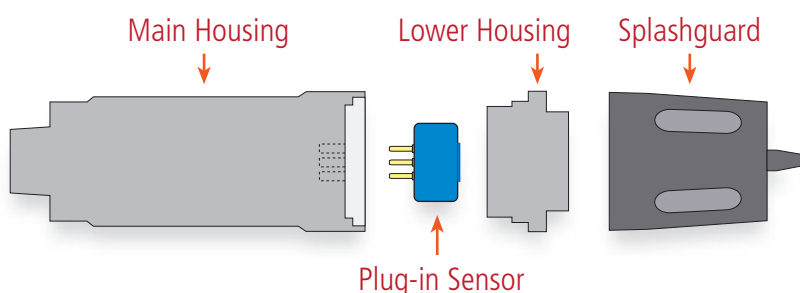   EMI/RFI Immunity
▷ Water-Proof, Corrosion-Proof, Vibration-Proof

Gold Plated
Mating Pins

Modular and Serviceable

▷ Modular Design
▷ Plug and Play Components
▷ Minimal Spare Parts
    Universal Design Concept
▷ Quick Thread Release
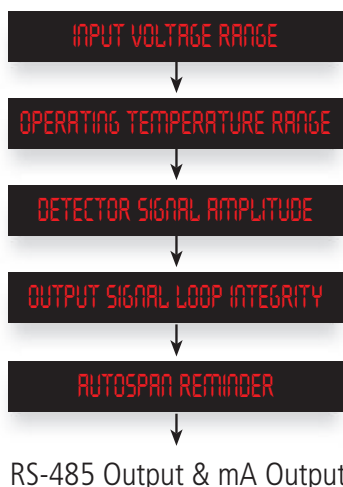   For Sensor Replacement
▷ Integral Calibration Port

Main Housing   Lower Housing   Splashguard

Plug-in Sensor

Failsafe User-Friendly Interface

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

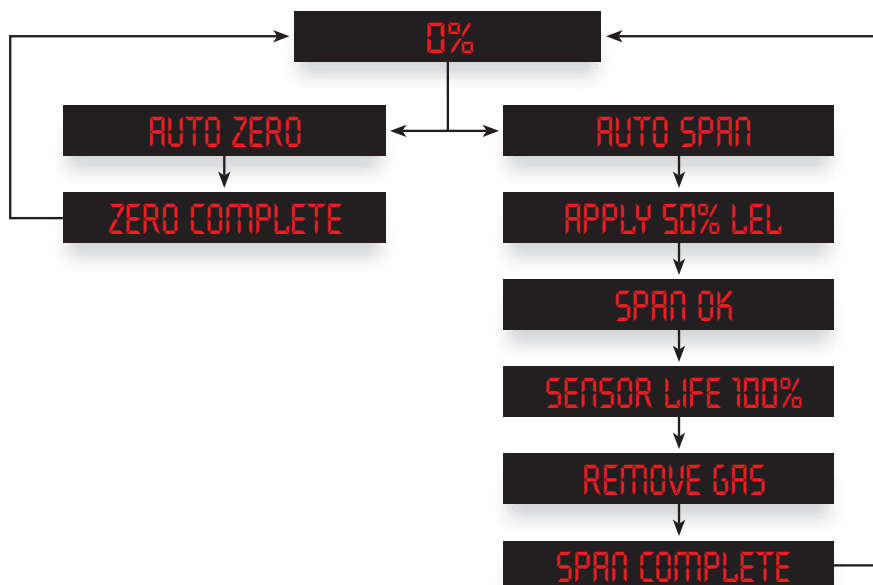### Scrolling Full Message/Text Display

PGM1   PGM2
⊗   ZERO   ⊗
ZERO   SPAN

Pre-emptive Fault Diagnostics

INPUT VOLTAGE RANGE

OPERATING TEMPERATURE RANGE

DETECTOR SIGNAL AMPLITUDE

OUTPUT SIGNAL LOOP INTEGRITY

AUTOSPAN REMINDER

RS-485 Output & mA Output

Auto Zero/Auto Span Sequence

0%

AUTO ZERO ⟷ AUTO SPAN

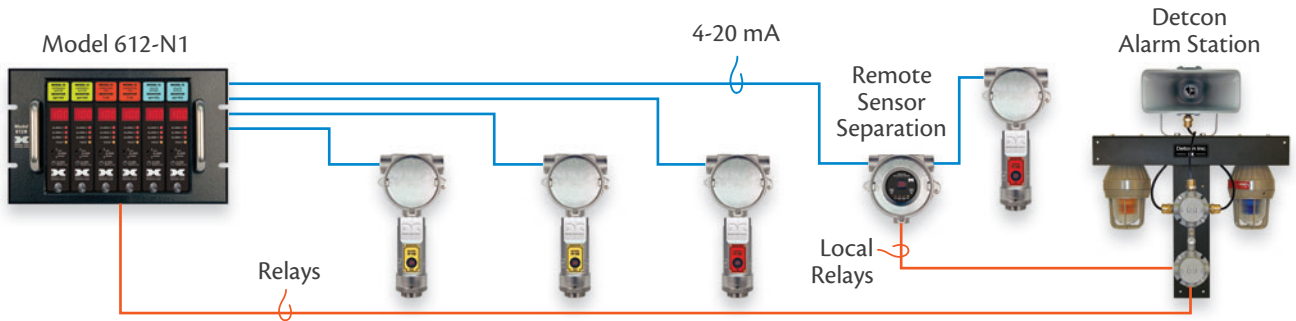ZERO COMPLETE

APPLY 50% LEL

SPAN OK

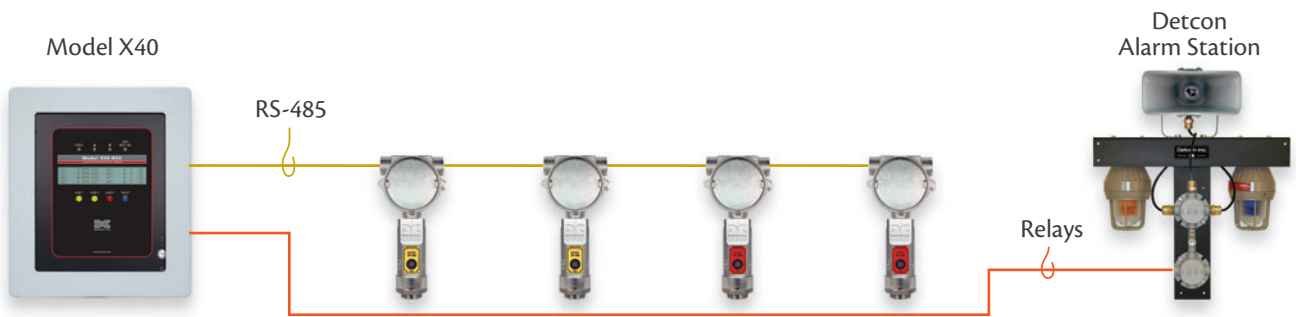SENSOR LIFE 100%

REMOVE GAS

SPAN COMPLETE

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 Sensor/Alarm Relay Module, Wireless Interface Module and communication interface modules for HART, and Foundation Fieldbus. Shown below are some typical system integration approaches:
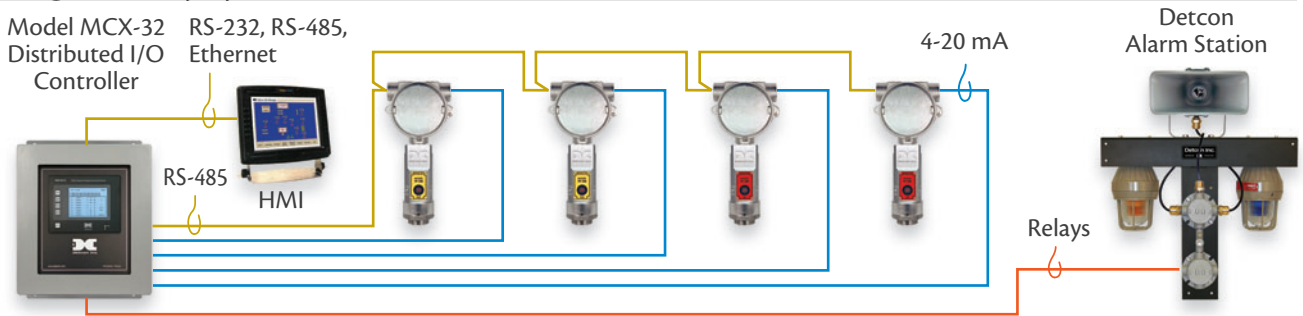
4-20 mA, Remote Sensor Separation & Local Relays

Model 612-N1

4-20 mA

Remote Sensor Separation

Detcon Alarm Station

Relays

Local Relays

Serial Input

Model X40

RS-485

Detcon Alarm Station

Relays

High Density System - 4-20 mA or Serial

Model MCX-32 Distributed I/O Controller

RS-232, RS-485, Ethernet

RS-485

HMI

4-20 mA

Detcon Alarm Station

Relays

Wide Range DCS/DAS and Integration Options

Remote Control Alarm Relay Module

Hart RAM Module

Hart Bridge Module

Foundation Fieldbus Module

Wireless Interface Module

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-C2H2	Acetylene/C2H2	0-100 ppm	−20°C to +50°C	2 Years
DM-700-NH3	Ammonia/NH3	0-100 ppm	−20°C to +40°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-CO	Carbon Monoxide/CO	0-100 ppm	−40°C to +50°C	3 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-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 Year
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-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

Accessories
Description
Remote Control/Alarm Relay Module in NEMA 7 Junction Box (Aluminum or Stainless Steel)
Hart RAM in NEMA 7 Junction Box (Aluminum or Stainless Steel)
Hart Bridge Module in NEMA 7 Junction Box (Aluminum or Stainless Steel)
Foundation Fieldbus Module in NEMA 7 Junction Box (Aluminum or Stainless Steel)
Wireless Interface Module in NEMA 7 Junction Box (Aluminum or Stainless Steel)

*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
FP-700, TP-700, IR-700-CH, IR-700-CO2:
Class I, Division 1, Groups B, C, D
Class I, Zone 1, Group IIB+H2 (ATEX)
DM-700 Toxics, DM-700-O2, PI-700:
Class I, Division 1, Groups A, B, C, D
Class I, Zone 1, Group IIC (ATEX)

Safety Approvals
CSA/NRTL (US OSHA Certified)
ATEX
GOST
INMETRO
CNEX
PESO
ABS

Dimensions
7" High x 2 1/8" Diameter (sensor only)

Weight
2 Lbs

Functional Safety Rating
IEC 61508 SIL2 Certified (TP, FP, DM and IR *ATEX version*)
Exida assessed SIL2 (FMEDA)

Performance Approvals
IR-700, FP-700 to ISA 12.13, CSA #152
TP-700, DM-700 to ISA 92.0.01

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: ±2% F.S. (0-50% 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: 15-100% 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 Transmitter 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.