MAGNETROL® / AMETEK®
LEVEL MEASUREMENT SOLUTIONS

Genesis Models ED1 & ED2
High Performance Multiphase Detector

DESCRIPTION

The Genesis Multiphase Detector is a Time Domain Reflectometry (TDR)-based, 24 VDC level detector designed to accurately measure the various layers in difficult interface level measurement applications. Encompassing a number of significant engineering accomplishments, this leading edge level detector is designed to provide measurement performance beyond that of many of the more traditional technologies.

Utilizing patented "Top-Down" and "Bottom-Up" signals, along with advanced level detection algorithms, this single device can be used in a wide variety of interface applications ranging from very light hydrocarbons to water-based media.

This detector, like other Magnetrol devices, is designed to maximize ease of wiring, configuration, and viewing of the versatile graphic LCD display.

The Genesis supports both the Field Device Integration (FDI) and Enhanced DD (EDDL) standards, which allow viewing of valuable configuration and diagnostic information in tools such as PACT*ware*™, AMS Device Manager, and various HART® Field Communicators.

APPLICATIONS

MEDIA: Hydrocarbons to water-based media (Dielectric Constant ε_r = 1.4–100)

VESSELS: Most process, separator, or storage applications up to rated probe temperature and pressure.

CONDITIONS: Most liquid level measurement and control applications including those with varying dielectric, vapors, turbulence, foam, buildup, bubbling or boiling and high fill/empty rates; liquid/liquid interface level measurement or density control.

Measures Multiple Phases within Interface Applications

FEATURES

- 24 VDC multiphase detector with up to four (4) 4-20mA outputs for convenient control of top level, top of emulsion, water level, and sediment
- Concurrent Top-Down and Bottom-Up signal generation
- Level measurement not affected by changing media characteristics.
- No need to move levels for calibration
- 4-button keypad and graphic LCD display allow for convenient viewing of configuration parameters and echo curves
- Proactive diagnostics advise not only what is wrong, but also offer troubleshooting tips.
- Probe designs up to +200 °C/70 bar (+400 °F/1000 psi)
- Main electronics can be remote-mounted up to 30 m (100 feet) away from the probe.
- No moving parts

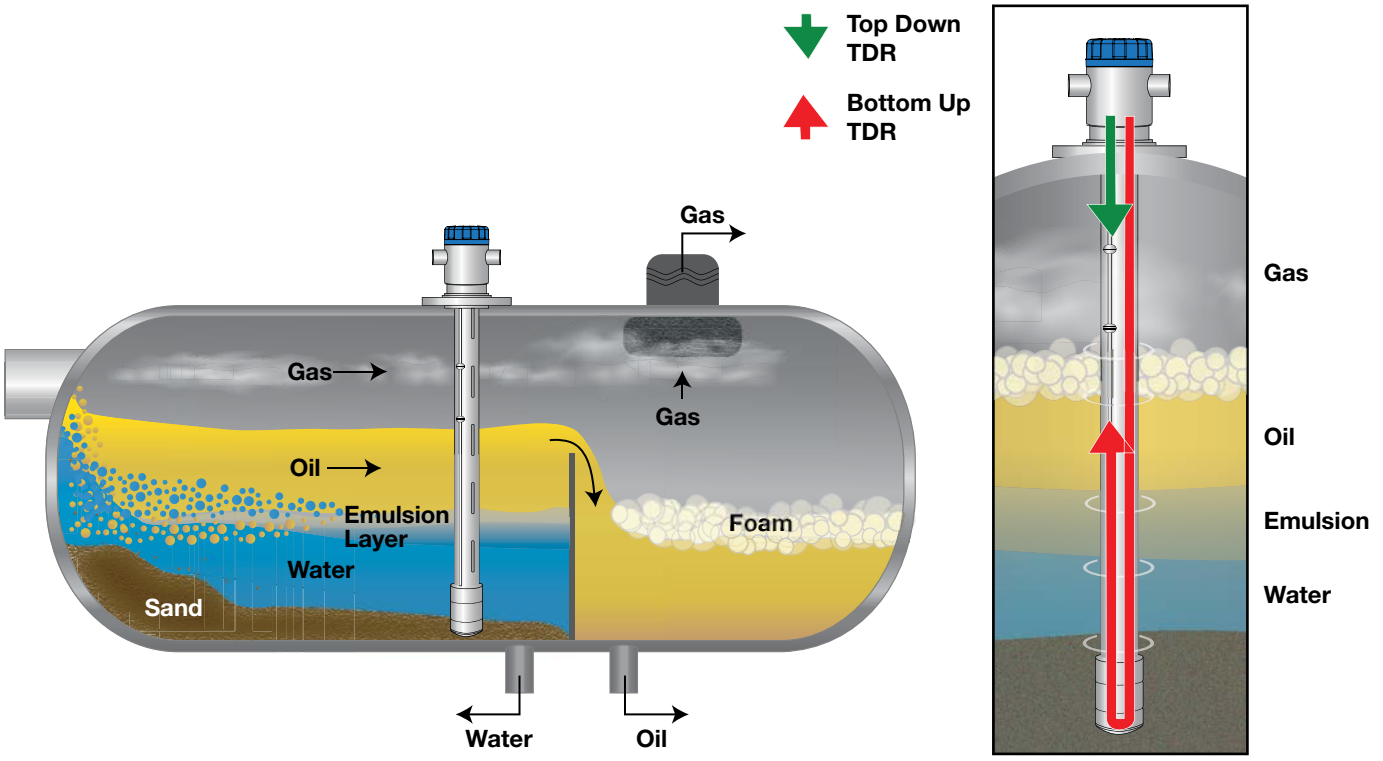
TECHNOLOGY

PRINCIPLE OF OPERATION

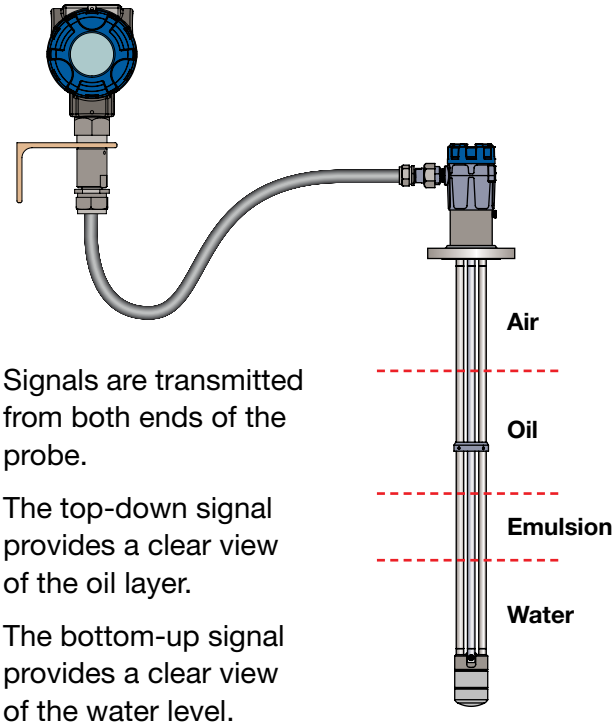
The Genesis is a multiphase level detector based upon the technology of Time Domain Reflectometry (TDR). The device utilizes pulses of electromagnetic energy transmitted along a physical probe. From a "Top-Down" perspective, when a pulse reaches a surface that has a higher dielectric constant than air ($\varepsilon_r = 1$), a portion of the pulse is reflected. The time of flight of the pulse is then measured via high speed timing circuitry that provides an accurate measure of the liquid level. The amplitude of the reflection depends on the dielectric constant of the product, with a higher dielectric constant yielding a larger reflection.

In addition to sending high frequency energy down the probe to detect upper (or total) level, the Genesis sends energy up the probe to detect various other levels that may be present; including the top of an emulsion layer, bottom of an emulsion layer (water level) and sediment.

This innovative form of TDR-based measurement, combining "Top-Down" and "Bottom-Up" signal processing utilizing sophisticated and patented algorithms, makes multiphase level detection possible.



TECHNOLOGY (cont.)



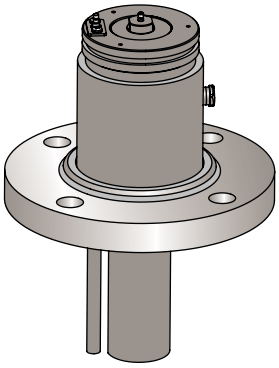
Signals are transmitted from both ends of the probe.

The top-down signal provides a clear view of the oil layer.

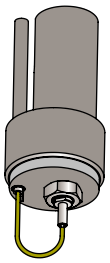
The bottom-up signal provides a clear view of the water level.

Two Signals

One transmitting for the top-down measurement.



One transmitting for the bottom-up measurement.

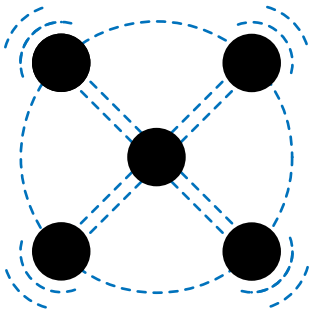


PROBE OVERVIEW

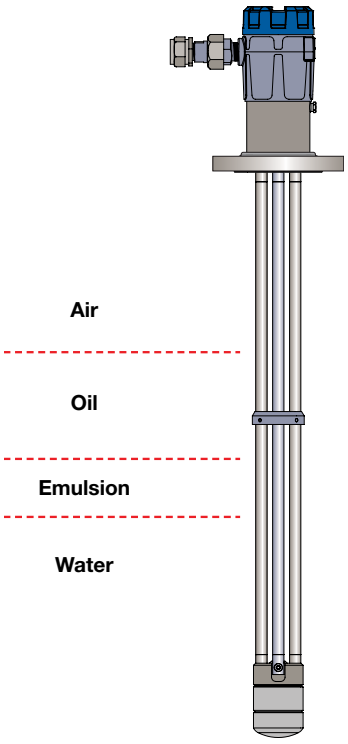
As is typical for most level measurement technologies, choosing the proper sensing element is the most important aspect in the decision-making process. The probe configuration establishes fundamental performance characteristics.

5-CONDUCTOR PENTAROD

With a PFA coated active center rod surrounded by four (4) reference rods, the 5-conductor Pentarod probe is the ideal probe offering for the Genesis. In addition to providing excellent performance, its open design makes it less susceptible to buildup and bridging.



Pentarod Signal Propagation



Pentarod 5-conductor probe

OPTIONAL FLUSHING CONNECTION

The maintenance of probes in applications containing buildup or crystallization can be significantly improved by using an optional flushing connection. This flushing connection is a metal extension with a port welded above the process connection. The port allows the user to purge the inside of the probes during routine maintenance.

SPECIFICATIONS

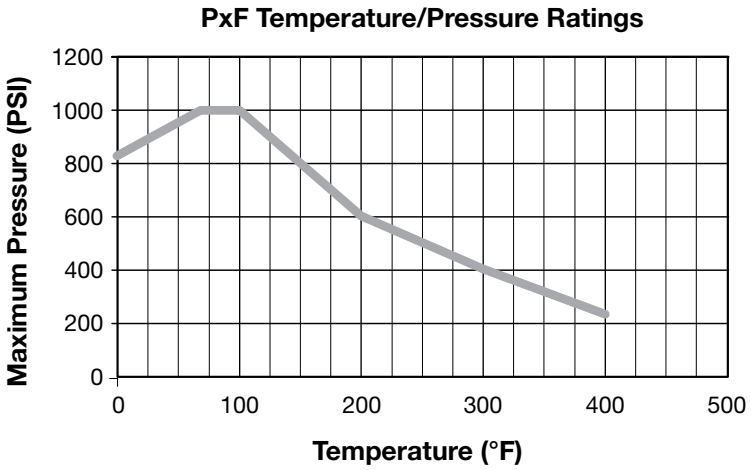
FUNCTIONAL

System Design	
Measurement Principle	TDR based electronics combined with patented, proprietary software algorithm
Input	
Measured Variable	Level, as determined by time of flight
Span	60 centimeters to 6 meters (2 to 20 feet)
Output	
Type	Four (4) “active” 4–20 mA analog outputs, one (1) with HART; 3.8–20.5 mA useable (per NAMUR NE 43)
Resolution	Analog: 0.003 mA Digital Display: 1 mm
Diagnostic Alarm	Selectable: 3.6 mA, 22 mA (meets requirements of NAMUR NE 43), or HOLD last output
Diagnostic Indication	Meets requirements of Namur NE107
Damping	Adjustable 0–30 seconds
User Interface	
Keypad	4-button menu-driven data entry
Display	Graphic liquid crystal display
Digital Communication/Systems	HART Version 7 - with Field Communicator, AMS, or FDI DTM (PACT*ware*™), EDDL
Menu Languages	LCD: English HART DD: English
Power (at wiring board terminals)	Explosion-proof with Instrinsically Safe probe 24 VDC (±10%), 10 Watt maximum, Um ≤ 30V DC (SELV)
Housing	
Main Electronics Material / Net/Gross Weight:	IP67 aluminum A413 (<0.4% copper) / 2.75 kg (6 lbs.) Stainless steel / 5.7 kg (12.5 lbs.)
Probe Electronics Material / Net/Gross Weight:	Aluminum / 1.4 kg (3 lbs.) Stainless steel / 3.2 kg (7 lbs.)
Cable Entry	¾" NPT or M20 × 1.5
Environment	
Operating Temperature	-40 to +70 °C (-40 to +160 °F); LCD viewable -20 to +70 °C (-5 to +160 °F)
Storage Temperature	-45 to +85 °C (-50 to +185 °F)
Humidity	0 to 99%, non-condensing
Electromagnetic Compatibility	Meets CE requirement (EN 61326) and NAMUR NE 21 ①
Surge Protection	Meets CE EN 61326 (1000V)
Shock/Vibration	ANSI/ISA-S71.03 Class SA1 (Shock); ANSI/ISA-S71.03 Class VC2 (Vibration)
Performance	
Reference Conditions	Reflection from liquid with a 3 meter (10 foot) probe at +20 °C (+70 °F)
Linearity	Application dependent
Accuracy	Application dependent
Response Time	Approximately 15 seconds
Initialization Time	Less than 30 seconds

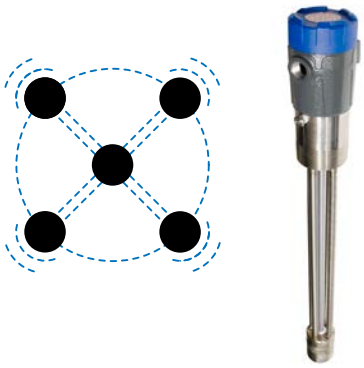
① Pentarod probes must be used in metallic vessel or stillwell to maintain CE noise immunity

TEMPERATURE / PRESSURE RATING

Temperature °C (°F)	Pressure (316 SS) bar (psi)
-40 (-40)	52 (750)
21 (+70)	70 (1000)
38 (+100)	70 (1000)
93 (+200)	45 (650)
149 (+300)	28 (400)
204 (+400)	19 (270)



PENTAROD PROBE



Description		PxF: 5-Conductor
Application		Interface
Installation		Direct insertion (preferred) or side-mounted chamber
Materials—Probe		316/316L (1.4401/1.4404) with PFA coated center rod
Process Seal		Teflon® TFE with Viton® o-rings ②
Spacers		Stainless steel
Probe Outside Diameter		316 SS: 70 mm (2.75")
Process Connection	**Threaded**	3" NPT or 3" BSP (G 3")
	Flanged	3" or larger; Various ASME, EN1092
Available Probe Length		60 to 610 cm (24 to 240 inches)
Transition Zones ③	**Top** **Bottom**	200 mm (8 inches) 200 mm (8 inches)
Process Temperature		-40 to +200 °C (-40 to +400 °F)
Max. Process Pressure		70 bar @ +20 °C (1000 psi @ +70 °F)
Dielectric Range		1.4 to 100
Vacuum Service ④		Negative pressure, but not hermetic seal
Maximum Viscosity		PxF: 10,000cP (mPa.s)

① 2nd digit E=English, M=Metric

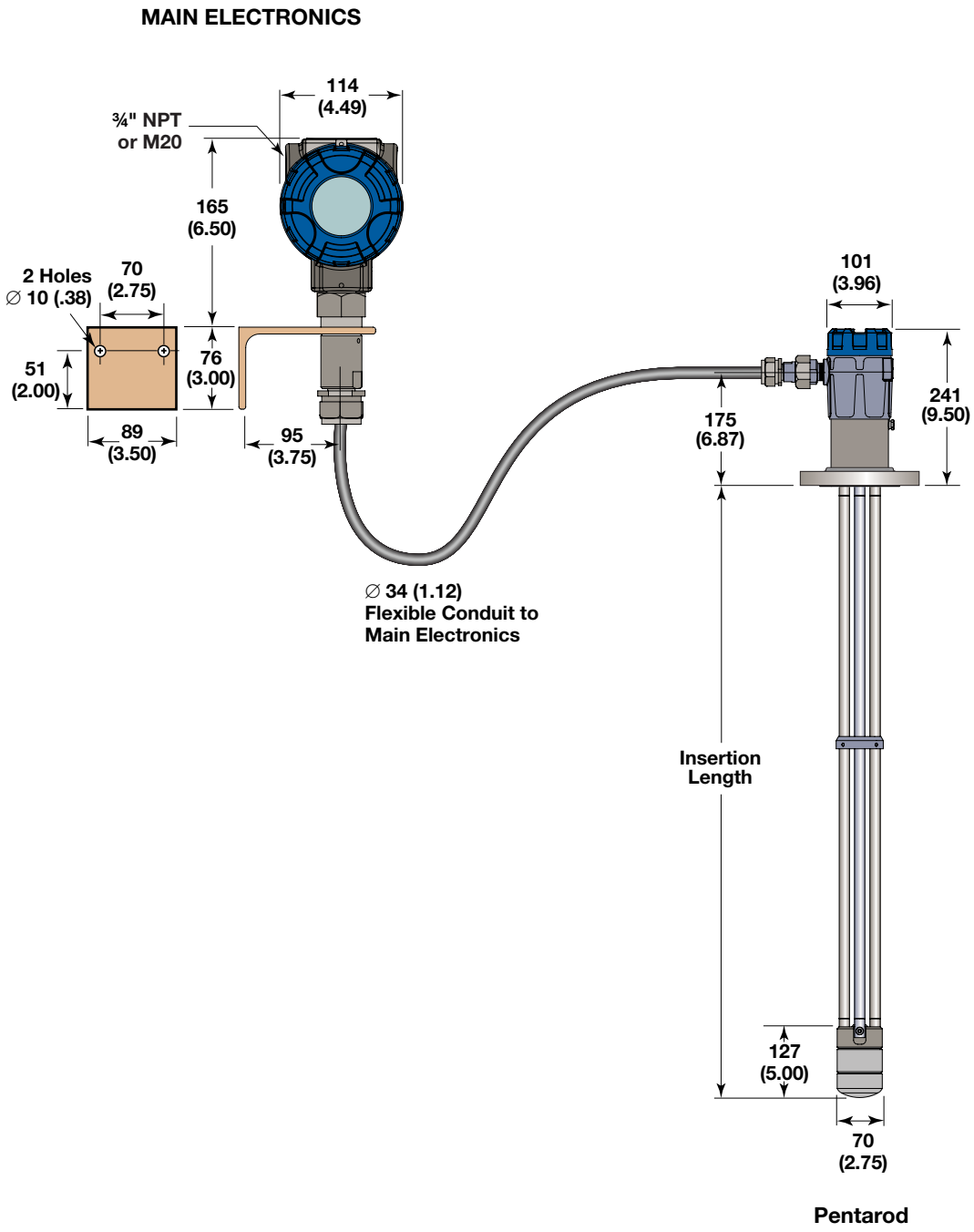
② Other o-ring materials available upon request.

③ Top Transition Zone: The detector may still operate but level readings may become non-linear. Bottom Transition Zone: Detector will not measure levels in this area.

④ Genesis probes containing o-rings can be used for vacuum (negative pressure) service but are not hermetically sealed.

DIMENSIONS

millimeters (inches)

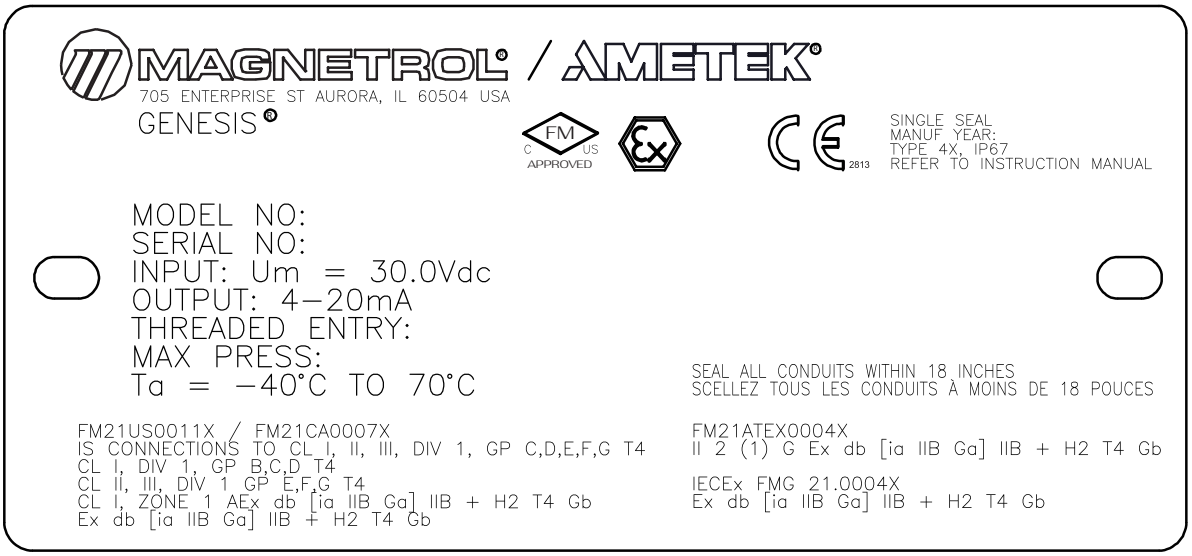


AGENCY APPROVALS

These units are in compliance with the EMC-directive 2014/30/EU, the PED-directive 2014/68/EU and the ATEX directive 2014/34/EU.

AVERTISSEMENT! Danger d'explosion éventuel. Ne brancher ou débrancher des ---équipements que si l'alimentation électrique a été coupée ou si la zone est réputée non dangereuse.

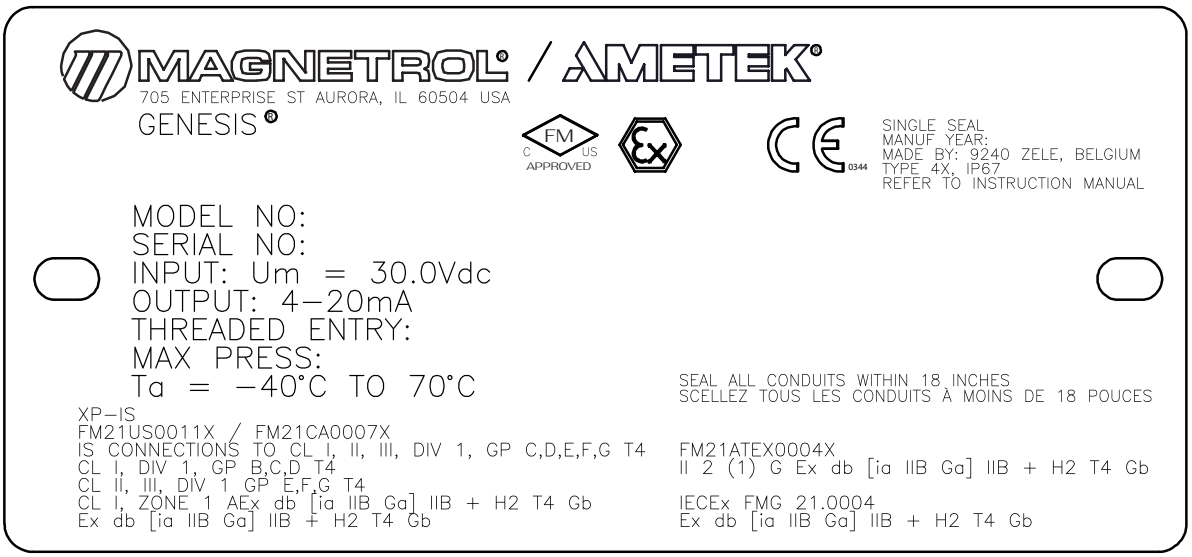
DETECTOR EDx-210x-xxx



Genesis: Aurora

Explosion Proof - Flameproof with I.S. probe output

5th Digit: 1 = HART
8th Digit: 3 = Explosion/Flameproof with I.S. probe output



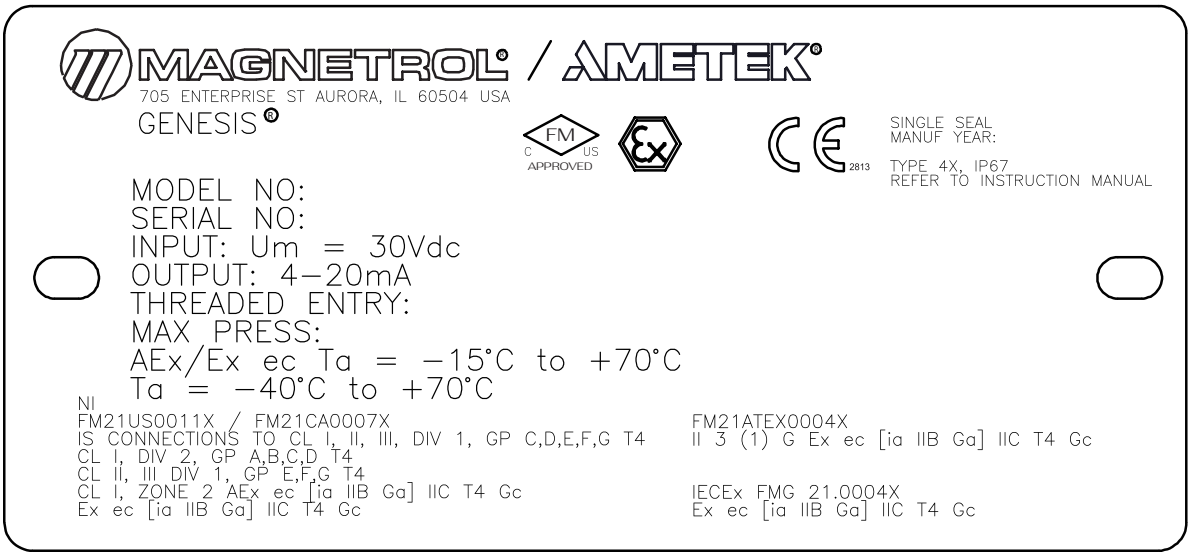
Genesis: Zele

Explosion Proof - Flameproof with I.S. probe output

5th Digit: 1 = HART
8th Digit: 3 = Explosion/Flameproof with I.S. probe output

AGENCY APPROVALS

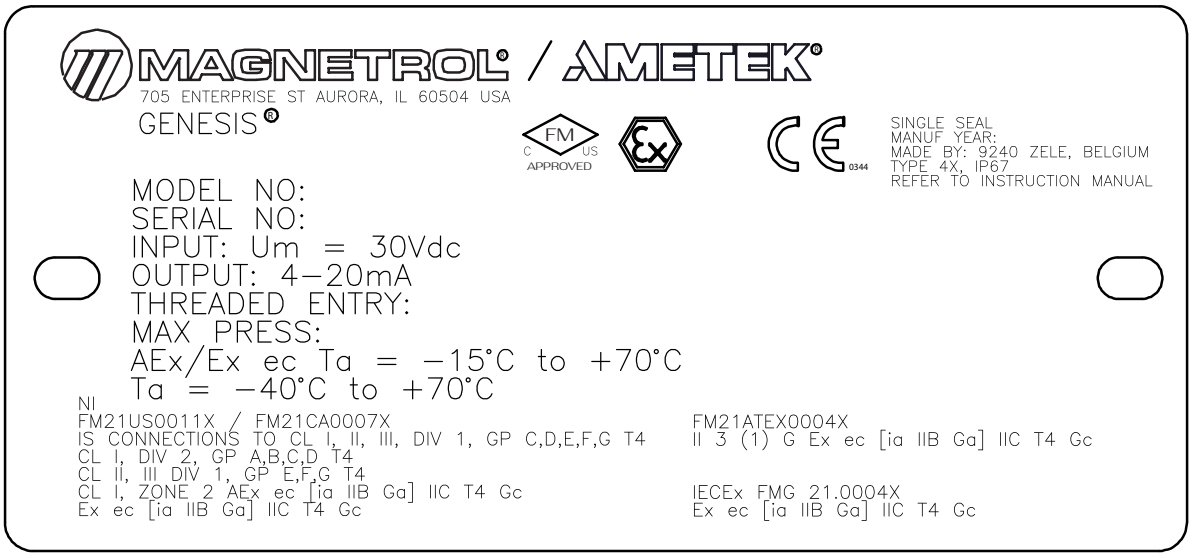
DETECTOR EDx-210x-xxx



Genesis: Aurora

Non Incendive - Increased Safetywith I.S. probe output

5th Digit: 1 = HART
8th Digit C = Non Incendive, Increased Safety with I.S. probe output

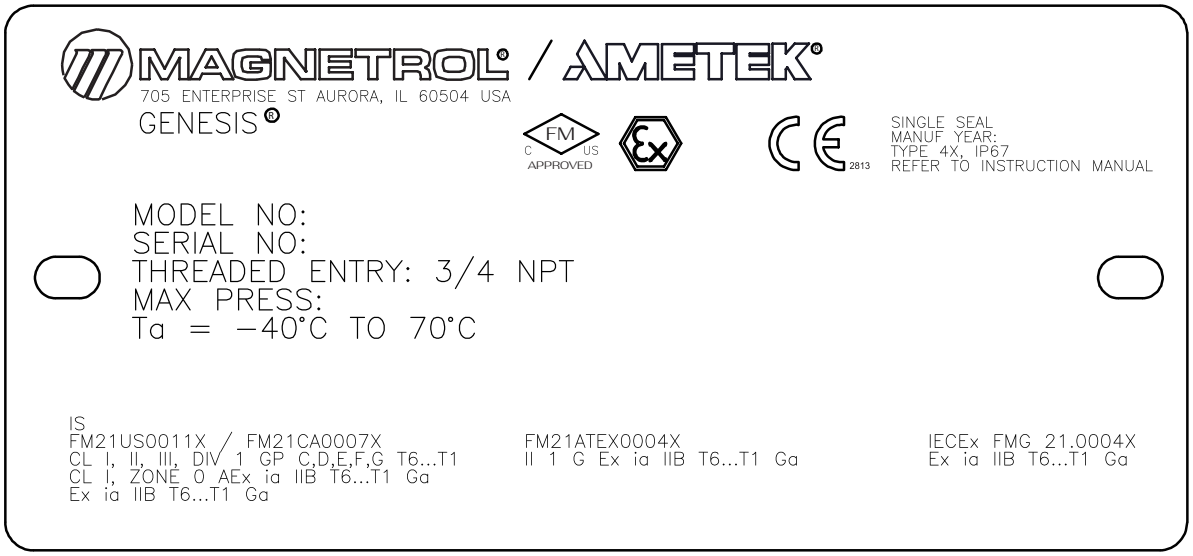


Genesis: Zele

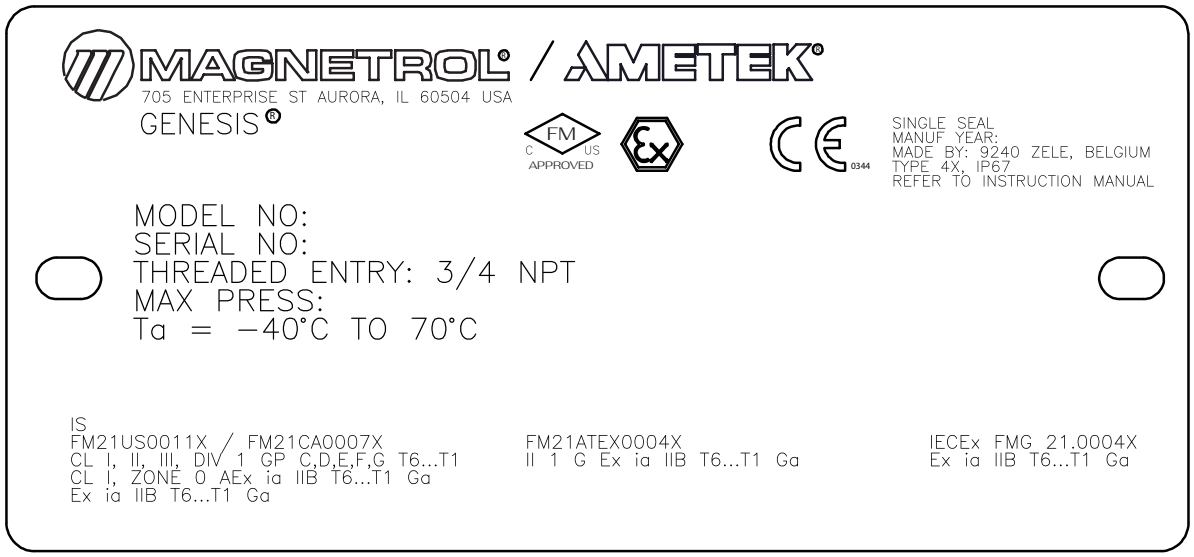
Non Incendive - Increased Safetywith I.S. probe output

5th Digit: 1 = HART
8th Digit C = Non Incendive, Increased Safety with I.S. probe output

PROBE Pxx-xxx0-A0x-xx-xxx



Genesis: Aurora
Intrinsically Safe



Genesis: Zele
Intrinsically Safe

AGENCY APPROVALS

Specific Conditions of Use

Detector:

1. The flamepaths of the equipment are not intended to be repaired. Consult the manufacturer if repair of the flamepath joints is necessary.
2. Refer to the manufacturer's instructions to reduce the potential of an electrostatic charging hazard on the equipment enclosure.
3. The detector shall be connected to a safety extra low-voltage circuit (SELV) with Um ≤ 30V

Probe:

1. Refer to the manufacturer's instructions to reduce the potential of an electrostatic charging hazard on the equipment enclosure.

Temperature Code

For Probe: T6…T1 temperature code are defined by the following table:

Process Temperature	Temperature Code-TCG (GAS)
≤ 75 °C	T6
75 to 90 °C	T5
90 to 120 °C	T4
125 to 185 °C	T3
185 to 285 °C	T2
285 to 435 °C	T1

O-RING (SEAL) SELECTION CHART

Code	O-Ring/Seal Material	Max. Process Temperature	Min. Process Temperature	Max. Process Pressure	Not Recommended For Applications	Recommended for Applications
0	**Viton® VX065**	400 °F @ 230 psi (200 °C @ 16 bar)	-40 °F (-40 °C)	1000 psi 70 °F (70 bar @ 20 °C)	Ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric or chlorosulfuric acids, sour HCs	General purpose, ethylene
2	**Kalrez® 4079**	400 °F @ 232 psi (200 °C @ 16 bar)	-40 °F (-40 °C)	1000 psi 70 °F (70 bar @ 20 °C)	Hot water/steam, hot aliphatic amines, ethylene oxide, propylene oxide	Inorganic and organic acids (including hydro fluids and nitric), aldehydes, ethylene, organic oils, glycols, silicone oils, vinegar, sour HCs
8	**Simriz SZ485** (formerly Aegis PF128)	400 °F @ 232 psi (200 °C @ 16 bar)	20 °F (-7 °C)	1000 psi 70 °F (70 bar @ 20 °C)	Black liquor, freon 43, freon 75, galden, KEL-F liquid, molten potassium, molten sodium	Inorganic and organic acids (including hydro fluids and nitric), aldehydes, ethylene, organic oils, glycols, silicone oils, vinegar, sour HCs, steam, amines, ethylene oxide, propylene oxide, NACE applications
A	**Kalrez® 6375**	400 °F @ 232 psi (200 °C @ 16 bar)	-40 °F (-40 °C)	1000 psi 70 °F (70 bar @ 20 °C)	Hot water/steam, hot aliphatic amines	Inorganic and organic acids (including hydro fluids and nitric), aldehydes, ethylene, organic oils, glycols, silicone oils, vinegar, sour HCs. ethylene oxide, propylene oxide

MODEL NUMBER

DETECTOR

While both versions of Genesis are robust designs capable of performing similar functions, the Model ED1 is the full-featured detector that comes standard with all (4) analog outputs, an enhanced DTM for dynamic viewing of all levels, and was the basis for developing the sophisticated algorithms that allow us to measure the most difficult levels found in the process industries.

The Model ED1 is particularly suited for the downstream Oil & Gas market (Petroleum Refining) where it outperforms traditional technologies while going head-to-head with nucleonic devices (e.g., Profilers) at a more competitive total cost of ownership.

The Model ED2 benefits from the heavy algorithms developed for the ED1 but allows two, three, or four analog output configurations that are better suited for the upstream Oil & Gas market (E&P).

1 2 3 | BASIC MODEL NUMBER

E D 1	Genesis High Performance Multiphase Detector
E D 2	Genesis Standard Multiphase Detector

4 | POWER

2	24 VDC (SELV)

5 | SIGNAL OUTPUT

1	4–20 mA with HART

6 | OPTIONS

0	None (Model ED1 only – Four (4) 4-20mA outputs included as standard)
2	Two (2) 4-20mA outputs (Model ED2 only)
3	Three (3) 4-20 mA outputs (Model ED2 only)
4	Four (4) 4-20 mA outputs (Model ED2 only)

7 | ACCESSORIES/MOUNTING

A	3 meter (10 foot) remote
B	6 meter (20 foot) remote
C	15 meter (50 foot) remote
D	30 meter (100 foot) remote

8 | CLASSIFICATION

3	Explosion/Flame proof with I.S. probe output
C	Non-Incendive, Increased Safety with I.S. probe output

9 | HOUSING

1	Aluminum
2	316 Stainless Steel

10 | CONDUIT CONNECTIONS

0	¾" NPT
1	M20 × 1.5

E	D		–	2	1			–			
1	2	3		4	5	6	7		8	9	10

MODEL NUMBER

PROBE

1 | TECHNOLOGY

P	Genesis TDR Probe

2 | MEASUREMENT SYSTEM

E	English (inches)
M	Metric (centimeters)

3 | CONFIGURATION

F	Pentarod (+200 °C / +400 °F)

4 - 5 | PROCESS CONNECTION – SIZE/TYPE (consult factory for other process connections)

Threaded

5 1	3" NPT
5 2	3" BSP (G 3)

ASME Flanges

5 1	3" 150# ASME RF
5 2	3" 300# ASME RF
5 1	3" 600# ASME RF
5 2	3" 900# ASME RF
5 1	3" 600# ASME RTJ
5 2	3" 900# ASME RTJ

6 3	4" 150# ASME RF
6 4	4" 300# ASME RF
6 5	4" 600# ASME RF
6 6	4" 900# ASME RF
6 K	4" 600# ASME RTJ
6 L	4" 900# ASME RTJ

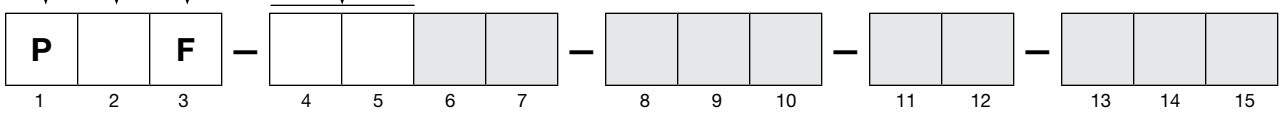
7 3	6" 150# ASME RF
7 4	6" 300# ASME RF
7 5	6" 600# ASME RF
7 K	6" 600# ASME RTJ

EN Flanges

E A	DN 80, PN 16	EN 1092-1 TYPE A
E B	DN 80, PN 25/40	EN 1092-1 TYPE A
E D	DN 80, PN 63	EN 1092-1 TYPE B2
E E	DN 80, PN 100	EN 1092-1 TYPE B2
E F	DN 80, PN 160	EN 1092-1 TYPE B2
E W	DN 80, PN 16	EN 1092-1 TYPE B1
E Z	DN 80, PN 25/40	EN 1092-1 TYPE B1
F A	DN 100, PN 16	EN 1092-1 TYPE A
F B	DN 100, PN 25/4	0EN 1092-1 TYPE A
F D	DN 100, PN 63	EN 1092-1 TYPE B2

F E	DN 100, PN 100	EN 1092-1 TYPE B2
F F	DN 100, PN 160	EN 1092-1 TYPE B2
F W	DN 100, PN 16	EN 1092-1 TYPE B1
F Z	DN 100, PN 25/40	EN 1092-1 TYPE B1
G A	DN 150, PN 16	EN 1092-1 TYPE A
G B	DN 150, PN 25/40	EN 1092-1 TYPE A
G D	DN 150, PN 63	EN 1092-1 TYPE B2
G E	DN 150, PN 100	EN 1092-1 TYPE B2
G W	DN 150, PN 16	EN 1092-1 TYPE B1
G Z	DN 150, PN 25/40	EN 1092-1 TYPE B1

Confirm mounting conditions/nozzle diameter to ensure sufficient clearance.



MODEL NUMBER

PROBE

6 | CONSTRUCTION CODES

0	Industrial
K	ASME B31.1
L	ASME B31.3
M	ASME B31.3 & NACE MR0175/MR0103
N	NACE MR0175/MR0103

7 | FLANGE OPTIONS

0	None

8 | MATERIAL OF CONSTRUCTION - FLANGE/NUT/ROD

A	316 SS/316L SS (PFA coated center rod)

9 | OPTIONS

0	None

10 | O-RING MATERIALS/SEAL OPTIONS

0	Viton® VX065
2	Kalrez® 4079
8	Simriz SZ485 (formerly Aegis PF128)
A	Kalrez 6375

11 | OPTIONS

0	None
1	Flushing Port

12 | REMOTE HOUSING MATERIAL

1	Aluminum
2	316 Stainless Steel

13 14 15 | INSERTION LENGTH
See page 8

X X X	inches (24 – 240) cm (60 – 610

Unit of measure determined by 2nd digit of model number

P		F	–				0	–	A	0		–			–			
1	2	3		4	5	6	7		8	9	10		11	12		13	14	15

QUALITY

The quality assurance system in place at AMETEK LMS guarantees the highest level of quality throughout the company. Magnetrol is committed to providing full customer satisfaction both in quality products and quality service.

The AMETEK LMS quality assurance system is certified to ISO 9001, affirming our commitment to internationally recognized quality management standards and continuous improvement.

WARRANTY

All AMETEK LMS electronic level and flow controls are warranted free of defects in materials or workmanship for eighteen months from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, AMETEK LMS will repair or replace the control at no cost to the purchaser (or owner) other than transportation.

AMETEK LMS shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of equipment. There are no other warranties expressed or implied, except special written warranties covering some AMETEK LMS products.

MAGNETROL® / AMETEK® LEVEL MEASUREMENT SOLUTIONS

AMETEK-Measurement.com

705 Enterprise Street • Aurora, Illinois 60504-8149 USA
630.969.4000 • info.magnetrol@ametek.com

Copyright © 2026 AMETEK Magnetrol USA, LLC
Performance specifications are effective with date of issue and are subject to change without notice.

BULLETIN: 63-101.3
EFFECTIVE: November 2026
SUPERSEDES: October 2023