



Digital E3 Modulelevel® Liquid Level Displacer Transmitter

DESCRIPTION

The Digital E3 Modulelevel® is an advanced, intrinsically safe two-wire instrument utilizing simple buoyancy principle to detect and convert liquid level changes into a stable output signal. The linkage between the level sensing element and output electronics provides a simple mechanical design and construction. The vertical in-line design of the transmitter results in low instrument weight and simplified installation. The instrument comes in a variety of configurations and pressure ratings for varied applications.

The Digital E3 MODULELEVEL has microprocessor-based electronics with 4–20 mA/HART® or FOUNDATION field-bus™ output. E3 supports the FDT/DTM standard and a PACTware™ PC software package allows for additional configuration and trending capabilities.

TECHNOLOGY

Changing buoyancy forces caused by liquid level change act upon the spring supported displacer causing vertical motion of the core within a linear variable differential transformer.

As the core position changes with liquid level, voltages are induced across the secondary windings of the LVDT. These signals are processed in the electronic circuitry and converted to a useable output signal. The enclosing tube acts as a static isolation barrier between the LVDT and the process media.



APPLICATIONS

MEDIA: Liquids or slurries, clean or dirty, light hydrocarbons to heavy acids (SG=0.23 to 2.20)

VESSELS: Process & storage, bridles, bypass chambers, interface, sumps & pits up to unit pressure & temperature ratings.

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. Also, liquid/liquid interface level measurement or density control.

FEATURES

- Two-wire, loop-powered, transmitter for level, interface or density measurement
- No level change needed for configuration; no field calibration necessary.
- Safety Integrity Level (SIL) Certified, SFF value of 90.6%
- 4–20 mA output signal
- Two-line, 8-character LCD and 3-button keypad
- Continuous self-test with 22 mA, 3.6 mA or Hold fault indication fully compliant with NAMUR NE 43
- Comprehensive diagnostics with faults, warnings & status history
- HART or FOUNDATION fieldbus digital communications
- PACTware PC program using HART communication for advanced configuration and troubleshooting (see bulletin 59-101)
- IS, XP and Non-incendive approvals by FM, CSA, ATEX, IEC
- Standard output range from 3.8 to 20.5 mA
- 11 VDC turn on voltage
- Maximum loop resistance of 620 ohms at 24 VDC
- Process temperatures to +850 °F (+454 °C) for non-steam applications
- Level ranges from 14 to 120+ inches (356 to 3048+ mm)
- Specific gravity as low as 0.23
- Cast aluminum or stainless steel, TYPE 4X, Cl I Div 1 Groups B, C, D housing
- Field wiring in isolated junction box
- Head rotatable through 360°
- Accepted proven LVDT/range spring technology
- Range spring suppresses effects of turbulence to produce stable output signal.
- Flanged top mounting or external cage with side/side or side/bottom connections
- Special options, materials of construction and custom engineered features available (consult factory).
- Spring protector standard
- Signal sampling 15 times per second

- Non-interacting zero and span
- Emission and immunity compliance to EN 61326
- Specific gravity adjustment without stopping process
- Signal damping adjustment
- 64-unit multi-drop capability

Consult factory for ASME B31.1, ASME B31.3 or NACE construction.

INTERFACE

E3 MODULELEVEL is capable of tracking the interface level of two immiscible liquids with different densities. Each unit is custom-made with a displacer specially designed for the user's application. This allows it to detect the position of a clean interface or an emulsion layer and convert it into a stable 4–20 mA signal. Contact the factory for assistance in specifying an E3 for interface service. Note that for proper interface detection, the entire displacer must always be immersed in liquid.

DENSITY

Yet another capability of E3 MODULELEVEL is to track the changing density of a liquid over a known density range and convert that into a stable 4–20 mA output signal. As the density of the liquid changes, so does the mass of the liquid displaced by the specially designed displacer. The resulting change in buoyancy force on the displacer causes the movement of the LVDT core necessary to convert the density change to the 4–20 mA signal.

PACTware™ PC SOFTWARE

PACTware PC software and the Field Device Tool (FDT) standard take level measurement to a new degree of setup efficiency and user-friendliness. PACTware adds a graphical software interface for increased ease of use. Simply connect your PC through a serial interface to the HART loop and all functionality can be accessed conveniently, and safely. Refer to Magnetrol® PACTware bulletins 59-101 & 59-601 for more information.

SPECIFICATIONS

FUNCTIONAL

| | |
|--|--|
| System Design | |
| Measurement Principle | Buoyancy – continuous displacement utilizing a precision range spring |
| Input | |
| Measured Variable | Level, determined by LVDT core movement affected by buoyancy force changes on continuous displacer |
| Physical Range | Up to 120" (300 cm) based on displacer length (consult factory for longer ranges) |
| Output | |
| Type | 4 to 20 mA with HART Version 6.x 3.8 to 20.5 mA useable (meets NAMUR NE 43) FOUNDATION fieldbus, H1 (31.25 ^{kbits} / _{sec}), Available blocks AI, PID, RB, TB LAS capable, ITK 5.0 interoperability tested |
| Resolution | Analog: 0.01 mA, Display: 0.1%, Level Units: 0.01 inch |
| Loop Resistance (maximum) | 620 ohms @ 24 VDC |
| Diagnostic Alarm | 3.6, 22 mA or HOLD selectable (meets NAMUR NE 43) |
| Damping | Adjustable 0-45 seconds |
| Sampling Rate | Transmitter 15 times per second |
| User Interface | |
| Keypad | 3-button menu-driven data entry and system security |
| Indication | 2-line x 8-character LCD display |
| Power | |
| Measured at instrument terminals | 11 to 36 VDC --- HART, 9 to 32 VDC --- FOUNDATION fieldbus (Direct Current) This device provides only Functional Isolation. |
| Current | 22.5 mA maximum HART, 17 mA (maximum current draw) FOUNDATION fieldbus This device provides only Functional Isolation. |
| Housing | |
| Material | Aluminum A356-T6 (<0.20% copper), optional 316 stainless steel |
| Cable Entry | ¾" NPT and M20 |
| Ingress Protection | TYPE 4X, IP66 |
| Chamber | |
| Materials | Carbon steel and 316/316L stainless steel |
| Wetted parts | 316/316L and Inconel® (spring) |
| Process connections | Tank Top: 3", 4", 6" ANSI Flange Chambered: 1½", 2" NPT, Socketweld, ANSI Flanges |
| Process Conditions | |
| Process temperature range ① | Steam applications: -20 to +800 °F (-29 to +427 °C) Non-steam applications: -20 to +850 °F (-29 to +454 °C) ② |
| Process pressure range | 5150 psig @ +100 °F (355 bar @ +38 °C) |
| Environment | |
| Electronics Operating Temperature | -40 to +176 °F (-40 to +80 °C) |
| Display Function Operating Temperature | -5 to +160 °F (-20 to +70 °C) |
| Storage Temperature | -50 to +185 °F (-40 to +85 °C) |
| Humidity | 0-99%, non-condensing |
| Electromagnetic Compatibility | Meets CE Requirement: EN 61326 |
| Surge Protection | Meets CE Requirements EN 61326 |
| Shock Class | ANSI/ISA-S71.03 Class SA1 ③ |
| Vibration Class | ANSI/ISA-S71.03 Class VC2 ③ |
| Altitude | ≤2000 m |
| Pollution Degree | 2 |

① Maximum process temperatures are based on ambient temperatures less than or equal to +120 °F (+49 °C). Higher ambient temperatures require reduced process temperatures.

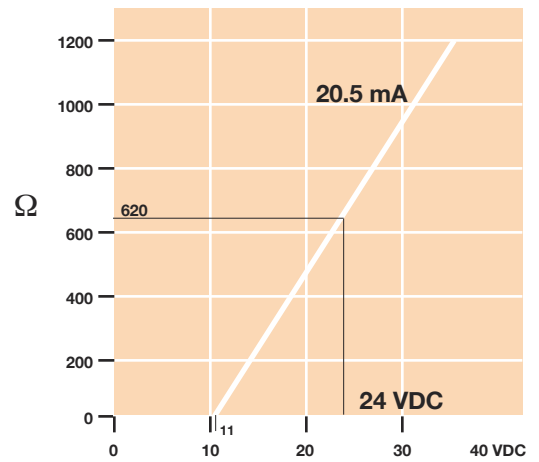
② Consult factory for low temperature applications down to -330 °F (-200 °C).

③ With aluminum housing only. Does not apply to models with 316 SS transmitter housings.

SPECIFICATIONS

PERFORMANCE: LEVEL

| | |
|----------------------------|---|
| Reference Conditions | Water @ +70 °F (+21 °C) with 14" displacer, wet calibration |
| Linearity | ±0.50% of full span |
| Repeatability | ±0.20% of full span |
| Ambient temperature effect | Maximum zero shift is 0.017%/°F over ambient temperature range |
| Operating Temp. range: | -40 to +176 °F (-40 to +80 °C) |
| LCD Temp. Range: | -5 to +160 °F (-20 to +70 °C) |
| Hysteresis | ±0.20% of full span |
| Response Time | <1 second |
| Warm-up Time | <5 seconds |
| SIL | SIL Certified with SFF of 90.6% |




Allowable Loop Resistance vs. Supply Voltage

PERFORMANCE: INTERFACE LEVEL & DENSITY ④



| | |
|----------------------------|---|
| Linearity | ±0.70% of full span |
| Repeatability | ±0.40% of full span |
| Ambient temperature effect | Maximum zero shift is 0.017%/°F over ambient temperature range |

④ The displacer must always be completely immersed in process liquid when the E3 is used in interface or density service. Top mounted models require liquid level to exceed the top of the displacer by 2" at all times to ensure optimal performance.

AGENCY APPROVALS

| Agency | Model | Transmitter Codes Digits 8, 9 and 10 | Approval |
|---|----------|--|---|
|  | EXX-XXXX | x11, x12, x13, x14 x21, x22, x23, x24 x31, x32, x33, x34 x41, x42, x43, x44 x51, x52, x53, x54 x61, x62, x63, x64 x81, x82, x83, x84 | Explosion Proof ① Class I, Div. 1; Groups B, C, D Type 4X, IP66 |
| | EXX-XXXX | x15, x16, x17, x18 x25, x26, x27, x28 x35, x36, x37, x38 x45, x46, x47, x48 x55, x56, x57, x58 x65, x66, x67, x68 x85, x86, x87, x88 | Intrinsically Safe ② Class I, Div. 1; Groups A, B, C, D Class II, Div. 1; Groups E, F, G Class III, T4 Entity Type 4X, IP66 |
| | EXX-XXXX | x11, x12, x13, x14 x21, x22, x23, x24 x31, x32, x33, x34 x41, x42, x43, x44 x51, x52, x53, x54 x61, x62, x63, x64 x81, x82, x83, x84 | Non-Incendive Class I, Div. 2; Groups A, B, C, D Class II, Div. 2; Groups E, F, G Class III, Div. 2; T4 Type 4X, IP66 |
| | EXX-XXXX | x11, x12, x13, x14 x21, x22, x23, x24 x31, x32, x33, x34 x41, x42, x43, x44 x51, x52, x53, x54 x61, x62, x63, x64 x81, x82, x83, x84 | Dust Ignition Proof Class II, Div. 1; Groups E, F, G Class III, T5 Type 4X, IP66 |

AGENCY APPROVALS

| Agency | Model | Transmitter Codes Digits 8, 9 and 10 | Approval |
|--|-----------------|--|---|
| CSA  | EXX-XXXX | x11, x13, x21, x23 x31, x33, x41, x43 x51, x53, x61, x63 x81, x83 | Explosion Proof ① Class I, Div. 1; Groups B, C, D Class II, Div. 1; Groups E, F, G Class III, T4 Type 4X, IP66 & IP67 |
| | EXX-XXXX | x15, x17, x25, x27 x35, x37, x45, x47 x55, x57, x65, x67 x85, x87 | Intrinsically Safe ② Class I, Div. 1; Groups A, B, C, D Class II, Div. 1; Groups E, F, G Class III, T4 Entity Type 4X, IP66 |
| | EXX-XXXX | x11, x13, x21, x23 x31, x33, x41, x43 x51, x53, x61, x63 x81, x83 | Non-Incendive Class I, Div. 2; Groups A, B, C, D Class II, Div. 2; Groups E, F, G Class III, T4 Type 4X, IP66 |
| ATEX  | EXX-XXXX | x1E, x1F, x1G, x1H x2E, x2F, x2G, x2H x3E, x3F, x3G, x3H x4E, x4F, x4G, x4H x5E, x5F, x5G, x5H x6E, x6F, x6G, x6H x8E, x8F, x8G, x8H | Flameproof ATEX Ex II 1/2 G Ex d IIC T6 EN 60079-0, EN 60079-1, EN 60079-26 94/9/EC |
| | EXX-XXXX | x1A, x1B, x1C, x1D x2A, x2B, x2C, x2D x3A, x3B, x3C, x3D x4A, x4B, x4C, x4D x5A, x5B, x5C, x5D x6A, x6B, x6C, x6D x8A, x8B, x8C, x8D | Intrinsically Safe ② ATEX Ex II 1 G Ex ia IIC T4 EN 60079-0, EN 60079-11, EN 60079-26, EN 60079-27 94/9/EC |
| | EXX-XXXX | x1A, x1B, x1C, x1D x2A, x2B, x2C, x2D x3A, x3B, x3C, x3D x4A, x4B, x4C, x4D x5A, x5B, x5C, x5D x6A, x6B, x6C, x6D x8A, x8B, x8C, x8D | Non-Sparking ATEX Ex II 3 G Ex ic II T6 EN 60079-0 EN 60079-11 94/9/EC |
| IEC | EXX-XXXX | x1E, x1F, x1G, x1H x2E, x2F, x2G, x2H x3E, x3F, x3G, x3H | Flameproof IECEx Ex d IIC T6 Ga/Gb IEC 60079-0, IEC 60079-1, IEC 60079-26 |
| | EXX-XXXX | x1A, x1B, x1C, x1D x2A, x2B, x2C, x2D x3A, x3B, x3C, x3D | Intrinsically Safe ② IECEx Ex ia IIC T4 Ga IEC 60079-0, IEC 60079-11, IEC 60079-26, IEC 60079-27 |

① On remote electronics housing only, seal is required within 18 inches.

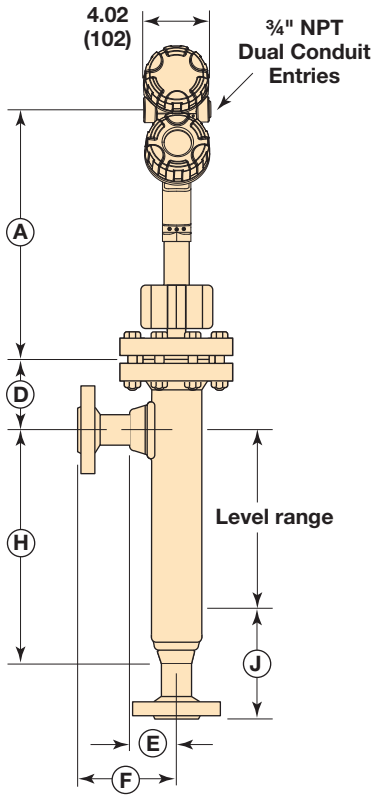
② See appropriate Installation & Operating Manual for entity parameters for IS installation.



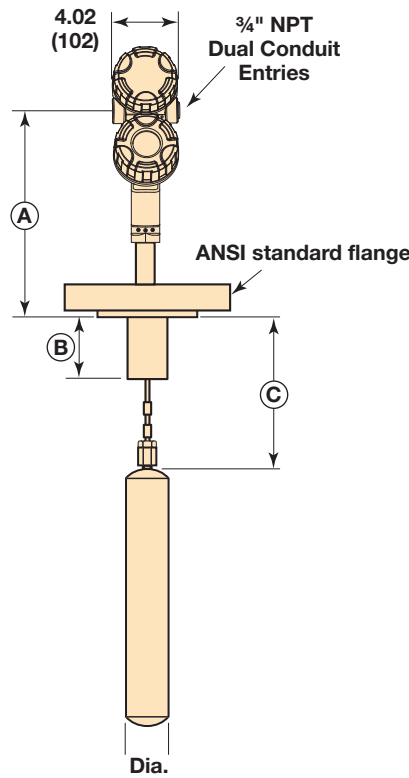
These units have been tested to EN 61326 and are in compliance with the EMC Directive 2004/108/EC.

DIMENSIONAL SPECIFICATIONS

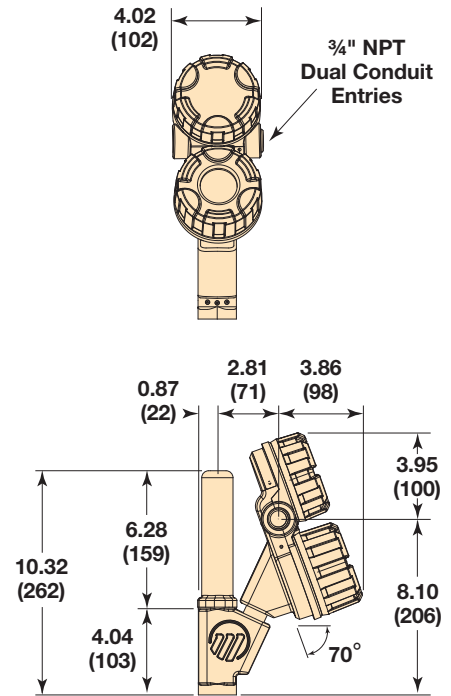
STANDARD PRESSURE MODELS E3A, E3B, E3C, E3D, E3E, E3F
INCHES (MM)



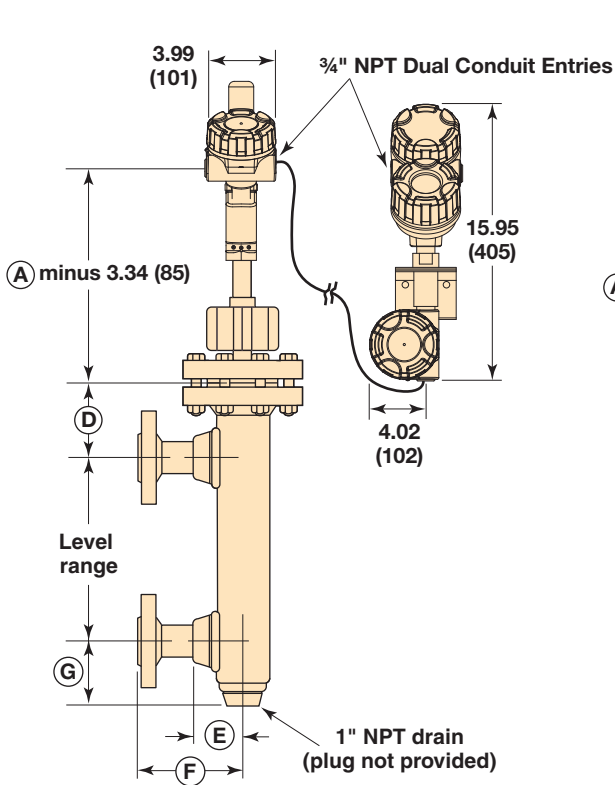
HT Integral Side/Bottom Mount
Fourth Digit Codes A, B, C



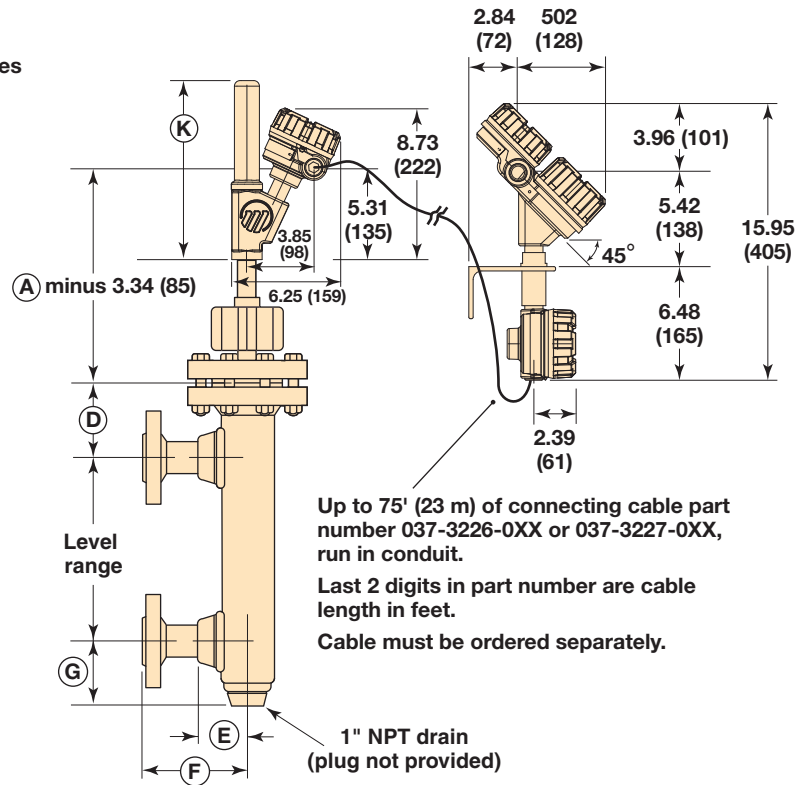
E3A/E3B Series with Integral Top Mounting
Fourth Digit Codes J, K, L



Integral Transmitter Head



Remote Side/Side Mount
Fourth Digit Codes A, B, C



Remote Side/Side Mount
Fourth Digit Codes A, B, C

DIMENSIONAL SPECIFICATIONS

INCHES (MM)

| 9th Digit | Cage Press. Rating | Process Conn. Size | Spring S.G. Range | Dimension | | | | | | | | |
|------------------|------------------------|--------------------|-------------------|---------------|---------------|---------------|---------------|---------------|--------------|------------------------------|----------------|----------------|
| | | | | B | C | D | E | F | G | H | J | K |
| 1, 2, 3, 4, 5, 6 | 150#, 300# & 600# ANSI | 1½" | 0.23 – 0.54 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 3.19 (81) | 7.00 (178) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | | | 0.55 – 1.09 | 4.75 (121) | 7.31 (186) | 7.31 (186) | 3.19 (81) | 7.00 (178) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | | | 1.10 – 2.20 | 4.75 (121) | 7.31 (186) | 7.31 (186) | 3.19 (81) | 7.00 (178) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | | 2" | 0.23 – 0.54 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 3.31 (84) | 7.13 (181) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | | | 0.55 – 1.09 | 4.75 (121) | 7.31 (186) | 7.31 (186) | 3.31 (84) | 7.13 (181) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | | | 1.10 – 2.20 | 4.75 (121) | 7.31 (186) | 7.31 (186) | 3.31 (84) | 7.13 (181) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | 900# ANSI | 1½" | 0.55 – 1.09 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 3.19 (81) | 7.00 (178) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | | 2" | 0.55 – 1.09 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 3.31 (84) | 7.13 (181) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 10.32 (262) |
| | 1500# ANSI | 1½" | 0.55 – 1.09 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 3.19 (81) | 7.00 (178) | 3.44 (87) | 3.44 + range (87 + range) | 6.43 (163) | 10.32 (262) |
| | | 2" | 0.55 – 1.09 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 3.31 (84) | 8.13 (207) | 3.44 (87) | 3.44 + range (87 + range) | 7.43 (189) | 10.32 (262) |
| | 2500# ANSI | 1½" | 0.55 – 1.09 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 4.00 (102) | 9.00 (229) | 3.44 (87) | 3.44 + range (87 + range) | 10.21 (259) | 10.32 (262) |
| | | 2" | 0.55 – 1.09 | 6.75 (171) | 9.31 (236) | 9.31 (236) | 4.38 (111) | 9.81 (249) | 3.44 (87) | 3.44 + range (87 + range) | 11.08 (281) | 10.32 (262) |
| 8 | 150#, 300# & 600# | 1½" | 0.55 – 1.09 | 8.25 (210) | 9.31 (236) | 9.31 (236) | 3.19 (81) | 7.00 (178) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 11.60 (295) |
| | | 2" | 0.55 – 1.09 | 8.25 (210) | 9.31 (236) | 9.31 (236) | 3.31 (84) | 7.13 (181) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 11.60 (295) |
| | 900# | 1½" | 0.55 – 1.09 | 8.25 (210) | 9.31 (236) | 9.31 (236) | 3.19 (81) | 7.00 (178) | 3.00 (76) | 3.00 + range (76 + range) | 5.43 (138) | 11.60 (295) |
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| | | 2" | 0.55 – 1.09 | 8.25 (210) | 9.31 (236) | 9.31 (236) | 3.31 (84) | 8.13 (207) | 3.44 (87) | 3.44 + range (87 + range) | 7.43 (189) | 11.60 (295) |
| | 2500# | 1½" | 0.55 – 1.09 | 8.25 (210) | 9.31 (236) | 9.31 (236) | 4.00 (102) | 9.00 (229) | 3.44 (87) | 3.44 + range (87 + range) | 10.21 (259) | 11.60 (295) |
| | | 2" | 0.55 – 1.09 | 8.25 (210) | 9.31 (236) | 9.31 (236) | 4.38 (111) | 9.81 (249) | 3.44 (87) | 3.44 + range (87 + range) | 11.08 (281) | 11.60 (295) |

| "A" Dimension | | Fourth Digit of Model Number | | | |
|--------------------|------------------|------------------------------|-------------|-------------|-------------|
| Cage Press. Rating | Head Flange Size | A, B, C | D, E, F | J, K, L | M, N, P |
| 150# ANSI | 3" | 16.97 (431) | 24.97 (634) | 12.97 (329) | 20.97 (533) |
| | 4" | 16.97 (431) | 24.97 (634) | 12.97 (329) | 20.97 (533) |
| | 6" | 17.03 (433) | 25.03 (636) | 13.03 (331) | 21.03 (534) |
| 300# ANSI | 3" | 17.16 (436) | 25.16 (639) | 13.16 (334) | 21.16 (537) |
| | 4" | 17.28 (439) | 25.28 (642) | 13.28 (337) | 21.28 (541) |
| | 6" | 17.47 (444) | 25.47 (647) | 13.47 (342) | 21.47 (545) |
| 600# ANSI | 3" | 17.53 (445) | 25.53 (648) | 13.53 (344) | 21.53 (547) |
| | 4" | 17.78 (452) | 25.78 (655) | 13.78 (350) | 21.78 (553) |
| | 6" | 18.16 (461) | 26.16 (664) | 14.16 (360) | 22.16 (563) |
| 900# ANSI | 3" | 17.78 (452) | 25.78 (655) | 13.78 (350) | 21.78 (553) |
| | 4" | 18.03 (458) | 26.03 (661) | 14.03 (356) | 22.03 (560) |
| | 6" | 18.47 (469) | 26.47 (672) | 14.47 (368) | 22.47 (571) |
| 1500# ANSI | 3" | 18.16 (461) | 26.16 (664) | 14.16 (360) | 22.16 (563) |
| | 4" | 18.41 (468) | 26.41 (671) | 14.41 (366) | 22.41 (569) |
| | 6" | 19.53 (496) | 27.53 (699) | 15.53 (394) | 23.53 (598) |
| 2500# ANSI | 4" | 19.28 (490) | 27.28 (693) | 15.28 (388) | 23.28 (591) |
| | 6" | 20.53 (521) | 28.53 (725) | 16.53 (420) | 24.53 (623) |

NON-STEAM SERVICE

MODEL NUMBER



Models available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP).

DESIGN TYPE

| | |
|------------|--|
| E 3 | Standard Construction Electronic MODULELEVEL |
|------------|--|

MOUNTING AND CHAMBER MATERIALS

| Flanged top ① | | Cage side/bottom | | Cage side/side | |
|---------------|----------|------------------|----------|----------------|----------|
| steel | 316 SS | steel | 316 SS ② | steel | 316 SS ② |
| A | B | C | D | E | F |

- ① Adjustable 8-foot hanger cable, part number 32-3110-001, required when distance from flange face to top of displacer must be greater than 7.31".
- ② Bolting material is alloy steel.

SPECIFIC GRAVITY AND PROCESS TEMPERATURE

| Integral or Remote | | | | | Transmitter Mounting |
|----------------------|----------------------|----------------------|----------------------|----------------------|--|
| 1 & 4 | 1 & 4 | 1 & 4 | 1, 4 & 8 ③ | 3, 6 & 8 ③ | Use with Mounting/Temp. codes (9th Digit) |
| +300 °F (+150 °C) | +400 °F (+200 °C) | +450 °F (+230 °C) | +850 °F (+454 °C) | +750 °F (+399 °C) | maximum process temperature |
| J | A | M | D | M | 0.23 – 0.54 specific gravity (up to 600 lbs) |
| K | B | N | E | N | 0.55 – 1.09 specific gravity (all pressures) |
| L | C | P | F | P | 1.10 – 2.20 specific gravity (up to 600 lbs) |

③ 9th Digit=8 only good with 0.55–1.09 SG.

PROCESS CONNECTION SIZE & TYPE

| External Cage | | Top Mount | | | Type |
|---------------|----------|-----------|----------|----------|--------|
| 1½" | 2" | 3" | 4" | 6" | |
| A | E | n/a | n/a | n/a | NPT |
| R | F | n/a | n/a | n/a | SW |
| P | Q | G | H | K | Flange |

CHAMBER PRESSURE CLASS

| ANSI Flange rating | | | | | |
|--------------------|----------|----------|----------|------------|--------------|
| 150# RF | 300# RF | 600# RF | 900# RF | 1500# RF ④ | 2500# RF ④⑤⑥ |
| 3 | 4 | 5 | 6 | 7 | 8 |

- ④ Pressure rating limited by enclosing tube to 5150 psi @ +100 °F.
- ⑤ For stainless steel construction on 1500# and 2500# models, consult factory.
- ⑥ Models E3A and E3B with 2500# construction must have a mounting flange 4" or greater.

LEVEL RANGE

| All Pressures / 9th Digit = 8 | | | | 600# and below | | | | | |
|-------------------------------|----------|----------|----------|----------------|----------|----------|----------|----------|--------|
| 14 | 32 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | Inches |
| 356 | 813 | 1219 | 1524 | 1829 | 2134 | 2438 | 2743 | 3048 | mm |
| A | B | C | D | E | F | G | H | I | Code |

TRANSMITTER – ELECTRONICS (see opposite page)



NON-STEAM SERVICE

MODEL NUMBER

SIGNAL OUTPUT

| | |
|----------|--|
| F | FOUNDATION fieldbus™ Digital Communications (English only) |
| S | 4–20 mA/HART, SIL 2/3 Certified |

MOUNTING/TEMPERATURE

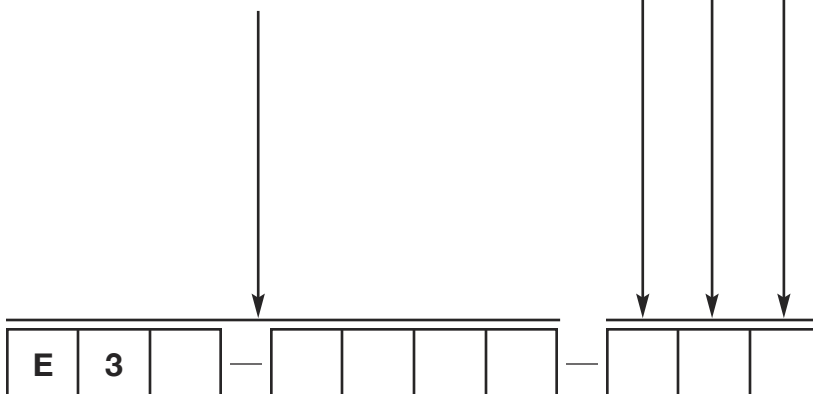
| Integral Mount | | |
|----------------|-----------------------------------|--|
| | Maximum Process Temperature | Use with Specific Gravity and Process Temperature codes (4th Digit): |
| 1 | +550 °F (+290 °C) | J, K, L, A, B, C, M, N, P, D, E, F |
| 3 | +551 to +600 °F (+291 to +315 °C) | M, N, P |
| Remote Mount ⑦ | | |
| | Maximum Process Temperature | Use with Specific Gravity and Process Temperature codes: |
| 4 | +550 °F (+290 °C) | J, K, L, A, B, C, M, N, P, D, E, F |
| 6 | +551 to +600 °F (+291 to +315 °C) | M, N, P |
| 8 | +601 to +850 °F (+316 to +454 °C) | E, N |

⑦ Cable for remote mounting transmitter is 037-3226-xxx up to +400 °F (+204 °C) and 037-3227-xxx (Belden 88777) above +400 °F (+204 °C) where -xxx is the length in feet from 10 (-010) to 400 (-400) feet.

HOUSING MATERIAL/CONDUIT ENTRY/APPROVAL

| | |
|----------|---|
| 1 | Cast aluminum, FM/CSA XP, ¾" NPT |
| 2 | Cast aluminum, FM XP, M20 |
| 3 | Cast stainless steel, FM/CSA XP, ¾" NPT |
| 4 | Cast stainless steel, FM XP, M20 |
| 5 | Cast aluminum, FM/CSA IS, ¾" NPT |
| 6 | Cast aluminum, FM IS, M20 |
| 7 | Cast stainless steel, FM/CSA IS, ¾" NPT |
| 8 | Cast stainless steel, FM IS, M20 |
| A | Cast aluminum, ATEX/IEC IS, ¾" NPT |
| B | Cast aluminum, ATEX/IEC IS, M20 |
| C | Cast stainless steel, ATEX/IEC IS, ¾" NPT |
| D | Cast stainless steel, ATEX/IEC IS, M20 |
| E | Cast aluminum, ATEX/IEC XP, ¾" NPT |
| F | Cast aluminum, ATEX/IEC XP, M20 |
| G | Cast stainless steel, ATEX/IEC XP, ¾" NPT |
| H | Cast stainless steel, ATEX/IEC XP, M20 |

E3X-XXXX (see previous page)



STEAM SERVICE

MODEL NUMBER

DESIGN TYPE

| | |
|------------|--|
| E 3 | Standard Construction Electronic MODULELEVEL |
|------------|--|

MOUNTING AND CHAMBER MATERIALS

| Flanged top ① | | Cage side/bottom | | Cage side/side | |
|---------------|----------|------------------|----------|----------------|----------|
| steel | 316 SS | steel | 316 SS ② | steel | 316 SS ② |
| A | B | C | D | E | F |

- ① Adjustable 8-foot hanger cable, part number 32-3110-001, required when distance from flange face to top of displacer must be greater than 7.31".
- ② Bolting material is alloy steel.

SPECIFIC GRAVITY AND PROCESS TEMPERATURE

| Integral or Remote | Integral | Remote | Integral or Remote | Integral or Remote | Remote | Transmitter Mounting |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--|
| 1 & 4 | 2 | 5 | 2 & 5 | 3 & 8 | 6 & 8 | Use with Mounting/Temp. codes (9th Digit) |
| +300 °F (+150 °C) | +400 °F (+200 °C) | +400 °F (+200 °C) | +450 °F (+230 °C) | +800 °F (+427 °C) | +700 °F (+371 °C) | maximum process temperature |
| K | B | K | N | E | N | 0.55 - 1.09 specific gravity (all pressures) |

PROCESS CONNECTION SIZE & TYPE

| External Cage | | Top Mount | | | Type |
|---------------|----------|-----------|----------|----------|--------|
| 1½" | 2" | 3" | 4" | 6" | |
| A | E | n/a | n/a | n/a | NPT |
| R | F | n/a | n/a | n/a | SW |
| P | Q | G | H | K | Flange |

CHAMBER PRESSURE CLASS

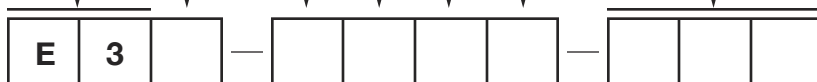
| ANSI Flange rating | | | | | |
|--------------------|----------|----------|----------|------------|--------------|
| 150# RF | 300# RF | 600# RF | 900# RF | 1500# RF ④ | 2500# RF ③④⑤ |
| 3 | 4 | 5 | 6 | 7 | 8 |

- ③ Pressure rating limited by enclosing tube to 5150 psi @ +100 °F.
- ④ For stainless steel construction on 1500# and 2500# models, consult factory.
- ⑤ Models E3A and E3B with 2500# construction must have a mounting flange 4" or greater.

LEVEL RANGE

| All Pressures / 9th Digit = 8 | | | | 600# and below | | | | | |
|-------------------------------|----------|----------|----------|----------------|----------|----------|----------|----------|--------|
| 14 | 32 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | Inches |
| 356 | 813 | 1219 | 1524 | 1829 | 2134 | 2438 | 2743 | 3048 | mm |
| A | B | C | D | E | F | G | H | I | Code |

TRANSMITTER – ELECTRONICS (see opposite page)



STEAM SERVICE

MODEL NUMBER

SIGNAL OUTPUT

| | |
|----------|--|
| F | FOUNDATION fieldbus™ Digital Communications (English only) |
| S | 4–20 mA/HART, SIL 2/3 Certified |

MOUNTING/TEMPERATURE

| Integral Mount | | |
|----------------|-----------------------------------|--|
| | Maximum Process Temperature | Use with Specific Gravity and Process Temperature codes (4th Digit): |
| 1 | +300 °F (+150 °C) | K |
| 2 | +301 to +450 °F (+151 to +230 °C) | B, N |
| 3 | +451 to +500 °F (+231 to +260 °C) | E |
| Remote Mount ⑥ | | |
| | Maximum Process Temperature | Use with Specific Gravity and Process Temperature codes (4th Digit): |
| 4 | +300 °F (+150 °C) | K |
| 5 | +301 to +450 °F (+151 to +230 °C) | B, K, N |
| 6 | +451 to +500 °F (+231 to +260 °C) | E, N |
| 8 | +501 to +800 °F (+261 to +427 °C) | E, N ⑦ |

⑥ Cable for remote mounting transmitter is 037-3226-xxx up to +400 °F (+204 °C) and 037-3227-xxx (Belden 88777) above +400 °F (+204 °C) where -xxx is the length in feet from 10 (-010) to 400 (-400) feet.

⑦ 4th digit N with 9th digit 8 has a maximum temperature of +700 °F (+371 °C).

HOUSING MATERIAL/CONDUIT ENTRY/APPROVAL

| | |
|----------|---|
| 1 | Cast aluminum, FM/CSA XP, ¾" NPT |
| 2 | Cast aluminum, FM XP, M20 |
| 3 | Cast stainless steel, FM/CSA XP, ¾" NPT |
| 4 | Cast stainless steel, FM XP, M20 |
| 5 | Cast aluminum, FM/CSA IS, ¾" NPT |
| 6 | Cast aluminum, FM IS, M20 |
| 7 | Cast stainless steel, FM/CSA IS, ¾" NPT |
| 8 | Cast stainless steel, FM IS, M20 |
| A | Cast aluminum, ATEX/IEC IS, ¾" NPT |
| B | Cast aluminum, ATEX/IEC IS, M20 |
| C | Cast stainless steel, ATEX/IEC IS, ¾" NPT |
| D | Cast stainless steel, ATEX/IEC IS, M20 |
| E | Cast aluminum, ATEX/IEC XP, ¾" NPT |
| F | Cast aluminum, ATEX/IEC XP, M20 |
| G | Cast stainless steel, ATEX/IEC XP, ¾" NPT |
| H | Cast stainless steel, ATEX/IEC XP, M20 |

E3X-XXXX (see previous page)



QUALITY



The quality assurance system in place at Magnetrol® 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 MAGNETROL quality assurance system is registered to ISO 9001 affirming its commitment to known international quality standards providing the strongest assurance of product/service quality available.

ESP

Expedite **S**hip **P**lan

Several Electronic MODULELEVEL Displacer Transmitters are available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP). Models covered by ESP service are color coded in the selection data charts.

To take advantage of ESP, simply match the color coded model number codes (standard dimensions apply).

ESP service may not apply to orders of ten units or more. Contact your local representative for lead times on larger volume orders, as well as other products and options.

WARRANTY



All MAGNETROL 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, MAGNETROL will repair or replace the

control at no cost to the purchaser (or owner) other than transportation.

MAGNETROL 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 MAGNETROL products.

For additional information, see Instruction Manual 48-635 or 48-640.



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