Digital E3 Modulevel® Liquid Level Displacer Transmitter

DESCRIPTION

The Digital E3 Modulevel® 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 MODULEVEL has microprocessor-based electronics with 4–20 mA/HART® or FOUNDATION fieldbus™ output. E3 supports the FDT/DTM standard and a PACT*ware*™ 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) value of 2, SFF value of 92.3%
- 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 MODULEVEL 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 MODULEVEL 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.

PACT*ware*™ 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® PACT*ware* 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 × 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	
	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	
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.

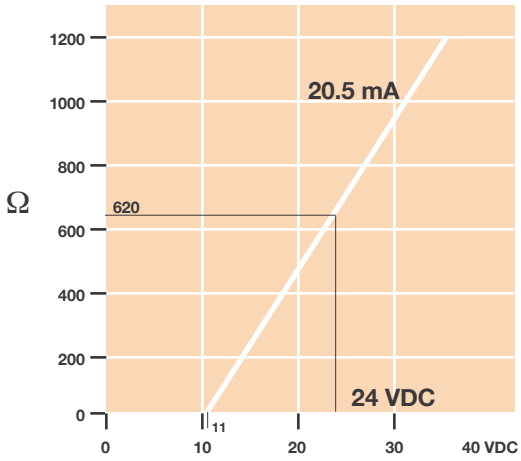
② Consult factory for low temperature applications down to -330° F (-200° C).

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	Suitable for use in SIL 2 environments with SFF of 92.3%



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
FM FM APPROVED	**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.

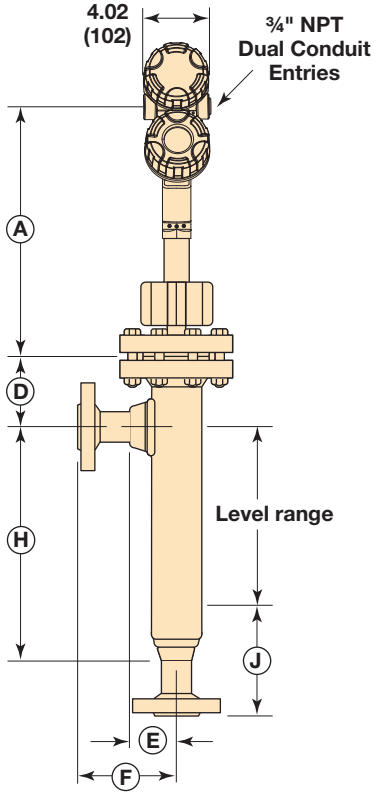
② See appropriate Installation & Operating Manual for entity parameters for IS installation.

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

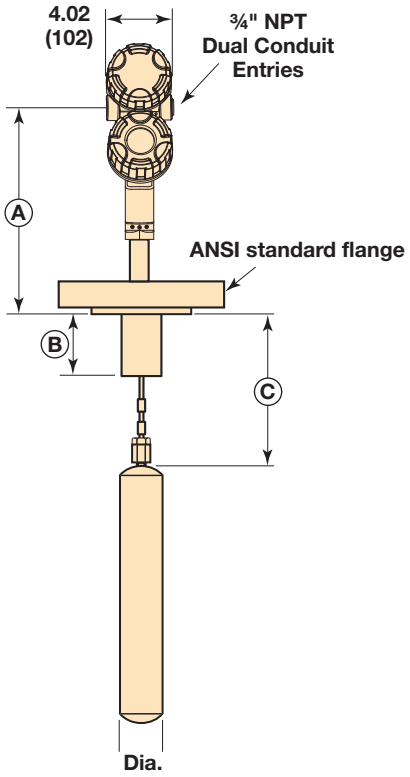
DIMENSIONAL SPECIFICATIONS

STANDARD PRESSURE MODELS E3A, E3B, E3C, E3D, E3E, E3F

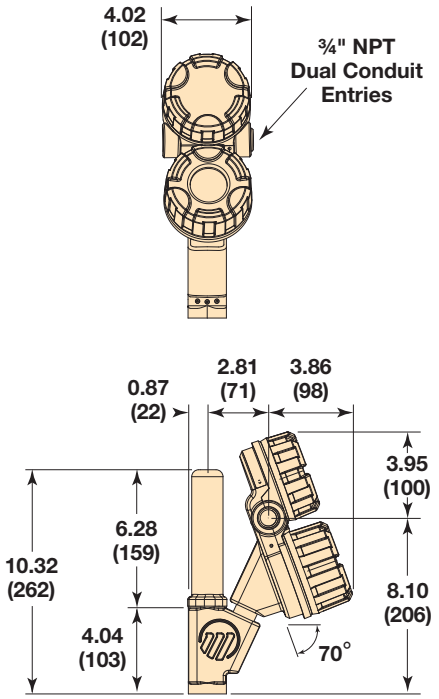
INCHES (MM)



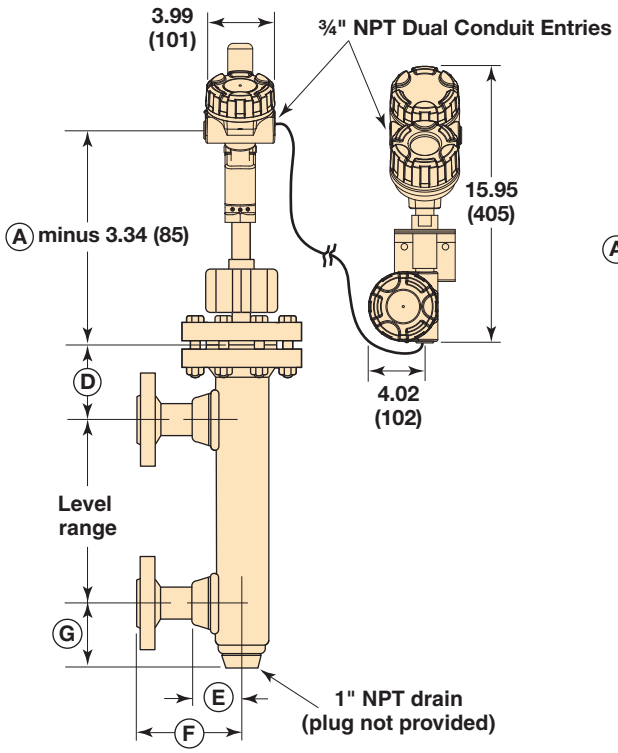
HT Integral Side/Bottom Mount
Fourth Digit Codes A, B, C



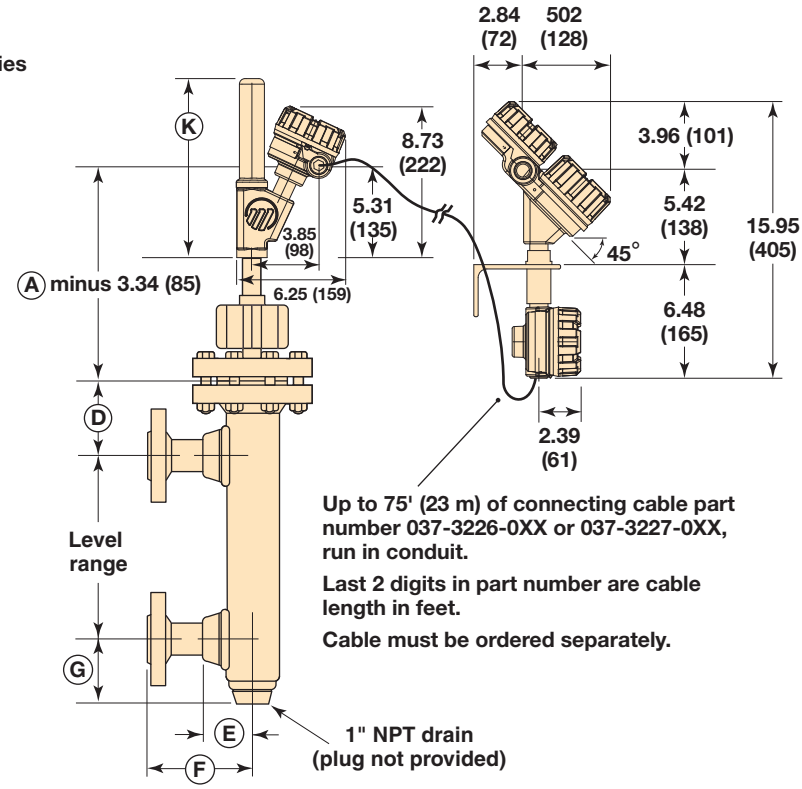
E3A/E3B Series with Integral Top Mounting
Fourth Digit Codes J, K, L



Integral Transmitter Head



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



Up to 75' (23 m) of connecting cable part number 037-3226-0XX or 037-3227-0XX, run in conduit.

Last 2 digits in part number are cable length in feet.

Cable must be ordered separately.

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)
		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)
	1500#	1½"	0.55 – 1.09	8.25 (210)	9.31 (236)	9.31 (236)	3.19 (81)	7.00 (178)	3.44 (87)	3.44 + range (87 + range)	6.43 (163)	11.60 (295)
		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)	1021 (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 MODULEVEL

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)
Std.	4"	8"	12"	8"	Temperature Extension
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)

E	**3**		—					—			

MODEL NUMBER

OUTPUT/SIL RATING

H	4-20 mA/HART, SIL 2
F	FOUNDATION fieldbus Digital Communications (English only)

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

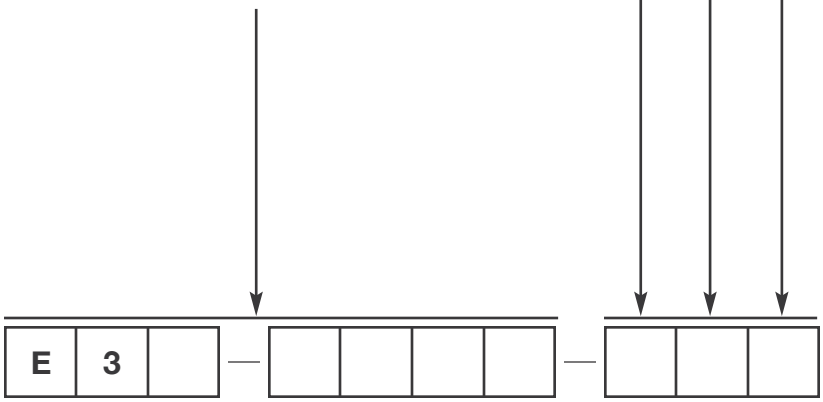
⑦ Cable for remote mounting transmitter is 037-3226-xxx up to +400° F (+204° C) and 037-3227-xxx (Belden 88777) above +400° F (+204° C) where -xxx is the length in feet from 10 (-010) to 400 (-400) feet.

HOUSING MATERIAL/CONDUIT ENTRY/APPROVAL

Housing Material/Conduit Entry/Approval		**9th Digit**
1	Cast aluminum, FM/CSA XP, ¾" NPT	1,3,4,6,8
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	1,3,4,6,8 ⑧
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	

⑧ 9th digit = 8 applies to ATEX only.

E3X-XXXX (see previous page)



MODEL NUMBER

DESIGN TYPE

E 3	Standard Construction Electronic MODULEVEL

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)
Std.	4"	Std.	8"	12"	8"	Temperature Extension
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)

E	**3**		—					—			

MODEL NUMBER

OUTPUT/SIL RATING

H	4-20 mA/HART, SIL 2
F	FOUNDATION fieldbus Digital Communications (English only)

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

Housing Material/Conduit Entry/Approval		**9th Digit**
1	Cast aluminum, FM/CSA XP, ¾" NPT	1,2,3,4,5,6,8
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	1,2,3,4,5,6,8 ⑧
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	

⑧ 9th digit = 8 applies to ATEX only.

E3X-XXXX (see previous page)

E	3		—					—			

QUALITY

MAGNETROL
REGISTERED TO
ISO 9001
Your Assurance of
Quality and Service

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
Ship
Plan

Several Electronic MODULEVEL 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 one full year 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.

Magnetrol®

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