



Magnetostrictive Liquid-Level Sensors
with Temposonics® Technology

M-Series Model MR3/4
MLG Transmitter with Analog Output

Data Sheet

FEATURES

- 4 to 20 mA Analog Output with HART®
- No Scheduled Maintenance or Recalibration
- High Accuracy and Repeatability
- AMS Aware
- Flame Proof and/or Intrinsically Safe

APPLICATIONS

- Inventory Control
- Process Vessel
- Bypass Chamber

MARKETS

- Petroleum and Petrochemical
- Power Generation
- Specialty Chemical

Product overview

The Level Plus® Model MR3/4 liquid level transmitter satisfies the demand for an analog communication interface for magnetic level gauge (MG) applications. The Model MR3/4 transmitter provides a 4-20mA output for most of our MG gauges and allows for mounting external to the chamber without interrupting the process.

Model MR3/4 transmitters are modular in design offering a selection of mounting options and pipe styles. The modularity also offers simple field replacement. Subject to local electrical codes, the sensing element and electronics can be removed from the transmitter pipe without disturbing the operation of the process saving both time and money

The model MR3/4 transmitter uses HART communication for setup, calibration, and diagnostics. HART can be utilized via a hand-held communicator or with the setup software via a PC and HART to serial converter. The optional on-board display and keypad is also provided for local indication and programming.





Model MR Sightglass Transmitter
Single-Cavity Housing with MG Gauge



Product specifications

Parameters	Specifications	Parameters	Specifications
LEVEL OUTPUT		FIELD INSTALLATION	
Measured variable:	Product level	Housing dimensions:	Single cavity: 127 mm (5 in.) by 133 mm (5.25 in.) 123 mm (4.84 in.) O.D.
Output signal / Protocol:	4 to 20 mA with HART®		Dual cavity: 127 mm (5 in.) by 177 mm (6.95 in.) 121 mm (4.75 in.) O.D.
Order length:	Rigid pipe: 508 mm to 5000 mm § Δ Δ Contact factory for longer lengths. § Order length equals the measurement range plus the inactive zone.	MOUNTING	
		Rigid pipe:	Hose clamp to chamber
		WIRING	
		Connections:	2-wire shielded cable twisted pair,
Non-linearity:	0.02% F.S. or 0.794 mm (1/32 in.)* * Whichever is greater	ELECTRICAL CONNECTIONS	
Repeatability:	0.01% F.S. or 0.381 mm (0.015 in.)* † Contact factory for alternative materials.	Single Cavity:	¾ in. conduit opening, M20 for ATEX / IEC version
ELECTRONICS		DISPLAY	
Input voltage:	10.5 to 36.1 Vdc, 28 Vdc maximum for I.S. approval	Measured variables:	Product level
Fail safe:	High (21.4 mA), or Low (3.8 mA)	Size:	13 mm (0.5 in.)
Reverse polarity protection:	Series diode	Number of digits:	16
Lightning/ Transient protection:	Stage 1: Line-to-ground surge suppression; IEC 61000-4-5 Stage 2: Line-to-line and line-to-ground transient suppressors; IEC 61000-4-4		
CALIBRATION			
Zero adjust range:	Anywhere within the active length		
Span adjust range:	Full scale to 152 mm (6 in.) from zero		
ENVIRONMENTAL			
Enclosure rating:	NEMA Type 4X		
Humidity:	0 to 100% relative humidity, non-condensing		
Operating temperatures:	Electronics: -40 °C (-40 °F) to 71 °C (160 °F) Sensing element: -40 °C (-40 °F) to 125 °C (257 °F) ◇ ◇. Contact factory for specific temperature ranges.		

Agency approvals

Explosion proof		Intrinsically safe	
FM 3615 C22.2 No. 30	Class I, Division 1, Groups B, C and D •• Class II, Division 1, Groups E, F and G •• Class III, Type 4X, T4 •• Explosion-proof housing required	C22.2 No. 157	Class I, Division 1, Groups A, B, C and D Class II, Division 1, Groups E, F and G Class III, Type 4X, T4
Flame proof		EN 60079-11:2007	PTB 10 ATEX 2011 X  II 1/2 G bzw. II 2 G Ex ia IIA T4 bzw. Ex ia IIB T4 ** ** Contact factory for model numbers
IECEX 60079-1:2007	IECEX FMG 13.0019X Ex d IIB T4 Ga/Gb IP66	FM 3610	Class I, Division 1, Groups C and D order length < 300 inches Class I, Division 1, Group D order length > 300 inches Class II, Division 1, Groups E, F, and G Class III, Type 4X, T4
EN 60079-1:2007	FM13ATEX0050X  II 1/2 G Ex d IIB T4 Ga/Gb IP66	GB3836.4	Ex ia IIB T4 Ga/Gb GYJ14.1051X
No. 2013-54	Ex d IIB T4 Ga/Gb		
ABNT NBR IEC 60069-1:2009e	TUV 14.0935 Ex d IIB T4 Ga/Gb IP66		

Analog Setup software

The Model MR3/4 transmitter is programmed through the HART interface. This interface is easily connected to a PC by using the HART-to-Serial converter. The Analog Setup Software allow the user to adjust both 'Zero' (4 mA) and 'Span' (20 mA) setpoints, adjust HART parameters, and customize the optional built-in display. The setup software is shipped with each transmitter order. However, if you require an additional copy or an upgrade to your previously installed setup software.

HART® handheld communicator programming

The Level Plus Model MR3/4 transmitter programing can also be performed by using handheld HART communicator device such as the *Rosemount® 375 or 475*.

Setpoint programming using the display

Any Level Plus Model MR3/4 transmitter that is purchased with a display has the ability to adjust the 4 and 20 mA setpoints by pressing the appropriate button located at the bottom of the display.

Product dimensions and mounting

Nihon Klingage offers the Level Plus Model MR3/4 transmitter configured for external mounting to most Magnetic Level Gauges (MG) (see 'Figure 1'). The model MR can be ordered with the standard 5/8 inch OD pipe or the optional 1/2 inch OD pipe from 508 mm to 5000 mm. Stainless steel hose clamps are typically used to secure the model MR to the MG.

The Model MR transmitter 'Measuring Range' is equal to the 'Order Length' minus the 'Inactive Zone' the 'Lower Adjustment' and the 'Upper Adjustment'. The 'Measuring Range' should equal the measuring range of the MG. Be sure to use an appropriate 'Order Length' for the transmitter, an easy way to calculate it is to add 230mm to the CtoC 'Measuring Range'.

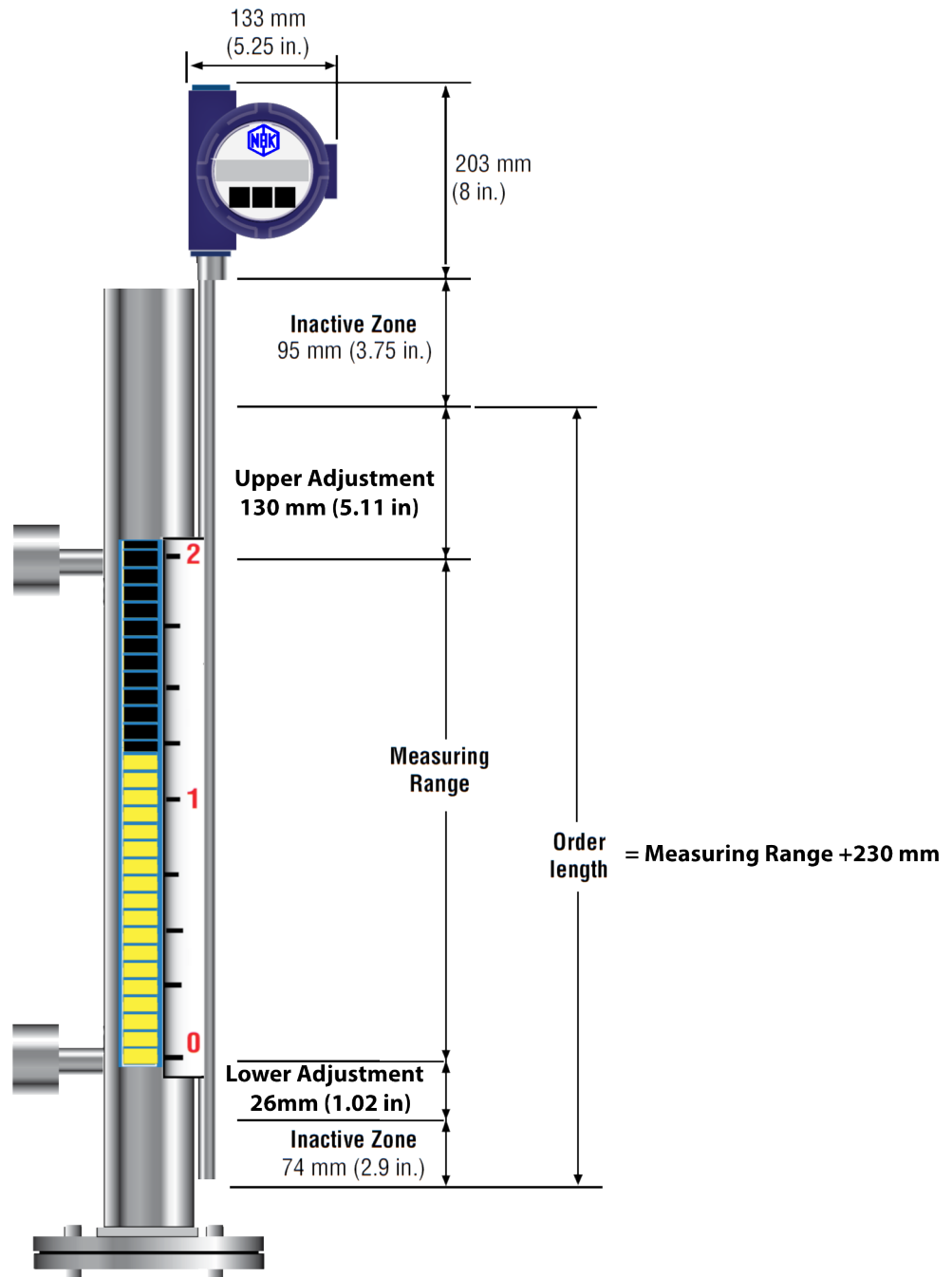


Figure 1. Model MR mounting, bottom flange

Product dimensions and mounting

Nihon Klingage offers the Level Plus Model MR3/4 transmitter configured for external mounting to most Magnetic Level Gauges (MG) (see 'Figure 2'). The model MR can be ordered with the standard 5/8 inch OD pipe or the optional 1/2 inch OD pipe from 508 mm to 5000 mm. Stainless steel hose clamps are typically used to secure the model MR to the MG.

The model MR offers an optional 90 degree fitting for an MG with both top and bottom flanges. The 90 degree fitting allows the electronic head of the Model MR to be positioned to the side of the pipe allowing for simpler mounting.

The Model MR transmitter 'Measuring Range' is equal to the 'Order Length' minus the 'Inactive Zone' the 'Lower Adjustment' and the 'Upper Adjustment'. The 'Measuring Range' should equal the measuring range of the MG. Be sure to use an appropriate 'Order Length' for the transmitter, an easy way to calculate it is to add 200mm to the CtoC 'Measuring Range'

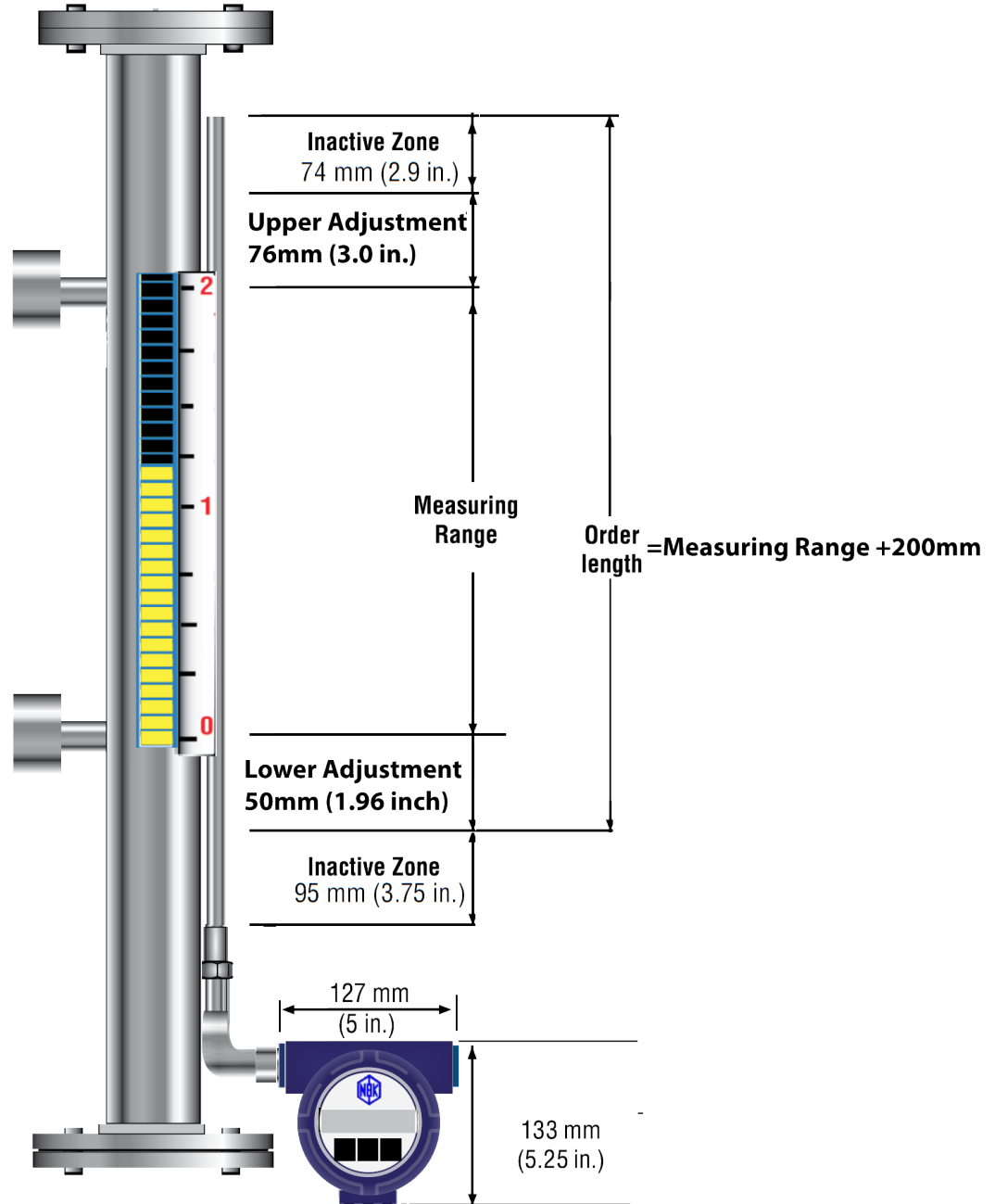


Figure 2. Model MR mounting, top and bottom flange



Ordering information for FM-CSA Approvals

TRANSMITTER MODEL		=	<input type="text" value="M"/>	1
M	= Magnetostrictive transmitter			
TYPE		=	<input type="text" value="R"/>	2
R	= Analog output liquid-level transmitter			
APPROVAL AGENCY		=	<input type="text"/>	3
F	= FM	C	= CSA	
OUTPUT		=	<input type="text"/>	4
3	= 4-20 mA Single loop with Display	4	= 4-20 mA Single loop no display	
HOUSING TYPE		=	<input type="text"/>	5
B	= Single cavity (explosion-proof and intrinsically safe)	D	= Single cavity with display (explosion-proof and intrinsically safe)	
C*	= Dual cavity (explosion-proof and intrinsically safe)	E*	= Dual cavity with display (explosion-proof and intrinsically safe)	
* (Housings C and E require Electronic Mounting 3, 4, 5 or 6)				
ELECTRONICS MOUNTING		=	<input type="text"/>	6
1	= Integral electronics	5	= 90° fitting, housing bottom left	
3	= 90° fitting, housing top left	6	= 90° fitting, housing bottom right	
4	= 90° fitting, housing top right			
TRANSMITTER PIPE		=	<input type="text"/>	7
B	= Industrial pipe, 5/8 in. OD	R	= Industrial pipe, 1/2 in. OD	
MATERIALS OF CONSTRUCTION (WETTED PARTS)		=	<input type="text"/>	8
Note: contact factory for other materials				
1	= 316L stainless steel			
PROCESS CONNECTION TYPE		=	<input type="text"/>	9
X	= Sightglass			
PROCESS CONNECTION SIZE		=	<input type="text"/>	10
X	= Sightglass			
TEMPERATURE		=	<input type="text"/>	11
0	= None			
UNIT OF MEASUREMENT		=	<input type="text"/>	12
M	= Metric (millimeters) Encode length in millimeters if using metric (XXXXX mm)	U	= US Customary (inches) Encode length in inches if ordering in US Customary (XXX.XX in.)	
LENGTH		=	<input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/> <input type="text" value=""/>	13-17
= Order length based on unit of measurement Rigid/Sanitary transmitter: 508 mm (20 in.) to 3158 mm (144 in.)				
SPECIAL		=	<input type="text"/>	18
S	= Standard product	E	= Engineering special (not affecting agency controlled parts or features)	

Ordering information for ATEX and IECEx Approval

TRANSMITTER MODEL	=	<input style="width: 20px; height: 20px;" type="text" value="M"/>	1
M = Magnetostrictive transmitter			
TYPE	=	<input style="width: 20px; height: 20px;" type="text" value="R"/>	2
R = Analog output level transmitter			
APPROVAL AGENCY	=	<input style="width: 20px; height: 20px;" type="text"/>	3
E = ATEX approval			
B = INMETRO approval			
P = CCoE approval			
H = IECEx approval			
K = KC approval			
OUTPUT	=	<input style="width: 20px; height: 20px;" type="text"/>	4
3 = 4-20 mA Single loop with display			
4 = 4-20 mA single loop no display			
HOUSING TYPE	=	<input style="width: 20px; height: 20px;" type="text"/>	5
B = Single cavity (Flameproof IIB)			
C* = Dual cavity (Flameproof IIB)			
D = Single cavity with display (Flameproof IIB)			
E* = Dual cavity with display (Flameproof IIB)			
G = Single cavity (ATEX Ex ia IIA)			
J = Single cavity with display (ATEX Ex ia IIA)			
R = Single cavity (ATEX Ex ia IIB)			
T = Single cavity with display (ATEX Ex ia IIB)			
* (Housings C and E require Electronic Mounting 3, 4, 5 or 6)			
ELECTRONICS MOUNTING	=	<input style="width: 20px; height: 20px;" type="text"/>	6
1 = Integral electronics			
4* = 90° fitting housing top right (Flameproof only)			
6* = 90° fitting housing bottom left (Flameproof only)			
3* = 90° fitting housing top left (Flameproof only)			
5* = 90° fitting housing bottom left (Flameproof only)			
* (Electronic Mounting 3, 4, 5 or 6 are only available with Housing B, C, D or E)			
TRANSMITTER PIPE/HOSE	=	<input style="width: 20px; height: 20px;" type="text"/>	7
B = Industrial pipe 5/8 in. OD			
R = Industrial pipe, 1/2 in. OD			
MATERIALS OF CONSTRUCTION (WETTED PARTS) (Note: contact factory for other materials)	=	<input style="width: 20px; height: 20px;" type="text"/>	8
1 = Stainless steel, 1.4404			
PROCESS CONNECTION TYPE	=	<input style="width: 20px; height: 20px;" type="text"/>	9
X = Sightglass			
PROCESS CONNECTION SIZE	=	<input style="width: 20px; height: 20px;" type="text"/>	10
X = Sightglass			
TEMPERATURE	=	<input style="width: 20px; height: 20px;" type="text"/>	11
0 = None			
UNIT OF MEASUREMENT	=	<input style="width: 20px; height: 20px;" type="text"/>	12
M = Metric (millimeters) Encode length in millimeters if using metric (XXXXX mm)			
U = US Customary (inches) Encode length in inches if ordering in US Customary (XXX.XX in.)			
LENGTH (Order length based on unit of measurement)	=	<input style="width: 40px; height: 20px;" type="text"/>	13-17
= Rigid or Sanitary transmitter: 508 mm (20 in.) to 3658 mm (144 in.)			
SPECIAL	=	<input style="width: 20px; height: 20px;" type="text"/>	18
S = Standard product			
E = Engineering special (not affecting agency controlled parts or features)			

Programming and hardware accessories

PROGRAMMING ACCESSORIES		PART NUMBER
	M-Series Model MR3/4 PC setup software on CD Includes HART adapter, part no. 380068	252273-1
	M-Series Model MR3/4 PC setup software on CD	252273-2
HARDWARE		PART NUMBER
	HART to USB adapter	380068

Document Part number:
RA010615

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