

2390-249 Series *Level-Trol* Electronic Liquid Level Transmitters



W4067-2/IL

Non-Interactive Zero and Span Adjustments; Dry Span Calibration Allows Field Recalibration without Removing Wiring Covers

Optional Output Meter for Local Indication

The Displacer Sensor Measures Changes in Liquid Level, Specific Gravity, or Interface Level, and the Controller or Transmitter Sends a Pneumatic Signal that is Proportional to the Changes

The 249 Series Displacer is Contained in a Rugged Cage for Mounting on the Side of a Tank, or the Displacer can be Suspended in a Tank without a Cage

Tank Flanged Connections to 8-Inch Size

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Controllers and Transmitters

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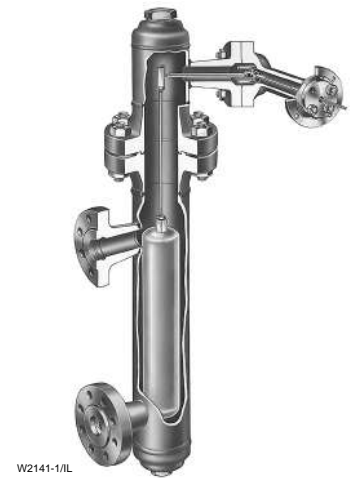
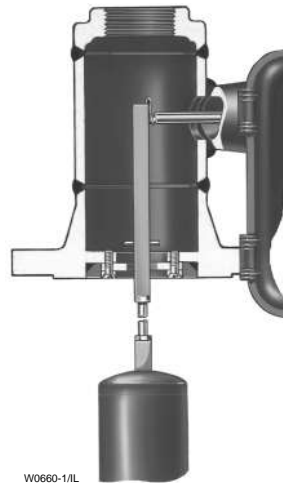
General Specifications

Transmitter Selections (Also Refer to Sensor Table)		Electronic liquid level transmitter: Type 2390 or 2390B (Refer to the Classifications section for ratings)
Input Signal		Liquid level, interface level, or density changes move the displacer up or down to provide rotary motion of the torque tube shaft
Output Signal		4 to 20 mA dc (direct—increasing input increases output; or reverse—increasing input decreases output)
Span Adjustment		10 to 100% of displacer length for level applications using a standard volume displacer
Zero Adjustment		100% of displacer length
Ambient Relative Humidity		10 to 95%
Options	Type 2390 and 2390B liquid level transmitters	Analog output meter
	249 Series Level Sensor	Heat insulator; Gauge glass for pressures to 29 bar at 232 C or 420 psig at 450 F; and Reflex gauges for high temperature and pressure

Performance

Transmitter (Specific Gravity of 1.0)	
Transmitter output reference accuracy	0.5% of full scale output
Hysteresis	0.1% of full scale
Repeatability	0.1% of full scale
Dry span calibration	2.5% of full scale at a specific gravity of 1.0
Optional analog output meter	2.5% of full scale
Transmitter and Sensor (Specific Gravity of 1.0; Standard Torque Tube)	
Independent linearity	0.75% of full scale output
Hysteresis	0.4% of full scale output

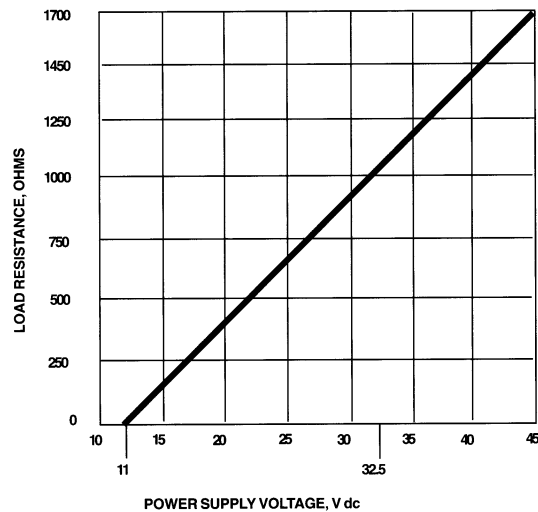
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Power Supply



Standard	LCIE or PTB (CENELEC) Approved	CSA or SAA Certified or FM Approved	Load Resistance	TRANSIENT POWER SURGE PROTECTION
11 to 45 V dc with reverse polarity protection	11 to 32.5 V dc for intrinsically safe (PTB) and 11 to 45 V dc (with reverse polarity protection) for flameproof (LCIE)	11 to 30 V dc with reverse polarity protection	Refer to the Load Resistance curve. Maximum for a 4-20 mA circuit is 1700 ohms at 45 V	No damage for a line-to-line surge of up to 100 kilowatts for 100 nanoseconds or 1.5 kilowatts for 1 millisecond

Temperatures

Temperature	Type or Material	Temperature Capability		Notes
		C	F	
Ambient	Type 2390 and 2390B	-40 to 80	-40 to 176	
Process	Cast iron sensor parts	-29 to 232	-20 to 450	For process temperatures below -29 C or -20 F and for guidance on the need for a heat insulator, contact your sales office. If the ambient dew point is higher than the process temperature, ice might form and cause instrument malfunction and reduce insulator effectiveness.
	Steel sensor parts	-29 to 427	-20 to 801	
	Stainless steel sensor parts	-198 to 427	-324 to 801	
	N05500 torque tube	-198 to 371	-324 to 700	
	Graphite/stainless steel gaskets	-198 to 427	-325 to 800	
Combination of ambient and process	Monel/PTFE gaskets	-73 to 204	-100 to 400	
	Some combinations of process and ambient temperatures within the above require an optional heat insulator to protect the instrument from high or low temperatures. For example, an ambient temperature of 30 C or 86 F and a process temperature of 200 C or 392 F require a heat insulator.			

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Materials

Part	Sensor Type	Standard Material	Notes
Sensor			
Cage, head, and torque tube arm	249	Cast iron	For optional materials and for parts not shown, contact your sales office.
	249CP	CF8M (316 stainless steel)	
	249K, 249L, and 249N	Steel	
	249P and 249V	Cast iron or steel	
Torque tube	All except 249CP	N05500 (K-Monel)	
	249CP	S31600 (316 stainless steel)	
Displacer	All except 249CP and 249L	S30400 (304 stainless steel)	
	249CP	S31600	
	249L	A91100F (solid aluminum)	
Bolting	All	B7 steel studs or cap screws and 2H steel nuts	
Transmitter			
Case and cover		Aluminum	---
Internal parts		Plated steel, aluminum, and stainless steel; conformal coating on printed wiring board	

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Sensor Sizes, Connections, and Ratings

Rating	Size	Connection Type	Sensor Type Number
Caged Displacers			
Class 125 or 250; cast iron	1-1/2 or 2 inches	Screwed or flanged	249
	2 inches	Flanged	
PN 10/16, 25/40, or 63/100; steel	DN 40	Flanged	249BF
PN 10/16 or 25/40; steel	DN 50		
Class 600; steel	1-1/2 or 2 inches	NPT or socket-welding ends	
Class 150, 300, or 600; steel		Raised-face flanged or ring-type joint flanged	
Class 1500; steel	1-1/2 or 2 inches	Raised-face flanged or ring-type joint flanged	249K
Class 2500; steel	2 inches (if a top connection is specified, it will be 1-inch flanged)	Ring-type joint flanged	249L
Class 900; steel	1-1/2 or 2 inches	Raised-face flanged or ring-type joint flanged	249N
Top-Mounted Cageless Sensors			
Class 150, 300, or 600; 316 stainless steel	3 inches	Raised-face flanged	249CP
PN10/16, 25/40, or 63 (Ratings to PN 250 also available); steel or stainless steel	DN 100	Flanged	249P
Class 900 or 1500; steel or stainless steel	4 inches	Raised-face flanged or ring-type joint flanged	
Class 150 through 2500; steel or stainless steel	6 or 8 inches	Raised-face flanged	
Side-Mounted Cageless Sensors			
Class 125 or 250; cast iron	4 inches	Flat-face flanged	249V
Class 150; steel	4 inches	Raised-face flanged or flat-face flanged	
Class 300 through 1500; steel	4 inches	Raised-face flanged or ring-type joint flanged	
Class 2500; steel	4 inches	Ring-type joint flanged	
Class 150; stainless steel	4 inches	Raised-face flanged or flat-face flanged	
Class 300, 600, or 900; stainless steel	4 inches	Raised-face flanged or ring-type joint flanged	

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Displacer Lengths and Volumes

Sensor Type Number	Displacer Length		Displacer Volume	
	mm	Inches	cm ³	Inches ³
Caged Displacers				
249	356 or 813	14 or 32	Type 249 CP: 983 All others: 1639	Type 249 CP: 60 All others: 100
249BF	356, 813, 1219, 1524, 1829, 2134, 2438, 2743, 3048	14, 32, 48, 60, 72, 84, 96, 108, 120		
249K				
249L				
249N				
Top-Mounted Cageless Sensors				
249CP				
249P				
Side-Mounted Cageless Sensors				
249V				

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Classifications

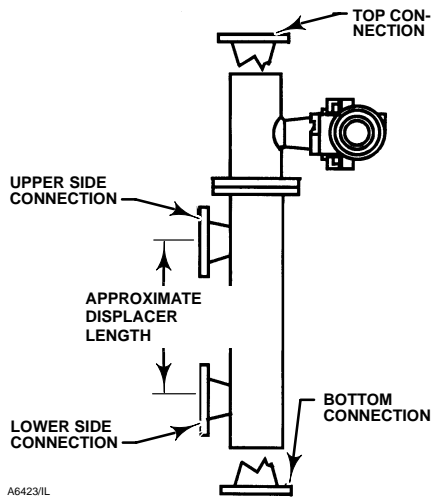
The Type 2390 and 2390B are available with the European CE Mark (CE) and Australian C-Tick Mark (C).

AGENCY	TYPE NUMBER	TYPE OF PROTECTION	ENCLOSURE RATING	NOTE	
INTRINSIC SAFETY OR NON-INCENDIVE					
FM	2390	Class I, Division 1, Groups A, B, C, D--T4	NEMA 4	Contact your sales office for the appropriate FM entity ratings and CSA parametric ratings for each group. Applicable for Class II, Division 1, Groups E, F, and G if barrier approval permits.	
CSA	2390	Class I, Division 1, Groups A, B, C, D--T4A	Type 4X		
PTB	2390B	EEx ia IIC T4	IP 66		
BASEEFA	2390B	EEx ia IIC ET AL			
SAA	2390	Ex ia IIC T4 Ex n IIC T4	IP 65		
FLAMEPROOF					
SAA	2390	Ex d IIC T6 (T _{amb} = 70 C)	IP 65		
LCIE	2390B	EEx d IIC T6	IP 54		
DIVISION 2					
FM	2390	Class I, Division 2, Groups A, B, C, D	NEMA 4		
		Class II, Division 2, Groups F, G			
CSA	2390	Class I, Division 2, Groups A, B, C, D	Type 4X		
		Class II, Division 2, Groups E, F, G			
EXPLOSION PROOF					
FM	2390	Class I, Division 1, Groups A, B, C, D--T5	NEMA 4X	Poured seal is required within 457 mm or 18 inches.	
		Class II, Division 1, Groups E, F, G--T5			
CSA	2390	Class I, Division 1, Groups A, B, C, D--T5	Type 4X		
		Class II, Division 1, Groups E, F, G--T5			

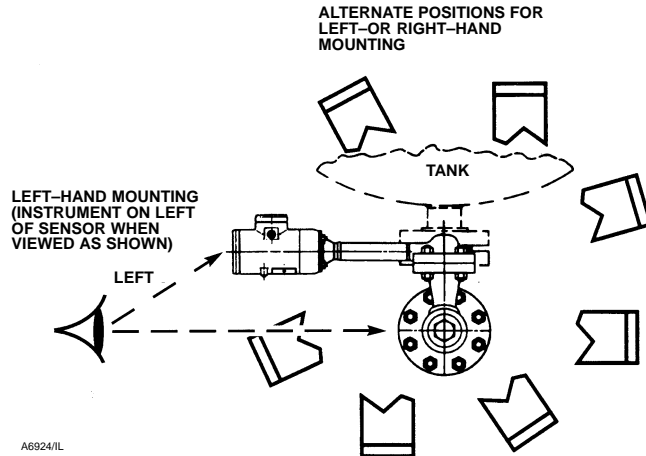
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Connection Styles and Positions



A6423/IL



A6924/IL

Connection Types:	T = Threaded F = Flanged			
Connection Locations:	Style 1	Style 2	Style 3	Style 4
	Top and bottom	Top and lower side	Upper side and lower side	Upper side and bottom
Example:	F-1 means flanged connections at the top and bottom of the cage.			