FIELDVUE® Digital Level Controllers

W8171

- **Microprocessor-Based, Communicating Digital Level Controllers for Liquid Level, Specific Gravity (Density), and Liquid Level Interface. Using the HART® Communications Protocol, Gives Easy Access to Information Critical to Process Operation.**

- **The Displacer Sensor Measures Changes in Liquid Level, Interface Level, or Density, and the Controller Provides a 4 to 20 Milliampere Current Output Signal.**

- **The 249 Series Displacer can be 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 Connection to 8-Inch Size; Ratings to PN 100 or Class 2500**

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FIELDVUE® Digital Level Controllers

The DLC3000 Series digital level controllers are loop-powered instruments. In conjunction with a displacer-type sensor, they measure changes in liquid level, level of an interface between two liquids, or density of a liquid. A level, density, or interface level change in the measured fluid causes a change in the displacer position.

This change is transferred to the torque tube assembly and to the digital level controller lever assembly. The rotary motion moves a magnet attached to the lever assembly, changing the magnetic field that is sensed by the Hall-effect sensor. The sensor converts the magnetic field signal to a varying electronic signal, which is converted to the 4 and 20 mA digital level controller output signal.

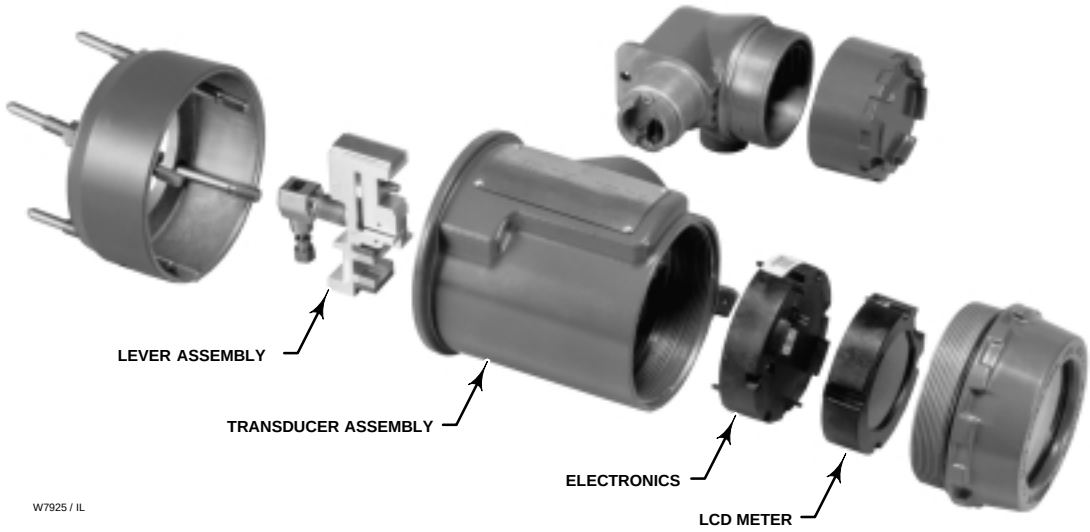
The 249 Series level sensors are available in both caged and cageless configurations. Caged sensors provide more stable operation than do cageless sensors for vessels with internal obstructions or considerable internal turbulence. Cageless sensors are generally used on applications requiring large displacers that are accommodated by large flange connections. Different displacer stem lengths permit lowering the displacer to the desired depth.

Simplified Setup and Calibration... With the electronic Setup Wizard, digital level controller startup is straightforward and fast. Level and temperature alarms, specific gravity tables, calibration trim, and trending are readily configurable. DLC3000 Series digital level controllers also support re-ranging without a fluid reference.

Responsive to Small Process Change... Accurate, high-gain analog-to-digital conversion enables measurement of small changes in the process variable. This allows DLC3000 Series digital level controllers to be used in difficult liquid level, interface, or density applications. In addition, an input filter and output damping eliminates displacer-induced ripple in the output signal due to liquid turbulence.

Reduced Temperature Effects... An internal temperature sensor ensures that ambient temperature changes do not affect the performance of the digital level controller. With an RTD input signal, the digital level controller can also automatically compensate for specific gravity changes due to temperature changes.

Easy Maintenance... Field wiring connections are in a compartment separated from the electronics. This protects the electronics from any moisture from the field wiring. The digital level controller does not have to be removed to facilitate troubleshooting or service. However, if it is necessary to remove the digital level controller for in-shop maintenance and calibration, field wiring does not need to be disconnected.



General Specifications

Controller Selections (Also Refer to Sensor Table)	**For use with Fisher 249 Series caged and uncaged displacer sensors**	Type DLC3010
	For use with displacer sensors of other manufacturers	Type DLC3030
Input Signal		**Liquid level, interface level, or density changes** move the displacer up or down to provide rotary motion of the torque tube shaft. **Temperature:** 2- or 3-wire 100 ohm platinum RTD for sensing process temperature to permit compensating for changes in specific gravity
Output Signal	**Analog**	4 to 20 mA dc direct (increasing input increases output) or reverse action
	Digital	HART 1200 baud FSK (frequency shift keyed)
Supply		12 to 30 V dc; the instrument has reverse-polarity protection Also refer to the Power Supply illustration
Ambient Relative Humidity		0 to 95% non-condensing
Approximate Weight (Controller)		2.7 kg or 6 pounds
Option		Heat insulator
Electrical Housing		NEMA 4X, IEC 60529 IP66
Hazardous Area Classification		CSA, FM, CENELEC, SAA, and JIS approvals are pending

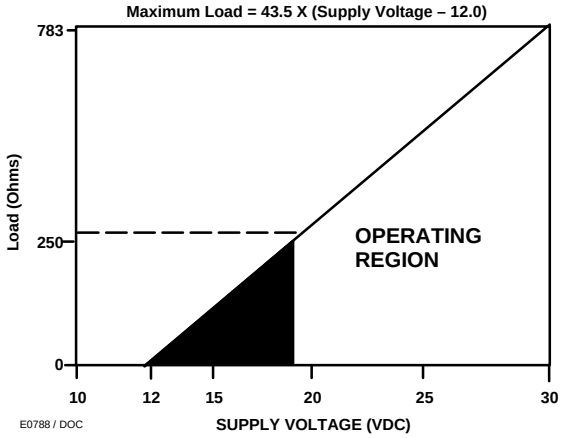
Performance

Reference Accuracy	Error less than 0.25% of full scale output (digital level controller alone)
Independent Linearity	Better than 0.5% of span at full design span condition (4.4°) (with 249 Series displacer and torque tube)
Hysteresis	Less than 0.2% of full scale output (digital level controller alone)
Repeatability	±0.1% of full scale output (digital level controller alone)
Dead Band	Less than 0.2% of full input span (digital level controller alone)

Cageless Sensor

Caged Sensor

Power Supply



Power Supply Requirements and Load Resistance

Temperatures

Temperature	Type or Material	Temperature Capability		Notes
		°C	°F	
Ambient	DLC3000 Series	–40 to 80	–40 to 176	For process temperatures below –29°C or –20°F and for guidance on the need for a heat insulator, contact your Fisher sales office. If the ambient dew point is higher than the process temperature, ice might form and cause instrument malfunction and reduce insulator effectiveness.
Process	Cast iron sensor parts	–29 to 232	–20 to 450	
	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	
	Monel/PTFE gaskets	–73 to 204	–100 to 400	
Combination of ambient and process	Some combinations of process and ambient temperatures within the above ranges 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.			

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 Fisher 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	
Controller			
Case and cover		Low-copper aluminum alloy	- - -
Internal parts		Plated steel, aluminum, and stainless steel; encapsulated printed wiring boards	

Sensor Sizes, Connections, and Ratings

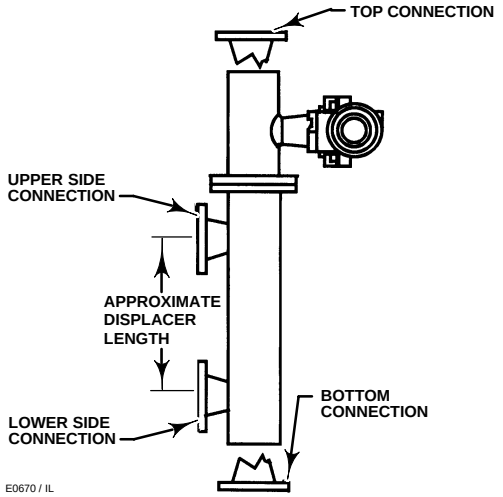
Displacer Diameters, Sensor Connections, and Ratings

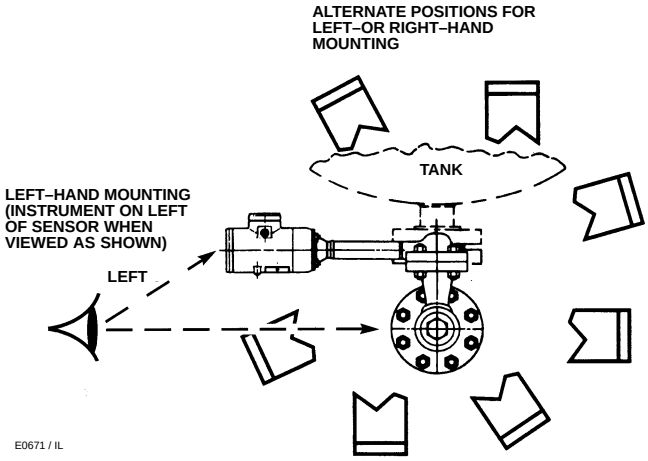
Rating	Connection Size	Connection Type	Sensor Type Number
Caged Displacers			
Class 125 or 250; cast iron	1-1/2 or 2 inches	Screwed or flanged	249
	2 inches	Flanged	
PN 10/16, 25/40, or 63/100; steel	DN 40	Flanged	249BF
PN 10/16 or 25/40; steel	DN 50		
Class 600; steel	1-1/2 or 2 inches	NPT or socket-welding 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	

Displacer Lengths and Volumes

Sensor Type Number	Displacer Length		Displacer Volume	
Caged Displacers	**mm**	**Inches**	**cm^3**	**$Inches^3$**
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				

Connection Styles and Positions





Connection Types:	S = Screwed F = Flanged SW = Socket welding			
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.			

Product Flier PF11.2:DLC3000

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