

WD-HL3010系列智能型电动浮筒液位(界位)变送器

WD-HL3010 SERIES OF INTELLIGENT BUOYANCY LIQUID LEVEL (INTERFACE) TRANSMITTER

概述 Introduction

HL3010系列智能型电动浮筒液位(界位)变送器是引进美国费希尔控制设备公司原装FIELDVUE DLC3000系列智能型液位控制器组装而成的产品。仪表可用于测量液位、界位或密度,能输出4~20mA标准直流信号,利用HART通信协议的DLC3000系列智能型液位控制器还可存取对过程操作至关重要的信息。使用与DLC3000系列智能液位控制器相兼容的275型HART通信器,可获取来自过程、智能液位控制器或浮筒测量室的信息。HART通信器可连接在智能液位控制器的现场接线盒上。由于使用HART通信器,用户可查询、组态、标定或测试智能液位器。利用HART协议,对来自现场的信息可下载到控制系统中或按单个回路的信息接受。

HL3010 series of intelligent buoyancy liquid level (interface) transmitters are assembled of introduce into the American FISHER corporation FIELDVUE FISHER. The instruments can be used to measure liquid level, interface or density. In addition to the normal function of providing a 4~20mA current signal, using HART communication protocol, the transmitters give easy access to information critical to process operation. You can gain information from the process, the controller, or sensor using the Model 275 HART Communicator at a field junction box of the controller. And you can interrogate, configure, calibrate or test the controller. Moreover, using the HART protocol, information from the field can be integrated into control systems or be received on a single loop basis.

HL3010系列智能型浮筒液位(界位)变送器由原装进口DLC3000智能液位控制器与浮筒测量室、测量机构、浮筒、扭力管等组成。浮筒浸没在测量室内的液位中,与扭力管系统刚性连接。扭力管系统承受的力量是浮筒自重减去浮筒所受的液体浮力的净值,在这种合力作用下的扭力管扭转一定角度。被测液体的位置、密度或界位高低的变化引起浮筒位置的变化,该变化被传递到扭力管组件,使其产生旋转。扭力管的旋转运动传递到智能液位控制器杠杆上,使固定在杠杆组件上的磁铁发生位移,改变了由霍尔效应传感器检测的磁场。该传感器将磁场信号转换为电信号。DLC3000系列智能液位控制器的彩微控制器与相关的电子线路测量过程变量,提供电流输出,驱动液晶显示器(LCD)及提供HART通信能力。微控制器接收经环境温度补偿与线性化了的信号,同时也补偿由于过程温度变化而引起的液体密度的变化。数/模(D/A)输出线路接受微控制器的输出并提供4~20mA电流输出信号。LCD可显示模拟量输出、过程变量(液位、界位高低或密度)、过程温度(若安装了RTD)、扭力管旋转角度及显示变量的百分数范围等。



HL3010 series of intelligent buoyancy liquid level (interface) transmitter is mostly composed of DLC3000 digital level controller, measure machines, displacer and torque tube. Rigidly joined to torque tube assembly, the displacer is submerged in liquid. The force applied to torque tube assembly is equal to the net value that weight force minus buoyancy force of displacer, and the composition of forces result in the torque tube rotating some angle. 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 the torque tube assembly rotates. The rotary motion of the torque tube is transferred to the controller lever assembly, and 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 electronic signal. A micro-processor and correlative electric circuits are applied in DLC3000 controllers to measure the process variable, output a current to drive a LCD, and provide communicating ability with HART protocol. The microprocessor takes over electric signal linearized and compensated with ambient temperature. At the same time liquid density change due to process temperature is compensated. Digit/analog output circuits receive the output from controller and provide a 4~20mA current signal output. LCD meter can be configured to display analog output, process variable (liquid level, interface level or density), process temperature (if RTD mounted), degrees of torque tube rotation or percent range.

主要技术指标 Main technical parameter

- 测量范围Measuring range:
0~350, 500, 750, 1000, 1200, 1500, 1800,
2000, 2500, 3000mm
- 参考精度Reference accuracy: $\pm 0.5\%FS$, $\pm 0.1\%FS$
- 独立线性度Independent linearity: $\pm 0.5\%FS$
- 迟滞误差Hysteresis: $< 0.2\%FS$ (仅对DLC3000液位控制器only for DLC3000 digital level controller)
- 重复性Repeatability: $\pm 0.1\%FS$ (仅对DLC3000液位控制器only for DLC3000 digital level controller)
- 死区Dead band: $< 0.2\%FS$ (仅对DLC3000液位控制器only for DLC3000 digital level controller)
- 电源Power supply: 12V~30VDC; 控制器内有反极性保护instrument has reverse polarity protection
- 输出信号Output signal:
模拟量analog: 4~20mADC (正作用direct action)
20~4mADC (反作用reverse action)
数字量Digital: HART 1200波特移频键控(FSK)
- 液晶显示LCD: 模拟量或液位、界位、温度、扭力管转角及百分数范围analog output, liquid level, interface level, temperature, rotary angle of torque tube or percent range.

★测量室材质与工作温度: measure chamber material and operating temperature

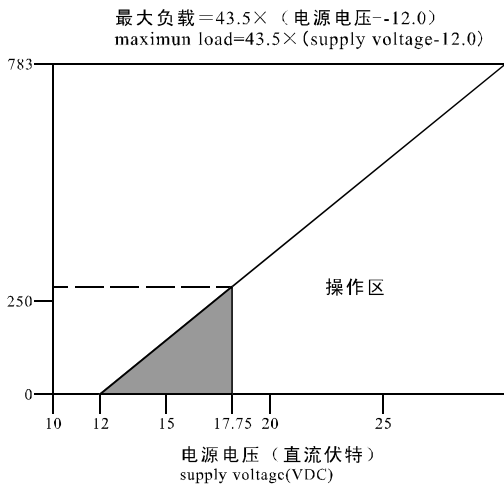
材质 material	工作温度 operating temperature
铸铁 cast iron	-29~232℃ (-20~450°F)
钢 steel	-29~427℃ (-20~800°F)
不锈钢 stainless steel	-198~427℃ (-325~800°F)
NO5500 (K蒙乃尔) K-monel	-198~371℃ (-325~500°F)
石墨片/不锈钢垫片 graphite laminate/SST gaskets	-198~427℃ (-325~800°F)
蒙乃尔/聚四氟乙烯垫片 monel/PTFE gaskets	-73~204℃ (-100~400°F)
注: NO5500 (K蒙乃尔) 扭力管温度不应超过260℃ note:NO5500(K-monel) torque tube temperature not exceeds 260℃	

- 最小密度差Minimum differential specific gravity: 0.05g/cm³
- 工作条件的影响Operating influences:
供电影响power supply effect: 当电压在规定电压的最小值与最大值间变化时, 输出变化 $< \pm 0.2\%FS$ output changes $< 0.2\%FS$ when supply varies between min. And max voltage specifications.
温度影响Temperature effect: 工作温度在-40~80℃内变化时, 输出变化 $< \pm 0.03\%FS/℃$ the output changes $< \pm 0.03\%FS$ per degree over the operating range -40~80℃
- 报警跳线Alarm jumper: DLC3000能对进行自诊断, 也能组成显示过程变量的高低报警。当高低位报警或检出一个故障时, 模拟量输出信号将显示低于4mA或高于20mA, 仪表出厂时一般是将跳线置于高位上。
DLC3000 controllers can self diagnose an error. The instrument can also be configured to indicate a process variable high or low alarm. When a process variable alarm or an error is detected the analog output signal is driven either below 4mA or above 20mA. The unit ships from the factory with the jumper in the high position.
- 防护等级Enclosure classification:
NEMA4X及IEC60529IP66
- 电气接口Electrical connection: 2个1/2-14NPT内螺纹, 一个在底部, 另一个在接线盒前面。可提供M20的转换头。
two 1/2-14NPT female conduit connection; one on bottom and one on back of terminal box. M20 adapters available.

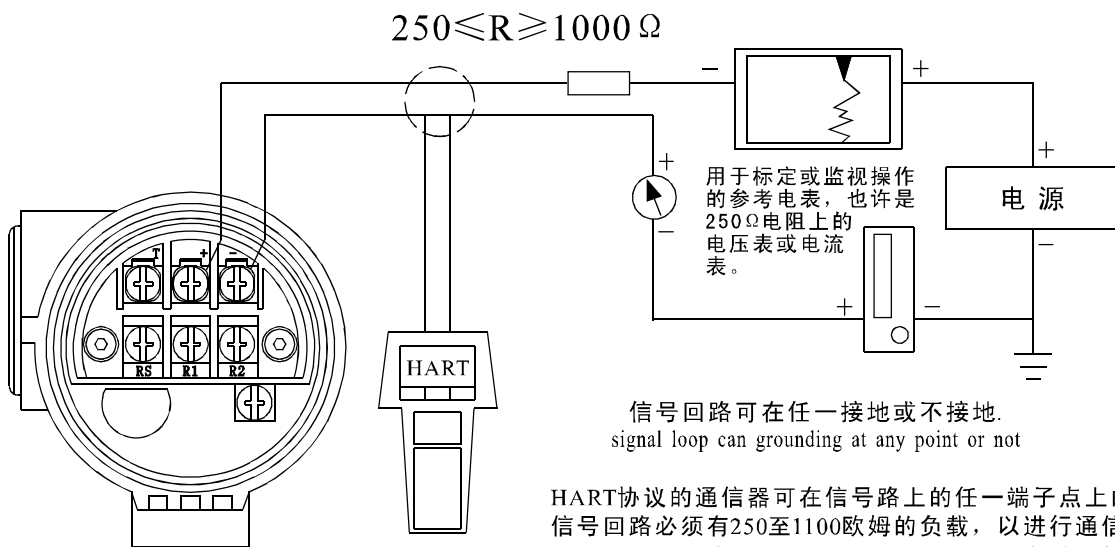
★环境温度与湿度: ambient temperature and humidity

条件 condition	正常限度 normal limit	运输与贮存限度 transport and store limit	名义考值 nominal reference
环境温度 ambient temperature	-40~80℃ (-40~176°F)	-45~80℃ (-50~176°F)	25℃ (77°F)
环境相对湿度 ambient relative humidity	0~95% (无冷凝) not cold storage	0~95% (无冷凝) not cold storage	40%

供电电压和负载电阻： power supply requirements and load resistance



将通信器连到智能液位控制器回路 wiring communicator to digital level controller

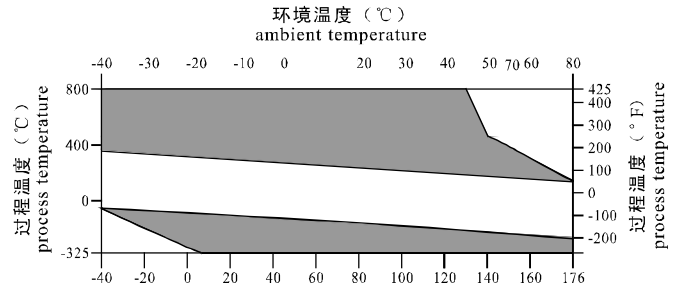


HART协议的通信器可在信号路上的任一端子点上的连接。
 信号回路必须有250至1100欧姆的负载，以进行通信。
 HART communicator can connect at any terminal point.
 A 250 to 1100 Ω load must be used

注意事项 Notes:

- 1、电气安装必须正确，以防止由于电噪声引起的误差，应采用屏蔽电缆；
Electrical installation must be correct to avoid error due to electrical noise, so shield cable should be used.
- 2、采用有足够截面积的普通铜线跨接接线，以保证液位控制器端子的电压不低于12.0V；
Normal copper wire with enough sectional area should be used to assure the voltage between terminals of controller not less than 12.0V;
- 3、信号线路不需要采用屏蔽线，但为了得到最好的效果，建议采用双绞线。
Signal lines not need shield cable, but to good effect, twist-pairs are recommended.

环境温度和过程温度极限 ambient temperature and process temperature limit



注：若环境露点高于过程温度，冰的形成会引起仪表故障并降低绝缘体的有效性。

Note: if ambient dew point is above process temperature, ice formation might cause instrument malfunction and reduce insulator effectiveness.

型号规格表 Model and spec

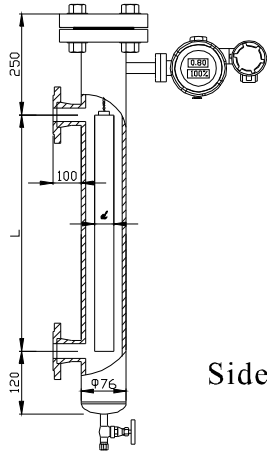
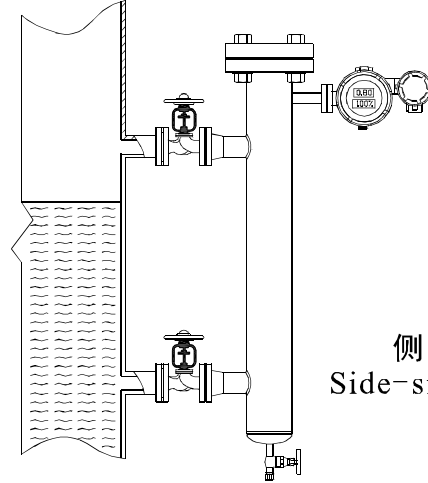
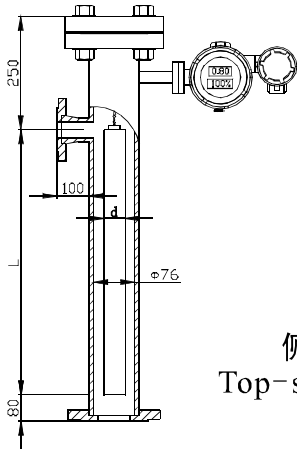
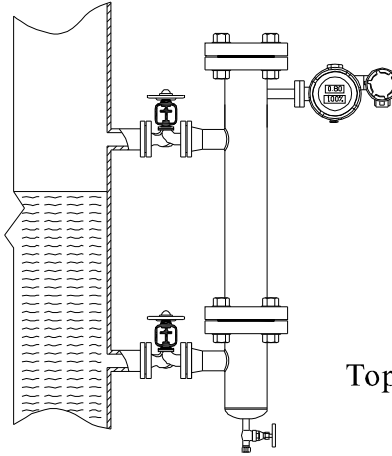
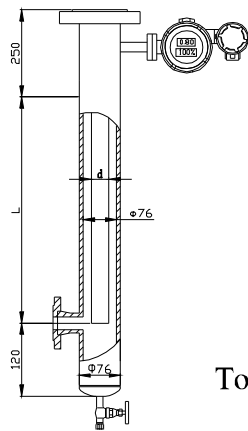
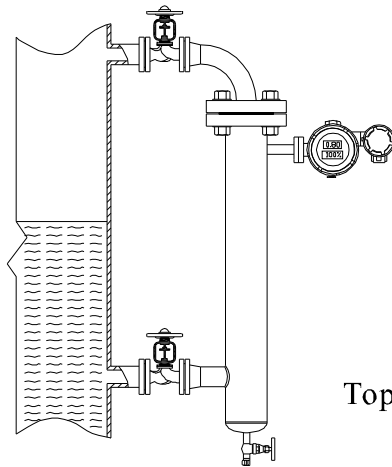
WD-HL3010		智能型电动浮筒液位（界位）变送器 intelligent buoyancy liquid level (interface level) transmitter		
	H	HART 通信协议 HART communication protocol		通信协议 communication protocol
	1	碳钢		材质 material
	2	321 (1Cr18Ni9Ti)		
	3	316Ti (0Cr18Ni12Mo2Ti)		
	4	304 (0Cr18Ni9)		
	5	316L (00Cr14Ni12Mo2)		
	6	特殊材质（需注明） special material (need noted)		
	H	外浮筒侧侧安装式 cage side-side mounting	连接法兰connection flange: (其它法兰标准如HGJ、GB、ANSI等请用户 注明) other standard need noted 外浮筒: 标准型 JB/T82.2-94 DN40 PN4.0 凸面法兰 cage: standard type JB/T82.2-94 DN40 PN4.0, convex flange 特殊型JB/T82.2-94 DN40 PN按所选压力, 凸面法兰 special type JB/T82.2-94 DN40 PN according to desired presure, convex flange 内浮筒: 标准型JB/T82.2-94 DN40 PN4.0 凸面法兰 cageless: standard type JB/T82.2-94 DN40 PN4.0, convex flange 特殊型JB/T82.2-94 DN40 PN按所选压力, 凸面法兰 special type JB/T82.2-94 DN40 PN according to desired presure.	安装形式 mounting mode
	C	外浮筒侧底安装式 cage side-bottom mounting		
	F	外浮筒顶侧安装式 cage top-side mounting		
	G	外浮筒顶底安装式 cage top-bottom mounting		
	N	内浮筒顶装式 cageless top mounting		
	1	测量液位 liquid level		被测对象 measurement task
	2	测量界位 interface level		
	3	测量密度 density		
	4	2.5MPa		工作压力 operating pressure
	5	4.0MPa		
	6	6.3MPa		
	7	16.0MPa		
	8	32.0MPa		
	9	40.0MPa		
	T1	常温型 normal temperature: -40~50℃		工作温度 operating temperature
	T2	高温型 high temperature: 150~400℃		
	T3	低温型 low temperature: -196~40℃		
D	隔爆型 Exd II CT4~T6 Explosion-proof type		防爆标志 explosion proof	
B	本安型 Exia II CT4~T6 Intrinsically safe type			
K1	蒸汽夹套, 过程连接G1/2" heat jacket, G1/2" process connection		附加装置 accessories (选配件) (optional)	
K2	蒸汽夹套, 过程连接JB/T82.1-94 DN15 PN1.0 heat jacket, JB/T82.1-94 DN15 PN1.0 connection			
F	配安全栅 safety barrier			
		-□□□□	测量范围(mm) measuring range	测量范围

标记示例Example: HL3010-H2H16T2BK1-1000

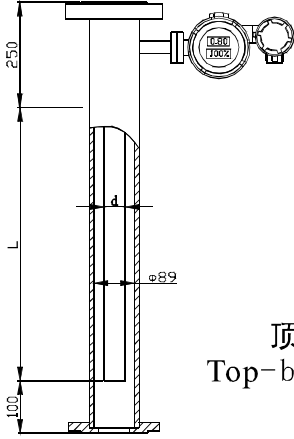
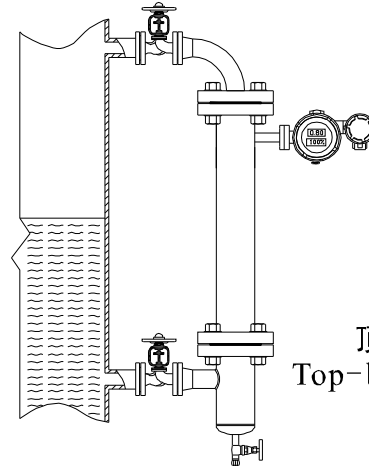
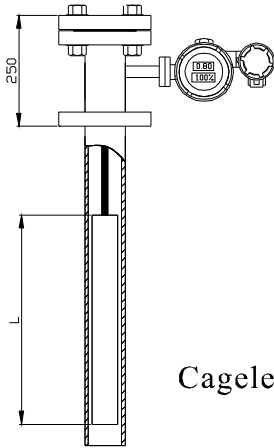
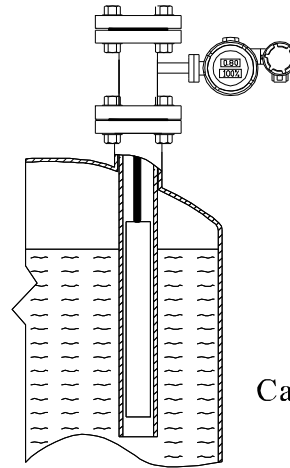
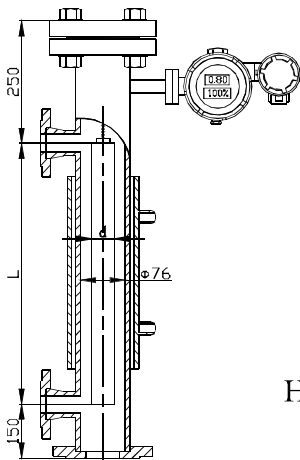
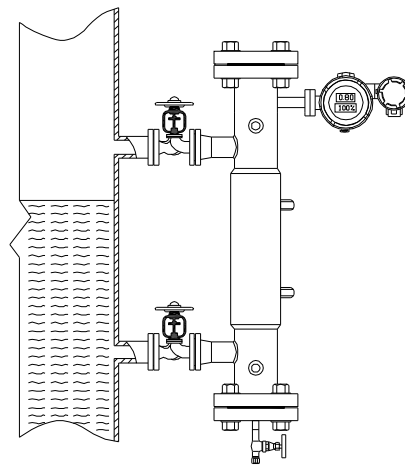
HL3010电动浮筒液位变送器, 带HART通讯协议, 材质1Cr18Ni9Ti不锈钢, 外浮筒侧侧安装, 测量液位, 工作压力6.3MPa, 介质温度320℃, 本质型, 附带蒸汽夹套, 伴热接口G1/2", 测量范围1000mm。

HL3010 buoyancy liquid level transmitter, with HART communication protocol, 1Cr18Ni9Ti material, caged side-side mounting, measure liquid level, operating pressure 6.3MPa, medium temperature 320℃, intrinsically safe type, with G1/2" joint heating jacket, measuring range 1000mm.

外形尺寸
 Dimensions

安装示意图
 installation illustration

H型
侧侧安装
 Side-side mounting

H型
侧侧安装
 Side-side mounting

C型
侧底安装
 Top-side mounting

C型
侧底安装
 Top-side mounting

F型
顶侧安装
 Top-side mounting

F型
顶侧安装
 Top-side mounting

外形尺寸
 Dimensions

安装示意图
 installation illustration

G型
顶底安装
 Top-bottom mounting

G型
顶底安装
 Top-bottom mounting

N型
内浮筒
 Cageless top mounting

N型
内浮筒
 Cageless top mounting

J型
夹套式
 Heat jacket

J型
夹套式
 Heat jacket