天康集团
TIANKANG GROUP

物位计选型样本

MATERIAL LEVEL METER

PRODUCT SELECTION CATALOGUE

安徽天康(集团)股份有限公司

ANHUI TIANKANG(GROUP) SHARES CO.,LTD

INNOVATION MAKES EXCELLENT

有丨跨丨越丨才丨有丨卓丨越

安徽天康(集团)股份有限公司
ANHUI TIANKANG(GROUP) SHARES CO.,LTD

企业简介
Brief Introduction

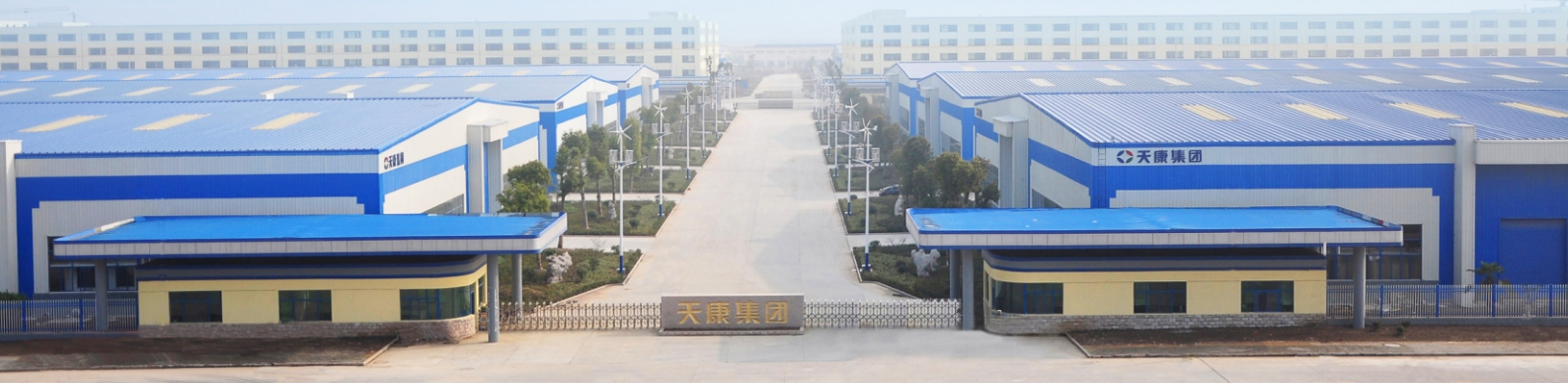
长江宛如一条巨龙奔腾不息，在长江之滨的天长市有这样一颗璀璨的明珠—安徽天康（集团）股份有限公司，在经历了岁月的历练与洗礼后愈发闪耀夺目。

安徽天康（集团）股份有限公司创建于1974年，总部位于“长三角”经济圈核心区域—天长市，是中国民营企业制造业500强企业、中国电子信息百强企业、国家级守合同重信用企业、国家高新技术企业、安徽省依法纳税先进企业、银行资信AAA级企业、中国仪表行业十强企业、中国电线电缆十强企业、安徽省重点骨干企业、“全国五一劳动奖状”获得者等荣誉。

天康集团历经四十年的蓬勃发展，已形成集仪器仪表、光电缆、医疗卫生、锂电池等跨行业、多元化的集团公司，下属子公司达二十余家。旗下产品凭借良好的质量与服务，被广泛应用于石油、电力、化工、通讯、卫生、新能源汽车及储能等行业和领域。

作为皖东经济最具活力与贡献的骨干企业之一，天康集团以“追求卓越，缔造满意”为目标，依托一流的产品、一流的管理、一流的服务，不仅在国内市场中赢得了广泛赞誉；在国际市场中，天康产品远销欧洲、非洲、亚洲等46个国家和地区。

天康集团在发展中逐步形成了独特的品牌文化及着眼全球的经营部局，全力塑造“高科技、高品质、国际化”的品牌形象。始终秉承“有跨越才有卓越”的天康精神，在创建和谐企业的基础上，引进国际先进的构架与模式，组织企业的生产经营管理体系。在积极参与国际化竞争的基础上，不断把握市场发展脉搏，寻求经济战略联盟，与全球伙伴共同发展与进步。如今天康人将全新的投入化为无私的奉献，与世界共同发展，与人类一起进步。



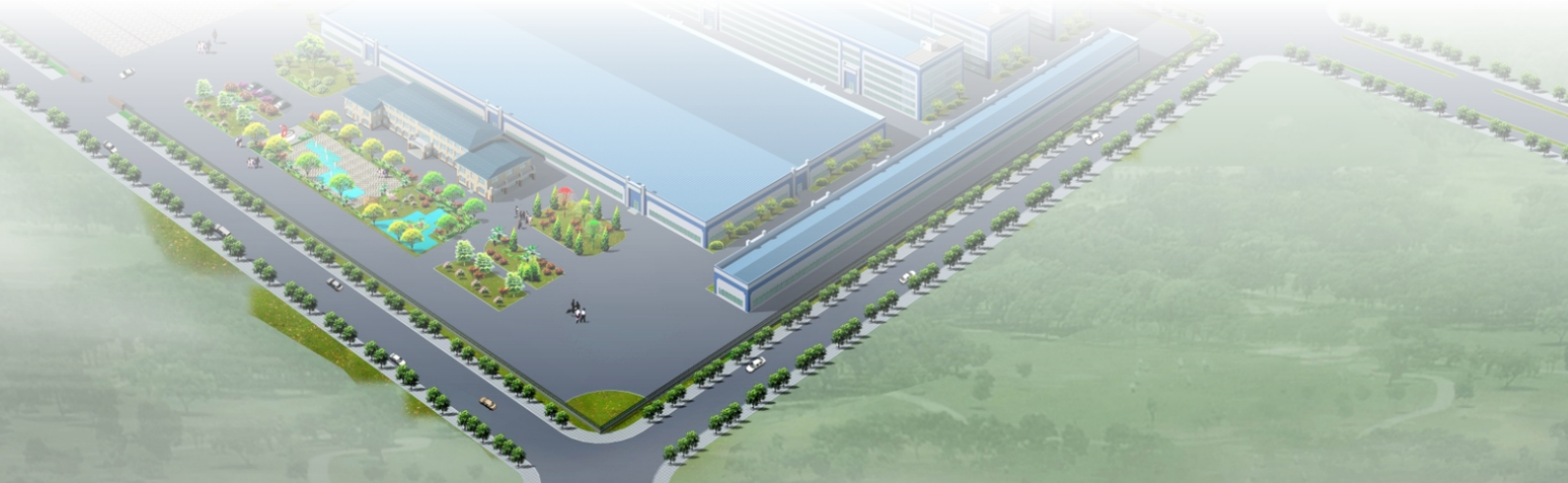
Yangtze River like a dragon Pentium, there is such a shining pearl - Anhui Tiankang (Group) Co., Ltd. in Tianchang City in the Yangtze River foreshore, in after years of experience and baptism increasingly shining brightly.

Anhui Tiankang (Group) Co., Ltd. created in 1974, the headquarters is located in the "Yangtze River Delta" economic circle core area - Tianchang City, is China's private enterprises in the manufacturing industry 500 strong enterprises, China's electronic information hundred enterprises, state-level keep contract re credit enterprise, national new and high technology enterprise, Anhui Province tax law advanced enterprises, bank credit AAA level enterprise, China instrument industry ten strong enterprises, top ten enterprises in the Chinese wire and cable, Anhui province key enterprises, "national labor certificate" get "and other honorary.

After forty years of vigorous development, the group has formed a set of instruments, optical cable, medical and health, lithium batteries, such as cross industry, diversified group companies, subsidiaries of more than twenty. Products with good quality and service, is widely used in oil, electricity, chemicals, communications, health, new energy vehicles and energy storage and other industries and areas.

As one of the backbone enterprises in Anhui east economy the most vitality and contribution, tecon group to "the pursuit of excellence, creating satisfaction" as the goal, relying on the first-class products, first-class management, first-class service, not only in the domestic market won wide acclaim; in the international market, the day Kang products are exported to 46 countries and regions, including Europe, Africa, and Asia.

Tecon group in the developing gradually formed a unique brand culture and focus on global business department bureau, spare no effort to shape the brand image of "high-tech, high-quality, internationalization". Always adhering to the "excellence," the spirit of Tiankang across only, to create the basis for a harmonious enterprise, the introduction of international advanced framework and patterns, organization of production management system. Actively participate in the international competition, and continue to grasp the pulse of the market development, to seek economic and strategic alliances, and global partners to develop and progress. Such as today, the people will be a new investment into the selfless dedication, and the common development of the world, together with the progress of mankind.



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TKUHZ–50系列磁性翻柱液位计

TKUHZ–50 Magnetic Liquid Level Meter

概述

TKUHZ–50系列磁性翻柱液位计是一种浮球式金属管现场指示型液位计。该系列产品可以做到高密封、防泄漏和在高温、高压、高粘度、强腐蚀性条件下安全可靠地测量液位，全过程测量无盲区，显示醒目，读数直观，且测量范围大，配上液位报警、控制开关，可实现液位或界位的上、下限报警和控制，配上液位变送器，可将液位、界位信号转换成二线制4~20mADC标准信号，实现远距离检测、指示、记录与控制。该系列产品广泛用于电力、石油、化工、冶金、环保、船舶、建筑、食品等各行业生产过程中的液位测量与控制。

原理

液位计是根据浮力原理和磁性耦合作用原理工作的。当被测容器中的液位升降时，液位计主导管中浮子也随之升降。浮子内的永久磁钢通过磁耦合传递到现场指示器，驱动红、白翻柱翻转180°；当液位上升时，翻柱由白色转为红色，当液位下降时，翻柱由红色转为白色，指示器的红、白界位处为容器内介质液位的实际高度，从而实现液位的指示。精密的红白磁性翻柱，普通型采用塑料树脂；高温型采用精密氧化铝陶瓷烧结工艺，嵌入高温永久磁钢耐温可达520℃。

选配项

配套TKL–121系列液位远传变送器

TKL-121系列液位远传变送器是将磁性系统耦合过来的液位信号作用于传感器内的电阻链上的每一个干簧管，引起输出电阻连续变化，从而引起测量电压的连续变化，此电压与罐体液位成正比，通过变送转换器，输出二线制4-20mA模拟信号，也可以带现场显示和HART通讯协议。

配套TKL–131系列磁致伸缩液位变送器

TKL-131系列磁致伸缩变送器是将磁性系统耦合过来的液位信号，以间隔1.5μs发送的脉冲，精确地测量液位计中磁浮子的位置。这个脉冲产生的磁场沿波导管向下传导。当磁浮子的磁场和脉冲电流磁场相遇时，产生返回脉冲。敏感元件探测到这个返回脉冲。根据电流脉冲与返回脉冲之间的时间，通过单片机计算出浮子的位置，确定被测液位和界位。

TKL-131系列产品适用于对测量精度要求高的场合，也适用于高温型磁翻板液位计的远传变送，变送器输出二线制4~20mA DC信号，可带HART通讯协议，也可输出RS485信号。

技术参数

测量范围：300~15000mm
精度：±10mm
介质密度：≥350kg/m³
环境震动：≤25Hz
介质粘度：≤0.4PaS
对于粘度大的介质或温度低时易结晶的介质，可选用加热夹套型液位计。

Overview

TKUHZ-50 magnetic liquid level meter is a floater type metal tube liquid level meter with scene indications. This series of products can reach strict sealing and leakproofness, and it can also safely and reliably measure the liquid level under the condition of high temperature, high pressure, high viscosity and strong corrosivity. In its whole measurement process, it has no blind area, striking display, visualized reading and large measuring range. Combined with liquid level alarming and control switch, it can realize limit alarming and control of the liquid level or the boundary level. Combined with liquid level transmitter, it can convert the liquid level or the boundary level signals to two-wire system 4-20ADC standard signals, thus realizing distant detection, direction, record and control. This series of products are widely used in the liquid level measurement and control in the manufacturing process of industries like electricity, petroleum, chemical industry, metallurgy, environmental protection, shipping, construction and food.

Principle

TKUHZ-50 magnetic liquid level meter is a floater type metal tube liquid level meter with scene indications. This series of products can reach strict sealing and leakproofness, and it can also safely and reliably measure the liquid level under the condition of high temperature, high pressure, high viscosity and strong corrosivity. In its whole measurement process, it has no blind area, striking display, visualized reading and large measuring range. Combined with liquid level alarming and control switch, it can realize limit alarming and control of the liquid level or the boundary level. Combined with liquid level transmitter, it can convert the liquid level or the boundary level signals to two-wire system 4-20ADC standard signals, thus realizing distant detection, direction, record and control. This series of products are widely used in the liquid level measurement and control in the manufacturing process of industries like electricity, petroleum, chemical industry, metallurgy, environmental protection, shipping, construction and food.

Optional attachment

Matched TKL-121 liquid level teletransmission transmitter

TKL-121 liquid level teletransmission transmitter works the liquid level signal from magnetic system coupling on every reed switch in the resistance chain inside the sensor, which gives rise to continuous changes of output resistance, thus causing the continuous change of measuring voltage. This voltage is in direct proportion to the tank's liquid level. Through the transmitting converter, it outputs two-wire system 4-20mA analog signal, which can also be equipped with status display and HART communication protocol.

Matched TKL-131 magnetostriction liquid level transmitter

TKL-131 magnetostriction liquid level transmitter accurately measures the position of the magnetic floater in the liquid level meter with the pulse sent at the interval of 1.5μs. The magnetic field produced by this pulse transmits downward along the waveguide. When the magnetic field of the magnetic floater meets with the pulse current of the pulse, reset pulse emerges. Then the sensitive element detects this reset pulse. According to the time between the current pulse and the reset pulse, the single chip can work out the position of the floater, thus confirming the measured liquid level and boundary.

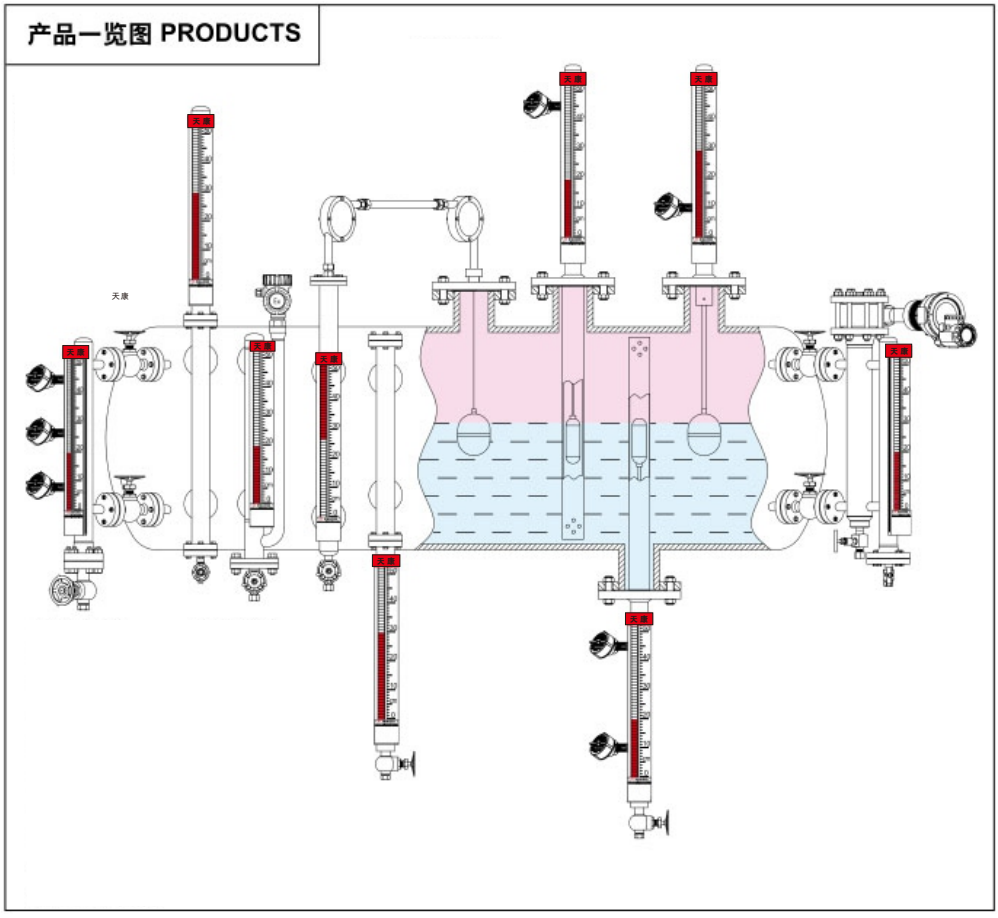
TKL-131 products apply to occasions with higher requirements of measurement accuracy as well as teletransmission and transmission of magnetic liquid level meter. The transmitter outputs two-wire system 4-20mA DC signals, which can be equipped with HART communication protocol and output RS485 signals.

Technical Parameters

Measurement range: 300-15000mm
Precision: ±10mm
Medium density: ≥350kg/m³
Environmental vibration: ≤25Hz
Medium viscosity: ≤0.4PaS
As to medium with higher viscosity or medium that are easy to crystallize under low temperature, heating jacket liquid level meter can be used.

材质：304、316、316L、Ti、PP、PVC、PTFE、Ta、Monel、Hastelloy C-276
可特殊定做其他材质
过程连接法兰：
标准型HG20592-20635 DN25 PN1.0-PN3.2
可特殊定做其他标准法兰
工作温度：-196~520℃
防护等级：IP66

Material: 304、316、316L、Ti、PP、PVC、PTFE、Ta、Monel、Hastelloy C-276, or other customized materials can be made.
Process connecting flange:
Standard type HG20592-20635 DN25 PN1.0-PN3.2
Other connecting flange can be customized.
Operating temperature: -196-520℃
Protection grade: Ip66



安装使用和维护

1. 液位计安装必须垂直，以保证浮球组件在主体管内能上下运动自如。
2. 最好在容器与液位计之间装上截止阀，以便清洗和检修液位计时切断物料。
3. 液位计主体管周围不容许有导磁物体靠近，否则直接影响液位计正常使用。
4. 液位计安装完毕后，需要用磁钢进行校正，对翻柱导引一次使零位以下显示红色，零位以上显示白色。
5. 液位计投入运行时应先打开上端截止阀，再打开下端进料引液管阀门，让液体介质平稳进入主体管，避免液体介质带着浮球组件急速上升，而造成翻柱失灵和乱蹦。（若发生此现象待液面平稳后可用磁钢重新校正。）
6. 为了不使浮球组件在运输工程中损坏，故出厂前浮球组件取出液位计主体管外。待液位计安装时打开底部排污法兰，再将浮球重新装入主体管内，注意浮球组件重的一头朝上，不能倒装。
7. 根据介质情况，可定期打开排污法兰清洗主体管内沉淀物。

Installation and Maintenance

1. The liquid level meter must be installed vertically so as to make sure that the floater element can move up and down freely in the main tube.
2. It is better to install a stop valve between the container and the liquid level meter so as to make it possible to cut off the material when cleaning and maintaining the liquid level meter.
3. Magnetic objects are not allowed to get close to the main tube of the liquid level meter, or it will directly influence the normal usage of the liquid level meter.
4. After the installation of the liquid level meter, magnetic steel should be used to check, making the reversible column guide display red below zero and white above zero.
5. In actual operation, the stop valve at the upper end should be opened first, and then the feeding liquid guide tube valve should be switched on to make the liquid medium enter the main tube smoothly in order to avoid the fact that the liquid medium rises rapidly with the floater element, which may lead to malfunction and jumping of the reversible column. (If this happens, when the liquid level becomes smooth, magnetic steel can be used to recalibrate.)
6. To avoid the damage to the floater element in transportation process, before delivery, the floater element is taken out of the main tube of the liquid level meter. When installing the liquid level meter, first open the sewage disposal flange at the bottom, and then install the floater into the main tube. Pay attention to it that the heavier end of the floater element is upwards, which can't be inversed.
7. According to different conditions of the medium, the sewage disposal flange can be opened regularly to clean the sediment inside the main tube.

结构外形尺寸

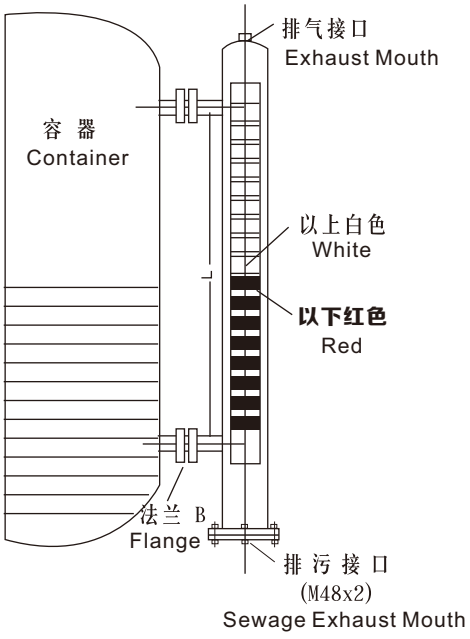
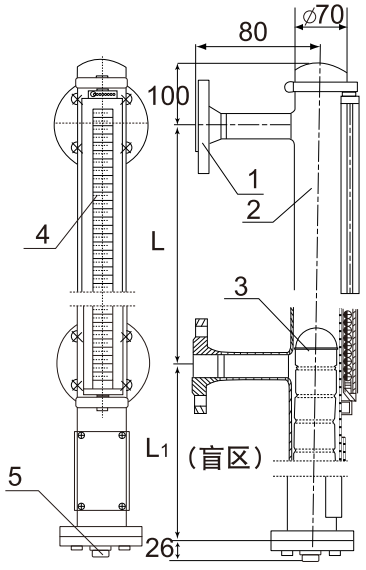
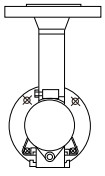


Figure 1 Working Theory

Structure Dimension





1. 连接法兰 Connection Flange
2. 主体 Main Body
3. 浮子组件 Floating Ball Sets
4. 显示器 Displayer
5. 排污螺钉 Sewage Exhaust Screw

L=法兰中心距Flange Central Span
L1=取决于介质比重It depends on specific gravity of medium.

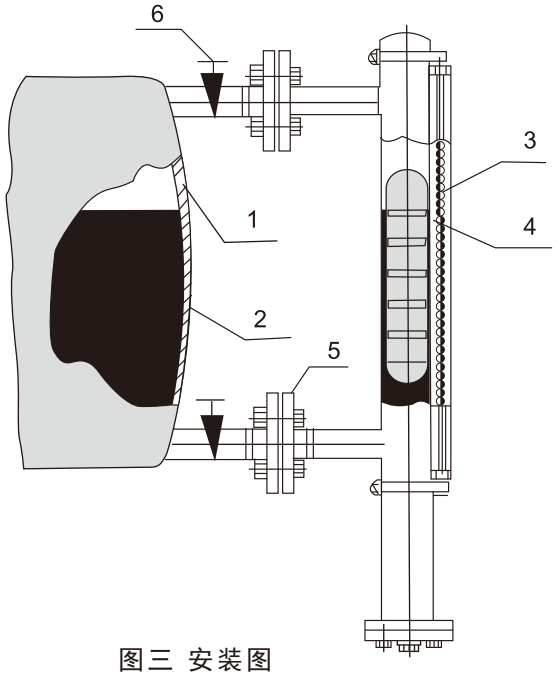
Figure 2a (Basic Type)

特点

1. 适用于容器内液体介质的液位测量，除现场显示外，还可配远传变送器、液位控制器等功能。
2. 显示直观醒目，可根据用户要求改变显示方向。
3. 测量范围大，不受容器高度限制。
4. 显示器组件与被测介质完全隔离，故密封性好，可靠安全。
5. 结构简单，安装方便，维修简易。
6. 耐腐蚀，防爆。

Features:

1. It applies to the liquid level measurement of liquid medium inside the container. Apart from status display, it can also be equipped with functions like teletransmission transmitter and level controller.
2. Its display is visualized and striking, and the display direction can be changed according to users' requirements.
3. The measurement range is large, which is not limited to the height of the container.
4. The display element is completely separated from the measured medium, so it has good leakproofness, both reliable and safe.
5. It has simple structure, easy to install and maintain.
6. it is corrosion resistant and blast-proof.



1. 容器
2. 被测介质
3. 显示器组件
4. 浮球组件
5. 连接法兰
6. 截止阀

1.Container
2. Medium to Be Tested
3. Displayer Sets
4. Floating Ball Sets
5. Connection Flange
6. Cut-off Valve

图三 安装图

Figure 3 Installation Figure

TKUHZ–50系列磁性翻柱液位计订购信息
Order Information of TKUHZ–50 Magnetic Liquid Level Meter

TKUHZ–50						
安装方式 **Installation method** 底–侧式 Bottom-side type 侧–底式 Side-bottom type 侧–侧式 Side-side type 顶部 Top 其他安装方式 Other installation methods	A B C D Z					
主体管材质 **Main tube material** 304 316L PP PVC 304+PTFE 304+PP 316+PTFE 其他特殊材质 Other special material		1 2 3 4 5 6 7 Z				
排污法兰 **Sewage disposal flange** 盲板排污法兰 Blind plate sewage disposal flange 排污法兰配排污螺钉 Sewage disposal flange matched with sewage disposal bolt 排污法兰配排污阀 Sewage disposal flange matched with blow-down valve			F L P			
配套仪表与安装类型 **Matched meter and installation type** 无配套仪表 No matched meter 上接线盒式配TKL-121变送器 Upper junction box type matched with TKL-121 transmitter 下接线盒式配TKL-121变送器 Bottom junction box type matched with TKL-121 transmitter 上接线盒式配TKL-131变送器 Upper junction box type matched with TKL-131 transmitter 下接线盒式配TKL-131变送器 Bottom junction box type matched with TKL-131 transmitter				B0 B1 B2 B3 B4		
接线盒形式 **Junction box form** 无接线盒 No junction box 普通型 Ordinary type 隔爆 ExdⅡBT4-6 Explosive-proof ExdⅡBT4-6 本安 ExaⅡCT4-6 Intrinsic safety ExaⅡCT4-6					P S D E	
测量范围 Measurement range						

TKUHZ-50					
过程连接 **Process connection** 法兰 Flange 螺纹 Thread 短管 Short pipe					
工作压力 Operating pressure					
工作温度 Operating temperature					
介质密度 Medium density					
附件选择 Attachment selection					
无附件 No attachment					0
电伴热带 Electric tracing band					1
蒸汽伴热 Steam tracing					2
真空夹套 Vacuum jacket					3
凸轮开关 Cam switch					4
干簧开关 Reed switch					5
其他 Others					9

TKUHZ-50/S系列浮球液位计
TKUHZ-50/S Floater Liquid Level Meter

概述

TKUHZ-50/S系列液位变送器利用带环形磁钢的浮球随液位升降，使主体管内的干簧管吸合，将液位转换成相应的电阻输出，将其输出电阻信号经专用模块处理将电阻信号转换成二线制的4-20mA信号输出。

TKUHZ-50/S系列液位变送器用于化工、电力、造纸、造船、环保、食品等行业，承压容器内介质的液位的测量，用于地下槽、池，高层水箱的液位测量，更为简单、可靠，最为理想。UHZ-50/S系列浮球液位变送器的材质为不锈钢耐腐蚀，适用于易燃易爆的场所。

工作原理

TKUHZ-50/S系列液位变送器的主导管内装有一组干簧管和精密电阻，当管外带有环形磁钢的浮球随液位上下变化，相应在主导管内位于液面处的干簧管在磁场作用下依次闭合使回路电阻值发生变化，经专用模块转换成电流输出。

Overview

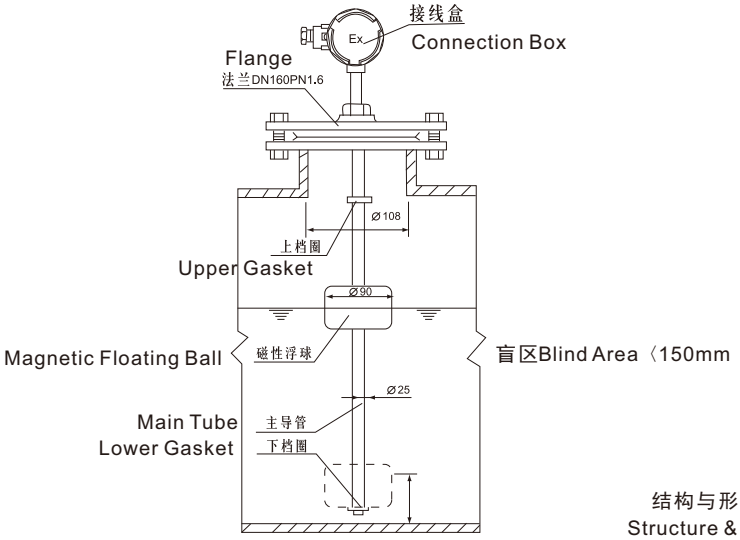
TKUHZ-50/S liquid level transmitter makes use of the floater with annular magnetic steel which rises or falls with the liquid level so as to make the reed switch inside the main tube pick up, convert the liquid level into corresponding resistance output, thus changing the output resistance signal into the two-wire system 4-20mA signal output through exclusive module processing.

TKUHZ-50/S liquid level transmitter is widely used in industries like chemical engineering, electricity, papermaking, shipbuilding, environmental protection and food, the liquid level measurement inside the pressure-bearing container as well as the liquid level measurement of underground tanks, pools and high-rise water tanks, so it is easier, more reliable and ideal. The material of UHZ-50/S floater liquid level transmitter is stainless steel, which is corrosion resistant, applicable to flammable and combustible sites.

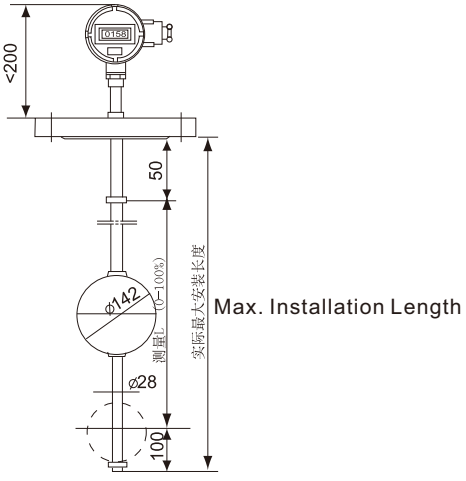
Overview

Inside the main tube of UHZ-50/S liquid level transmitter, there is a group of reed switch and precision resistance. When the floater with annular magnetic steel outside the tube changes up and down along with the liquid level, correspondingly, under the function of magnetic field, the reed switch at the liquid level inside the main tube will close successively to change the loop resistance value, which will be converted into current output through exclusive module.

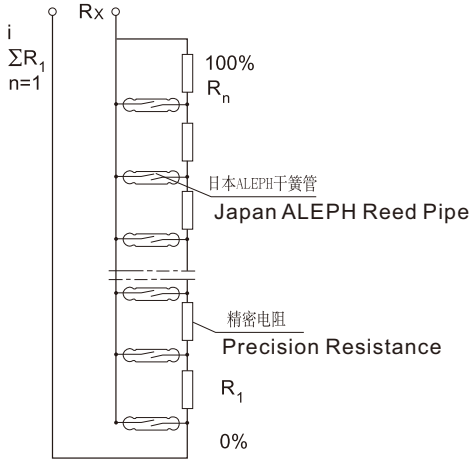
结构与形式 Structure and Form



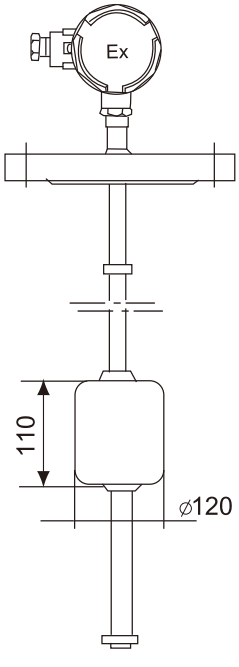
结构与形式
Structure & Form



PIC-a



工作原理 Circuit Diagram



PIC-b

技术参数

1. 测量范围：0~6000mm
2. 远传精度：±1.5%（L≥1000mm）
   ±2.5%（L≤1000mm）
3. 变送器电源：24VDC 4~20mA（二线制）输出
4. 介质温度：-10℃~+80℃
5. 介质密度：≥0.5g/cm³
6. 工作压力：<2.5MPa
7. 现场指示精度：±2.5%F.S
8. 防护等级：IP65
9. 防爆等级：隔爆型ExdⅡBT4-6
   本安型ExiaCT4-6

特点

1. 结构简单，可靠性高
2. 进口磁簧开关，使用寿命长
3. 适用于敞口或带压容器
4. 可用于液位或介面的测量与控制
5. 多种触液材质，适用于强腐蚀性液体
6. 开关控制器提供多种控制方案
7. 具有防爆性能，可用于危险场合
8. 多种安装形式可供选择

Technical Parameters

Technical Parameters:
1. Measurement range: 0—6000mm
2. Teletransmission accuracy: ±1.5%（ L≥ 1000mm）
±2.5%（L≤1000mm）
3. Transmitter power: 24VDC 4-20mA (Two-wire system) output
4. Medium temperature: -10℃—+80℃
5. Medium density: ≥0.5g/cm³
6. Operating pressure: <2.5MPa
7. Site indication precision: ±2.5%F.S
8. Protection level: Ip65
9. Explosive-proof grade: Flame-proof type ExdⅡBT4-6Intrinsic safety type ExiaCT4-6

Features

1. Simple structure, high reliability
2. Imported magnetic switch, long service life
3. Applicable to open or pressure vessel
4. Available for the measurement and control of liquid level or interface
5. Multiple fluid contacting materials, applicable to liquid with strong corrosivity
6. Multiple control plans for on-off controllers
7. Anti-explosion is available for dangerous occasions
8. Multiple available installation forms

TKUHZ–50/S系列浮球液位计订购信息
Order Information of TKUHZ–50/S Floater Liquid Level Meter

TKUHZ–50/S									
安装方式 **Installation method** 顶装 Top installation A 其他安装方式 Other installation methods Z									
触液材质 **Fluid contacting materials** 304 1 316L 2 PP 3 PVC 4 304+PTFE 5 304+PP 6 316+PTFE 7 其他特殊材质 Other special materials Z									
过程连接 **Process connection** 无固定装置 No fixed device O 固定法兰 Fixed flange 法兰标准 Flange standard 固定螺纹 Fixed thread 螺纹规格 Thread specification 安装支架 Installing support J 其他 Others Z									
数字显示表头 **Digital display header** 无显示 No display B0 液晶显示 Liquid crystal display B1 数码显示 Digital display B2									
接线盒形式 **Junction box form** 普通型 Ordinary type S 隔爆ExdⅡBT4-6 Explosive-proof ExdⅡBT4-6 D 本安ExaⅡCT4-6 Explosive-proof ExdⅡBT4-6 E									
测量范围 Measurement range									
插深 Inserting depth									
工作压力 Operating pressure									
工作温度 Operating temperature									
介质密度 Medium density									

TKUHZ-50-U_B系列液位远传变送器

TKUHZ-50-UB Liquid Level Teletransmission Transmitter

本产品也可以与磁翻板液位计配套使用时，作远传变送器功能。将磁性系统耦合过来的液位信号作用于传感器内的电阻链上的每一个干簧管，引起输出电阻连续变化，从而引起测量电压的连续变化，此电压与罐体液位成正比，通过变送转换器，输出二线制4~20mA模拟信号，也可以带现场显示和HART通讯协议。

This product can be matched with magnetic liquid level meter as a telecommunication transmitter. Make the liquid level signal coupled by the magnetic system work on every reed switch inside the sensor to arouse continuous changes of the output resistance, thus causing continuous changes of measuring voltage. This voltage is in direct proportion to the tank's liquid level. Through transmission converter, output the two-wire system 4-20mA analog signal, which can also be equipped with status display and HART communication protocol.

TKUHZ-50-UB						
安装方式 **Installation method**						
顶装 Top installation	A					
底装 Bottom installation	B					
探杆材质 **Probe material**						
304		1				
其他特殊材质 Other special materials		Z				
数字显示表头 **Digital display header**						
无显示 No display			B0			
液晶显示 Liquid crystal display			B1			
数码显示 Digital display			B2			
接线盒形式 **Junction box form**						
普通型 Ordinary				S		
隔爆ExdⅡBT4-6 Explosive-proof ExdⅡBT4-6				D		
本安ExaⅡCT4-6 Explosive-proof ExdⅡBT4-6				E		
测量范围 **Measurement range**						
工作温度 **Operating temperature**						

注：UHZ-50/S-UB系列只产远传部分时选型用。
Note: UHZ-50/S-UB can only be used for the model selection of teletransmission.

TKUHZ-50/S-U_B系列磁性浮球控制器
TKUHZ-50/S-U_B Magnetic Floater Controller

概述

TKUHZ-50/S系列液位变送器的主导管内装有一组干簧管和精密电阻，当管外带有环形磁钢的浮球随液位上下变化，相应在主导管内位于液面处的干簧管在磁场作用下依次闭合使回路电阻值发生变化，经专用模块转换成电流输出。

Overview

Inside the main tube of TKUHZ-50/S liquid level transmitter, there is a group of reed switch and precision resistance. When the floater with annular magnetic steel outside the tube changes up and down along with the liquid level, correspondingly, under the function of magnetic field, the reed switch at the liquid level inside the main tube will close successively to change the loop resistance value, which will be converted into current output through exclusive module.

特点

1. 结构简单安装方便，易维护
2. 使用范围广，适用多种介质的液位控制
3. 重复精度高
4. 耐腐蚀性强
5. 特殊要求可定制

Features

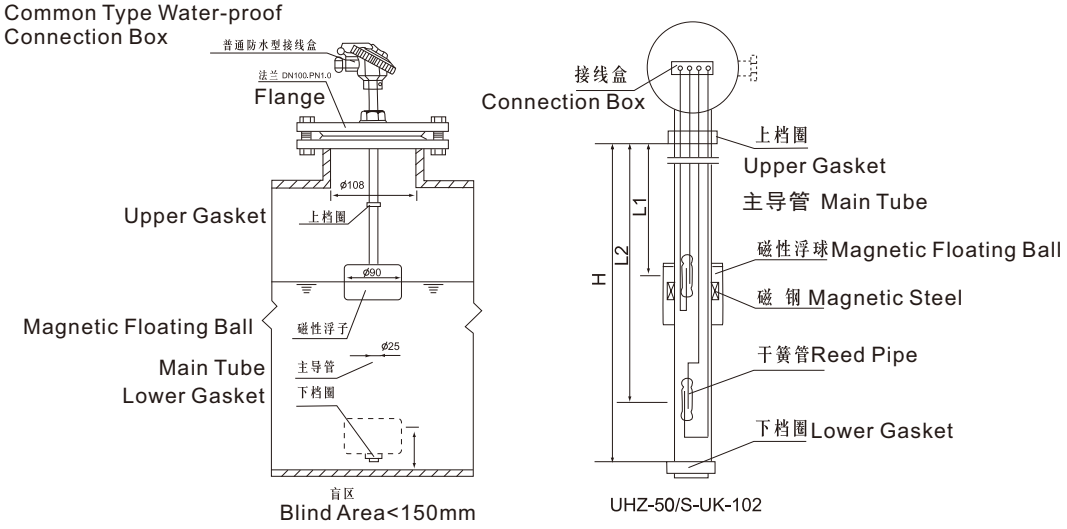
1. Simple structure, easy installation and maintenance
2. Wide range of usage, applicable to the liquid level control of multiple media
3. High repeated accuracy
4. Strong corrosion resistance
5. Customized according to special requirements

结构原理

利用磁性浮球随液位升降使处在主导管内设定位置的干簧管开关动作发出接点开关信号。

Structure Principle

The magnetic floater rises and falls with the liquid level, which drives the on-off action of the reed switch at the set position inside the main tube to send out connection switching signals.



结构原理图 Structure & Theory

技术参数

1. 公称长度：70~3000mm
2. 测量误差： ±10mm
3. 触点容量：220VA.C/A（阻性）
4. 防爆等级：ExidⅡCT6
5. 介质比重：＞0.55g/cm³
6. 工作压力：1.0、1.6、2.5
7. 工作温度：0℃~+80℃
8. 介质粘度：≤0.4Pa.S

Technical Parameters

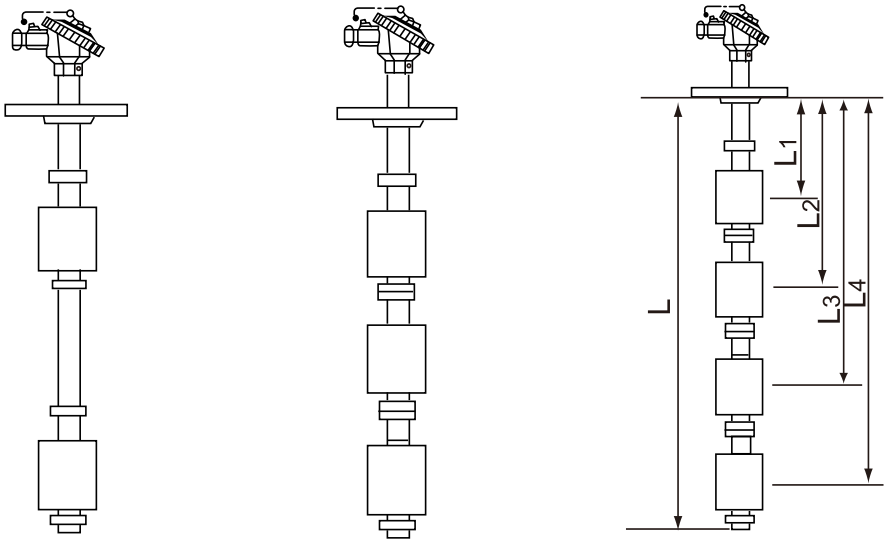
1. Nominal length: 70~3000mm
2. Measure error: ±10mm 24VD.C 0.5A
3. Contact capacity: 220VA.C/A9(resistive)24VD.C 0.5A
4. Explosive-proof grade: ExidⅡCT6
5. Medium proportion: ＞0.55g/cm³
6. Operating pressure: 1.0、1.6、2.5
7. Operating temperature: 0℃~+80℃
8. Medium viscosity: ≤0.4Pa.S

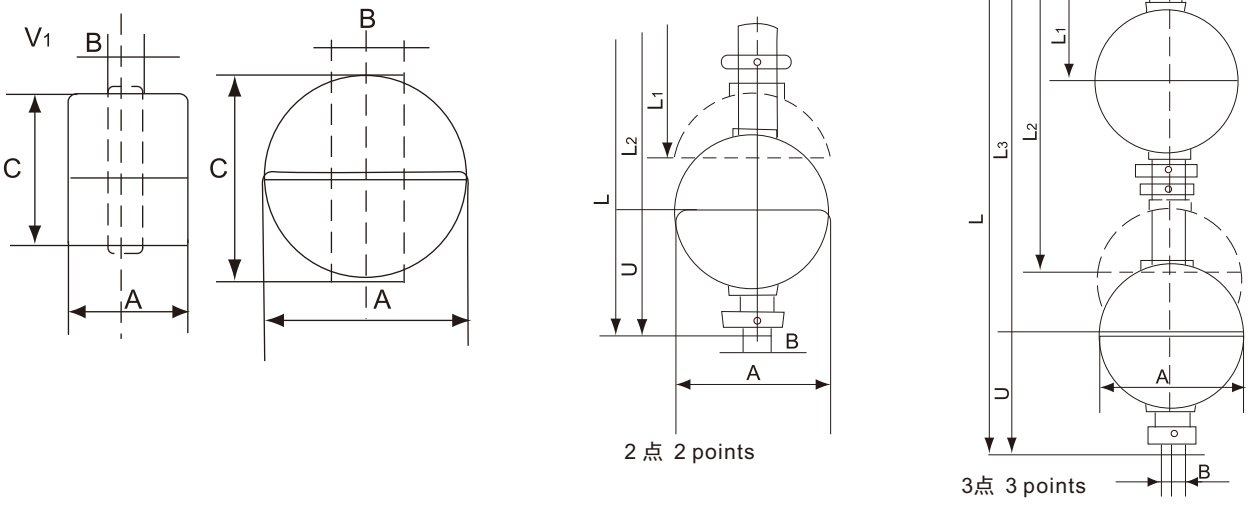
产品结构

因客户需求的控制方式不同，其控制器的结构也有所不同。

Product Structure

According to customers' different needs of control modes, the structures of the controllers are different.





结构形式　　Structures (Flange Connection)

TKUHZ–50/S–U_B系列磁性浮球控制器订购信息
Order Information of TKUHZ–50/S–UB Magnetic Floater Controller

TKUHZ-50/S-U_B										
安装方式 **Installation method** 顶装 Top installation 其他安装方式 Other installation methods	A Z									
触液材质 **Fluid contacting material** 304 316L PP PVC 304+PTFE 304+PP 316+PTFE 其他特殊材质 Other special material	1 2 3 4 5 6 7 Z									
过程连接 **Process connection** 无固定装置 No fixed device 固定法兰 Fixed flange 固定螺纹 Fixed thread 支架 Support 其他 others		O 法兰标准 Flange standard 螺纹规格 Thread specification J Z								
接线盒形式 **Junction box forms** 普通型 Ordinary type 隔爆ExdⅡBT4-6 Explosive-proof ExdⅡBT4–6 本安ExaⅡCT4-6 Explosive-proof ExdⅡBT4-6			S D E							
插深 **Inserting depth**										
控制点数 **Control point figures** 1个浮球1个控制点 Control point figures 1个浮球2个控制点 1 floater 2 control points 2个浮球2个控制点 2 floaters 2 control points 3个浮球3个控制点 3 floaters 3 control points 4个浮球4个控制点 4 floaters 4 control points 其他 others						B0 B1 B2 B3 B4 Z				
控制高度及方式（从过程连接处为基准） **Control height and method (with the standard of the process joint)** 高度mm+常开（K）或常闭（B） Control height and method (with the standard of the process joint)										
工作压力 Operating pressure										
工作温度 Operating temperature										
介质密度 Medium density										

TKML–130系列磁致伸缩液位计
TKML–130 Magnetostriction Liquid Level Meter

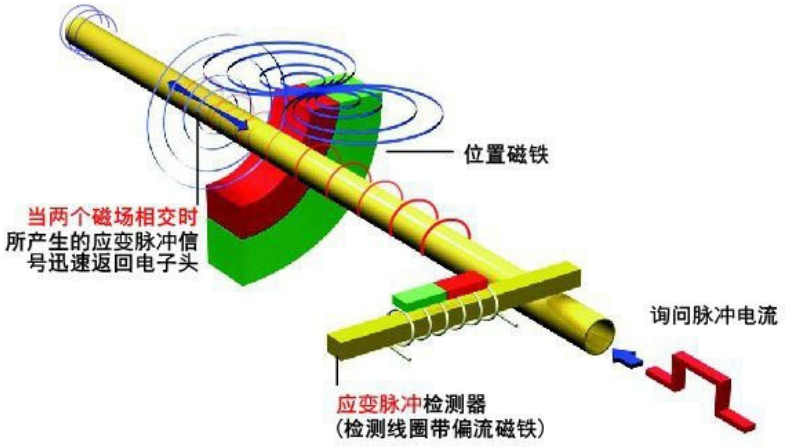
工作原理

磁致伸缩液位计的传感器工作时，传感器的电路部分将在波导丝上激励出脉冲电流，该电流沿波导丝传播时会在波导丝的周围产生脉冲电流磁场。在磁致伸缩液位计的传感器测杆外配有一浮子，此浮子可以沿测杆随液位的变化而上下移动。在浮子内部有一组永久磁环。当脉冲电流磁场与浮子产生的磁环磁场相遇时，浮子周围的磁场发生改变从而使得由磁致伸缩材料做成的波导丝在浮子所在的位置产生一个扭转波脉冲，这个脉冲以固定的速度沿波导丝传回并由检出机构检出。通过测量脉冲电流与扭转波的时间差可以精确地确定浮子所在的位置，即液面的位置。

Overview

When the sensor of the magnetostriction liquid level meter works, the circuit of the sensor will stimulate the pulse current on the waveguide wire, which will produce pulse current magnetic field around along the waveguide wire. Outside the sensor's measuring bar is equipped with a floater, which can move up and down along with the changes of the liquid level. Inside the floater there is a group of permanent magnetic ring. When the pulse current magnetic field meets with the magnet ring's magnetic field produced by the floater, the magnetic field around the floater will change, thus making the waveguide wire made out of magnetostriction materials produce a torsional wave pulse in the position of the floater. This pulse returns at fixed speed along the waveguide wire and is detected by the detection institution. By measuring the time difference between the pulse current and the torsional wave, we can accurately confirm the position of the floater, i.e. the position of the liquid level.

磁 致 伸 缩 工 作 原 理



特点

◆ 非接触式测量
◆ 高精度、高稳定性、高可靠性
◆ 使用寿命长
◆ 多种信号输出方式选择
◆ 具有反向极性保护功能
◆ 防雷击、防射频干扰
◆ 结构精巧、环境适应性强
◆ 不需定期重标和维护
◆ 可监测带压或不带压液罐的液位
◆ 隔爆、防腐（可选）
◆ 安装方便

Features

◆Non-contact measurement
◆High accuracy, high stability, high reliability
◆ Long service life
◆Multiple signal output mode selection
◆ Reversed polarity defensive function
◆Lightning protection and anti-radio-frequency interference
◆ Exquisite structure, strong environmental adaptation
◆ No need of regular rescaling and maintenance
◆ Able to monitor the liquid level of pressure or non-pressure fluid tanks
◆Explosive-proof and corrosion prevention (optional)
◆ Easy installation

特点

◆ 工业现场液位测量与控制
◆ 油罐液位测量
◆ 食品饮料液罐控制
◆ 大坝水位监控
◆ 化工过程液位控制
◆ 制药罐液位控制
◆ 饮用水和污水处理等

Features

◆Liquid level measurement and control on the industrial fields
◆Liquid level measurement of oil tanks
◆Control of food and beverage containers
◆ Water level monitoring of dams
◆ Liquid level control of chemical process
◆ Liquid level control of pharmaceutical tanks
◆ Drinking water and wastewater treatment

技术参数

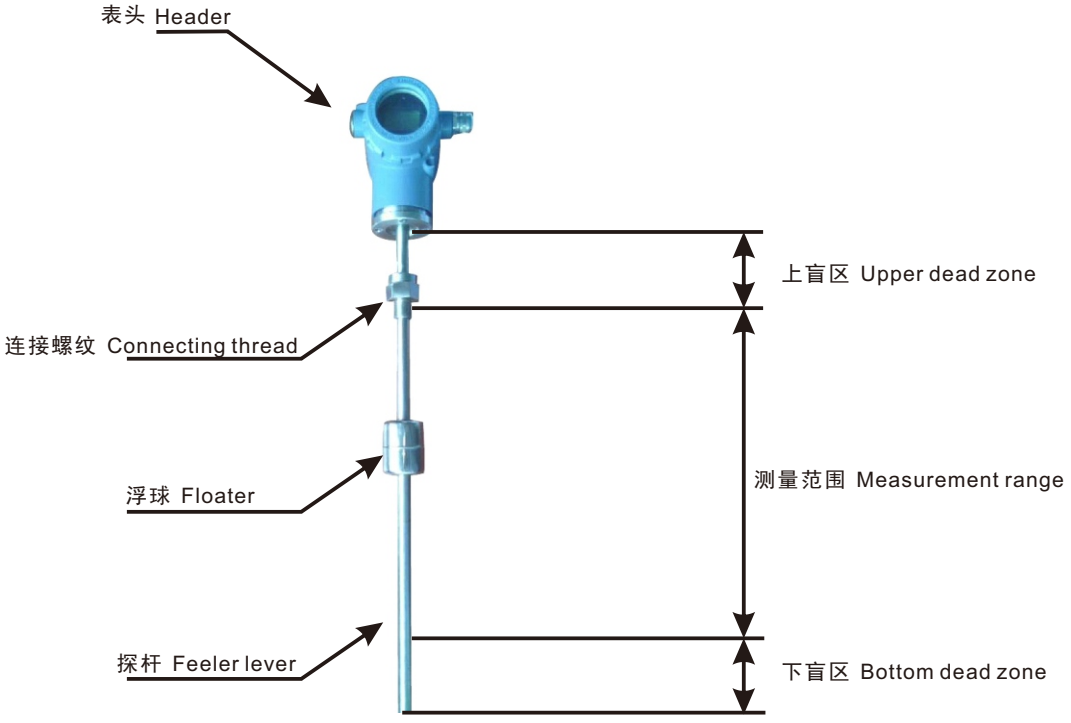
供电电源：24V±2.4V.DC
工作温度：-40~160℃
量程范围：用户定制80~6000mm量程范围内产品
输出形式：4~20mA
线性误差：±0.05%FS，最高精度1mm

Technical parameters

Power supply: 24V±2.4V.DC
Operating temperature: -40-160℃
Range ability: Users' customized products within the range of 80-6000mm
Output form: 4-20mA
Linear error: ±0.05%FS, highest accuracy 1mm

产品结构

Product structure



TKML–130系列磁致伸缩液位计订购信息
Order Information of TKML–130 Magnetostriction Liquid Level Meter

TKML–130						
安装方式 **Installation method** 顶装 Top installation 侧装 Side installation 其他安装方式 Other installation methods	A B Z					
触液材质 **Fluid contacting materials** 304 316L PP PVC 304+PTFE 304+PP 316+PTFE 其他特殊材质 Other special materials		1 2 3 4 5 6 7 Z				
过程连接 **Process connection** 无固定装置 No fixed device 固定法兰 Fixed flange 固定螺纹 Fixed thread 其他 Others			O 法兰标准 Flange standard 螺纹规格 Thread specification Z			
数字显示表头 **Digital display header** 无显示 No display 液晶显示 Liquid crystal display				B0 B1		
接线盒形式 **Junction box form** 普通型 Ordinary type 隔爆ExdⅡBT4-6 Explosive-proof ExdⅡBT4-6 本安ExaⅡCT4-6 Explosive-proof ExdⅡBT4-6					S D E	
测量范围 Measurement range						
插深 Inserting depth						
工作压力 Operating pressure						
工作温度 Operating temperature						
介质密度 Medium density						

注：产品标配HART通信，4~20mA输出，如需其他通信方式或输入，订货前请说明。
Note: The product's standard configuration is HART communication and 4-20mA output.
If other communication modes or inputs are needed, please illustrate before ordering.

TKML–131磁致伸缩液位远传变送器订购信息
Order Information of TKML–131 Magnetostriction Liquid Level Teletransmission Transmitter

TKML–131							
安装方式 **Installation method** 顶装 Top installation 底装 Bottom installation	A B						
探杆材质 **Probe material** 304 其他特殊材质 Other special materials		1 Z					
数字显示表头 **Digital display header** 无显示 No display 液晶显示 Liquid crystal display			B0 B1				
接线盒形式 **Junction box form** 普通型 Ordinary 隔爆ExdⅡBT4–6 Explosive-proof ExdⅡBT4–6 本安ExaⅡCT4-6 Explosive-proof ExdⅡBT4-6				S D E			
测量范围 **Measurement range**							
工作温度 **Operating temperature**							

注：TKML-131系列只适用于作磁翻板远传使用，建议与我公司产品配套适用，避免各厂家产品参数不一致，导致无法正常使用。

Note: TKML-131 series are only applicable to magnetic teletransmission. It is suggested that it be used together with other products of our company so as to avoid inconformity with the product parameters of other factories, which is likely to lead to failure in usage.

TKML-140系列玻璃板液位计

TKML-140 Glass Plate Liquid Level Meter

概述

TKML-140系列玻璃板液位计主要用于各种受压容器或敞口容器（如塔、罐、槽等）内的液体液位现场直接指示。

原理与结构

TKML-140系列液位计是基于连通器原理设计的，由玻璃板及液位计主体通过法兰与被测容器相接构成连通器，透过玻璃板可观察到实际液位。液位计主要由玻璃板、表体、压盖、上下阀门和法兰等组成的，由于玻璃板长度固定，所以通过改变玻璃板节数可制成不同规格的液位计。

液位计配套的上下阀门不但起截止阀的作用，而且内置钢球在玻璃板意外破损时起自动关闭作用，防止液体或气体外泄。

参数

1. 安装中心距：500 800 1100 1400 1700mm
2. 工作压力：2.5 4.0 6.4MPa
3. 介质温度：0~250℃ -40~80℃
4. 阀门自动关闭：≥0.2MPa
5. 夹套工作压力：≤0.6MPa
6. 夹套接口尺寸：G1/2″ (M) 可定制
7. 液位计结构尺寸

Overview

TKML-140 glass plate liquid level meter is mainly used in direct site indication of the liquid level inside various pressure vessels or open vessels (such as tower, tank and groove).

Principle and Structure

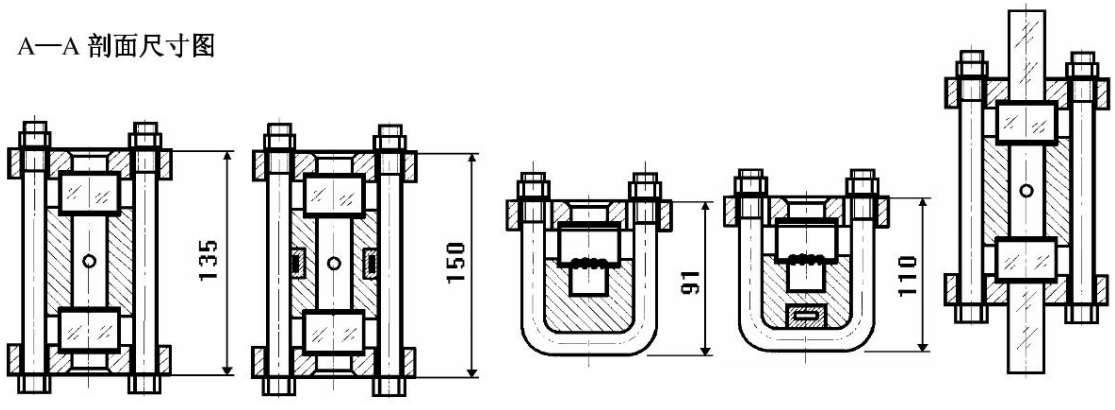
TKML-140 liquid level meter is designed based on the theory of communicating vessels. The communicating vessel is formed by the connection of the glass plate and the body of the liquid level meter through the flange and the measured vessel. Through the glass plate, actual liquid level can be observed. The liquid level meter is mainly composed of the glass plate, the meter body, the cover, upper and bottom valves as well as the flange. As the length of the glass plate is fixed, by changing the pitch number of the glass plate, liquid level meters of different specifications can be made.

Not only can the matched upper and bottom valves of the liquid level meter play the role of the stop valve, but the inside steel ball can also play the role of closing when the glass plate is damaged accidentally in order to prevent escape of liquid or gas.

Parameters

1. Center distance of installation: 500 800 1100 1400 1700mm
2. Operating pressure: 2.5 4.0 6.4MPa
3. Medium temperature: 0~250℃ -40~80℃
4. Self-closing of valve: ≥0.2MPa
5. Jacket's operating pressure: ≤0.6MPa
6. Jacket's pipe dimension: G1/2″ (M) customized
7. Structure size of liquid level meter

A—A 剖面尺寸图



透光式　透光式带夹套　反射式　反射式带夹套　防霜式

TKML–140系列玻璃板液位计订购信息
Order Information of TKML–140 Glass Plate Liquid Level Meter

TKML–140								
功能类型 **Function type** 透光式 Transmitting type 双色透光式 Two-tone transmitting type 反射式 Reflecting type	A B C							
触液材质 **Fluid contacting material** 碳钢 Carbon steel 304 316L 其他特殊材质 Other special materials		1 2 3 Z						
过程连接 **Process connection** 固定法兰 Fixed flange 固定螺纹 Fixed thread 其他 Other			法兰标准 Flange standard 螺纹规格 Flange specification Z					
安装方式 **Installation method** 侧-侧式 Side-side type 顶-底式 Top-bottom type 侧-底式 Side-bottom type 顶-侧式 Top-side type 其他 Other				B0 B1 B2 B3 Z				
中心距 **Center distance**								
工作压力 **Operating pressure**								
工作温度 **Operating temperature**								
附件选择 **Attachment selection** 无附件 No attachment 蒸汽伴热 Steam tracing 无盲区 No dead zone 防霜 Frost prevention 其他 Others								0 1 2 3 4

TKML–150系列玻璃管液位计
TKML-150 Glass Tube Liquid Level Meter

概述

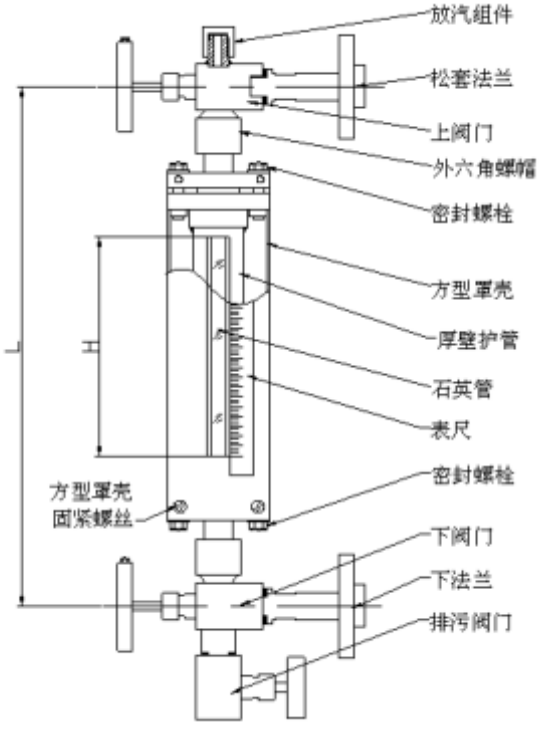
TKML–150系列石英玻璃管液位计是我公司采用高纯度石英管制造的产品。仪表显示清晰，密封性能好，耐高温、高压、防粘稠，寿命长，冲洗、维护方便，广泛应用于石油、化工、电力、冶金等行业中各种容器及锅炉的液位检测指示。特别适用于无色透明液体的测量指示。

工作原理

仪表上下均装有法兰，通过过程连接与容器构成连通器。透过石英管或玻璃管就可以直接读得容器内介质液位或界位的高度。双色式工作是基于光线在气相与液相介质中的光学透射、反射与折射原理，经过光学系统设计而实现，使气相与液相相比格外分明、清晰，液相呈绿色，气相呈红色，色别反差大，显示一目了然，无盲区。

参数

测量范围：最大允许2500mm
可视尺寸：法兰中心距-200mm
工作压力：1.6、2.5、4.0、6.4MPa
介质温度：-80~450℃
显示方式：有单色、双色两种显示方式，仪表观测方向任意可调
自锁阀：安全阀钢球自动密封压力≥0.2MPa
伴热蒸汽压力：≤1MPa，接口G1/2″ （M）



Overview

TKML-150 quartz glass tube liquid level meter is the product produced by our company with highly pure quartz tube. It has clear meter display and good sealing property; it can resist high temperature and high pressure as well as prevent thickness; it has long service life and it is easy to maintain. Thus, it is widely used in the liquid level measurement and indication of various vessels and boilers in industries like petroleum, chemical engineering, electricity and metallurgy, especially applicable to the measurement and indication of colorless clear liquid.

Working Principle

Flanges are equipped on both top and bottom of the instrument, which are connected with the vessel to form the communicating vessels through process connection. Through the quartz tube or the glass tube, the height of the medium liquid inside the vessel can be read directly. The two-color type works according to the principles of optical protection, reflection and refraction of light ray in gas and liquid. It is realized through optical system design, which makes the comparison of gas and liquid extremely clear. The liquid phase presents green and gas phase presents red. With large contrast of colors, it seems clear at a glance and there is no dead zone.

Parameters

Measurement range: 2500mm at the maximum
Visible size: Flange's center distance-200mm
Operating pressure: 1.6、2.5、4.0、6.4MPa
Medium temperature: -80~450℃
Display mode: solid color and bicolor, the meter's observation direction can be adjusted at will
Latching valve: Self-sealing pressure of the steel ball inside the safety valve ≥0.2MPa
Tracing steam pressure: ≤1MPa，connector G1/2″（M）

结构特点

1、除方罩壳外，内部增加了焊接连接的厚壁管护管，使整体更加坚固，确保产品更加安全。
2、石英管或玻璃管更粗，壁更厚内径更大，高透明，保证了使用安全、观测清晰。
3、仪表观测方向任意可调。
4、配自锁阀，当仪表泄漏或玻璃管意外损坏时能自动密封进液。
5、清洗方便：用铁丝一段系棉团或海绵从上堵塞穿出，反复几次即可。亦可用酸洗或清洗剂清洗。
6、法兰连接采用松套法兰，更加宽限了中心距。

Structure Features

1. Apart from the square cover, welded connection thick tube is added inside for protection, which makes the whole more solid and confirms the product's safety.
2. The quartz tube or the glass tube is thicker, the wall is thicker, the inner diameter is larger, and it is of high transparency, thus confirming safe usage and clear observation.
3. Arbitrarily adjustable direction of the instrument.
4. It is matched with latching valve, which can automatically seal the feeding liquid when the meter leaks or damages accidentally.
5. Convenient cleaning: Use a section of wire attached with cotton lump or sponge to penetrate upwards. Repeat for several times. It can also be cleaned by acid pickling or cleaning agent.
6. Loose flange is used in flange connection, which better extends the center distance.

TKML–150系列玻璃管液位计订购信息
Order Information of TML–150 Glass Tube Liquid Level Meter

TKML–150								
功能类型 **Function type** 普玻璃管 Ordinary glass tube 石英玻璃管 Quartz glass tube	A B							
触液材质 **Fluid contacting material** 碳钢 Carbon steel 304 316L PP 304+PTFE 其他特殊材质 Other special materials		1 2 3 4 5 Z						
过程连接 **Process connection** 固定法兰 Fixed flange 固定螺纹 Fixed thread 其他 Other			法兰标准 Flange standard 螺纹规格 Flange specification Z					
安装方式 **Installation method** 侧–侧式 Side-side type 顶–底式 Top-bottom type 侧–底式 Side-bottom type 顶–侧式 Top-side type 其他 Other				B0 B1 B2 B3 Z				
中心距 **Center distance**								
工作压力 **Operating pressure**								
工作温度 **Operating temperature**								
附件选择 **Attachment selection** 无附件 No attachment 蒸汽伴热 Steam tracing 无盲区 No dead zone 其他 Others								0 1 2 3

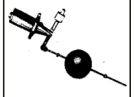
TKUQK系列浮球液位控制器
TKUQK Floater Liquid Level Controller

概述

TKUQK型浮球液位控制器适用于对各种容器内液体的液位控制，当液位到达上、下切换值时，控制器触点发出通断开关式信号。产品系列分防爆和非防爆两大类，防爆型能用于易燃和易燃介质为1/2级及A、B、C级承压容器的液位控制。控制器不适用于对黄铜、不锈钢等材料有较强腐蚀性以及含有导磁杂质的介质。

Overview

TKUQK floater liquid level controller is applicable to the liquid level control of various vessels. When the liquid level reaches upper and lower switching value, the contactor of the controller sends out on-off switch signals. The products are classified into anti-explosion type and not anti-explosion type. The anti-explosion type can be applicable to the liquid level control of inflammable vessels or pressure vessels whose inflammable medium is grade ½ as well as vessels of grade A, B or C. The controller is not applicable to medium with strong corrosivity and magnetic conductive impurities like brass and stainless steel.

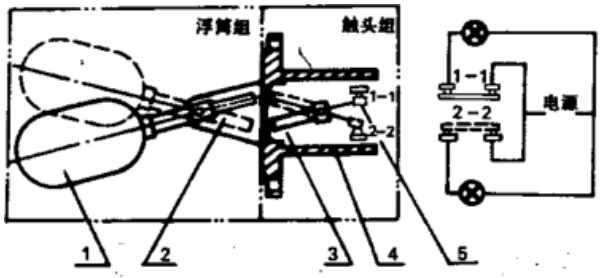
外形 Shape	型号名称 Type name	防爆等级 Anti-explosion grade	介质压力Mpa Medium pressure Mpa	介质温度℃ Medium temperature ℃	控制范围mm Control scope mm	浮球尺寸mm Float size mm	整定方式 Setting method	安装型式 Installation method	电源及触点容量 Power source and contact capacity
	TKUQK-01 型浮球液位控制器 TKUQK-01 Float liquid level controller		1	150	≤14	φ79	不可调 Nonadjus -table	水平 Horizontal	AC220V 220W DC100V 150W
	TKUQK-01G 型浮球液位控制器 TKUQK-01G Float liquid level controller					φ60			
	TKUQK-01-dⅡBT3型浮球液位控制器 TKUQK-01-dⅡBT3 Float liquid level controller dⅡBT3					φ76			
	TKUQK-02 型浮球液位控制器 TKUQK-02 Float liquid level controller			150	22~550	φ79	有级调整 Step adjus tment		
	TKUQK-02G型浮球液位控制器 TKUQK-02G Float liquid level controller		1			φ60	无级调整 stepless ad -justment	水平 Horizontal	
	TKUQK-02-dⅡBT3型浮球液位控制器 TKUQK-02-dⅡBT3 Float liquid level controller	dⅡBT3	4			φ76	有级调整 Step ad -justment		
	TKUQK-03 型浮球液位控制器 TKUQK-03 Float liquid level controller		1	150	8~1000	φ126	无级调整 stepless adjustment	垂直 vertical	
	TKUQK-03G 浮球液位控制器 TKUQK-03 type TKUQK-03G Float liquid level controller				50~1000	φ79			
	TKUQK-03-dⅡBT3型浮球液位控制器 TKUQK-03-dⅡBT3 Float liquid level controller	dⅡBT3	2.5		8~1000	φ126			

结构原理

TKUQK型浮球液位控制器由互为隔离的浮球组和触头组二大部分组成。G型触头组为微动开关。当被测液位升高或降低时，浮球1随之升降，使其端部的磁钢2上、下摆动，通过磁力作用，推斥安装在外壳3内相同磁极的磁钢4上、下摆动，其另一端的动触点5便在静触头1-1及2-2间连通或断开。

Structure Principle

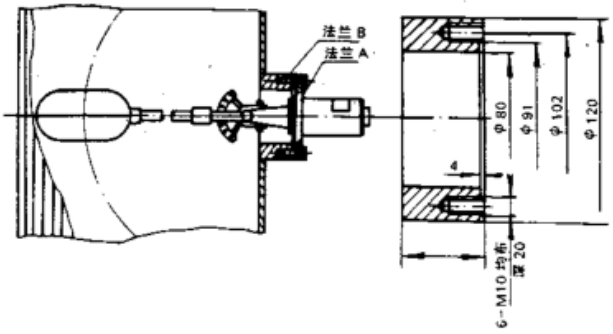
TTKUQK float liquid level controller is composed of separate floater group and contactor. G type contactor group adopts micro switch. When the measured liquid level rises or falls, floater 1 will rise or fall accordingly, making the magnetic steel 2 at its end swing up and down. With magnetic force, it repulses magnetic steel 4 with same pole inside shell 3 to swing up and down; meanwhile, the movable contact 5 at the other end will connect or break between the fixed contact 1-1 and 2-2.



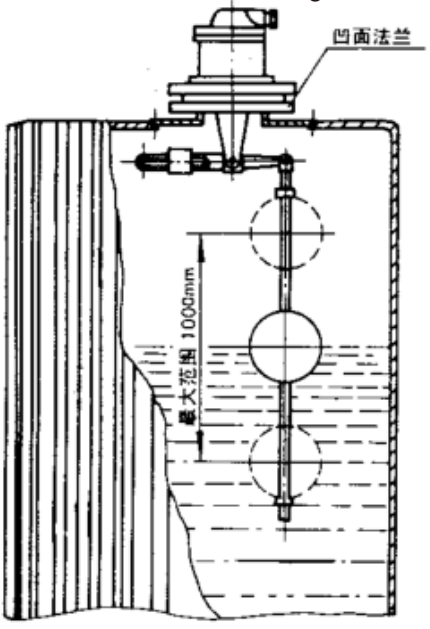
1、浮筒　2、4、相同磁级磁钢　3、外壳　5、动触头

安装 Installation

TKUQK型水平安装示意图
TKUQK Horizontal installation diagram

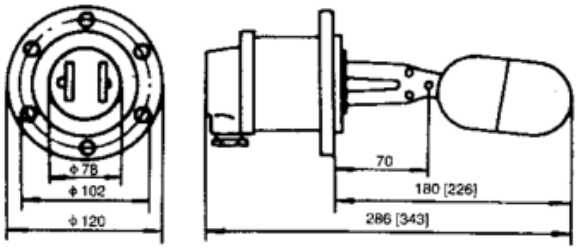


TKUQK型垂直安装示意图
TKUQK Vertical installation diagram

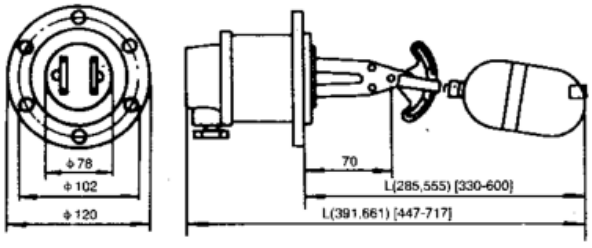


外形及安装尺寸 Shape and installation dimension

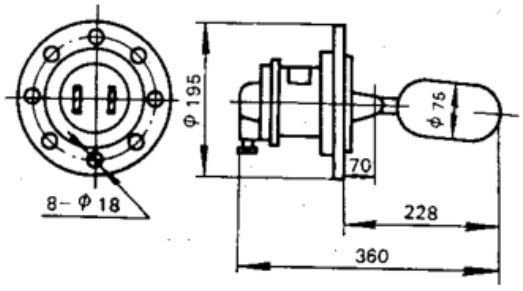
TKUQK-01G



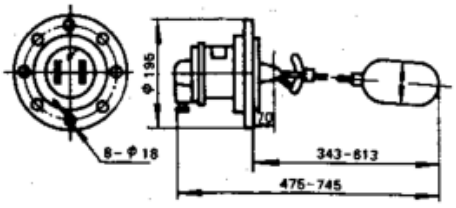
TKUQK-03G TKUQK-03-dⅡBT3



TKUQK-01-dⅡBT3



TKUQK-02-dⅡBT3



TKUQK-60系列浮球液位控制器

TKUQK-60 Floater Liquid Level Controller

概述

电缆式浮球液位开关利用重力与浮力的原理设计而成，结构简单而合理，主要包括浮漂体，设置在浮漂体内的大容量微型开关和能将开关处于通断状态的驱动机构，以及与开关相连的三芯电缆。该产品的显著特点是性能稳定可靠（不因液面的波动而引起误动作），同时，它还具有无毒、耐腐蚀、安装方便、价格低廉、使用寿命长等特点。该产品可与各种液泵配套，广泛用于给水、排水及含腐蚀性液体的液位自动控制。

Overview

The cable floater liquid level switch is designed by making use of the principle of gravity and buoyancy, whose structure is simple and reasonable. It mainly includes the floating body, the high-capacity micro switch set inside the floating body and the driving mechanism that can make the switch on the on-off state as well as the three-core cable connected to the switch. The significant feature of the product is stable and reliable property (malfunction can't be aroused by the fluctuation of the liquid level). Meanwhile, it is also non-poisonous, corrosion resistant and easy to install, together with the features of low price and long service life. This product can be matched with various liquid pumps, which is widely used in the automatic control of the liquid level of feedwater, drainage and corrosive liquid.

产品特点

1、结构简易，性能可靠：产品能在正常情况下发出开关控制信号，可靠性强，抗干扰性强。
2、坚固耐用：产品使用寿命长，操作正确，故障率低。
3、易于安装方法、方便调节：水位控制范围可调，用一枚螺丝钉保护电缆信号，完成安装。
4、应用范围广、一般性能强：该产品对直流，污水、油、低浓度的酸液，无污染环境，柴油机气化和自动燃料供给均适用。
5、电路简单、经济而实用：操作电压220V，电流10A，产品应用电路简单，实用成本低。

Product Features

1. Simple structure and reliable performance: the product can send out on-off control signals under normal conditions, which has strong reliability and anti-interference.
2. Sturdy and durable: the product has long service life, which is correct to operate and low in failure rate.
3. Easy installation and adjustment : The control range of the water level can be adjusted. A screw spike can be used to protect the cable signal to complete installation.
4. Wide range of application and strong general performance: this product is applicable to direct current, sewage, oil, acid liquor of low concentration, non-pollution environment, diesel aerification, as well as self-motion fuel feeding.
5. Simple circuit, economical and practical: the control voltage is 220V and electric current 10A. Its application circuit is simple and the application cost is low.

参数

Parameters

型号名称 Type Name	TK-UQK-60系列浮球液位控制器 TK-UQK-60 Floater Liquid Level Controller
测量范围 Measurement range	200mm~10000mm
控制方式 Control mode	单点、2点、3点、4点 Single point, 2 points, 3 points, 4 points
触点容量 AC220V 2A	AC220V 2A
工作压力 Operating pressure	≤1.0MPa
工作温度 Operating temperature	-20℃~100℃
介质密度 Medium density	≥0.7g/cm³
安装型式 Installation Model	法兰 Flange

TKUQK-60系列订购信息
TKUQK-60 Floater Liquid Level Controller

TKUQK-60			
控制点数 Control point			
单点 Single point	1		
2点 2 points	2		
3点 3 points	3		
4点 4 points	4		
其他 Others	Z		
材质 Material			
工程塑料 Engineering plastics		A	
304		B	
316L		C	
量程 Range			

TKWL-1100系列智能型雷达物位计
TKWL-1100 Intelligent Radar Level Meter

概述

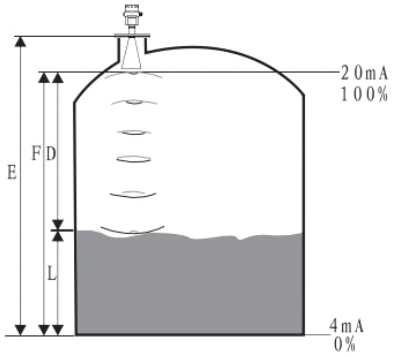
TKWL1100系列雷达式物位测量，输出4~20Ma模拟信号，测量最大距离可达70米。天线被进一步优化处理，新型的快速的微处理器可以进行更高速率的信号分析处理，使得仪表可以用于：反应釜或固体料仓非常复杂的测量条件。

Overview

TKWL1100 intelligent radar level meter measurement outputs 4~20Ma analog signals, and the largest distance of measurement can reach 70 meters. The antenna is further optimized and processed, the new rapid microprocessor can conduct higher rate signal analysis and processing, making the instrument applicable to very complex measurement conditions like reaction still or solid stock bin.

原理

雷达物位计天线发射较窄的微波脉冲，经天线向下传输，微波接触到被测介质表面后被反射回来，再次被天线系统接收并将其传输给电子线路部分自动转换成物位信号。



Principle

TKWL1100 intelligent radar level meter measurement outputs 4~20Ma analog signals, and the largest distance of measurement can reach 70 meters. The antenna is further optimized and processed, the new rapid microprocessor can conduct higher rate signal analysis and processing, making the instrument applicable to very complex measurement conditions like reaction still or solid stock bin.

特点：

雷达物位计采用了高达26GHz的发射频率，因而具有以下特点：
A. 非接触测量，无磨损，无污染
B. 天线尺寸小，便于安装
C. 波长更短，对在倾斜的固体表面有更好的反射
D. 测量盲区更小，对于小罐测量也会取得良好的效果
E. 波束角小，能量集中，增强了回波能力的同时，又有利于避开干扰物
F. 几乎不受腐蚀、泡沫影响
G. 几乎不受大气中水蒸气、温度和压力变化影响
H. 严重粉尘环境仪表也能准确读取到真实物位回波
I. 高信噪比，即使在波动的情况下也能获得更优的性能
J. 26GHz频率，是测量固体和低介电常数介质的最佳选择。

Features:

The radar level meter adopts the emission frequency of 26GHz, and thus features:
A. It can realize non-contact measurement, which is non-abrasion and non-pollution
B. Its smaller antenna size makes it easy to install
C. Shorter wave length, which can realize better reflection on the oblique solid surface
D. Smaller measurement dead zone can help small tank measurement achieve good effect
E. The smaller filed angle and concentrated energy enhance the echo ability and is in favor of avoid the interferent
F. It is hardly influenced by erosion and foam
G. It is hardly influenced by vapor, temperature and pressure changes in the atmosphere
H. In serious dust environment, the instrument can accurately read the echo of real material level
I. Its high signal-to noise ratio can help achieve better performance even under fluctuations
J. 26GHz frequency is the best selection to measure solid and medium of low dielectric constant.

产品款型信息 Information of Product Models

 TKWL-1101	应　　用：液体　适合强腐蚀性液体 测量范围：10m 测量精度：±5mm 过程温度：-40~130℃ 过程压力：-1.0~0.3MPa 频　　率：26GHz Frequency: 26GHz 输出信号：4~20mA/HART/Modbus 电　　源：两线制（DC24V）四线制（DC24V/AC220V） 现场显示：标配 外　　壳：选配 过程连接：螺纹/法兰（选配） 天　　线：PTFE	Application: liquid Suitable for liquid with high corrosivity Measurement range: 10m Measurement accuracy: ±5mm Process temperature: -40-130℃ Process pressure: -1.0-0.3MPa Frequency: 26GHz Output signal: 4~20mA/HART/Modbus Power supply: Two-wire system (DC24V) Four-wire system (DC24V/AC220V) Status display: standard Shell: Optional Process connection: Thread/flange (optional) Antenna: PTFE

 TKWL-1102	应　　用：液体　耐温、耐压、轻微腐蚀的液体 测量范围：30m 测量精度：±3mm 过程温度：-40~800℃ -40~130℃ 过程压力：常压/~1.0-4MPa 频　　率：26GHz 输出信号：4~20mA/HART/Modbus 电　　源：两线制（DC24V） 四线制（DC24V/AC220V) 外　　壳：选配 过程连接：螺纹/法兰（选配） 天　　线：喇叭（不锈钢304/ 316L）	Application: liquid Suitable for liquid of temperature resistance, pressure resistance and slight corrosivity Measurement range: 30m Measurement accuracy: ±3mm Process temperature: -40-800℃ -40-130℃ -60-250℃ -60-400℃ Process pressure: normal pressure/-1.0-4MPa Frequency: 26GHz Output signal: 4~20mA/HART/Modbus TKWL-1102 Power supply: Two-wire system (DC24V) Four-wire system (DC24V/AC220V) Status display: standard Shell: Optional Process connection: Thread/flange (optional) Antenna: horn (stainless steel 304/ 316L)
 TKWL-1103	应　　用：液体　耐温、耐压、轻微腐蚀的液体 测量范围：30m 测量精度：±3mm 过程温度：-40-800℃ -40~130℃ 过程压力：常压/-1.0~4MPa 频　　率：26GHz 输出信号：4~20mA/HART/Modbus 电　　源：两线制（DC24V） 四线制（DC24V/AC220V） 外　　壳：选配 过程连接：螺纹/法兰（选配） 天　　线：喇叭（不锈钢304/ 316L）	Application: liquid Suitable for liquid with high corrosivity and sanitation Measurement range: 20m Measurement accuracy: ±3mm Process temperature: -40-150℃ Process pressure: -0.1-0.5MPa Frequency: 26GHz Output signal: 4~20mA/HART/Modbus ower supply: Two-wire system (DC24V) Four-wire system (DC24V/AC220V) TKWL-1103 Status display: standard Shell: Optional Process connection: Flange (optional) Antenna: _____
 TKWL-1105	应　　用：固体 存储容器、过程容器或强粉尘易结晶、结露场合 测量范围：70m 测量精度：±15mm 过程温度：-40~80℃ -40~130℃ 过程压力：常压/-0.1~4MPa 频　　率：26GHz 输出信号：4~20mA/HART/Modbus 电　　源：两线制（DC24V） 四线制（DC24V/AC220V） 现场显示：标配 外　　壳：选配 过程连接：螺纹/法兰（选配 天　　线：喇叭（不锈钢304/ 316L）	Application: solid Spots where storage vessels, process vessels or strong dust are easy to crystallize or condensate Measurement range: 70m Measurement accuracy: ±15mm Process temperature: -40-80℃ -40-130℃ -60-250℃ -60-400℃ Process pressure: Normal pressure/-0.1-4MPa Frequency: 26GHz TKWL-1105 Output signal: 4~20mA/HART/Modbus Power supply: Two-wire system (DC24V) Four-wire system (DC24V/AC220V) Status display: standard Shell: Optional Process connection: thread/flange (optional) Antenna: horn (stainless steel 304/ 316L)
 TKWL-1106	应用:固体料、过程容器或强粉尘易结晶、揭露场合 测量范围：70米 过程连接：螺纹、法兰 介质温度：-40~250℃ 精度：±15mm 频率范围：26GHz 防爆等级：Exib IIC T6 Gb 防护等级：IP67 信 号 输 出 ： 4~20mA/HART（两线/四线） RS485/Modbus	Application: the solid material, the process container or the strong dust is easy to crystallize, to expose the situation Measuring range: 70 meters Process connection: thread, flange Medium temperature: -40~250 Accuracy: + 15mm Frequency range: 26GHz Explosion proof grade: IIC T6 Gb ExibProtection level: Ip67 ignal output: 4~20mA/HART (two line / four line) RS485/Modbus

选型指南 Model Selection Guide

TKWL-1101

TKWL-1101									
现场显示/编辑 **Status display/edition** 带With B 不带Without X									
电缆进线 **Cable inlet wire** M20*1.5 M ½NPT N									
外壳/防护等级 **Shell/protection grade** 铝/IP67 Aluminum/IP67 L 塑料/IP66 Plastics/IP66 P 不锈钢/IP67 Stainless steel/IP67 Q									
电子组件 **Electronic building bricks** 24V（4~20）mA/HART两线制 24V（4~20）mA/HART Two-wire system A （4~20）mA/2V DC/Modbus两线制 （4~20）mA/2V DC/Modbus Two-wire system B									
容器接管长度 **Vessel adapter tube length** 接管100mm Adapter tube 100mm A 接管200mm Adapter tube 200mm B									
法兰选配/材料 **Flange selection/material**									

规格、材料 Specification/material	PP	PTFE	不锈钢 Stainless steel
DN50	PA	FA	QA
DN80	PB	FB	QB
DN100	PC	FC	QC
DN125	PD	FD	QD
DN150	PE	FE	QE

过程连接/材料 **Process connection/material** (F) 螺纹 G1½A (F) Thread G1½A GP (L)法兰DN50/PTFE (L) Flange DN50/PTFE FA 特殊定制 Specially customized FX									
天线形式/材料/过程温度 **Antenna forms/ materials/process temperature** (R型) 密封喇叭/PP/(-40~80)℃ RP (type)sealed horn/PP/(-40~80)℃ (R型) 密封喇叭/PTFE/(-40~130)℃ RF (type)sealed horn/PTFE/(-40~130)℃									
防爆形式 **Anti-explosion type** 标准型(非防爆)电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC P 本安型（ExiaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC I 本安型+隔爆型（Exd iaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC D									

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TKWL-1102								
电缆进线 **Cable inlet wire** M20*1.5 M ½NPT N								
外壳/防护等级 **Shell/protection grade** 铝/IP67 Aluminum/IP67 L 塑料/IP66 Plastics/IP66 P 不锈钢/IP67 Stainless steel/IP67 Q								
电子组件 **Electronic building bricks** 24V（4~20）mA/HART两线制 24V（4~20）mA/HART Two-wire system A （4~20）mA/2V DC/Modbus两线制 （4~20）mA/2V DC/Modbus Two-wire system B 220V AV/Modbus四线制 220V AV/Modbus Four-wire system C								
密封/过程温度 **Sealing/process temperature** Viton(-60~150)℃ 1 Kalrez(-60~250)℃ 2 石墨(-60~400)℃ Graphite（-60~400）℃ 3								
天线形式/材料 **Antenna forms/materials** 喇叭天线 φ48mm/不锈钢316L Horn antenna φ48mm/stainless steel 316L TA 喇叭天线 φ78mm/不锈钢316L Horn antenna φ78mm/stainless steel 316L TB 喇叭天线 φ98mm/不锈钢316L Horn antenna φ98mm/ stainless steel 316L TC 喇叭天线 φ123mm/不锈钢316L Horn antenna φ123mm/ stainless steel 316L TD 喇叭天线 φ48mm/不锈钢316L/PTFE(PP)防尘罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) dust cover SA 喇叭天线 φ78mm/不锈钢316L/PTFE(PP)防尘罩 Horn antenna φ78mm/ stainless steel 316L/PTFE(PP) dust cover SB 喇叭天线 φ98mm/不锈钢316L/PTFE(PP)防尘罩 Horn antenna φ98mm/ stainless steel 316L/PTFE(PP) dust cover SC 喇叭天线 φ123mm/不锈钢316L/PTFE(PP)防罩 Horn antenna φ123mm/ stainless steel 316L//PTFE(PP) dust cover SD 喇叭天线 φ48mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) corrosion cover WA 喇叭天线 φ78mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) corrosion cover WB 喇叭天线 φ98mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ98mm/ stainless steel 316L/PTFE(PP) corrosion cover WC 喇叭天线 φ123mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ123mm/ stainless steel 316L/PTFE(PP) corrosion cove WD 特殊定制 Specially customized XX								
法兰选配/材料 **Flange selection/material** 不选 Not selected FO 特殊定制 Specially customized FX								
传感器/材料 **Sensor/material** (H)螺纹 G½A/不锈钢(304/316L) (H) Thread G½A/stainless steel(304/316L) QG (J)螺纹 G½A/不锈钢(304/316L)/温度(-60-250)℃ (J) Thread G½A/stainless(304/316L)/temperature(-60-250)℃ SG (I)螺纹 G½A/不锈钢(304/316L)/(带吹扫) (I) Thread G½A/Stainless steel(304/316L)/(With blowing) XX								
防爆形式 **Anti-explosion type** 标准型(非防爆)电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC P 本安型（ExiaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC I 本安型+隔爆型（Exd iaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC D								

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TKWL-1103						
现场显示/编辑 **Status display/edition**						
带With	B					
不带Without	X					
电缆进线 **Cable inlet wire**						
M20*1.5		M				
½NPT		N				
外壳/防护等级 **Shell/protection grade**						
铝/IP67 Aluminum/IP67			L			
塑料/IP66 Plastics/IP66			P			
不锈钢/IP67 Stainless steel/IP67			Q			
电子组件 **Electronic building bricks**						
24V（4~20）mA/HART两线制 24V（4~20）mA/HART Two-wire system				A		
(4~20）mA/2V DC/Modbus两线制 (4~20）mA/2V DC/Modbus Two-wire system				B		
C（198~242）V AV/Modbus四线制 C(198~242）V AV/Modus Four-wire system				C		
天线材料/过程连接 **Antenna material/process connection**						
(U型)不锈钢复合PTFE法兰 DN50 (U TYPE)STAINLESS STEEL COMPOUND PTFE FLANGE DN50					A	
(U型)不锈钢复合PTFE法兰 DN80 (U type)Stainless steel compound PTFE flange DN80					B	
(U型)不锈钢复合PTFE法兰 DN100 (U type)Stainless steel compound PTFE flange DN100					C	
特殊定制 Specially customized					X	
防爆形式 **Anti-explosion type**						
标准型(非防爆)电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC						P
本安型（ExiaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4-20mA), HRAT protocol 24VDC						I
本安型+隔爆型（Exd iaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC						D

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TKWL-1105						
现场显示/编辑 **Status display/edition**						
带With	B					
不带Without	X					
电缆进线 **Cable inlet wire**						
M20*1.5		M				
½NPT		N				
外壳/防护等级 **Shell/protection grade**						
铝/IP67 Aluminum/IP67			L			
塑料/IP66 Plastics/IP66			P			
不锈钢/IP67 Stainless steel/IP67			Q			
电子组件 **Electronic building bricks**						
24V（4~20）mA/HART两线制 24V（4~20）mA/HART Two-wire system				A		
(4-20）mA/2V DC/Modbus两线制 (4-20）mA/2V DC/Modbus Two-wire system				B		
220V AV/Modbus四线制 220V AV/Modbus Four-wire system				C		
密封/过程温度 **Sealing/process temperature**						
Viton(-60~150)℃					1	
Kalrez(-60~250)℃					2	
石墨(-60~400)℃ Graphite（-60~400）℃					3	

天线形式/材料 **Antenna forms/materials**	
喇叭天线 φ48mm/不锈钢316L Horn antenna φ48mm/stainless steel 316L	TA
喇叭天线 φ78mm/不锈钢316L Horn antenna φ78mm/stainless steel 316L	TB
喇叭天线 φ98mm/不锈钢316L Horn antenna φ98mm/ stainless steel 316L	TC
喇叭天线 φ123mm/不锈钢316L Horn antenna φ123mm/ stainless steel 316L	TD
喇叭天线 φ48mm/不锈钢316L/PTFE（PP）防尘罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) dust cover	SA
喇叭天线 φ78mm/不锈钢316L/PTFE（PP）防尘罩 Horn antenna φ78mm/ stainless steel 316L/PTFE(PP) dust cover	SB
喇叭天线 φ98mm/不锈钢316L/PTFE（PP）防尘罩 Horn antenna φ98mm/ stainless steel 316L/PTFE(PP) dust cover	SC
喇叭天线 φ123mm/不锈钢316L/PTFE（PP）防罩 Horn antenna φ123mm/ stainless steel 316L//PTFE(PP) dust cover	SD
喇叭天线 φ48mm/不锈钢316L/PTFE（PP）防腐罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) corrosion cover	WA
喇叭天线 φ78mm/不锈钢316L/PTFE（PP）防腐罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) corrosion cover	WB
喇叭天线 φ98mm/不锈钢316L/PTFE（PP）防腐罩 Horn antenna φ98mm/ stainless steel 316L/PTFE(PP) corrosion cover	WC
喇叭天线 φ123mm/不锈钢316L/PTFE（PP）防腐罩 Horn antenna φ123mm/ stainless steel 316L/PTFE(PP) corrosion cove	WD
特殊定制 Specially customized	XX

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法兰选配/材料
Flange selection/material

规格、材料 Specification, material	PP	PTFE	不锈钢 Stainless steel	万向（PP） Direction (PP)	万向节（不锈钢） Cardan joint (stainless steel)
DN50	PA	FA	QA	DA	EA
DN80	PB	FB	QB	DB	EB
DN100	PC	FC	QC	DC	EC
DN125	PD	FD	QD	DD	ED
DN150	PE	FE	QE	DE	EE
DN200	PF	FF	QF	DF	EF
DN250	PG	FG	QG	DG	EG

FO 不选　FX 特殊定制　　FO Not selected FX Specially customized

法兰选配/材料
Flange selection/material

不选 Not selected	FO		
特殊定制 Specially customized	FX		

传感器/材料
Sensor/material

(H)螺纹　G½A/不锈钢(304/316L) (H) Thread G½A/stainless steel(304/316L)	QG	
(J)螺纹　G½A/不锈钢(304/316L)/温度(-60-250)℃ (J) Thread G½A/stainless(304/316L)/temperature(-60-250)℃	SG	
(I)螺纹　G½A/不锈钢(304/316L)/(带吹扫) (I) Thread G½A/Stainless steel(304/316L)/(With blowing)	XX	

防爆形式
Anti-explosion type

标准型(非防爆)电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC	P
本安型（ExiaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC	I
本安型+隔爆型（Exd iaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC	D

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TKWL-1106						
现场显示/编辑 **Status display/edition**						
带With	B					
不带Without	X					
电缆进线 **Cable inlet wire**						
M20*1.5		M				
½NPT		N				
外壳/防护等级 **Shell/protection grade**						
铝/IP67 Aluminum/IP67			L			
塑料/IP66 Plastics/IP66			P			
不锈钢/IP67 Stainless steel/IP67			Q			
电子组件 **Electronic building bricks**						
24V（4~20）mA/HART两线制 24V（4~20）mA/HART Two-wire system				A		
(4~20）mA/2V DC/Modbus两线制 (4~20）mA/2V DC/Modbus Two-wire system				B		
220V AV/Modbus四线制 220V AV/Modbus Four-wire system				C		
密封/过程温度 **Sealing/process temperature**						
Viton(-60~150)℃					1	
Kalrez(-60~250)℃					2	
石墨(-60~400)℃ Graphite（-60~400）℃					3	

天线形式/材料 **Antenna forms/materials**	
喇叭天线 ϕ48mm/不锈钢316L Horn antenna φ48mm/stainless steel 316L	TA
喇叭天线 ϕ78mm/不锈钢316L Horn antenna φ78mm/stainless steel 316L	TB
喇叭天线 ϕ98mm/不锈钢316L Horn antenna φ98mm/ stainless steel 316L	TC
喇叭天线 ϕ123mm/不锈钢316L Horn antenna φ123mm/ stainless steel 316L	TD
喇叭天线 ϕ48mm/不锈钢316L/PTFE(PP)防尘罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) dust cover	SA
喇叭天线 ϕ78mm/不锈钢316L/PTFE(PP)防尘罩 Horn antenna φ78mm/ stainless steel 316L/PTFE(PP) dust cover	SB
喇叭天线 ϕ98mm/不锈钢316L/PTFE(PP)防尘罩 Horn antenna φ98mm/ stainless steel 316L/PTFE(PP) dust cover	SC
喇叭天线 ϕ123mm/不锈钢316L/PTFE(PP)防罩 Horn antenna φ123mm/ stainless steel 316L//PTFE(PP) dust cover	SD
喇叭天线 ϕ48mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) corrosion cover	WA
喇叭天线 ϕ78mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ48mm/ stainless steel 316L/PTFE(PP) corrosion cover	WB
喇叭天线 ϕ98mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ98mm/ stainless steel 316L/PTFE(PP) corrosion cover	WC
喇叭天线 ϕ123mm/不锈钢316L/PTFE(PP)防腐罩 Horn antenna φ123mm/ stainless steel 316L/PTFE(PP) corrosion cove	WD
特殊定制 Specially customized	XX

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法兰选配/材料
Flange selection/material

规格、材料 Specification, material	PP	PTFE	不锈钢 Stainless steel	万向（PP） Direction (PP)	万向节（不锈钢） Cardan joint (stainless steel)
DN50	PA	FA	QA	DA	EA
DN80	PB	FB	QB	DB	EB
DN100	PC	FC	QC	DC	EC
DN125	PD	FD	QD	DD	ED
DN150	PE	FE	QE	DE	EE
DN200	PF	FF	QF	DF	EF
DN250	PG	FG	QG	DG	EG

FO 不选　FX 特殊定制　　FO Not selected FX Specially customized

法兰选配/材料
Flange selection/material

不选 Not selected	FO		
特殊定制 Specially customized	FX		

传感器/材料
Sensor/material

(H)螺纹　G½A/不锈钢(304/316L) (H) Thread G½A/stainless steel(304/316L)	QG	
(J)螺纹　G½A/不锈钢(304/316L)/温度(-60-250)℃ (J) Thread G½A/stainless(304/316L)/temperature(-60-250)℃	SG	
(I)螺纹　G½A/不锈钢(304/316L)/(带吹扫) (I) Thread G½A/Stainless steel(304/316L)/(With blowing)	XX	

防爆形式
Anti-explosion type

标准型(非防爆)电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC	P
本安型（ExiaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC	I
本安型+隔爆型（Exd iaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC	D

注：标配法兰大小参照GB/T9119-2000 PN1.6MPa尺寸，厚度为15mm
Note: The size of the standard flange refers to the size of GB/T9119-2000 PN1.6MPa, whose thickness is 15mm

TKWL-1200系列智能型雷达物位计

TKWL -1200 Series Intelligent Radar Level Meter adfa

产品概述

TKWL-1200系列物位计是先进的雷达式物位测量仪表，测量距离最大35米，可以用于存储罐、中间缓冲罐或过程容器的物位测量，输出4~20mA模拟信号。

Products Introduction

TKWL-1200 series sensor is advanced material level measuring instrument of radar type with maximum measuring distance of 35 meters, which can be applied to material level measurement for storage tank, intermediate buffer tank or process container and outputs 4~20mA analog signal.

特点

●采用先进的非接触式测量
●采用极其稳定的材料制造
●测量液体、固体介质的物位
●可以测量所有介电常数＞1.8的介质
●测量范围0~20m(可以扩展到35米)
●采用两线制、回路供电的技术，供电电压和输出信号通过一根两芯电缆传输
●4~20mA输出或数字型信号输出
●分辨率1mm
●不受噪音、蒸汽、粉尘、真空等工况影响
●不受介质密度、粘稠度和温度的变化的影响
●过程压力可达4MPa
●过程温度可达250℃

Characteristics

●Adopt the advanced non-contact measurement
●Manufactured with the extremely stable material
●Measure the material level of liquid and solid medium
●Can measure all mediums with dielectric constant＞1.8
●Measuring range 0~20m (can be extended to 35 meters)
●Adopt technologies of two wire system and loop power supply, voltage of power supply and output signal can be transmitted by two-core cable
●4~20mA output or digital signal output
●Resolution 1mm
●Not affected by noise, steam, dust, vacuum and other working conditions
●Not affected by medium density, viscosity and changes of temperature
●Process pressure can reach 4MPa
●Process temperature can reach 250℃

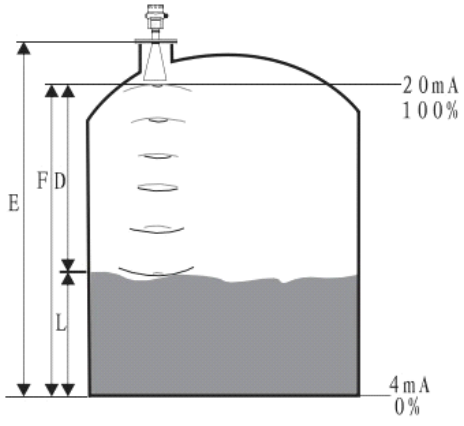
原理

6.8G高频微波脉冲通过天线系统发射并接收，雷达波以光速运行，运行时间可以通过电子部件被转换成物位信号。一种特殊的时间延伸方法可以确保极短时间内稳定和精确的测量。

即使工况比较复杂的情况下，存在虚假回波，用最新的微处理技术和调试软件也可以准确的识别出物位的回波。

Principle

6.8G high-frequency microwave pulse transmits and receives through antenna system, radar wave operates at the speed of light and the operation time can be converted to material level signal through electronic components. A special time extension method can ensure the stable and accurate measurement in a short time.
Even under the situation of complicated working conditions, virtual echo exists and use the latest micro-processing technology and debug software can identify the echo of material level accurately.



产品款型信息 Product model information

TKWL-1201

 TKWL-1201	应　用 Application	过程条件简单，腐蚀性的液体、浆料、固体比如：污水储罐，酸碱储罐，浆料储罐，固体颗粒，小型储油罐 process conditions are simple, corrosive liquids, pastes and solids, such as sewage tank, acid storage tank, paste storage tank, solid particles, small oil storage tank
	测量范围 Measurement range	20米 20 meters
	过程连接 Process Connection	G11/2螺纹或11/2NPT G11/2 screw thread or 11/2NPT
	介质温度 Medium Temperature	-40~120℃
	过程压力 Process Pressure	-1.0~3bar
	重复性 Repeatability	± 2mm
	精度 Accuracy	< 0.1%
	频率范围 Frequency Range	6.8GHz
	防爆/防护等级 Explosion-proof/ protection Class	Exia IIC T6/IP67
	信 号 输 出 Signal Output	4~20mA/HART(两线) 4~20mA/HART (two-wire)

 TKWL-1202	应　用 Application	存储或过程容器腐蚀性的液体、浆料、固体比如：水液储罐,酸碱储罐,浆料储罐,固体颗粒,小型储油罐 store or process container corrosive liquids, pastes and solids, such as water tank, acid storage tank, paste storage tank, solid particles and small oil storage tank
	测量范围 Measurement range	20米 20 meters
	过程连接 Process Connection	法兰 flange
	介质温度 Medium Temperature	-40~150℃
	过程压力 Process Pressure	-1.0~20bar
	重复性 Repeatability	± 2mm
	精度 Accuracy	< 0.1%
	频率范围 Frequency Range	6.8GHz
	防爆/防护等级 Explosion-proof/ protection Class	Exia IIC T6/IP67
	信 号 输 出 Signal Output	4~20mA/HART(两线) 4~20mA/HART (two-wire)

 TKWL-1203	应　用 Application	适应各种存储容器或过程计量环境，液体、浆料、固体，比如：原油、轻油储罐,原煤、粉煤仓位,挥发性液体储罐,焦碳料位,浆料储罐,固体颗粒 suitable for all kinds of storage containers or process measurement environment, liquids, pastes and solids, for example, crude oil, light oil tank, raw coal, pulverized coal position, volatile liquid storage tank, coke level, paste storage tank, solid particles.
	测量范围 Measurement range	35米 35 meters
	过程连接 Process Connection	法兰 flange
	介质温度 Medium Temperature	-40~250℃
	过程压力 Process Pressure	-1.0~40bar
	重复性 Repeatability	± 2mm
	精度 Accuracy	< 0.1%
	频率范围 Frequency Range	6.8GHz
	防爆/防护等级 Explosion-proof/ protection Class	Exia IIC T6/IP67
	信 号 输 出 Signal Output	4~20mA/HART(两线) 4~20mA/HART (two-wire)

 TKWL-1202	应　用 Application	适用于粉状料，固体颗粒，块状料的测量 suitable for the measurement of powder material, solid particles and bulk material
	测量范围 Measurement range	35米 35 meters
	过程连接 Process Connection	万向法兰 universal flange
	介质温度 Medium Temperature	-40~250℃
	过程压力 Process Pressure	-1.0~3bar
	重复性 Repeatability	± 2mm
	精度 Accuracy	< 0.1%
	频率范围 Frequency Range	6.8GHz
	防爆/防护等级 Explosion-proof/ protection Class	Exia IIC T6/IP67
	信 号 输 出 Signal Output	4~20mA/HART(两线) 4~20mA/HART (two-wire)

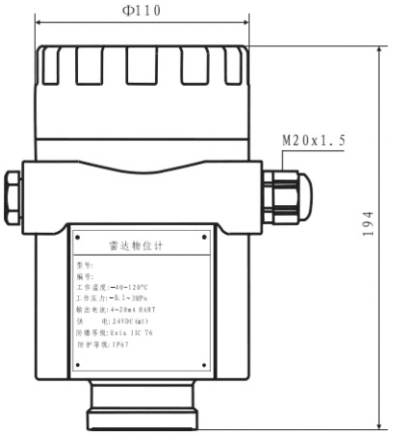
 TKWL-1205	应　用 Application	适用于低介电常数液体和带搅拌器的液体储罐测量 suitable for liquid storage tank measurement with low dielectric constant liquid and liquid with stirrer
	测量范围 Measurement range	0-30米可选 0-30 meters optional
	过程连接 Process Connection	法兰 flange
	介质温度 Medium Temperature	-40~250℃
	过程压力 Process Pressure	-1.0~20bar
	重复性 Repeatability	± 2mm
	精度 Accuracy	< 0.1%
	频率范围 Frequency Range	6.8GHz
	防爆/防护等级 Explosion-proof/ protection Class	Exia IIC T6/IP67
	信 号 输 出 Signal Output	：4~20mA/HART(两线) ：4~20mA/HART (two-wire)

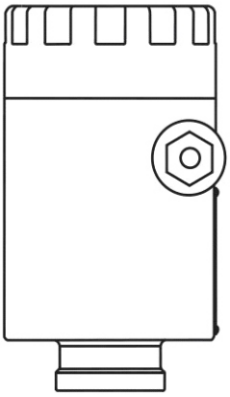
 TKWL-1206	应　用 Application	：适用于高炉料位，较厚罐顶的储罐和安装短管较高的工况测量 ：suitable for measurements for material level of blast furnace, storage tank with thicker tank roof and working conditions with higher short installation tube
	测量范围 Measurement range	：35米 ：35 meters
	过程连接 Process Connection	：法兰 ：flange
	介质温度 Medium Temperature	：-40~250℃
	过程压力 Process Pressure	：-1.0~40bar
	重复性 Repeatability	：± 2mm
	精度 Accuracy	：< 0.1%
	频率范围 Frequency Range	：6.8GHz
	防爆/防护等级 Explosion-proof/ protection Class	：Exia IIC T6/IP67
	信 号 输 出 Signal Output	：4~20mA/HART(两线) ：4~20mA/HART (two-wire)

产品系列尺寸 Dimensions of products series

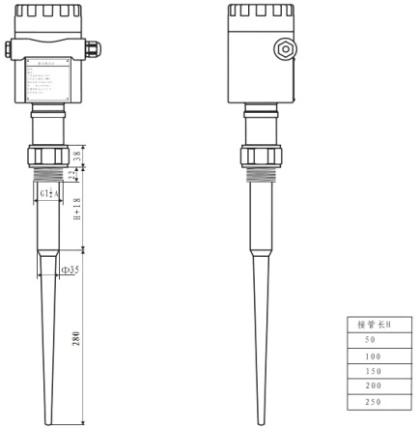
外壳 Shell

材质：AL/316L
Material: AL/316L

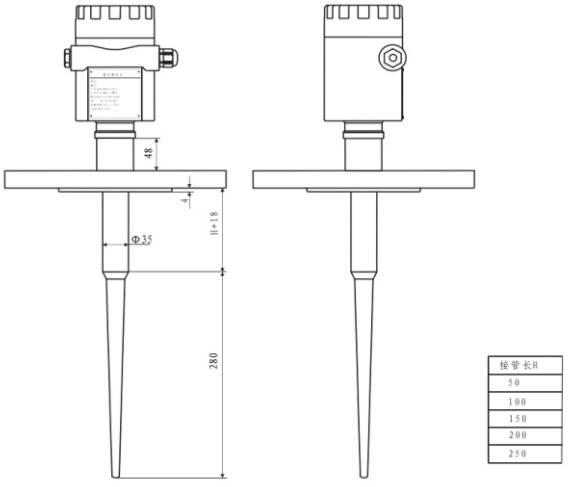




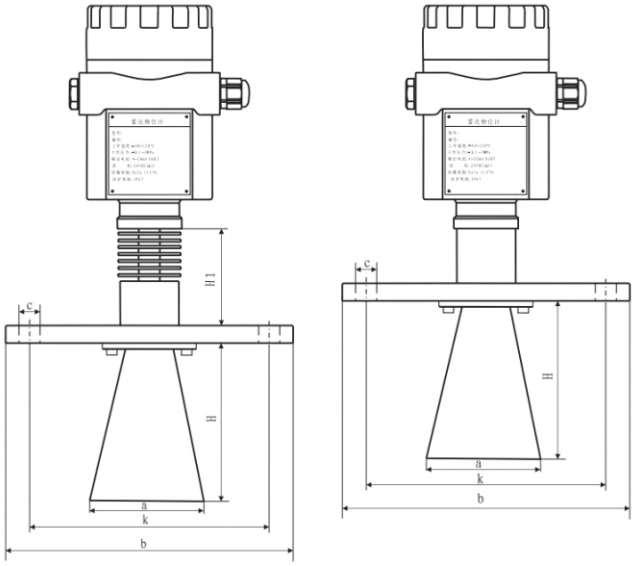
TKWL-1201螺纹型
TKWL-1201 Screw Thread model



TKWL-1202法兰型
TKWL-1202 flange model



TKWL-1202 flange model



	a	k	b	c	H	H1
DN50		Φ125	Φ165	Φ18x4		125
DN80	Φ76	Φ160	Φ200	Φ18x8	75	125
DN100	Φ96	Φ180	Φ220	Φ18x8	120	125
DN150	Φ146	Φ240	Φ285	Φ22x8	205	125
DN200	Φ196	Φ295	Φ340	Φ22x12	296	125
DN250	Φ242	Φ355	Φ405	Φ26x12	380	125

技术参数

基本参数

工作频率：6.8GHz
波 束 角： 24°RD51，Rd52
20°RD53 带DN150法兰
16°RD53 带DN200法兰
14°RD53 带DN250法兰
测量范围：0~35m
重复性 ：±2mm
分辨率 ：1mm
采样 ：回波采样55次/s
响应速度：>0.2s
(根据具体使用情况而定)
电流信号：4~20mA精度
：<0.1%

天线材质

RD51： PP或PTFE
RD52： PTFE
RD53： Stainless steel

通讯接口 HART通讯协议

过程连接

RD51（PP，PTFE棒式天线）：G11/2A或11/2NPT
RD52(PTFE棒式天线）：翻边法兰DN50、DN80、DN100、DN150、DN200、DN250
RD53(喇叭口形式天线)：法兰DN50、DN80、DN100、DN150、DN200、DN250

电源

电源：24V DC(±10%)，波纹电压：1Vpp
耗电量：max22.5mA

环境条件

温度：-40℃~+70℃
容器压力（表压）-1~4MPa

防爆认证 Exia IIC T6

外壳保护等级 Ip67

两线制接线 供电和信号输出共用一根两芯导线

电缆入口 2个M20*1.5或2个1/2NPT（电缆直径5…9mm）

Technical parameter

Basic parameters

Work frequency: 6.8GHz
Beam angle: 24°RD51，Rd52
20°RD53 with DN150 flange
16°RD53 with DN200 flange
14°RD53 with DN250 flange
Measurement range: 0...35m
Repeatability: ±2mm
Resolution: 1mm
Sampling: echo sampling 55 times/s
Response speed: >0.2s
(based on specific situations)
Current signal: 4...20mA
Accuracy: <0.1%

Antenna material

RD51： PP or PTFE
RD52： PTFE
RD53： Stainless steel

Communication interface HART communication protocol

Process connection

RD51 (PP，PTFE rod antenna)： G11/2A or 11/2NPT
RD52(PTFE rod antenna) ： flange DN50、DN80、DN100、DN150、DN200、DN250
RD53(horn form antenna): flange DN50、DN80、DN100、DN150、DN200、DN250

Power

Power: 24V DC(+/-10%), ripple voltage: 1Vpp
Electricity consumption: max22.5mA

Environmental condition

Environmental condition Temperature: －40℃...＋70℃
Container pressure (meter pressure) －1...4MPa

Certification of explosion proof Exia IIC T6

Shell protection class Ip67

Two-wire connection

power supply and signal output use the same two-core wire

Cable entrance

2 M20*1.5 or 2 1/2NPT (cable diameter 5...9mm)

产品选型　Products Selection

TKWL-1201

TKWL-1201								
量程 (mm) **Measuring range**								
编程器 Programmer 带 with　B 不带 without　X								
现场显示 Site display 带 with　V 不带 without　X								
电缆进线 cable entrance M20*1.5　M ½NPT　N								
外壳/防护等级 **Shell/protection class** 塑料/IP65 Plastic/IP65　P 铝/IP67 Aluminum/IP67　L								
容器接管长度Length of container connection tube 50mm　A 100mm　B 150mm　C 200mm　D 250mm　E 特殊约定 Special agreement　Y								
过程连接Process connection 螺纹　G1½A Screw thread G1½A　G 螺纹　1½NPT Screw thread 1½NPT　N 不锈钢法兰 DN50 PN16C型 Stainless steel flange DN50 PN16C model　A 不锈钢法兰 DN80 PN16C型 Stainless steel flange DN80 PN16C model　B 不锈钢法兰 DN100 PN16C型 Stainless steel flange DN100 PN16C model　C 不锈钢法兰 DN150 PN16C型 Stainless steel flange DN150 PN16C model　D 不锈钢法兰 DN200 PN16C型 Stainless steel flange DN200 PN16C model　E 不锈钢法兰 DN250 PN16C型 Stainless steel flange DN250 PN16C model　F								
天线型式/材料/过程温度 **Antenna type/material/process temperature** SP 塑料棒/PP/-40~100℃SP Plastic rod/PP/-40~100℃ SF 塑料棒/PTFE/-40~120℃SF Plastic rod/PTFE/-40~120℃								
防爆 Explosion proof 标准型(非防爆)　电流信号输出(4~20mA)HART协议 Standard (non explosion proof)　Current signal output agreement (4~20mA)HART　P 本安型(Exia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type (Exia IIC T6) Current signal output agreement (4~20mA) HART　I 本安型＋隔爆型(Exd ia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART　D								

TKWL-1202

TKWL-1202									
量程 (mm) **Measuring range**									
编程器 Programmer 带 with B 不带 without X									
现场显示 Site display 带 with V 不带 without X									
电缆进线 cable entrance M20*1.5 M ½NPT N									
外壳/防护等级 **Shell/protection class** 塑料/IP65 Plastic/IP65 P 铝/IP67 Aluminum/IP67 L									
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40-250℃ with radiator P 高温密封/-40~150℃带散热片 High temperature seal /-40~150℃ with cooling fin G									
过程连接Process connection 万向节法兰DN150 Universal flange DN150 D 万向节法兰DN200 Universal flange DN200 E 万向节法兰DN250 Universal flange DN250 F 特殊约定 Special agreement Y									
容器接管长度Length of container connection tube 50mm A 100mm B 150mm C 200mm D 250mm E 特殊约定 Special agreement Y									
天线型式/材料/过程温度 **Antenna type/material/process temperature** SF 塑料棒/PTFE SF Plastic rod/PTFE									
防爆 Explosion proof 标准型(非防爆) 电流信号输出(4~20mA)HART协议 Standard (non explosion proof) Current signal output agreement (4~20mA)HART P 本安型(Exia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type (Exia IIC T6) Current signal output agreement (4~20mA) HART I 本安型+隔爆型(Exd ia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART D									

TKWL-1203

TKWL-1203										
量程 (mm) **Measuring range (mm)**										
编程器 Programmer 带 with B 不带 without X										
现场显示 Site display 带 with V 不带 without X										
电缆进线 cable entrance M20*1.5 M ½NPT N										
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** 塑料/IP65 Plastic/IP65 P 铝/IP67 Aluminum/IP67 L										
密封/过程温度 Seal/process temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator P 高温密封/-40~150℃带散热片 High temperature seal /-40~150℃ with cooling fin G										
天线延长管 Antenna extension tube 无 No 1 200mm 2 300mm 3 400mm 4										
天线型式/材料Antenna type/material 导波管/不锈钢316L Stilling well/stainless steel 316L A 喇叭天线76mm/不锈钢316 Horn antenna 76mm/stainless steel 316 B 喇叭天线96mm/不锈钢316 Horn antenna 96mm/ stainless steel 316 C 喇叭天线146mm/不锈钢316 Horn antenna 146mm/ stainless steel 316 D 喇叭天线196mm/不锈钢316 Horn antenna 196mm/ stainless steel 316 E 喇叭天线242mm/不锈钢316 Horn antenna 242mm/ stainless steel 316 F										
过程连接Process connection 法兰DN50 PN16 C型 Flange DN50 PN16 C model A 法兰DN80PN16 C型 Flange DN80PN16 C model B 法兰DN100PN16 C型 Flange DN100 PN16 C model C 法兰DN150PN16 C型 Flange DN150 PN16 C model D 法兰DN200 PN16 C型 Flange DN200 PN16 C model E 法兰DN250 PN16 C型 Flange DN250 PN16 C model F G21/2A G 特殊约定 Special agreement Y										
防爆 Explosion proof 标准型(非防爆) 电流信号输出(4-20mA)HART协议 Standard (non explosion proof) Current signal output agreement (4-20mA)HART P 本安型(Exia ⅡC T6) 电流信号输出(4-20mA)HART协议 Intrinsically safe type (Exia IIC T6) Current signal output agreement (4-20mA) HART I 本安型+隔爆型(Exd ia ⅡC T6) 电流信号输出(4-20mA)HART协议 Intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4-20mA) HART D										

TKWL-1204

TKWL-1204									
量程 (mm) **Measuring range**									
编程器 Programmer 带 with B 不带 without X									
现场显示 Site display 带 with V 不带 without X									
电缆进线 cable entrance M20*1.5 M ½NPT N									
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** 塑料/IP65 Plastic/IP65 P 铝/IP67 Aluminum/IP67 L									
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator P 高温密封/-40~150℃带散热片 High temperature seal /-40~150℃ with cooling fin G									
天线延长管 Antenna extension tube 无 No A 200mm B 300mm C 400mm D									
过程连接Process connection 万向节法兰DN150 Universal flange DN150 D 万向节法兰DN200 Universal flange DN200 E 万向节法兰DN250 Universal flange DN250 F 特殊约定 Special agreement Y									
防爆 Explosion proof 标准型(非防爆) 电流信号输出(4~20mA)HART协议 Standard (non explosion proof) Current signal output agreement (4~20mA)HART P 本安型(Exia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type (Exia IIC T6) Current signal output agreement (4~20mA) HART I 本安型+隔爆型(Exd ia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART D									

TKWL-1205

TKWL-1205								
量程 (mm) **Measuring range**								
编程器 Programmer 带 with B 不带 without X								
现场显示 Site display 带 with V 不带 without X								
电缆进线 cable entrance M20*1.5 M ½NPT N								
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** 塑料/IP65 Plastic/IP65 P 铝/IP67 Aluminum/IP67 L								
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator P 高温密封/-40~150℃带散热片 High temperature seal /-40~150℃ with cooling fin G								
天线型式/材料Antenna type/material DN50导波管/不锈钢316 DN50 Stilling well /stainless steel 316 A DN80导波管/不锈钢316 DN80 Stilling well / stainless steel 316 B DN100导波管/不锈钢316 DN100 Stilling well / stainless steel 316 C								
过程连接Process connection 法兰DN50 PN16 C型 Flange DN50 PN16 C model A 法兰DN80 PN16 C型 Flange DN80 PN16 C model B 法兰DN100 PN16 C型 Flange DN100 PN16 C model C 特殊约定 Special agreement D								
防爆 Explosion proof 标准型(非防爆) 电流信号输出(4~20mA)HART协议 Standard (non explosion proof) Current signal output agreement (4~20mA)HART P 本安型(Exia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type (Exia IIC T6) Current signal output agreement (4~20mA) HART I 本安型+隔爆型(Exd ia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART D								

TKWL-1206

TKWL-1206										
量程 (mm) **Measuring range**										
编程器 Programmer 带 with B 不带 without X										
现场显示 Site display 带 with V 不带 without X										
电缆接口 Cable interface M20*1.5 M ½NPT N										
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** 塑料/IP65 Plastic/IP65 P 铝/IP67 Aluminum/IP67 L										
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator P 高温密封-40~250℃带散热器 Common seal -40~250℃ G										
天线延长管 Antenna extension tube 1000mm 1 1500mm 2 2000mm 3 2500mm 4 3000mm 5										
天线型式/材料Antenna type/material 喇叭天线146mm/不锈钢316 Horn antenna 146mm/stainless steel 316 D 喇叭天线196mm/不锈钢316 Horn antenna 196mm/stainless steel 316 E 喇叭天线242mm/不锈钢316 Horn antenna 242mm/stainless steel 316 F										
过程连接Process connection 法兰DN150 PN16 C型 Flange DN150 PN16 C model A 法兰DN200 PN16 C型 Flange DN200 PN16 C model B 法兰DN250 PN16 C型 Flange DN250 PN16 C model C 特殊约定 Special agreement D										
防爆 Explosion proof 标准型(非防爆) 电流信号输出(4~20mA)HART协议 Standard (non explosion proof) Current signal output agreement (4~20mA)HART P 本安型(Exia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type (Exia IIC T6) Current signal output agreement (4~20mA) HART I 本安型+隔爆型(Exd ia ⅡC T6) 电流信号输出(4~20mA)HART协议 Intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART D										

TKWL-1300系列导波雷达料位计

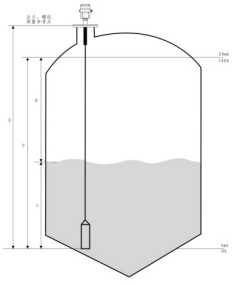
TKWL-1300 series guided wave radar material level meter

概述 Overview

测量原理 Measuring principle

导波雷达是基于时间行程原理的测量仪表，雷达波以光速运行，运行时间可以通过电子部件被转换成物位信号。探头发出高频脉冲并沿缆式探头传播，当脉冲遇到物料表面时反射回来被仪表内的接收器接收，并将距离信号转化为物位信号。

Guided wave radar is a measuring instrument based on the principle of time travel, radar wave operates at the speed of light and the operation time can be converted into material level signal through electronic components. The probe sends out high-frequency pulse and tansmit along with the cable type probe. When pulse reflected back after encountering material surface and received by receiver in the meter, it will convert the distance signal into material level signal.



输入 Input

反射的脉冲信号沿缆绳传导至仪表电子线路部分，微处理器对此信号进行处理，识别出微波脉冲在物料表面所产生的回波。正确的回波信号识别由智能软件完成，距离物料表面的距离D与脉冲的时间行程T成正比： D=C×T/2 其中C为光速。

The reflected pulse signal transmits along the cable into the electronic circuit of meter; microprocessor will process this signal and identify the echo produced by microwave pulse on the surface of material. Correct echo signal identification is accomplished by intelligent software and the distance D to the surface of material and the time travel T of pulse are in the direct ratio: D=C×T/2, in which C is speed of light.

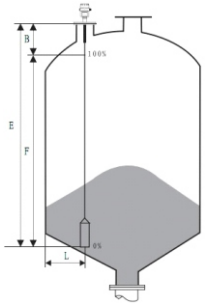
因 空 罐 的 距 离E已 知 ， 则 物 位L为 ： L = E − D

As the distance of empty tank is known, and then the material level L is L=E-D.

输出 Output

通过输入空罐高度E（=零点），满罐高度F（=满量程）及一些应用参数来设定，应用参数将自动使仪表适应测量环境。对应于4~20mA输出。

Through inputing the height of empty tank E (=zero point), the height of full tank F (=full measuing range) as well as some application parameters to set, adapt the meter to measuring environment based on parameters automatically, corresponding to 4—20mA output.



测量范围 Measuring range

测量范围 Measuring range
F----测量范围 measuring range
E----空罐距离 distance of empty tank
B----顶部盲区 top blind area
L----探头到罐壁的最小距离 minimum distance between probe to tank wall
顶部盲区是指物料最高料面与测量参考点之间的最小距离。
Top blind area refers to the minimum distance between the highest material surface and reference point of measurement.
底部盲区是指缆绳最底部附近无法精确测量的一段距离。
Bottom blind area refers to the distance at the bottom of cable which can't be measured accurately.
顶部盲区和底部盲区之间是有效测量距离。
Distance between op blind area and bottom blind area is effective measuring distance.
注意：Attention:
只有物料处于顶部盲区和底部盲区之间时，才能保证罐内物位的可靠测量。
A reliable measurement for the material level in the tank can only be guaranteed when the material is located between top blind area and bottom blind area.

产品款型信息 Products Model Information

TKWL-1301

TKWL-1301

应　　用 Application	液体、固体颗粒 Liquids, solid particles
测 量 范 围 Measurement Range	30米 30 meters
过 程 连 接 Process Connection	螺纹、法兰 Screw thread, flange
过 程 温 度 Process Temperature	-40~250℃
过 程 压 力 Process Pressure	-0.1~2MPa
精　　度 Accuracy±1mm	±1mm
频 率 范 围 Frequency Range	100MHz~1.8GHz
防爆/防护等级 Protection Class	Exia IIC T6/IP67
信 号 输 出 Signal Output	4~20mA/HART (两线) (Two-wire)

TKWL-1302

TKWL-1302

应　　用 Application	液体、固体颗粒 Liquids, solid particles
测 量 范 围 Measurement Range	6米 6 meters
过 程 连 接 Process Connection	螺纹、法兰 Screw thread, flange
过 程 温 度 Process Temperature	-40~250℃
过 程 压 力 Process Pressure	-0.1~2MPa
精　　度 Accuracy±1mm	±1mm
频 率 范 围 Frequency Range	100MHZ-1.8GHZ
防爆/防护等级 Protection Class	Exia IIC T6/IP67
信 号 输 出 Signal Output	4~20mA/HART (两线) (Two-wire)

TKWL-1303

TKWL-1302

应　　用 Application	液体、固体颗粒 Liquids, solid particles
测 量 范 围 Measurement Range	6米 6 meters
过 程 连 接 Process Connection	螺纹、法兰 Screw thread, flange
过 程 温 度 Process Temperature	-40~250℃
过 程 压 力 Process Pressure	-0.1~2MPa
精　　度 Accuracy±1mm	±1mm
频 率 范 围 Frequency Range	100MHZ~1.8GHZ
防爆/防护等级 Protection Class	Exia IIC T6/IP67
信 号 输 出 Signal Output	4~20mA/HART (两线) (Two-wire)

TKWL-1304

TKWL-1304

应　　用 Application	液体 Liquids
测 量 范 围 Measurement Range	6米 6 meters
过 程 连 接 Process Connection	螺纹、法兰 Screw thread, flange
过 程 温 度 Process Temperature	-40-250℃
过 程 压 力 Process Pressure	-0.1-2MPa
精　　度 Accuracy±1mm	±1mm
频 率 范 围 Frequency Range	100MHZ-1.8GHZ
防爆/防护等级 Protection Class	Exia IIC T6/IP67
信 号 输 出 Signal Output	4...20mA/HART（两线） （Two-wire）

TKWL-1305

TKWL-1305

应　　用 Application	腐蚀性液体 Corrosive liquid
测 量 范 围 Measurement Range	杆式6米/缆式20米 Rod type 6 meters/cable type 20 meters
过 程 连 接 Process Connection	法兰 flange
过 程 温 度 Process Temperature	-40~1200℃
过 程 压 力 Process Pressure	-0.1~2MPa
精　　度 Accuracy±1mm	±1mm
频 率 范 围 Frequency Range	100MHz~1.8GHz
防爆/防护等级 Protection Class	Exia IIC T6/IP67
信 号 输 出 Signal Output	4~20mA/HART（两线） （Two-wire）

TKWL-1306

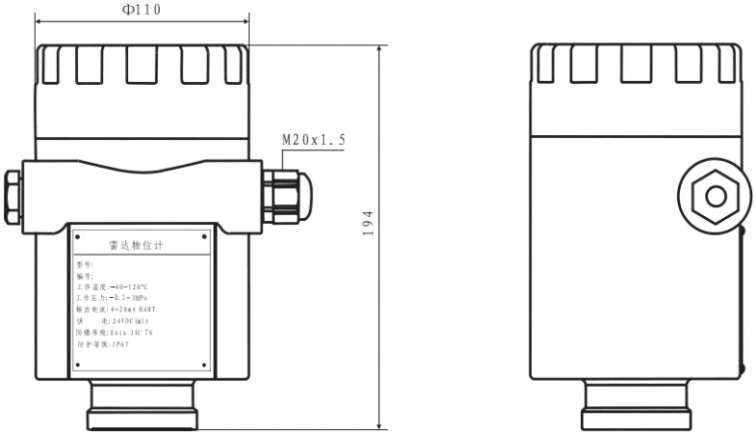
TKWL-1306

应　　用 Application	介电常数低或表面波动液体 Liquid with low dielectric constant or surface fluctuation
测 量 范 围 Measurement Range	6米 6 meters
过 程 连 接 Process Connection	法兰 flange
过 程 温 度 Process Temperature	-40~250℃
过 程 压 力 Process Pressure	-0.1~2MPa
精　　度 Accuracy±1mm	±1mm
频 率 范 围 Frequency Range	100MHz~1.8GHz
防爆/防护等级 Protection Class	Exia IIC T6/IP67
信 号 输 出 Signal Output	4~20mA/HART（两线） （Two-wire）

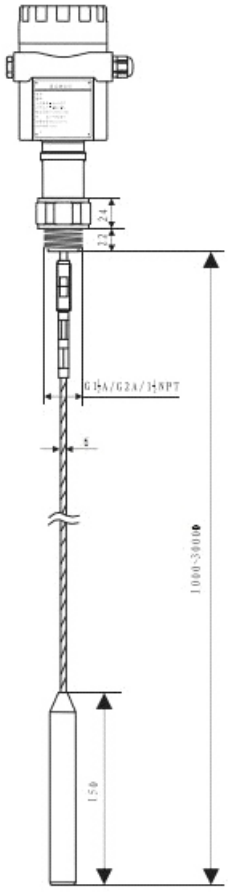
产品系列尺寸 Dimensions of products series

外壳 Shell

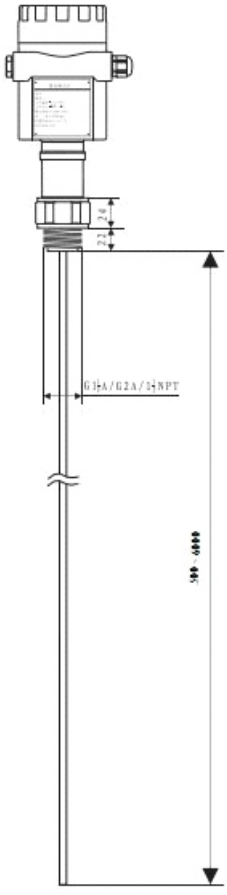
材质：AL/316L
Material: AL/316L



缆式 Cable type



杆式 Bar type



技术参数 Technical Parameters

参数 Parameters	工作频率: 100MHz~1.8GHz Working efficiency: 100MHz~1.8GHz
	测量范围:缆式：0~30m;杆式、双杆式、同轴管式：0~6m; Working efficiency: 100MHz~1.8GHz
	重复性：±2mm Repeatability: ±2mm
	分辨率：1mm Resolution: 1mm
	采样：回波采样55 次/s Sampling: echo sampling 55 times/s
	响应速度：>0.2S（根据具体使用情况而定） Sampling: echo sampling 55 times/s
	输出电流信号：4~20mA Output current signal: 4~20mA
	精度：<0.1% Accuracy: <0.1%
	通讯接口：HART通讯协议 Accuracy: <0.1%
	过程连接: G11/2A螺纹 Process connection: screw thread
	法兰（flange）DN50，DN80，DN100，DN150，DN200,DN250
	过程压力: -0.1~2MPa Process pressure: -0.1~2MPa
	电源：24VDC(±10%),纹波电压：1Vpp Power: 24VDC(±10%), ripple voltage: 1Vpp
	耗电量：max 22.5mA Electricity consumption: max 22.5mA
	环境条件：温度-40℃～+70℃ Environmental condition: temperature -40℃～+70℃
	外壳防护等级: IP67 Environmental condition: temperature -40℃～+70℃
	防爆等级： EXia IIC T6 Explosion proof class: EXia IIC T6
	两线制接线：仪表供电和信号输出共用一根两芯屏蔽电缆线 Two wire connection: power supply of meter and signal output use the same two-core cable.
	电缆入口：2个M20*1.5或1/2NPT(电缆直径5--9mm) Cable entrance: 2 M20*1.5 or 1/2NPT (diameter of cable 5-9mm)

测量距离 Measuring distance

下表列出不同类别被测介质与测量距离的关系

The intelligent float liquid level meter is made up of a float, an indicator and a sensor, as shown in the figure:

介质分组 Medium Group	DK(ε)	固体颗粒 Solid particle	液体 Liquid	测量范围 Measuring Range
	1.4~16		冷凝气，如N2CO2 Condensing gas, such as N2CO2	3m（仅指同轴杆式探头） 3m(only refers to coaxial rod probe)
	1.6~19	塑料带粒子 白灰石，特种水泥 糖 Plastic belt particles Lime stone, special cement Sugar	液化气，如丙烷 溶剂 氟利昂12/氟利昂 棕榈油 Liquefied petroleum gas, such as propane Solution Freon 12/Freon Palm oil	30m
	1.9~25	普通水泥，石膏 Common cement, gypsum	矿物油，燃料 Mineral oil, fuel	30m
	2.5~4	谷物,种子 石头 砂粒 Grain, seed Stone Sand	苯，苯乙烯，甲苯 呋喃 萘 Benzene, styrene, toluene Furane naphthalene	30m
	4~7	潮湿的石头，矿石 盐 Wet rock, ore Salt	含水液体 酒精 液氮 Liquid with water Alcohol Liquid ammonia 30m	30m
	>7	金属粉末 碳黑 煤炭 Metal powder Carbon black Coal	氯苯，氯仿 纤维素喷雾 异氰盐酸，本胺 Benzene, chloroform Cellulose spray ISO cyanide, the amine	30m

产品选型 Products Selection

TKWL-1301

TKWL-1301											
探头类型 **Probe Model** 6mm杆式探头 6mm cable type probe											
最大量程 **Maximum Meauring Range** 30000mm											
材质 **Material** 不锈钢 Stainless steel											
探头长度(mm) length of probe											
编程器 Programmer 带 with 不带 without					B X						
现场显示 Site display 带 with 不带 without						V X					
电缆接口 Cable interface M20*1.5 ½NPT							M N				
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** 塑料/IP65 Plastic/IP65 铝/IP67 Aluminum/IP67								P L			
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator 高温密封-40~250℃带散热器 Common seal -40~250℃									P G		
一体化过程连接/材质 **Integrated process connection/materia** 法兰DN50 PN16C 不锈钢 Flange DN50 PN16C Stainless Steel 法兰DN80 PN16C 不锈钢 Flange DN80 PN16C Stainless Steel 法兰DN100 PN16C 不锈钢 Flange DN100 PN16C Stainless Steel 法兰DN150 PN16C 不锈钢 Flange DN150 PN16C Stainless Steel 法兰DN200 PN16C 不锈钢 H Flange DN200 PN16C Stainless Steel 特殊约定 Special agreement										C D E F H Y	
防爆 Explosion proof 非防爆型（普通型）电流信号输出（4~20mA）HART协议 Non explosion proof type (common type) Current signal output agreement (4~20mA) HART 本安防爆型（Exia IIC T6） 电流信号输出（4~20mA）HART协议 intrinsically safe explosion proof type (Exia IIC T6) Current signal output agreement (4~20mA) HART D 本安型＋隔爆型(Exd ia ⅡC T6)电流信号输出(4~20mA)HART协议 D intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART											P I D

TKWL-1302

TKWL-1302											
探头类型 **Probe Model** 10mm杆式探头 10mm cable type probe											
最大量程 **Maximum Meauring Range** 6000mm											
材质 **Material** 不锈钢 Stainless steel											
探头长度(mm) length of probe											
编程器 Programmer 带 with 不带 without					B X						
现场显示 Site display 带 with 不带 without						V X					
电缆接口 Cable interface M20*1.5 ½NPT							M N				
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** 塑料/IP65 Plastic/IP65 铝/IP67 Aluminum/IP67								P L			
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator 高温密封-40~250℃带散热器 Common seal -40~250℃									P G		
一体化过程连接/材质 **Integrated process connection/materia** G1 1/2A 螺纹 screw thread 不锈钢Stainless Steel N 1 1/2NPT 螺纹 screw thread 不锈钢Stainless Steel C Flange 法兰 DN50 PN16C 不锈钢Stainless Steel D Flange 法兰 DN80 PN16C 不锈钢Stainless Steel E Flange 法兰 DN100 PN16C 不锈钢Stainless Steel F Flange 法兰 DN150 PN16C 不锈钢Stainless Steel 特殊约定 Special agreement										G N C D E F Y	
防爆 Explosion proof 非防爆型（普通型）电流信号输出（4~20mA）HART协议 Non explosion proof type (common type) Current signal output agreement (4~20mA) HART 本安防爆型（Exia IIC T6） 电流信号输出（4~20mA）HART协议 intrinsically safe explosion proof type (Exia IIC T6) Current signal output agreement (4~20mA) HART D 本安型＋隔爆型(Exd ia ⅡC T6)电流信号输出(4~20mA)HART协议 D intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART											P I D

TKWL-1303

TKWL-1303											
探头类型 **Probe Model** 6mm杆式探头 6mm cable type probe											
最大量程 **Maximum Meauring Range** 30000mm											
材质 **Material** 不锈钢（法兰安装） Stainless steel (flange installation)											
探头长度(mm) length of probe											
编程器 Programmer 带 with 不带 without					B X						
现场显示 Site display 带 with 不带 without						V X					
电缆接口 Cable interface M M20*1.5 N ½NPT							M N				
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** P 塑料/IP65 P Plastic/IP65 L 铝/IP67 L Aluminum/IP67								P L			
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator 高温密封-40~250℃带散热器 Common seal -40~250℃									P G		
一体化过程连接/材质 **Integrated process connection/materia** D Flange 法兰DN80 PN16C 不锈钢Stainless Steel E Flange 法兰DN100 PN16C 不锈钢Stainless Steel Flange 法兰DN150 PN16C 不锈钢Stainless Steel Flange 法兰DN200 PN16C 不锈钢Stainless Steel Flange 法兰DN250 PN16C 不锈钢Stainless Steel 特殊约定 Special agreement										D E F H K Y	
防爆 Explosion proof 非防爆型（普通型）电流信号输出（4~20mA）HART协议 Non explosion proof type (common type) Current signal output agreement (4~20mA) HART 本安防爆型（Exia IIC T6） 电流信号输出（4~20mA）HART协议 intrinsically safe explosion proof type (Exia IIC T6) Current signal output agreement (4~20mA) HART D 本安型＋隔爆型(Exd ia ⅡC T6)电流信号输出(4~20mA)HART协议 D intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART											P I D

TKWL-1304

TKWL-1304											
探头类型 **Probe Model** 10㎜双杆式探头 10mm double rod type probe											
最大量程 **Maximum Meauring Range** 6000mm											
材质 **Material** 不锈钢（法兰安装） Stainless steel (flange installation)											
探头长度(mm) length of probe											
编程器 Programmer 带 with 不带 without					B X						
现场显示 Site display 带 with 不带 without						V X					
电缆接口 Cable interface M M20*1.5 N ½NPT							M N				
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** P 塑料/IP65 P Plastic/IP65 L 铝/IP67 L Aluminum/IP67								P L			
密封温度Seal temperature 普通密封-40~100℃ High temperature seal -40~250℃ with radiator 高温密封-40~250℃带散热器 Common seal -40~250℃									P G		
一体化过程连接/材质 **Integrated process connection/materia** D Flange 法兰DN80 PN16C 不锈钢Stainless Steel E Flange 法兰DN100 PN16C 不锈钢Stainless Steel Flange 法兰DN150 PN16C 不锈钢Stainless Steel Flange 法兰DN200 PN16C 不锈钢Stainless Steel Flange 法兰DN250 PN16C 不锈钢Stainless Steel 特殊约定 Special agreement										D E F H K Y	
防爆 Explosion proof 非防爆型（普通型）电流信号输出（4~20mA）HART协议 Non explosion proof type (common type) Current signal output agreement (4~20mA) HART 本安防爆型（Exia IIC T6） 电流信号输出（4~20mA）HART协议 intrinsically safe explosion proof type (Exia IIC T6) Current signal output agreement (4~20mA) HART D 本安型＋隔爆型(Exd ia ⅡC T6)电流信号输出(4~20mA)HART协议 D intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART											P I D

TKWL-1305

TKWL-1305											
探头类型 **Probe Model** 14mm双杆式探头 14mm double rod type probe											
最大量程 **Maximum Meauring Range** 6000mm											
材质 **Material** 不锈钢（法兰安装） Stainless steel (flange installation)											
探头长度(mm) length of probe											
编程器 Programmer 带 with 不带 without					B X						
现场显示 Site display 带 with 不带 without						V X					
电缆接口 Cable interface M M20*1.5 N ½NPT							M N				
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** P 塑料/IP65 P Plastic/IP65 L 铝/IP67 L Aluminum/IP67								P L			
密封温度Seal temperature 普通密封-40~100℃ Common seal -40~100℃									P		
一体化过程连接/材质 **Integrated process connection/materia** Flange法兰DN50 PN16C 不锈钢 Stainless steel Flange法兰DN80 PN16C 不锈钢 Stainless steel Flange法兰DN100 PN16C 不锈钢 Stainless steel Flange法兰DN150 PN16C 不锈钢Stainless steel 特殊约定 Special agreement										C D E F Y	
防爆 Explosion proof 非防爆型（普通型）电流信号输出（4~20mA）HART协议 Non explosion proof type (common type) Current signal output agreement (4~20mA) HART 本安防爆型（Exia IIC T6） 电流信号输出（4~20mA）HART协议 intrinsically safe explosion proof type (Exia IIC T6) Current signal output agreement (4~20mA) HART D 本安型＋隔爆型(Exd ia ⅡC T6)电流信号输出(4~20mA)HART协议 D intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART											P I D

TKWL-1306

TKWL-1306										
探头类型 **Probe Model** 同轴管式探头 Maximum Meauring Range										
最大量程 **Maximum Meauring Range** 6000mm										
材质 **Material** 不锈钢（法兰安装） Stainless steel (flange installation)										
探头长度(mm) length of probe										
编程器 Programmer 带 with 不带 without				B X						
现场显示 Site display 带 with 不带 without					V X					
电缆接口 Cable interface M M20*1.5 N ½NPT						M N				
外壳/防护等级/天线防护等级 **Shell/protection class/antennaprotection class** P 塑料/IP65 P Plastic/IP65 L 铝/IP67 L Aluminum/IP67							P L			
密封温度Seal temperature 高温密封-40~250℃带散热器 High temperature seal -40~250℃ with radiator 普通密封-40~100℃ Common seal -40~100℃								P G		
一体化过程连接/材质 **Integrated process connection/materia** Flange法兰DN50 PN16C 不锈钢 Stainless steel Flange法兰DN80 PN16C 不锈钢 Stainless steel Flange法兰DN100 PN16C 不锈钢 Stainless steel Flange法兰DN150 PN16C 不锈钢Stainless steel 特殊约定 Special agreement									C D E F Y	
防爆 Explosion proof 非防爆型（普通型）电流信号输出（4~20mA）HART协议 Non explosion proof type (common type) Current signal output agreement (4~20mA) HART 本安防爆型（Exia IIC T6） 电流信号输出（4~20mA）HART协议 intrinsically safe explosion proof type (Exia IIC T6) Current signal output agreement (4~20mA) HART D 本安型＋隔爆型(Exd ia ⅡC T6)电流信号输出(4~20mA)HART协议 D intrinsically safe type+ isolating explosion type (Exd ia ⅡC T6) Current signal output agreement (4~20mA) HART										P I D

TKWL-1500射频导纳物位计

TKWL-1500 Radio Frequency Admittance Material level meter

概述

TKWL-1500系列为通用型物位仪表,用于连续物位测量，产品应用于工矿现场，适用于大多数应用场合。仪表由一个电路单元一套防爆外壳和杆式或缆式传感元件组成、传感器有很多种型号可选，仪表可选整体或分体安装。

测量原理

射频导纳是一种从电容式发展起来的、防挂料，更可靠、更准确、适用性更广的新型物位控制技术，是电容式物位计的升级。所谓射频导纳，导纳的含义为电学中阻抗的倒数，它由电阻性成分，电容性成分，感性成分综合而成，而射频即高频无线电波谱，所以射频导纳可以理解为用高频无线电波测量导纳。仪表工作时，仪表传感器与罐壁及被测介质形成导纳值。物位变化时，导纳值相应变化。电路单元将被测导纳值转换成物位信号输出，实现物位测量。

特点

1.通用性强：可测量液位及料位，可满足不同温度，压力，介质的测量要求，并可应用于腐蚀、冲击等恶劣场合。
2.防挂料：独特的电路设计和传感器结构，使其测量可以不受传感器挂料影响，无需定期清洁，避免误测量。
3.免维护：测量过程无可动部件，不存在机械部件损坏问题，无需维护。
4.抗干扰：接触式测量，抗干扰能力强，可克服蒸汽，泡沫及搅拌对测量的影响。
5.准确可靠：测量多样化，使测量更加准确，测量不受环境变化影响，稳定性高，使用寿命长。

典型应用

导电、绝缘液体-化工、油田、水及污水处理
导电、绝缘浆体-造纸、制药、水及污水处理
粉沫：灰、粉-电厂、冶金、水泥
颗粒：煤、粮食-电厂、冶金、粮食
界面：不同两种液体-油田、化工

性能指标

输出：4~20mA（两线制）+HART
输出方式：物位方式或距离方式
精度：0.5级
环境温度：-40~70℃
介质温度：-100~260℃
最大负载：24VDC350Ω
负载影响：0.2%（0-最大负载）
响应时间：＜0.5s（标准）0.5~30s（可调）
量程：最大1500PF，最大距离100m（不同传感器最大量程不同）
火花防护（对传感器）：内置火花防护电路
电气接口：M20×1.5
电缆：分体式电子单元与传感器之间的专用连接电缆标准5m，最长50m
过程连接：NPT螺纹安装（标准）
法兰安装（可选）
外壳防护：IP66
防爆：ExdiaIICT4

Summary

TKWL-1500 series are universal material level meters used for continuous material level measurement, which have been widely applied to industrial and mining sites and also most application occasions. The meter is composed of one circuit unit, one set of explosion-proof shell and rod type or cable type sensing component; there are numerous sensor models for choice and the meter can be installed completely or partially.

Meaurement principle

Radio frequency admittance is a new material lelvel control technology, developed from capacitor type, anti-hanging material, more reliable, more accurate and with more extensive applicability. For radio frequency admittance, the meaning of admittance is reciprocal of electrical impedance, which is composed of resistive component, capacitive component and perceptual component comprehensively, while the radio frequency refers to high-frequency radio wave frequency, so the radio frequency admittance can also be understood as using high-frequency radio wave to measure admittance. When meter works, meter sensor and tank wall as well as measured medium form admittance value. When material level changes, the admittance value will also change accordingly. Circuit unit converts the measured admittance value into material level signal and outputs it to realize measurement for material level.

Characteristics

1. Strong generality: can measure liquid level and material level, can meet measurement requirments of different temperatures, pressures and mediums and can be applied to corrosion and attack and other severe situations.
2. Anti-hanging material: unique circuit design and sensor structure male the measurement not affected by hanging-material of sensor; there is no need to clean regularly and avoid error measurement.
3. Maintenance free: there is no moving part during measurement process, problem of parts damage does not exist and no need to maintaim.
4. Anti-interference: contact measurement, with strong interference ability, can get over the influence of steam, foam and stirring on measurement.
5. Accurate and reliable: Measurement diversification, which can make the measurement more accurate, the measurement is not affected by change of environment, make it with high stability and long using life.

Classical Application

Electric conduction, insulating liquids-chemical, oil field, water and sewage treatment.
Electric conduction, insulating paste-paper making, pharmacy, water and sewage treatment.
Powder: ash, powder-power plant, metallurgy and cement .
Particles: coal, food-power plant, metallurgy, food.
Interface: two different liquids-oil field, chemical .

Performance Index

Output: 4~20mA(two wire system)＋HART
Output method: way of material level or way of distance
Accuracy: 0.5 grade
Environmental temperature: -40~70℃
Temperature of medium: -100~260℃
Maximum loading: 24VDC350 Ω
Influence of loading: 0.2% (0-the maximum load)
Response time: ＜0.5s(standard) 0.5~30s(adjustable)
Measuring range: max 1500PF, max distance 100m (different sensors have different measuring distances)
Spark protection (for sensor): built-in spark protection circuit
Electrical interface: M20×1.5
Cable: the standard cable for split electronic unit and sensor is 5m in length, max 50m.
Process connection: NPT screw thread installation (standard)
Flange installation (optional)
Shell protection: Ip66
Explosion proof: ExdiaIICT4

TKWL–1500系列订购信息 TKWL– 1500 series ordering information

TKWL–1500							
探杆形式 **Form of probe rod** 杆式 Rod type 缆式 Cable type	1 2						
测量介质 **Measurement medium** 液体 Liquid 固体 Solid		A B					
过程连接 **Process Connection** 3/4NPT螺纹连接 screw thread connection 其他螺纹连接 other crew thread connections 法兰连接 Flange connection			A 请注明 Please specify				
测量范围 **Meansurement range**							
传感器型号（具体见下表） **Sensor models (as shown in following table)**							
安装形式 **Forms of installation** 一体 Integrated 分体 Split						I R	
防爆 Explosion proof 无防爆 Without explosion proof 带防爆 With explosion proof							E F

TK1300系列传感器选型 TK 1300 series ordering information

型号 Model	温度压力 Temperature /pressure	最大长度 Max. Length	传感器材质 Material of senso	传感器外型 Appearance of sensor	安装尺寸 Dimensions of installation	应用 Application
S21	230℃/3MPa	5m	304SS/TFE	杆式	3/4″NPT	中温中压 一般用导电液体及强腐蚀介质浆体、颗粒. Medium temperature and medium pressure, usually use conductive liquid and strong corrosive medium paste and particle
S22	200℃/3MPa	20m	304SS/FET	φ2.7mm缆式	3/4″NPT	大量程导电液体及强腐蚀介质、界面 Wide range conductive liquid and strong corrosive medium and interface
S23	200℃/2MPa	2m	2m304SS/FET	双电极	法兰	用于低介电常数的液体 Liquid used for low dielectric constant
S24	特殊规格定制 Customized special specifications					

备注：本系列超声波探头还可以根据客户需求定制：耐高压、耐高温、小口径、小盲区等特规探头。

Note: this series of ultrasonic probe can be customized based on customers' needs: high voltage resistance, high temperature resistance, small caliber, small blind area and other special probes.

产品功耗 Product power consumption	分体式用24V电源供电，不带继电器功耗是100mA，带一个继电器是要120mA，2路继电器145mA，3路继电器要170mA，4路继电器要190mA. The split model adopts 24V power supply; power consumption without relay is 100 mA and with relay is 120 mA; power consumption for 2-way relay is 145 mA, 3-way relay is 170 mA and 4-way relay is 190 mA. 具体功率如下： The specific powers are as following: 无继电器是24×100mA=2.4W; Without relay is 24×100mA=2.4W; 1路继电器是24×120mA=2.9W；2路继电器是24×145mA=3.5W; One-way relay is 24×120mA=2.9W；two-way relay is 24×145mA=3.5W; 3路继电器是24×170mA=4.1W；2路继电器是24×190mA=4.6W; Three-way relay is 24×170mA=4.1W； two-way relay is 24×190mA=4.6W;
产品功耗 Product power consumption	一体式四线制用24V电源供电，不带继电器功耗是80mA，带一个继电器是要105mA，2路继电器130mA， Integrated four-wire system adopts 24V power supply, power consumption without relay is 80 mA, with relay is 105 mA and two-way relay is 130 mA. 具体功率如下： The specific powers are as following: 无继电器是24×80mA=1.9W; Without relay is 24×80mA=1.9W; 1路继电器是24×105mA=2.5W；2路继电器是24×145mA=3.1W; One-way relay is 24×105mA=2.5W；two-way relay is 24×145mA=3.1W;
产品功耗 Product power consumption	一体式二线制用24V电源供电，不能带继电器，功耗是30mA。 具体功率如下： 无继电器是24×30mA=0.72W; Integrated two-wire system adopts 24V power supply; the power supply without relay is 30mA. The specific power is as following: Without relay is 24×30mA=0.72W;

TKWL-1600系列超声波物位计

TKWL-1600 series ultrasonic level meter

概述

超声波物位计（测量料位，液位），是一种非接触式、高可靠性、高性价比、易安装维护的物位测量仪器。它不必接触介质就能满足大部分物位测量要求，是我们公司经过多年努力开发，拥有完全自主产权的新一代超声波物位计。

Summary

Ultrasonic level meter (measure material level and liquid level) is a non-contact measuring device for material level with high reliability, high cost performance and easy installation and maintenance. It can meet most of requirements for material level measuring without contacting medium, which is a new generation ultrasonic level meter of our company with completely independent property right after years of hardworking and development.

产品介绍 Introduction of products

TKWL-1600 一体式
TKWL-1600 integrated model

TKWL-1600 分体式
TKWL-1600 split model

TKWL-1600一体式防爆式
TKWL-1600 split model

技术参数 Technical parameters

功 能 Functions	一 体 式 Integrated Model	分 体 式 Split model
量 程 Measuring range	5米、10米、15米、20米、30米、40米、50米、60米 5m、10m、15m、20m、30m、40m、50m、60m	5米、10米、15米、20米、30米、40米、50米、60米、70米、 5m、10m、15m、20m、30m、40m、50m、60m、70m
	0.5%~1.0%	0.5%~1.0%
分辨率 Resolution	3mm或0.1%(取大者) 3mm or 0.1% (choose the bigger)	3mm或0.1%(取大者) 3mm or 0.1% (choose the bigger)
显 示 Display	中文液晶显示 LCD in Chinese	中文液晶显示 LCD in Chinese
模拟输出 Analog output	4线制4～20mA/510Ω负载 4 wire system 4～20mA/510Ω loading 2线制4～20mA/250Ω负载 2 wire system 4～20mA/250Ω loading	4～20mA/510Ω负载 4～20mA/510Ω loading
继电器输出 Relay output	可选配2组AC 250V/ 8A或DC 30V/ 5A 状态可编程 2 sets of AC 250V/ 8A or DC 30V/ 5A are optional, state is programmable	（可选配）单通道为2组，双通道是4组AC 250V/ 8A或DC 30V/ 5A 状态可编程 2 sets of single channel are (optional), the double channel is 4 sets of AC 250V/ 8A or DC 30V/ 5A, state is programm -able
供 电 Power supply	标配24VDC Standard: 24VDC 可选 220V AC+15% 50Hz Optional: 220V AC+15% 50Hz	标配220V AC+15% 50Hz Standard: 220V AC+15% 50Hz 可选24VDC 120mA Optional: 24VDC 120m 定做12VDC或电池供电 Customized 12VDC or battery powered
环境温度 Environmental temperature	显示仪表-20～+60℃， Meter display -20～+60℃, 探头-20～+80℃ Probe -20～+80℃	显示仪表-20～+60℃， Meter display -20～+60℃, 探头-20～+80℃ Probe -20～+80℃
通 信 Communication	可选485，232通信（厂家协议） Optional 485, 232 communication (manufacturer agreement)	可选485，232通信（厂家协议） Optional 485, 232 communication (manufacturer agreement)
防护等级 Protection class	显示仪表IP65，探头IP68 Display meter IP65, Probe Ip68	显示仪表IP65, 探头IP68 Display meter IP65, Probe Ip68
探头电缆 Probe cable	无 No	可达100米，标配10米 100m reachable, standard 10m
探头安装 Probe installation	根据量程和探头的选型 Selection based on measuring range and probe	根据量程和探头的选型 Selection based on measuring range and probe

产品选型 Product Selection

TKWL-1600						
	01	结构型式及材料 structure and material				
	FX	新的分体式壳体ABS材质 new split shell in ABS material				
	FL	分体式增强型，铸铝材质strengthened split model in cast aluminum material				
	SK	一体式普通型(最大量程10米，只有4～20mA输出，不带继电器，不带485通信) Integrated ordinary type (max measuring range 10m, with output of 4-20ma only, without relay and without 485 communication)				
	TK68	Ip68防护等级的超声波液位计 Ultrasonic liquid level meter with IP68 protection class				
量程 Measuring range						
	02	具体的量程，用两位数表示，例如：05表示5米，30表示30米。 Specific measuring range, expressed with two digits, such as 05 represents 5 meters and 30 represents 30 meters				
	05	50米量程 50m measuring range				
	70	70米量程 70m measuring range				
传感器外壳 sensor shell						
		A	ABS做传感器外壳 sensor shell in ABS material			
		F	Pe做传感器外壳 sensor shell in PE material			
		F	聚四氟乙烯做传感器外壳sensor shell in PTFE material			
		P	POM做传感器外壳 sensor shell in POM material			
		V	PVDF做传感器外壳 sens shell in PVDF material			
		S	不锈钢做传感器外壳sensor shell in stainless steel material			
		T	特殊材质做传感器外壳 sensor shell in special material			
传感器的安装尺寸 installation dimensions of sensor						
			A	Screw thread螺纹M48×2mm		
			B	Screw thread螺纹M60×2mm		
			C	Screw thread螺纹M78×2mm		
			D	Screw thread螺纹M108×2mm		
			E	Screw thread螺纹M98×2mm		
			F	Screw thread螺纹G1-1/2A, Big diameter大径：Φ47.8m		
			G	Screw thread螺纹G2A Big diameter大径：Φ59.6mm		
			H	Screw thread螺纹1-1/2"NPT Big diameter大径：Φ48.1mm		
			I	Screw thread螺纹2"NPT Big diameter大径：Φ60.1mm		
			T	特殊规格型 special specifications		
安装方式 installation method						
				N	不是法兰安装 installed not with flange	
				B	DN40法兰 flange	
				C	DN50法兰flange	
				D		
				E	DN80法兰flange	
				F	DN100法兰flange	
				G	DN125法兰flange	

H	Dn150法兰flange				
I	Dn200法兰flange				
		加长型探头螺纹长度 length of screw thread of lengthened probe			
		空白表示是标准探头，可以不写 blank refers to standard probe, can not write			
	100	含螺纹长度是100毫米 indicate the length of probe with screw thread is 100mm			
	～				
	999	表示探头含螺纹长度是999毫米indicate the length of probe with screw thread is 999 mm			
		电源、防爆种类 types of power and explosion proof			
		DCSP	特殊供电12VDC、9VDC、电池供电 Special power supply 12VDC、9VDC and battery		
		DC	4线制直流供电非防爆24VDC Four-wire DC power supply without explosion resistance 24VDC		
		AC	4线制交流供电非防爆220VAC Four-wire AC power supply without explosion resistance 220VAC		
		TC	2线制直流供电非防爆24VDC Two-wire DC power supply without explosion resistance 24VDC		
		TCIA	2线制直流供电本安防爆型24VDC Two-wire DC power supply intrinsically safe explosion resistance model 24VDC		
		TCDD	2线制直流供电隔离防爆型24VDC Two-wire DC power supply isolating explosion resistance model 24VDC		
		DCIA	4线制直流供电本安防爆型24VDC Four-wire DC power supply intrinsically safe explosion resistance model 24VDC		
		DCDD	4线制直流供电隔离防爆型24VDC Four-wire DC power supply isolating explosion resistance model 24VDC		
			继电器数量 Quantity of relay		
			R0	没有继电器 without relay	
			R1	1个继电器 one relay	
			R2	2个继电器 two relays	
			R3	3个继电器 three relays	
			R4	4个继电器 four relays	
				输出信号 output signal	
				MA 4～20ma	
				C2 232通讯 communication	
				C4 485通讯 communication	
				C2MA 4～20ma+232通讯communication	
				C4MA 4～20ma+485通讯communication	
				HTMA 4～20ma+HART通讯communication	
				RJ RJ45网卡接口 network interface	
				TS 特殊输出信号 special output signal	
					变送器外壳材质 transmitter shell material
					PL ABS塑料壳体 ABS plastic shell
					Al 铸铝壳体cast aluminum shell
					F4 聚四氟乙烯壳体 PTFE shell
					S4 304不锈钢壳体 304 stainless steel shell
					S6 316不锈钢壳体 316 stainless steel shell
					13 传感器电缆长度，00就是无配套电缆 Length of sensor cable, 00 indicates withou
					01 传感器电缆01米 Sensor cable 01 meter
					～
					200 传感器电缆200米 Sensor cable 200 meters

TKWL–1700系列电容式物位计
TKWL-1700 series capacitance level meter

工作原理

电容式物位计由电容式物位传感器和检测电容的线路组成。其基本工作原理是电容式物位传感器把物位转换为电容量的变化，然后再用测量电容量的方法求知物位数值。

电容式物位传感器是根据圆筒电容器原理进行工作的。其结构如同2个长度为L 、半径分别为R和r的圆筒型金属导体，中间隔以绝缘物质，当中间所充介质是介电常数为ε1的气体时，两圆筒的电容量为：

$$C_1=2\pi\varepsilon_1 L/R/(\ln R/r) \quad (1)$$

如果被测介质为导电性液体时，电极要用绝缘物（如聚乙烯）覆盖作为中间介质，而液体和外圆筒一起作为外电极。假设中间介质的介电常数为ε3，电极被浸没长度为l，则此时电容器所具有的电容量为:

$$C=2\pi\varepsilon_3 L/R/(\ln R/r) \quad (3)$$

其中：R 和r 分别为绝缘覆盖层外半径和内电极外半径。由于ε3 为常数，所以C 与l 成正比。

如果电极的一部分被介电常数为ε2的液体（非导电性的）浸没时，则必须会有电容量的增量△C产生（因ε2>ε1），此时两极间的电容量C=C1+△C。假如电极被浸没长度为l，则电容增量为：

$$\triangle C=2\pi\varepsilon_3 L/R/(\ln R/r) \quad (2)$$

当ε2、 ε1、R、r不变时，电容量增量△C与电极浸没的长度l 成正比，因此测出电容增量数值便可知道液位高度。

电容式物位计液位计在应用中应注意的几个问题

1、选型

由于被测介质的不同，电容式物位传感器有不同的型式。

（1）测量非导电液体的电容物位传感器，当用于较稀的非导电液体（如轻油等）时，可采用一金属电极，外部同轴套上一金属管，相互绝缘固定，以被测介质为中间绝缘物质构成同轴套筒形电容器。

（2）测量导电液体的电容物位传感器，容器（规则）和液体作为电容器的一个电极，插入的金属电极作为另一电极，绝缘套管作为中间介质，三者组成圆筒形电容器。当容器为非导电体时，需另加一个接地极，其下端浸至被测容器底部，上端与安装法兰有可靠的导电连接，以使二电极中有一个与大地及仪表地线相连，保证仪表正常测量。

Working principle

Capacitance level meter is composed of capacitive material level sensor and circuit checking capacitance, whose basic working principle is the change of converting material level into capacitance with capacitive material level sensor, and then calculate the value of material level with the method of measuring capacitance.

Capacitance level meter works based on the principle of cylinder capacitor, whose structure is similar to two cylindrical metal conductors with length of L, radiuses of R and r respectively; the middle is separated with insulating material and when the filled medium in the middle is the gas with dielectric constant of ε1, the capacitance of two cylinders is:

If the measured medium is conductive liquid, the electrode needs to be covered with insulator (such as polyethylene) as intermediate medium, while the liquid and external cylinder are as outer electrodes. Presume the dielectric constant of intermediate medium is ε3 and the immersed length of electrode is 1, and then the capacitance of capacitor is:

In which R and r are outer radius of insulating coating and outer radius of inner electrode. As the ε3 is constant, so C and l are in direct ratio.

If part of electrode is immersed by liquid (non-conductive) with dielectric constant atε2, and then there must be increase of capacitance △C produced (becauseε2>ε1) , now the capacitance between these two electrodes is C=C1+△C. Presume the immersion length of electrode is l, and then the increase of capacitance is:

When ε2, ε1, R, r keep unchanged, the increase of capacitance △C and immersed length of electrode l are in direct ratio, therefore, the liquid level can be gotten after the value of capacitance increase is measured.

A few problems need to be paid attention to during the application of capacitance level meter

1. Selection

Due to the differences of measured medium, capacitance level meter has different models.

(1)When apply the capacitive level sensor of measuring non-conductive liquid to more dilute non-conductive liquid (such as light oil), it can adopt one metal electrode and put a metal tube on external coaxial, mutually insulated and fixed, form coaxial sleeve type capacitor by taking measured medium as intermediate insulating material.

(2)For capacitive level sensor of measuring non-conductive liquid, take container (rule) and liquid as one electrode of capacitor, the inserting metal electrode as another electrode, the insulating tube as intermediate medium, and these three compose cylindrical capacitor. When the container is non-conductive, it needs to add another earth electrode, whose bottom part will be immersed to the bottom of the container and the top part will make reliable electrical connection with installation flange to make one of the electrodes connected with earth and meter ground line and ensure the normal measurement of meter.

（3）当测量粉状非导电固体料位和粘滞性非导电液体液位时，可采用金属电极直接插入圆筒型容器的中央，将仪表地线与容器相连，以容器作为外电极，料或液体作为绝缘介质构成圆筒型电容器。

所以应根据现场实际情况，即被测介质的性质（导电特性、粘滞性）、容器类型（规则/非规则金属罐、规则/非规则非金属罐），选择合适的电容物位计。

2、测量回路中接地点的处理

仪表测量回路中接地点的正确、可靠与否直接影响被测参数的测量。电容物位计对油品精制8个碱液罐进行液面监控，由于碱液罐位于防爆区，所以最初设计测量回路中引入齐纳式输入安全栅（见图1）。

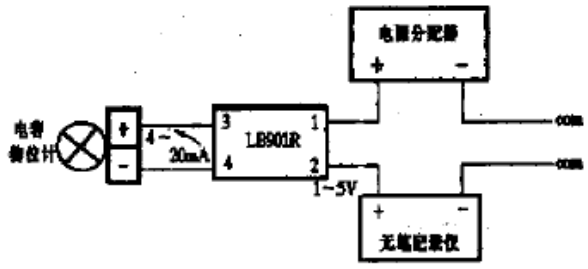


图1 采用齐纳式输入安全栅的系统接线图
Pic. 1 System wiring diagram with adoption of zenner diode safety barrier

安装调试发现，系统无法正常工作：安全栅2端电压高达23V，而变送器（电容物位计）供电电压为0V，也就是说已短路。仔细查找原因，发现是由于电容物位计的电路结构所致。电容物位计的探头为等效电容的一极，对于外壁规则的金属容器，其罐壁为电容的另一极。因此变送器信号负接地，而齐纳栅也接地则变送器被短路。于是将接地COM点悬空，观察到开始时变送器输出在4mA，安全栅2端电压在0.86V，不长时间变为1.6V，7V，变送器工作很不稳定，这是由于COM点悬空，系统回路受外部干扰所致。于是抛开安全栅与COM板，将24V电源直接送到变送器，串入标准电流表检测变送器工作情况，变送器工作正常。得出结论：由于电容物位计信号负与大地（罐壁）相连，因此不能选用齐纳式安全栅。经与厂家协商，选用隔离式安全栅，因为电容物位计与隔离式安全栅已进行系统安全防爆联合取证。选用隔离式安全栅系统接线如图2所示。由于隔离式安全栅的电源、输入、输出信号三者隔离，避免了系统间的相互干扰，以及系统多点接地问题。

(3)When measuring the material level of powder non-conductive solid and the liquid level of viscous non-conductive liquid, can adopt metal electrode to insert into the center of cylindrical container directly, connect the ground line of instrument with container and construct cylindrical capacitor by taking the container as outside electrode, material or liquid as insulating medium.

So it should choose suitable capacitance level meter based on real site situation, that is the property of measured medium (conductivity, viscosity) and type of container (regular/irregular metal tank, regular/irregular non-metal tank).

2. Treatment of ground point in measurement circuit

Whether the ground point in meter measurement circuit is correct and reliable or not affects the measurement of measured parameters. Liquid monitoring for eight soda solution tank of oil refining during overhaul. As the soda solution tank locates at explosion proof area, so it introduces zenner diode safety barrier in the initital design of measurement circuit (as shown in pic.1)

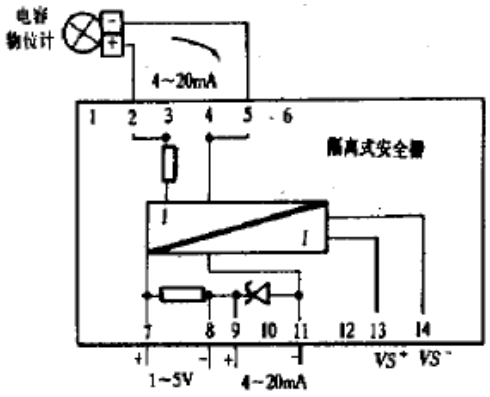


图2 采用隔离式安全栅的系统接线图
Pic. 2 System wiring diagram adopting isolating safety barrier

It is found out during installation and debugging that the system can't work normally: voltage at two ends of safety barrier is as high as 23V, whle the power supply voltage of transmitter (capacitance level meter) is 0V, which means short circuit. After careful checking, it finds out that it is caused by the circuit structure of capacitance level meter. The probe of capacitance level meter is one electrode of equivalence capacitance, for the metal container with regular wall; the tank wall is another electrode of capacitance. Therefore, the signal of transmitter is negative ground, while zenner barrier is grounded, which makes the transmitter become short circuit. Hang the grounding COM point and it is observed that at the beginning stage, the output of transmitter is 4 mA, the voltage at two ends of safety barrier is 0.86V, and then changes into 1.6V, 7V shortly. The transmitter works unsteadily, which is caused by hang of COM point and the system circuit is affected by external disturbance. Therefore, throw off safety barrier and COM plate, send 24V power to transmitter directly, string into standard current meter to examine the working condition of transmitter and the transmitter works normally. It can draw a conclusion that as the negative signal of capacitance level meter is connected with ground (wall of the tank), therefore, it can't adopt zenner diode safety barrier. After negotiation with manufacturer, select isolating safety barrier, because capacitance level meter and isolating safety barrier have made joint forensics for system safety and explosion proof. Selecting isolating safety barrier system wiring is as shown in picture 2. Due to the isolation among power, input and output signal of isolating safety barrier, it avoids the mutual interference between systems as well as multiple points grounding problem of system.

技术参数 Technical parameters

用于高温高压、强腐蚀等介质液位测量。在电力、冶金、食品、酿造、制药、污水处理、锅炉汽包等军工业场合广泛运用。
Used for liquid level measure for mediums of high tempersure, high pressure and strong corrosive characteristics and is widely applied in electric power, metallurgy, food, brewing, pharmaceutical, sewage treatment, boiler drum and other military and industrial occasions.

产品型号 Product Model	TK-1700
测量范围 Measuring Range	0~6m
精　　度 Accuracy	0.5级 0.5 grade
承受范围 Bearing Scope	负压、常压、高压 Negative pressure, normal pressure, high pressure
工作温度 Working temperature	-50~240℃
环境温度 Environmental temperature	-20~75℃
适用介质 Applicable medium	酸、碱、盐或聚氟乙烯无腐蚀的任意介质 Acid, alkali, salt, PTFE, any non-corrosive medium
输出型号 Output signal	4~20mA二线制 4-20 mA two~wire system
供电电源 Power supply	负载电阻0~750Ω DC24V Load resistance 0~750 Ω DC24V
固定方式 Fixation method	螺纹安装M20X1. 5、M27X2，法兰安装DN15、DN25、DN50、DN80特殊规格可定制 Screw installation M20X1.5, M27X2Flange installation DN15, DN25, DN50, DN80 Speical specifications can be customized
现场显示 Site display	铝合金 Aluminum alloy

用于高温高压、强腐蚀等介质液位测量。在电力、冶金、食品、酿造、制药、污水处理、锅炉汽包等军工业场合广泛运用。
Used for liquid level measure for mediums of high tempersure, high pressure and strong corrosive characteristics and is widely applied in electric power, metallurgy, food, brewing, pharmaceutical, sewage treatment, boiler drum and other military and industrial occasions.

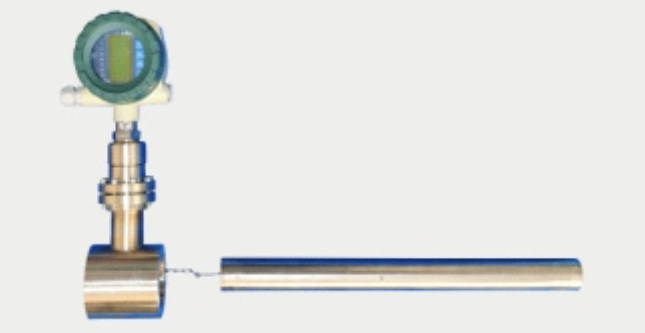
产品型号 Product Model	TK-1701
测量范围 Measuring Range	6~30m
精　　度 Accuracy	0.5级 0.5 grade
承受范围 Bearing Scope	负压、常压、高压 Negative pressure, normal pressure, high pressure
工作温度 Working temperature	-50~240℃
环境温度 Environmental temperature	-20~75℃
适用介质 Applicable medium	酸、碱、盐或聚氟乙烯无腐蚀的任意介质 Acid, alkali, salt, PTFE, any non-corrosive medium
输出型号 Output signal	4~20mA二线制 4~20 mA two-wire system
供电电源 Power supply	负载电阻0~750Ω DC24V Load resistance 0~750 Ω DC24V
固定方式 Fixation method	螺纹安装M20X1. 5、M27X2，法兰安装DN15、DN25、DN50、DN80特殊规格可定制 Screw installation M20X1.5, M27X2Flange installation DN15, DN25, DN50, DN80 Speical specifications can be customized
现场显示 Site display	铝合金 Aluminum alloy

TKWL–1700订购信息 Ordering information for TKWL–1700 capacitance level meter

TKWL–1700						
输出信号 Output signal 4~20mA D 智能 Intelligent S 4~20 MA+HART E						
安装接口 Installation interface 罗纹M20*1.5外 Ribbing M20*1.5 outside 0 罗纹1/2NPT外 Ribbing 1/2NPT outside 1 法兰DN25 FlangeDN25 2 法兰DN40 FlangeDN40 3 法兰DN50 FlangeDN50 4 法兰DN80 FlangeDN80 5 特殊 Special 6						
传感器材质 Sensor material Φ5的软缆 Φ5 Soft cable C1 Φ8的软缆 Φ8 Soft cable C2 Φ14的软缆 Φ14 Soft cable C3 Φ16的软缆 Φ16 Soft cable C4 Φ8的软杆高压 Φ8 Soft rod high pressure C5 特殊规格 Special specification C6						
电气接口 Electrical interface 0:M20*1.5内 within 1:1/2NPT内within						
防爆等级explosion proof class 本安型 Instrinsically safe model I 本安型+隔爆 Instrinsically safe model+isolating explosion P						
长度length						

TKWL–1800电动浮筒液位计

TKWL-1800 Electric Float Liquid Level Meter



概述

智能浮筒液位计依据力平衡原理，在早期浮筒液位计的基础上采用最新的传感结构，使传感器与杠杆机构合二为一，可直接测量浮筒在液体中所受的浮力，很好地解决了静压的影响。本仪表具有耐高温、耐高压的突出特点，为解决高温高压容器内的液位测量提供了良好的方法，并且该仪表具有精度高、可靠性好、调整方便、测量范围广、经久耐用、性能价格比高等优点。适合工艺流程中敞口或带压容器内的液位、界位、密度的连续测量，广泛应用于石油、化工、电力、食品、水利、冶金、热力、水泥和污水处理等行业。该仪表符合二线制4~20mA传输协议，并有本安型、隔爆型、液晶指示型、电池型、Hart型以及多种安装形式，为用户提供了非常广阔的选择空间。另外高质量的电路及传感系统，保证了在各种应用场所的优良性能。

主要特点

1. 三行液晶数字显示。
2. 耐高温高压、抗振性能好、质量稳定、性能可靠。
3. 采用系列化设计，多种安装方式，实用面广，可装于各种储灌和过程罐，各种常压罐和压力容器。
4. 智能化结构设计，具有参数设定、标校及故障提示功能。
5. 标准的二线制 4~20mA 输出，无需专用二次仪表，并可与计算机连接。
6. 具有温度补偿和软件修正功能。
7. 具有去零功能及中间点标校功能。

Overview

According to the principle of equilibrium, based on the earlier float liquid level meter, the intelligent floater liquid level meter adopts the latest sensor structure to make the sensor and the leverage become one, which can directly measure the buoyancy of the float in the liquid, thus well solving the influence of static pressure. This instrument has outstanding features of high temperature and high pressure resistance, which provides a good method to deal with the liquid level measurement inside high-temperature and high pressure vessels. Besides, this instrument is of high precision, good reliability, simple adjustment, wide range of measurement, durable service and high cost performance. It is applicable to the continuous measurement of the liquid level, boundary and density inside the open or pressure vessels in the technological process, so it is widely applied to industries like petroleum, chemical engineering, electricity, food, water conservancy, metallurgy, heating power, cement and sewage treatment. This instrument accords with the two-wire system 4~20mA transport protocol, and it has multiple installation methods like intrinsic safety type, flame-proof type, liquid crystal indication type, battery type and Hart type, thus offering users a wide range of selections. Besides, the high-quality circuit and sensor system guarantees its good performance in various applications.

Main Features

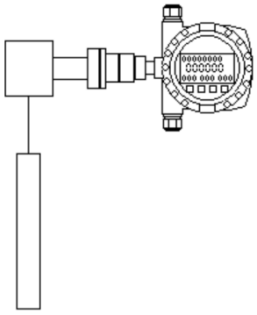
1. Three-line liquid crystal digital display.
2. High temperature and high pressure resistance, good resistance to shock, stable quality and reliable performance.
3. Serialized design, multiple installation methods and wide range of application; it can be installed to various storage tanks, processing tanks, various ordinary pressure tanks and pressure vessels.
4. Intelligent structure design, functions of parameter determination, calibration and malfunction prompt.
5. Standard two-wire 4~20mA output, no need of secondary meters, able to be connected to the computer.
6. Functions of temperature compensation and software revision.
7. Functions of zero-suppression and intermediate point calibration.

结构原理

结构

智能浮筒液位计由浮筒、指示器、传感器三部分组成，如图所示：

(1)液晶指示器
(2)传感器
(3)浮筒



工作原理

浮筒受到液体向上浮力 F 后通过浮力杆将浮力 F 作用到传感器上，如图二所示： 传感器电压输出： 即： V ∝ F 因为浮筒浸没液体的高度与所受到的浮力成正比，因此，浮力的变化通过传感器电压输出就变换成对应的液体高度，并通过 A/D→CPU→D/A 转换成标准的 4~20mA 电流输出， 如图三所示：

Structure Principle

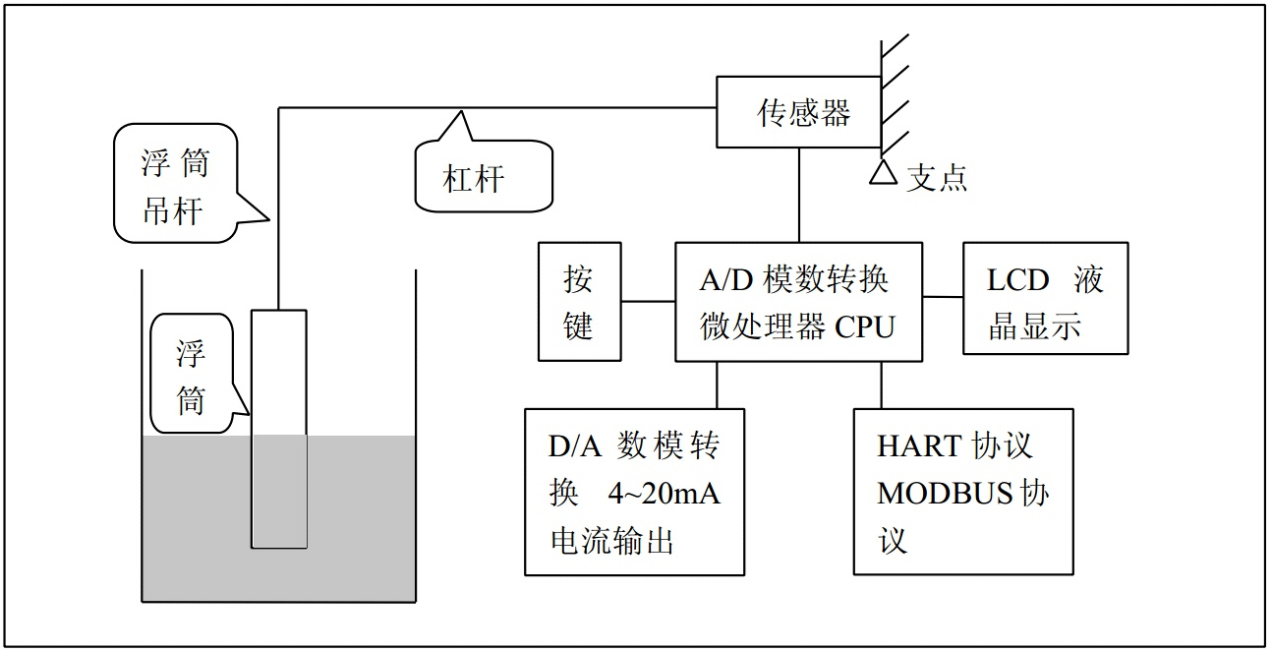
Structure

The intelligent float liquid level meter is made up of a float, an indicator and a sensor, as shown in the figure:

(1) Liquid crystal indicator
(2) Sensor
(3) Float

Working Principle

Receiving the upward buoyancy F of the liquid, the float makes the buoyancy F work on the sensor through the buoyancy pole, as shown in figure 2: as to the sensor's voltage output, i.e. V ∝ F, because of the direction proportion between the float's height of immersing in the liquid and the buoyancy it receives, the change of the buoyancy is converted to corresponding liquid height through the sensor's voltage output, which is then changed into standard 4~20mA current output through A/D→ CPU→ D/A, as shown in figure 3.



技术参数

测量范围： 0.3~6m(特殊尺寸可订购)
精度等级： 1.0、0.5（特殊型）
输出信号： 4~20mA DC 二线制，可带 HART 协议
供电电源：标准型： 24VDC 二线制 4~20mA(12VDC-32VDC)
电池型： 3.6V@19AH 锂电池，可连续使用一年
公称压力：最大 16MPa(特殊规格可订购)
环境温度:-40℃~+85℃（液晶不会损坏）
液晶正常工作—30℃~+80℃
介质温度:常温-40℃ ~100 ℃（无散热片）
高温100℃ ~200 ℃（带散热片）
超高温 200~450 （带散热片及夹套装置）
介质密度：液位 p≥0.4g/cm3
界位p1-p2≥0.1g/cm3
接液材质：测量室为碳钢或 1Cr18Ni9Ti其余为1Cr18Ni9Ti
外壳材质：铸铝
连接法兰：内浮筒 DN30 PN4.0法兰标准 DIN2501
外浮筒侧法兰DN50 PN4.0主体法兰 DN50 PN4.0 法兰标准DIN2501
特殊型： 由用户选择
电缆接口：隔爆型为 1/2NPT内螺纹，其它M20*1.5内螺纹
液晶显示：主屏液位显示数值范围： 0~50000(可带小数点)付屏百分比显示保留一位小数
防爆标志：本安型 iaⅡCT5 隔爆型 dⅡBT6
防护等级： Ip65
负载特性： RImax=50*(电源电压-12)Ω=600Ω@24V

Technical Parameters

Measurement range: 0.3~6m (special sizes can be customized)
Accuracy grade: 1.0 , 0.5（special type）
Output signal: 4~20mA DC two-wire system, which can be equipped with HART protocol
Power supply:standard: 24VDC two-wire system 4~20mA(12VDC-32VDC)
Battery type: 3.6V@19AH lithium battery, which can be continuously used for a year
Nominal pressure: 16MPa at the maximum (special grades can be customized)
Environmenrface: flame-proof type adopts 1/2NPT internal thread, others adopt M20*1.5 internal thread
Liquid crystal display: number range of liquid level dt temperature: —40℃~+85℃ (the liquid crystal can't be damaged), liquid crystal's normal operation —30℃~+80℃
Medium temperature: normal temperature —40℃ ~100℃(no cooling fin)
High temperature: 100℃ ~200 ℃ (with cooling fin)
Superhigh temperature 200~450 (with cooling fin and jacket device)
Medium density: liquid level p ≥ 0.4g/cm3
boundary p1-p2 ≥ 0.1g/cm3
Connecting liquid material: the measuring room uses carbon steel or 1Cr18Ni9Ti. Others use 1Cr18Ni9Ti
Shell material: cast aluminium
Connecting flange: internal float DN30 PN4.0 Flange standard DIN2501
External float side flange DN50 PN4.0 Body flange DN50 PN4.0 Flange standard DIN2501
Special type: chosen by users
Cable inteisplay on the main screen: 0-50000 (with decimal point) the percentage display of the secondary screen reserves a decimal
Explosion-proof sign: intrinsic safety type iaⅡCT5 Flame-proof type dⅡBT6
Protection grade: Ip65
Load characteristics: RImax=50* (supply voltage-12) Ω =600 Ω @24V

TKWL–1800订购信息
Order Information of TKWL–1800r

TKWL–1800										
接液材质 **Connecting liquid material** 304 B 316 C 其他 Others Z(并注明) (noted)										
精度等级 **Accuracy grade** ±1%F.SXP XP ±0.5%F.S SP										
过程连接 **Process connection** 不锈钢法兰DN50 PN16 Stainless steel flange DN50 Pn16 A 不锈钢法兰DN50 PN16 Stainless steel flange DN50 Pn16 B 其他 Others C										
测量范围 **Measurement range** 0.3-6m（订货请注明） Measurement range										
介质温度 **Medium temperature** -40~100℃ A 100~200℃ B 200~450℃ C										
介质密度 **Medium density** 液位 ρ ≥0.4g/cm³ Liquid levelρ≥0.4g/cm³ 界位 ρ1-ρ2≥0.1g/cm³ Boundary ρ1-ρ2≥0.1g/cm³			订货时注明（界位注明两项密度） Please specify when ordering (de -nsity of the two items should be specified at the boundary)							
电气接口 **Electrical interface** M20×1.5 M 1/2NPT N										
现场显示 **Status display** 带 With V 不带 Without X										
防爆形式 **Anti-explosion type** 标准型(非防爆)电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC P 本安型（ExiaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC I 本安型+隔爆型（Exd iaIICT6）电流信号输出（4~20mA）HRAT协议24VDC Standard type (not explosion proof) Current signal output (4~20mA), HRAT protocol 24VDC D										
防护等级 **Protection grade** IP65 E IP67 F										

TKWL-1900系列射频导纳物位开关

TKWL-1900 series RF admittance level switch

产品概述

射频导纳是一种从电容式技术发展起来的、防挂料、更可靠、更准确、适用性更广的物位控制技术，射频导纳中的导纳的含义为电学中阻抗的倒数，它由电阻性成份、电容性成份、电感性成份综合而成。而射频即发射高频无线电波，所以射频导纳物位控制技术是通过用高频无线电波测量被测介质导纳值来实现物位测量。

射频导纳技术与电容式技术最重要的区别在于测量的多样化和三电极技术。射频导纳测量的多样化在于不止是测电容量，测量的还有电阻和电感量，使测量更加准确。三电极技术包括电子单元和传感器，在测量电极和地极之间加入屏蔽电极，将测量电极保护起来，不受挂料影响。

技术参数

◆电源要求：交流系统：标准：185~255VAC 50/60Hz
5W（最大）
直流系统：24VDC系统：19~29VDC输入
3W（最大）
◆输　出：DPDT继电器（双刀双掷）
触点容量 220VAC 3A
环境温度：-40~75℃
介质温度：-40~600℃（高温场合需选高温型）
◆延　时：1~55s(可选)
◆分 辨 率:<0.5PF
◆高低位报警：现场可设置为高位报警方式或低位报警方式
◆温度影响：0.15pF/30℃
◆稳 定 性：0.1pF/6个月(最大漂移)
◆火花防护：内置火花防护电路
◆传感元件安装：NPT螺纹或法兰安装（规格可选）
◆插入长度：标准450mm(插入长度IL)~250mm(屏蔽CSL长度)
也可依用户要求提供，最大6m最小0.1m
◆电气接口：M20*1.5
◆分体电缆：标准长度为5米，最长20米(仅对分体)
◆重复性:：<1mm（导电介质）　　<10mm(绝缘介质)
◆响应时间：<0.5S

Products summary

Radio frequency admittance is a material lelvel control technology, developed from capacitor technology, anti-hanging material, more reliable, more accurate and with more extensive applicability. For radio frequency admittance, the meaning of admittance is reciprocal of electrical impedance, which is composed of resistive component, capacitive component and perceptual component comprehensively, while the radio frequency can be understood as emissing high-frequency radio wave, so the RF admittance level control technology realizes measurement for material level by measuring the admittance of measured medium with high-frequency radio wave.

The most important difference between RF admittance technology and capacitive technology is diversified measurement and three-electrode technology. The diversification of RF admittance measurement lies in not only measuring capacitance but also resistance and inductance, which make the measurement more accurate. Three-electrode technology includes electronic unit and sensor, add shield electrode between measured electrode and ground electrode, protect measured electrode and not affected by hanging material.

Technical parameters

◆Requirement of power:
AC system: standard: 185~255VAC 50/60Hz 5W (max)
DC system: 24VDC system: 19~29VDC input 3W (max)
◆Output: DPDT relay (DPDT)
Capacity of touch point 220VAC 3A
Environmental temperature: -40~75℃
Medium temperature: -40~600℃
(select high-temperature model for high temperature occasions)
◆Time delay: 1~55s (optional)
◆Resolution: <0.5PF
◆High-low level alarm: the site can be set as high level alarm method or low level alarm method
◆Temperature influence: 0.15pF/30℃
◆Stability: 0.1pF/6 months (max shift)
◆Spark protection: built-in spark protection circuit
◆Sensor installation: NPT screw thread or flange installation (specifications are optional)
◆Inserting length: standard 450mm(inserting length IL)-250mm(shield length CSL)
Can also be customized based on requirements of users, max 6m and min 0.1m
◆Electrical interface: M20*1.5
◆Split cable: standard length is 5 meters, 20 meters at maximum (only for split model)
◆Repeatability: <1mm (conductive medium) <10mm(insulating medium)
◆Response time: <0.5S

TKWL-1900射频导纳物位开关订购信息
Ordering information of TKWL-1900 RF admittance level switch

TKWL-1900						
防爆 **Explosion proof** 普通型 Ordinary model: P 隔爆型 Isolating explosion model: D						
探头材质 **Material of probe** 316L+陶瓷 ceramic: A 316L+: B						
过程连接 Process connection 3/4NPT螺纹连接 screw thread connection: M 其他螺纹连接 other screw thread connections 法兰连接 Flange connection: 请注明 Please specify						
供电电源 Power supply 24V: 2 220V: 3						
电气接口Electrical interface M20×1.5: M 1/2NPTN: N						
安装类型Installation type 一体式Integrated model: A 分体式Split model: B						
插深 Deep inserting						请注明 Please specify

TKWL-2100系列音叉物位开关

TKWL-2100 series tuning fork material level switch

产品简介

TK2100系列音叉物位开关是通过电晶体的谐振来引起其振动的，当受到物料阻尼作用时，振幅急剧降低且频率和相位发生明显变化，这些变化会被内部电子电路检测到，经过处理后，转换成开关信号输出。该产品可以对料罐的高低位进行监测、控制和报警，适用于各种液体、粉末、颗粒状固体。它实用简单、运行可靠、适应性强基本上是面维护的、音叉和输出均有工作状态，均用发光二极管指示，可依据习惯调整状态指示，并配有三种输入方式（直流24V、交流110V和交流220V）和多种输出方式（直流电流输出型、继电器接点输出型、直流电压输出型）。所有类型均有高或低故障报警模拟和可选择的仪表开关灵敏度。

产品特点

◆运行真正免受流动、湍流、气泡、泡沫、振动、固体含量、涂覆、液体特性以及产品变化的影响
◆不需要标定而且所需要的安装工序最少
◆极性不敏感而且具有短路保护功能
◆无活动零件或缝隙真正实现免维护
◆发光二极管指示，可依据习惯调整状态指示
◆“快速滴落”的音叉设计对于粘性液体具有更快的响应时间
◆卫生连接件

测量原理

本产品是一种采用音叉原理设计的液点液位开关。使用压电晶体以音叉的固有频率对音叉进行振动。对于这种频率的变化，可进行连续监控。当产品用于低报警用途时，容器内的液体向下排放流经音叉，引起固有频率的变化，这一变化被电子元件检测，从而切换输出状态。当用于高报警用途时，容器内的液体上升并与音叉接触，又可切换输出状态。

Brief introduction of products

Tk2100 series tuning fork material level switch produces vibration through resonance of transistor. When affected by material damping, the vibration smplitude decreases dramatically and the frequency and phase change obviously, which can be examined by internal electric circuit and convert into swith signal for outputting after treatment. This product can monitor, control and report the high-low level of the material tank and is applicable for various kinds of liquids, powders and particle solid. It is simple in use, reliable in operation and strong in adaptability, which is basically surface maintenance and both the tuning fork and output are with working state and both adopt LED indicator, can adjust the status indicator based on habits and equipped with three kinds of output methods (DC24V, AC110V and AC220V) and various output methods (DC current output type, relay contact point output type and DC voltage output type). All types have high or low analog fault alarm and optional instrument swith sensitivity.

Product characteristics

◆Operation is not affected by flow, turbulence, air bubble, foam, vibration, solid content, coating, liquid property as well as change of products in a genuine way.
◆No need calibration and require the least intallation process
◆Polarity insensitive and with short circuit protection function
◆No moving parts or gap, realize maintenance free in a genuine way
◆LED indicator and the status indicator can be adjusted based on habits
◆“Rapid drip” tuning fork design has more rapid response time for viscous liquid.
◆Sanitary connecting piece

Principle of measurement

This product is liquid level switch adopting tuning fork principle design and adopts piezoelectric crystal to make vibration for tuning fork with the fixed frequency of tuning fork. It can make continuous monitoring for this kind of frequency change. When the product is used for low alarm, the liquid in the container will flow downward through tuning fork and cuase the change of fixed frequency. This change is examined by electronic components and then swithches output status. When applied to high alarm, the liquid in the container will rise and contact with tuning fork and also switches output status.

技术参数

※ 介质温度范围：-20℃~80℃
※ 环境温度：-20℃~60℃
※ 环境湿度：≤95%RH
※ 被测介质：液体、粉末或颗粒状固体
※被测介质密度：固体≥0.1g/cm³；
液体≥0.7g/cm³；
※ 被测固体颗粒尺寸：≤10mm
※ 最大液体粘度：＜1000mm²/S
※ 被测介质安息角：≥200
※ 压力范围：≤1MPa
※ 壳体材料：压铸铝合金
※ 叉体材料：1Cr18Ni9Ti
※ 外壳防护等级：IP65
※连接方式：G1螺纹
法兰（用户选定）
※ 电气参数：
1. 供电电压：DC24V;AC220V 50HZ
2. 输出信号：继电器输出：5A 220V AC
3A 24V DC
3. 电源功耗：≤2W
※ 音叉振动频率：300±50HZ
※ 环境振动等级：V.L.4加速度不大于1g
※开关信号动作时间：1~60S

Technical parameters

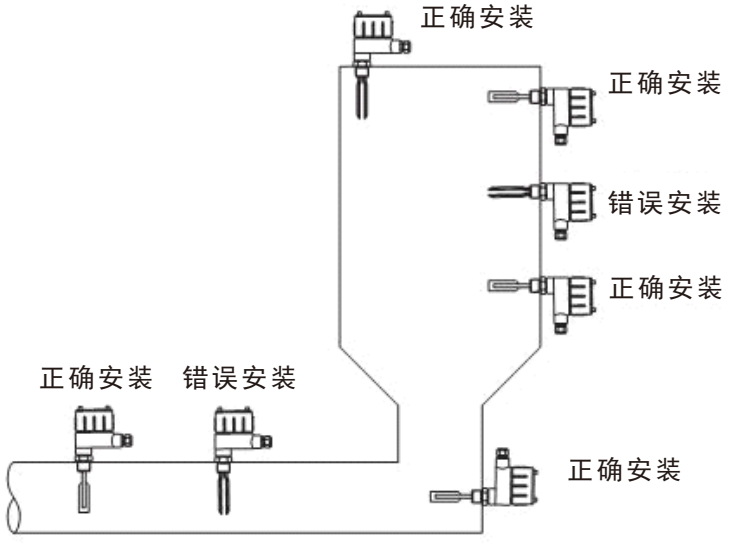
※Temperature range of medium: -20℃~80℃
※Environmental temperature: -20℃~60℃
※Environmental humidity: ≤95%RH
※Examined medium: liquid, powder or particle solid
※Density of examined medium: solid ≥0.1g/cm³;
※Liquid≥0.7g/cm³;
※Size of examined solid particle: ≤10mm
※Max liquid viscosity: ＜1000mm²/S
※Angle of repose of examined medium: ≥200
※Pressure range: ≤1MPa
※Material of shell: die-casting aluminium
※Material of fork: 1Cr18Ni9Ti
※Shell protection class: Ip65
※Connection method: G1 screw thread
※Flange (selected by user)
※Electrical parameters:
1. Power supply: DC24V;AC220V 50HZ
2. Signal output: relay output: 5A 220V AC
3A 24V DC
3. Power consumption: ≤2W
※Vibration frequency of tuning fork: 300±50HZ
※Environmental vibration class: V.L.4, acceleration no bigger than 1g
※Action time of switch signal: 1~60S

安装方法

1. 仪表一般为叉端向下垂直安装、水平安装或叉端向下倾斜安装（物料粘附性强时，建议采用叉端向下垂直安装）。
2. 仪表不允许仰装方式，即叉端向上的安装方式。
3. 对物料中混有块状或坚硬颗粒时建议采用垂直或倾斜安装方式。
4. 在安装到设备上之前，建议用少量的介质样品检测校准灵敏度。例如：将仪表浸入一个安装有介质的容器内检测开关的可靠性。
5. 实际安装时一般又分顶部安装（对介质进行高位监测）、侧壁安装（对介质进行高位或低位监测）、管道安装（对料泵进行空流监测）。
如下图所示：

Installation Methods:

1. There are vertical installation with fork end downward, horizontal installation and tilting installation with fork end downward for meter. (it is suggested to chose vertical installation with fork end downward when material is with strong adhesion)
2. Upturned installation that is installation method with fork end upward is not allowed.
3. When the material is mixed with lump or hard particle, it is suggested to choose vertical or tilting installation methods.
4. Before installing onto device, it is suggested to use a small amount of medium sample to examine the sensitivity calibration. For example, immerse the meter into a continer installed with medium to examine the reliability of switch.
5. During practical installation, there are top installation (making high monitoring for medium), side wall installation (making high or low monitoring for medium) and pipe installation (making air flow monitoring for material pump).
As indicated in the following picture:



注意事项

1. 避免因物料粘结，阻止齿叉的振动。
2. 结疤场合下，齿叉与罐壁之间应留足空间。
3. 用于液位监测的仪表，检测点按所需监视或控制的高度确定。
4. 对于低粘度液体，音叉头能够自由的二和过程介质分开，就可以按上图所示的任何位置安装。
5. 对于高粘度液体，音叉头不能够自由的和过程介质分开，建议只能叉端向下垂直安装。
6. 用于料位监测的仪表，对于立式圆筒容器或与之近似的容器，安装位置不仅取决于需要监视或控制的料位高度，同时还需考虑物料的安息角和进料位置。水平安装时，叉端宜处在距离容器内壁三分之一容器半径处；两叉股应在同一水平面内。垂直安装在容器顶部时，安装中心与容器内壁间的距离应选在容器半径的三分之一处。仪表安装位置应尽量避免物料流的直接冲击或飞溅，以免引起错误动作及磨损，如果无法避免物料的冲击或飞溅，可以在仪表安装位置的上方安装防护檐，防护檐的有效宽度应大于叉端宽度，其长度应大于仪表实际渗入料仓的尺寸。

警告!

安装使用时，不得用手抓握仪表叉股或敲击碰弹叉股，以免叉股受力变形，甚至造成内部压电元件损坏。

Attentions

1. Avoid the prevention of fork vibration caused by material bonding.
2. Under scar occasion, it should keep enough space between fork and tank wall.
3. Meters for liquid monitoring, the check points are determined by the height of needed monitoring or control.
4. For liquid with low viscosity, the fork head can be separted from process medium freely and can be installed on any location based on above picture.
5. For liquid with high viscosity, the fork head can't be separted from process medium and it is suggested to make vertical installation with fork downwards.
6. Meters used for monitoring of material level, for vertical cylindrical container or containers in similar shape, the installation position is not only determined by the height of material level for monitoring or control, at the same time, it also needs to consider about the repose angle and feed position of material. During horizontal installation, the fork end is better positioned at the diameter place with 1/3 distance to container wall; the two forks should in the same level. When vertically installed at the top of the container, the distance between installation center and inner container wall should be positioned at 1/3 of container diameter. The installation position of the meter should try to avoid direct attack or splash of material flow to avoid wrong action and abrasion; if unable to avoid the attack or splash of material, it can install protective canopy above the installation position of meter; the effective width of canopy should be bigger than the width of fork and its length should be bigger than the real size of meter penetrating into the material warehouse.

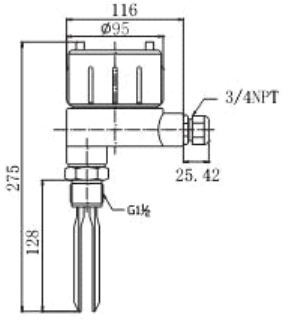
Warnings!

During installation and usage, grasping of meter fork with hands or knocking and touching fork is forbidden to avoid deformation of fork or even the damage of internal piezoelectric components.

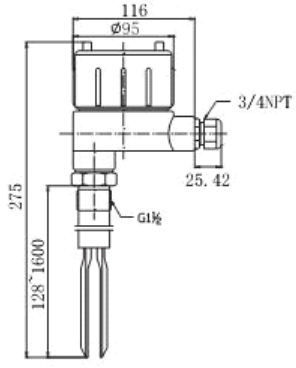
尺寸图

Dimensions

螺纹安装

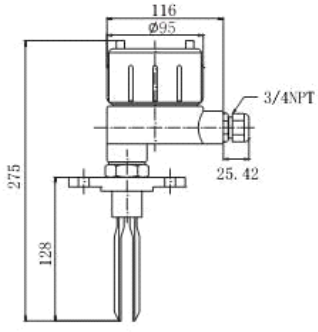


普通型

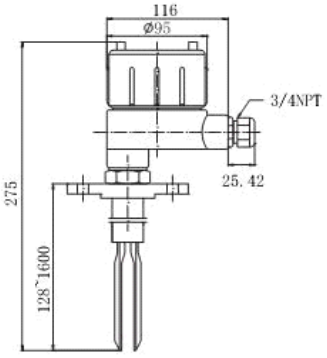


加长型

法兰安装



普通型



加长型

TKWL–1700订购信息
Ordering information for TKWL–1700 capacitance level meter

TKWL-1700								
SC	音叉式液位开关 turning fork type liquid level switch							
SG	音叉式液位开关 turning fork type liquid level switch							
	0	两线制串继电器或负载 Two wire system relay or loading						输出方式 Output mode
	1	继电器输出 Relay output						
		0	标准型 standard model					叉体形式 Fork form
			口	延长型，数字为叉体长度，范围： Extension model, the number is the length of fork, ranging 200~2000mm				
				1	固定螺纹G1″ Fixed screw thread G1			过程连接 Process connection
				2	固定法兰DN32 Fixed flange DN32			
				3	活动螺纹G1″ Movable screw thread G1			
				4	法兰DN32 Flange DN32			
					N	N普通型 Normal type		防爆选项 Option of explosion proof
					D	隔爆型（MSG型无） Isolating explosion model (exclude MSG model)		
					E	本安型（MSG型无） Intrinsically safe model (exclude MSG model)		
						S	标准型 Standard model	工作温度 Working temperature
						M	中温型 Medium temperature model	

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