TKWL-1500射频导纳物位计

TKWL-1500 Radio Frequency Admittance Material level meter

一、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。

二、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。

三、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。

四、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。

五、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: 24VDC350Ω
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　1 缆式 Cable type　2							
测量介质 **Measurement medium** 液体 Liquid　A 固体 Solid　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　I 分体 Split　R							
防爆 **Explosion proof** 无防爆 Without explosion proof 带防爆 With explosion proof　F							E

TK1500系列传感器选型　　TK 1500 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；