TKWL-2101系列音叉物位开关

TKWL-2101 Tuning fork material level switch



一、产品简介

TKWL2101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。

二、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。

三、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

TKWL2101 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.

四、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

五、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。

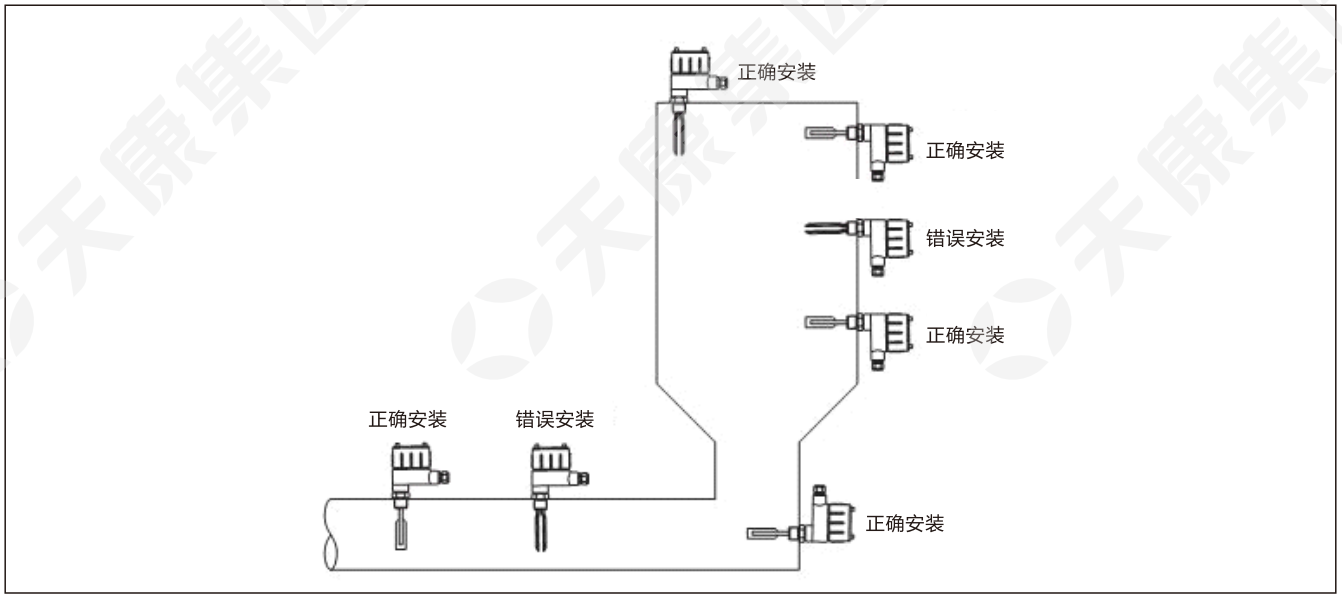
5、实际安装时一般又分顶部安装（对介质进行高位监测）、侧壁安装（对介质进行高位或低位监测）、管道安装（对料泵进行空流监测）。

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.

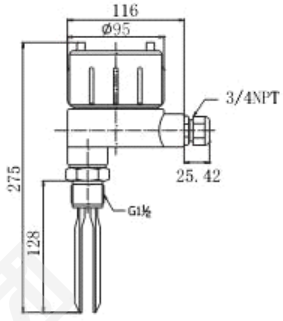
Warnings!

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.

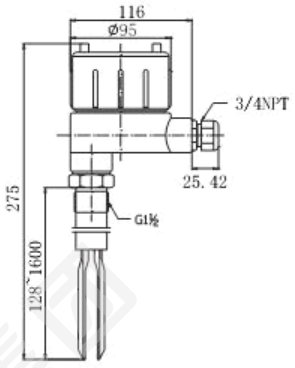
六、尺寸图

Dimensions

螺纹安装

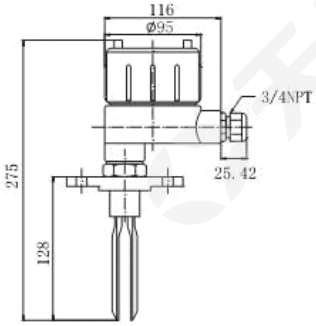


普通型

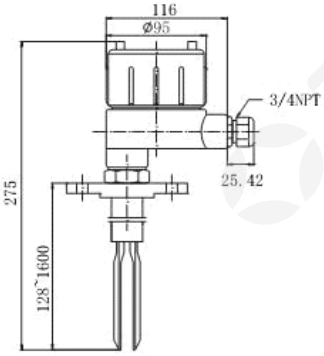


加长型

法兰安装



普通型



加长型

TKWL-2101订购信息
Ordering information for TKWL-2101 capacitance level meter

TKWL-2101								
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
		延长型，数字为叉体长度，范围：200~2000mm 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	活动法兰DN32 Movable flange Dn32				
				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		