

TKWL-1300系列导波雷达物位计

TKWL-1300 Series Guided Wave Radar Level Gauge

产品概述

Product Overview

TKWL-1300系列导波雷达物位计输出4~20mA模拟信号，测量最大距离可达30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，使得仪表可以用于高温，蒸汽大的罐体，或固体料仓等非常复杂的测量工况。

The TKWL-1100 series 26GHz high-frequency radar level gauge is designed to provide a 4-20mA analog output signal and can measure distances up to 70m. The antenna is optimized for improved performance, and the advanced microprocessor enables high-speed signal analysis, making the instrument suitable for measuring under complex conditions in reactors or solid material silos.

产品原理

Product 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。探头发高频脉冲并沿缆式或杆式探头传播，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。

反射的脉冲信号沿缆式或杆式探头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脉冲软件完成，距离物料表面的距离D与脉冲的时间行程T成正比：

$$D = C \times T / 2 \quad \text{其中} C \text{为光速}$$

因空罐的距离E已知，则物位L为： $L = E - D$

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。

F——测量范围，E——空罐距离B——顶部盲区，L——探头到罐壁的最小距离

顶部盲区是指物料最高料面与测量参考点之间最小距离。

底部盲区是指缆绳最底部附近无法精确测量的一段距离。

顶部盲区和底部盲区之间是有效测量距离。

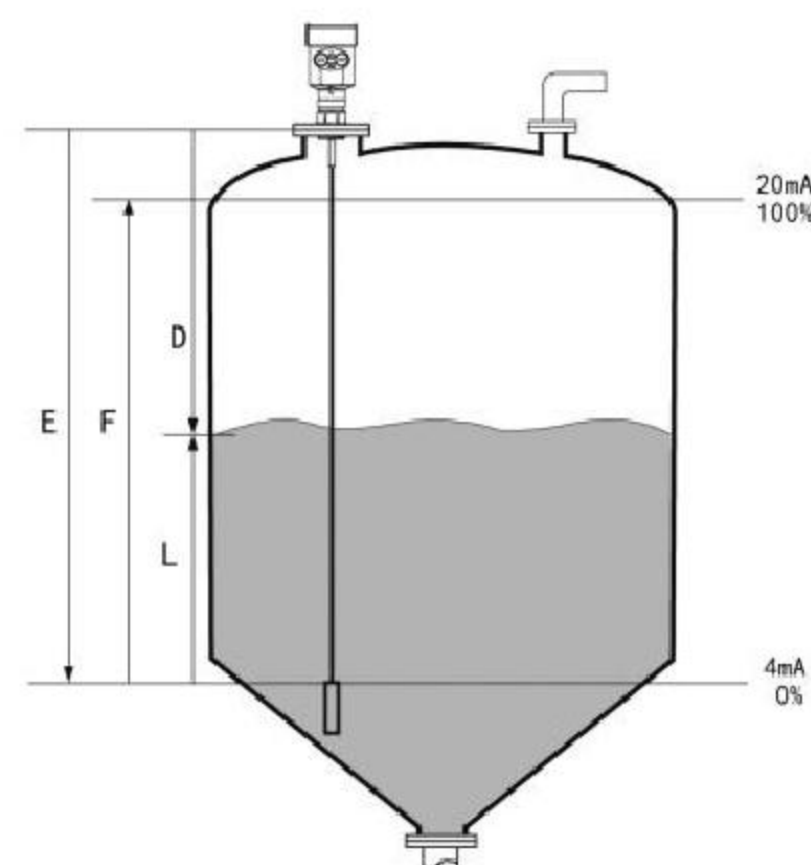
注意：只有物料处于顶部盲区和底部盲区之间时，才能保证罐内物位的可靠测量。

Guided wave radar is a measurement instrument based on the principle of time of flight. Radar waves travel at the speed of light, and the travel time can be converted into a level signal through electronic components. The probe emits high-frequency pulses and propagates along a cable or rod probe. When the pulse encounters the material surface, it is reflected back and received by the receiver inside the instrument, which converts the distance signal into a level signal.

The reflected pulse signal is conducted to the electronic circuitry of the instrument through the cable or rod probe. The microprocessor processes this signal and identifies the echo generated by the microwave pulse on the material surface. The identification of the correct echo signal is performed by pulse software. The distance D to the material surface is directly proportional to the time of flight T of the pulse:

$$D = C \times T / 2, \text{ where } C \text{ is the speed of light.}$$

Given the distance E to the empty tank, the level L is calculated as: $L = E - D$.



By inputting the empty tank height E (zero point) and the full tank height F (full range), as well as some application parameters, the instrument can be set. The application parameters automatically adapt the instrument to the measurement environment, corresponding to the 4-20mA output.

F-Measurement range, E - Distance to the empty tank

B-Top dead zone , L-Minimum distance from the probe to the tank wall

The top dead zone refers to the minimum distance between the highest material level and the measurement reference point.

The bottom dead zone refers to a section near the bottom of the cable where accurate measurements cannot be made.

The effective measurement distance is between the top dead zone and the bottom dead zone.

Note: Only when the material is between the top dead zone and the bottom dead zone, reliable measurement of the tank level can be guaranteed.

产品特点

Product Features

- 1、运用时间行程原理，不受蒸汽、粉尘、泡沫等影响；

2、采用了先进的微处理器和独特的EchoDiscovery回波处理技术；

3、采用接触式杆式或缆式天线传导信号，受干扰影响小，可测量复杂工况，如高温、高压及小介电常数介质；

4、坚固的模块化设计，操作简单，使用降低运行维护成本，提高了安全型；

5、测量盲区更小，对于小罐测量效果也很好；

6、波长更短，对小颗粒物料的料位测量更适合。
- 1.Utilizes the principle of time-of-flight, unaffected by steam, dust, foam, and other factors.

2. Incorporates advanced microprocessors and unique Echo Discovery echo processing technology.

3. Uses contact rod or cable antenna for signal transmission, minimizes interference, and enables measurements in complex conditions such as high temperature, high pressure, and low dielectric constant media.

4. Features a robust modular design, simple operation, reduced operating and maintenance costs, and improved safety.

5. Offers a smaller measurement blind zone and performs well in measuring small tanks.

6. Has a shorter wavelength, making it more suitable for level measurement of small particles or materials.

产品信息

Product Information

 TKWL-1301	应用：液体及固体粉状测量，复杂过程条件 测量范围：0-15m 测量精度：±3mm 过程温度：-40~120℃/-40~200℃/-40~600℃ 过程压力：-0.1~4.0MPa/-0.1~10MPa 频率：100MHZ~1.8GHz 输出信号：4-20mA/HART 电源：两线制（DC24V） 四线制（DC24V/AC220V） 现场显示：标配 过程连接：螺纹/法兰/支架 天线：单缆式天线 防爆标志：ExdbIICT6 Gb ExialICT6 Ga ExdbII BT4 Gb Extb II ICT80℃ Db	Application: Measurement of liquids and solid powders in complex process conditions. Measurement range: 0-15m Measurement accuracy: ±3mm Process temperature: -40~120℃/-40~200℃/-40~600℃ Process pressure: -0.1~4.0MPa/-0.1~10MPa Frequency: 100MHz~1.8GHz Output signal: 4-20mA/HART Power supply: Two-wire system (DC24V), Four-wire system (DC24V/AC220V) Field display: Included as standard Process connection: Thread/Flange/Bracket Antenna: Single-cable antenna Explosion-proof marking: ExdbIICT6 Gb ExialICT6 Ga ExdbII BT4 Gb、 Extb II ICT80℃ Db
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 TKWL-1302	应用：液体及固体粉状测量，复杂过程条件 测量范围：0-6m 测量精度：±3mm 过程温度：-40 ~ 120°C/-40 ~ 200°C/-40 ~ 600°C 过程压力：-0.1 ~ 4.0MPa/-0.1 ~ 10MPa 频率：100MHZ ~ 1.8GHz 输出信号：4-20mA/HART 电源：两线制 (DC24V) 四线制 (DC24V/AC220V) 现场显示：标配 过程连接：螺纹/法兰/支架 天线：单杆式天线 防爆标志：ExdbIICT6 Gb ExialICT6 Ga ExdbIIBT4 Gb Extb IIICT80°C Db	Application: Measurement of liquids and solid powders in complex process conditions Measurement range: 0-6m Measurement accuracy: ±3mm Process temperature: -40 to 120°C / -40 to 200°C / -40 to 600°C Process pressure: -0.1 to 4.0MPa / -0.1 to 10MPa Frequency: 100MHZ ~ 1.8GHz Output signal: 4-20mA/HART Power supply: Two-wire system (DC24V), Four-wire system (DC24V/AC220V) On-site display: Standard Process connection: Thread/Flange/Bracket Antenna: Single rod antenna Explosion-proof marking: ExdbIICT6 Gb, ExialICT6 Ga, ExdbIIBT4 Gb, Extb IIICT80°C Db
 TKWL-1303	应用：小介电常数液体；水泥仓粉料测量；粉煤灰粉测量 测量范围：双杆6m/双缆30m 测量精度：±3mm 过程温度：-40 ~ 120°C/-40 ~ 200°C 过程压力：-0.1 ~ 4.0MPa 频率：100MHZ ~ 1.8GHz 输出信号：4-20mA/HART 电源：两线制 (DC24V) 四线制 (DC24V/AC220V) 现场显示：标配 过程连接：法兰 天线：双杆式天线/双缆式天线 防爆标志：ExdbIICT6 Gb ExialICT6 Ga ExdbIIBT4 Gb Extb IIICT80°C Db	Application: Measurement of low dielectric constant liquids; cement silo powder measurement; fly ash powder measurement Measurement range: Dual rod 6m / Dual cable 30m Measurement accuracy: ±3mm Process temperature: -40 to 120°C / -40 to 200°C Process pressure: -0.1 to 4.0MPa Frequency: 100MHz to 1.8GHz Output signal: 4-20mA/HART Power supply: Two-wire system (DC24V), Four-wire system (DC24V/AC220V) On-site display: Standard Process connection: Flange Antenna: Dual rod antenna / Dual cable antenna Explosion-proof marking: ExdbIICT6 Gb, ExialICT6 Ga, ExdbIIBT4 Gb, Extb IIICT80°C Db
 TKWL-1305	应用：无离子水、脱氧水等液体的测量 测量范围：0-6m 测量精度：±3mm 过程温度：-40 ~ 120°C/-40 ~ 200°C 过程压力：-0.1 ~ 4.0MPa 频率：100MHZ ~ 1.8GHz 输出信号：4-20mA/HART 电源：两线制 (DC24V) 四线制 (DC24V/AC220V) 现场显示：标配 过程连接：法兰 天线：同轴管式天线 防爆标志：ExdbIICT6 Gb ExialICT6 Ga ExdbIIBT4 Gb Extb IIICT80°C Db	Application: Measurement of ion-free water, deionized water, and similar liquids Measurement range: 0-6m Measurement accuracy: ±3mm Process temperature: -40 to 120°C / -40 to 200°C Process pressure: -0.1 to 4.0MPa Frequency: 100MHz to 1.8GHz Output signal: 4-20mA/HART Power supply: Two-wire system (DC24V), Four-wire system (DC24V/AC220V) On-site display: Standard Process connection: Flange Antenna: Coaxial pipe antenna Explosion-proof marking: ExdbIICT6 Gb, ExialICT6 Ga, ExdbIIBT4 Gb, Extb IIICT80°C Db

选型指南

Selection Handbook

TKWL-1301							
电气接口 Electrical Entry M20*1.5 1/2NPT 特殊定制 Customized							
外壳材质 Enclosure Material 铸铝 Cast Aluminum 不锈钢 Stainless Steel							
电子组件 Electronic Components 4-20mA/HART/24V DC 两线制 4-20mA/HART/24V DC Two-wire system 4-20mA/HART/24V DC 四线制 4-20mA/HART/24V DC Four-wire system 4-20mA/HART /220V AC四线制 4-20mA/HART/220V AC Four-wire system 特殊定制 Special Customization							
密封温度 Sealing Temperature 普通密封-40-120℃ Standard sealing, -40 to 120℃ 高温密封-40-200℃带散热器 High-temperature sealing with radiator, -40 to 200℃ 高温高压密封-40-600℃带散热器 High-temperature and high-pressure sealing with radiator, -40 to 600℃							
天线材质 Antenna Material 304 316L 304+PTFE 316L+PTFE							

安装方式
Installation Method

G1-1/2 螺纹	A
G1-1/2 Threaded	
DN50法兰	B
DN50 Flange	
DN65法兰	C
DN65 Flange	
DN80法兰	D
DN80 Flange	
DN100法兰	E
DN100 Flange	
DN125法兰	F
DN125 Flange	
DN150法兰	G
DN150 Flange	
其它	Z
Other	

防爆形式
Explosion Protection Type

普通型	P
Ordinary Type	
防爆型	D
Explosion-proof Type	

TKWL-1302							
电气接口 Electrical Entry M20*1.5 M 1/2NPT N 特殊定制 X Customized							
外壳材质 Enclosure Material 铸铝 L Cast Aluminum 不锈钢 Q Stainless Steel							
电子组件 Electronic Components 4-20mA/HART/24V DC 两线制 A 4-20mA/HART/24V DC Two-wire system 4-20mA/HART/24V DC 四线制 B 4-20mA/HART/24V DC Four-wire system 4-20mA/HART /220V AC四线制 C 4-20mA/HART/220V AC Four-wire system 特殊定制 X Special Customization							
密封温度 Sealing Temperature 普通密封-40-120℃ P Standard sealing, -40 to 120℃ 高温密封-40-200℃带散热器 G High-temperature sealing with radiator, -40 to 200℃ 高温高压密封-40-600℃带散热器 H High-temperature and high-pressure sealing with radiator, -40 to 600℃							
天线材质 Antenna Material 304 A 316L B 304+PTFE C 316L+PTFE D							

安装方式
Installation Method

G1-1/2螺纹	A
G1-1/2 Threaded	
DN50法兰	B
DN50 Flange	
DN65法兰	C
DN65 Flange	
DN80法兰	D
DN80 Flange	
DN100法兰	E
DN100 Flange	
DN125法兰	F
DN125 Flange	
DN150法兰	G
DN150 Flange	
其它	Z
Other	

防爆形式
Explosion Protection Type

普通型	P
Ordinary Type	
防爆型	D
Explosion-proof Type	

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DN125法兰	C	
DN125 Flange		
DN150法兰	D	
DN150 Flange		
其它	Z	
Other		
防爆形式		
Explosion Protection Type		
普通型		P
Ordinary Type		
防爆型		D
Explosion-proof Type		

TKWL-1305							
电气接口 Electrical Entry M20*1.5 M 1/2NPT N 特殊定制 X Customized							
外壳材质 Enclosure Material 铸铝 L Cast Aluminum 不锈钢 Q Stainless Steel							
电子组件 Electronic Components 4-20mA/HART/24V DC 两线制 A 4-20mA/HART/24V DC Two-wire system 4-20mA/HART/24V DC 四线制 B 4-20mA/HART/24V DC Four-wire system 4-20mA/HART /220V AC四线制 C 4-20mA/HART/220V AC Four-wire system 特殊定制 X Special Customization							
密封温度 Sealing Temperature 普通密封-40-120℃ P Standard sealing, -40 to 120℃ 高温密封-40-200℃带散热器 G High-temperature sealing with radiator, -40 to 200℃							
天线材质 Antenna Material 304 A 316L B							
安装方式 Installation Method DN80法兰 A DN80 Flange DN100法兰 B DN100 Flange DN125法兰 C DN125 Flange DN150法兰 D DN150 Flange 其它 Z Other							

防爆形式**Explosion Protection Type**

普通型

P

Ordinary Type

防爆型

D

Explosion-proof Type