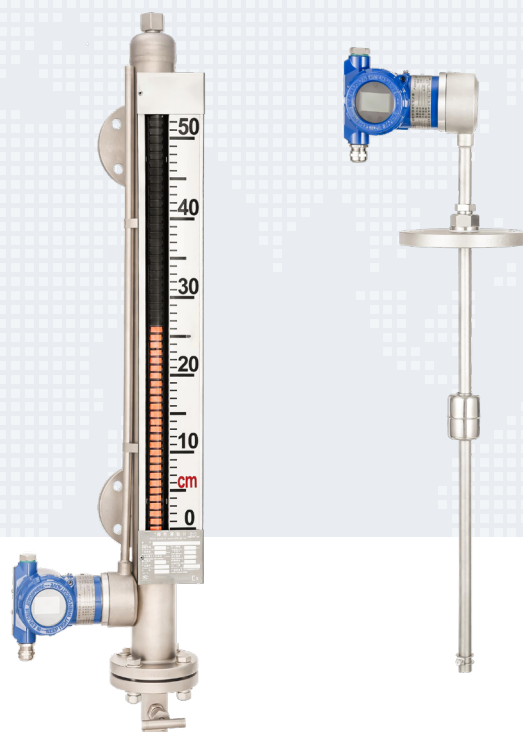


DATASHEET + MANUAL

Magnetostrictive Level Meter



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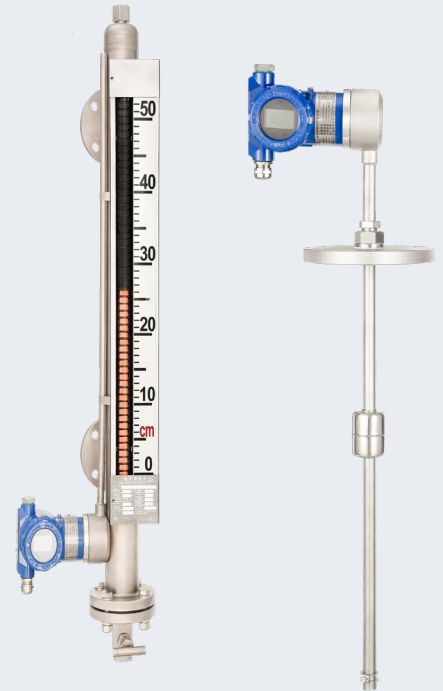
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Product Overview

Magnetostrictive Level Meter

The Magnetostrictive Liquid Level Meter is a cutting-edge explosion-proof instrument developed based on the Wiedemann effect of magnetostrictive materials. It delivers high-speed, reliable, accurate, and continuous position signals in explosive gas environments. This liquid level meter is capable of measuring the absolute position of one or more floating balls simultaneously, with outputs available in both analog and digital formats. The analog output uses a 2-wire system with 4–20 mA + HART, while the digital output employs RS485 communication via the Modbus protocol. Depending on the application, the device can operate with one or multiple floating balls. These floating balls can be suspended at the liquid-gas or liquid-liquid interface within the tank, moving in synchronization to provide real-time detection of liquid levels or interfaces.

The measuring rod of the magnetostrictive liquid level meter is available in various probe designs, including rigid and flexible leads, making it suitable for demanding industrial environments such as volatile or corrosive conditions. This device excels in detecting multiple liquid levels or interfaces simultaneously, offering significant advantages in applications like chemical reaction vessels, storage tanks, oil depots, and fuel tanks. The product is developed, designed, and manufactured in strict compliance with the GB 21117-2007T “Magnetostrictive Liquid Meter” standard, ensuring exceptional performance and reliability.



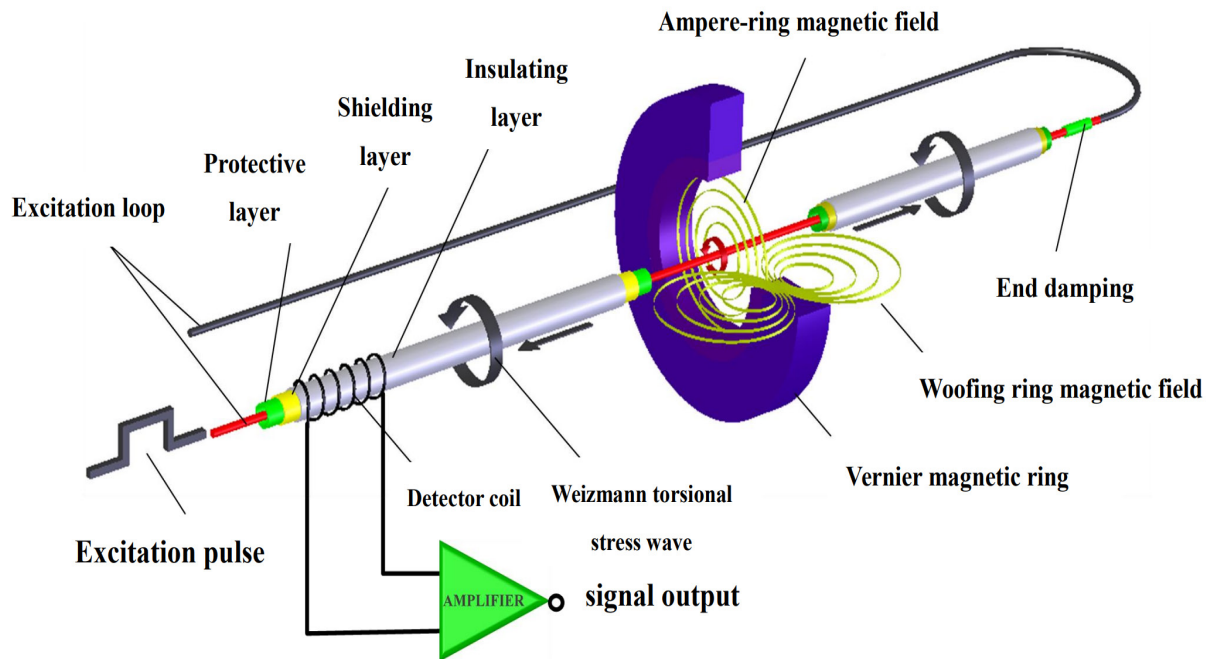
Product Features

- Supports simultaneous detection of multiple liquid levels with high precision and repeatability
- Provides absolute position output without requiring zero reset upon restart
- Supports measurement at up to 5 points
- Convenient for maintenance and monitoring
- Offers multiple output options for versatile applications
- Long service life with stable and dependable performance
- Designed to minimize system heat generation, improving efficiency
- Compliant with electrical safety standards for explosive gas environments

Working Principles

Magnetostrictive Level Meter

The magnetostrictive liquid level meter operates based on the Wiedemann effect between the magnetostrictive waveguide wire and the cursor magnetic ring (magnetic float). During measurement, the excitation module sends a query pulse along the waveguide wire, generating a circular magnetic field. When this field interacts with the magnetic float's bias field, it creates a torsional stress wave that travels along the waveguide. The wave propagates in two directions: one is absorbed at the terminal, and the other is detected by the excitation end. The control module calculates the time difference between the query pulse and the received signal, then multiplies it by the wave's propagation speed (about 2800 m/s) to determine the float's absolute position relative to the reference point, ensuring real-time, precise measurements.



Working Principle Schematic Diagram

Technical Parameters

Magnetostrictive Level Meter

| | | |
|----------------------------------|--|-----------------------------------|
| Output type | 2-wire, 4-20 mA + HART | Modbus |
| Output parameter | Liquid level, interface, temperature | |
| Effective range | Rigid lead: 100 to 6,000 mm; flexible lead: 1,000 to 22,000 mm | |
| Number of measurement points | 1, 2 points | Up to 5 temperature points |
| Resolution ratio | 1 mm | 1 mm |
| Nonlinear error | $\leq \pm 0.05\%$ F.S | |
| Repeatability precision | $\leq \pm 0.01\%$ F.S | |
| Indicating error | $\leq \pm 0.5\%$ F.S | |
| Temperature performance | ≤ 100 ppm/°C | |
| Response time | ≤ 100 ms | |
| Working voltage | Rated working voltage: 24 VDC; normal operating voltage: 10 to 30 VDC | |
| Working current | < 25 mA (varying with range size) | < 50 mA (varying with range size) |
| Load characteristic | The power supply is 24 V, maximum load 500 Ω for current output | |
| Protection rating | IP65 | |
| Measuring blind area | Upper blind area ≤ 50 mm; lower blind area ≤ 100 mm | |
| Temperature | Ambient temperature: -30°C to +70°C ; | |
| Housing material | Aluminum alloy (standard), SS304 and other materials need to be customized | |
| Medium density | ≥ 500 kg/m ³ | |
| Probe material | SS304, 316L, 304 + PTFE, 316L+ PTFE, other special materials need to be customized | |
| Pressure bearing characteristics | ≤ 2.5 MPa, exceed this pressure requires customization | |
| Process connection | DN50 (2") and above (top mounted) | |
| Electrical interface | 2 M20 * 1.5 | |
| Operating environment | When the ambient temperature is lower than -30°C, the meter head needs to be insulated on site (such as installing an incubator, etc.) | |
| Overpressure protection | 36 V | |
| Polarity protection | Tandem diode | |
| Electromagnetic compatibility | Compliance with the standard of GB 21117-2007-T | |
| Insulation resistance | 20 M (100 V) | |
| Insulation strength | 500 V | |
| Other functions | 5-point temperature measurement; with on-site display and setting functions | |
| Explosion-proof marking | Ex db IIC T6 Gb, ExiaIICT6 | |

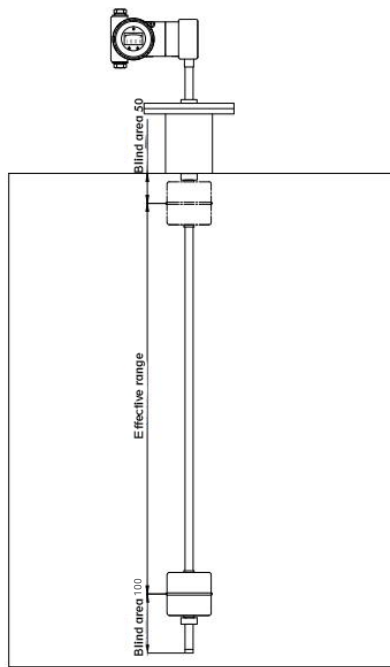
Installation

Magnetostrictive Level Meter

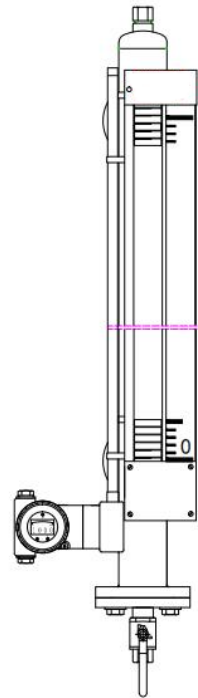
Installation Precautions

To ensure safe, reliable, stable, and accurate operation in explosive gas environments, the following points should be observed during installation and use:

- Carefully check the nameplate and confirm that all specifications (e.g., explosion-proof markings and protection level) meet the requirements of the actual working environment.
- Inspect components such as the compression nut, cable entry device, instrument plug, and front and rear covers to ensure they are not loose, missing, or damaged.
- Ensure that both flexible and rigid measuring rods are in a straight state for accuracy. Rigid measuring rods must not be used if bent.
- In a safe area, independently power the level meter according to the wiring instructions in the manual. Move the float to verify that the level meter operates correctly.
- At installation, Secure the level meter to the top of the equipment (top-mounted design) during installation. Ensure the level meter is in a vertical position; it must not be tilted. If the liquid level in the container fluctuates significantly or if there is stirring, install a wave-damping protective sleeve to stabilize the liquid surface, as instability may affect measurement accuracy. To ensure normal operation, the instrument casing must be reliably grounded.
- After installation, check whether the creepage distance and electrical clearance meet the requirements.
- Ensure there are no exposed wire ends during wiring to prevent electrical discharge.
- Always adhere to the rule "power off before opening the cover". Regularly clean the surface to prevent dust accumulation.
- Explosion-proof-certified products must not be modified or have any components affecting explosion-proof performance replaced arbitrarily.
- For flameproof products, the on-site installation must comply with the provisions of GB/T 3836.15-2017 (Standards for the Design, Selection, and Installation of Electrical Equipment in Explosive Atmospheres).
- The level meter and wiring are equipped with shielding wires. If necessary, ground the sensor shielding wire. The external grounding point on the level meter must also be securely grounded.



Top Mounted



Bundled Mounted

Typical Installation Diagram of Liquid Level Meter

Debugging

The debugging functions include liquid level meter recalibration, floating ball matching, zero point adjustment, factory recovery and other functions. Note that recalibration includes floating ball matching, lower limit calibration and upper limit calibration. The steps must be performed in order without omissions.

Match the Floating Ball

- Move the float to the zero point. When the LCD displays normally, press and hold the "Z" key until 5 zeros appear on the screen. Press the "S" key to start blinking. Press the "Z" key to move the blinking position. While blinking, press the "S" key to modify the data and change the number to "00080". Press the "M" key once.
- Press the "S" key once, and the "S_no" indicator in the lower-right corner will start blinking. Press and hold the "S" key until "auto" appears in the lower-right corner. Release the "S" key, and wait until the "S_no" indicator starts blinking again. Press the "M" key to save the data.

Calibration of Range Limits

- When the LCD displays normally, press and hold both the "M" and "Z" keys simultaneously for 3 seconds to directly enter the lower limit calibration mode. Alternatively, you can access this function by entering the operation code "00031". The LCD will display the number "31" in the lower-left corner.
- Move the float to the lower limit calibration point. Press the "S" key once to make the far-left arrow start blinking, indicating that calibration has begun. Press the "Z" key to shift positions, and press the "S" key to modify the numbers. Input the corresponding length value, and once completed, press the "M" key to save the data and switch to the upper limit calibration mode.
- At this point, the LCD will display "32" in the lower-left corner. Move the float to the upper limit calibration point and repeat the same procedure. After inputting the corresponding length value, press the "M" key to save the data.
- Note: Calibration for menus "31" (lower limit) and "32" (upper limit) must be performed together! Additionally, the upper and lower limits cannot have the same level value.

Zero Point Adjustment

- When the LCD displays normally, press and hold the Z key, there are 5 zeros on the screen, and press the S key to start flashing. Press the Z key to move the blinking position. Press the S key to modify the data when flashing, change the number to "00060", and press the M key once. The number "60" is displayed in the lower left corner of the LCD.
- Press the "S" key once, and the arrow on the far-left side will start blinking. Press the "Z" key to shift positions, and press the "S" key to change the numbers. Input the corresponding length value, and press the "M" key to save the data. (Level float adjustment corresponds to "60," and interface float adjustment corresponds to "61.")

Double Floating Ball

- When the LCD is displaying normally, long-press the Z key, and 5 zeros will appear on the screen. Press the S key to start flashing. Press the Z key to move the flashing position. When flashing, press the S key to modify the data, and change the numbers to "00110". Press the M key once.
- Press the S key once, and the leftmost number will flash. Press the Z key to move the flashing position, and press the S key to change the number. Input 12345, and save the data by pressing the M key once. The level meter will reset to the factory default, and you can restart it. (Note: Inputting 54321 will save the level meter parameters as a backup.)

Factory Data Reset

- When the LCD is displaying normally, long-press the Z key, and 5 zeros will appear on the screen. Press the S key to start flashing. Press the Z key to move the flashing position. When flashing, press the S key to modify the data, and change the numbers to "00110". Press the M key once.
- Press the S key once, and the leftmost number will flash. Press the Z key to move the flashing position, and press the S key to change the number. Input 12345, and save the data by pressing the M key once. The level meter will reset to the factory default, and you can restart it. (Note: Inputting 54321 will save the level meter parameters as a backup.)

Maintenance

Once the level meter has been installed and debugged, it is not necessary to regularly correct the calibration operation. If any damage is found, it should be replaced immediately. It cannot be repaired on site. During the replacement operation, first cut off the power, then remove the damaged level meter and replace it with a new level meter, and finally power it on. It is strictly forbidden to open the cover with electricity!

Product Model

Magnetostrictive Level Meter

| Model Type | Code | Description |
|------------------------|------|--|
| YC-200 | | Magnetostrictive fluid level meter |
| Installation type | A1 | Top mounted |
| | A2 | Bundled mounted |
| | A3 | Top mounted with measuring cylinder |
| Measurement type | C1 | Liquid level measurement (single signal) |
| | C2 | Interface measurement (single signal) |
| | C3 | Liquid level + interface measurement (dual signal) |
| Output signal | E1 | 4-20 mA DC |
| | E2 | 4-20 mA DC + HART |
| | E3 | RS-485 (only this output mode when multiple signals are used) |
| Explosion-proof type | B0 | Non explosion-proof |
| | B1 | Explosion-proof |
| | B2 | Intrinsically safe explosion protection |
| | B3 | Dust explosion protection |
| Probe type | G | Rigid lead |
| | R | Flexible lead |
| Probe material | F1 | 304 |
| | F2 | 316L |
| | F3 | PP/PVC |
| | F4 | 304 + PTFE |
| | F5 | 316L + PTFE |
| | F6 | Titanium TA2 |
| | F7 | Hastelloy C (HC276) |
| | F8 | MONEL 400/500 |
| Float material | Q1 | SS304 |
| | Q2 | SS316L |
| | Q3 | PP/PVC |
| | Q4 | 304 + PTFE |
| | Q5 | 316L + PTFE |
| | Q6 | Titanium TA2 |
| | Q7 | Hastelloy C (HC276) |
| | Q8 | MONEL 400/500 |
| Connection type | S | Flange: nominal diameter/pressure, sealing surface (such as DN50, PN40 RF surface, the code is S50/40 RF), note: the material of the flange is the same as the material of the probe |
| | W | Chuck (for example, the outside diameter of the chuck is 64, the code is W64) |
| | L | Thread (for example, thread size is 2", code is LG2) |
| Measurement range (mm) | | Center distance/side loading, measuring range (tank height)/top loading |
| | | Mounting height (tank height plus mounting flange shorting height) |
| Information code | | |

Wiring Guide

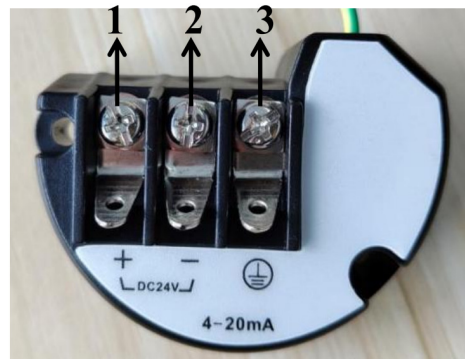
Magnetostrictive Level Meter

- The power supply cable must have a shielding layer, which is reliably connected to the inner ground of the liquid meter.
- The external ground point of the level meter housing must be grounded.

Wire Connection

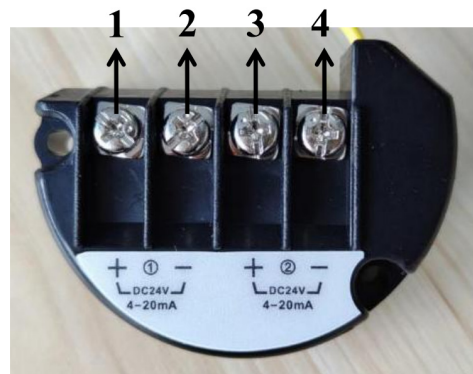
Single Output: 4-20 mA

1: Signal + 2: Signal - 3: GND



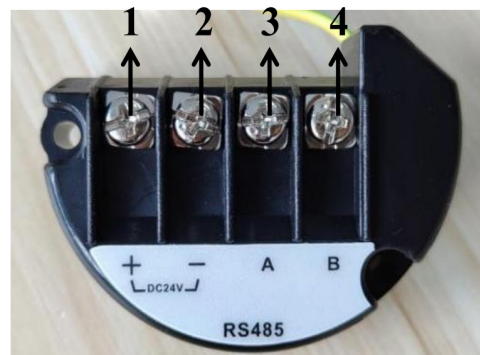
Dual Output: Interface/Liquid Level 2 Signal Output

1: Signal 1+ 2: Signal 1- 3: signal 2+ ; 4: signal 2-



RS485 (Modbus) Output

1: 24 VDC+ 2: GND 3: A 4: B



After-Sales Service

Magnetostrictive Level Meter

The manufacturer is responsible for providing installation guidance and a one-year free warranty. The product will also be maintained for life. When a product malfunctions and needs to be repaired, please return it in its entirety, do not disassemble it, and make sure to pack it properly to avoid damage during transportation. Damage caused by human error, improper installation or use, or damage caused by unforeseeable circumstances or other non-product quality-related issues are not covered by the warranty.



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