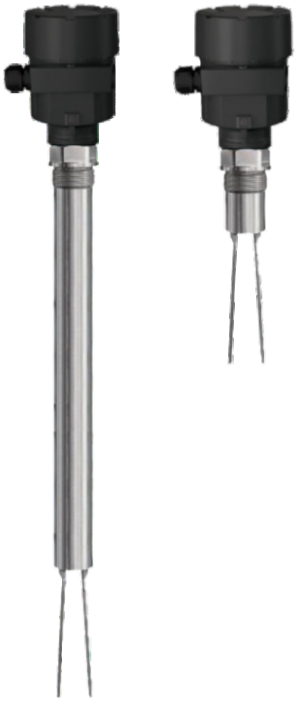
MADECO Solid Fork Level Switch

Operating Instruction

Model:MDFL4



1.Product Overview

1.1 Principle

The tuning fork is driven by piezoelectric actuators and vibrates at a mechanical response frequency of about 150Hz. If the tuning fork is covered by a medium, the frequency will change. This change is detected by the built-in electronic unit and converted into a switching instruction. A tuning fork is a compact instrument that can be operated without external analysis. The built-in electronic component analyzes the level signal and provides the switch signal for use. Using this switch signal can directly operate a rear-mounted instrument (such as a warning device, a pump, etc.) .

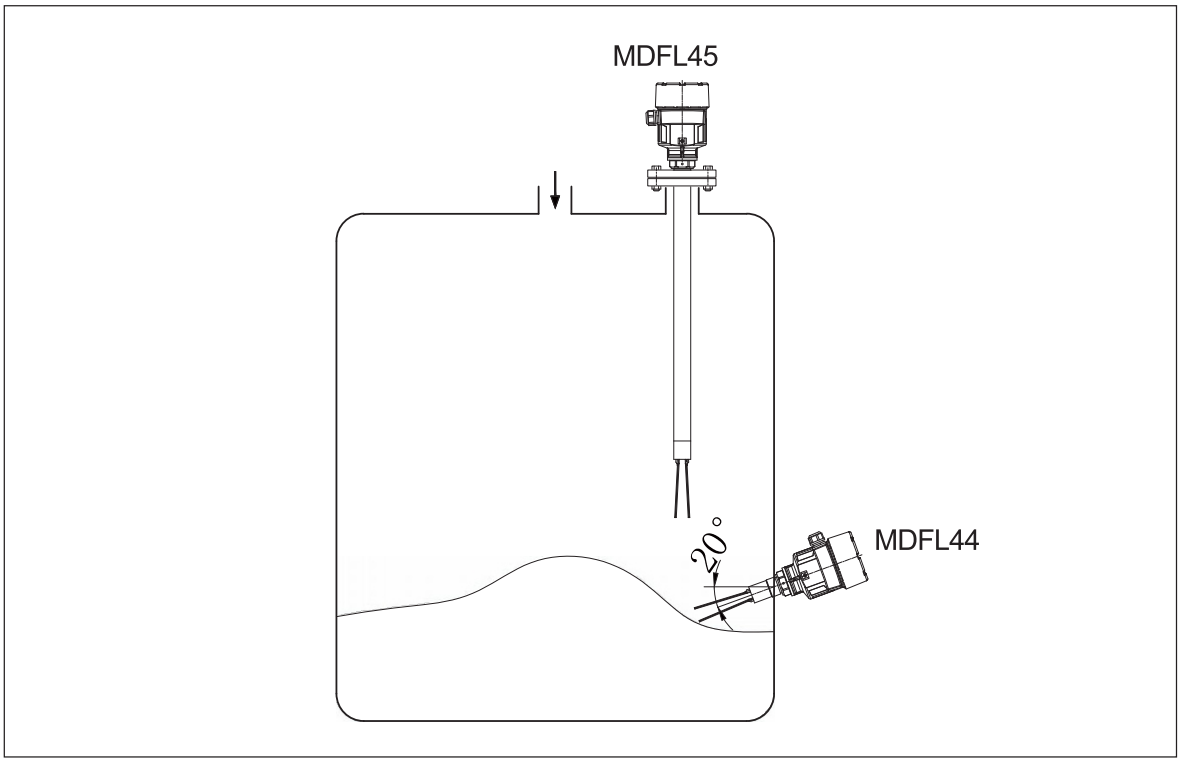


Figure 1

1.2 Application

Solid tuning fork is a kind of limit level sensor with tuning fork, which is used to measure the limit level. It is designed for industrial applications in various process technology areas and is preferred for use in solids. Overflow and dry run protection for typical applications. Solid tuning forks can be used with little or no chemical or physical influence from solid materials using simple and durable measurement systems. It can also work under strong external vibration or in a constantly changing medium. To detect solids in water, order a solid tuning fork as a solid-in-water detector. The tuning fork should be adjusted to suit the density of the water in the air or when covered by water (density: 1 g/cm³/0.036• lbs/in) , the instrument is“Not alarm” state, only when the vibration components are additional solid materials (such as sand, silt, pebbles, etc.) covered, the instrument is“Alarm” state.

2.Product Introduction

 MDFL44	Features: not affected by external vibration, not affected by medium transformation, not affected by dielectric constant, can be measured in the liquid solid. Applications: solid material measuring Pipe length: 200mm Process connection: thread/flange Process temperature: standard type: -50~150 ° C high temperature type: -50~250 ° C Process pressure: -0.1~2.5 Mpa Ambient temperature: -40~70 ° C Frequency: about 150Hz Output signal: relay (two group of normally open and normally closed contacts) transistor PNP Contact capacity: 24V DC/8a; 220V AC/5A Explosion protection grade: Exd IIC T6 Gb Protection rating: aluminum IP67/plastic IP66
 MDFL45	Features: not affected by external vibration, not affected by medium transformation, not affected by dielectric constant, can be measured in the liquid solid. Applications: solid material measuring Pipe length: 200~2000mm Process connection: thread/flange Process temperature: standard type: -50~150 ° C high temperature type: -50~250 ° C Process pressure: -0.1~2.5 Mpa Ambient temperature: -40~70 ° C Frequency: about 150Hz Output signal: relay (two groups of normally open and normally closed contacts) transistor PNP Contact capacity: 24V DC/8a; 220V AC/5A Explosion protection grade: Exd IIC T6 Gb Protection rating: aluminum IP67/plastic IP66

3.Installation

3.1 Basic requirements

In principle, the tuning fork can be installed in any position, the installation of instrumentation only note that the tuning fork must be located at the desired switch point height.

Attention:

① solid tuning fork should be installed at the desired switch point height.

② if the density of the solid material to be measured is different from that of the factory setting (> 0.02 g/cm³) , the instrument can be adjusted for the solid material with density > 0.008 g/cm³

③In the hopper of solid material, it is easy to form a cone-shaped material pile, which can change the switch point and cause the switch function failure.

3.2 Installation instructions

① MDFL44 is side mounted to achieve the most accurate alarm point possible. If the switch point is allowed to move within a few centimeters, please tilt the MDFL44 down 20 ° to install it so as not to deposit on it. The more narrow storage tank, the use of top loading;

② MDFL45 is top mounted.

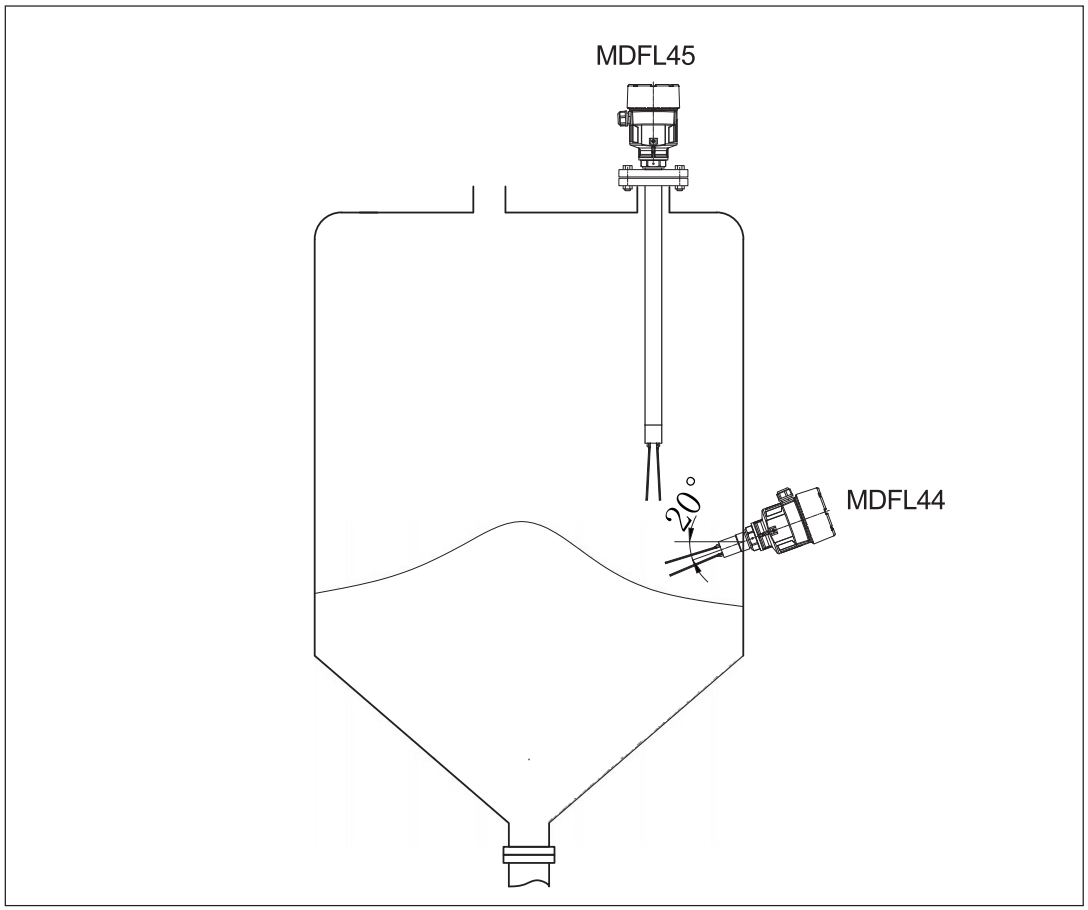


Figure 2

Typical bad installation

Can not be installed in the feeding port or mixing device easily affected location, at the same time note: outdoor installation should take shading, rain-proof measures

①Right
②wrong

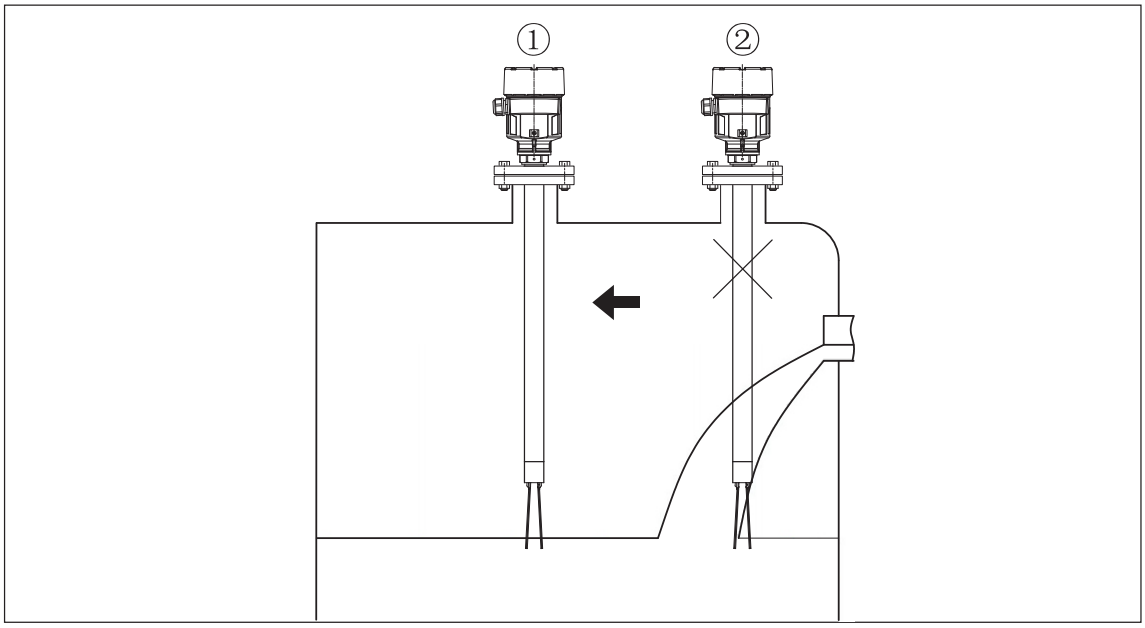


Figure 3

Dampproof

For installation in outdoor or wet environment, should tighten the cable sealing sleeve, and to make the cable down into U-shaped inlet. Here it is:

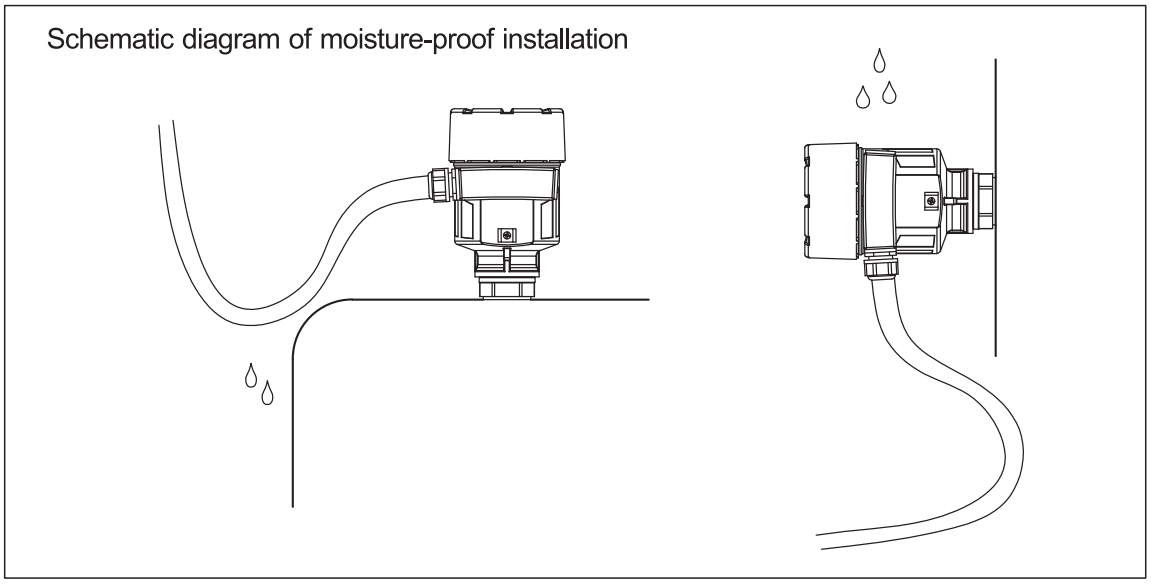


Figure 4

Protection rating

This instrument fully meets the protection grade IP67 requirements, please ensure that the cable sealing head waterproof. Below:

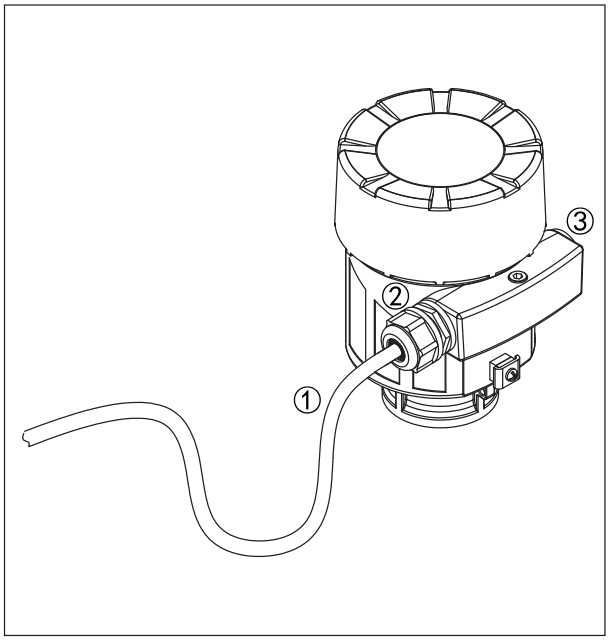


Figure 5

How to ensure that the installation meets IP67 requirements:

- Please make sure the sealing head is not damaged
- Please make sure the cable is not damaged
- Please ensure that the cable used meets the requirements of the electrical connection specification by bending the cable downward before entering the electrical interface to ensure that water does not flow into the housing, See①
- Please tighten the cable seal head, See②
- Please tighten the unused electrical interface with blind plug, see③

Adhesive medium

When mounted horizontally in an adhesive medium, the tuning fork face should be kept as vertical as possible to minimize sediment on the tuning fork. There is a mark on the threaded hexagon so that you can check the position of the tuning fork when you screw it in. If the hexagon is on the gasket, you can also continue to rotate the thread about half a turn, so that the recommended position can be fully achieved.

For the flange type, the tuning fork is aimed at the flange hole.

In adhesive media, tuning fork should be as far as possible unshielded into the container, so as to prevent deposition. Therefore, the use of flanged bushings and screw-in joints should be avoided during horizontal installation.

The medium of flow

In order to make tuning fork as little as possible in the movement of the media resistance.

The tuning fork shall be parallel to the motion of the medium.

4.Electrical connection

- Safety tip: only allow wiring in the state of power failure.
- Power supply: electronic plug-ins with relay output have Class I protection. To maintain this level of protection, the grounding wire must be connected to an internal grounding wire
- connection terminal.

Connecting cable: this instrument and the market common without shielding three-core wire cable connected. Shielded cables should be used if the expected electromagnetic spurious values exceed the standard test values applicable to the industrial field. Please use cable with round section, diameter 6 ~ 9mm cable, ensure the sealing of cable thread joint. If you are using cables with other diameters or cross sections, replace the seals or use a suitable threaded connection for the cable.

- Explosion-proof application connection cable: Please use the approved cable threaded connection in the explosion-proof area.

- Wiring procedure:

For explosion-proof instruments, the housing cover may be opened only if an explosive atmosphere is not present.

The steps are as follows:

① Unscrew the cover

② Loosen the lock nut on the cable threaded joint

③Remove about 10 cm of skin from the connecting cable and about 1 cm of insulation from the end of the core wire

④ Insert the cable through the cable threaded connector into the instrument housing

⑤ Open the connecting terminal with a screwdriver

⑥ Insert the mandrel end into the open terminal according to the wiring diagram

⑦ Tighten the connecting terminals with a screwdriver

⑧ The position of the wire in the terminal can be checked by pulling it lightly

⑨ Tighten the lock nut of the threaded connection of the cable. The sealing ring must completely enclose the surrounding cable

⑩ Screw on the housing cover, electrical connection is completed.

5.Technical Parameters

General parameters

Model	MDFL44	MDFL45
Process connection	G1½ A	G1½ A
	flange	flange
Tuning fork material	316L	316L

The shell

-The shell	Aluminium
-Shell window material	PC
-Ground terminal	304 stainless steel
-Sealed	Fluorine glue

Weight

-MDFL44	≈2.0Kg (Depends on the process connection, take-over length, and housing)
-MDFL45	≈1.875~2.0Kg (Depends on the process connection, take-over length, and housing)

Power supply

Supply voltage	24V DC 220V AC
Output signal	Relay (two sets of normally open and normally closed contacts)/transistor PNP
Contact capacity	24V DC/8A; 220V AC/5A

Cable parameters

Cable terminal	One M20 × 1.5 cable connector (cable diameter 6~9 mm)
	One blind plug (M20 × 1.5)
Terminal	Cross section of a wire 2.5²mm
Relative ambient humidity	45 ~ 75 %

Medium density

- Standards	>0.2g/cm³
- Adjustable	>0.08g/cm³

Switch Lag

- When cover up	0.5 s
-When naked	1 s
Output frequency	About 150 Hz

Process conditions

Measurement variables	Limit level of solids
Process pressure	-1 ~ 25 bar/-100 ~ 2500 kPa The process pressure depends on the process joint, such as flange, etc.

Process temperature

The temperature below the thread or flange	-50 ~ 150°C
Thread or flange temperature (with high temperature fit)	-50 ~ 250°C

Adjustment element

Run the mode switch	
H	Maximum level measurement or overflow protection /overflow protection
L	Minimum level measurement or dry run protection

Switching power

H	About 0.45 W
L	About 0.1 W

Electrical protection measures

Protection	Aluminum IP67/plastic IP66
Overvoltage level	III
Protection level	I

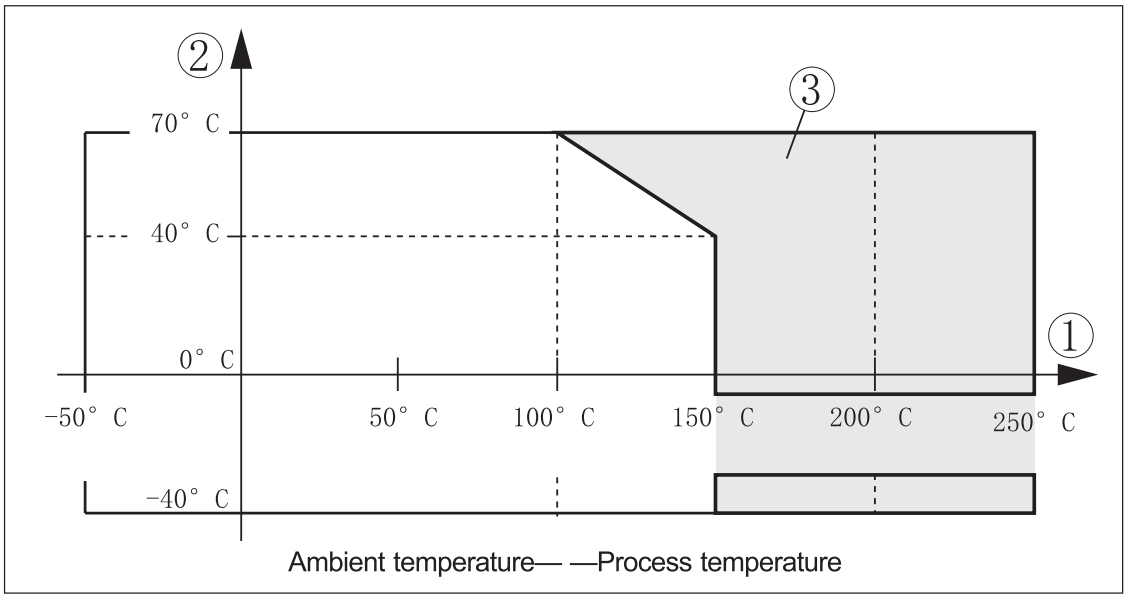


Figure 6

① Process temperature
② Ambient temperature
③ Temperature range with temperature connection element

6. Wiring

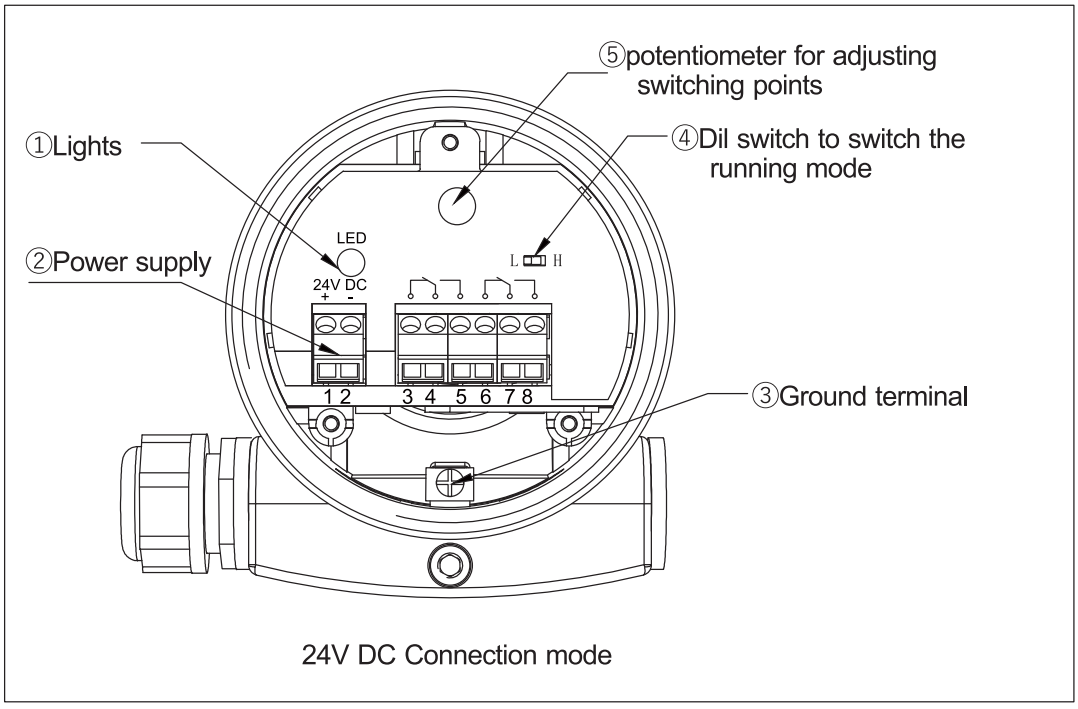


Figure 7

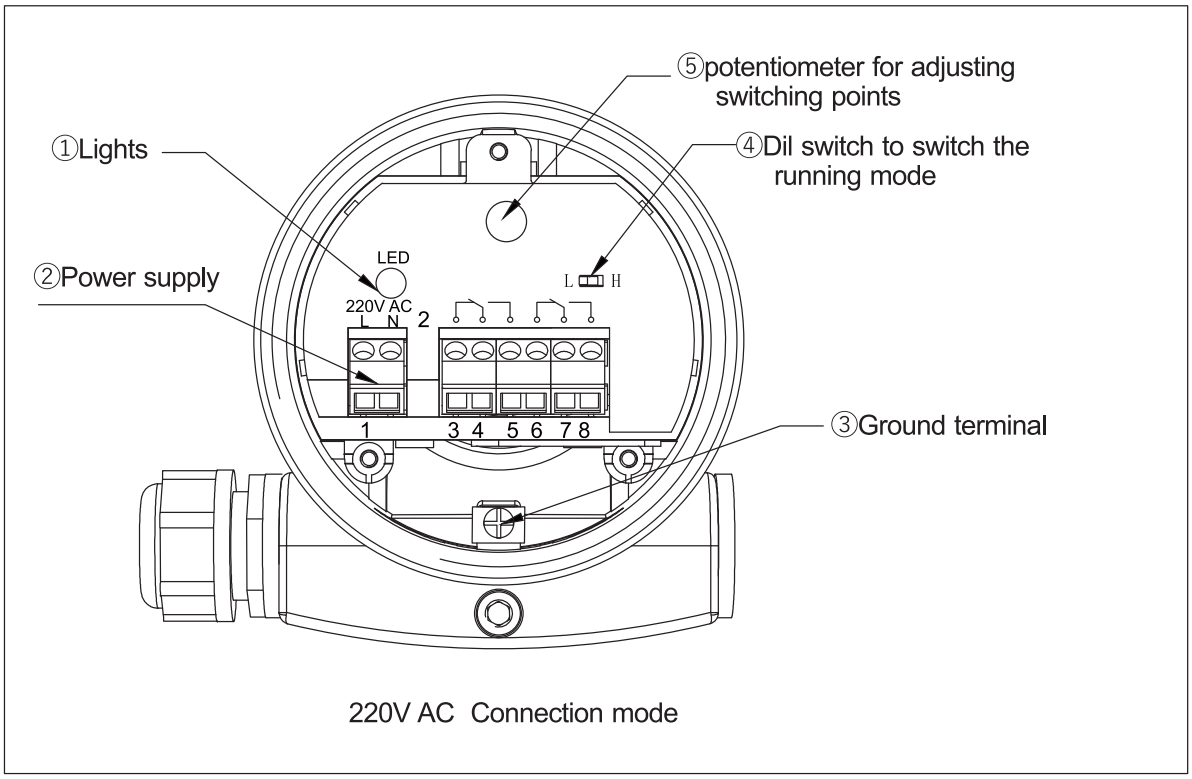


Figure 8

Terminal definition:

(1)1, 2 Power supply； (2)3,6Normally closed contacts； (3)4,7Public End；

(4)5,8Always Open contacts

Wiring diagram

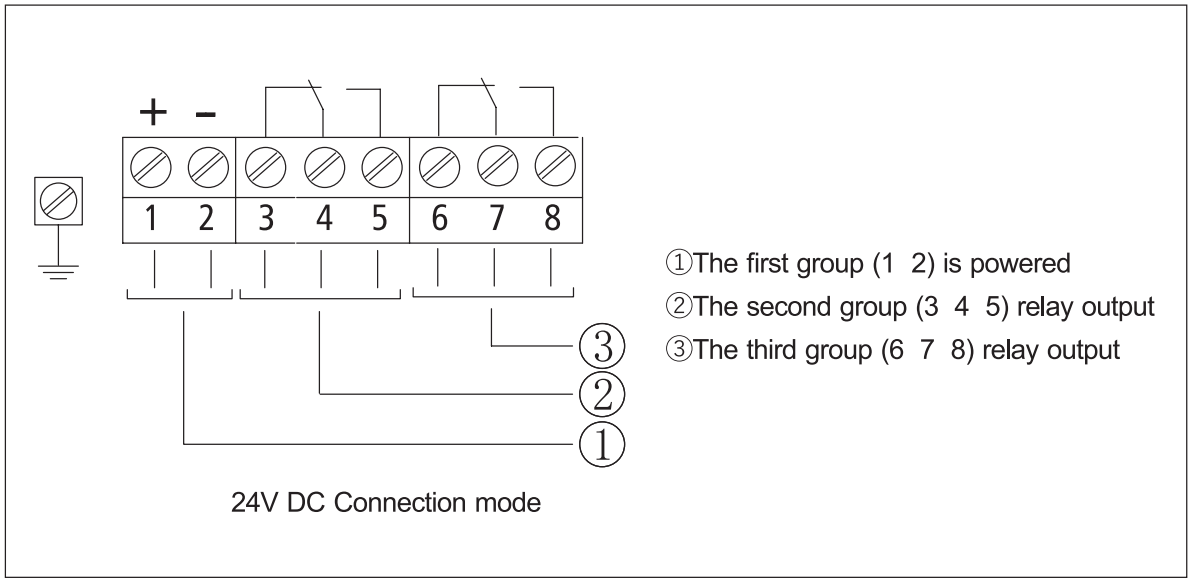
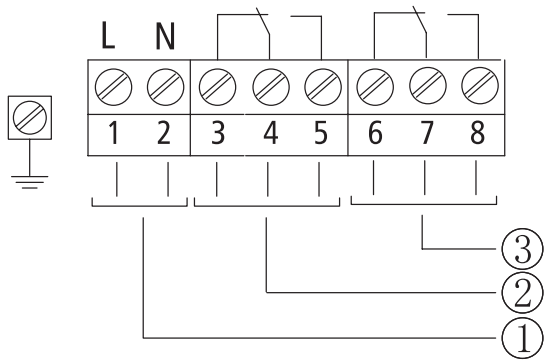


Figure 9



①The first group (1 2) is powered
②The second group (3 4 5) relay output
③The third group (6 7 8) relay output

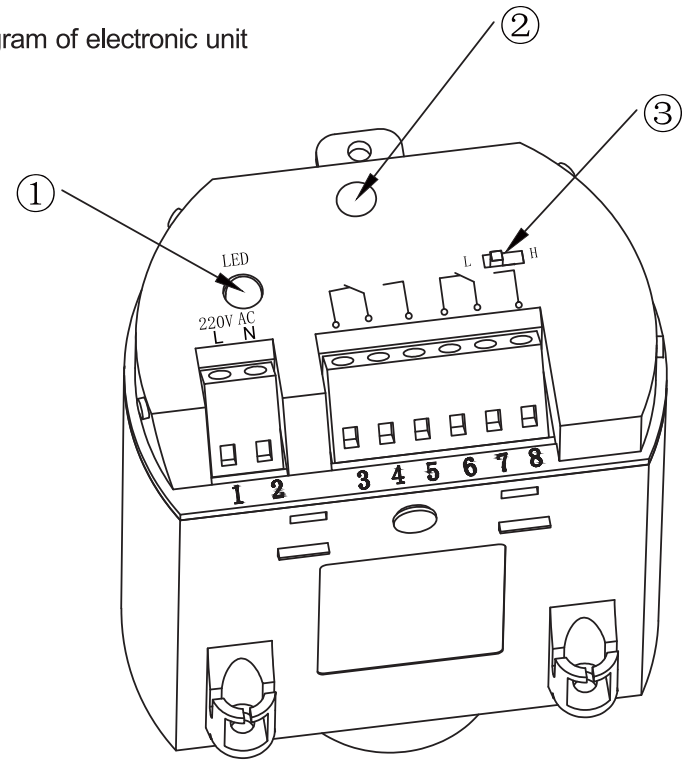
220V AC Connection mode

Figure 10

7.Instrument commissioning

7.1 Adjust the switch

Schematic diagram of electronic unit



① Control Lights
② Potentiometers are used to adjust to the density of the medium
③ Dil switch for switching operation mode-high/low

Figure 11

Tip: usually set the running mode with the running mode Switch ③ before debugging the solid tuning fork. If switching to the running mode switch ③ , the output of the switch will change and the downstream instrument may be operated.

Control Lights① light used to indicate the status of a switch

Green = conductive relay

Red = relay no current

Red light (flashing) = fault

Adjust Switch Point ②

The switch point is adjusted by rotating potentiometer to suit solid material. The factory default only needs to be changed in critical conditions.

The potentiometer of the solid tuning fork is positioned at the right stop (> 0.02 g/cm³ or 0.0008 lbs/in³) at the time of manufacture. In the case of extremely light solids, the potentiometer rotates to the left stop (0.008 g/cm³ or 0.0003 lbs/in³) . Solid-state tuning fork sensors will be more sensitive, allowing for more accurate detection of lightweight solids.

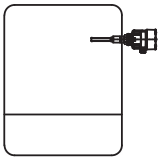
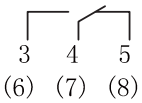
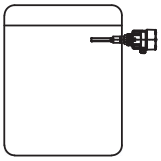
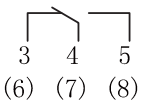
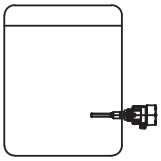
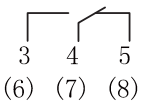
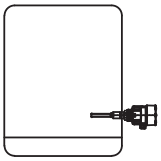
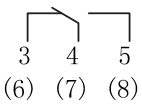
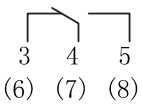
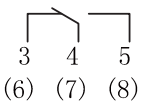
These settings do not apply to meters that detect solids in water. Factory on the adjustment of the switch point, not allowed to change.

Switch to run mode ③

The switching state of the relay can be changed by changing the operating mode (H/L) . You can then set the desired mode of operation (h-max position measurement or overflow protection, L-min position measurement or dry operation protection) according to the“Function sheet”.

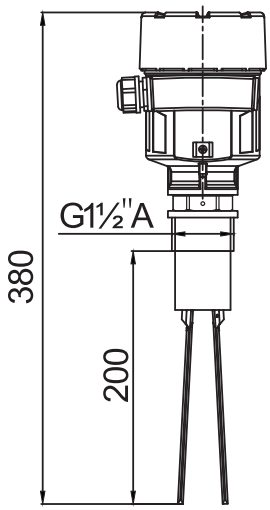
7.2 Function Table

The table below shows the switch state associated with the set operation mode and the level.

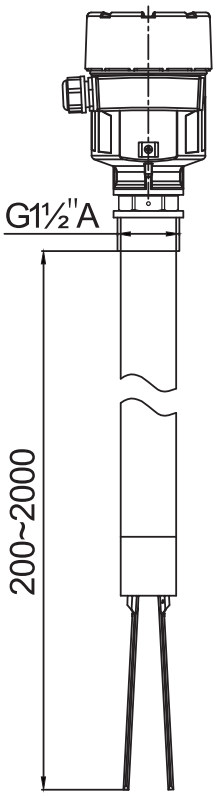
	Level	Switch state	Indicator lamp
Operation mode H overflow alarm		 Conductive relay	 Green
Operation mode H overflow alarm		 No current in relay	 Red
Operation mode L overflow alarm		 Conductive relay	 Green
Operation mode L overflow alarm		 No current in relay	 Red
Power supply interruption (operating mode H/L)	Arbitrary	 No current in relay	 Closing
Fault	Arbitrary	 No current in relay	 Flashing red light

8.Size (unit: mm)

MDFL44



MDFL45



9.Transport And Storage

In addition the transport and storage conditions of level transmitter shall be in accordance with the following requirements:

1. The material level Transmitter should be transported strictly according to the characteristics of the products and the requirements of the specifications.

2. The level gauge shall be stored in a dry ventilated room at -20 ~ 60°C with a relative humidity of not more than 80% . Not to be mixed with corrosive substances. After long-term storage of the instrument should be carried out the corresponding test before sale, use.

Address: 7191 Yonge street, Toronto, Canada

Tel: +16472221281(5 line)

Web: www.madecotech.com

Email: Info@madecotech.com