

# MADECO Series Smart RF Admittance Level Switch Operating Instruction

## Model: MDRF10



### 1. Product Overview

The intelligent Radio Frequency admittance level switch, as an optimal upgraded substitute product for traditional radio frequency admittance level switch and capacitance level switch, is a high-end instrument for point switching value measurement with the characteristics of stable performance and maintenance free. The traditional radio frequency admittance level switch can only be set by adjusting the sensitivity knob of the instrument and the parameters cannot be displayed, the settings are tedious during field application. The intelligent radio frequency admittance level switch, which is produced by our company, has unique LCD and all the measurement parameters of the instrument can be checked on LCD visually; meanwhile, the instrument can be set by one key during site application no matter it's empty or full. The instrument is widely used in chemical medicine, plastics, thin film, fodder, cereal, rubber, liquid, waste water, sand, food, mud, cement, powdery substance, coating, coal, granular solid, oil and pulp, etc.

## 2.Measurement Principle

There are capacitance characteristics between the detector bar of radio frequency admittance level switch and the metal canister wall, and forming a bridge circuit. The RF oscillating electronic signal generated by the oscillating circuit is imposed on the bridge. If the measured medium can not contacted the detector bar, the bridge is in balance state and there is no output signal. Whereas if the measured medium is filled between the detector bar and the metal canister wall, since the electrical property of the measured medium is not the same with those of air, imbalance will be caused to the bridge circuit, and then, the output signal will be

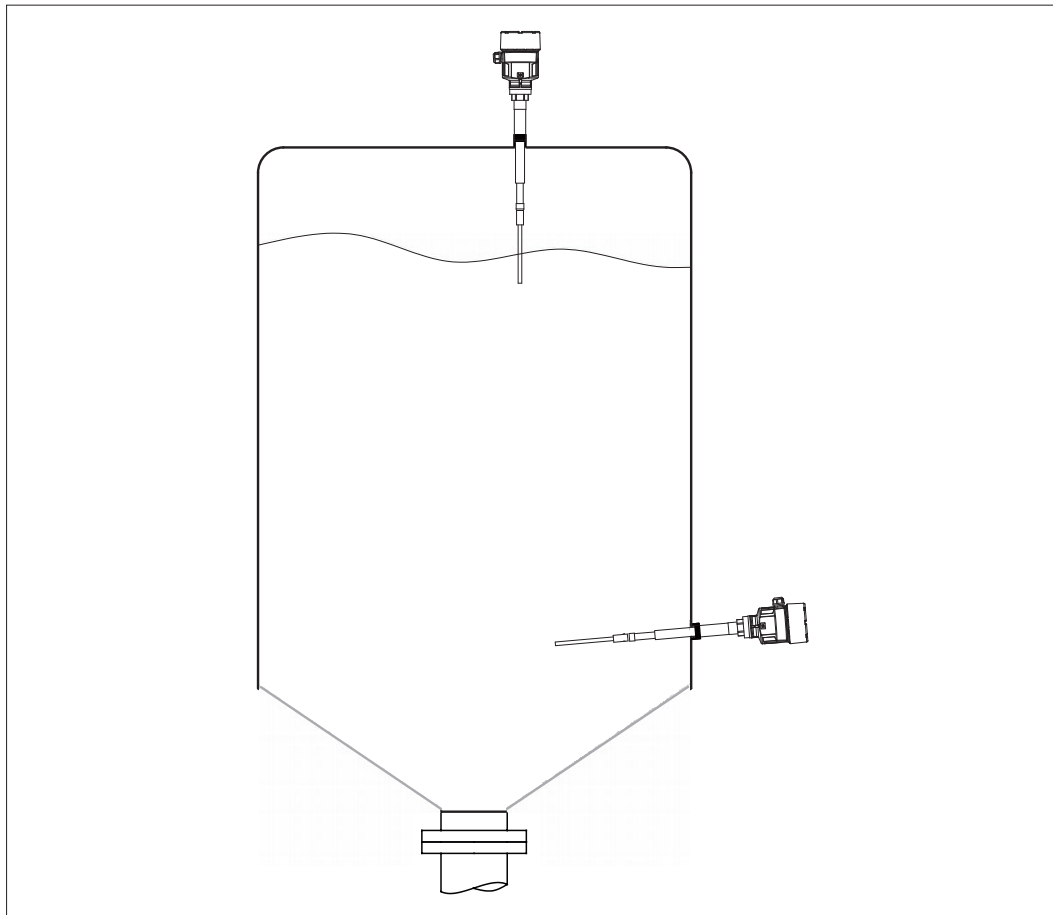






Fig 1

### 3.Introduction to Instrument

Modle	MDRF10	MDRF11	MDRF12	MDRF13
Picture				
Features	LCD display, programmable, adjustable return difference, a key set empty, full bin, a key set high and low level alarm.			
Application	Solid material switch measurement	Liquid switch measurement	High temperature type solid material switch measurement	Corrosive liquid switch measurement
Process temperature	-40°C ~ 200°C	-40°C ~ 150°C	-180°C ~ 500°C	-40°C ~ 150°C
Probe material	Stainless steel, PPS	Stainless steel, PTFE/FEP	Stainless steel, ceramic	Stainless steel, PTFE/FEP
Process connection	3/4"NPT thread/flange	3/4"NPT thread/flange	G1 1/2" A thread/flange	Composite anti-corrosion flange
Probe length	Standard type 350/500mm Customization 500~3000mm			
Power supply	24V DC/220V AC			
Relative humidity	≤ 85%			
Output signal	Relay (two sets of normally open and normally closed contacts) Transistor PNP			
Contact rating	24V DC/8A; 220V AC/5A			
Delay	0~99S(adjustable)			
Ambient temperature	-40~70°C			
Protection rating	Plastic case IP66/Aluminum case I P67			
Explosion-proof grade	Exd IIC T6 Gb			
Installation method	Top/side mount			

## 4. Mounting Requirements

### (1) Basic Requirements

RF admittance level switches can be mounted anywhere in the vessel as long as there is no contact between the probe and material. The distance between probes should be no less than 0.5m if the vessel is equipped with alarms of higher and lower level limits.

Pay attention to the following precautions during the selection of cable probe for switches control:

- ① The distance between probe and sidewall should be no less than 30 mm.
- ② When the steel cable probe measures solid particles, the roof of the vessel must be strong enough to withstand the downward pulling force of the medium.
- ③ It's recommended to use tightening loops at the bottom to bear the min. horizontal force when measuring by steel cable probe.

During the mounting of the standard model, the insulation part needs to be extended over 30mm out from the connecting pipe to avoid malfunction caused by stockpile of materials in pipe; or the sensitivity cannot be adjusted since the distance between the connecting pipe and the detector bar is too close. (Fig 2)

The detector bar and the canister wall should keep at least 300mm during the mounting. (Fig 3)

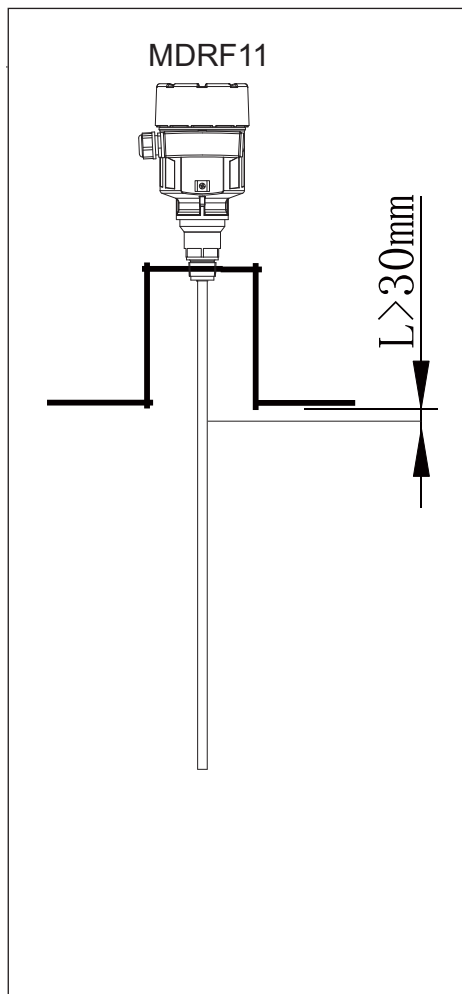


Fig 2

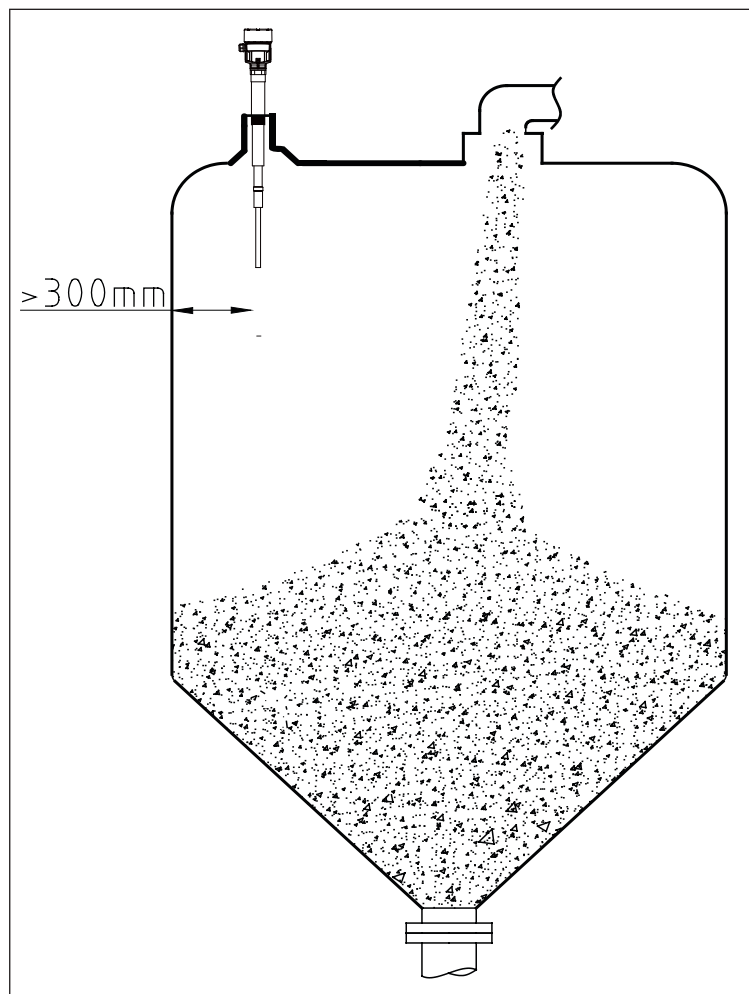


Fig 3

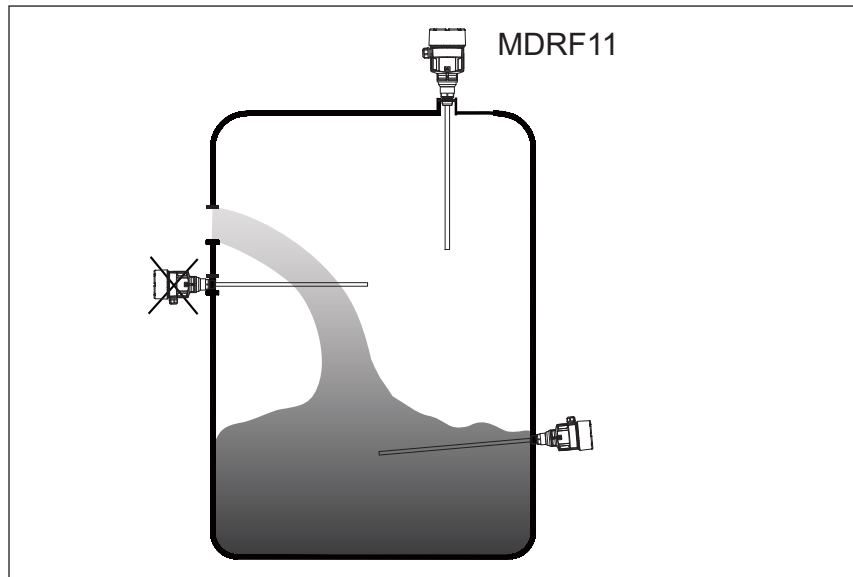


Fig 4

If the RF admittance level switch is used to measure liquid, please do not be installed under the water inlet to avoid malfunction caused by water (or other liquids) dripping on the probe.

### (3) Stirring

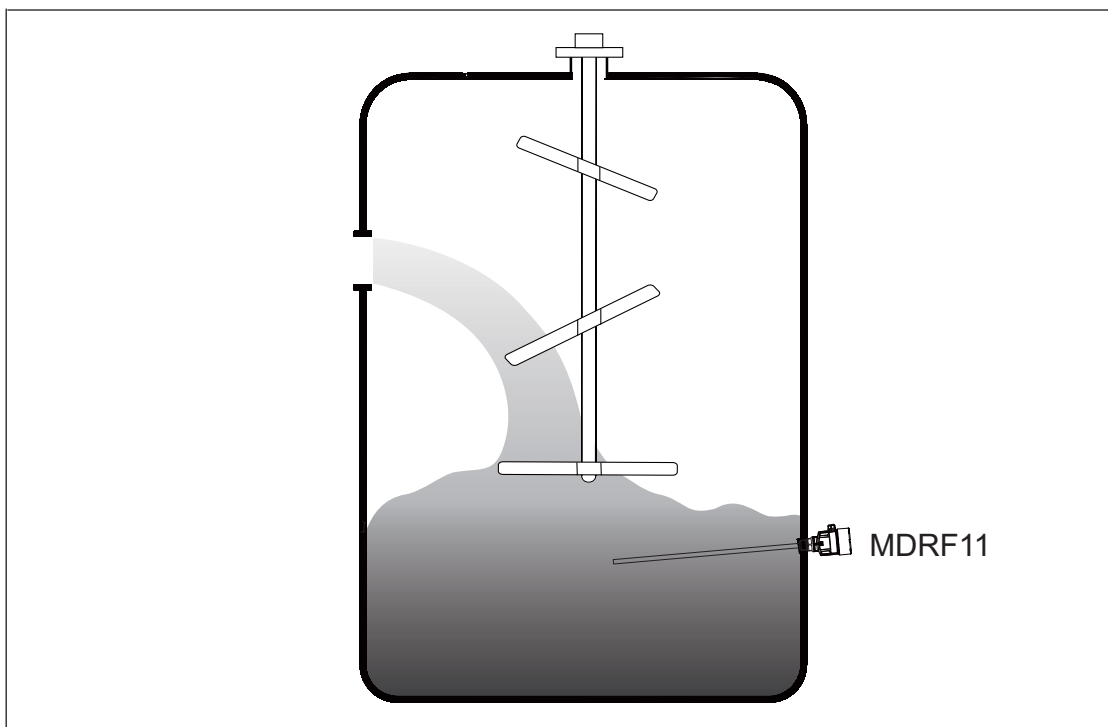


Fig 5

If the radio frequency admittance level switch is mounted in a canister with stirring device, delay function should be set to avoid malfunction caused by fluctuation.

## 5. Electrical connection

Voltage supply	24V DC;220V AC
The mounting of the connection cable	Ordinary cables could be used for power supply, with an outer diameter of 5 ~ 9 mm to ensure the sealing of cable inlet.

Connection of wiring connection

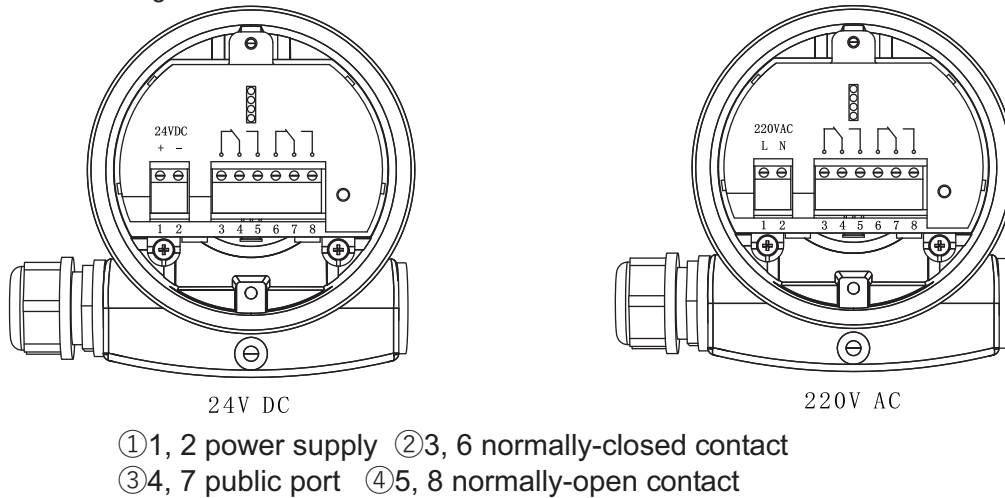


Fig 6

## 6. Technical Parameters

Product model	MDRF10	MDRF11	MDRF12	MDRF13
Process connection	Thread ¾" NPT	Thread ¾" NPT	Thread G1½A	Composite anti-corrosion flange
	Flange	Flange	Flange	
Material of the antenna	Stainless steel /PPS	Stainless steel /PTFE/FEP	Stainless steel /Porcelain	Stainless steel, PTFE/FEP
Weight (depends on process fitting)	1.2KG	1.2KG	3KG	3KG <sup>+</sup> Weight of flange
Voltage supply	24V DC/220V AC			
Cable parameters	Cable inlet/ male plug	One cable inlet M20×1.5 (cable diameter 6~9mm) One plug M20×1.5		
	Spring clamp Terminal	Cross section of conducting wire 2.5mm <sup>2</sup>		
Parameters of output	Output signal	Relay (two sets of normally open and normally closed contacts) Transistor PNP		
	Output delay	24V DC/8A ;220V AC/5A		
	Capacitance of contact	0~99s		
Housing	Housing Material	AL		
	Housing Sealing	Fluoroelastomer		
	Display on the upper lid	PC		
	Grounding terminal	Stainless steel		

## 7. Display/Adjustment Setting Module Menu

The four keys on programmable display can be used for the setting of instrument parameters (as shown in the picture below). Normally the programmable display is used on site display after commissioning or it may be removed.

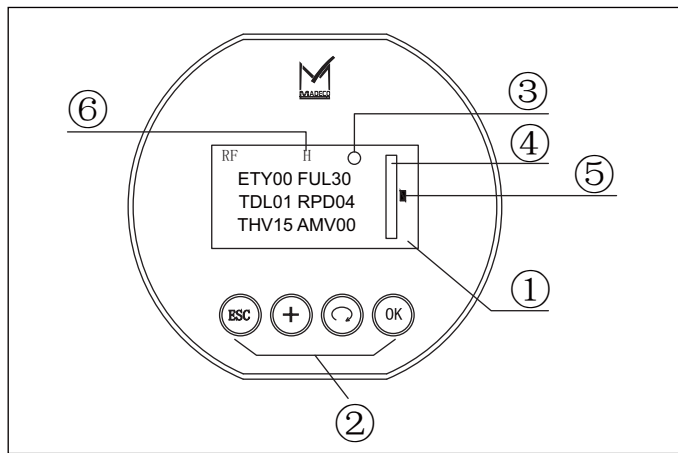


Fig 7

### (1) Interface Operating Instructions

①LCD display ②Button ③Relay triggering indicator (○ means the relay is always open,● means the relay is closed after triggered) ④Measurement value display ⑤ Hysteresis error range ⑥Display of high and low level

- ▶ Empty: measurement value or set value when the material level is empty
- ▶ Full: measurement value or set value when the material level is full
- ▶ Delay: trigger delay time of relay (unit: Second)
- ▶ Threshold value:

#### Alarm threshold value of high material level switch:

$$\text{Alarm condition} = \left( \frac{\text{Full value} + \text{Empty value} + \text{return difference}}{2} \right)$$

\*continuous holding time is greater than or equals to delay time

Cancel alarm

$$\text{condition} = \left( \frac{\text{Full value} + \text{Empty value} - \text{return difference}}{2} \right)$$

\*continuous holding time is greater than or equals to delay time

#### ▶ Alarm threshold value of low material level switch:

$$\text{Alarm condition} = \left( \frac{\text{Full value} + \text{Empty value} - \text{return difference}}{2} \right)$$

-1 \*continuous holding time is greater than or equals to delay time

Cancel alarm

$$\text{condition} = \left( \frac{\text{Full value} + \text{Empty value} + \text{return difference}}{2} \right)$$

\*continuous holding time is greater than or equals to delay time

- ▶ Actual measurement: actual measurement value (displayed in relative %)

## (2) Operating Instructions

Manual setting: empty, full, delay, return difference.

Press **OK** key enter into manual setting; select the setting parameters for manual modification;

Continuously press **OK** key for selection in sequence: press **OK** key to select [Empty]; and then press **OK** key to select [Full]; and then press **OK** key to select [Delay]; and then press **OK** key to select [Return difference]; the selected parameters will be displayed in black. After selecting the to-be-modified parameters, press **+** key and **↺** key to plus or minus parameter.

After settings, press **ESC** key to exit manual setting status. (or the system will exit manual setting on itself if no button is pressed over 2 minutes after setting)

### ► Operation of Shortcut Keys

Set full value: press **ESC** key + **+** key while making the current system measurement as full value. (Normally its used when the measured object is in full material level)

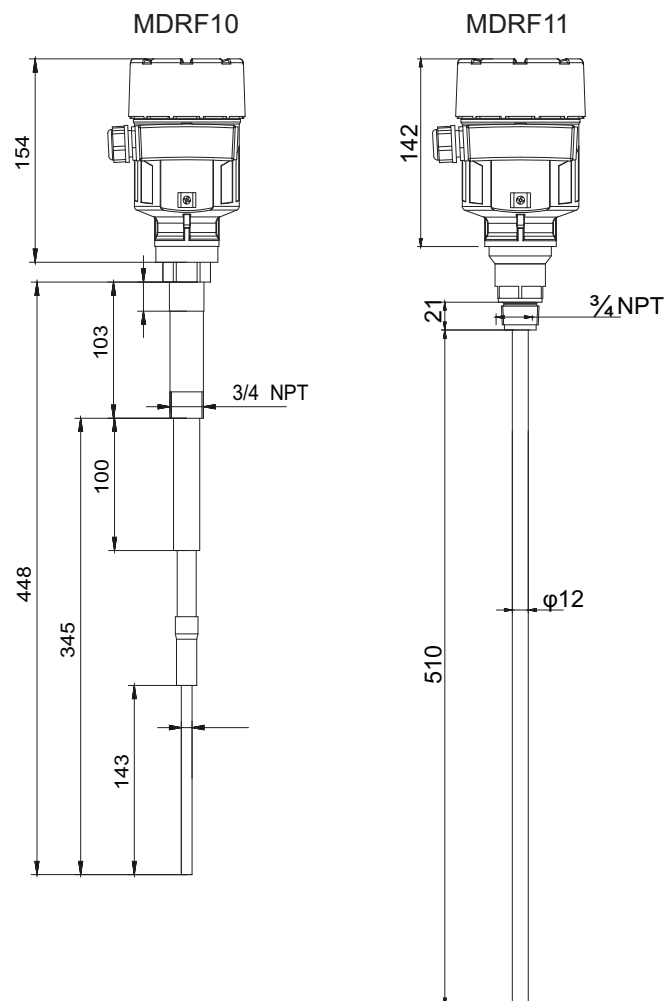
Set empty value: press **ESC** key + **↺** key while making the current system measurement as empty value. (Normally its used when the measured object is in empty material level)

System restores default value: press **+** key + **↺** key at the same time, the empty value, full value, delay value and return difference value will be set as the restores default value.

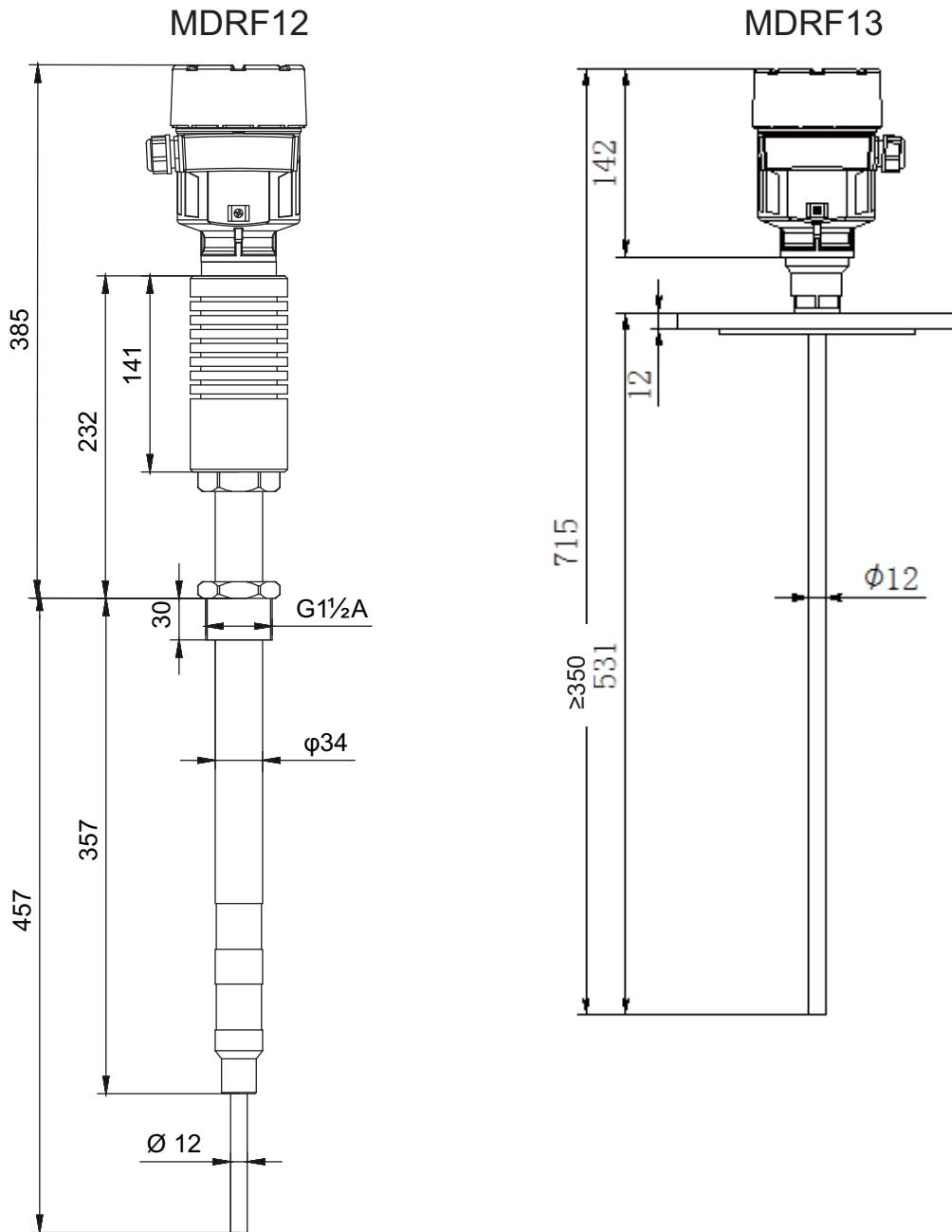
Switch high/low material level: press **+** key and **OK** key at the same time.

Switch Chinese/English: press **ESC** key and **OK** key at the same time.

## 8. Structure & Dimension (Unit: mm)







## 9. Transport and storage

In addition to the requirements of JBT9329, the transport and storage conditions of Nullah flowmeters shall comply with the following requirements:

1. Nullah flowmeters shall be transported in strict accordance with product characteristics and specifications during transportation.
2. Nullah flow meters should be stored in dry ventilated rooms with a relative humidity of  $-20 \hat{a} \text{ } ^\circ \text{C}$  to  $60 \hat{a} \text{ } ^\circ \text{C}$  and not more than 80% . Do not mix with corrosive substances. After long-term storage of the instrument should be carried out after the corresponding test can be sold, use.