

General Information

HTM-Series

Vibration Type Level Switch



General Information



HITROL CO., LTD.

General

Vibration type level switch is solid state sensor. Level limit switches based on the tuning fork damping principle are eminently suitable for a wide range of bulk materials.

Principle

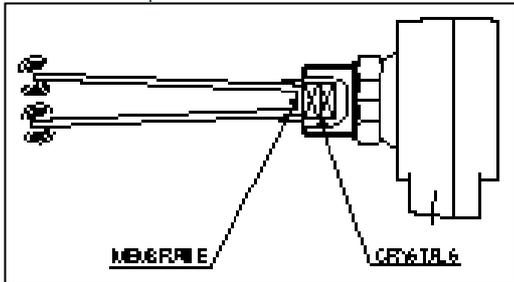


Fig. 1

Vibration damping is used to detect the level.

The system consist of two stainless steel tines mounted on a membrane. It has a natural resonance of approximately 80 Hz and operates on the tuning fork principle.

Two piezoelectric crystals are mounted on the membrane. One of these crystals is driven by an 80 Hz oscillator, causing the system to resonate when the fork is free of the product, see Fig. 1.

When the product then produces a damping effect on the system, the second crystal will no longer produce the voltage and the amplifier will switch. Because relatively little power is needed to dampen the resonant frequency, a tuning fork level limit switch is capable of detecting levels in products with very low relative density i. e. 30 kg/m³

Specifications

Model	HTM 230	HTM 330	HTM 430
Mounting Method	Screw Flange		
Mounting Size	1-1/2Inch PT	2Inch Flange	
Working Pressure	10 kgf/cm ²		
Process Temp.	Max. 80 °C	Max. 60 °C	Max. 80 °C
Enclosure	Weather-Proof		
Conduit Conn.	2-1/2 PF(F)		
Material	Connector	SUS 316	
	Tuning Fork	SUS 316	
	Extension Tube		SUS 304(or 316)
	Extension Cable	Rubber	
Ambient Temp.	-20 °C ~ +60 °C (amp. unit)		
Power Source	AC 110 or 220 V, 60 Hz / DC 24V		
Power Consumption	Max. 3.8 VA / Max. 1.2VA		
Fail Safe	Max. / Min. switchable		
Output Signal	1-DPDT		
Contact Rating	AC 220 V, 5 A / DC 28 V, 1 A		

Practical Application

In the first model, the tuning fork, mounting boss and relay amplifier are in a single integrated unit known as the compact. The tuning fork level switch

can be mounted horizontally in a silo or hopper wall, provided that the tines of the fork are mounted in a horizontal and not a vertical plane, thus allowing the product to fall between them.

In the second type, a strong cable no longer than 6 m connects the fork and amplifier. This enables the amplifier to be mounted on the silo roof, for example, with the tuning fork suspended in the silo. The length of cable will then determine the height of the level switching point.

The third type is fitted with an extension tube between the fork and mounting boss, thus forming a single rigid structure which can, for example, be mounted at an angle in a cyclone. Beside the above standard models, there are two additional models of Ex d IIc T4(Class 1 region) for using at flammable environment, and have an operation mounting device in order to use for a very critical process.

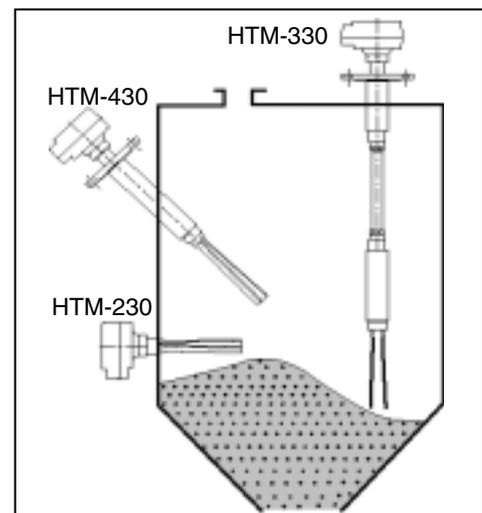


Fig. 2

Installation

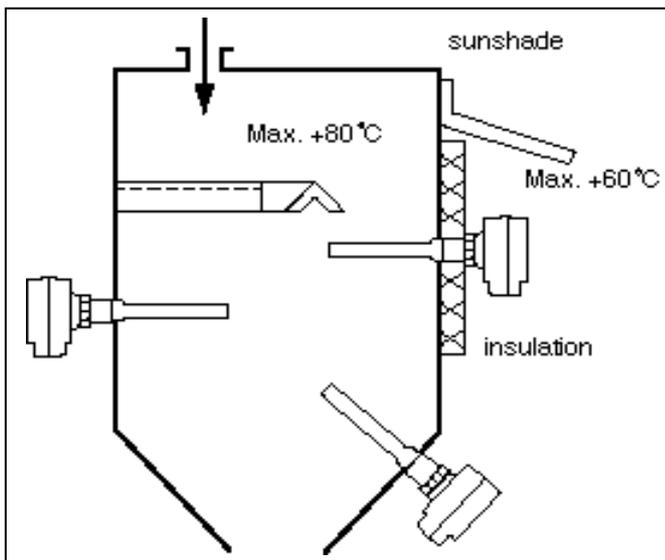
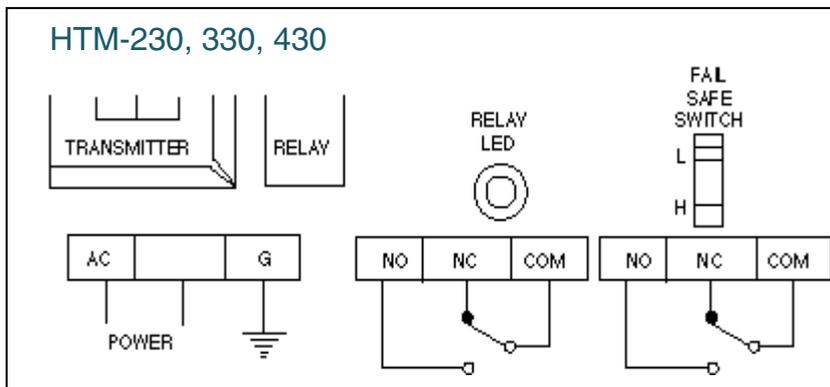


Fig. 3

Types using an extension cable or metallic tube should be vertically installed. However, for a type that tuning fork is suspended to the mounting boss, it should be paid attention for the following three points (see Fig.3).

- Material to be measured should not fall between tines.
- It should be vertically installed to the direction for the wider fork, and refer the reference mark on the mounting boss,
- The length of threaded socket should not over 23 mm. If it becomes over 23 mm, it has a high possibility to make errors due to dust and other materials.

Adjustment Method



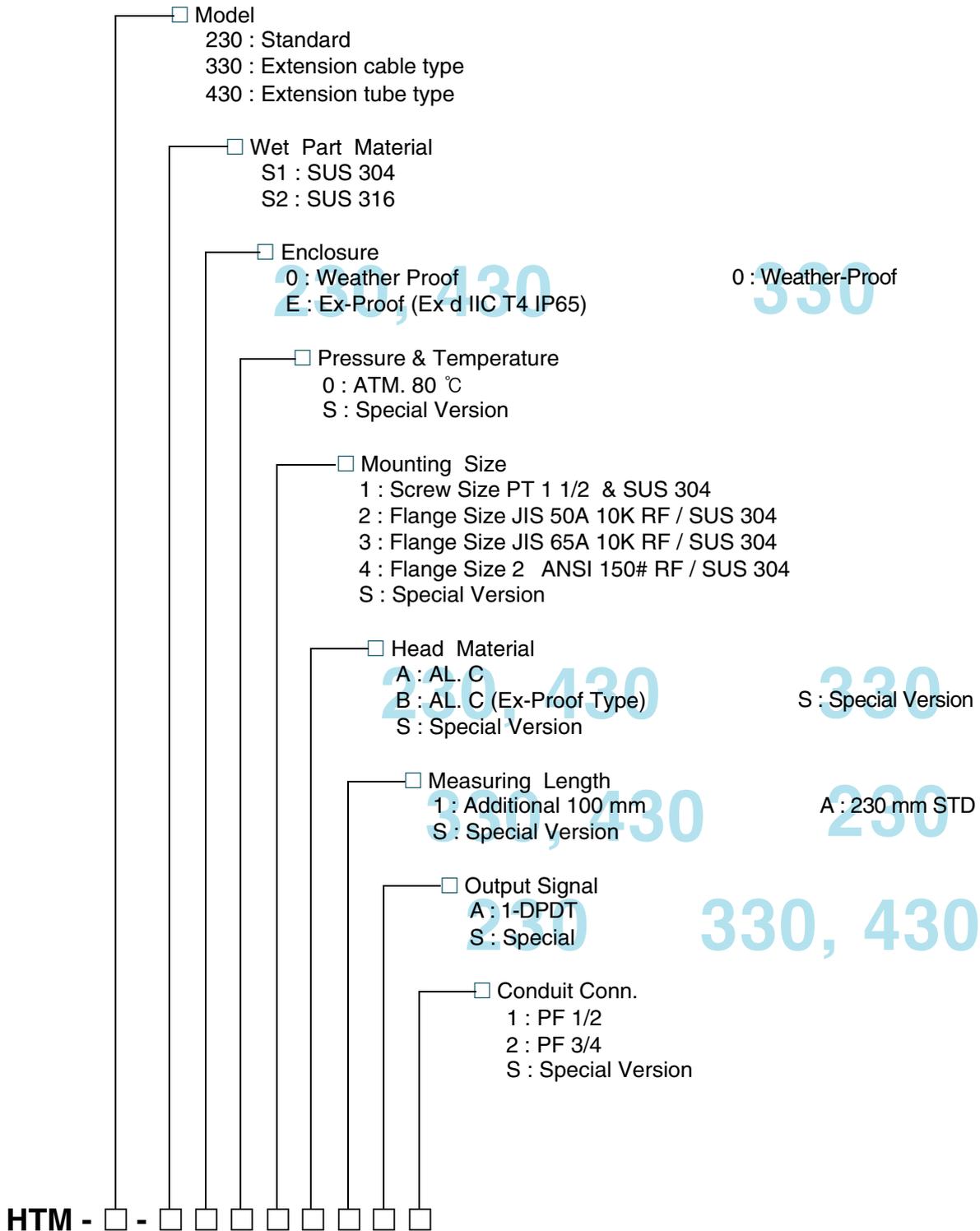
- Check that material to be measured is not in contact with the tuning fork.
- Set up the fail safe switch to H.
- Check the vibration of the tuning fork after power is supplied.
- Check the LED's turn on and vibration of the tuning fork after filling up the material to be measured.
- When it is used for HIGH LEVEL FAIL SAFE, the switch should be set up at L. At this time, LED and RELAY will turn on.

The level switch using principle of suppression of fork's vibration is suitable for most of the bulk material, however, following restriction should be applied for the practical use.

- Maximum environmental temperature
 - Maximum pressure
 - Maximum size of particles
 - When other products and circuits should be attached.
- Polystyrene particles Powdered milk Washing powders
 Plastic granules sawdust shavings

Application

ORDER CODES



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