

ChuteMaster

Microwave-blocked chute detection and point level instrument

ChuteMaster microwave-blocked chute detector prevents blockages in bulk solid and powder applications

Measurement made easy

Ease of use

- Very simple operating principle
- No complicated settings to adjust
- Simply adjust switching density and hysteresis timers

Reduced installation cost

- Can be powered by AC-power or DC-power
- Does not require perfect alignment between receiver and transmitter
- Output is simply a relay
- Optional mounting bracket further eases installation

Works in the most difficult conditions

- Works in dusty environments
- Works with dust or particle buildup
- Works in difficult industrial applications with large rocks
- Works through smoke and vapors



Prevents

- Blocking, bridging or jamming often seen when transporting bulk solid materials around a plant
- Severe site problems including lost production, crippled and damaged plant, lost material and long down times.

Safety

- Microwave signal is 100% safe

Applicable to a wide range of materials including:

- Coal
- Rock
- Powders
- Feed pellets
- Sawdust
- Chemicals
- Cement
- Resin
- Stucco
- Regrind

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ChuteMaster uses non-contact microwave energy to detect when a chute is blocked. The microwave transmitter in ChuteMaster emits an average power density of less than 0.05 mW/cm^2 . Therefore, there is no need for any warning signs, shielding or protection and it is regarded as completely safe.

A pulse of microwave energy emits from the transmitter at the speed of light and is detected by the receiver. When the microwave signal passes through an object, some of the signal may be absorbed or reflected, with a portion of the signal passing through to the receiver. How much of the signal passes through depends of the composition of this object. Microwave is absorbed by water content and reflected by conductive materials.

For this reason the received signal will be much lower when passing through metals and materials with a high water content.

A potentiometer adjusts the sensitivity on the receiver so that the relay can switch at an approximate amount of obstruction. By adjusting this potentiometer you can compensate for some material build-up on the side of the vessel. Adjustable time delays are incorporated to allow delay of relay switching.

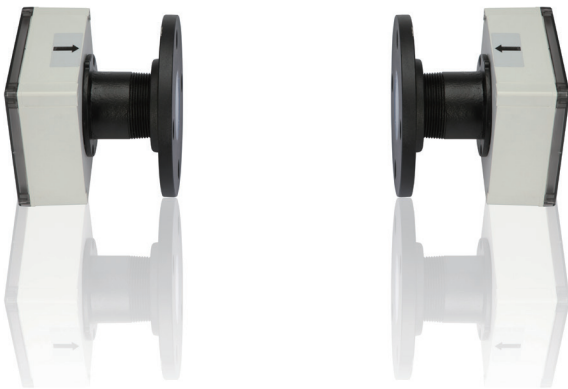


Fig.1: Microwave energy emits from the transmitter and is detected by the receiver

Applicable to a wide range of materials

The switching point is the amount of microwave energy at which the relay switches. This switching point is adjustable, allowing it to work on a wide range of materials.

The ideal switching point is where the beam is unaffected by the installed window and product falling between transmitter and receiver. The instrument will only trigger when the material builds up and breaks the trigger for a longer period of time

For this purpose, the switching timers can be adjusted from a fast 100 ms up to 30 s. Using the timer, we can control how long the beam needs to be broken before the relay is switched. There is a separate timer for switch on and switch off.

Adjusting the switching point and timers allow the instrument to be used on material with high absorption or reflective properties and on materials where absorption or reflective properties are low.

Safe to use

Common public perception that microwave signals are dangerous, but when the energy is limited there is no need to be concerned.

Using ChuteMaster is just as safe as using a cellular phone or standing close to a closed microwave oven. The energy emitted by ChuteMaster is between 5% and 10% of the approved safe energy for microwave signals.

Easy to set up

ChuteMaster does not require to be aligned 100% accurately, making sure installation is easy to do without the need for millimeter precision. Setting up sensitivity is done by the adjusting one sensitivity setting on the receiver. Switching times are independently managed using individual settings. No complicated settings are needed to get an application running with ChuteMaster.

Optional mounting bracket

ChuteMaster can function in processes with high temperatures, aggressive materials, high vibration and physical damage such as falling rocks. This is done by separating ChuteMaster from the process using a window which allows the microwave signal to pass. Examples of ideal materials for this window are glass and polyurethane.

The optional mounting bracket is a flange with a window of polyurethane. This is the ideal way to protect ChuteMaster from harm in the process while allowing the microwave signal to pass.



Fig.2: The optional bracket makes installation easy and protects ChuteMaster

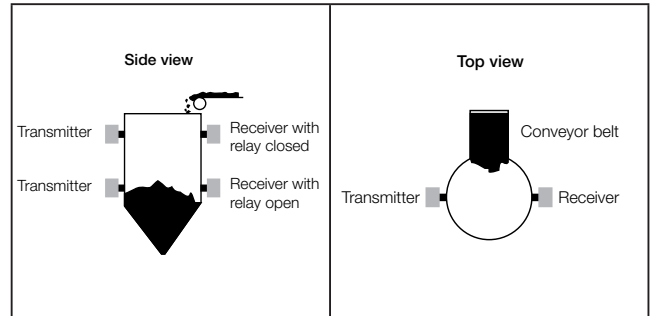


Fig.3: High / Low point level detection (conveyor-fed silo)



Fig.4: Conveyor-fed silo

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Specification

General

Range

10 m (33 ft.)

Response time

100 ms

Delay time

100 ms to 30 s

Operating frequency

24 GHz

Power density

< 0.05 mW/cm²

Display

Type

LEDs to display status

Transmitter

Red for power

Green for pulsing

Receiver

Red for power

Green for received signal

Red for relay status

Relay output

Number of relays

One relay as output

Relay response time

100 ms

Relay contacts

Single-pole changeover

Rating 5 A, 115 / 230 V AC, 5 A DC

Failsafe

Configurable as high / low set point using a jumper

Access to functions

Configuration

The device is configured using three potentiometers using a screwdriver. Configuration is only done on the receiver

Switching sensitivity

Configured by adjusting potentiometer marked 'Trigger'

Switching Delay

Configured for On and Off change using potentiometers marked 'Delay On' and 'Delay Off'

Failsafe

Relay failsafe can be set as high / low using jumper marked 'Relay Rev'

Mechanical data

Transmitter and receiver

IP65, Polycarbonate enclosure and powder-coated mild steel sensor

Enclosure dimensions

130 mm high x 130 mm wide x 61 mm deep

(5.1 in. high x 5.1 in. wide x 2.4 in. deep)

Sensor dimensions 66 mm x 51 mm

(2.6 in. x 2 in. NPT)

Weight 1.2 kg (2.7 lb) each

Transmitter cable entry types

1 x entry suitable for M20 or 0.5 in. NPT cable gland

Supplied with 1 x M20 cable gland

Receiver cable entry types

2 x entries suitable for M20 or 0.5 in. NPT cable glands

Supplied with 2 x M20 cable gland

Mounting using 2 in. NPT thread on sensor or using 4 screws

Power supply

Voltage requirements

110 V AC or 240 V AC \pm 15%, 50/60 Hz, 2 VA

(for transmitter and receiver)

24 V DC, 2 VA

(for transmitter and receiver)

Environmental data

Operating temperature limits

-30 to 65 °C

(-22 to 149 °F)

EMC

Emissions and immunity

Meets requirements of EN61326-3

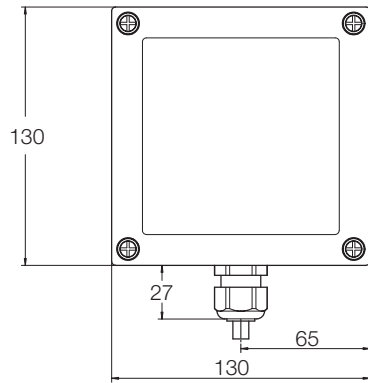
(for commercial environment)

EMC Directive 2006/95/EC

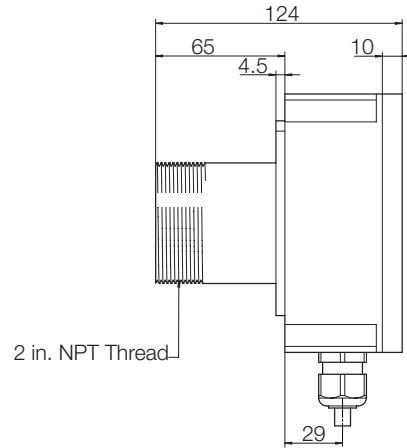
(IEC 61010-1)

Dimensions

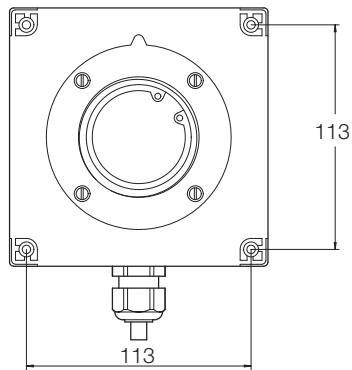
Dimensions in mm



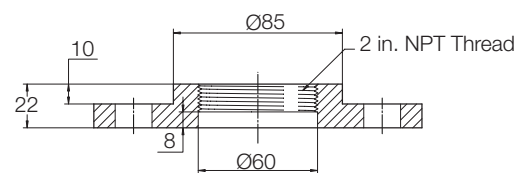
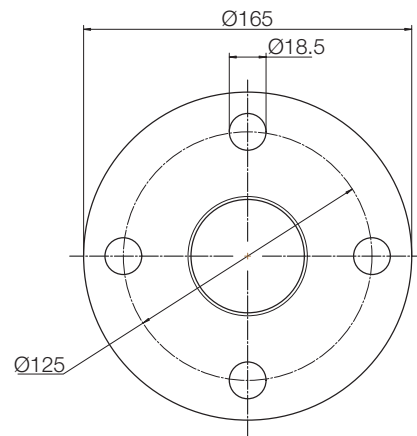
Front view



Side view



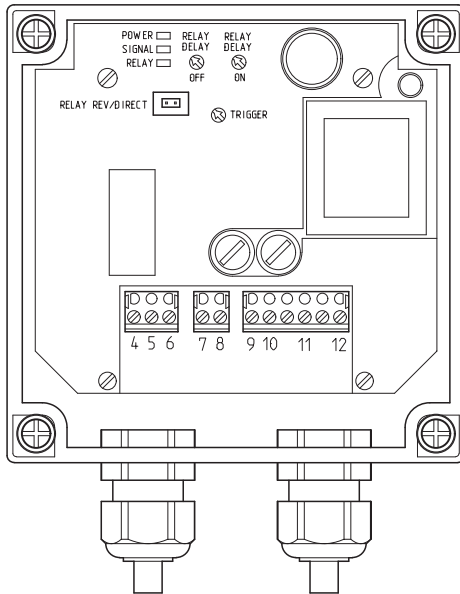
Back view



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Connection



Relay output

4. Normally open contact
5. Common
6. Normally closed contact

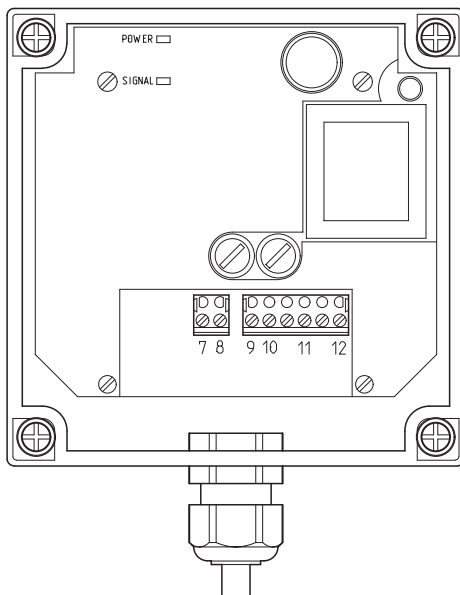
DC power supply

7. 24 V DC
8. 0 V DC

AC power supply

9. Live 220 V AC
10. Live 110 V AC
11. Neutral
12. Ground

Note: Choose 9 or 10.



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Note: Choose 9 or 10.

Ordering information

Basic ordering information for ChuteMaster.

	X	X
Code		
ChuteMaster	CHMSTR	
Additional options		
Optional mounting bracket		CHMTG

Contact us

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