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 k 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 — Chemicals
— Rock — Cement
— Powders — Resin
— Feed pellets — Stucco
— Sawdust — Rengrid
ChuteMaster

Microwave blocked chute detection and point level instrument

ChuteMaster

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/cm². 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 on 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.

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.

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

---

2 DS/ChuteMaster-EN Rev. A | ChuteMaster | Microwave blocked chute detection and point level instrument
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
## 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 ±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

2 in. NPT Thread

2 in. NPT Thread
ChuteMaster
Microwave blocked chute detection and point level instrument

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.
## Ordering information

Basic ordering information for ChuteMaster.

<table>
<thead>
<tr>
<th>Code</th>
<th>CHMSTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChuteMaster</td>
<td>CHMSTR</td>
</tr>
<tr>
<td>Optional mounting bracket</td>
<td>CHMTG</td>
</tr>
</tbody>
</table>
The LST400 is an Ultrasonic Level Transmitter capable of measuring liquid level or solid applications up to 50 ft. / 15 meters or flow rates in all types of open channel flow applications. The transmitter has a single 4-20 mADC output.

Specifications:
- **Accuracy:** 0.25% full span with temperature compensation
- **Blanking Distance:** 0.5m
- **Rate of Change:** 0.03 to 65 ft / minute; 0.01 to 20 m / minute
- **Configuration:** 5 touch button keys
- **Power Supply:** 110 VAC or 240 VAC; ±15% 50/60 Hz, 5VA Standard
- **Dimensions:** 7.56×9.06×3.7 inches / 192×230×94
- **Configuration s**
  - Bagging Hoppers
  - Flumes
  - Weirs
- **OPTION S**
  - **OPTIONS**
    - Transducers for Liquids & Solids
    - Aiming Kit
    - Cable length of 10m, 20m, 30m, 40m or 50m
- **APPLICATIONS**
  - **Application s**
    - Mineral Oil
    - Moderate Range Solids Such as Loading & Unloading
    - V-Notch
- **FEATURES**
  - Automatic Variable Gain & Power for Difficult measurement devices
  - Pump Cycling and Pump Monitoring
  - Remote Totalizer Count Outputs
  - Configurable as Open Channel Flow Meter
  - Integrated Analytical Software
  - Graphic LCD Display

Note
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents add-in whole or in parts is forbidden without prior written consent of ABB.

Copyright© 2014 ABB
All rights reserved

www.abb.com/level