

**WMEA Presentation  
Thursday, June 7th**



**Measurement America**

# WMEA Presentation 2007



## Level Measurement and Plug Chute Detection

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**Position  
Detection**



**Crusher  
Level**



**Stock Pile Level**



**Liquid Level**



**Silo Level**



# WMEA

## June 7<sup>th</sup> 2007



### Agenda

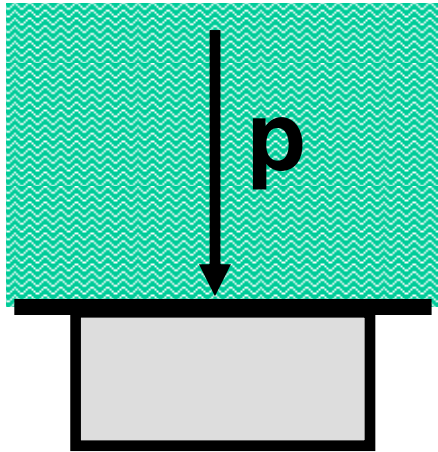
- Level Measurement
  - Commonly used technologies
  - Acoustic Wave
  - Applications
- Plug Chute Detection
  - Commonly used technologies
  - Microwave
  - Applications

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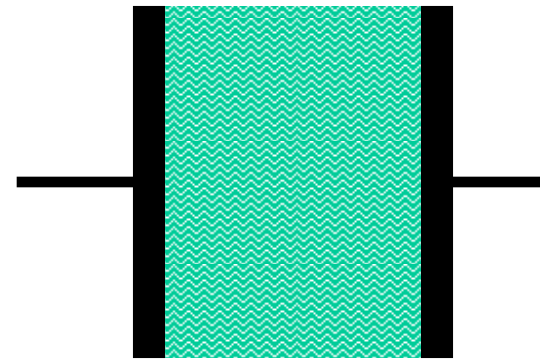
# **Level Measurement**

# Commonly Used Technologies



## Hydrostatic:

- Density and Pressure dependent
- Dirt Sensitive



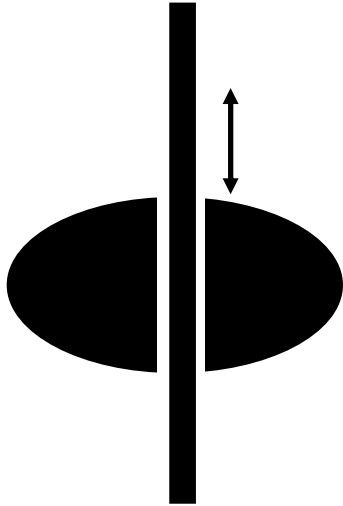
## Capacitive / Conductive:

- Product dependent
- Influenced by scaling on Electrodes

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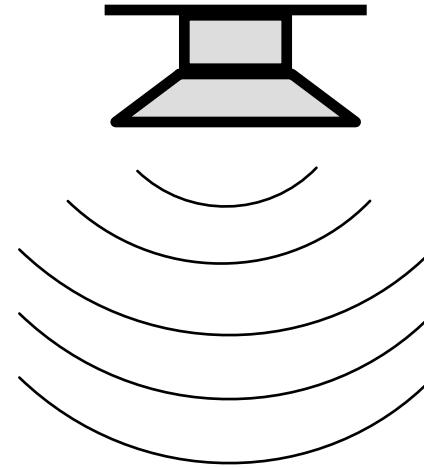


# Commonly Used Technologies



## Float / Displacer:

- Scaling
- Density dependent
- Maintenance



## Ultrasonic:

- Temperature dependent
- Atmosphere dependent

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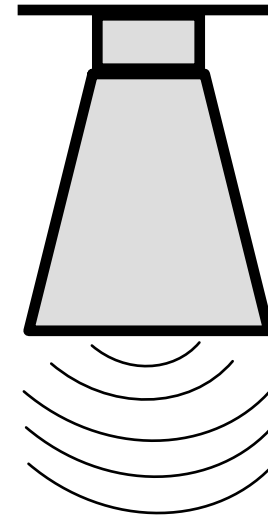


# Commonly Used Technologies



## Guided Radar:

- Scaling
- Maintenance



## Radar:

- Reflectivity dependent
- Atmosphere dependent (dust)

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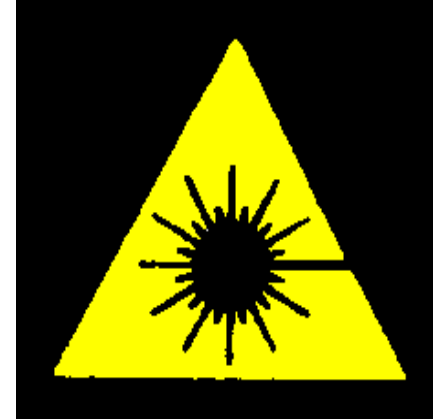


# Commonly Used Technologies



## Nuclear:

- Radiation protection
- Expensive licensing / testing



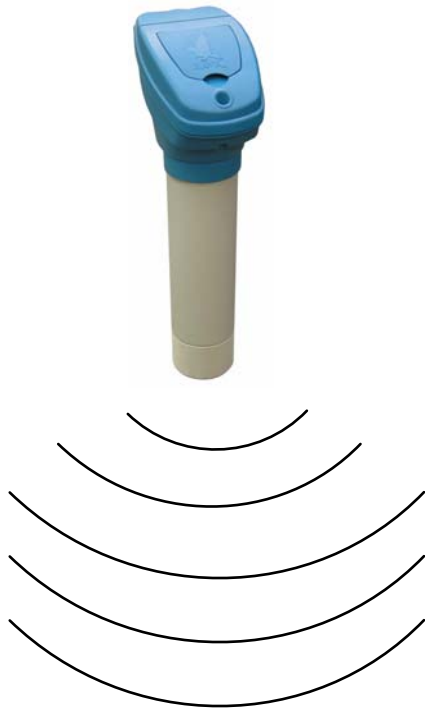
## Laser:

- Dirt sensitive
- No Dust and Smoke

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# Acoustic Wave Technology



Atmosphere dependent?

- Dust
- Steam
- Foaming

**New Developments:**

- Low Frequency
- High Power
- Adaptive Gain Control

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# Acoustic Wave Technology



## Acoustic Wave

What does it mean for  
my Application?

**Measurement even in:**

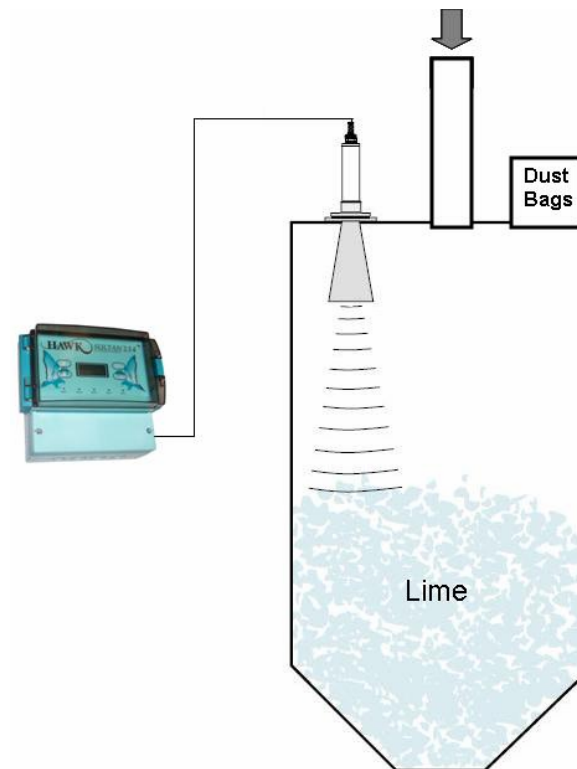
- Foaming Liquids
- Dusty Environments
- Steamy Environments

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# How Acoustic Wave is used?

- Continuous level transmitter
- level switch
- Open channel flow meter
- Plugged chute detector
- Sump control
- Interface level transmitter
- Screen differential transmitter
- Open channel flow totalizer



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# Applications



Fly Ash

Boiler Bunkers

Raw Coal Bunkers

Ash Pits

Coal Silos

Intake screens

Cooling towers

Sumps

Water treatment

Makeup level

Limestone slurry

Discharge flow

De-mineralizers

Filter beds



# Applications



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Surge Bins

Stock Pile

Tripper Position

Ore Pass

Plug Chute

Conveyor Profile

Bunker oil level

Chemical stock tanks



# Acoustic Wave



Reliable even in difficult environments!

Strong level signal in tough applications!

Acoustic Wave Technology

High Power

Low Frequency

Adaptive Gain Control

# **Plug Chute Detection**



# Plug Chute Detection



## Commonly Used Technologies

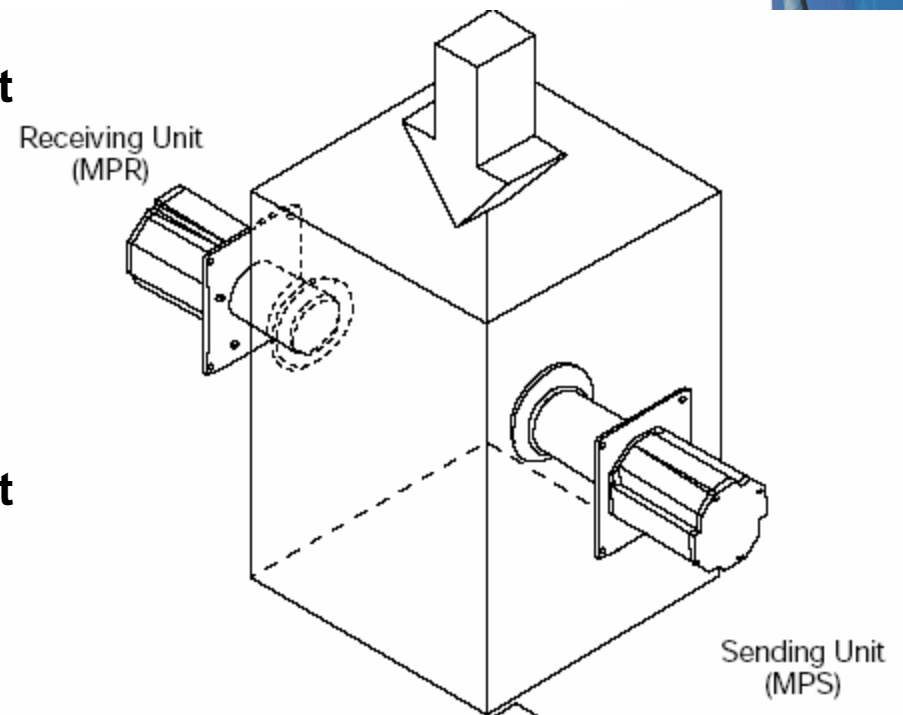
- **Tilt switches**
- **Paddle switches**
- **Nuclear switches**
- **Capacitance switches**

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# Microwave Switch Systems

- Non-contact point level measurement
- Maximum range 300ft
- 110VAC / 24VDC supply standard
- Suitable for Class II Div 1 areas
- Separate make/break relay control
- Sensitivity adjustment
- Various window, mounting options
- Remote electronics separation to 50ft
- Safe, no hazard warning requirement



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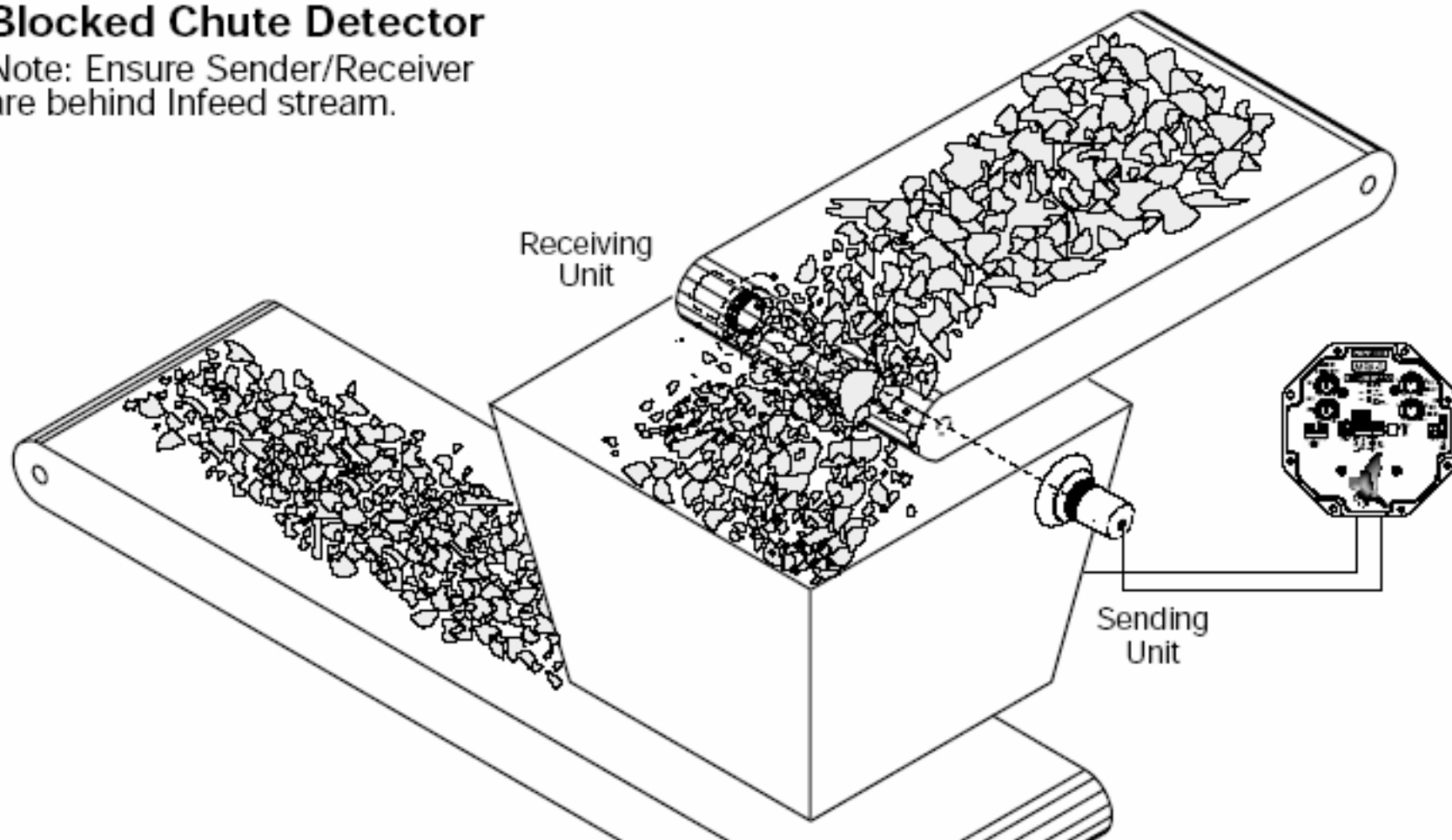




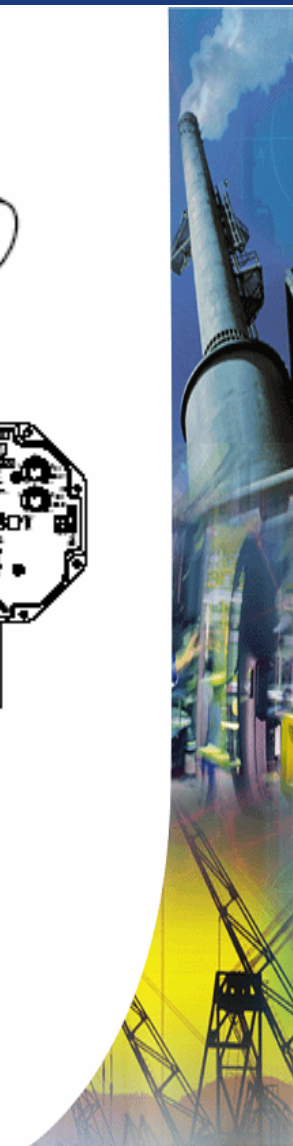
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## Blocked Chute Detector

Note: Ensure Sender/Receiver are behind Infeed stream.



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# Special Applications

## Coal Feeder Flow / Plugged Chute

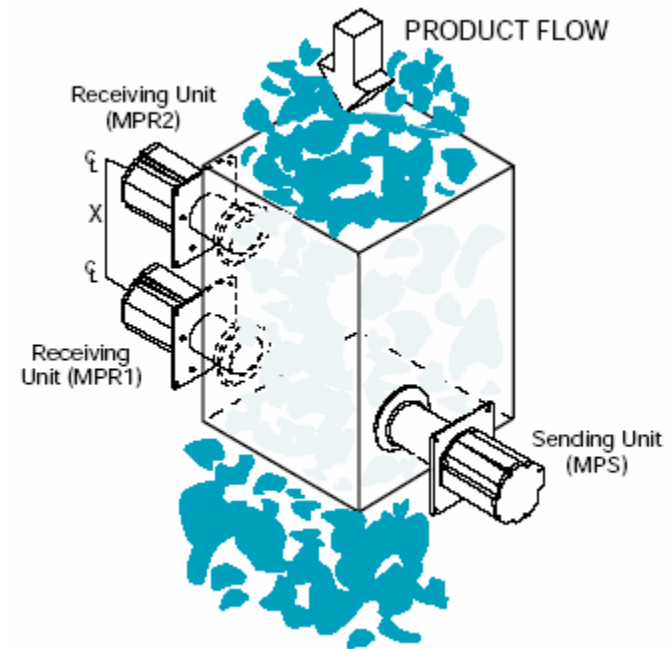
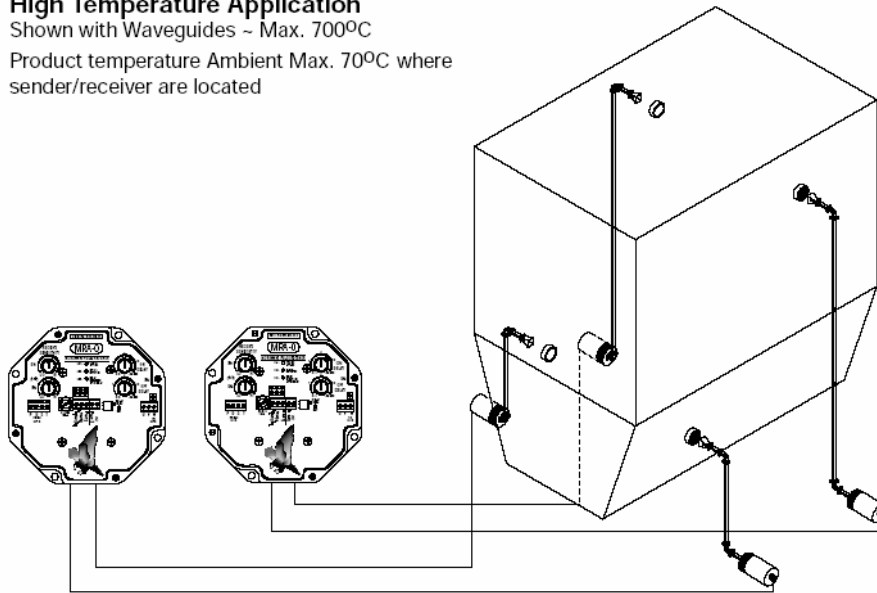
- No Flow allows reflected signals to be detected at the second receiver
- Flowing conditions give an alarm
- Plugged chute detector will trip when the feeder fills with material

### SPECIALTY APPLICATION

#### High Temperature Application

Shown with Waveguides - Max. 700°C

Product temperature Ambient Max. 70°C where sender/receiver are located

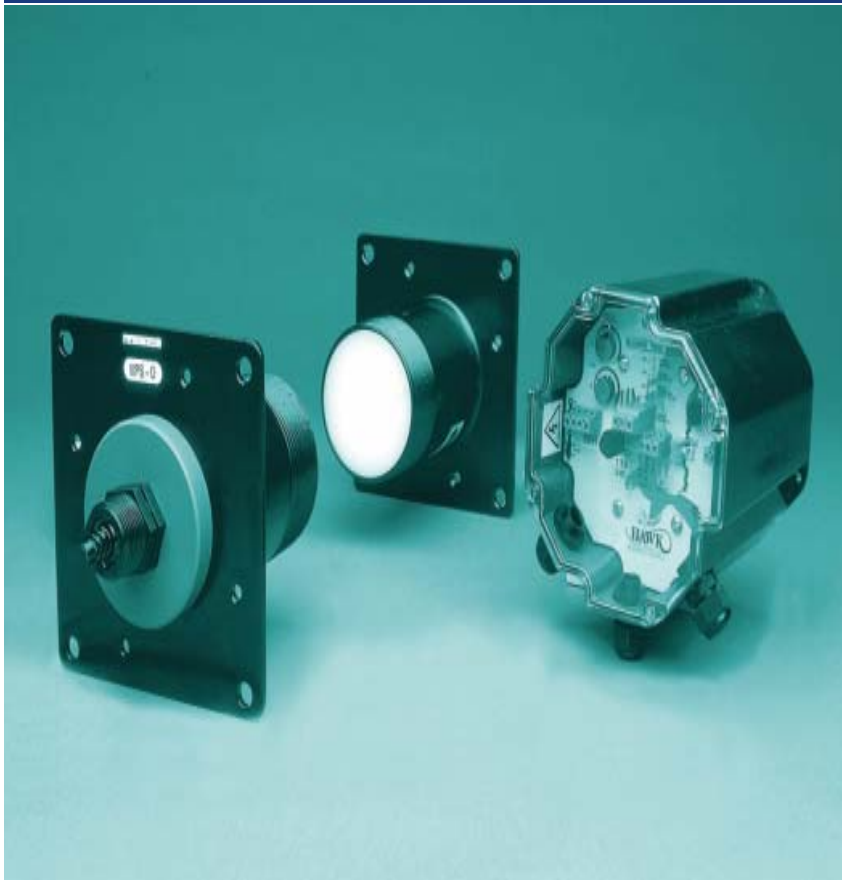


Waveguides can be used for applications where the ambient temperature exceeds 160F (flyash, calcined lime, clinker bins)

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# Microwave Switch System



Non contact point level switch  
Integral or remote electronics  
300ft max range  
110VAC or 24VDC supply  
10A control relay

High sensitivity turn-down for  
short range or light density  
applications.

Can be used for plugged chute,  
absence/presence, positioning,  
timing and interface applications

**Safe alternative to nuclear switches – no hazard  
posting requirements**

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