Flow Detection

**MDS Integral or Remote Housing**

- Microwave Doppler Switch
- Solids - Chute and Conveyor
- 10.525 GHz Sender Receiver

**FUNCTION**
Flow/no flow detection in solid material handling applications such as feeder chutes and conveyor systems.

**TYPICAL USES**
- Product detection on belt conveyor systems
- Product discharge detection on stackers
- Coal feeder monitoring - Power stations
- Grain feeder monitoring
- Aggregate feeder chute monitoring
- Conveyor/transfer chute monitoring
- Machine/conveyor motion detector
PRINCIPLE OF OPERATION
The Hawk MDS series microwave doppler flow switch was developed for use in process applications requiring highly reliable non-contact product flow detection. The system operates by sending out bursts of microwave energy toward the target product being monitored. The target product will reflect some of the microwave energy back to the MDS system where it is processed to determine if the product is flowing. The MDS system uses the Doppler principle to determine if the product is moving by monitoring small charges in the reflected signal frequency. When product flow is detected, a timer is initiated and after the user set time-out period, the relay output is switched. The system also has adjustable sensitivity to compensate for products that may partially reflect the microwave energy. The SPST relay can be set to either energise or de-energise when product flow is detected. Three LED indicators are provided to indicate power, flow detection, and relay energised status. The system is available in either an integral or remote housing and is powered by 115Vac, 240Vac or 24Vdc. The system is housed in a FM listed NEMA 4X housing and is mounted using the standard 3 inch NPT weldment or flange.

FEATURES
- Flow/No Flow detection
- Maximum range capability: 5m (15ft)
- No site licensing required
- Low cost installation and cabling
- Versatile power supply: 115Vac (240Vac also available), 24Vdc (standard)
- Excellent adjustment stability for maximum repeatability
- Super bright LED annunciation for power, microwave signal established, and relay condition
- Compact integral construction
- Meets Class 2 Div. 1, E, F, & G specifications
- Water tight, dust tight, chemically resistant NEMA 4X enclosure
- Sealed O-ring enclosure
- Stainless captive screws
- Baked enamel coating
- Sealed switch selectable failsafe relay
- Pre-drilled for convenient access for conduit entry
- Single turn thumbwheel adjustment potentiometers
- Push-to-test circuit
- 100m sec. to 30 sec. time delays
- Multiple mounting options (NPT, remote flange etc.)
- Flush mounted sensor face
- Robust (high vibration resistance)
- U.H.M.W. (polyethylene) wear plate (standard)
- High temperature remote mounting with waveguides (contact factory)

*See specifications (Range)
NOTE: Maximum cable length including extension is 50 metres.
**Remote Microwave Doppler System - Remote Amplifier (MDA)**

- 137mm (5.4")
- 25.5mm (1")
- 61.5mm (5.4")
- 4 x 5.0mm holes

**Remote Microwave Doppler System - Remote Sensor (MDR)**

- 160mm (6.3")
- 135mm (5.25")
- UHMW Window
- 4 x Ø22.0 holes thru equi spaced on 241 P.C.D.

**Integral Microwave Doppler System (MDI)**

- 160mm (6.3")
- 135mm (5.25")
- 3" N.P.T.
- 25.5mm (1")
- 61.5mm (5.4")
SPECIFICATIONS

Input Voltage:
- 240Vac nominal, 200-270Vac acceptable, 50-60 Hz
- 115Vac nominal, 100-130Vac acceptable, 50-60 Hz
- AC supply line fuse: 100mA, 250Vac
Units have terminals for 24Vdc supply power.

Power Consumption:
- <3VA

Power Density:
- Rated from emitter at approximately 20µW/cm². Complies with FCC Title Rules Part 15. Caution sign posting not required.

Transmitted Signal:
- Frequency: 10.525 GHz, ±25 MHz
- Average Power Density: 20µW/cm² typical
- Linearly Polarised Field
- Beam angle (3dB) approximately 30° (conservative)

Range:
- Maximum range under ideal conditions: 10m (33 ft.)
- Expected maximum practical range: 5m (16 ft.)
- Minimum range under ideal conditions: 0cm (0 in)
- Expected minimum practical range: 1cm (0.4 in)

Note: Ranges are dependent on application reflectivity.

L.E.D. Indicators:
- Power on (green) Signal detect (red)
- Relay state (amber) EMI indicator (red)

Mounting:
1. 3" male NPT thread or four 6mm (0.25 in.) blind bolt holes in flange
   a) 3" weldments supplied for standard integral mounting
   b) Flange is used for remote mount in high vibration applications—isolation shock mounts are available
2. 4" weldments with PTFE (teflon) and UHMW windows
3. Ceramic window assemblies
4. Firebrick window assemblies available on custom basis
5. 2" NPT sight glass window
6. Flanged Pipe Mount.

Adjustments:
- Test switch - momentary push-button
- Single turn coarse and single turn fine adjustment potentiometers for set point.
- Relay time delays adjustable from 100ms to 30 seconds via two independent on/signal make and off/signal break potentiometers with automatic reset.

Fail-safe:
- Switch selectable - presence or absence of material flow
- High level fail-safe position: relay is activated when flow is present
- Low level fail-safe position: relay is activated when no material flow is present

Temperature:
- -30°C to +65°C (-20°F to +150°F)
  Note: for higher temperature applications, remote mounting with windows is necessary. Custom waveguide assemblies can also be provided.
  UHMW Window: Consult factory for manufacturer’s specifications.
  Firebrick Assemblies: Consult factory for manufacturer’s specifications.

Cabling Entry:
- 3 x 10mm (3/8" NPT)

Relay Contact Output:
- SPDT - 10amps @ 250Vac resistive
  10amps @ 125Vac resistive

Enclosure:
- NEMA 4X. IP67/IP66
- SAA LISTED
- Meets Class 2, Div 1, Group E, F & G (DIP-Dust Ignition Proof) classification. FM Approval Pending

Sealing:
- NEMA 4X

Shipping Weights:
- 4.5kg (10lb)
**PART NUMBERING**

MODEL
- MDS-I = Integral Microwave Doppler Switch System
- MDS-R = Remote Microwave Doppler Switch System (Sensor and Amplifier)
- MDS-S = Remote Microwave Doppler Switch - Sensor only
- MDS-A = Remote Microwave Doppler Switch - Amplifier only

**SUPPLY VOLTAGE**

240 = 240Vac  
220 = 220Vac  
115 = 115Vac

*Note: 24Vdc standard on all units*

**OUTPUTS**

0 = Standard Relay outputs  
6 = Solid State relay outputs

**FACIAL MATERIAL**

0 = UHMW Polyethlene  
1 = PTFE (Teflon)  
Z = Special Request

**MOUNTING ACCESSORIES**

1 = 2” Glass Window  
2 = 4” Glass Window  
3 = 3” UHMW Window  
4 = 4” UHMW Window  
5 = 6” UHMW Window  
6 = 3” PTFE Window  
7 = 4” PTFE Window  
8 = 6” PTFE Window  
9 = 9” x 4.5” Firebrick  
10 = 6” x 4” Ceramic  
11 = Isolation Shock Mounts (pack of 4)  
12 = Adjustable Mount-UHMW  
13 = Adjustable Mount-PTFE  
15 = Flange Pipe Mounting  
16 = 3” Ceramic Window  
17 = 4” Ceramic Window  
X = Not Required

**MDS R - 240 - 0 0 - X**

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ADDITIONAL PRODUCT WARRANTY AND APPLICATION GUARANTEES UPON REQUEST.  
TECHNICAL DATA SUBJECT TO CHANGE WITHOUT NOTICE.