

# HS-100I Intrinsically Safe Accelerometer

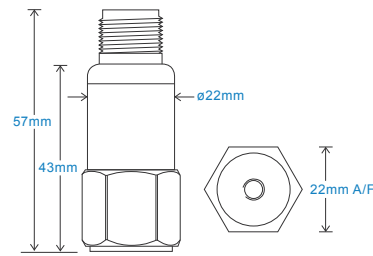
## AC acceleration output via 2 Pin MS Connector

### Key Features

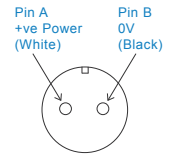
- Intrinsically Safe with European, USA, South African and Australian approvals
- For use with data collector

### Industries

Building services, Pulp and Paper, Mining, Metals, Utilities, Automotive, Water, Pharmaceutical



### Connection Details



### Technical Performance

|                        |  |
|------------------------|--|
| Mounted Base Resonance | see 'How To Order' table (nominal)   |
| Sensitivity            | see: 'How To Order' table $\pm 10\%$<br>Nominal 80Hz at 22°C   |
| Frequency Response     | 2Hz (120cpm) to 10kHz (600kcpm) $\pm 5\%$<br>1.5Hz (90cpm) to 12kHz (720kcpm) $\pm 10\%$<br>0.8Hz (48cpm) to 15kHz (900kcpm) $\pm 3dB$ |
| Isolation              | Base isolated  |
| Range                  | see: 'How To Order' table  |
| Transverse Sensitivity | Less than 5%   |

### Mechanical

|                                   |  |
|-----------------------------------|--|
| Case Material                     | Stainless Steel  |
| Sensing Element/Construction      | PZT/Compression  |
| Mounting Torque                   | 8Nm  |
| Weight                            | 106gms (nominal) body only   |
| Screened Cable Assembly Connector | see: <a href="http://www.hansfordsensors.com">www.hansfordsensors.com</a> for options<br>HS-AA004 - non-booted<br>HS-AA053 or HS-0054 - booted |
| Mounting Threads                  | see: 'How To Order' table  |

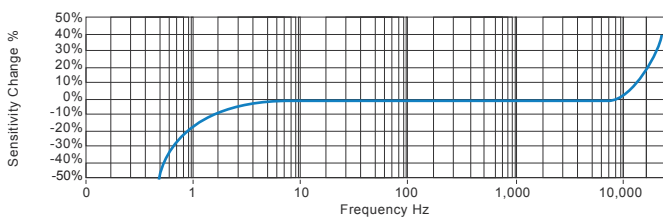
### Electrical

|                     |                           |
|---------------------|---------------------------|
| Excitation Voltage: | 18-30Volts DC             |
| Electrical Noise    | 0.1mg max                 |
| Current Range       | 0.5mA to 8mA              |
| Bias Voltage        | 10 - 12 Volts DC          |
| Settling Time       | 2 seconds                 |
| Output Impedance    | 200 Ohms max.             |
| Case Isolation      | $>10^8$ Ohms at 500 Volts |

### Environmental

|                             |                                     |
|-----------------------------|-------------------------------------|
| Operating Temperature Range | see: attached certification details |
| Sealing                     | IP68                                |
| Maximum Shock               | 5000g                               |
| EMC                         | EN61326-1:2013                      |

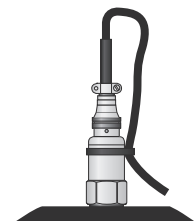
### Typical Frequency Response (at 100mV/g)



### Applications

Fans, Motors, Pumps, Compressors, Centrifuges, Conveyors, Air Handlers, Gearboxes, Rolls, Dryers, Presses, Cooling, VAC, Spindles, Machine Tooling, Process Equipment

Vibration sensor should be firmly fixed to a flat surface (spot face surface may be needed to be produced and cable anchored to sensor body.)



### Certifications



[www.hansfordsensors.com](http://www.hansfordsensors.com)  
[sales@hansfordsensors.com](mailto:sales@hansfordsensors.com)

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TS035.16



# HS-100I Intrinsically Safe Accelerometer

## AC acceleration output via 2 Pin MS Connector

### Intrinsically Safe Requirements

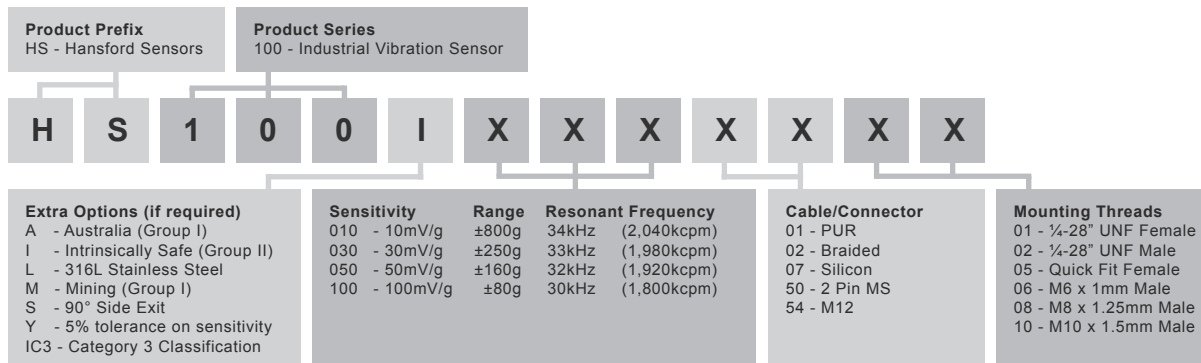
|   |  |   |  |
|---|--|---|--|
| Maximum Cable Length  | See website <a href="http://www.hansfordsensors.com">www.hansfordsensors.com</a><br>- see attached system drawing              | Certified Temperature Range   | Ex ia IIC T6 Ga (-55°C ≤ Ta ≤ +60°C) (Gas)<br>Ex ia IIIC T80°C IP65 Da (-55°C ≤ Ta ≤ +60°C) (Dust)<br>Ex ia IIC T4 Ga (-55°C ≤ Ta ≤ +110°C) (Gas)*<br>Ex ia IIIC T130°C IP65 Da (-55°C ≤ Ta ≤ +110°C) (Dust)*<br>Ex ia I Ma (-55°C ≤ Ta ≤ +110°C) (Mining)<br>*On request - consult Sales Office |
| Certificate details: Group I                                  | IECEX BAS07.0037X<br>Baseefa07ATEX0149X<br>ⓈI M1<br>Ex ia I Ma<br>(-55°C ≤ Ta ≤ +110°C)  | Australian Approval Group I   | IECEX ITA 11.0013X<br>Ex ia I Ma<br>(-55°C ≤ Ta ≤ +110°C)  |
| Certificate details: Group II<br>(ignition temperature 130°C) | IECEX BAS07.0035X<br>Baseefa07ATEX0144X<br>ⓈII 1GD<br>Ex ia IIC T4 Ga<br>Ex ia IIIC T130°C IP65 Da<br>(-55°C ≤ Ta ≤ +110°C)    | US/Canada Approvals   | Certificate No. USTC/15/FAI/01350<br>Class I, II, III, Division 1, 2, Groups A - G, T4, -55°C to +110°C, IP65<br>Class I, Zone 0, AEx, ia, IIC, T4, Ga, -55°C to +110°C<br>Zone 20, AEx, ia, IIIC, T130°C, IP65, Da, -55°C to +110°C   |
| Certificate details: Group II<br>(ignition temperature 80°C)  | IECEX BAS07.0035X<br>Baseefa07ATEX0144X<br>ⓈII 1GD<br>Ex ia IIC T6 Ga<br>Ex ia IIIC T80°C IP65 Da<br>(-55°C ≤ Ta ≤ +60°C)      | Class I, II, III, Division 1, 2, Groups A - G, T6, -55°C to +60°C<br>Class I, Zone 0, AEx, ia, IIC, T6, Ga, -55°C to +60°C<br>Zone 20, AEx, ia, IIIC, T80°C, IP65, DA, -55°C to +60°C | South African Approval   |
| Accelerometer System Certificate                              | Baseefa07Y0145<br>Ex ia IIC T6 (-55°C ≤ Ta ≤ +60°C)<br>Ex ia IIC T4 (-55°C ≤ Ta ≤ +110°C)<br>On request - consult Sales Office | System Connections  | Certificate No. MASC S/16-0231X<br>Group II (As Baseefa/ATEX)<br>MASC M/16-0230X<br>Group I (As Baseefa/ATEX)  |
| Terminal Parameters   | Ui = 28V, Ii = 93mA, Pi = 0.65W<br>Ci = 83nf<br>Li/Ri = 15.4µH/Ohm   | Barrier   | 1 x Pepperl + Fuchs Galvanic Isolator<br>KFD2-VR4-Ex1.26 (BAS02ATEX7206)<br>see attached system drawings<br>1 x MTL Zener Barrier MTL7728+ (BAS01ATEX7217)<br>or Pepperl + Fuchs Zener Barrier<br>Z728 (BAS01ATEX7005) or any other barrier that<br>conforms to system drawings on website       |
| 500V Isolation  | Units Will Pass A 500V Isolation Test  |   |  |

Notes: Special conditions of safe use for Group I & II. The free end of the cable on the integral cable version of the apparatus must be terminated in an appropriate dust-proof enclosure.

### Intrinsically Safe Requirements for IC3 Variations

|   |  |  |
|---|--|--|
| HS-100IC3 Variation is certified as Category 3 equipment. These sensors are only certified for use within Zones 2 & 22. | Certified Temperature Range  | Ex ic IIC T4 Ga (-55°C ≤ Ta ≤ +110°C)  |
|   | Terminal Parameters  | Ui = 25.2V, Ii = 146mA, Pi = 0.92W<br>Ci = 83nf<br>Li 66µH   |
| Certificate Details: Group II<br>(ignition temperature 130°C)   | IECEX BAS17.0054X<br>Baseefa7ATEX0069X<br>eII 3G<br>Ex ic IIC T4 Ga<br>(-55°C ≤ Ta ≤ +110°C) | 500V Isolation   |
|   | Special Conditions of Use:   | Units will pass a 500V Isolation Test<br>The Ci and Li parameters listed on the equipment certificate must be taken into account when connecting this equipment. |

### How To Order

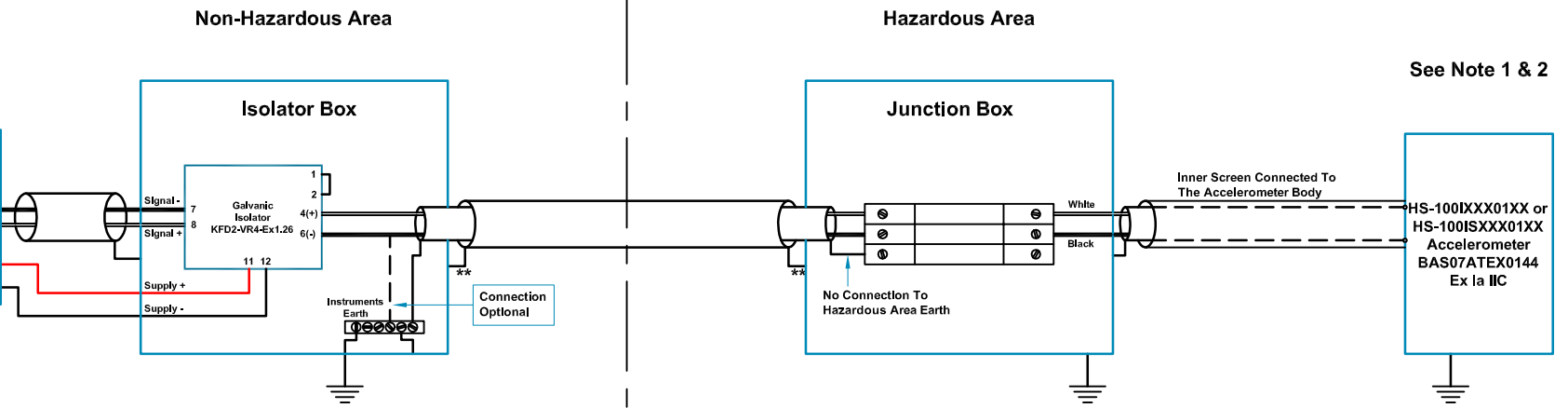


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Non-hazardous area apparatus which is unspecified except that it must not be supplied from nor contain under normal or abnormal conditions, a source of potential with respect to earth in excess of 250 volts DC, under normal conditions the potential at the connections to the galvanic isolator must not exceed 40 volts DC.



\*\*Outer shield only connected to chassis via Ex approved cable gland

**Table 1: Cable Parameters For Additional Cable Lengths**

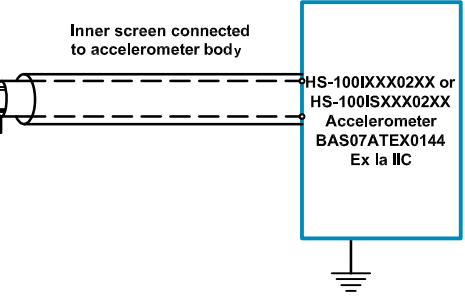
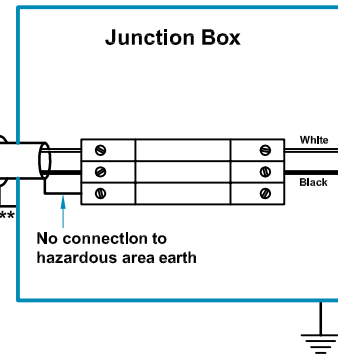
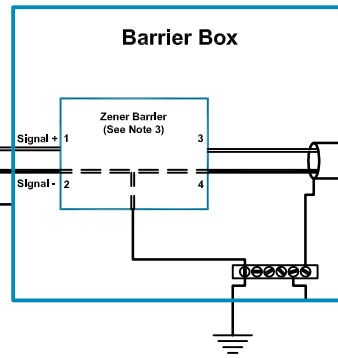
| Accelerometer With Integral Cable Length ≤ 10m |                |                |
|--|----------------|----------------|
| Group  | Capacitance μF | L/R Ratio μH/Ω |
| IIC  | 0.086          | 46             |
| IIB  | 0.730          | 172            |
| IIA  | 2.470          | 363            |
| Accelerometer With Integral Cable Length ≤ 50m |                |                |
| Group  | Capacitance μF | L/R Ratio μH/Ω |
| IIC  | 0.051          | 46             |
| IIB  | 0.695          | 172            |
| IIA  | 2.435          | 363            |
| Accelerometer With Integral Cable Length ≤ 92m |                |                |
| Group  | Capacitance μF | L/R Ratio μH/Ω |
| IIC  | 0.013          | 46             |
| IIB  | 0.657          | 172            |
| IIA  | 2.397          | 363            |

**Hansford Sensors Ltd**  
 HS-100I or HS-100IS  
 Accelerometer System  
 Ex ia IIC T4 (-55°C ≤ Ta ≤ +110°C) or  
 Ex Ia IIC T6 (-55°C ≤ Ta ≤ +60°C)

- Notes:**
- The capacitance and inductance, to resistance ratio (L/R) of hazardous area cable, must not exceed the values shown in Table 1.
  - The cable from the accelerometer to the junction box must not be installed in a high velocity dust laden atmosphere
  - The installer is to perform a risk assessment in accordance with clause 10 of EN 60079-25 and install lightning protection arrestors as deemed necessary.

|        |         |          |        |         |  |   |                             |  |                       |
|--------|---------|----------|--------|---------|--|---|-----------------------------|--|-----------------------|
| Rev No | DRF No  | Date Drg | Drg By | Appd By | Material: N/A  | <p><b>Hansford Sensors Ltd</b><br/>         Excellence in Vibration Monitoring</p> <p>Hansford Sensors Ltd<br/>         Artisan, Hillbottom Rd<br/>         Sands Industrial Estate<br/>         High Wycombe<br/>         Bucks HP12 4HJ</p> | <p>Do Not Scale</p>         | Description: System Connections For HS-100I & HS-100IS Group II Accelerometers With 2 Pin MS Connector F.U.W. Galvanic Isolation |                       |
| A      | Release | 15/06/07 | MJS    | CMH     | Tolerances Unless Stated<br>0 or 0.0 ±0.5<br>0.00 ±0.15<br>Angle ±5° |   |                             | All Dimensions In mm Unless Otherwise Stated   | Drawing No: M06-056-A |
|        |         |          |        |         | Finish All Over<br>Threads g6 H6                                     | <p><b>If In Doubt - Ask!</b></p>  | Scale: NTS<br>Sheet: 1 of 2 | Form Number:<br>QF024 Issue 1  |                       |

Non-hazardous area apparatus which is unspecified except that it must not be supplied from nor contain under normal or abnormal conditions, a source of potential with respect to earth in excess of 250 volts rms or 250 volts dc. under normal conditions the potential at the connections to the zener barrier must not exceed 40 volts dc.



**Table 1: Cable Parameters For Additional Cable Lengths**

| Accelerometer With Integral Cable Length ≤ 10m |                |                |
|--|----------------|----------------|
| Group  | Capacitance μF | L/R Ratio μH/Ω |
| IIC  | 0.073          | 56             |
| IIB  | 0.239          | 168            |
| IIA  | 0.654          | 448            |
| Accelerometer With Integral Cable Length ≤ 50m |                |                |
| Group  | Capacitance μF | L/R Ratio μH/Ω |
| IIC  | 0.038          | 56             |
| IIB  | 0.204          | 168            |
| IIA  | 0.619          | 448            |
| Accelerometer With Integral Cable Length ≤ 92m |                |                |
| Group  | Capacitance μF | L/R Ratio μH/Ω |
| IIC  | 0.000          | 56             |
| IIB  | 0.166          | 168            |
| IIA  | 0.581          | 448            |

**Hansford Sensors Ltd**

HS-100I or HS-100IS  
Accelerometer System

Ex ia IIC T4 (-55°C ≤ Ta ≤ +110°C) or  
Ex ia IIC T6 (-55°C ≤ Ta ≤ +60°C)

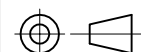
**Notes:**

- The capacitance and inductance, to resistance ratio (L/R) of hazardous area cable, must not exceed the values shown in Table 1.
- The cable from the accelerometer to the junction box must not be installed in a high velocity dust laden atmosphere.
- Any single zener diode safety barrier certified by an approved body to [Ex ia] IIC having the following output parameters: Uo = 28V dc, Io = 93mA dc, Po = 0.65W. e.g. MTL7728 to BAS01ATEX7217 or Pepperl + Fuchs Z728 to BAS01ATEX7005.
- The installer is to perform a risk assessment in accordance with clause 10 of EN 60079-25 and install lightning protection arrestors as deemed necessary.

| Rev No | DRF No  | Date Drg | Drg By | Appd By | Material: N/A                         |
|--------|---------|----------|--------|---------|---------------------------------------|
| A      | Release | 16/09/15 | MJS    | CMH     |                                       |
|        |         |          |        |         | Tolerances Unless Stated              |
|        |         |          |        |         | 0 or 0.0 ±0.5                         |
|        |         |          |        |         | 0.00 ±0.15                            |
|        |         |          |        |         | Angle ±5°                             |
|        |         |          |        |         | 1.6/ Finish All Over<br>Threads g6 H6 |



Hansford Sensors Ltd  
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High Wycombe  
Bucks HP12 4HJ



Do Not Scale

All Dimensions In mm Unless  
Otherwise Stated

**If In Doubt - Ask!**

Description: System Connections  
For HS-100I & HS-100IS Group II  
Accelerometers With 2 Pin MS Connector  
F.U.W. Zener Barrier

Drawing No: M06-056-A

Scale: NTS  
Sheet: 2 of 2

Form Number:  
QF024 Issue 1