

# HS-100I Intrinsically Safe Accelerometer

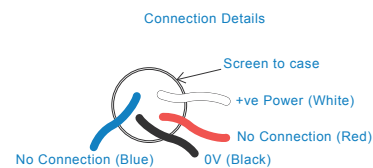
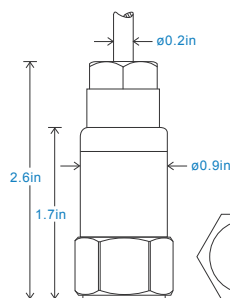
## AC acceleration output via PUR Cable

### Key Features

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

### Industries

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



### Technical Performance

|                        |                                                                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Mounted Base Resonance | see 'How To Order' table (nominal)                                                                                                            |
| Sensitivity            | see: 'How To Order' table $\pm 10\%$<br>Nominal 80Hz at 72°F                                                                                  |
| Frequency Response     | 120cpm (2Hz) to 600kcpm (10kHz) $\pm 5\%$<br>90cpm (1.5Hz) to 720kcpm (12kHz) $\pm 10\%$<br>48cpm (0.8Hz) to 900kcpm (15kHz) $\pm 3\text{dB}$ |
| 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              | 5.9ft. lbs                              |
| Weight                       | 4.4 oz. (nominal)                       |
| Maximum Cable Length         | 3,280 ft.                               |
| Standard Cable Length        | 16 ft.                                  |
| Shielded Cable               | PUR - length to be specified with order |
| Mounting Threads             | see: 'How To Order' table               |
| Submersible Depth            | 328 ft. max (10 bar)                    |

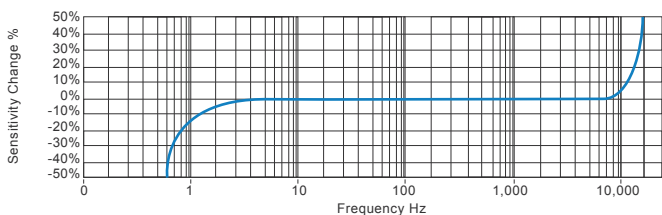
### Electrical

|                  |                           |
|------------------|---------------------------|
| 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                      |

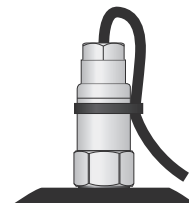
### Typical Frequency Response (at 100mV/g)



### 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



This product is certified in accordance with  
UL 913, 8th Ed. Rev. December 6, 2013  
CAN/CSA C22.2 No. 157-92 (R2012) +Upd1 +Upd2



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

We reserve the right to alter the specification of this product without prior notice

TS150U.12



## AC acceleration output via PUR Cable

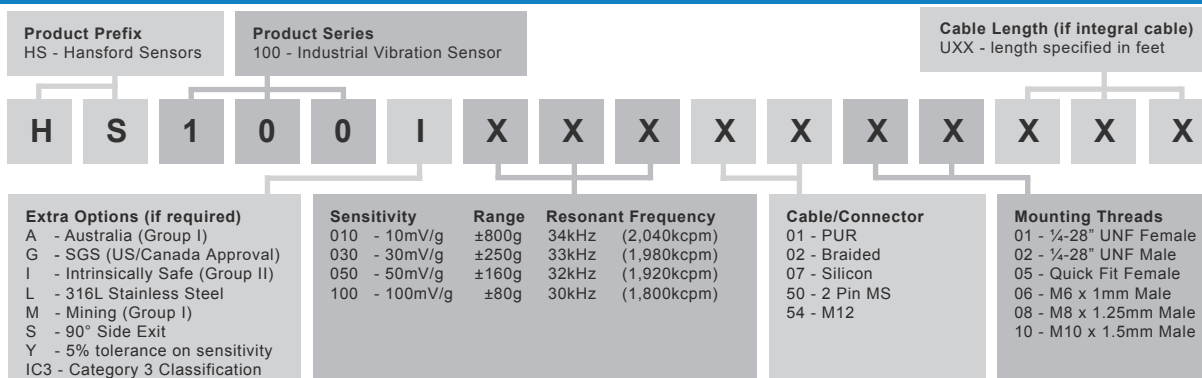
## Intrinsically Safe Requirements

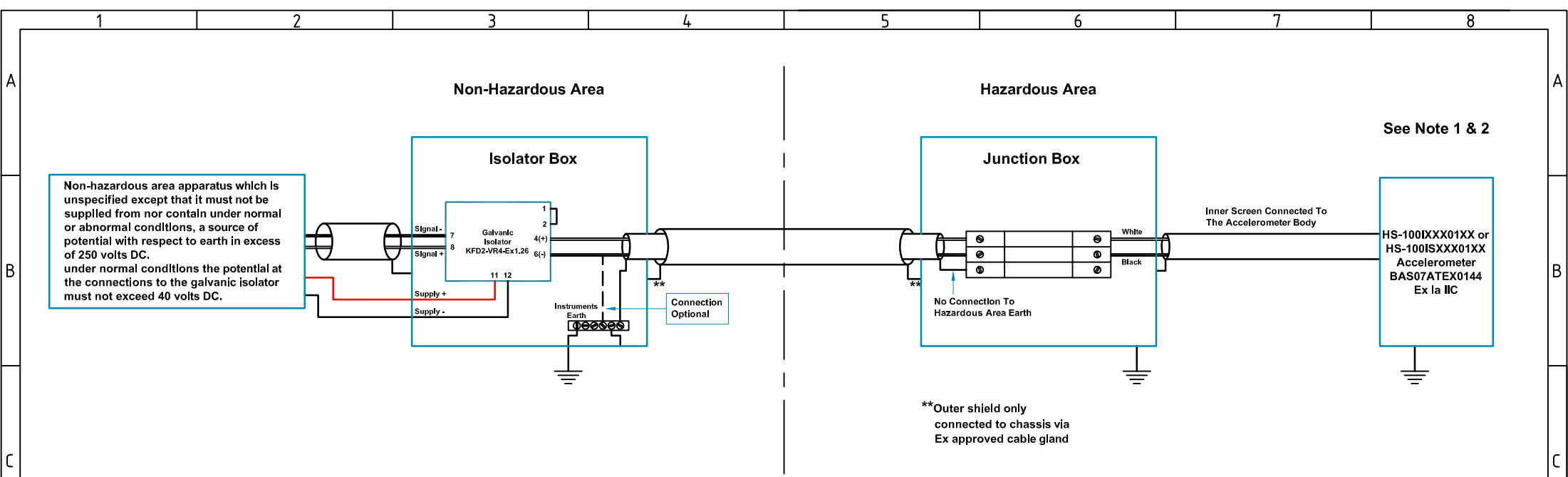
|                                                               |                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                       |                                                                                                                                                                                                                    |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum Cable Length                                          | See website <a href="http://www.hansfordsensors.com">www.hansfordsensors.com</a><br>- see attached system drawing                                                                                                                                                                                | Australia Approval Group I                                                                                                                                                                                            | IECEx ITA 11.0013X<br>Ex ia I Ma<br>(-55°C ≤ Ta ≤ +110°C)                                                                                                                                                          |
| Certificate details: Group I                                  | IECEx BAS07.0037X<br>Baseefa07ATEX0149X<br>ⓈI M1<br>Ex ia I Ma<br>(-55°C ≤ Ta ≤ +110°C)                                                                                                                                                                                                          | US/Canada Approvals<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, IIC, T130°C, IP65, Da, -55°C to +110°C | Certificate No. USTC/15/FAI/01350                                                                                                                                                                                  |
| 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)                                                                                                                                                                      | 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, IIC, T80°C, IP65, DA, -55°C to +60°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)                                                                                                                                                                        | South African Approval<br>Korean Approval Group II                                                                                                                                                                    | Certificate No. MASC S/16-0231X<br>Group II (As Baseefa/ATEX)<br>MASC M/16-0230X<br>Group I (As Baseefa/ATEX)<br>Certificate No 19-AV4BO-0048X<br>Ex ia IIC T6/T4<br>T6 -55°C < Ta< +60°C<br>T4 -55°C < Ta< +110°C |
| 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                                                                                                                                                                   | Terminal Parameters 10m of Cable<br>Terminal Parameters 92m of Cable                                                                                                                                                  | Ui = 28V, li = 93mA, Pi = 0.65W<br>Ci = 9.9nf<br>Li = 7µF or Li/Ri =15.4µF/Ohm<br>Ui = 28V, li = 93mA, Pi = 0.65W<br>Ci = 83nf<br>Li/Ri =15.4µF/Ohm                                                                |
| Terminal Parameters                                           | Ui = 28V, li = 93mA, Pi = 0.65W<br>Ci = 83nf<br>Li/Ri = 15.4µH/Ohm                                                                                                                                                                                                                               | System Connections                                                                                                                                                                                                    | see attached system drawings                                                                                                                                                                                       |
| 500V Isolation                                                | Units Will Pass A 500V Isolation Test                                                                                                                                                                                                                                                            | Barrier                                                                                                                                                                                                               | 1 x Pepperl + Fuchs Galvanic Isolator<br>KFD2-VR4-Ex1.26 (BAS02ATEX7206)<br>see attached system drawings                                                                                                           |
| 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 | 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                                        |                                                                                                                                                                                                                    |
|                                                               |                                                                                                                                                                                                                                                                                                  | Notes: Special conditions of safe use for Group I & II. The free end of the<br>cable on the integral cable version of the apparatus must be terminated in<br>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. |                                                    | Certified Temperature Range | Ex ic IIC T4 Gc (-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>Ex II 3G | 500V Isolation              | Units will pass a 500V Isolation Test                                                                                   |
|                                                                                                                    | Ex ic IIC T4 Gc<br>(-55°C ≤ Ta ≤ +110°C)           | Special Conditions of Use:  | The Ci and Li parameters listed on the equipment certificate must be taken into account when connecting this equipment. |

## How To Order





| 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            |

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HS-100I or HS-100IS  
Accelerometer System  
Baseefa07Y0145/1  
Ex ia IIC T4 (-55°C ≤ Ta ≤ +110°C) or  
Ex ia IIC T6 (-55°C ≤ Ta ≤ +60°C)

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

|   |        |         |          |        |         |                                                                                                               |                                                                                                                                                                                                                                                                                     |                                                                                       |                    |                                                                                                                                               |                       |   |               |                               |  |
|---|--------|---------|----------|--------|---------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---|---------------|-------------------------------|--|
| F | Rev No | DRF No  | Date Drg | Drg By | Appd By | Material: N/A                                                                                                 |  <div>Hansford Sensors<br/>Excellence in Vibration Monitoring</div> <div>Hansford Sensors Ltd<br/>Artisan, Hillbottom Rd<br/>Sands Industrial Estate<br/>High Wycombe<br/>Bucks HP12 4HJ</div> |  | Do Not Scale       | Description: System Connections<br>For HS-100I & HS-100IS Group II<br>Accelerometers With Non Armoured<br>PUR Cable F.U.W. Galvanic Isolation |                       |   |               |                               |  |
|   | A      | Release | 15/06/07 | MJS    | CMH     |                                                                                                               |                                                                                                                                                                                                                                                                                     |                                                                                       |                    |                                                                                                                                               |                       |   |               |                               |  |
|   | B      | DFR0164 | 13/01/11 | MJS    | CMH     | Tolerances Unless Stated<br>0 or 0.0 ±0.5<br>0.00 ±0.15<br>Angle ±5°<br>1.6/ Finish All Over<br>Threads g6 H6 |                                                                                                                                                                                                                                                                                     | All Dimensions In mm Unless<br>Otherwise Stated                                       | If In Doubt - Ask! |                                                                                                                                               | Drawing No: M06-004-B |   |               |                               |  |
|   |        |         |          |        |         |                                                                                                               |                                                                                                                                                                                                                                                                                     |                                                                                       |                    |                                                                                                                                               |                       |   |               |                               |  |
|   |        |         |          |        |         |                                                                                                               |                                                                                                                                                                                                                                                                                     |                                                                                       |                    |                                                                                                                                               |                       |   | Scale: NTS    | Form Number:<br>QF024 Issue 1 |  |
|   |        |         |          |        |         |                                                                                                               |                                                                                                                                                                                                                                                                                     |                                                                                       |                    |                                                                                                                                               |                       |   | Sheet: 1 of 2 |                               |  |
| 1 |        | 2       |          | 3      |         | 4                                                                                                             |                                                                                                                                                                                                                                                                                     | 5                                                                                     |                    | 6                                                                                                                                             |                       | 7 |               | 8                             |  |

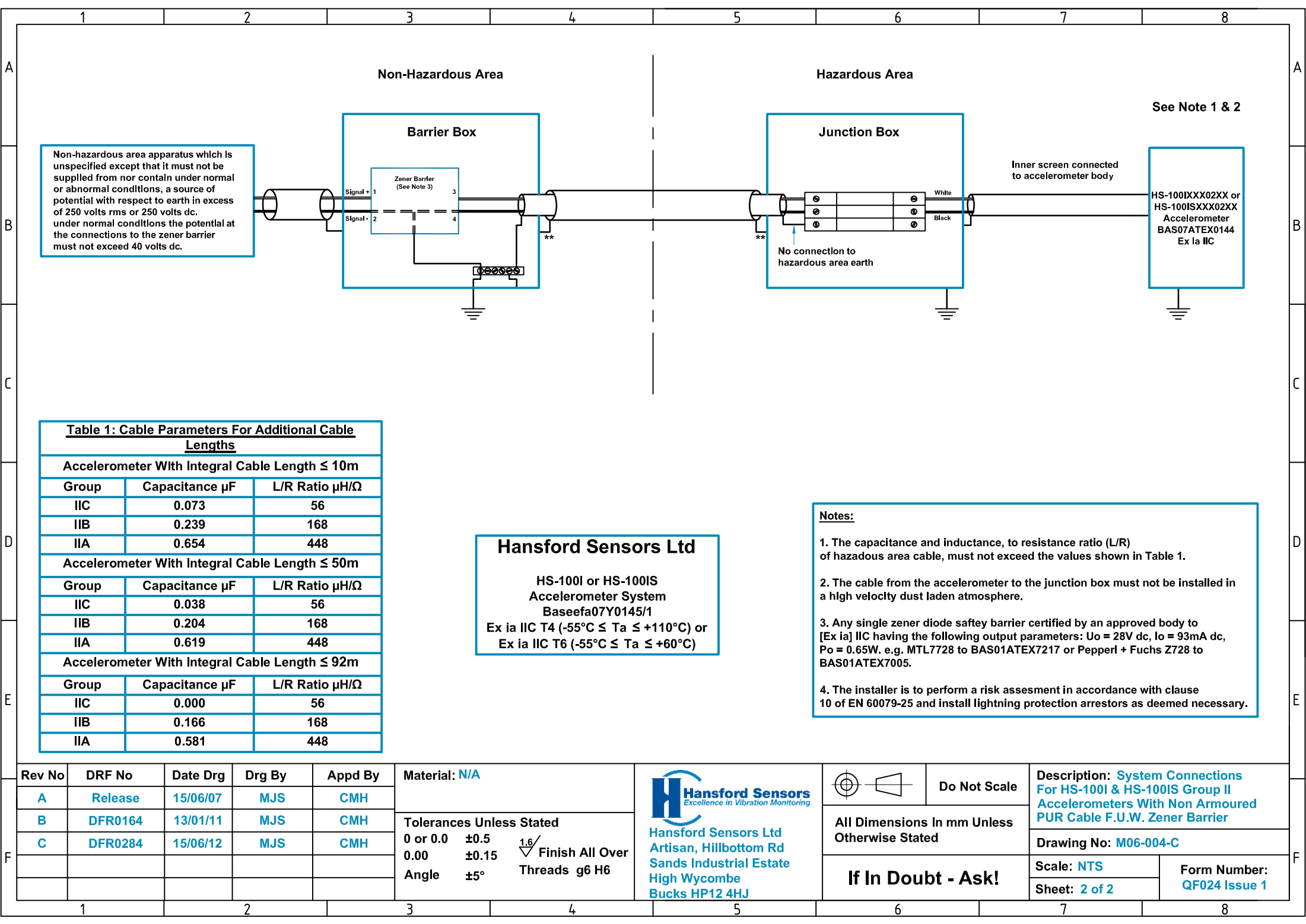


Table 1: Cable Parameters For Additional Cable Lengths

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            |

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HS-100I or HS-100IS  
Accelerometer System  
Baseefa07Y0145/1  
Ex ia IIC T4 (-55°C ≤ Ta ≤ +110°C) or  
Ex ia IIC T6 (-55°C ≤ Ta ≤ +60°C)

Notes:

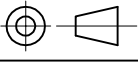
1. The capacitance and inductance, to resistance ratio (L/R) of hazardous area cable, must not exceed the values shown in Table 1.
2. The cable from the accelerometer to the junction box must not be installed in a high velocity dust laden atmosphere.
3. Any single zener diode safety barrier certified 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.
4. 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 |
|--------|---------|----------|--------|---------|
| A      | Release | 15/06/07 | MJS    | CMH     |
| B      | DFR0164 | 13/01/11 | MJS    | CMH     |
| C      | DFR0284 | 15/06/12 | MJS    | CMH     |

|                                    |       |
|------------------------------------|-------|
| Material: N/A                      |       |
| Tolerances Unless Stated           |       |
| 0 or 0.0                           | ±0.5  |
| 0.00                               | ±0.15 |
| Angle                              | ±5°   |
| 1.6/ Finish All Over Threads g6 H6 |       |

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Excellence in Vibration Monitoring

Hansford Sensors Ltd  
Artisan, Hillbottom Rd  
Sands Industrial Estate  
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 Non Armoured PUR Cable F.U.W. Zener Barrier

Drawing No: M06-004-C

Scale: NTS

Sheet: 2 of 2

Form Number: QF024 Issue 1