OVERVIEW
The Metrix 5485C High-Temperature Velocity Sensor is suitable for use in temperatures up to 375°C. It is designed for gas turbines and other machinery with high surface temperatures where a velocity signal is desired. The sensor’s moving-coil design requires no external power as it self-generates a signal proportional to vibration velocity.

FEATURES
- Self generating, no power required
- Stainless Steel Housing
- Zero friction - infinite analog resolution

APPLICATIONS
- Large industrial gas turbines
- Furnace fan monitoring

HAZARDOUS AREAS
UL intrinsically safe for Class 1, Div. 1, Grps (A-D); Non-incendive for Class 1, Div. 2, Grps. (A-D). CSA intrinsically safe for: Class 1, Div. 1, Grps (A-D); ATEX/IECEx intrinsically safe for: EEx ia IIC T1-T6 Ga.
INSTALLATION
The sensitive axis of the transducer can be oriented in any direction. To ensure clean response to high frequency vibrations, the transducer must be securely mounted to a flat machined surface using four #6 (or 3mm) socket head screws. If a bracket is required, it should be of rigid construction to prevent spurious mechanical resonances in the pass band.

WIRING
In ordinary, nonhazardous locations the transducer should be wired according to Page 4 (drawing 7623, Sheet 2).

In hazardous locations the wiring method depends upon the area classification.

1. In Class I, Div 1, Groups A, B, C & D or IEC Zone 0, Group IIC hazardous locations, the transducer may be connected through a zener diode safety barrier to the safe area receiver in accordance with Page 5 (drawing 7623, Sheet 3).

2. In Class I, Div 2, Groups A, B, C & D locations the transducer may be wired as in (1), or it can be wired without a safety barrier if wired in accordance with Page 6 (drawing 8096).

ATEX/IECEx INPUT ENTITY PARAMETERS
- \( U_i = 28v \)
- \( I_i = 120mA \)
- \( P_i = 625 \text{ mW} \)
- \( C_i = 0 \)
- \( L_i = 0.88 \text{mH max.} \)

SPECIFIC CONDITIONS OF USE
In order to ensure temperature classification and safety, the power supply must adhere to the following:
- \( U_o \leq 28V \)
- \( I_o \leq 120mA \)
- \( P_o \leq 0.625W \)

The temperature classifications and ambient temperature range can vary as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-54°C</td>
<td>45°C</td>
<td>T6</td>
</tr>
<tr>
<td></td>
<td>60°C</td>
<td>T5</td>
</tr>
<tr>
<td></td>
<td>95°C</td>
<td>T4</td>
</tr>
<tr>
<td></td>
<td>160°C</td>
<td>T3</td>
</tr>
<tr>
<td></td>
<td>260°C</td>
<td>T2</td>
</tr>
<tr>
<td></td>
<td>375°C</td>
<td>T1</td>
</tr>
</tbody>
</table>
SPECIFICATIONS

TYPE: SPRING SUSPENDED, DUAL CONDUCTOR, HERMETICALLY SEAL IN PERMANENT MAGNETIC FIELD, NO SLIDING PARTS, ZERO FREQUENCY.

AXIS ORIENTATION: ANY

SENSITIVITY: SEE TABLE A (+– 5% AT 100 Hz)

CROSS AXIS SENSITIVITY: LESS THAN 1%

EXTERNAL FIELD SENSITIVITY: < .005 IPS/GAUSS AT 60Hz

COIL RESISTANCE: (25°C) = SEE TABLE A

TEMPERATURE LIMITS: CONTINUOUS: –54°C TO 375°C

INTERMITTENT: –54°C TO 400°C

FREQUENCY RANGE: 15 Hz TO 2000 Hz

DISPLACEMENT LIMIT: 0.07 (1/8") PK – PK

SENSITIVITY SHIFT VS POSITION: 5% MAX.

SENSITIVITY VS TEMPERATURE: –.002%/°C, MAX.

ACCELERATION LIMITS: 0 TO 50 G

DAMPING (ELECTROMAGNETIC): AT 20°C: 0.8

AT 220°C: 0.5

AT 375°C: 0.4

CASE TO CASE ISOLATION: AT 20°C: 110 MEGOHMS MIN.

AT 375°C: 10 MEGOHMS MIN.

CASE MATERIAL: STAINLESS STEEL, HERMETIC SEAL

WEIGHT: 7.5 OZ. (.21 KG)

Hazard RATING: SEE SHEET 3

SEE SHEETS 2 AND 3 FOR WIRING.

---

**TABLE A**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SENSITIVITY</th>
<th>COIL RESISTANCE</th>
<th>TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5485C-001-XXX*</td>
<td>100mV/IPS</td>
<td>75 OHMS</td>
<td>FIXED CABLE</td>
</tr>
<tr>
<td>5485C-002-XXX*</td>
<td>100mV/IPS</td>
<td>75 OHMS</td>
<td>CONNECTOR</td>
</tr>
<tr>
<td>5485C-003-XXX*</td>
<td>100mV/IPS</td>
<td>100 OHMS</td>
<td>FIXED CABLE</td>
</tr>
<tr>
<td>5485C-004-XXX*</td>
<td>100mV/IPS</td>
<td>100 OHMS</td>
<td>CONNECTOR</td>
</tr>
<tr>
<td>5485C-005-XXX*</td>
<td>100mV/IPS</td>
<td>150 OHMS</td>
<td>FIXED CABLE</td>
</tr>
<tr>
<td>5485C-006-XXX*</td>
<td>100mV/IPS</td>
<td>150 OHMS</td>
<td>CONNECTOR</td>
</tr>
<tr>
<td>5485C-007-XXX*</td>
<td>100mV/IPS</td>
<td>150 OHMS</td>
<td>FIXED CABLE</td>
</tr>
<tr>
<td>5485C-008-XXX*</td>
<td>100mV/IPS</td>
<td>150 OHMS</td>
<td>CONNECTOR</td>
</tr>
</tbody>
</table>

* XXX INDICATES CABLE LENGTH IN FEET

   (EX: –010 = 10 FEET)
NOTE:
1. UL LISTED AND CSA CERTIFIED AS INTRINSICALLY SAFE. CLASS I, GROUPS A, B, C, & D. WHEN USED WITH ZENER DIODE BARRIER HAVING A MAXIMUM VOLTAGE RATING OF 28 V DC OR A MAXIMUM SHORT CIRCUIT CURRENT OF 0.25 A ACROSS THE INTRINSICALLY SAFE TERMINALS.

ENTITY PARAMETERS OF TRANSUCER:
MAXIMUM VOLTAGE (Vmax) = 28 VDC
MAXIMUM CURRENT (Imax) = 0.25 A
UNPROTECTED INTERNAL CAPACITANCE (Cc) = 0 UF
UNPROTECTED INTERNAL INDUCTANCE (Lc) = 0.08 mH MAX.
MAXIMUM POWER (Pmax) = 0.025 W (UL ONLY)

SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:
Vcc 0 Vmax = 0.6 Vcc x Imax

IF Pcc OF THE ASSOCIATED APPARATUS IS NOT KNOWN, IT MAY BE CALCULATED USING THE FORMULA Pcc = (Vcc * Imax) / (Sin * Io x A).

2. CSA CERTIFIED INTRINSICALLY SAFE SYSTEM WHEN USED WITH CSA CERTIFIED BARRIER RATING 14 VOLTS MAX., 50 DIAMS MIN.; OR 22 VOLTS MAX., 300 DIAMS MIN.

3. CENELEC (LCE) CERTIFIED EN 50173 TRANSUCER

<table>
<thead>
<tr>
<th>ENTITY PARAMETERS OF TRANSUCER</th>
<th>SENSITIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transducer</td>
<td>100 mV/pa</td>
</tr>
<tr>
<td>100 mV/pa</td>
<td>0.19 Vout</td>
</tr>
<tr>
<td>145 mV/pa</td>
<td>0.27 Vout</td>
</tr>
<tr>
<td>150 mV/pa</td>
<td>0.28 Vout</td>
</tr>
<tr>
<td>200 mV/pa</td>
<td>0.35 Vout</td>
</tr>
</tbody>
</table>

4. THE RECEIVER MUST NOT BE SUPPLIED FROM A COMMON SOURCE OF POWER WITH RESPECT TO GROUND UNLESS NORMAL OR FAULT CONDITIONS EXCEEDING 200 VOLTS.

5. CABLE LENGTH BETWEEN TRANSUCER AND ZENER DIODE BARRIER SHALL NOT EXCEED 1000 FT. (300 M).

6. ASSOCIATED AND INTRINSICALLY SAFE APPARATUS MUST BE INSTALLED IN ACCORDANCE WITH ITS MANUFACTURER’S CONTROL DRAWING AND ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) FOR INSTALLATION IN THE UNITED STATES, OR SECTION 16 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS IN CANADA.

7. WHEN REQUIRED BY THE MANUFACTURER’S CONTROL DRAWING, THE ASSOCIATED APPARATUS MUST BE CONNECTED TO A SUITABLE GROUND ELECTRODE PER THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70), THE CANADIAN ELECTRICAL CODE, OR OTHER LOCAL INSTALLATION CODES, AS APPLICABLE. THE RESISTANCE OF THE GROUND PATH MUST NOT BE LESS THAN 1 OHM.

8. WHERE MULTIPLE CIRCUITS EXTEND FROM THE SAME PIECE OF INTRINSICALLY SAFE EQUIPMENT TO ASSOCIATED APPARATUS, THEY MUST BE INSTALLED IN SEPARATE CABLES OR IN ONE CABLE MAINTAINING SUITABLE INSULATION. REFER TO ARTICLE 504.30(B) OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) AND INSTRUMENT SOCIETY OF AMERICA (ISA) RP12.2 FOR INSTALLING INTRINSICALLY SAFE EQUIPMENT.

9. ASSOCIATED APPARATUS MUST NOT BE USED IN COMBINATION UNLESS PERMITTED BY THE ASSOCIATED APPARATUS CERTIFICATION.
HAZARDOUS LOCATION

SAFE AREA

SINGLE ENDED INPUT VIBRATION MONITOR (NOTE 2)

5485C TRANSDUCER
CABLE ARMOR
COIL
SHEL
BLK
WHT/LBLK
+15VDC
100K
15V
200K
SIG
AMP
COM
SENSOR MALFUNCTION COMPARATOR
0 mV
10 mV

DIFFERENTIAL INPUT VIBRATIOM MONITOR (NOTE 2)

5485C TRANSDUCER
CABLE ARMOR
COIL
SHEL
BLK
WHT/LBLK
+15VDC
100K
100K
100K
SIG
AMP
COM
100K

NOTES:

1. WARNING – THE VIBRATION MONITOR MUST PROVIDE A NON-INCIDENT FIELD CIRCUIT TO TRANSDUCER, SO THAT IF THE WIRING BETWEEN THE TRANSDUCER AND MONITOR IS OPENED, SHORTED OR GROUNDED, THE CIRCUIT WILL REMAIN NON-INCIDENT. MUST BE WIRE IN ACCORDANCE WITH THE NEC.

2. THE VIBRATION MONITOR SHALL PROVIDE A CIRCUIT HAVING MAXIMUM VOLTAGE AND MINIMUM RESISTANCE VALUES SHOWN IN THE SCHEMATIC DIAGRAMS.

3. TRANSDUCER CIRCUIT PARAMETERS:

   Vmax = 15 Vcc
   Imin = 5 mA
   L1 = 3.85 mH
   C1 = 8 mF

4. CABLE LENGTH SHALL NOT EXCEED 1000' (300m).

5. ALTERNATIVELY, IN LIEU OF THE ACTUAL CIRCUIT PARAMETERS SHOWN HERE, IT IS ALSO ACCEPTABLE TO CONNECT THE TRANSDUCER TO A VIBRATION MONITOR WHICH HAS A "mL" (LIMITED ENERGY) APPROVAL TO EN 50021. NOT APPLICABLE TO U.L.
SENSOR VERIFICATION CALIBRATION PROCEDURE

Mount the 5485C on a shaker table and verify the RMS output per table below.

<table>
<thead>
<tr>
<th>Calibrated Sensitivity (mV/in/s)</th>
<th>Calibrated Sensitivity (mV/mm/s)</th>
<th>RMS Output (mV) Min/Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>4.14</td>
<td>67/81</td>
</tr>
<tr>
<td>145</td>
<td>5.71</td>
<td>93/112</td>
</tr>
<tr>
<td>150</td>
<td>5.91</td>
<td>95/167</td>
</tr>
<tr>
<td>200</td>
<td>7.87</td>
<td>127/156</td>
</tr>
</tbody>
</table>

The test should be performed on a NIST traceable shaker at 1 ips, 150Hz.

Metrix recommends that this procedure be performed every 3 years.

NOTE: Due to the difficulties of field sensor verification, the +/- 5% sensitivity specification is relaxed to +/- 10%. The sensor should be returned to Metrix, Houston, Texas for metrology verification of factory calibration.
ENVIROMENTAL INFORMATION

This electronic equipment was manufactured according to high quality standards to ensure safe and reliable operation when used as intended. Due to its nature, this equipment may contain small quantities of substances known to be hazardous to the environment or to human health if released into the environment. For this reason, Waste Electrical and Electronic Equipment (commonly known as WEEE) should never be disposed of in the public waste stream. The “Crossed-Out Waste Bin” label affixed to this product is a reminder to dispose of this product in accordance with local WEEE regulations. If you have questions about the disposal process, please contact Metrix Customer Service.