

5485C HIGH-TEMPERATURE VELOCITY TRANSDUCER

Installation Manual



2-PIN CONNECTOR VERSION
(requires mating Model 4850-XXXX cable)



FIXED ARMORED CABLE VERSION

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

- $U_i = 28\text{v}$
- $I_i = 120\text{mA}$
- $P_i = 625\text{ mW}$
- $C_i = 0$
- $L_i = 0.88\text{mH max.}$

SPECIFIC CONDITIONS OF USE

In order to ensure temperature classification and safety, the power supply must adhere to the following:

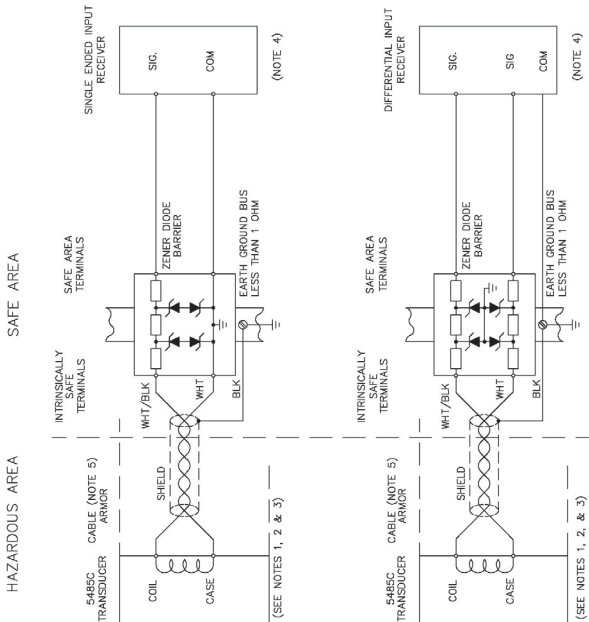
- $U_o \leq 28\text{V}$
- $I_o \leq 120\text{mA}$
- $P_o \leq 0.625\text{W}$

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

Max. Low Ambient Temp.	Max. High Ambient Temp.	Temp. Classification
-54°C	45°C	T6
	60°C	T5
	95°C	T4
	160°C	T3
	260°C	T2
	375°C	T1

AGENCY APPROVED PRODUCT
DO NOT REMOVE FROM
DOCUMENTED CONSTRUCTION
OR LISTED PARTS

WARNING: TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE
ATMOSPHERE, DISCONNECT POWER BEFORE SERVICING



NOTES:

- UNLISTED AND CSA CERTIFIED AS INTRINSICALLY SAFE (CLASS I, GROUPS A, B, C, & D) WHEN USED WITH ZENER DIODE BARRIER. THE ZENER DIODE BARRIER MUST BE VOLTAGE OF 28 VOLTS OR A MAXIMUM SHORT CIRCUIT CURRENT OF 0.25 A ACROSS THE INTRINSICALLY SAFE TERMINALS.
- INTRINSICALLY SAFE SYSTEM WHEN USED WITH UNPROTECTED INTERNAL CAPACITANCE (CI) = 0.88 nHt MAX. MAX. POWER (Pmax) = 0.625 W (UL ONLY)

SUCH THAT THE FOLLOWING CONDITIONS ARE SATISFIED:

$V_{oc} \leq V_{max}$ $I_{sc} \geq I_{min}$ $P_{max} \geq P_o$
 $I_{sc} \leq 5 \text{ Wmax}$ $C_i \geq C_i + C_{cable}$

F Po OF THE ASSOCIATED APPARATUS IS NOT KNOWN, IT MAY BE CALCULATED USING THE FORMULA $P_o = (V_{oc} \times I_{sc})/4 = (I_{sc}^2 \times R_i)/4$.

3. CENELEC (CEC) CERTIFIED IECa to IEC 18

RECEIVER SENSITIVITY	MAXIMUM CABLE LENGTH	RECEIVER RESISTANCE (RI)
105 mV/ps	28 Vdc	39 nHt
145 mV/ps	28 Vdc	77 nHt
185 mV/ps	28 Vdc	115 nHt
200 mV/ps	28 Vdc	130 nHt

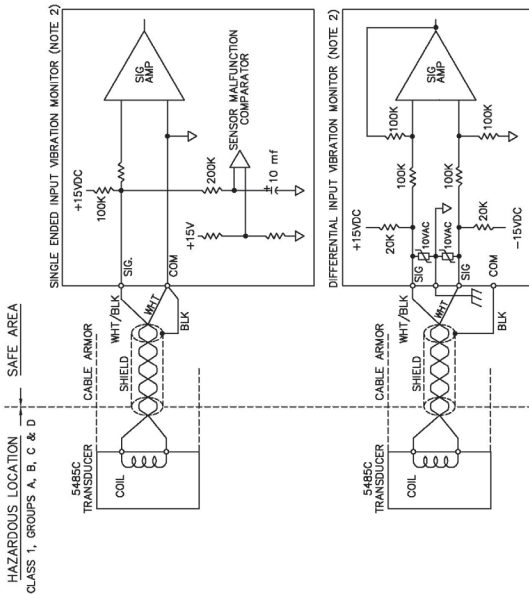
- THE RECEIVER MUST NOT BE SUPPLIED FROM INTRINSICALLY SAFE SYSTEMS. THE RECEIVER MUST BE INSTALLED UNDER NORMAL OR FAULT CONDITIONS EXCEEDING 250 WMS.
- CABLE LENGTH BETWEEN TRANSDUCER AND ZENER DIODE BARRIER SHALL NOT EXCEED 1000 FT. (300 FT).
- ASSOCIATED AND INTRINSICALLY SAFE APPARATUS MUST BE INSTALLED ACCORDING TO THE IEC 18 AND IEC 118 ELECTRICAL CODE (ANSI/AFPA 70) FOR INSTALLATION IN THE UNITED STATES, OR SECTION 18 OF THE CANADIAN ELECTRICAL CODE FOR INSTALLATIONS IN CANADA.
- WHEN REQUIRED BY THE MANUFACTURER'S CONTROL DRAWING, THE ASSOCIATED APPARATUS MUST BE CONNECTED TO THE ZENER DIODE BARRIER IN ACCORDANCE WITH THE ELECTRICAL CODE (ANSI/AFPA 70), THE CANADIAN ELECTRICAL CODE, OR OTHER LOCAL INSTALLATION CODES, AND THE DISTANCE OF THE GROUND PATH MUST BE LESS THAN 1 OHM.
- 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 HAVING TO ARTICLE 504.30(3) OF THE CANADIAN ELECTRICAL CODE (ANSI/AFPA 70) AND NATIONAL ELECTRICAL CODE (ANSI/AFPA 70) AND INSTRUMENT SOCIETY OF AMERICA RECOMMENDED PRACTICE ISA RPT28 FOR INSTALLING INTRINSICALLY SAFE EQUIPMENT.
- ASSOCIATED APPARATUS MUST NOT BE USED IN COMBINATION, UNLESS PERMITTED BY THE ASSOCIATED APPARATUS CERTIFICATION

METRIX
INDUSTRIAL TOOLS, U.S.A.

SPECIFICATION MODEL 5485C,
INTRINSICALLY SAFE TRANSDUCER
VELOCITY TRANSDUCER
WIRING (HAZARDOUS LOCATIONS)

76223 U

1 SHEET OF 3



NOTES:

1. WARNING — THE VIBRATION MONITOR MUST PROVIDE A NON-INCENDIVE FIELD CIRCUIT TO TRANSDUCER, SO THAT THE WIRING BETWEEN THE TRANSDUCER AND MONITOR IS NOT INCENDIVE. UNGROUNDED, THE CIRCUIT WILL REMAIN NON-INCENDIVE. THE CIRCUIT WILL REMAIN NON-INCENDIVE, MUST BE WIRED IN ACCORDANCE WITH THE NEC.
2. THE VIBRATION MONITOR SHALL PROVIDE A MINIMUM RESISTANCE VALUES SHOWN IN THE SCHEMATIC DIAGRAMS.
 $V_{max} = 15 \text{ Vdc}$
 $I_{max} = 15 \text{ mA}$
 $L_{max} = 3.85 \text{ mH}$
 $C = 0 \text{ uF}$
3. TRANSDUCER CIRCUIT PARAMETERS:
4. CABLE LENGTH SHALL NOT EXCEED 1000' (300m).
5. ALTERNATELY, IN LIEU OF THE ACTUAL CIRCUIT PARAMETERS SHOWN, THE VIBRATION MONITOR SHALL BE CONNECTED TO A TRANSDUCER TO A VIBRATION MONITOR WHICH HAS A "TIL" (LIMITED ENERGY) APPROVAL TO EN 50021. NOT APPLICABLE TO UL.

AGENCY APPROVED PRODUCT
DO NOT DEVIATE FROM
DOCUMENTED CONSTRUCTION
OR LISTED PARTS

REV	DATE	DESCRIPTION	BY	CHKD	APP'D
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UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES. ALL DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.

DATE: 1/1/84
 DRAWN BY: JOK
 CHECKED BY: JOK
 SURFACE FINISH: SURFACE FINISH

DO NOT SCALE DIMENSIONS

METRIX
 METRIX TOOL & DIE
 5700 W. 28000 HIGHWAY
 WINGO (CLASS 1, DIV 2)
 DRAWING NO. 8096

SENSOR VERIFICATION CALIBRATION PROCEDURE

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

CALIBRATION VERIFICATION TABLE 1 ips peak @ 150Hz		
Calibrated Sensitivity mV/in/s	Calibrated Sensitivity mV/mm/s	RMS Output mV Min/Max.
105	4.14	67/81
145	5.71	93/112
150	5.91	95/167
200	7.87	127/156

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.

ENVIRONMENTAL 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.

info@metrixvibration.com

www.metrixvibration.com

8824 Fallbrook Dr. Houston, TX 77064, USA

Tel: 1.281.940.1802 • Fax: 1.713.559.9421