1-828 SERIES
DISPLACEMENT TRANSMITTER

Operation & Maintenance Manual

746 Arrow Grand Circle
Covina, CA 91722
United States of America

Tel: (626) 938-0200
Fax: (626) 938-0202

Internet: http://www.cecvp.com
E-mail: info@cecvp.com

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Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

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1.0 Overview

1.1 Introduction

This document contains information on the operation, installation and maintenance of the CEC Type 1-828 Displacement Transmitter. The instrument is manufactured by CEC Vibration Products Inc. and is designed to accept radial vibration signals from model 3300/3300XL, 7200 type proximity probes or probes with equivalent electrical ratings.

1.2 Description

The 1-828 series radial transmitters are an integral part of a three component “system”. The “system” is comprised of a proximity probe, extension cable and the 1-828 transmitter. The system is used primarily to measure the movement or proximity of a rotating shaft or machine part in relation to the fixed location of the probe tip.

Signals from the proximity probe are conditioned to provide a negative 200mV/mil output proportional to displacement and a calibrated 4-20mA representing the peak to peak displacement vibration level. A GAP voltage is also provided for reference.

The transmitter is housed in a plastic enclosure suitable for 35mm-din rail/surface mounting (see Figure 1-1). On the front of the transmitter are four electrical connectors: two positive force terminal blocks for the +24 VDC input, (+/-) Analog output, a BNC connector for the Buffered sensor output and one miniature threaded connector to interface with the proximity probe. There is also a multi-function green indicator light (XDCR OK) which illuminates when power and a sensor are properly connected to the transmitter and working correctly.

A buffered transducer output connection allows the user to connect across the vibration sensor for on-line vibration diagnostics and testing of the sensor. This connection is before the filtering allowing full spectrum analysis.

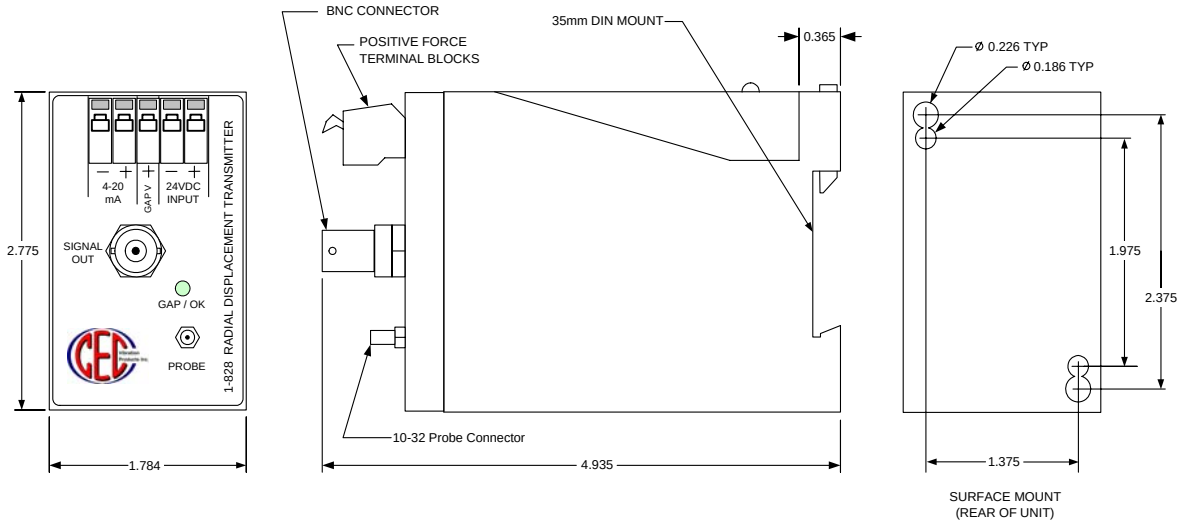


Figure 1-1 Dimensional Outline Drawing

Table 1.1 Specifications

Output (conditioned)	4-20 mA (Active Source)
Buffered Output	Buffered sensor output common is isolated from power and 4-20 mA output.
Bandpass Filtering	The 1-828 Transmitter contains a bandpass filter, which consists of a low-pass and a high-pass filter. Filter roll off is better than 42 dB/octave (High & Low Pass).
Power Input	18-32 VDC (Power on delay of 20msecs from zero to 7VDC and 40msecs from zero to 18VDC)
Temperature Range **Operating** **Storage**	 -40°F to +150°F (-40°C to +65°C) -55°F to +200°F (-49°C to +94°C)
Probe Types	3300, 3300XL, 7200 or equivalent with the following parameters: Vmax $\geq$ 10V, Imax $\geq$ 20mA, Ct $\leq$ 15nF, Li $\leq$ 200μF, Pmax $\geq$ 0.2W
Connectors	Positive force terminal block contacts BNC 10/32 Miniature Threaded Connector
Weight	7 ounces maximum
Hazardous Area Rating	CSA C/US certified Class I, Division 2, Group A, B, C, D Temp code: T3C, Max Ambient 65°C ATEX certified II 3 G Ex nA II T3 KEMA 07ATEX0114X -40°C$\leq$ Ta$\leq$ 65°C Reference Installation Drawing 701268 See Appendix A

- **I/O configuration on a particular 1-828 may be obtained from the unit's label or using the part number, reference Selection Guide on Page 5.**

2.0 Installation

2.1 Mounting the Transmitter Case

The transmitter case is designed for quick mounting to a 35mm din rail. The case can be surface mounted via screw holes located at opposite corners (see Figure 2-2).

2.2 Electrical Connections

2.2.1 Connect the proximity probe and extension cable to the mini-threaded connector labeled PROBE at the bottom front of the transmitter.
Note: The system length is designated on the side of the transmitter. This length is fixed for each transmitter and therefore any change to the extension cable length will affect the calibration and linearity of the system. Check with the probe manufacturer for information related to the correct mounting methods of the probe.

2.2.2 Connect the vibration monitoring test equipment to the desired output connection.

2.2.2.1 ANALOG OUTPUT (+ & -): Scaled 4-20mA proportional to peak to peak static vibration, voltage reversal & short circuit protected terminal connection.

2.2.2.2 SIGNAL OUTPUT (BNC): Scaled -200mV/mil buffered signal output short circuit protected.

2.2.2.3 GAP Voltage: Reference to the Negative (-) 24VDC. The GAP Voltage is used to electrically set the system to the approximate center of its measurement range. While observing the dc voltage with an isolated meter, adjust the probe gap to obtain ~ -9Vdc.

2.2.3 Connect the 24 VDC input power to the two terminals (+ & -) 24VDC INPUT on the top of the vibration transmitter.

2.2.4 Apply power; the XDCR OK LED should flash. If power and transducer are connected correctly, the green XDCR OK light will stop flashing and remain on.

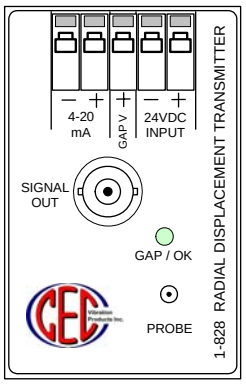


Figure 2-1 Front Panel

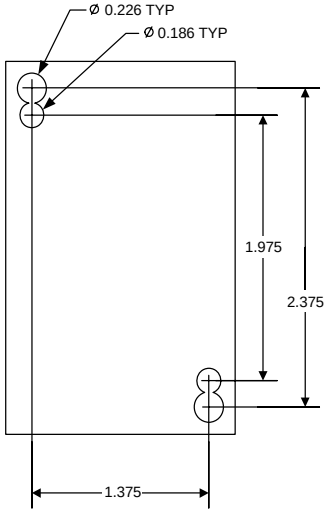


Figure 2-2 Surface Mount

2.3 Hazardous Environment Installation

2.3.1 For installation in a Division 2 hazardous area this equipment must be used within an overall system enclosure that is appropriately designed for the intended environment and rated at least IP54 or higher and where the final installation is acceptable to the local inspection authority having jurisdiction.

2.3.2 For installation in a Zone 2 hazardous area the transmitter must be installed in an enclosure with an degree of protection not less than IP 54 and where the final installation is acceptable to the local inspection authority having jurisdiction.

2.3.3 WARNINGS:

EXPLOSION HAZARD - Substitution of components may impair suitability for Class I, Division 2 operation.

EXPLOSION HAZARD - Do not connect or disconnect equipment unless power has been removed or the area is known to be non-hazardous.

This equipment is suitable for use in Class I, Division 2, Groups A,B,C,D hazardous locations or non-hazardous locations only.

3.0 Operation

There are no adjustments to be made on the model 1-828 displacement transmitters.

3.1 Transmitter Performance

During normal operation, the status LED will indicate constant Green. The conditions listed below shall result in the status LED going from Green to Red.

3.1.1 Probe too close to target: Output goes below 2.5mA if the gap is less than 10 mils (Status LED – Constant Red)

3.1.2 Shorted leads: Output goes below 2.5mA (Status LED – Constant Red)

3.1.3 Probe not connected or too far from target: Output goes above 20.5mA if the gap is greater than 90 mils (Status LED – Blinking Red)

4.0 Maintenance

4.1 General

There are no customer replaceable parts within the 1-828 Displacement Transmitter. The amplifier has been designed for trouble-free service under normal operating conditions. CEC warrants the equipment for one year from the date of purchase. Should your instrument require repair within the warranty period, you may contact our customer service representative at 626-938-0200.

5.0 Selection Guide

Using the following guide, select the desired parameters to build a part number:

CEC P/N 1-828- [A][A][A] - [B][B] - [C][D]

PROXIMITY PROBE TRANSMITTER

A — **INPUT TYPE (5mm or 8mm Tip)**

	Probe Type	Target Material	System Length
A05 =	3300	Incoloy	5m
A09 =	3300	Incoloy	9m
A14 =	3300	Incoloy	14m
B05 =	3300	4140 S.S.	5m
B09 =	3300	4140 S.S.	9m
B14 =	3300	4140 S.S.	14m
C05 =	7200	Incoloy	5m
C09 =	7200	Incoloy	9m
D05 =	7200	4140 S.S.	5m
D09 =	7200	4140 S.S.	9m
D14 =	7200	4140 S.S.	14m

B — **4-20 mA OUTPUT RANGE (Full Scale)**

- **05** = *0 - 5 mils*
- **10** = *0 - 10 mils*
- **20** = *0 - 20 mils*

C — **HIGH PASS FILTER**

- **0** = *None*
- **1** = *5 Hz*
- **2** = *10 Hz*
- **3** = *15 Hz*
- **4** = *20 Hz*
- **5** = *30 Hz*
- **6** = *50 Hz*

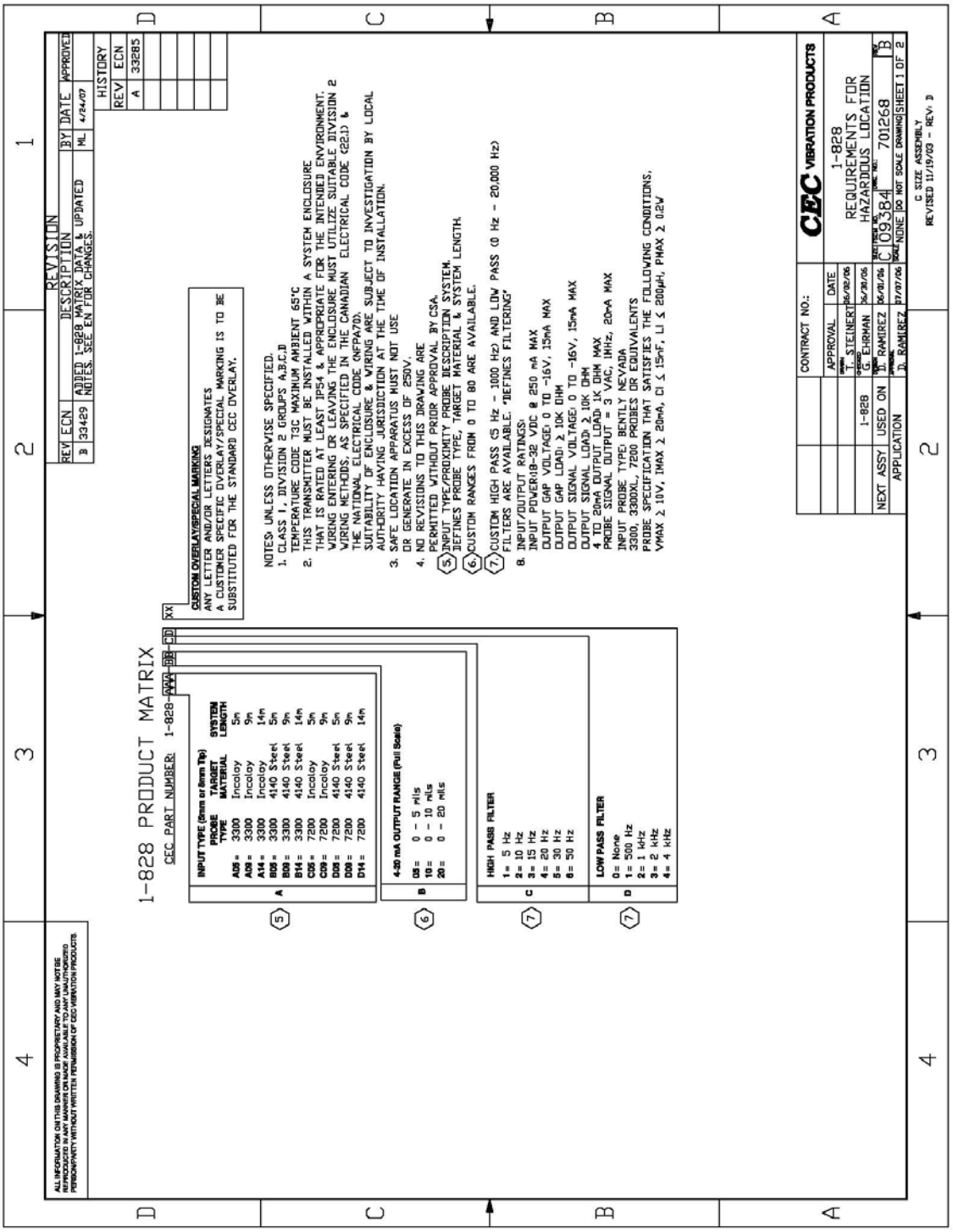
D — **LOW PASS FILTER**

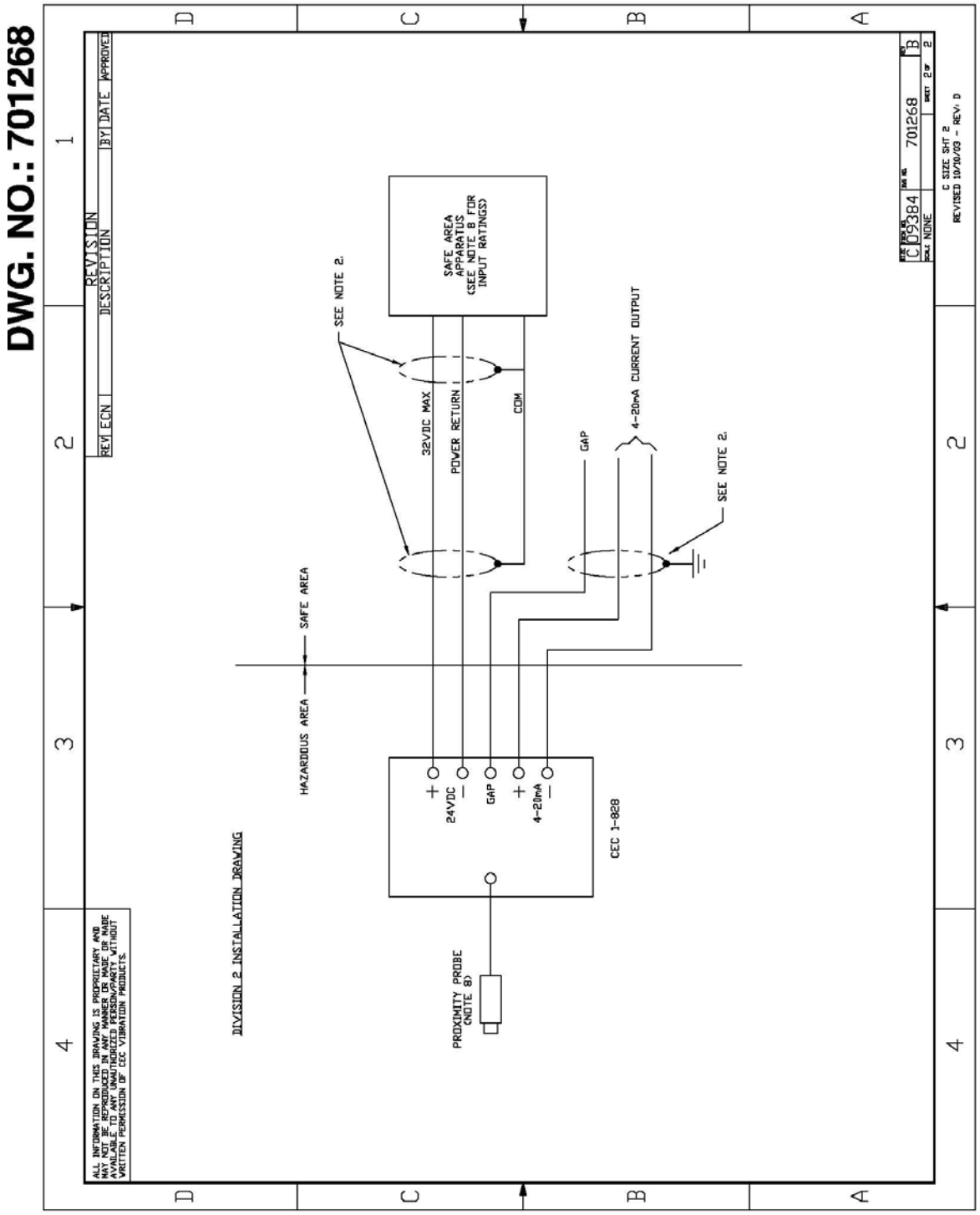
- **0** = *None*
- **1** = *500 Hz*
- **2** = *1 kHz*
- **3** = *2 kHz*
- **4** = *4 kHz*

Example: ***P/N 1-828-*** [B][0][9] - [1][0] - [2][2]

The example unit's input is from a 3300 type proximity probe with a total system length of 9 meters and a target material of 4140 S.S. The output is 4-20 mA scaled from 0 to 10 mils, peak to peak. The filtering includes a combination of a 10 Hz high pass and 1,000 Hz low pass filters.

Revised February, 2007


DWG. NO.: 701268
REVISION
REV ECN DESCRIPTION BY DATE APPROVED
B 33429 ADDED 1-828 MATRIX DATA & UPDATED NOTES. SEE EN FOR CHANGES. ML 4/24/07
HISTORY
REV ECN
A 33285
1-828 PRODUCT MATRIX
CEC PART NUMBER: 1-828-XXX BB CD XX
CUSTOM OVERLAY/SPECIAL MARKING
ANY LETTER AND/OR LETTERS DESIGNATES A CUSTOMER SPECIFIC OVERLAY/SPECIAL MARKING IS TO BE SUBSTITUTED FOR THE STANDARD CEC OVERLAY.
INPUT TYPE (25mm or 8mm Tip)
PROBE TYPE
TARGET MATERIAL
SYSTEM LENGTH
A05 = 3300 Incoloy 5m
A09 = 3300 Incoloy 9m
A14 = 3300 Incoloy 14m
B05 = 3300 4140 Steel 5m
B09 = 3300 4140 Steel 9m
B14 = 3300 4140 Steel 14m
C05 = 7200 Incoloy 5m
C09 = 7200 Incoloy 9m
D05 = 7200 4140 Steel 5m
D09 = 7200 4140 Steel 9m
D14 = 7200 4140 Steel 14m
4-20 mA OUTPUT RANGE (Full Scale)
05= 0 - 5 mils
10= 0 - 10 mils
20= 0 - 20 mils
HIGH PASS FILTER
1= 5 Hz
2= 10 Hz
3= 15 Hz
4= 20 Hz
5= 30 Hz
6= 50 Hz
LOW PASS FILTER
0= None
1= 500 Hz
2= 1 kHz
3= 2 kHz
4= 4 kHz
NOTES: UNLESS OTHERWISE SPECIFIED.
1. CLASS I, DIVISION 2 GROUPS A,B,C,D
TEMPERATURE CODE T3C MAXIMUM AMBIENT 65°C
2. THIS TRANSMITTER MUST BE INSTALLED WITHIN A SYSTEM ENCLOSURE THAT IS RATED AT LEAST IP54 & APPROPRIATE FOR THE INTENDED ENVIRONMENT. WIRING ENTERING OR LEAVING THE ENCLOSURE MUST UTILIZE SUITABLE DIVISION 2 WIRING METHODS, AS SPECIFIED IN THE CANADIAN ELECTRICAL CODE (22.1) & THE NATIONAL ELECTRICAL CODE (NFPA70). SUITABILITY OF ENCLOSURE & WIRING ARE SUBJECT TO INVESTIGATION BY LOCAL AUTHORITY HAVING JURISDICTION AT THE TIME OF INSTALLATION.
3. SAFE LOCATION APPARATUS MUST NOT USE OR GENERATE IN EXCESS OF 250V.
4. NO REVISIONS TO THIS DRAWING ARE PERMITTED WITHOUT PRIOR APPROVAL BY CSA.
5. INPUT TYPE/PROXIMITY PROBE DESCRIPTION SYSTEM. DEFINES PROBE TYPE, TARGET MATERIAL & SYSTEM LENGTH.
6. CUSTOM RANGES FROM 0 TO 80 ARE AVAILABLE.
7. CUSTOM HIGH PASS (5 Hz - 1000 Hz) AND LOW PASS (0 Hz - 20,000 Hz) FILTERS ARE AVAILABLE. *DEFINES FILTERING*
8. INPUT/OUTPUT RATINGS:
INPUT POWER:18-32 VDC @ 250 mA MAX
OUTPUT GAP VOLTAGE: 0 TO -16V, 15mA MAX
OUTPUT GAP LOAD: ≥ 10K OHM
OUTPUT SIGNAL VOLTAGE: 0 TO -16V, 15mA MAX
OUTPUT SIGNAL LOAD ≥ 10K OHM
4 TO 20mA OUTPUT LOAD 1K OHM MAX
PROBE SIGNAL OUTPUT = 3 VAC, 1MHz, 20mA MAX
INPUT PROBE TYPE: BENTLY NEVADA 3300, 3300XL, 7200 PROBES OR EQUIVALENTS
PROBE SPECIFICATION THAT SATISFIES THE FOLLOWING CONDITIONS.
VMAX ≥ 10V, IMAX ≥ 20mA, Ci ≤ 15nF, Li ≤ 200µH, PMAX ≥ 0.2W
ALL INFORMATION ON THIS DRAWING IS PROPRIETARY AND MAY NOT BE REPRODUCED IN ANY MANNER OR MADE AVAILABLE TO ANY UNAUTHORIZED PERSON/PARTY WITHOUT WRITTEN PERMISSION OF CEC VIBRATION PRODUCTS.
CONTRACT NO.:
CEC VIBRATION PRODUCTS
APPROVAL DATE
T. STEINERT 05/02/06
G. EHRMAN 05/30/05
I. RAMIREZ 05/01/06
D. RAMIREZ 07/07/06
1-828
NEXT ASSY USED ON
APPLICATION
1-828 REQUIREMENTS FOR HAZARDOUS LOCATION
DRAWING NO. C 09384
SCALE NONE
701268 REV B
DO NOT SCALE DRAWING
SHEET 1 OF 2
C SIZE ASSEMBLY
REVISED 11/19/09 - REV: D


DWG. NO.: 701268
REVISION
REV ECN DESCRIPTION BY DATE APPROVED
ALL INFORMATION ON THIS DRAWING IS PROPRIETARY AND MAY NOT BE REPRODUCED IN ANY MANNER OR MADE OR MADE AVAILABLE TO ANY UNAUTHORIZED PERSON/PARTY WITHOUT WRITTEN PERMISSION OF CEC VIBRATION PRODUCTS.
DIVISION 2 INSTALLATION DRAWING
HAZARDOUS AREA
SAFE AREA
SEE NOTE 2.
SAFE AREA APPARATUS (SEE NOTE B FOR INPUT RATINGS)
32VDC MAX
POWER RETURN
COM
GAP
4-20mA CURRENT OUTPUT
SEE NOTE 2.
+ 24VDC −
GAP
+ 4-20mA −
CEC 1-828
PROXIMITY PROBE (NOTE B)
C09384
701268
B
SCALE NONE
SHEET 2 OF 2
C SIZE SHT 2
REVISED 10/10/03 - REV: D

Typical Identification Label

CEC Vibration Products
746 Arrow Grand Cr.
Covina, CA 91722 USA

SERIAL NO: 1000
CEC P/N: 1-828-B09-10-14
TARGET MATERIAL: 4140 STEEL
SYSTEM INPUT: 9M, 3300 TYPE PROBE
CURRENT OUTPUT: 4-20mA = 0-10 MILS
GAP OUTPUT: 0 TO -16V, 15mA MAX.
SCALE: -200mV / mil

Typical Warning Label

CEC VIBRATION PRODUCTS
MODEL 1-828

INPUT POWER: 18-32 VDC @250mA MAX.
Class I Division 2 Groups A, B, C, D
Temperature Code T3C Maximum Ambient 65°C

II 3 G Ex nA II T3 KEMA 07ATEX0114X
-40°C ≤ Ta ≤ 65°C, Install per drawing 701280

WARNING- EXPLOSION HAZARD
DO NOT CONNECT OR DISCONNECT WHILE CIRCUIT IS LIVE
UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS
SEE MANUAL FOR ADDITIONAL RATINGS