

## GEMS SENSORS AND CONTROLS

### OPERATING & INSTALLATION INSTRUCTIONS

**INTRINSICALLY SAFE  
SECURITE INTRINSEQUE**



**SERIES 12CS/16CS/22CS/26CS**

PLEASE READ CAREFULLY BEFORE INSTALLING

**Installation Bulletin P/N 227519**

**REV: E**

### INTRODUCTION

The Series 12CS/16CS/22CS/26CS transducers and transmitters are fitted with an ASIC amplifier providing various optional (at time of order) voltage outputs, and a 4-20mA current output capable of being used in control and indicating loops without further amplification.

The models 12CS, 16CS, 22CS and 26CS are CSA certified Intrinsically Safe for use in:

**CLASS I; Division 1; Groups A, B, C, D; CLASS II, Division 1, Groups E, F, G; CLASS III**

### MODEL SPECIFICATION

**12CSabcccddeCfAhhh; 16CSabcccddeCfAhhh; 22CSabcccddeCfghhh;  
26CSabcccddeCfghhh;**

Where:

- a = Output Code: B, C, D, F, G, H, J, R, S (F and G are only options for 22CS and 26CS models)
- b = Pressure Datum Code: A or G (A has maximum range of 25 bar, 300 psi)
- ccc = Pressure Range Code:  
A10, A16, A25, A40, A60, B10, B16, B25, B40, B60, C10, C16, C25, C40, VAC, 1A0, 1A6, 2A5, 4A0, 6A0, 1B0, 1B6, 2B5, 4B0, F07, F15, F30, F60, G10, G15, G20, G30, G50, G60, H10, H15, H20, H30, H40, H50, 1F5, 3F0, 6F0, 1G0, 1G5, 2G0, or 3G0
- dd = Pressure Port:
- e = Connector Code: A, B, D, F, or 2 for 12CS models  
C, G, 1, or 3 for 16CS models  
A, B, D, F, or 2 for 22CS models  
1, C, G, F, 3 or M for 26CS models
- f = Cable Length (Max length of 150m)
- g = Performance Code: A or B
- hhh = Option codes: Any combination of alpha/numeric characters representing options not affecting certification



## **HAZARDOUS PRODUCTS**

Products which are supplied per this bulletin may be classified as Electrical, Electro-Mechanical and Electronic equipment.

These products are tested and supplied in accordance with our published specifications or individual special requirements that are agreed in writing at time of order. They are constructed so as not to affect adversely the safety of persons and property installed, maintained and used by qualified personnel, in the application for which they were designed and manufactured.

## **ENTITY PARAMETERS**

<b>Vmax</b>	<b>Imax</b>	<b>Ci</b>	<b>Li</b>	<b>Temperature</b>
28 Vdc	150mA	40.4nF	858µH	T4

## **GENERAL**

The equipment is designed and manufactured to:

- a) Avoid physical injury or other harm which may be caused by direct or indirect contact.
- b) Ensure that excess surface temperature of accessible parts or radiation which would cause a danger are not produced.
- c) Eliminate non-electrical dangers which are revealed by experience.
- d) Ensure that foreseeable conditions of overload will not give rise to dangerous situations.

Provided that:

- Pressure range must be compatible with the maximum pressure being measured.
- Pressure media must be compatible with the transducer/transmitter wetted parts listed in these instructions.
- Liquid must not be allowed to freeze in the pressure port.
- The gasket must be fitted under the electrical connector.

## **MECHANICAL INSTALLATION**



**Pressure Connection:** Refer to attached connection drawing Figure 1.

**Mounting:** Omni-directional, self supported directly into the pipe-work. Use 19mm AF (3/4”) spanner on the hexagon provided to apply a maximum torque of 15.8Nm.

**ELECTRICAL INSTALLATION**

Installation of this type must be carried out in accordance with the Approved Installation condition for Intrinsically Safe Pressure Transmitters.

SERIES	Connector code	mA Output			Voltage Output			
		(+)	(-)	EARTH	IN+	COMMON	OUTPUT	EARTH
12CS	A	1	2	E	1	2	3	E
	B							
	2							
	D F	RED	BLACK	DRAIN	RED	BLACK	WHITE	DRAIN
16CS	1	A	B	D	A	C	B	D
	C	A	B	E	A	C	B	E
	G	1	2	4	1	2	3	E
	3(CABLE)	RED	BLACK	DRAIN	RED	BLACK	WHITE	DRAIN
	3(Leads)	RED	BLACK	GREEN	RED	BLACK	WHITE	GREEN
22CS	A	1	2	E	1	2	3	E
	B							
	2							
	D F	RED	BLACK	DRAIN	RED	BLACK	WHITE	DRAIN
26CS	1	A	B	D	A	C	B	D
	C	A	B	E	A	C	B	E
	G	1	2	4	1	2	3	E
	F & 3 (CABLE)	RED	BLACK	DRAIN	RED	BLACK	WHITE	DRAIN
	3(Leads)	RED	BLACK	GREEN	RED	BLACK	WHITE	GREEN
	M	RED	BLUE	DRAIN	RED	WHITE	YELLOW	DRAIN

**SPECIAL CONDITIONS FOR SAFE USE**

1. The screen of the integral cable may be connected internally to the frame of the apparatus and this must be taken into consideration when installing the apparatus.
2. Pin 4 of the optional plug/socket arrangement is connected internally to the frame of the apparatus and this must be taken into consideration when installing the apparatus.

**WARNING**  
**SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR INTRINSIC SAFETY**

**AVERTISSEMENT**  
**LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE**

**OPERATION**

Having installed the transducers as instructed (see figure 1), they are ready for use. Before applying power, check that the correct polarity and excitation levels are being applied. See table 1 for electrical connections.

**TABLE 1**

OUTPUT	SUPPLY VOLTAGE (Vdc)
4-20mA	7-28Vdc
1 – 6 V	7.5 – 28Vdc
1 – 11 V	12.5 – 28Vdc
0.1 – 5.1 V	6.6 – 28Vdc
0.2 – 10.2 V	11.7 – 25.5Vdc
1 – 5 V	6.5 – 28Vdc
0.5 – 5.5 V	7.0 – 28Vdc
0 – 5 V	6.5 – 28Vdc
0 – 10 V	11.5 – 28Vdc

**LOAD CHARACTERISTICS**

The total resistive load in the loop (to include all the cable resistance) can be from Zero (0) to 50 X (supply voltage – 7) ohms e.g. with a 24 Vdc supply the permissible load is from zero up to 850 ohms.

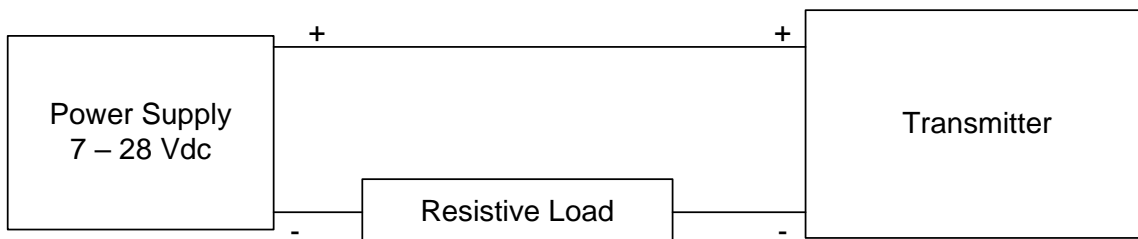




FIGURE 1

## **WARRANTY**

We guarantee this instrument against faulty workmanship and material for a period of one year from date of delivery. Gems Sensors will repair or replace, free of charge, any transducer/transmitter found to be defective within the specified period providing the device has been used within specification in accordance with these instructions and has not been misused in any way.

Detailed notice of such defects and satisfactory proof thereof must be given to Gems Sensors immediately after the discovery of the defect. Contact Gems Sensors for instructions. See "RETURN TO FACTORY"

## **WETTED PARTS**

316 and 17-4 PH stainless steels plus Nickel Braze to BS1845:NK3/HTN2.

## **SERVICING**

The transducer is not to be repaired by the user and must be replaced by an equivalent certified unit. Repairs should be carried out by the manufacturer or an approved repairer.

## **RETURN TO FACTORY**

**PLEASE NOTE:** To comply with Health and Safety requirements, the transducer/transmitter must be clean and safe to handle and accompanied by a formal statement to that effect duly signed by an authorized officer of the company.

Any instrument returned without certification will be quarantined and no action will occur until cleared. It may ultimately be returned to you and subject to a transportation charge.

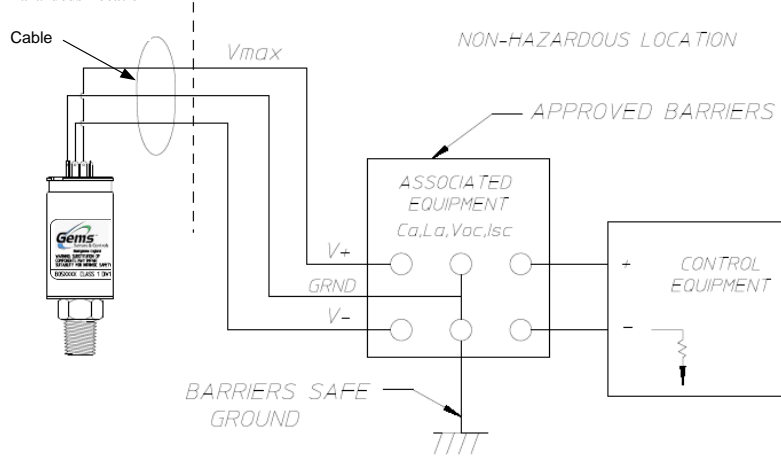
## **MAINTENANCE**

Routine Inspection: Not required except for periodic inspection of the cable and connector to ensure that these are neither damaged nor softened by incompatible liquids.

## **INTRINSICALLY SAFE INSTALLATION** **SECURITE INTRINSEQUE**

Hazardous Location

SIGNAL OUTPUT: 4 -20mA



$$V_{max} \geq V_{dc}$$

$$I_{max} \geq I_{sc}$$

$$C_a \geq C_{cable} + C_i$$

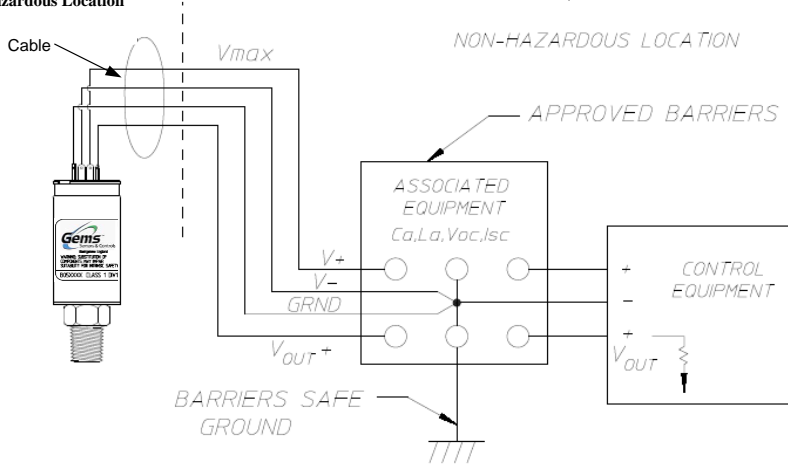
$$L_a \geq L_{cable} + L_i$$

**ENTITY PARAMETERS**

**V<sub>max</sub> – 28Vdc**  
**I<sub>max</sub> – 150mA**  
**C<sub>i</sub> – 40.4 nF**  
**L<sub>i</sub> – 858μH**

Hazardous Location

SIGNAL OUTPUT: 0-5Vdc, 0-10Vdc



**Notes:**

1. Control equipment must not use or generate more than 250V
2. Cable Capacitance (C<sub>cable</sub>) and Inductance (L<sub>cable</sub>) parameters must be known to determine the total energy storing parameters. If the cable parameters are not known, the following values may be used:

Capacitance: 60 pF/ft

Inductance: .20 μH/ft