

# **GEMS SENSORS & CONTROLS**

**OPERATING & INSTALLATION INSTRUCTIONS**

**CE MARKED SERIES 4700B**

**PLEASE READ CAREFULLY BEFORE INSTALLING**

**PART NUMBER: 560550-0077**

**ISSUE: D**

## **INTRODUCTION**

Series 4700B are fluid pressure measuring transmitters in which a four active arm Wheatstone bridge of sputtered thin film gauges, integral with a beam structure connected to a pressure summing diaphragm, is used to convert fluid pressures into a proportional electrical signal. These instruments are suitable for long, continuous arduous service when operated within the published specifications.

Common integral electronics converts the input from the gauge to a 4-20mA, 2-wire output signal.

Series 4700B conform with the essential protection requirements of the EMC Directive 2004/108/EC amended by certified type testing to BS EN61326-1 and BS EN61326-2-3.

Series 4700B with the CE0086 mark also complies with the requirements of the Pressure Equipment Safety Regulations 2016 and can be used as part of a safety-related system on Category IV pressure equipment.

**Conformity with the requirements of the CE mark only applies when the installation conditions described in these instructions have been met. For units supplied without a cable assembly connection to the transmitter must be accomplished using Gems Sensors approved cable. see APPROVED CABLE section.**

All instruments conform to the appropriate specifications and/or drawings applicable and have been subjected to relevant strict quality control procedures.

## **HAZARDOUS PRODUCTS**

The Consumer Protection Act of 1987, Section 6 of the Health and Safety at Work Act 1974 and the Control of Substances Hazardous to Health Regulations 1988 require that we advise recipients and users of our products of any potential hazards associated with their storage, handling or use.

The products which our Company supplies 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 when properly installed, maintained and used by qualified personnel, in the applications for which they were designed and manufactured

## **ACTION ON RECEIPT**

- \* Check details on Calibration Certificate agree with data etched on Transmitter body.
- \* Check accessories supplied include:
  - Calibration Certificate (or QA Certificate)
  - Seal, Dowty Bonded
  - Mating Connector (where applicable)

## **GENERAL**

- \* Transmitter should not be subjected to greater than the maximum allowable pressure (P.S.) / Temperature (T.S) as defined on the Transmitter label.
- \* Transmitter should not be subjected to mechanical impact.
- \* In the event of fire the end user must ensure that the system pressure is vented to a safe area.
- \* The effects of decomposition of unstable fluids should be considered by the user when placing this device in service.
- \* The pressure transmitter has no means of draining or venting, this must be performed by another component in the end users system.
- \* Pressure range must be compatible with the maximum pressure being measured.
- \* Pressure media must be compatible with the transmitter wetted parts which are:-
  - Ranges 1 and 1.6 bar, 15 and 30 psi :** 15-7 Mo plus 17-4 PH stainless steels
  - Ranges 2.5 bar and 60 psi and above :** 17-4 PH stainless steel
  - Pressure connection code K:** Inconel alloy 625
- \* Exposed end of cable must be kept free from moisture.
- \* Liquid must not be allowed to freeze in the pressure port.

Full specifications for all products available on request from our Service Department.

## **MECHANICAL INSTALLATION**

**Pressure Connections:** G $\frac{1}{4}$  internal pressure connection to BS2779 as standard. Alternative fitted as specified at time of order.

Pressure couplings screwed into G $\frac{1}{4}$  pressure ports should have a maximum thread engagement 13 mm and **UNDER NO CIRCUMSTANCES** be allowed to touch the pressure sensitive diaphragm. Pressure couplings should be sealed against the outer face at the pressure port entry using bonded seal washer such as:-

<b>Part Number</b>	<b>Description</b>
234646-0002	G $\frac{1}{4}$ bonded seal up to +100°C operation. Dowty Ref: 400-021-4490-02

Refer to Dowty for external pressure ratings.

**Mounting:** Pressure transmitter is designed to be attached by the coupling thread only. Omni-directional. To fit, use a 22.2 mm (7/8 inch) AF spanner on the hexagon provided and apply maximum torque of 27 Nm (20 lbf-ft). The Customer must ensure that the pressure seal is suitable for the application. If in doubt contact Gems Sensors.

**Vibration:** Where present, mount in a saddle clamp such as part number 499877-1500 (material: Polypropylene). Position the clamp as close to the pressure port as practicable.

**Effects of Heat:** Avoid mounting the transmitter near a source of heat which is liable to create a temperature gradient across the instrument. If this is unavoidable, use a heat shield to deflect uneven radiated heat or wrap the transmitter in glass fibre insulation so that an even temperature is assumed throughout.

**High Temperature Pressure Measurement:** Possible using a length of piping or a "syphon" to isolate the instrument from the hot media. Since there is no flow, the temperature drop along the tubing is considerable and usually a relatively short length is sufficient to bring the pressure media temperature within acceptable limits for the instrument. Alternatively a temperature isolator, part number 558564-0001, can be fitted (G $\frac{1}{4}$  connection only). Pressure media must not be allowed to solidify in the tube and/or pressure port.

## **ELECTRICAL INSTALLATION**

All types include suppression devices providing transient protection to EN 61326-1 and EN 61326-2-3.

**For all types conformity with the requirements of the CE mark only applies when connection is made with Gems Sensors approved cable, See APPROVED CABLE section, and the screen of that cable is connected to a reliable earthing point at the instrumentation end.**

## **APPROVED CABLES**

Gems Sensors uses cable comprising 7 colour-coded cores, with a central vent tube, enclosed by an aluminium/polyester screen where the screen is in intimate contact with a separate drain wire. The outer sheath material is Polyurethane (immersion, +50°C). Other sheath materials available on request for harsh environments.

## **OPERATION**

Having installed the transmitters as instructed they are ready for use. The transmitter should not be removed whilst the system is at pressure. Before applying power, check that the correct polarity and excitation levels are being applied. See ELECTRICAL REQUIREMENTS.

## **OPERABLE TEMPERATURE RANGE**

Cable Versions: -20°C to +50°C

Connector Versions: -25°C to +85°C

Process Media (connector version only): -30°C to +100°C

## OPERATIONAL LIFE:

Limited to 3 million full scale cycles.

## CALIBRATION

Transmitters are calibrated to the range requested at time of order.

- G** - gauge datum vented to atmosphere via the electrical connection
- A** - absolute datum
- S** - sealed reference; reference side of the instrument is sealed and the output electrically adjusted to zero with 1013 mb applied to pressure port

## ADJUSTMENT OF ZERO AND SPAN CONTROLS

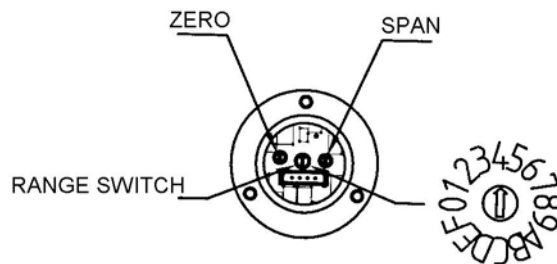
Switch and potentiometers provide continuous adjustment over the range 130% to 17% of nominal pressure range.

Zero and Span controls are precisely set during manufacture and should only need adjustment if there is a change in the required pressure measurement.

Access to these controls is provided by means of a removable end plate. Remove the 3 retaining screws using 2.5mm A/F hex wrench and withdraw end plate.

**Caution: Care should be taken in withdrawing end plate so as not to disconnect internal plug.**

To maintain sealing integrity ensure end cap 'O' ring is correctly seated and clean prior to re-fitting.



## RANGE SWITCH DETAILS

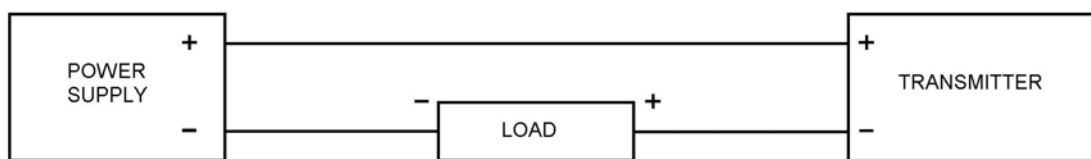
Switch Position (Current Mode)	Downranging Scope (Nominal)
0	130 to 80%
1	102 to 62%
2	82 to 49%
3	70 to 42%
4	61 to 36%
5	54 to 32%
6	49 to 28%
7	45 to 25%
8	42 to 23%
9	39 to 22%

Switch Position (Current Mode)	Downranging Scope (Nominal)
A	36 to 20%
B	34 to 19%
C	32 to 17%
D	Not Used
E	Not Used
F	Not Used

## LOAD RESISTANCE

The total permissible resistive load in the loop (to include all the cable resistance, and in the I.S. versions the internal resistance of the Galvanic Isolator) can be from 'zero to 50 x (supply volts -9.5) ohms' e.g. with a 24V d.c. supply the permissible load is from zero up to 775 ohms (Figure 1).

**FIGURE 1**



## SUPPLY VOLTAGE

Non I.S: 9.5V to 40V d.c.  
 I.S: 9.5V to 28V d.c.

## MAINTENANCE

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

## CAUTION

**CARE MUST BE TAKEN NOT TO TOUCH THE PRESSURE SENSITIVE DIAPHRAGM WHILST CLEANING THE PRESSURE PORT. FAILURE TO OBSERVE THIS PRECAUTION CAN CAUSE IRREPARABLE DAMAGE.**

## **WARRANTY**

The Company warrants its products to be free from defects in material and workmanship in normal use and service for a period of one year from date of shipment. The Company reserves the right and option to refund the purchase price in lieu of repair or replacement upon evaluation of the returned original part. Modification, misuse, attempted repair by others, improper installation or operation shall render this guarantee null and void. The Company makes no warranty of merchantability or fitness for a part or purpose.

## **SERVICING**

The Transmitter cannot be repaired locally and if damaged should be returned to ourselves at the address shown below or to accredited dealers when a replacement/repair is required:

Gems Sensors & Controls  
Lennox Road  
Basingstoke  
Hants. RG22 4AW

Gems Sensors Inc  
1 Cowles Road  
Plainville, CT 06062  
U.S.A.

## **RETURN TO FACTORY**

**PLEASE NOTE:** To comply with Health and Safety requirements, the instrument must be clean and safe to handle and accompanied by a formal statement to that effect duly signed by an authorised 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.

## **ELECTRICAL CONNECTION**

<b>ELECTRICAL CONNECTION</b>		<b>WIRING</b>		
		<b>(+)</b>	<b>(-)</b>	<b>Earth</b>
G	DIN	1	2	4
C	10-6 Bayonet	A	B	E
M	IP68 Cable	R	BL	Drain
E	M12 x 1	1	2	4
3	Conduit	R	BL	Drain



# EU DECLARATION OF CONFORMITY



**Manufacturer Name:** Gems Sensors and Controls  
**Manufacturer Address:** Lennox Road, Basingstoke, Hampshire, RG22 4AW  
**Product Type:** **4700B Series**  
Pressure Transmitters  
Full Scale Pressure Range 1 Bar to 690 Bar  
Operating Temperature Range -25°C to +85°C

**Pressure Equipment Directive:** 2014/68/EU  
Equipment marked CE0086 is classed as a safety accessory and can be used as a safety-related device on Category IV pressure equipment

**Conformity Assessment Procedure:** CE0086: Modules B + D CE: Sound Engineering Practice

**Module B EC Type Examination Certificate reference(s):** CE72108

**Compliance with other Directives:**  
**EMC Directive:** 2014/30/EU  
**Harmonised Standards Used:** BS EN 61326-1:2013 BS EN 61326-2-3:2013

**RoHS2 Directive** 2011/65/EU

## Notified Bodies:

**Notified Body for PED Module B Assessment:**  
BSI 0086  
Kitemark Court  
Davy Avenue, Knowlhill  
Milton Keynes, MK5 8PP, UK

**Notified Body for PED Module D Assessment:**  
BSI 0086  
Kitemark Court  
Davy Avenue, Knowlhill  
Milton Keynes, MK5 8PP, UK

**Notified Body for Monitoring Quality Assurance System:**  
BSI 0086  
Kitemark Court  
Davy Avenue, Knowlhill  
Milton Keynes, MK5 8PP, UK

**This apparatus must not be put into service until the equipment into which it is to be incorporated has been declared in conformity with the provisions of the relevant New Approach Directive**

On behalf of Gems Sensors and Controls, I declare that on the date the product(s) listed on this declaration is placed on the market, the product(s) conforms with all technical and regulatory requirements of the above listed directives.

 (signature)

Nick Blomfield  
Site Leader and Director of Finance EMEA

2/10/17 (date)

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