

## **GEMS SENSORS**

### **OPERATING & INSTALLATION INSTRUCTIONS**

#### **SERIES 5000**

**PLEASE READ CAREFULLY BEFORE INSTALLING**

**PART NUMBER: 560550-0079**

**ISSUE: A**

**Please Note:** Ranges above 500mbar are designed and manufactured in accordance with sound engineering practice as defined by the Pressure Equipment Directive 97/23/EC and must not be used as a "safety accessory" as defined by the Pressure Equipment Directive, Article 1, Paragraph 2.1.3.

Ranges below 500mbar are exempt from the Pressure Equipment Directive. The CE Mark on the unit does not relate to the Pressure Equipment Directive.

### **INTRODUCTION**

Series 5000 are low range fluid pressure measuring transducers and transmitters in which a ceramic capacitive sensor 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.

Series 5000 conform with the essential protection requirements of the EMC Directive 89/336/EEC amended by certified type testing to EN 50082-2 and EN 60081-1.

**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 transducer 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 transducer body.
- \* Check accessories supplied include:
  - Calibration Certificate (or QA Certificate)
  - Seal, Dowty Bonded (where applicable)
  - Mating Connector (where applicable)

## **GENERAL**

- \* Transducer should not be subjected to greater than the maximum allowable pressure or temperature as defined in the transducer specification.
- \* Transducer 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 transducer 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 transducer wetted parts which are stainless steel to UNS 31803, Ceramic and Nitrile
- \* 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:**

- 1) G<sup>1</sup>/<sub>4</sub> internal pressure connection to BS2779. Alternative fitted as specified at time of order.
- 2) KF25 Flange

Pressure couplings screwed into G<sup>1</sup>/<sub>4</sub> pressure ports should have a maximum thread engagement of 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 <sup>1</sup> / <sub>4</sub> bonded seal up to +100°C operation. Dowty Ref: 400-021-4490-02
499207-0002	G <sup>1</sup> / <sub>4</sub> bonded seal up to +200°C operation. Dowty Ref: 300-021-0967-02

499207-0006

G1/8 bonded seal up to +200°C operation.

Dowty Ref: 300-020-0967-02

Refer to Dowty for external pressure ratings.

**Mounting:** Pressure Transducer is designed to be attached by the coupling thread. Alternatively units fitted with an immersible cable can be suspended via the cable or flange. Omni-directional. To fit, use a M16 (5/8 UNF) 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.

**Effects of Heat:** Avoid mounting the transducer 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 transducer in glass fibre insulation so that an even temperature is assumed throughout.

## **ELECTRICAL INSTALLATION**

All types include suppression devices providing transient protection to EN 61000-4-2 and EN 61000-4-4.

**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 (immersible, +50°C). Alternative outer sheath materials available on request for harsh environments.

## **OPERATION**

Having installed the transducers as instructed they are ready for use. The transducer 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.

Cable Version:       -20°C to +50°C  
Connector Version:  -25°C to +85°C  
Process Media:       -40°C to +100°C

## **OPERATIONAL LIFE:**

Limited to 10 million full scale cycles.

## **CALIBRATION**

Transducers are calibrated to the range requested at time of order. Gauge datum vented to atmosphere via the electrical connection

## ADJUSTMENT OF ZERO AND SPAN CONTROLS

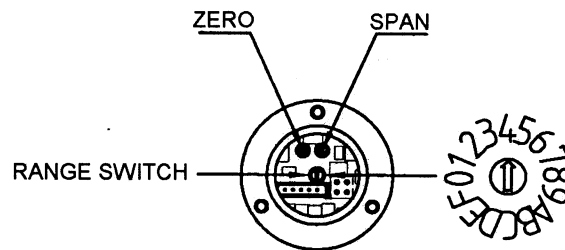
Switch and potentiometers provide continuous adjustment over the range 110% to 32% of nominal pressure range. (See Table below)

Zero and span controls are precisely set during manufacture and should only read 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)	Range
0	Not Used
1	Not Used
2	Not Used
3	Not Used
4	W
5	X
6	Y
7	Z

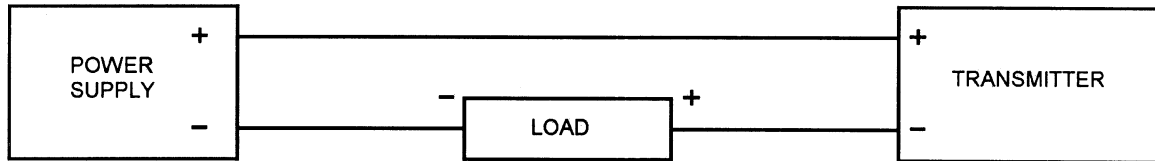
Switch Position (Voltage Mode)	Range
8	W
9	X
A	Y
B	Z
C	Not Used
D	Not Used
E	Not Used
F	Not Used

Range	Downranging Scope (Nominal)
W	110 to 74%
X	78 to 52%
Y	54 to 37%
Z	47 to 32%

## LOAD RESISTANCE (4-20mA Transmitter)

The total permissible resistive load in the loop (to include all the cable resistance) can be from 'zero to 50 x (supply volts - 8.5) ohms' e.g. with a 12V d.c. supply the permissible load is from zero up to 175 ohms (Figure 1).

**Figure 1**



## 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 two years 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 transducer 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  
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.

### **W A R N I N G**

**\* IF INSTRUMENT IS SUBJECTED TO +400°C PLUS**

Some instruments use Viton sealant. Above +400°C this material decomposes producing (amongst others) Hydrofluoric Acid which is extremely corrosive

**\* DO NOT ALLOW CONTACT WITH SKIN**

If it is suspected that an instrument has been subjected to temperatures in excess of +400°C

**\* CONTACT OUR SALES OR SERVICE DEPARTMENT TO ASCERTAIN IF THE INSTRUMENT CONTAINS VITON**

### **W A R N I N G**

## ELECTRICAL CONNECTIONS

	4-20MA			VOLTAGE			
	IN+	IN-	EARTH	IN+	COM	OUT+	EARTH
CABLE	R	BL	DRAIN	R	W	Y	DRAIN
CONNECTOR	1	2	E	1	2	3	E

OUTPUT	SUPPLY VOLTAGE
4-20mA	9 - 35V d.c.
0.5 - 5.5V d.c.	7.5 - 35V d.c.
1 - 6V d.c.	8 - 35V d.c.
0 - 5V d.c.	7.5 - 35V d.c.
0.1 - 5.1V d.c.	7.5 - 35V d.c.
1 - 5V d.c.	7.5 - 35V d.c.

# EC DECLARATION OF CONFORMITY

**MANUFACTURERS NAME:** Gems Sensors

**MANUFACTURERS ADDRESS:** Lennox Road, Basingstoke,  
Hampshire, RG22 4AW

**PRESSURE TRANSDUCER TYPE:** 5000 Series

**DESCRIPTION:** Pressure Transducers and Transmitters

**DATE OF ISSUE:** 12<sup>th</sup> March 2003

Gems Sensors hereby declares that the product(s) above conform with the essential protection requirements of the following EC Directives:

**EMC:** *89/336/EEC amended by 93/68/EEC by compliance to EN 50082-2, EN 50081-1 and EN 50081-2*

**SAFETY:** *"For the equipment within which this component is installed to comply with the Low Voltage Directive (73/23/EEC), this product must be powered from a Safety Extra Low Voltage (SELV) source of 42V peak maximum.*

*When the power source is derived from a transformer this must conform to EN 60742 or equivalent, with intrinsic short circuit protection. The power source to this component must also incorporate suitable over-current protection related to the current rating of this component"*

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.

  
.....  
Signed for and on behalf of

Gems Sensors  
Michael J Powers  
Technical Director  
England