

# Appendix for ATEX Certified EX Units Instruction Manual



Sierra Instruments' Model 640S-EEX and 780S-  
EEX Flow Transmitters

Part Number: IM-ATEX, Rev. C.1 October 2013

## **GLOBAL SUPPORT LOCATIONS: WE ARE HERE TO HELP!**

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### **IMPORTANT CUSTOMER NOTICE- OXYGEN SERVICE**

Sierra Instruments, Inc. is not liable for any damage or personal injury, whatsoever, resulting from the use of Sierra Instruments standard mass flow meters for oxygen gas. You are responsible for determining if this mass flow meter is appropriate for your oxygen application. You are responsible for cleaning the mass flow meter to the degree required for your oxygen flow application.

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### **TRADEMARKS**

Steel-Trak® and Smart Interface™ software are trademarks of Sierra Instruments, Inc. Other product and company names listed in this manual are trademarks or trade names of their respective manufacturers.

**Revision C:** clarify instructions for current zero and current span adjustments, add information on non-isolated 4-20mA outputs, add maximum temperature for probe mounted electronics, add cable resistance value in Sensor Validation procedure.


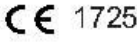
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<p>This is a certified ATEX document. Changes must be approved by the Sierra Instrument’s "ATEX Authorized Person"</p>
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## 1. Labeling

Sierra Instruments Model 640S-EEX and 780S-EEX Flow Transmitters that have the following label attached have been certified in compliance with the Directive 94/9/EC of the European Parliament and the Council as published in the Official Journal of the European Communities No. L 100/1 on 19 April 1994.

<b>SIERRA</b> INSTRUMENTS, INC.	5 Harris Court, Monterey CA, USA 93940 www.sierrainstruments.com 831-373-0200
Serial No <input type="text"/>	Year of Mfr <input type="text"/>
<input type="radio"/> Model No <input type="text"/>	<input type="radio"/>
	
KEMA No. 06ATEX0105 Ambient temp: -20°C TO 50°C Electrical cable entries: 2x3/4 NPT - Housing Rating IP66 <b>WARNING: DO NOT OPEN WHEN ENERGIZED</b>	

### KEMA ATEX official label from Sierra Instruments, Inc.

The following information is provided as part of the labeling of the transmitter:

- Name and address of the manufacturer: Sierra Instruments, Inc., 5 Harris Court, Building L, Monterey, CA 93940, USA, Ph. 831-373-0200, Fax 831-373-4402
- The serial number of the device
- Year of construction
- Model Number
- CE Mark
- Marking for explosion protection: ATEX II 2 GD EX d IIC T6-T2 T280°C (Suitable for Use in Zone 1 Gas and Dust applications)
- KEMA ATEX certificate number: 06ATEX0105
- Cable entry threads information (3/4" NPT) and housing IP rating

## 2. Type Approval Standards

The Sierra Instruments Ex approved flow meters have an EC Type examination certificate issued by KEMA and have been approved to the following standards:

EN 60079-0 : 2004  
 EN 60079-1 : 2004  
 EN 50281-1-1 : 1998 + A1

## 3. Zone, Gas Group, Category and Temperature class

The Sierra Instruments 640S-EEX and 780S-EEX have been certified ATEX II 2 GD EX d IIC T6-T2 T280°C (Tamb. -20°C to +50°C). This means that the units can be installed in locations with the following conditions.

### 3.1. Area Classification

Zone 1	Area in which an explosive gas atmosphere is likely to occur in normal operation occasionally
Zone 2	Area in which an explosive gas atmosphere is not likely to occur in normal operation and if it does occur, is likely to do so only infrequently and will exist for a short period only
Zone 21	Place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally
Zone 22	Place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does, will persist for a short period only

### 3.2. Gas Grouping

Group IIA	Propane
Group IIB	Ethylene
Group IIC	Hydrogen and Acetylene

### 3.3. Equipment Category

2GD (Zone 2 suitable for Gasses and Dust explosive environments)

### 3.4. *Temperature Classification*

Temperature Class	Maximum Process temperature (°C)	Maximum Surface Temperature (°C)
T6	40	70
T5	50	80
T4	85	115
T3	150	180
T2	250	280

### 3.5. *Ambient Temperature Range*

Ambient temperature range -20°C to +50°C

## 4. Safe Use of ATEX Approved Equipment

### 4.1. *Notes on Safe Use of the ATEX Approved Equipment*

Approved usage of the meter is restricted to fluids compatible with the wetted materials of the flow meter and within the restrictions on temperature and pressure as defined in the product manual.

### 4.2. *Mounting, Commissioning, and Operation*

The device has been designed to operate safely in accordance with the current technical and safety regulations of the EU. If installed incorrectly or used for applications for which it is not intended, it is possible that application related changes may arise. For this reason, the instrument must be installed, connected, operated, and maintained according to the instructions in this and the specific product operating manual.

Persons handling/installing or commissioning this equipment must be authorized and suitably qualified. The manual must be read, understood, and the instructions must be followed. Modifications and repairs to the device are only permissible when they are expressly approved in this manual.

### 4.3. *Explosive Hazardous Area*

If the device is to be installed in an explosive hazardous area, then the specifications in the certificate as well as all national and local regulations must be observed.

The instrument can be delivered with the certificate ATEX II 2 GD EX d IIC T6-T2 T280°C, FM, or CSA. The certificate type can be identified from the second group of letters on the model code stamped on the nameplate. For example:

NAA : Not suitable for hazardous areas  
 EEX : ATEX II 2G/ EEX d IIC T6-T2  
 FM : Explosion proof for Class I, Division 1, Groups B, C, D  
 CSA : Explosion proof for Class I, Division 1, Groups B, C, D

This manual addition only applies to EEX: ATEX II 2G/ EEX d IIC T6-T2 units.

The unit is supplied without cable glands for the power and signal. It is the users responsibility to select suitable cable glands that meet or exceed the required EEX approval and that are suitable for the signal and power cable used. The connection on the electronics housing for the cable glands is 3/4" NPTF according to the NPT requirements of ANSI/ASME B1.20.1

**NOTE:** Please insure that when you mount these cable glands they are made-up wrench tight. At least 3 1/2 turns of the thread must be engaged inside of the electronics enclosure.

#### **4.4. Special Conditions for a Safe Use**

The ambient temperature must never overrun the following limits: 20...+50°C. The surface temperature of the device (indicated on the device) must never exceed this temperature and must take into account both ambient and fluid temperatures.

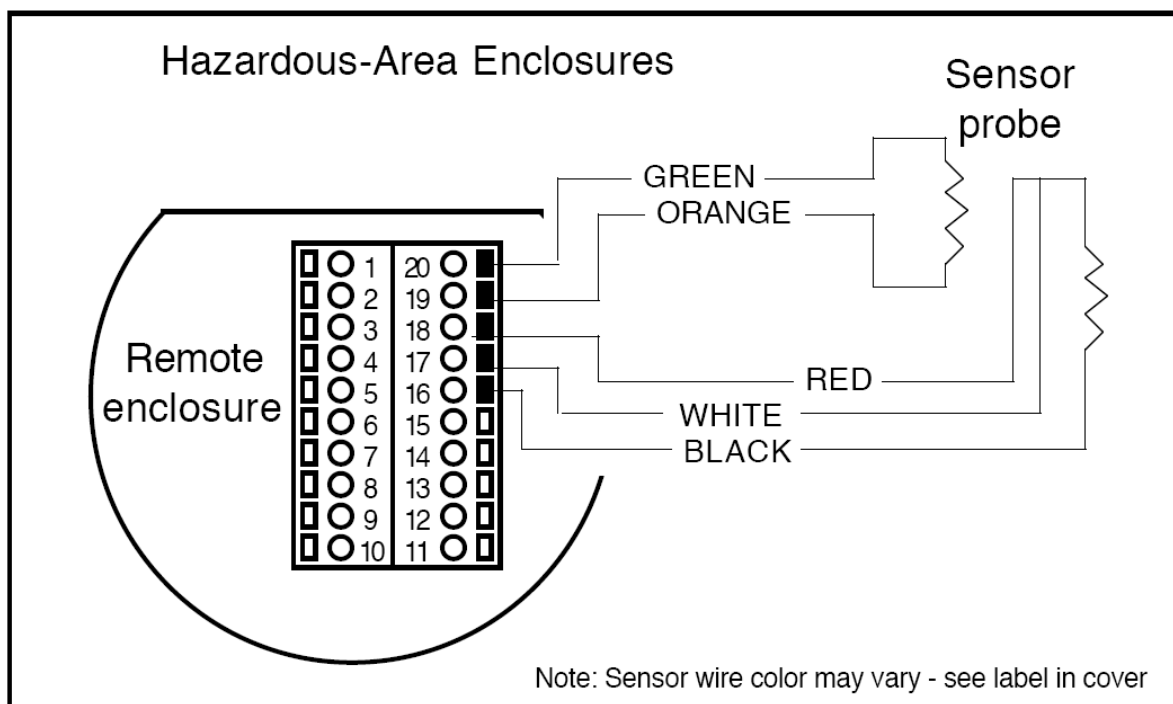
#### **4.5. Particular Recommendations: Closing the Cover**

- The safety is guaranteed as long as the cover is correctly screwed and clamped.
- The indication « WARNING: DO NOT OPEN WHEN ENERGIZED» must be strictly respected before any operation on the instrument.

## 5. Remote Electronics

Sierra Thermal flow transmitters with E3 in the model code have remote electronics. They have a cable with Ex glands between the sensor and the electronics. With these models it is not possible or allowed to disconnect the cable from the sensor side. It is possible to disconnect the cable and re-mount it using the electronics' side.

Please observe the following: Ensure that the power to meter has been disconnected before you open the EEx d housing. Then open the terminal housing (short dome on the housing) This dome is sealed with a set-screw in the edge of the dome. Unscrew the set-screw and screw the dome from the housing. Record the color of the wires to terminals 16 thru 20. Disconnect the sensor wires (See diagram below).



**Fig 2 Wiring diagram remote probe (E3 option)**

Unscrew the cable gland and remove the wire from the electronics housing.

To re-install the cable, insert the cable in the cable gland. Then connect the wires to terminals 16 – 20, ensuring that they are connected identically to what they were before you removed the cable.

Assemble the cable gland according to the cable gland manufacturers' instructions (See enclosed), close the housing, tighten the set-screw, and power the system up.

**NOTE:** The unit has some built in electronic wire length compensation. It is possible to shorten the cable or to extend it up to +/- 25% of the cable length. Use only Sierra cable PN 23-0221.



## 6. Maintenance

### 6.1. *External Maintenance*

The Sierra flow meters can be externally maintained with a dry clean cloth.

### 6.2. *Sensor Maintenance*

The sensor can be maintained by switches off the power, removing the probe from the process and cleaning the probe with a solvent compatible with 316SS. After cleaning the probe clean and dry the sensor with compressed air before you insert it back it the process. It is not recommended to us any Ultrasonic Bath cleaning.

### 6.3. *Internal Maintenance*

Please make sure that the internals of the unit always stay dry and clean. There are no User maintainable components inside the electronic compartment

## 7. Earthing

The Sierra Instruments units must be connected to a good quality earth. The units are provided with internal and external earthing terminals.

### 7.1. *External Earthing*

The external earthing connection is located on the boss on the outside of the housing and consist of an 316SS screw (10-24" UNC-2B tread), seal spring washer and cable shoe/crimp lug suited for maximum 3 mm OD Ground cable connection.

When using the external earth terminal the provided or similar cable shoe/crimp lug with a seal spring washer must be used to ensure that the cable lug is secured against loosening and twisting.

### 7.2. *Internal Earthing*

The internal earthing connection is located in the terminal housing and consist of an 316SS screw (10-24" UNC-2B tread), seal spring washer and cable shoe/crimp lug suited for maximum 3 mm OD Ground cable connection.

When using the external earth terminal the provided or similar cable shoe/crimp lug with a seal spring washer must be used to ensure that the cable lug is secured against loosening and twisting.

## 8. Warning

The electronics for EEX unit contain special Ex dedicated electronics. No customer modifications are available and are strictly forbidden. Any modification or adjustment to the electronics can be performed at the factory only.

## 9. Returning Equipment to Factory

Before returning any mass flow meter to the factory, you must request and complete a Sierra Calibration/Repair Data Sheet. To obtain the data sheet contact Customer Service at: [www.sierrainstruments.com](http://www.sierrainstruments.com) or (831) 373-0200 in the USA or +31(0)72-5071400 in Europe.

Return shipments to:

USA Headquarters  
Sierra Instruments, Inc.  
Attn: Customer Service Department  
5 Harris Court, Building L  
Monterey, CA 93940

European Headquarters  
Sierra Instruments b.v.  
Customer Service Department  
Bijlmansweid 2  
1934RE Egmond aan den Hoef  
The Netherlands

When returning a component, make sure to include the completed Calibration/Repair Data Sheet with the shipment.

## 10. Addendum: Installation Instructions Cable Gland

**Manufacturer:**

Peppers Cable Gland Ltd  
Stanhope Road  
Camberley  
GU153BT  
UK

Used Cable Glands on Sierra E3 units:

E3WFR/16/050NPT (With Silicon Seals) (Sierra Reference 30-0701)  
E3WFR/16/075NPT (With Silicon Seals) (Sierra Reference 30-0702)

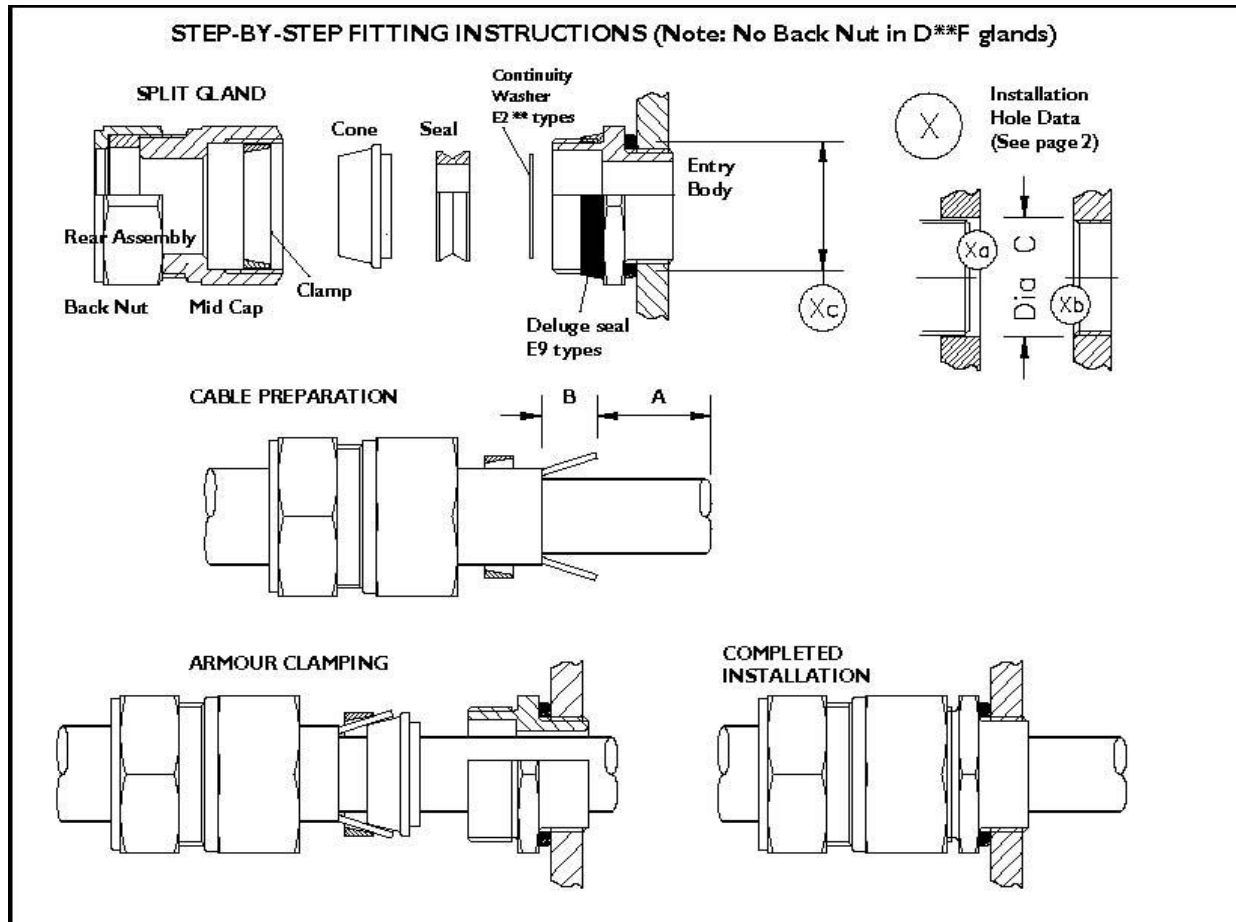
**Brief Description:**

The Peppers E\*\*F type cable gland is for outdoor use in the appropriate Hazardous Areas with armoured cable. It gives environmental protection to IP66/67. The type IE option has an earth stud on the entry body. D\*\*F type glands are for indoor use and offer IP54 environmental protection. A termination suitable for EMC protection can be made using armoured cables with these glands. Clamp options allow woven steel wire and steel tape armours. A variant giving electrical continuity to a lead sheath is available.

**Warning:**

**PLEASE STUDY CAREFULLY ALL PAGES OF THESE INSTRUCTIONS BEFORE INSTALLATION.**

These glands should not be used in any application other than those mentioned here or in our Data Sheets, unless Peppers states in writing that the product is suitable for such application. Peppers can take no responsibility for any damage, injury or other consequential loss caused where the glands are not installed or used according to these instructions. This leaflet is not intended to advice on the selection of cable glands.



**STEP-BY-STEP FITTING INSTRUCTIONS (NOTE: No Back Nut in D1W gland)**

1. Split gland as shown. Remove Seal to reduce cable damage. E2 types:- remove Continuity Washer. E9 types:- remove Deluge Seal.
2. Check Clamp:- FOR KITS E1L/D1L/E9L ETC:- Use PLAIN clamp ring for wire armour. Use GROOVED clamp ring IN BAG for woven wire or tape armour.
3. Fit Entry Body. For correct torque see page 2. DO NOT EXCEED MAX TORQUE FOR ENCLOSURE.  
Slide Rear Assembly including Clamp onto cable as shown.
4. Prepare cable as shown in diagram.  
**A** Strip outer jacket and armour, length to suit installation. **For lead sheathed cable** the lead sheath must pass through the Continuity Washer when installation is complete.  
**B** Expose armour approx. 20mm long.
5. Slide Cone onto inner sheath and under armour. Slide Clamp onto exposed armour. Insert cable through Entry Body. DO NOT RE-FIT SEAL OR CONTINUITY WASHER.
6. Tighten Mid Cap to Entry Body to make-off armour. FOR CORRECT TORQUE SEE PAGE 2.
7. Loosen off Mid Cap to visually check armour is securely locked. Pull out cable from Entry Body.
8. RE-FIT SEAL (AND CONTINUITY WASHER ON E2 TYPES) (AND DELUGE SEAL ON E9 TYPES).
9. Re-insert cable through Continuity Washer, Seal and Entry Body. **For lead sheathed cable** the Continuity Washer must be in contact with the lead sheath and must be in front of the seal.
10. Re-tighten Mid Cap to correct torque.
11. Hold Mid Cap with wrench and tighten Back Nut onto cable.

12. Ensure Seal makes full contact with cable sheath, then tighten Back Nut 1 extra turn

**X** INSTALLATION HOLE DATA (See drawing)

**Xa** Diameter C for clearance holes (NOT EExd)

**Xb** Diameter C countersink for threaded holes (EExd)

**Xc** Diameter O of O-ring seal

X Hole data (see overleaf)		Cable Sizes (mm), Armour Acceptance (mm) & Assembly Torques (Nm)								NOTE:-** Type 3 seals only to 11.0mm diameter					
Dia Xc	Dia Xa/Xb	Gland Size	Torque Settings	Inner Sheath		Outer Sheath		Reduced Bore		Armour Acceptance Ranges					
				Min	Max	Min	Max	Min	Max	Wire		Tape Armour		Woven steel wire	
18.5	16.5	16	32.5	3.5	8.4	8.4	13.5	4.9	10.0	0.9		0.15	0.35	0.2	0.3

## Installation Guidance

Point	Advice
1	◆ BS EN 60079-10 Classification of Hazardous Areas ◆ BS EN 60079-14 Electrical Installations in hazardous areas (other than mines) ◆ BS 6121, Part 5 Selection, Installation and Maintenance of Cable Glands
2	Installation should only be carried out by a competent electrician, skilled in cable gland installation.
3	NO INSTALLATION SHOULD BE CARRIED OUT UNDER LIVE CONDITIONS.
4	To maintain Ingress Protection ratings above IP54, use IP washers or O-rings for parallel threads. For taper threads use thread sealant. Also see page 1 diagram and Hole Data above.
5	The surface of the enclosure should be sufficiently flat and rigid to make both the IP joint, and earth contact where needed. With painted enclosures, a star washer should be fitted to break through the paint and make a satisfactory earth contact.
6	Once installed do not dismantle except for occasional inspection. If necessary, dismantle by reversing the Fitting Instructions given above. The gland is not serviceable and spare parts are not supplied.
7	Parts are not interchangeable with any other design. If manufacturers' parts are mixed, certification will be invalidated.

**Limitations on Usage.** Be sure your installation complies with the following:

Feature	Comment				
Enclosure entry thread	The female thread in the enclosure must comply with clause 5.3 of EN 50018, or clause 5.3 of IEC 79-1, as appropriate. Do not damage threads on assembly. Check the number of full turns of thread engaged is at least 5.				
Cable construction	The glands should only be used with substantially round and compact cables with extruded bedding (i.e. effectively filled cables).				
Installation conditions	Gas Group?	Internal Ignition Source?	Enclosure Volume?	Which Zone?	Use Type E**F/D**F Gland?
	IIC	NO	2 litres or less	Zone 1 or 2	YES
	IIB, IIA, II	NO	Any	Zone 1 or 2	YES
	IIB, IIA, II	YES	Any	Zone 2	YES
	IIB, IIA, II	YES	2 litres or less	Zone 1	YES

## Interpretation of Markings.

Markings on the outside of this gland carry the following meanings:

### Cable Gland Type & Size E-a-b-IE-c-FR-ddd-eee-IP67-nn


- a** = Seal Type  
**1** = Neoprene (black - temp range  $-20^{\circ}$  to  $+85^{\circ}\text{C}$ )  
**2** = Neoprene with Continuity washer for lead sheathed cable  
**3** = Silicone (white or red - temp range  $-60^{\circ}$  to  $+180^{\circ}\text{C}$ ) ;
- b** = Armour clamping  
**W** = single wire armour  
**XZ** = woven steel wire/tape  
**L** = Kit for W and XZ
- IE** = Integral Earth stud option
- c** = Main component material  
**none** = brass  
**S** = stainless steel ;
- R** = Optional reduced bore outer seal (red silicone)
- ddd** = Gland size ;
- eee** = Entry thread type and size ;
- IP67** = Ingress Protection code
- nn** = year of manufacture

**Protection Concept and Gas Groups EEx d IIC / EEx e II (CENELEC & ATEX) ; Ex d IIC / Ex e II (IEC) ; Ex d = Flameproof ; IIC = suitable for Gas Group IIC (e.g. hydrogen) ignitable gas/air mixtures, and also Groups IIB and IIA ; II = combined Gas Group**

### Certificate Numbers:

(ATEX) **KEMA 06ATEX0105** The 'X' suffix denotes Special Conditions for Safe Use' (see below)

### ATEX (EU Directive 94/9/EC) Markings

 **II 2 GD** - Equipment Group II (Non-Mining) for Category 2 (Zone 1) with potentially explosive gas mixtures or combustible dusts

### ATEX Special Conditions for Safe Use

1. These glands must not be used with EEx d IIC enclosures with a volume greater than 2 litres.
2. These glands must not be used with enclosures where the temperature at the point of mounting exceeds  $-20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  using neoprene seals, or  $-60^{\circ}$  to  $+180^{\circ}\text{C}$  using silicone seals.

### IEC Ex Conditions of Certification

1. These glands are certified with one specific size of flameproof sealing ring per gland size as supplied.
2. These glands must not be used with enclosures where the temperature at the point of mounting exceeds  $-20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  using neoprene seals, or  $-60^{\circ}$  to  $+180^{\circ}\text{C}$  using silicone seals.