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FIBRECO Geo-Beam™ EX

Assembly & User Manual

Contents

ATEX / IECEx Product Description

Geo-Beam™ EX

Cinch Connectivity Solutions explosion proof series Geo-Beam™ EX has been designed in accordance with the ATEX directive, and IECEx 60079, for use in Zone 1 Hazardous Areas.

The Geo-Beam™ EX product range will includes an inline plug and box mount bulkhead and is manufactured using Stainless Steel 316, making it able to withstand the most extreme environments. The inline plug is self explanatory and can be used with variable Ex d cable gland. The box mount bulkhead is, as it suggests mountable to an Ex d enclosure via the M32 threaded section at the rear. In addition to this, the connector can also be used as an Inline Bulkhead when linking cables through a system. The product will use a Tri-Start Trapezoidal coupling method, giving a reduce turn and an additional locking mechanism, giving positive mating and an audible click to ensure full engagement.

A standard ATEX approved metric cable gland can be used and will fit all of the Geo-Beam™ EX connector types. The wide array of cable gland offerings allow for termination to varied cable constructions.

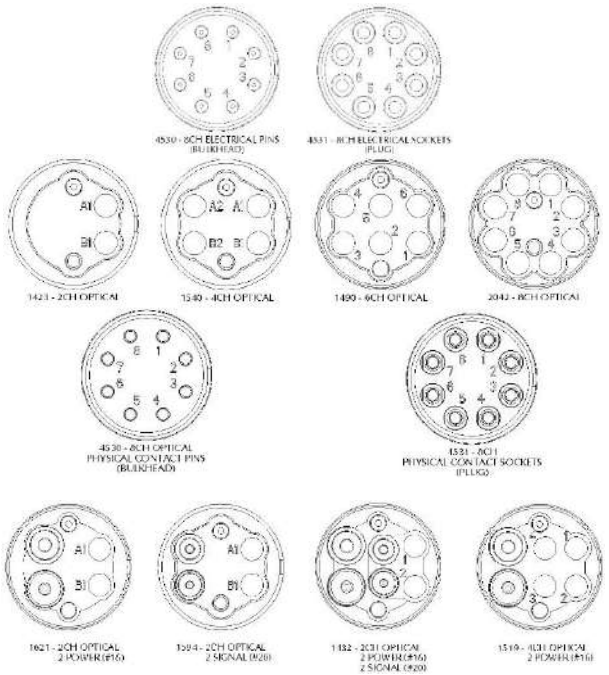
The Geo-Beam™ EX range will offers the greatest flexibility of connector configurations and broadest options for the customer. The range has been designed using an 8 way copper connector, focusing around a standard #16 MIL-C-39029 contact, with maximum ratings of 13A per pin and a Maximum 600V the product is placed in a T4 (gas) & T135°C (dust) operating class, within the Geo-Beam™ EX range will also be a variable range of fiber optic configurations.

Expanded beam technology is ideally suited for the harsh environments likely to be found in Hazardous Areas. This can be offered in a number of variations with good optical performance. However, if a lower optical loss is needed in a less harsh environment then a physical contact version is also available with the use of an MIL-PRF-29504 termini.

In addition to this the Geo-Beam™ Ex is also able to offer Hybrid version within the same connector, below is a list of configurations available within the Geo-Beam Ex Connector Range:-

Configurations & Inserts Types.

- 2, 4, 6 and 8 Expanded Beam Channels (Lensed Optical)
- Hybrid – expanded beam and electrical (using #16 and/or #20 pin and socket contacts).
- Up to 8 #16 Pin or Socket Contacts (all copper MIL-C-39029, all fiber MIL-PRF-29504, or mixed copper & fiber)



Optical Sources of Ignition Statement

The use of Fibre Optics in a hazardous area.

Consideration has been made to the use of optical power in hazardous areas. The assessment has been considered and with the connector being protected with the use of threaded and cylindrical flamepaths an “op pr” rating would give acceptable levels for use in Zones 1&2.

With most optical lasers running at around -10dBm these would output around 0.1mW this being well within the parameters set out in Tables 2 (gas) and 3 (dust) IEC 60079-28 Ed 2 specification (page 15).

Geo-Beam™ EX Part Numbering Scheme

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Geo-Beam EX *Connector* Part Numbering Scheme

Issued by: Engineering | Date: 12th June 2017 | Rev: 05 | Page: 1 of 1

EX15	P	2E	09	B	2(20)	SB

Connector Family
EX15 – Geo-Beam EX Shell Size 15

Connector Type
P – Plug
BM – Bulkhead Box Mount without Panel Nut
BMP – Bulkhead Box Mount with Panel Nut

Number of Optical Channels
0 – No Optical Channels
2E – 2 Optical EB Channels
4E – 4 Optical EB Channels
6E – 6 Optical EB Channels
8E – 8 Optical EB Channels
2P – 2 Optical PC Channels (MIL-PRF-29504/4D & 5D) - ***only with 6(16)***
4P – 4 Optical PC Channels (MIL-PRF-29504/4D & 5D) - ***only with 4(16)***
6P – 6 Optical PC Channels (MIL-PRF-29504/4D & 5D) - ***only with 2(16)***
8P – 8 Optical PC Channels (MIL-PRF-29504/4D & 5D)

Fibre Type
0 – No Optical Channels
09 – 9/125
50 – 50/125
62 – 62.5/125

Wavelength of Operation
0 – No Optical Channels
A - 850 / 1300nm
B – 1310 / 1550nm
C – 1310nm ONLY
D – 1550nm ONLY

Number of Electrical Contacts
0 – No Electrical Channels
2(20) – 2 Electrical Contacts #20 (MIL-C-39029/93A & 94A) - ***only with 2E***
2(16)2(20) – 4 Electrical Contacts 2#16+2 #20 (MIL-C-39029/93A & 94A) - ***only with 2E***
2(16) – 2 Electrical Contacts #16 (MIL-C-39029/93A & 94A) - ***only with 2E or 4E***
2(16) – 2 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***only with 6P***
4(16) – 4 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***only with 4P***
6(16) – 6 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***only with 2P***
8(16) – 8 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***no optical***

Connector Shell Material
SB – Stainless Steel Shot Blast

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Geo-Beam EX *Cable Assembly* Part Numbering Scheme

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EX15	P	2E	09	B	2(20)	1	SB	LC	2M5

END A - Connector Family
EX15 – Geo-Beam EX Shell Size 15

END A - Connector Type
P – Plug
BM – Bulkhead Box Mount without Panel Nut
BMP – Bulkhead Box Mount with Panel Nut

Number of Optical Channels
0 – No Optical Channels
2E – 2 Optical EB Channels
4E – 4 Optical EB Channels
6E – 6 Optical EB Channels
8E – 8 Optical EB Channels
2P – 2 Optical PC Channels (MIL-PRF-29504/4D& 5D) - ***only with 6(16)***
4P – 4 Optical PC Channels (MIL-PRF-29504/4D& 5D) - ***only with 4(16)***
6P – 6 Optical PC Channels (MIL-PRF-29504/4D& 5D) - ***only with 2(16)***
8P – 8 Optical PC Channels (MIL-PRF-29504/4D& 5D)

Fibre Type
0 – No Optical Channels
09 – 9/125
50 – 50/125
62 – 62.5/125

Wavelength of Operation
0 – No Optical Channels
A - 850 / 1300nm
B – 1310 / 1550nm
C – 1310nm ONLY
D – 1550nm ONLY

Number of Electrical Contacts
0 – No Electrical Channels
2(20) – 2 Electrical Contacts #20 (MIL-C-39029/93A & 94A) - ***only with 2E***
2(16)2(20 – 4 Electrical Contacts 2#16+2#20 (MIL-C-39029/93A & 94A) - ***only with 2E***
2(16) – 2 Electrical Contacts #16 (MIL-C-39029/93A & 94A) - ***only with 2E or 4E***
2(16) – 2 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***only with 6P***
4(16) – 4 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***only with 4P***
6(16) – 6 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***only with 2P***
8(16) – 8 Electrical Contacts #16 (MIL-C-39029/56E & 58E) – ***no optical***

Cable Gland
0 – No Cable Gland
1 – Single Compression M20x1.5 (Cable Diameter 4.0mm to 8.4mm)
2 – Single Compression M20x1.5 (Cable Diameter 7.2mm to 11.7mm)
3 – Single Compression M20x1.5 (Cable Diameter 9.4mm to 14.0mm)
4 – Armour Clamp M20x1.5 (Armoured Cable Diameter 9.0mm to 13.5mm)
5 – Armour Clamp M20x1.5 (Armoured Cable Diameter 12.9mm to 16.0mm)
6 – Armour Clamp M20x1.5 (Armoured Cable Diameter 15.5mm to 21.1mm)
7 – Barrier M20x1.5 (Armoured Cable Diameter 6.0mm to 12.0mm)
8 – Barrier M20x1.5 (Armoured Cable Diameter 9.0mm to 16.0mm)
9 – Barrier M20x1.5 (Armoured Cable Diameter 12.5mm to 20.5mm)

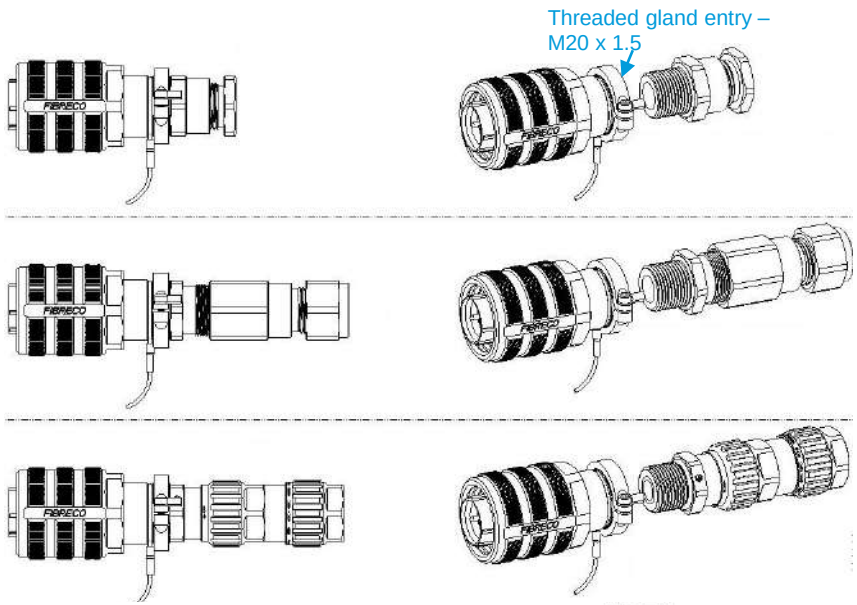
Connector Shell Material
SB – Stainless Steel Shot Blast

END B - Connector Type
A – Same as End A
SC – SC Type Connector
SCD – SC Duplex Type Connector
ST – ST Type Connector
LC – LC Type Connector
LCD – LC Duplex Type Connector
FC – FC Type Connector
XX – No Connector

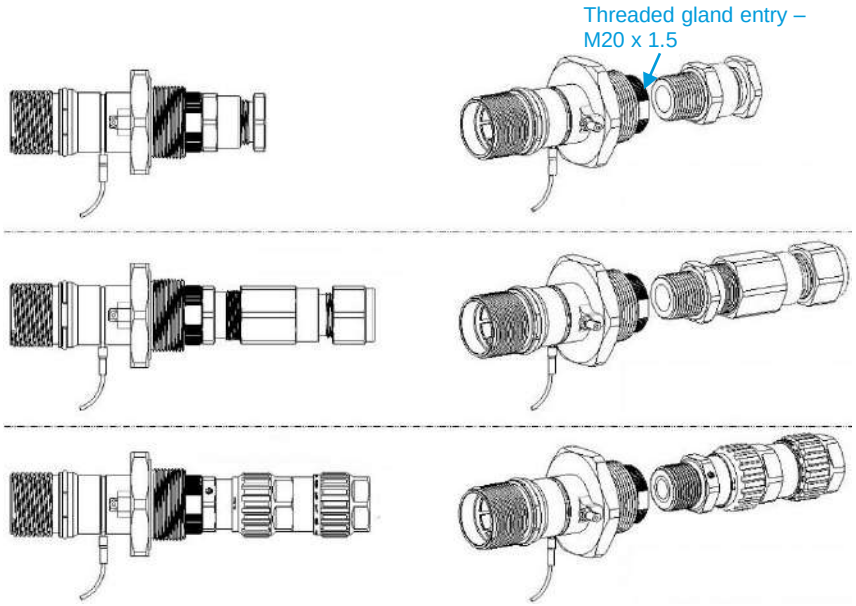
Length (metres)
Example: **250M0** = 250m / **2M5** = 2.5m

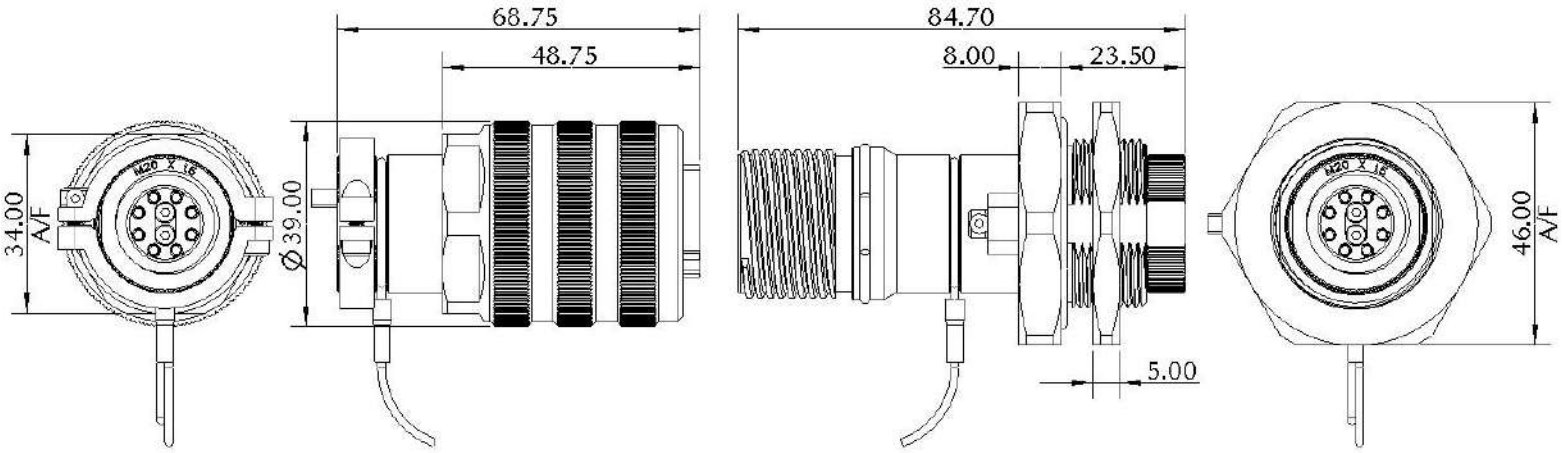
Connector Outlines

Geo-Beam™ Ex Plug Connector



Geo-Beam™ Ex Universal Bulkhead





Geo-Beam™ Ex Technical Information

Conformity to ATEX Directive	EN 61984:2009 – Safety Requirements EN 60309-1:1999 – General Requirements EN60079-0:2012 – General Requirements EN60079-1:2014 – Flameproof Enclosures EN60079-28:2015 – Protection, optical radiation EN60079-31:2014 – Equipment Dust Ignition Protection by Enclosure "t"
Product Materials	Shell Parts - Stainless Steel 316L Seals – Silicone 70 Shore Inserts – Plastic, Tecaform Metal - ARCAP AP1D
Cable Entry Methods	Suitable M20 Ex flameproof gland, Glands & Cable may reach 47°C above ambient.
Ingress Protection	IP67 – 30 minutes @ 1mtr Immersion
Temperature Parameters	-30˚C to +60˚C
Connector Weight	No Gland / w/Gland Plug - 420g / 600g Bulkhead - 580g / 760g
Contact Types	Copper / Fibre Pin – MIL-C-39029/58E / MIL-PRF-29504/4D Socket – MIL-C-39029/56E / MIL-PRF-29504/5D 600VAC 13A
Grounding	Cable Shielding Internal – Contact selection External – Use of connector Earth Bond Point Shell - See Additional Accessories

Geo-Beam EX - Certificate of Conformity

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11 Bilton Road, Chelmsford, Essex, CM1 2UP

EU DECLARATION OF CONFORMITY

This is a declaration of conformity where Cinch Connectivity Solutions declares sole responsibility that the products listed below conform to the relevant provisions of directive 2014/34/EU from 20th April 2016.

Notified Body: *CML Ex Certification Management Limited*
Unit 1, Newport Business Park,
New Port Road, Ellesmere Port,
CH65 4LZ, UK.

Products with conformity to ATEX Directive:
Geo-Beam™ Ex Range of connectors including plugs and bulkheads.

Ex Certificate Numbers:
CML16ATEX1398X IECEx CML16.0151X

Standards coding:
Ⓔx II 2GD
Ex db op pr IIC T4 Gb
Ex tb op pr IIIC T135°C Db

Additional ambient conditions.

Ta = -30˚C to +60˚C
MAX 600V MAX 13A per contact

Conformity – General Safety Conformity: LVD 2014/35/EU
IEC 61984:2009 – Connectors – Safety requirements and tests
IEC 60309-1:1999 – Plugs, sockets-outlets and couplers for industrial purposes-Part 1: General requirements.

ATEX	IECEx
EN 60079-0:2012/ A11:2013	IEC 60079-0 Ed 6 2011
EN 60079-1:2014	IEC 60079-1 Ed 7 2014
EN 60079-28:2015	IEC 60079-28 Ed 2 2015
EN 60079-31:2014	IEC 60079-31 Ed 2 2013

Signed for and on behalf of:	Cinch Connectivity Solutions
Place of issue:	11, Bilton Road, Chelmsford, Essex CM1 2UP
Date of issue:	1st September 2017
Name:	Mark Falkingham
Position:	Director of product & business development.

Signature:

Geo-Beam™ EX - General notes

General Notes.

- ***DO NOT CONNECT OR DISCONNECT WHEN ENERGISED***
- ***DO NOT CONNECT OR DISCONNECT CONNECTORS UNLESS ALL ELECTRICAL/OPTICAL POWER IS ISOLATED AT THE SOURCE.***
- Read all information in this document before implementing a system and manufacturing the product.
- The installation, Inspection, Maintenance should only be carried out by a appropriately trained person in accordance with the codes of practice found within the IEC / EN 60079. e.g. EN/IEC 60079-14, 60079-17 & 60079-19
- The end user must ensure that the product is suitable for the intended application.
- If the insert is not fully populated with wired contacts fill unused channels with a blank contact.
- Only the documented tooling and methods should be used and followed.
- Cables and gland selection as per clause 16.6 of IEC 60079-0, temperature above 70°C when used in a high ambient. Cable glands and cable insulation may reach 47°C above ambient. Consideration must also be given to the temperature rating of the cable at high ambient.
- Use only the suggested tooling during manufacture of the products.
- Only the components specified within this document should be used when manufacturing/repairing the product, therefore any use of non approved components will invalidate the certification for the product.
- A connector with a damaged flame path is an explosion risk and should be removed from service. Always fit the protective cap to disengaged connectors, this will protect flame paths and ensure contamination and moisture is kept to a minimum. See page
- Ensure that the current and voltage parameters of the electrical circuits are within the limits specified. E.g. MAX 600V MAX 13A per contact
- Cable gland selection must not be detrimental to the certification of this product.
- Caution shall be applied when a non resistive circuit is used with regards storage of energy after isolation, circuit shall be de energised before connect/disconnect in hazardous areas.

Geo-Beam™ EX - Tooling & Accessories

Crimp tool
DMC M22520/1-01 (or equivalent)
Set up according to Tool manufacturer

Turret
M22520/1-04 (or equivalent)
Set up according to Tool manufacturer

Insert Applicator Tools
5226
5227

Fibre Applicator Tool
ASAT-1

Fibre Optic Cleaning Kit
5264

Panel Nut
5095

Earth Bonding Clamp (plug)

Standard Tooling

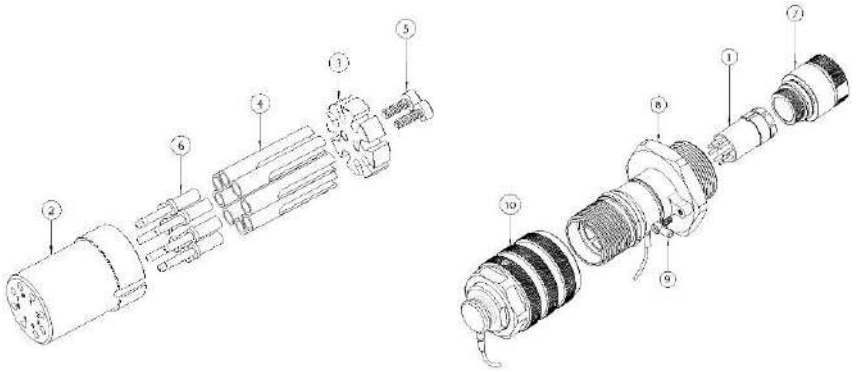
Termination.	Assembly.	Consumables
2.5mm Allen Key	24mm Spanner	Indelible Pen
1.5mm Allen Key	34mm Spanner (optional)	Silicone Grease
Wire Cutters	46mm Spanner	
Sheath Strippers		
Steel rule		

NOTE. All tools can be supplied by CINCH Connectivity Solutions

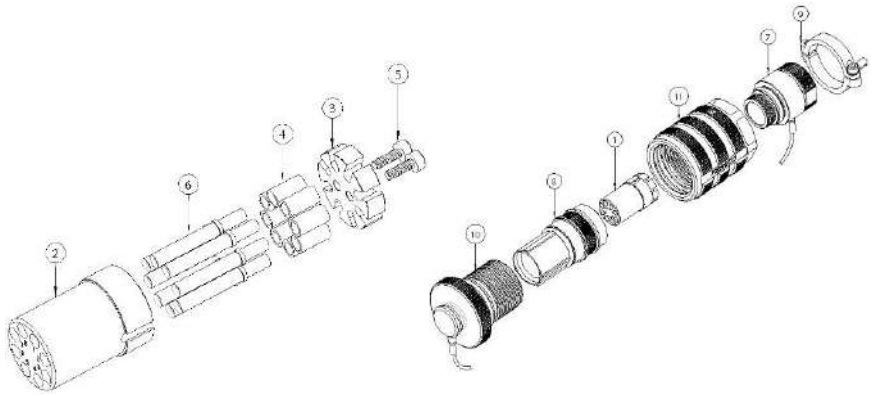
Geo-Beam™ EX - Part List (Plug & Bulkhead)

1. Insert Assembly.
2. Insert shell.
3. Coverplate.
4. Insulator.
5. Coverplate screws.
6. Contacts.
7. Gland adaptor (Seal fitted).
8. Main body (Seals fitted).
9. Earth/grounding terminal point.
10. Connector cap (Including Captive Locking Screw and Sealing Ring).
11. Plug Grip Ring (Including Captive Locking Screw and Sealing Ring).

Geo-Beam™ EX - Exploded Views (Plug & Bulkhead)



Geo-Beam™ EX Bulkhead Insert & Shell View



Geo-Beam™ EX Plug Insert & Shell View

Geo-Beam™ EX - Cable Preparation & Assembly instructions.

All instructions and notes should be read fully before manufacture and installation

Cable Preparation.

1. Select appropriate cable and read instructions fully before termination and assembly. See ***page 9 Parts List & Exploded views*** for components.
2. Once cable is selected ensure the correct components/ glands are suited to this cable.
3. Position the selected gland onto the cable as shown in ***Fig. 1.*** Ensure that the compression seals are not compressed and can rotate freely on the cable.
4. Strip the outer sheath from the cable, remove approximately 140mm, this will expose the braid and inner coated cores.
5. Cut back the braided section leaving approximately 25mm.
6. Using the sheath end as datum, cut the wire accordingly:
   Pin (Bulkhead) = 115mm
   Socket (Plug) = 100mm
7. Attach the remainder of the gland to the M20 x 1.5mm gland adaptor *Fig.2* (**7**) as shown in ***Fig. 3***.
8. Position insulator sleeve (**4**) on each core.
9. Remove approximately 5mm of sheath from the wire core.
10. Position the appropriate contact(**6**) onto the wire core and crimp in place with appropriate tooling. *See tooling list on page 8 for assistance*. In accordance with IEC 60352-2
11. Position all of the insulator sleeves(**4**) over the back of the crimped contact.
12. Position all of the cores into the slots on the coverplate(**3**) (behind the insulators) as shown in ***Fig.4.***
13. Load the contacts into the insert(**1**) all at once, ensure that the screw holes on the insert are aligned with those on the coverplate(**3**).
14. Add the screws(**5**) and tighten down the coverplate(**3**).

Connector Assembly.

1. Add a small amount of silicone grease to the seal situated inside the main body(**8**).
2. Align the key slot on the insert(**1**) with the major key position on the shell.
3. With the use of the insert applicator tool (5226/5227), locate the insert inside the main body pushing through the seals. ***Fig.5***.

Nb. The insert should not be able to be rotated once in position.

4. Slide the M20 x 1.5mm gland adaptor(**7**) into the main body(**8**) and tighten securely using 24mm spanner (thread lock can be added if necessary).

NOTE. Read general notes on page before manufacture and installation

General Notes.

- If the insert is not fully populated with wired contacts fill unused channels with a blank contact.
- Only the documented tooling and methods should be followed for manufacture.
- As well as threaded flamepaths special attention needs to be applied to the cylindrical flamepath featured in ***Fig 5,*** *see page 11 for additional informational views.*
- For Fibre termination procedures please contact Cinch Connectivity Solutions, see page 16 for contact details.

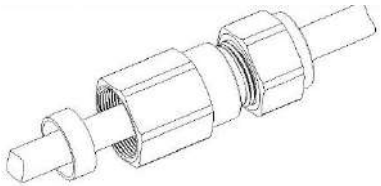


Fig.1

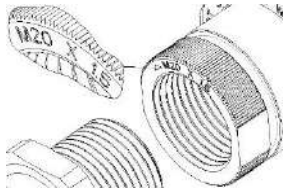
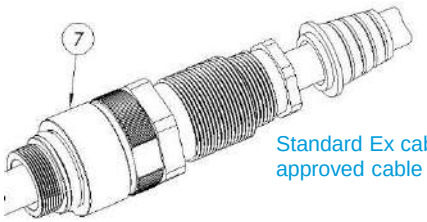


Fig.2



Standard Ex cable gland and approved cable (not supplied).

Fig.3

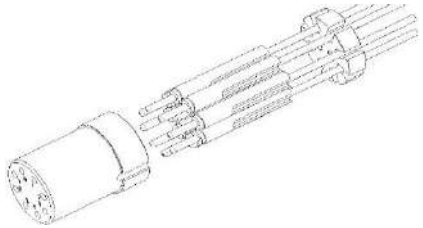
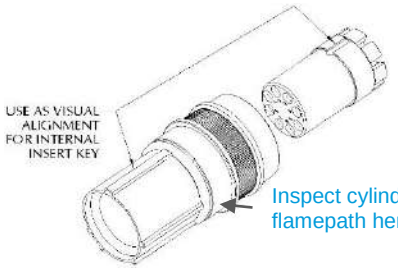
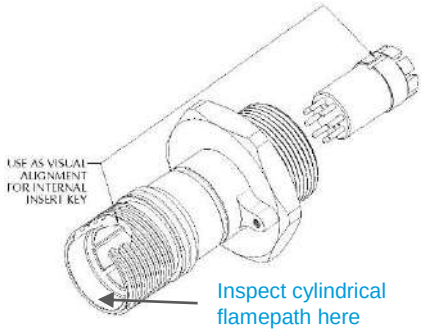


Fig.4



Inspect cylindrical flamepath here

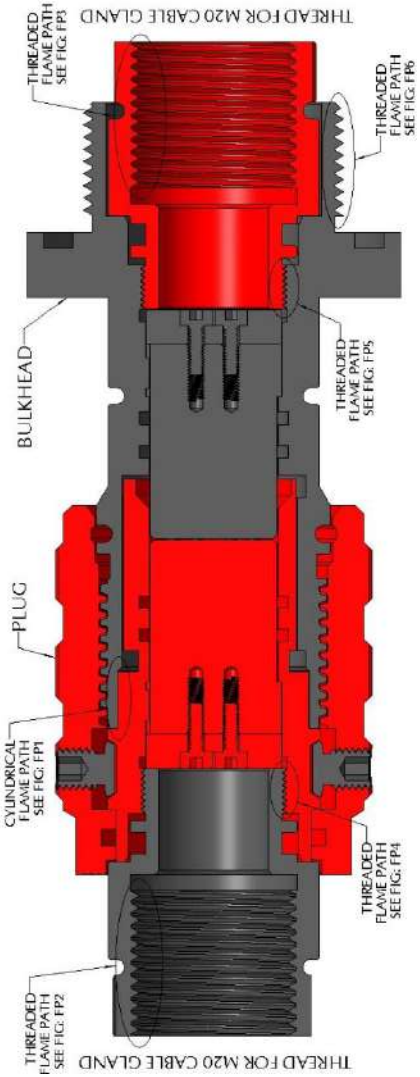


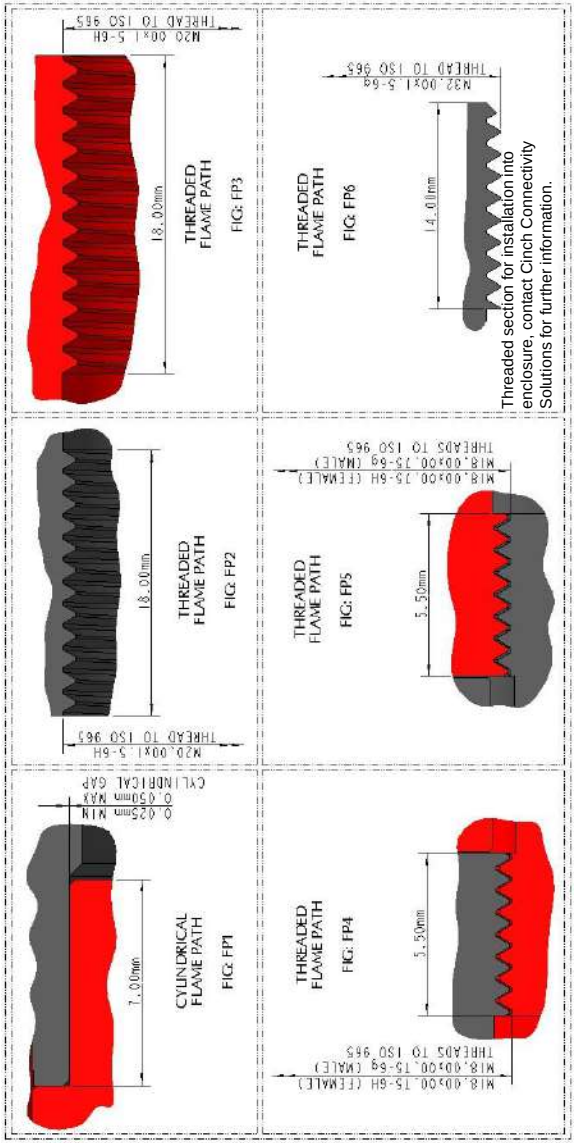
Inspect cylindrical flamepath here

Fig.5

Caution: Special attention must be given to the cylindrical flamepath, any protection should be left in place until connection when possible. Always inspect surfaces before use.

Geo-Beam™ EX – Flampaths & Threaded Entries



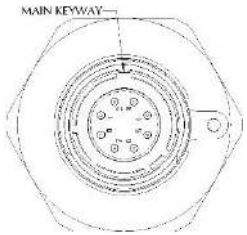


Geo-Beam™ EX - Connector handling & Operation

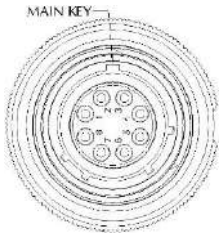
1. Ensure the locking screws are loosened fully **Fig 5**.
2. ATTENTION: Check the flamepath fully before use, see **Fig 4** on page 10 for assistance
3. Align the keys with the key ways, use the major keys shown below to assist.
4. Bring the connectors together and start to tighten the grip ring (**10**).
5. Tighten the grip ring until reaching the C-clip.
6. Continue to tighten over the C-clip, until the audible "click" indicator is clearly heard **Fig. 6**.
7. When the audible "click" is heard continue to tighten until a stop, the connectors are now fully engaged.
8. Tighten the M5 captive locking screws fully using a 2.5mm Allen key **Fig. 7,** torque to 1Nm.

Note. Read general notes on page before manufacture and installation

Note. Use of the external earth bonding should be used when necessary. It would be the responsibility of the user/installer to provide adequate earth bonding. See page 13 for further information.



Bulkhead Major Key



Plug Major Key

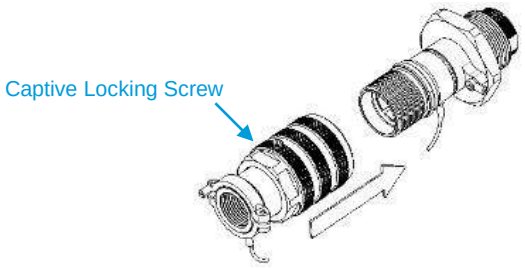


Fig. 5

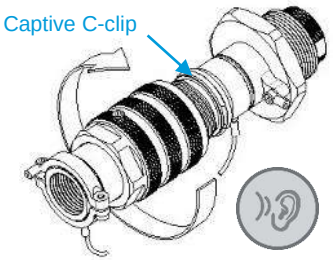


Fig. 6

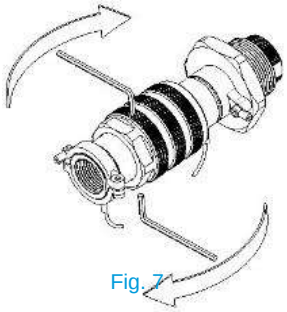


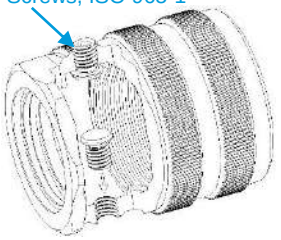
Fig. 7

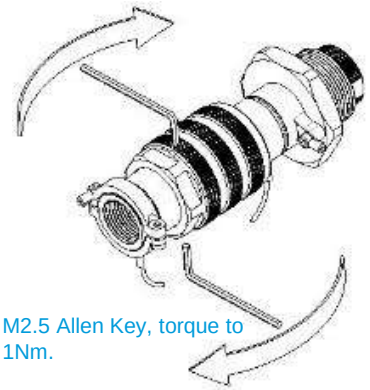
Geo-Beam™ Ex - Safety Precautions & Warnings

Important Information:
Information in this section is provided to enable users to evaluate the risk of work.

Special Conditions of Use.

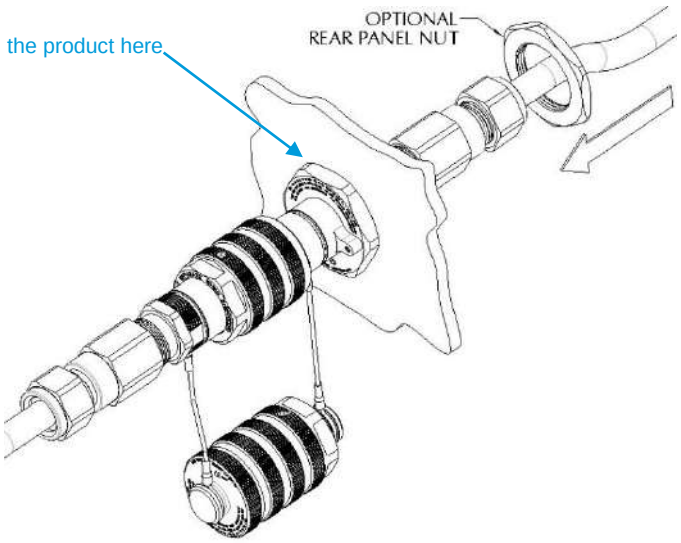
- **Do not separate when energised**
- **Do not disconnect / connect connectors unless all electrical/optical power is isolated at the source.**
- **Do not disconnect / connect the connectors when a gas or dust atmosphere is present.**
- **Do not energise an unmated connector even when dust caps are fitted.**
- The current and voltage parameters of the electrical circuits are limited to 600Vr.m.s, 13 Amps per pin [maximum 8 pin electrical connector]. These shall not be exceeded.
- The cable glands used with Free Plugs and Free Receptacles shall be an appropriately approved Ex d and Ex tb type which is suitably for the type of cable used. The cable gland selection shall not affect the compliance of the connector arrangements.
- The cable glands and cable insulation may reach up to 47°C above the ambient temperature. Consideration shall be given to the temperature rating of the cable and glands at high ambient.
- User gland entries shall be fitted with suitable ingress seals to maintain the overall ingress protection of the connectors to IP66/7.
- Optical power levels of more than 5mW/mm² and 35mW shall not be used.
- Ensure that the M5 captive locking screws are in place and are fully tightened before energised. Torque the screw to 1Nm.
- The M5 captive locking screws are required to protect the user from un-insulated live parts, any damage to these parts means they will need replacing. Only the Cinch Connectivity Solutions, part (Part # 4513) shall be used and dis-assembly will be required and should only be carried out by an appropriately trained person in accordance with the relevant codes of practice.
- The dimensions of the flamepaths shall not be modified. In the event that the unit requires repair, it must be returned to the manufacturer.
- Use associated dust caps when the plug and socket are not in use.
- The plug and socket shall be inspected prior to connection to remove any foreign objects.





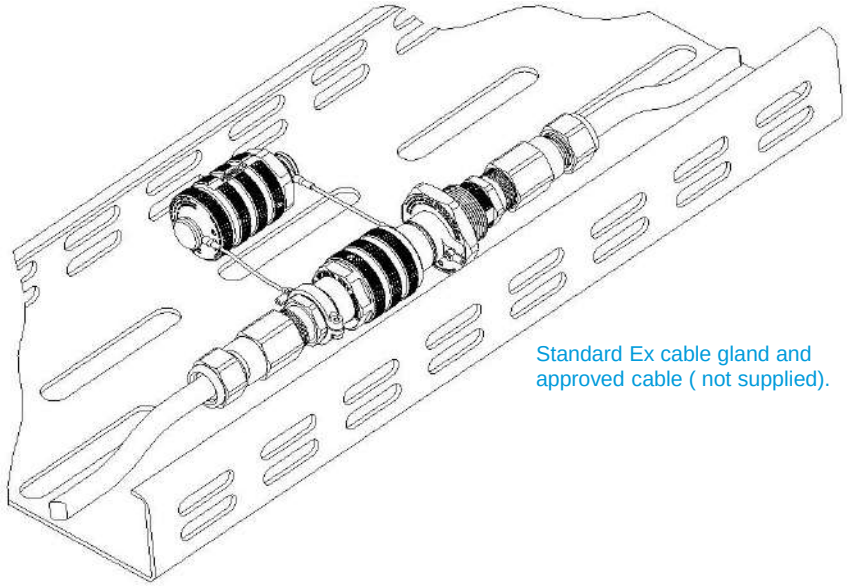
Geo-Beam™ Ex Installation Options Examples

The Geo-Beam EX can be installed into most areas, below are a few examples of how the connectors can be positioned and used effectively.



Optional panel mount with the use of M32 thread or radially positioned with the use of a rear panel nut.

A torque of 40Nm should be applied when tightening either of the panel nuts, when the panel nut is secure the housing o'ring will be compressed.



Standard Ex cable gland and approved cable (not supplied).

Inline plug and bulkhead positioned in a tray.

Geo-Beam™ Ex - Earth Bonding

Earth bonding on the Geo-Beam Ex product can be performed as per clause 15.1 in IEC 60079-0.

An internal Earth bond can be achieved by the use of a selected channel through the insert. A 16AWG 39029 contact can be designated as part of a cable assembly.

Ensure that if this method is adopted that it is grounded properly before the connector is actually engaged.

In addition the use of the External Earth Bonding mounts on both the Plug and Bulkhead connectors can be utilised suiting section 15.1.2 a), see images opposite for assistance.

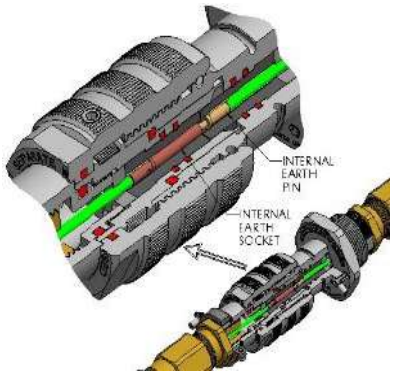
Note. If both pin [internal] and external earth points are used they must be electrically connected to each other.

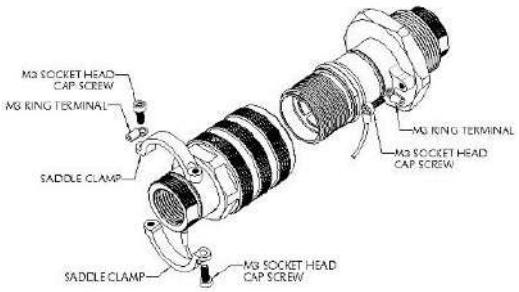
With reference 15.3 Cross sectional area of protective earthing (PE) conductor must be as defined in table 10 of IEC 60079-0. Typical wire size for product is 1.5mm² and #16 contact.

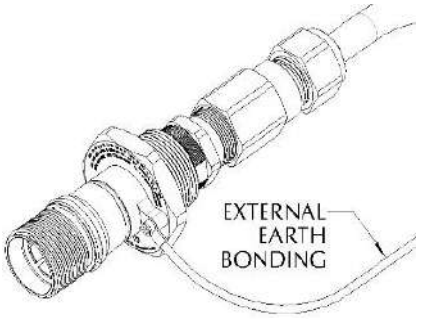
Ensure all earth connections are made using suitable materials protected against corrosion as described in 15.4 IEC 60079-0.

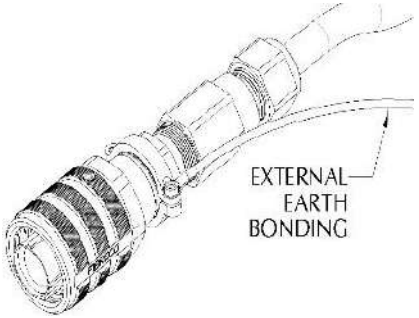
When earth connections are made ensure suitable methods are used to secure the fixing to prevent loosening or twisting as described in 15.5 IEC 60079-0

Note. If the above earth bonding methods do not suit it would be the responsibility of the user/installer to provide adequate earth bonding.









Contact Us.

Support for

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