



TX3706 • TX3707
Falcon Ex d Connectors




TROLEX«

User Manual

TX3706 • FALCON Ex d Connectors

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1. Product Overview



1.1 Operating Features

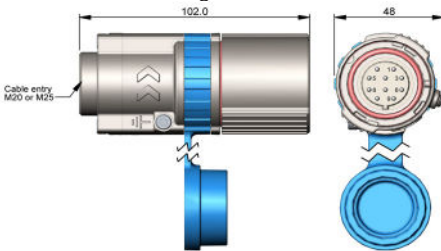
- Multi-pin connector for use in Group I and Group II hazardous areas
- Precision cast metal **Free Plug** and **Free Receptacle** for cable mounting
- Precision cast metal **Fixed Receptacle** for Ex d or Ex e box mounting
- Standard cable glands are utilised to user preference
- Simple connection - no special tools required
- Double insulated contact cartridge for added safety and ease of connection
- Rapid double bayonet engagement ensures that contacts make or break under Ex d protection for live disconnection
- Pilot circuit interlocking safety protection can be incorporated
- Security coding options to prevent non-permitted engagement
- Supplied with flexible ingress protection cover caps
- Ex d blanking cover caps may be supplied where specified
- Mounting clamp available for Unistrut bulkhead mounting of **Free Connectors**

1.2 Application

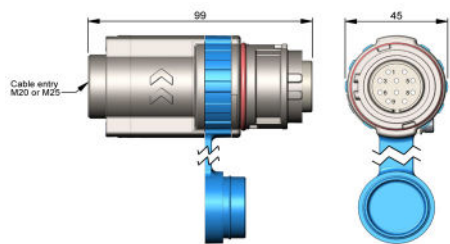
- High integrity, multi path, robust, explosion proof connector, designed for extra heavy duty and critical applications.
- ATEX and IECEx industrial hazardous area applications and underground mines. Suitable for use in flammable gas and dust atmospheres.
- Rapid and convenient connect/disconnect of control circuits and power circuits for electrical equipment installation.
- Live disconnect of critical equipment for maintenance and change-out.
- Offshore oil and gas platforms, mining, tunnelling, petrochemical plants, process plants, storage areas, pump stations, well head control panels, mobile equipment, on shore drill rigs and top drive control room systems.

1.3 Dimensions

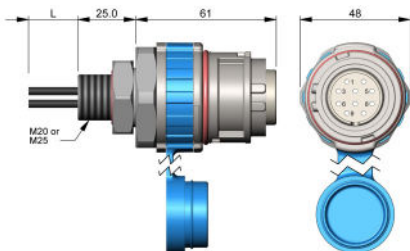
TX3706.1 Free Plug



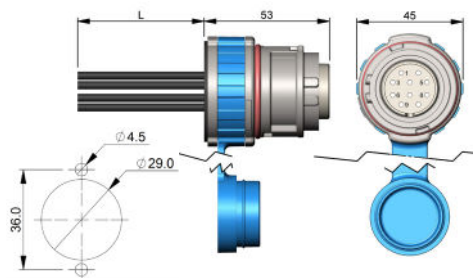
TX3706.2 Free Receptacle



TX3706.3 Fixed Receptacle
M20 or M25 bush mounting on
Ex d or Ex e enclosures



TX3706.3 Fixed Receptacle
Surface Mounting on Ex e enclosures



1.4 Technical Information

Housing material:	Stainless Steel : ANC4B Aluminium Alloy : LM25TF with hard anodised protection	
Cable entry on free plug and receptacle:	Choice of threaded cable entry sizes for standard Ex d cable glands M20 and M25	
Mounting of fixed receptacle:	<ul style="list-style-type: none"> • Surface fix onto Ex e housing • M20 onto Ex d or Ex e housing • M25 onto Ex d or Ex e housing 	
Connections of fixed receptacle:	1.5 mm ² x 1m / 2m / 3m (L) 2.5 mm ² x 1m / 2m / 3m (L)	
Mating cycles:	100,000 with no load connected (Limited to 200 for live disconnect)	
Security Coding:	5 selectable coding positions - A, B, C, D, E	
Ingress protection:	IP66 - triple sealed	
Temperature limits:	-50 °C to +60 °C	
Weight:	Stainless Steel	Aluminium
Free Plug	0.5kg	0.2kg
Free Receptacle	0.43kg	0.17kg
Fixed Receptacle	0.4kg	0.15kg
Conformity:	EN 61984: 2009 - Safety Requirements EN 60664: 2007 - Insulation Co-ordination EN60079-0: 2012+A11:2013 - General Requirements EN60079-1: 2014 - Flame-proof Enclosures EN60079-31: 2014 - Equipment Dust Ignition Protection by Enclosure "t"	

Contact Inserts



Contact ways:	10	4
Maximum rated current per contact:	25 A	25 A
Maximum total current (all contacts):	100 A	100 A
Rated voltage:	250 V ac/ 100 V dc	250 V ac/ 100 V dc
Maximum live disconnect voltage Power factor 0.4 to 0.5	80 V ac/dc	250 V ac/dc
Load breaking current (up to 200 mating cycles):	1 A	1 A
Creepage and clearance: (IEC 60664-1)	2 mm	5 mm
Cable terminations:	6 or 8 point crimp or solder - IEC 60352-2	
Wire size:	1.5 mm ² or 2.5 mm ²	
Insert material:	Glass filled polymer	
Fire rating:	VL94, V-0	
Contacts:	Multi-spring wire socket and solid pin	
Insertion force:	6 N per contact	
Contact protection:	Passivated silver plating	
Contact resistance:	400 ohm	
Test Voltage:	2000 V	
Insulation:	Class II double insulated BS 61140	
Over voltage transients:	3000 V	
Protective earth connections	Screw clamp terminals for 2.5 mm cables	

Checkpoint

Intrinsically safe circuits

The contact inserts are clearance compatible for use with approved intrinsically safe circuits up to 30 Volts. This feature can be used to maintain flameproof properties where intrinsically safe circuits are exiting a flameproof enclosure.

Caution

Intrinsically safe circuits must not be mixed with non-intrinsically safe circuits on the same connector.

2. Certification and Conformity



ATEX (European Union) certification for use in underground mines and surface industry with explosive gas and dust atmospheres.

Complies with ATEX Directive 94/9/EC (until 19th of April 2016)

Complies with ATEX Directive 2014/34/EU (from 20th of April 2016)



IECEX (International) certification for use in underground mines and surface industry with explosive gas and dust atmospheres.

2.1 Underground mines (stainless steel versions only)

Product Code:	Ex Certificate Number:	Ex Certification Code:
TX3706.xx.xx.xx.xx.xx.xx	CML 15ATEX1143X IECEX CML 15.0070X	I M2 Ex db I Mb -50 °C ≤ Ta ≤ +60 °C

2.2 Surface industry with explosive gas and dust atmospheres (stainless steel and aluminium versions)

Product Code:	Ex Certificate Number:	Ex Certification Code:
TX3706.xx.xx.xx.xx.xx.xx	CML 15ATEX1143X IECEX CML 15.0070X	II 2GD Ex db IICT4 Gb Ex tb IIICT135 °C Db -50 °C ≤ Ta ≤ +60 °C

2.3. The following Conditions of Certification and Special Conditions for Safe Use apply to the above ATEX and IECEX Certificates:

- 1) The total capacity of the 4 or 10 pin contact option must not to exceed 100 A giving each contact a limitation of:
 - 4 contacts – 25 A
 - 10 contacts – 10 A
- 2) The cable entries and cable used with the TX3706 connectors may reach 60 °C above ambient temperatures, therefore they shall be selected accordingly for the operating ambient temperatures.
- 3) The connector arrangement remains flameproof through the first stage of disconnection which fully disconnects the pins, however, this only applies to circuits with a power factor of 0.6 or less.

For circuits outside this range, additional time delays need to be considered before fully disconnecting the connector even if energised.

- 4) During maintenance and inspection the flamepath dimensions in the tables below shall be observed:

Flamepath Ref.	Description	Type of Flame Path	Max Gap (mm)	Min Length (mm)
1-2	End Cap (M) Receptacle (F)	Cylindrical Joint	0.093	9.5
3-4	Plug (M) Receptacle (F)	Cylindrical Joint	0.093	9.5
5-6	End Cap (M) Plug (F)	Cylindrical Joint	0.093	9.5
7-8	Ex d Cap (M) Receptacle	Cylindrical Joint	0.093	9.5
9-10	Plug (M) Ex d Cap (F)	Cylindrical Joint	0.093	9.5
Threaded entries	End cap threaded cable entries	Metric threaded M20 M25	Threads engaged >10	M20 = 19 mm M25 = 16 mm

Flamepath Ref.	Description	Type of Flame Path	Max Gap (mm)	Min Length (mm)
1-2	Ex d Cap (M) Receptacle (F)	Cylindrical Joint	0.093	9.5
3-4	Plug (M) Ex d Cap (F)	Cylindrical Joint	0.093	9.5

3. Fitting and Installation

3.1 Precautions

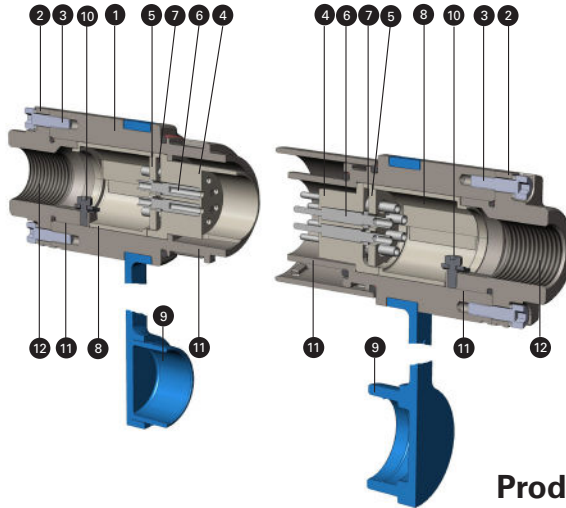
- Special conditions of use relating to the Ex certification may apply to particular applications.
- The cable gland used with Free Plugs and Free Receptacles must be an approved Ex d type which is suitably certified for the equipment and the type of cable to be used.
- Gland entries must be fitted with suitable ingress seals to maintain the overall ingress protection of the connector.
- Ensure that the current and voltage parameters of the electrical circuits are within the limits specified.
- The sealing faces and flame paths will have been treated with a protective film of grease during manufacture. Renew if necessary before assembly or engagement, in accordance with the relevant installation standards and procedures.
- Ensure that the end cap screws are in place and are fully tightened before engagement.
- Always fit either a rubber ingress protection cap or an Ex protection cap to disengaged connectors to protect flame paths and to exclude debris and moisture.
- Do not disengage the connector by pulling on the cable as this may damage the fitting of the cable into the cable gland.
- A connector with a damaged flame path is an explosion risk and should be removed from service.

3.2 Tools and Equipment

- 2.5mm & 3mm Allen key
- Wire cutters
- Wire strippers
- 6 or 8 point crimping tool (or soldering iron for soldered connections)

3.3 Free plug and free receptacle

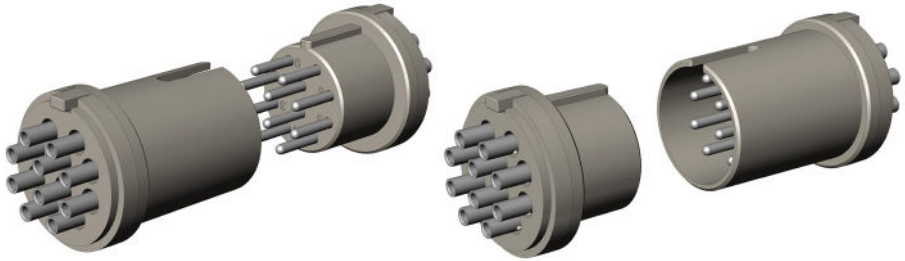
3.3.1 General assembly and definitions



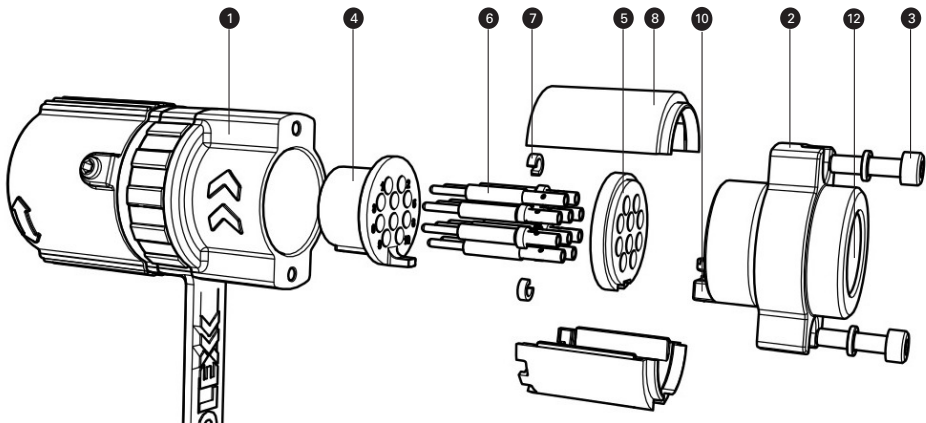
Product Options

1. Body (Plug or receptacle) Group I	Stainless Steel
1. Body (Plug or receptacle) Group II	Stainless Steel/Aluminium
2. End cap	
3. End cap screws	
4. Contact insert	10 way/4 way
5. Backing ring	
6. Contacts	1.5 mm ² Pins/Sockets 2.5 mm ² Pins/Sockets
7. Retainer	
8. Sleeve (Upper and lower pair)	
9. Ingress protection cap	
10. Earth bonding terminal	
11. Flame path	
12. Cable entry for standard Ex cable glands	M20/M25

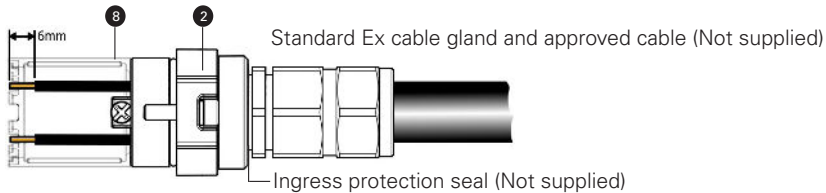
- PINS or SOCKETS can be fitted into MALE or FEMALE contact inserts
- MALE or FEMALE contact inserts can be fitted into PLUGS or RECEPTACLES



3.3.2 Connecting



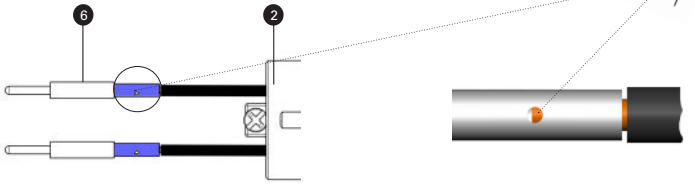
- Prepare cable



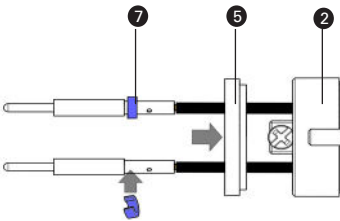
Checkpoint

Use sleeve 8 as a temporary wire length cutting gauge.

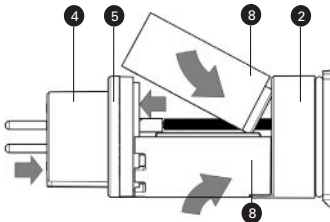
- Crimp or solder connectors



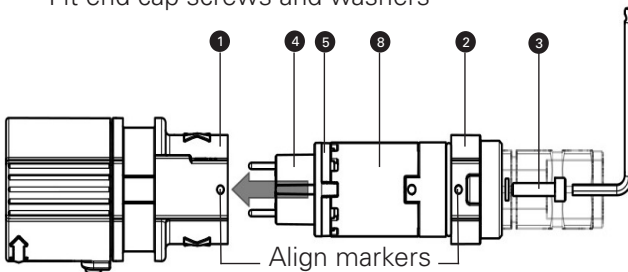
- Fit backing ring 5
- Clip a retaining clip 7 to each contact



- Load contacts into the contact insert 4
- Slide the backing ring 5 up to the contact insert 4
- Clip the sleeves 8 in place

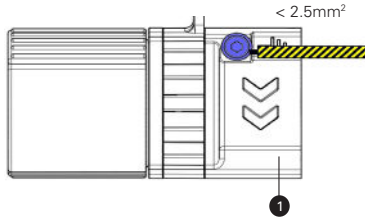


- Load into connector body 1
- Fit end cap screws and washers

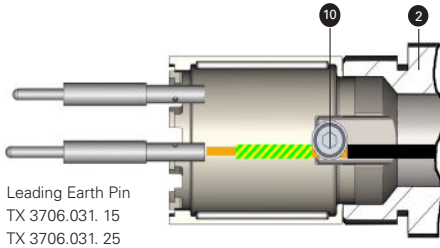


3.3.3 Earth Bonding

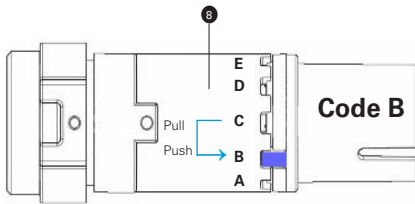
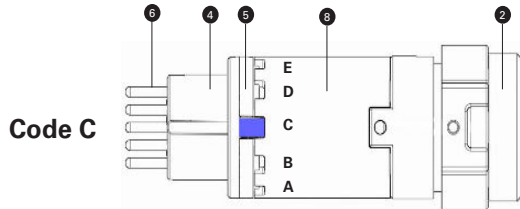
- External Earth bonding



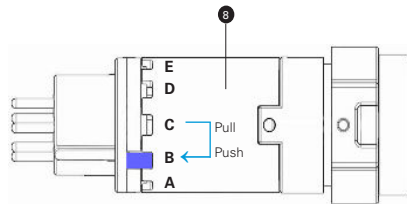
- Internal Earth Continuity bonding



3.3.4 Security Coding



Female
Contact insert



Male
Contact insert

3.4 Fixed Receptacle

3.4.1 General assembly and definitions

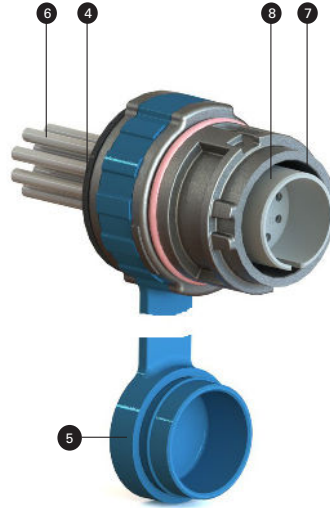
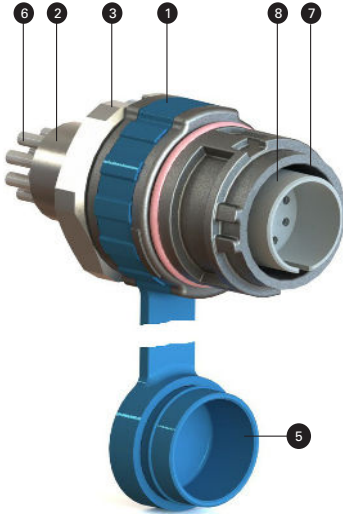
TX3706. 03

Fixed Receptacle

Bush mounting onto Ex e or Ex d housing (Section 3.4.2)

Fixed Receptacle

Surface fix onto Ex e housing (Section 3.4.3)



Product options

1. Body (Plug or receptacle) Group I	Stainless Steel
1. Body (Plug or receptacle) Group II	Stainless Steel/Aluminium
2. Threaded entry mounting bush	M20/M25
3. Locking ring with ingress seals	
4. Ingress seal for surface mounting	
5. Ingress protection cap	
6. Pre-wired encapsulated connections	1.5 mm ² X 1M / 2M / 3M (L) 2.5 mm ² X 1M / 2M / 3M (L)
7. Female contact insert	10 way/4 way (Security code to be specified)
8. Contacts	Pins/sockets (Leading earth pin when specified) (Lagging pilot pin when specified)

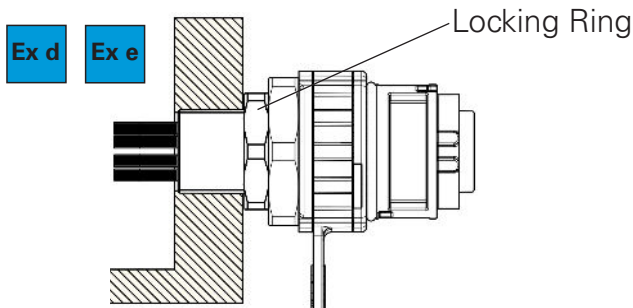
3.4.2 Ex d bush mounting

TX 3706.3...20

TX 3706.3...25

A locking ring enables the Receptacle to be radially positioned to suit user preference and incorporates ingress seals to IP66 standards.

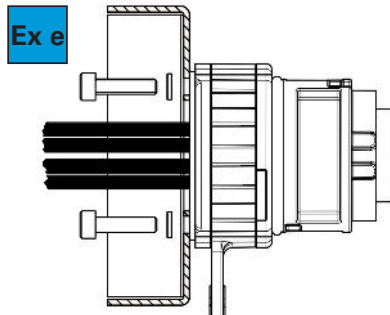
- Position the Receptacle to concur with any radial position of the corresponding free plug.
- Align Receptacles for best visual appearance
- Locks against the effect of rotational forces which may occur from the connecting cable.



1. Screw the locking ring all the way home.
2. Screw the Receptacle all the way into the mounting bush on the enclosure. This must be a minimum of five threads engaged on an Ex d enclosure.
3. Use a half-spanner to apply counter-clockwise locking force to the locking ring.

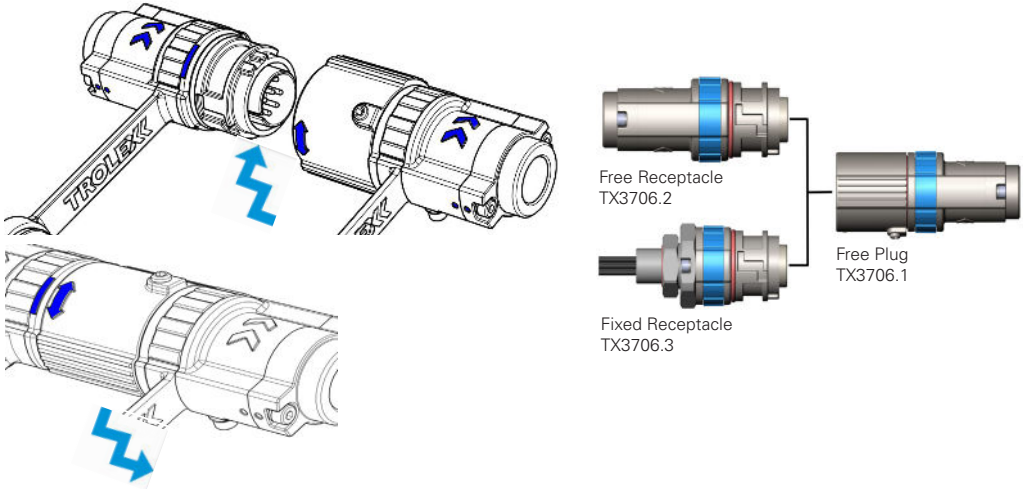
3.4.3 Ex e surface mounting

TX 3706.3...01



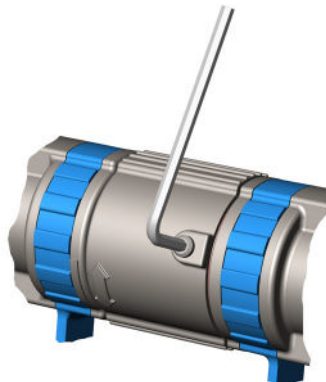
4. Operation

4.1 Engage and separate



Engage				Ex d Protection
Break				Ex d Protection
Separate				IP30 on Socket

Locking Screw



4.2 Safety Precautions



There are three methods of safety protection depending upon the application and local safety regulations.

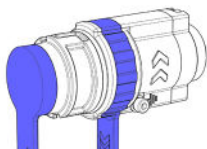
4.2.1 Isolate elsewhere

Isolate all electrical power at source BEFORE separation



Checkpoint

IP65



Fit the rubber ingress protection cap when separated.

Ex d + IP66

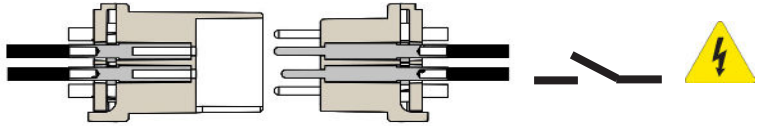


Fit an Ex protection cap if the system power is to be reinstated.

4.2.2 Pilot circuit interlocking

Automatic isolation of the power source during separation using one of the connector contacts for interlocking a pilot switching circuit.

- Fit a lagging pilot pin TX 3700.032.15 or TX 3700.032.25

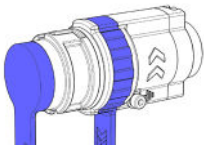


Engage			Ex d Protection
Break			Ex d Protection
Separate			---

Checkpoint

- The pilot relay will isolate the power source slightly in advance of the main contacts during separation
- Breaking of the pilot contract will take place under Ex d protection
- The pilot circuit must be de-energised along with the power source.

IP65



Fit the rubber ingress protection cap when separated.

Ex d + IP66

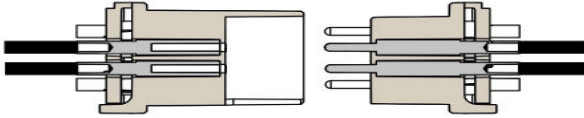


Fit an Ex protection cap if the system power is to be reinstated.

4.2.3 Live engagement

ENGAGE or SEPARATE the connector with live power in the hazardous area, is permitted for short periods to allow maintenance or change-out of apparatus.

Power must originate from the SOCKET ONLY.

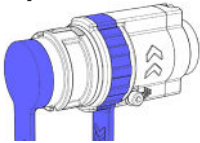


Engage			Ex d Protection
Break			Ex d Protection
Separate			IP30 on Socket

Checkpoint

Maximum Voltage . 4 way	250 V ac/dc
Maximum Voltage .10 way	80 V ac
Maximum breaking current (per contact)	1 A
Power factor	< 0.5

IP65 Only



Fit the rubber ingress protection cap during temporary separation to exclude dust and moisture.

Ex d + IP66



Fit an Ex protection cap if the connection is to remain separated after the permitted maintenance period.

Important:

- Information in this section is provided to enable users to evaluate the risk of live work.
- Live disconnection should be carried out under an appropriate permit to work system based on the risk assessment and should be carried out in a clean and dry environment on a temporary basis only.
- Before an Ex protection cap is fitted and whilst disconnected, the connector is no longer Ex d or Ex tb protected however creepage and clearances of the connector meet requirements of IEC/EN 60079-7 for the maximum rated live disconnection voltages. Fitting Ex protection cap restores full Ex d or Ex tb protection.
- Before a rubber ingress protection cap or an Ex protection cap is fitted, live connectors will have an IP30 rating only and whilst disconnected, both the plug and socket parts need to be protected from mechanical damage.
- The rubber protection cap provides an ingress protection IP65 when fitted but does not provide an enclosure meeting the requirements IEC/EN 60079-0.

5. Accessories

Mounting clamp

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Leading earth pin 1.5 mm²

P5609.23.01



Leading earth pin 2.5 mm²

P5609.16.01



Live disconnect/pilot pin 1.5 mm²
Maximum current: 1 Amp

P5609.23.02



Live disconnect/pilot pin 2.5 mm²
Maximum current: 1 Amp

P5609.16.02



Ex protection plug cap
Aluminium
Stainless Steel

TX3706.41
TX3706.42



Ex protection receptacle cap
Aluminium
Stainless Steel

TX3706.43
TX3706.44



6 Maintenance

No regular maintenance is required

Flame paths and ingress protection seals should be inspected at periodic intervals, in accordance with local statutory regulations and light protective grease applied when necessary.

Disclaimers

The information provided in this document contains general descriptions and technical characteristics of the performance of the product. It is not intended as a substitute for and is not to be used for determining suitability or reliability of this product for specific user applications. It is the duty of any user or installer to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use. Trolex shall not be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments, or find errors in this publication, please notify us at marketing@trolex.com.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only Trolex or its affiliates should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Trademarks

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Patent pending.

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