



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx CML 15.0005X Issue No: 0 Certificate history:
Status: **Current** Page 1 of 3 [Issue No. 0 \(2015-01-19\)](#)

Date of Issue: **2015-01-19**

Applicant: **T.E.L Engineering Limited (Trading as Trolex Engineering)**
Newby Road
Hazel Grove
Stockport
SK7 5DA
United Kingdom

Electrical Apparatus: **Type TX470* Range of Slip Ring Units**
Optional accessory:

Type of Protection: **Flameproof, Dust, Increased Safety, Intrinsic Safety**

Marking:
Ex d* IIB T6 or T4** Gb, Tamb = -20°C or -40°C up to +60°C**
Ex tb IIIC T85°C or T135°C** Db
*code may include Ex e, [ia], [op is], depending on model
**T-class, assigned maximum surface temperature and ambient range depend on option selected

Approved for issue on behalf of the IECEx
Certification Body:

D R Stubbings MIET

Position:

Technical Director

Signature:
(for printed version)

Date:

2015-02-19

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2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](#).

Certificate issued by:

Certification Management Limited
Unit 1, Newport Business Park
New Port Road
Ellesmere Port
CH65 4LZ
United Kingdom



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T.E.L. ENGINEERING LIMITED



IECEX Certificate of Conformity

Certificate No: IECEx CML 15.0005X Issue No: 0

Date of Issue: 2015-01-19 Page 2 of 3

Manufacturer: **T.E.L Engineering Limited (Trading as Trolex Engineering)**
Newby Road
Hazel Grove
Stockport
SK7 5DA
United Kingdom

Additional Manufacturing
location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2014-06 Edition:7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-31 : 2013 Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
IEC 60079-7 : 2006-07 Edition:4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[GB/CML/ExTR15.0004/00](#)

Quality Assessment Report:

[GB/BAS/QAR08.0003/05](#)

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IECEX Certificate of Conformity

Certificate No: IECEx CML 15.0005X

Issue No: 0

Date of Issue: 2015-01-19

Page 3 of 3

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

This certificate covers the Type TX470* Range of Slip Ring Units. All types consist of a flameproof housing containing several slip rings and a rotating shaft. For detailed description, refer to certificate Annex.

CONDITIONS OF CERTIFICATION: YES as shown below:

Refer to certificate Annex

Annex:

[Certificate Annex IECEx CML 15.0005X.pdf](#)

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T.E.L. ENGINEERING LIMITED

Annexe to: IECEx CML 15.0005X Issue 0
Applicant: T.E.L Engineering Limited
 (Trading as Trolex Engineering)
Apparatus: Type TX470* Range of Slip Ring Units



Description

Units TX4701, TX4702, TX4703 and TX4704:

This range of slip ring units comprise of a cast base and cover manufactured from a number of specified materials. The unit base houses two rolling element bearings which support a slip ring shaft which has a maximum operating speed of up to 200 rev/min. The base unit and the end of the slip ring may be machined to accept cable glands or specific component approved sockets, with or without a right angled adaptor fitted.

The number of slip rings and the height of the cover can vary to form the alternative type designations. The slip rings can be provided with between two and eight brushes per ring and the maximum rating per brush is 6 A and per slip ring is 24 A.

The maximum voltage and number of slip rings are indicated in the table below:

Type	Maximum Number of Slip Rings	Maximum Voltage*	Maximum Total Current (A)
TX4701	3	1500 Va.c., 1800 Vd.c.	18
TX4702 & TX4702X	8	1500 Va.c., 1800 Vd.c.	48
TX4703	16	1000 Va.c., 1200 Vd.c.	96
TX4704	24	1000 Va.c., 1200 Vd.c.	144
TX4704F	24	1000 Va.c., 1200 Vd.c.	144
TX4702i	4 I.S. & 3 non I.S.	60 V I.S. & 240 Va.c. non I.S.	18

* When the angled adaptor and the component approved sockets are fitted, the voltage is reduced depending upon the quantity of contacts, as specified in the component certificates of the sockets.

Options include the installation of a shaft encoder with a reduction in the number of rings for the TX4703 and TX4704 units, a longer cover for the TX4702 unit (TX4702X), installation of a receiver/converter (TX4704F), and a combination of intrinsically safe and non-intrinsically safe circuits without the right angled adapter fitted (TX4702i).

The enclosure may be provided with a potentiometer or a shaft encoder. Internal and external earth facilities are provided.

Cable entry holes are provided, for the accommodation of suitably certified flameproof entry devices. Unused entries are to be fitted with suitably approved flameproof stopping plugs.

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Suitable flameproof entry devices, thread adapters and stopping plugs which are suitably certified as equipment may also be used in the manner specified above.

Units TX4705 and TX4706:

The Type TX4705 Slip Ring Unit comprises a machined housing incorporating a bearing and a flange manufactured from aluminium or stainless steel with a stainless steel fabricated/welded cover of various lengths from 70 mm to 335 mm enclosing slip rings and associated brush gear. Cable entries are provided in the housing and the flange.

The slip rings are individually rated up to 2000 V, 16 A and may be used for power, signal and intrinsically safe circuits, with a maximum throughput of 268 A. The maximum voltage is reduced to 60 V for intrinsically safe circuits.

Options include:

- Provision of a cable entry in the end of the cover, in lieu of an entry in the housing; this is provided with a permanently attached cable to form a TX4706 unit.
- A reduced rating with an increased ambient temperature to +60°C to form a TX4705P unit

Model numbers are suffixed with an "i" when used with intrinsically safe circuits.

The following marking options apply:

Equipment Marking Variations				
Type	Ambient Range	Temperature Class	Assigned Maximum surface Temperature	Maximum Current
TX4705 & TX4706	-20°C to +40°C	T6	T85°C	268 A
TX4705P	-40°C to +60°C	T4	T135°C	128 A
TX4705LT & TX4706LT	-40°C to +40°C	T6	T85°C	268 A
TX4705FO (Ex op is)	-40°C to +40°C	T6	T85°C	134 A
TX4705 & TX4706	-20°C to +50°C	T6	T85°C	134 A

Cable entry holes are provided, for the accommodation of suitably certified flameproof entry devices. Unused entries are to be fitted with suitably approved flameproof stopping plugs.



Suitable flameproof entry devices, thread adapters and stopping plugs which are suitably certified as equipment may also be used in the manner specified above.

Unit TX4707:

The Type TX4707 Slip Ring Unit is similar in construction to the TX4705 unit, but is of a more compact design.

The Type TX4707 Slip Ring Unit comprises a machined housing incorporating two rolling element bearings and a flange manufactured from aluminium or stainless steel with a stainless steel fabricated/welded cover of length 53 mm, enclosing two slip rings and associated brush gear. Cable entries are provided in the housing and the flange.

The slip rings are individually rated up to 2000 V, with a maximum throughput of 16 A. The following marking applies to this model:

Type	Ambient Range	Temperature Class	Assigned Maximum surface Temperature	Maximum Current
TX4707	-40°C to +60°C	T6	T85°C	16 A

Conditions of Manufacture

- i. Where the product incorporates certified parts or safety critical components the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate.
- ii. Each unit shall be subjected to a routine overpressure test in accordance with IEC 60079-1, clause 16, at the following pressures:

Model	Pressure
TX4701 to TX4704 when marked -20°C	8.7 bar
TX4701 to TX4704 when marked -40°C	39.3 bar
All units TX4705, TX4706 & TX4707	

The pressure shall be held for at least 10 seconds. There shall be no permanent deformation or damage to the enclosure.

- iii. When the component approved plug/socket arrangements are used as entry devices, the marked maximum electrical ratings of the equipment shall not exceed the limits defined on the component certificates for the plugs/sockets.
- iv. Factory fitted cable glands and cable shall be installed in accordance with IEC 60079-14 and shall be suitable for the service temperature range.



Special Conditions for Safe Use

- i. The integral cables, when fitted, must be protected against impact and be terminated in a suitable junction facility.
- ii. For slip ring units carrying intrinsically safe circuits:
 - The voltage of each intrinsically safe circuit and between separate intrinsically safe circuits shall not exceed 60 V
 - The sum of the maximum peak voltages of intrinsically safe and non-intrinsically safe circuits shall not exceed 1575 V
 - Each intrinsically safe circuit shall be separately screened
- iii. Units fitted with a connector certified under IECEX BAS 12.0034U or IECEx BAS 12.0036U shall also be fitted with either the associated plug or blanking cover.
- iv. For slip ring units incorporating the fibre optic rotary joint; the optical power is to be limited to a radiated power of less than 35mW and a peak power density of less than 5 mW/mm², as defined by IEC 60079-28.



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx CML 15.0005X Issue No: 3 Certificate history:
Status: Current Page 1 of 4 Issue No. 3 (2018-07-31)
Date of Issue: 2018-07-31 Issue No. 2 (2018-07-25)
Issue No. 1 (2016-07-04)
Issue No. 0 (2015-01-19)

Applicant: T.E.L Engineering Limited (Trading as Trolex Engineering)
Unit 2 Levens Road
Newby Road Industrial Estate
Hazel Grove
Stockport
Cheshire
SK7 5DL
United Kingdom

Equipment: Type TX470* Range of Slip Ring Units

Optional accessory:

Type of Protection: Flameproof, Dust, Increased Safety, Intrinsic Safety

Marking:

Ex d* IIB T6 or T4** Gb, Tamb = -20°C or -40°C up to +60°C**

Ex tb III C T85°C or T135°C** Db

*code may include Ex e, [ia], [op is], depending on model

**T-class, assigned maximum surface temperature and ambient range depend on option selected

Note: Dust marking does not apply to the TX4705X-FCS

Approved for issue on behalf of the IECEx
Certification Body:

H M Amos MIET

Position:

Technical Manager

Signature:
(for printed version)

Date:

July 31, 2018

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

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New Port Road
Ellesmere Port, CH65 4LZ
United Kingdom



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IECEX Certificate of Conformity

Certificate No: IECEX CML 15.0005X Issue No: 3

Date of Issue: 2018-07-31 Page 2 of 4

Manufacturer: **T.E.L Engineering Limited (Trading as Trolex Engineering)**
Unit 2 Levens Road
Newby Road Industrial Estate
Hazel Grove
Stockport
Cheshire
SK7 5DL
United Kingdom

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2014-06 Edition:7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-28 : 2006-08 Edition:1	Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation
IEC 60079-31 : 2013 Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
IEC 60079-7 : 2006-07 Edition:4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[GB/CML/ExTR15.0004/00](#) [GB/CML/ExTR16.0058/00](#) [GB/CML/ExTR18.0119/00](#)
[GB/CML/ExTR18.0157/00](#)

Quality Assessment Report:

[GB/BAS/QAR08.0003/07](#)

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IECEX Certificate of Conformity

Certificate No: IECEx CML 15.0005X

Issue No: 3

Date of Issue: 2018-07-31

Page 3 of 4

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

This certificate covers the Type TX470* Range of Slip Ring Units. All types consist of a flameproof housing containing several slip rings and a rotating shaft.

For detailed description and Conditions of Manufacture, refer to certificate Annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:

Refer to certificate Annex

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IECEX Certificate of Conformity

Certificate No: IECEx CML 15.0005X

Issue No: 3

Date of Issue: 2018-07-31

Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1 introduces the following modifications:

1. Introduction of model TX4705X-FCS to the range.
2. The updated of the routine overpressure test requirements to account for the introduction of the TX4705X-FCS.

Issue 2 introduces the following modifications:

1. Update of the applicant and manufacturer's address.

Issue 3 introduces the following modifications:

1. Introduction of the option to use a component approved connector and adapter arrangement as an alternative to the cable gland entry arrangements on the TX4705 and TX4707.
2. The certificate description and Conditions of Manufacture have been updated to account for the above modification.
3. Minor change to the enclosure diameter of the TX4707.

Annex:

[IECEX CML 15.0005X Annex \(Issue 3\).pdf](#)

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T.E.L. ENGINEERING LIMITED

Annexe to: IECEx CML 15.0005X Issue 3
Applicant: T.E.L Engineering Limited
 (Trading as Trolex Engineering)
Apparatus: Type TX470* Range of Slip Ring Units



Description

Description of Units TX4701, TX4702, TX4703 and TX4704:

This range of slip ring units comprise of a cast base and cover manufactured from a number of specified materials. The unit base houses two rolling element bearings which support a slip ring shaft which has a maximum operating speed of up to 200 rev/min. The base unit and the end of the slip ring may be machined to accept cable glands or specific component approved sockets, with or without a right-angled adaptor fitted.

The number of slip rings and the height of the cover can vary to form the alternative type designations. The slip rings can be provided with between two and eight brushes per ring and the maximum rating per brush is 6 A and per slip ring is 24 A.

The maximum voltage and number of slip rings are indicated in the table below:

Type	Maximum Number of Slip Rings	Maximum Voltage*	Maximum Total Current (A)
TX4701	3	1500 Va.c., 1800 Vd.c.	18
TX4702 & TX4702X	8	1500 Va.c., 1800 Vd.c.	48
TX4703	16	1000 Va.c., 1200 Vd.c.	96
TX4704	24	1000 Va.c., 1200 Vd.c.	144
TX4704F	24	1000 Va.c., 1200 Vd.c.	144
TX4702i	4 I.S. & 3 non I.S.	60 V I.S. & 240 Va.c. non I.S.	18

* When the angled adaptor and the component approved sockets are fitted, the voltage is reduced depending upon the quantity of contacts, as specified in the component certificates of the sockets.

Options include the installation of a shaft encoder with a reduction in the number of rings for the TX4703 and TX4704 units, a longer cover for the TX4702 unit (TX4702X), installation of a receiver/converter (TX4704F), and a combination of intrinsically safe and non-intrinsically safe circuits without the right-angled adapter fitted (TX4702i).

The enclosure may be provided with a potentiometer or a shaft encoder. Internal and external earth facilities are provided.

Cable entry holes are provided, for the accommodation of suitably certified flameproof entry devices. Unused entries are to be fitted with suitably approved flameproof stopping plugs.

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Company Reg No. 8554022 VAT No. GB163023642



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Suitable flameproof entry devices, thread adapters and stopping plugs which are suitably certified as equipment may also be used in the manner specified above.

Description of Units TX4705 and TX4706:

The Type TX4705 Slip Ring Unit comprises a machined housing incorporating a bearing and a flange manufactured from aluminium or stainless steel with a stainless steel fabricated/welded cover of various lengths from 70 mm to 335 mm enclosing slip rings and associated brush gear. Cable entries are provided in the housing and the flange.

The slip rings are individually rated up to 2000 V, 16 A and may be used for power, signal and intrinsically safe circuits, with a maximum throughput of 268 A. The maximum voltage is reduced to 60 V for intrinsically safe circuits.

Options include:

- Provision of a cable entry in the end of the cover, in lieu of an entry in the housing; this is provided with a permanently attached cable to form a TX4706 unit.
- A reduced rating with an increased ambient temperature to +60°C to form a TX4705P unit

Model numbers are suffixed with an "i" when used with intrinsically safe circuits.

The following marking options apply:

Equipment Marking Variations				
Type	Ambient Range*	Temperature Class	Assigned Maximum surface Temperature	Maximum Current
TX4705 & TX4706	-20°C to +40°C	T6	T85°C	268 A
TX4705P	-40°C to +60°C	T4	T135°C	128 A
TX4705LT & TX4706LT	-40°C to +40°C	T6	T85°C	268 A
TX4705FO (Ex op is)	-40°C to +40°C	T6	T85°C	134 A
TX4705 & TX4706	-20°C to +50°C	T6	T85°C	134 A

* When the component approved connector and adapter arrangements are used, the minimum ambient temperature shall be no lower than -20°C, and the maximum ambient temperatures are as defined above, but shall be no greater than +55°C



Cable entry holes are provided, for the accommodation of suitably certified flameproof entry devices. Unused entries are to be fitted with suitably approved flameproof stopping plugs.

Suitable flameproof entry devices, thread adapters and stopping plugs which are suitably certified as equipment may also be used in the manner specified above. On the TX4705, as an alternative to cable gland entries, an adapter and connector arrangement may be used.

Description of Unit TX4707:

The Type TX4707 Slip Ring Unit is similar in construction to the TX4705 unit, but is of a more compact design.

The Type TX4707 Slip Ring Unit comprises a machined housing incorporating two rolling element bearings and a flange manufactured from aluminium or stainless steel with a stainless steel fabricated/welded cover of length 53 mm, enclosing two slip rings and associated brush gear. Cable gland entries are provided in the housing and the flange. As an alternative to cable gland entries, an adapter and connector arrangement may be used.

The slip rings are individually rated up to 2000 V, with a maximum throughput of 16 A. The following marking applies to this model:

Type	Ambient Range*	Temperature Class	Assigned Maximum surface Temperature	Maximum Current
TX4707	-40°C to +60°C	T6	T85°C	16 A

* When the component approved connector and adapter arrangements are used, the ambient temperature range shall be limited to -20°C to +55°C.

Unit TX4705X-FCS.

The TX4705X-FCS is similar in construction to the existing TX4701 to TX4704, except it has a shorter cover and differing flamepath dimensions on the shaft/bore arrangement.

The maximum voltage, current and number of slip rings of the TX4705X-FCS are specified in the table below:

Type	Maximum number of Slip Rings	Maximum Voltage	Maximum Total Current (A)
TX4705X-FCS	8	1500 Va.c., 2200 Vd.c.	35 A



Conditions of Manufacture

- i. Where the product incorporates certified parts or safety critical components the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate.
- ii. Each unit shall be subjected to a routine overpressure test in accordance with IEC 60079-1, clause 16, at the following pressures:

Model	Pressure
TX4701 to TX4704 and TX4705X-FCS when marked -20°C	8.7 bar
TX4701 to TX4704 and TX4705X-FCS when marked -40°C	39.3 bar
TX4705*, TX4706 & TX4707* * Without component approved plug/socket arrangement fitted	39.3 bar
TX4705 & TX4707 (with component approved plug/socket arrangement fitted)	7.8 bar

The pressure shall be held for at least 10 seconds. There shall be no permanent deformation or damage to the enclosure.

- iii. When the component approved plug/socket arrangements are used as entry devices, the marked maximum electrical ratings of the equipment shall not exceed the limits defined on the component certificates for the plugs/sockets.
- iv. Factory fitted cable glands and cable shall be installed in accordance with IEC 60079-14 and shall be suitable for the service temperature range.
- v. The length of the enclosure of the TX4705 shall be no greater than 100 mm when the component approved plug/socket arrangements are fitted.

Conditions of Certification

- i. The integral cables, when fitted, must be protected against impact and be terminated in a suitable junction facility.
- ii. For slip ring units carrying intrinsically safe circuits:
 - The voltage of each intrinsically safe circuit and between separate intrinsically safe circuits shall not exceed 60 V
 - The sum of the maximum peak voltages of intrinsically safe and non-intrinsically safe circuits shall not exceed 1575 V
 - Each intrinsically safe circuit shall be separately screened
- iii. Units fitted with a connector certified under IECEx BAS 12.0034U or IECEx BAS 12.0036U shall also be fitted with either the associated plug or blanking cover.

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- iv. For slip ring units incorporating the fibre optic rotary joint; the optical power is to be limited to a radiated power of less than 35mW and a peak power density of less than 5 mW/mm², as defined by IEC 60079-28.



IECEX Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEX CML 15.0005X	Page 1 of 4	<u>Certificate history:</u>
Status:	Current	Issue No: 4	Issue 3 (2018-07-31)
Date of Issue:	2022-05-27		Issue 2 (2018-07-25)
			Issue 1 (2016-07-04)
			Issue 0 (2015-01-19)
Applicant:	T.E.L Engineering Limited (Trading as Trolex Engineering) Unit 2 Levens Road Newby Road Industrial Estate Hazel Grove Stockport Cheshire SK7 5DL United Kingdom		
Equipment:	Type TX470* Range of Slip Ring Units		
Optional accessory:			
Type of Protection:	Flameproof, Dust, Increased Safety, Intrinsic Safety		
Marking:	Ex d* IIB T6 or T4** Gb, Tamb = -20°C or -40°C up to +60°C** Ex tb III C T85°C or T135°C** Db *code may include Ex e, [ia], [op is], depending on model **T-class, assigned maximum surface temperature and ambient range depend on option selected		
	Note: Dust marking does not apply to the TX4705X-FCS		

Approved for issue on behalf of the IECEx
Certification Body:

L A Brisk

Position:

Certification Officer

Signature:
(for printed version)

Date:
(for printed version)

2022-05-27

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Eurofins E&E CML Limited
Unit 1, Newport Business Park
New Port Road
Ellesmere Port, CH65 4LZ
United Kingdom

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IECEX Certificate of Conformity

Certificate No.: **IECEX CML 15.0005X**

Page 2 of 4

Date of issue: 2022-05-27

Issue No: 4

Manufacturer: **T.E.L Engineering Limited (Trading as Trolex Engineering)**
Unit 2 Levens Road
Newby Road Industrial Estate
Hazel Grove
Stockport
Cheshire SK7 5DL
United Kingdom

Manufacturing locations: **T.E.L Engineering Limited (Trading as Trolex Engineering)**
Unit 2 Levens Road
Newby Road Industrial Estate
Hazel Grove
Stockport
Cheshire SK7 5DL
United Kingdom

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STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

[IEC 60079-0:2017](#) Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

[IEC 60079-1:2014-06](#) Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

[IEC 60079-11:2011](#) Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

[IEC 60079-28:2015](#) Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation
Edition:2

[IEC 60079-31:2013](#) Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"
Edition:2

[IEC 60079-7:2017](#) Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

[GB/CML/ExTR15.0004/00](#)
[GB/CML/ExTR18.0157/00](#)

[GB/CML/ExTR16.0058/00](#)
[GB/CML/ExTR22.0093/00](#)

[GB/CML/ExTR18.0119/00](#)

Quality Assessment Report:

[GB/BAS/QAR08.0003/09](#)

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IECEX Certificate of Conformity

Certificate No.: **IECEX CML 15.0005X**

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Date of issue: 2022-05-27

Issue No: 4

EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

This certificate covers the Type TX470* Range of Slip Ring Units. All types consist of a flameproof housing containing several slip rings and a rotating shaft.

For detailed description and Conditions of Manufacture, refer to certificate Annex.

SPECIFIC CONDITIONS OF USE: YES as shown below:

Refer to certificate Annex

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IECEX Certificate of Conformity

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Date of issue: 2022-05-27

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above) Issue 1

This issue introduces the following modifications:

1. Introduction of model TX4705X-FCS to the range.
2. The updated of the routine overpressure test requirements to account for the introduction of the TX4705X-FCS.

Issue 2

This issue introduces the following modification:

1. Update of the applicant and manufacturer's address.

Issue 3

This issue introduces the following modifications:

1. Introduction of the option to use a component approved connector and adapter arrangement as an alternative to the cable gland entry arrangements on the TX4705 and TX4707.
2. The certificate description and Conditions of Manufacture have been updated to account for the above modification.
3. Minor change to the enclosure diameter of the TX4707.

Issue 4

This issue introduces the following modifications:

1. Updating IEC 60079-0:2011 Ed 6 to IEC 60079-0:2017 Ed 7
2. Updating IEC 60079-7:2006-07 Ed 4 to IEC 60079-7:2017 Ed 5.1
3. Updating IEC 60079-2006-08 to IEC 60079-28:2015 Ed 2

Annex:

[Certificate Annex IECEX CML 15.0005X Iss 4_1.pdf](#)

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Description

Description of Units TX4701, TX4702, TX4703 and TX4704:

This range of slip ring units comprise of a cast base and cover manufactured from a number of specified materials. The unit base houses two rolling element bearings which support a slip ring shaft which has a maximum operating speed of up to 200 rev/min. The base unit and the end of the slip ring may be machined to accept cable glands or specific component approved sockets, with or without a right-angled adaptor fitted.

The number of slip rings and the height of the cover can vary to form the alternative type designations. The slip rings can be provided with between two and eight brushes per ring and the maximum rating per brush is 6 A and per slip ring is 24 A.

The maximum voltage and number of slip rings are indicated in the table below:

Type	Maximum Number of Slip Rings	Maximum Voltage*	Maximum Total Current (A)
TX4701	3	1500 Va.c., 1800 Vd.c.	18
TX4702 & TX4702X	8	1500 Va.c., 1800 Vd.c.	48
TX4703	16	1000 Va.c., 1200 Vd.c.	96
TX4704	24	1000 Va.c., 1200 Vd.c.	144
TX4704F	24	1000 Va.c., 1200 Vd.c.	144
TX4702i	4 I.S. & 3 non I.S.	60 V I.S. & 240 Va.c. non I.S.	18

* When the angled adaptor and the component approved sockets are fitted, the voltage is reduced depending upon the quantity of contacts, as specified in the component certificates of the sockets.

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Options include the installation of a shaft encoder with a reduction in the number of rings for the TX4703 and TX4704 units, a longer cover for the TX4702 unit (TX4702X), installation of a receiver/converter (TX4704F), and a combination of intrinsically safe and non-intrinsically safe circuits without the right-angled adapter fitted (TX4702i).

The enclosure may be provided with a potentiometer or a shaft encoder. Internal and external earth facilities are provided.

Cable entry holes are provided, for the accommodation of suitably certified flameproof entry devices. Unused entries are to be fitted with suitably approved flameproof stopping plugs.

Suitable flameproof entry devices, thread adapters and stopping plugs which are suitably certified as equipment may also be used in the manner specified above.

Description of Units TX4705 and TX4706:

The Type TX4705 Slip Ring Unit comprises a machined housing incorporating a bearing and a flange manufactured from aluminium or stainless steel with a stainless steel fabricated/welded cover of various lengths from 70 mm to 335 mm enclosing slip rings and associated brush gear. Cable entries are provided in the housing and the flange.

The slip rings are individually rated up to 2000 V, 16 A and may be used for power, signal and intrinsically safe circuits, with a maximum throughput of 268 A. The maximum voltage is reduced to 60 V for intrinsically safe circuits.

Options include:

- Provision of a cable entry in the end of the cover, in lieu of an entry in the housing; this is provided with a permanently attached cable to form a TX4706 unit.
- A reduced rating with an increased ambient temperature to +60°C to form a TX4705P unit

Model numbers are suffixed with an "i" when used with intrinsically safe circuits.

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The following marking options apply:

Equipment Marking Variations				
Type	Ambient Range*	Temperature Class	Assigned Maximum surface Temperature	Maximum Current
TX4705 & TX4706	-20°C to +40°C	T6	T85°C	268 A
TX4705P	-40°C to +60°C	T4	T135°C	128 A
TX4705LT & TX4706LT	-40°C to +40°C	T6	T85°C	268 A
TX4705FO (Ex op is)	-40°C to +40°C	T6	T85°C	134 A
TX4705 & TX4706	-20°C to +50°C	T6	T85°C	134 A

* When the component approved connector and adapter arrangements are used, the minimum ambient temperature shall be no lower than -20°C, and the maximum ambient temperatures are as defined above, but shall be no greater than +55°C

Cable entry holes are provided, for the accommodation of suitably certified flameproof entry devices. Unused entries are to be fitted with suitably approved flameproof stopping plugs.

Suitable flameproof entry devices, thread adapters and stopping plugs which are suitably certified as equipment may also be used in the manner specified above. On the TX4705, as an alternative to cable gland entries, an adapter and connector arrangement may be used.

Description of Unit TX4707:

The Type TX4707 Slip Ring Unit is similar in construction to the TX4705 unit, but is of a more compact design.

The Type TX4707 Slip Ring Unit comprises a machined housing incorporating two rolling element bearings and a flange manufactured from aluminium or stainless steel with a stainless steel fabricated/welded cover of length 53 mm, enclosing two slip rings and associated brush gear. Cable gland entries are provided in the housing and the flange. As an alternative to cable gland entries, an adapter and connector arrangement may be used.

The slip rings are individually rated up to 2000 V, with a maximum throughput of 16 A. The following marking applies to this model:

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Type	Ambient Range*	Temperature Class	Assigned Maximum surface Temperature	Maximum Current
TX4707	-40°C to +60°C	T6	T85°C	16 A

* When the component approved connector and adapter arrangements are used, the ambient temperature range shall be limited to -20°C to +55°C.

Conditions of Manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

- i. Where the product incorporates certified parts or safety critical components the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate.
- ii. Each unit shall be subjected to a routine overpressure test in accordance with EN 60079-1, clause 16, at the following pressures:

Model	Pressure
TX4701 to TX4704 and TX4705X-FCS when marked -20°C	8.7 bar
TX4701 to TX4704 and TX4705X-FCS when marked -40°C	39.3 bar
TX4705*, TX4706 & TX4707* * Without component approved plug/socket arrangement fitted)	39.3 bar
TX4705 & TX4707 (with component approved plug/socket arrangement fitted)	7.8 bar

The pressure shall be held for at least 10 seconds. There shall be no permanent deformation or damage to the enclosure.

- iii. When the component approved plug/socket arrangements are used as entry devices, the marked maximum electrical ratings of the equipment shall not exceed the limits defined on the component certificates for the plugs/sockets.
- iv. Factory fitted cable glands and cable shall be installed in accordance with EN 60079-14 and shall be suitable for the service temperature range.
- v. The length of the enclosure of the TX4705 shall be no greater than 100 mm when the component approved plug/socket arrangements are fitted.

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Specific Conditions of Use

The following conditions relate to safe installation and/or use of the equipment.

- i. The integral cables, when fitted, shall be protected against impact and be terminated in a suitable junction facility.
- ii. For slip ring units carrying intrinsically safe circuits:
 - The voltage of each intrinsically safe circuit and between separate intrinsically safe circuits shall not exceed 60 V
 - The sum of the maximum peak voltages of intrinsically safe and non-intrinsically safe circuits shall not exceed 1575 V
 - Each intrinsically safe circuit shall be separately screened
- iii. Units fitted with a connector certified under Baseefa 06ATEX0305U or Baseefa 06ATEX0306U shall also be fitted with either the associated plug or blanking cover.
- iv. For slip ring units incorporating the fibre optic rotary joint; the optical power is to be limited to a radiated power of less than 35 mW and a peak power density of less than 5 mW/mm², as defined by EN 60079-28.

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