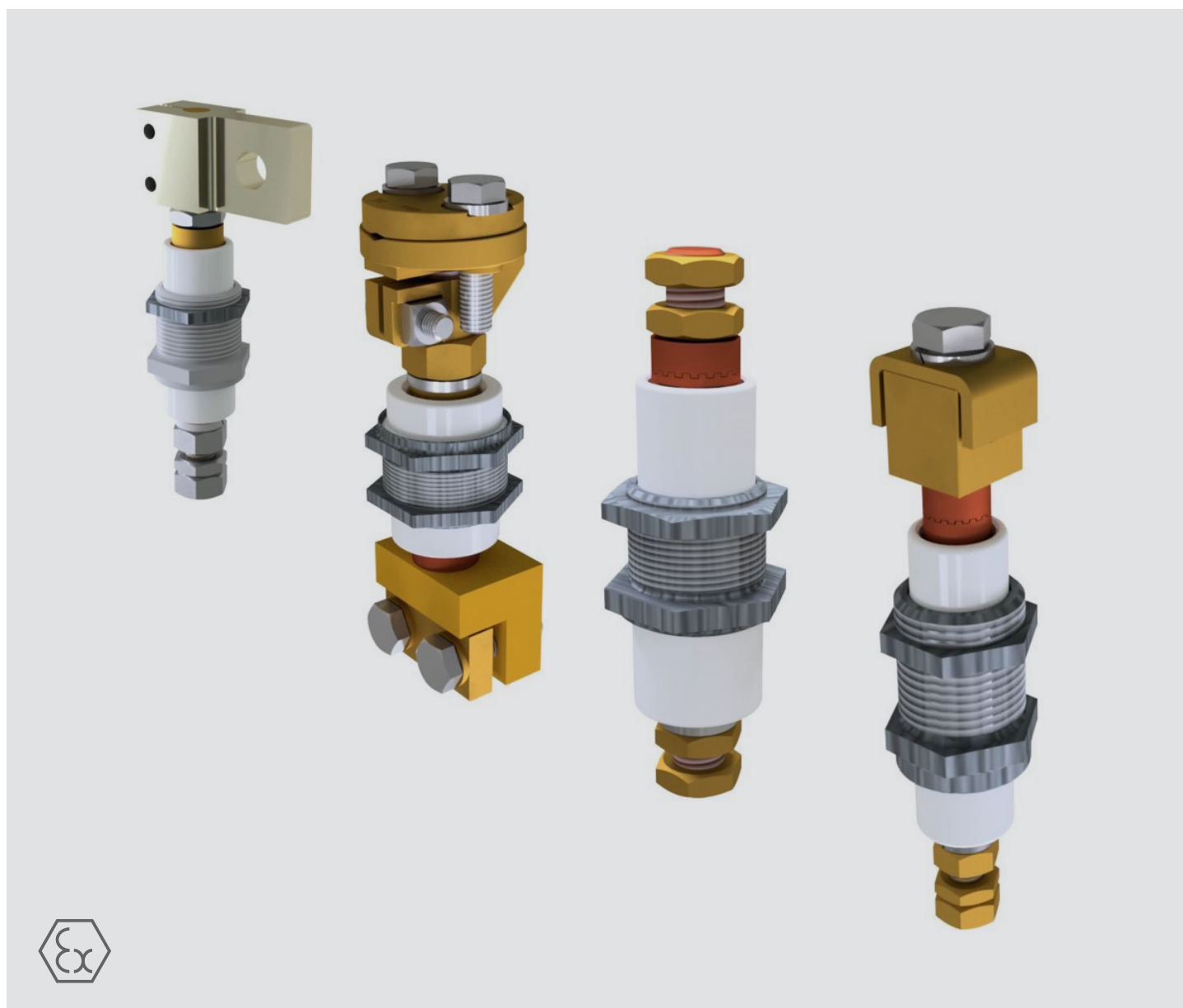


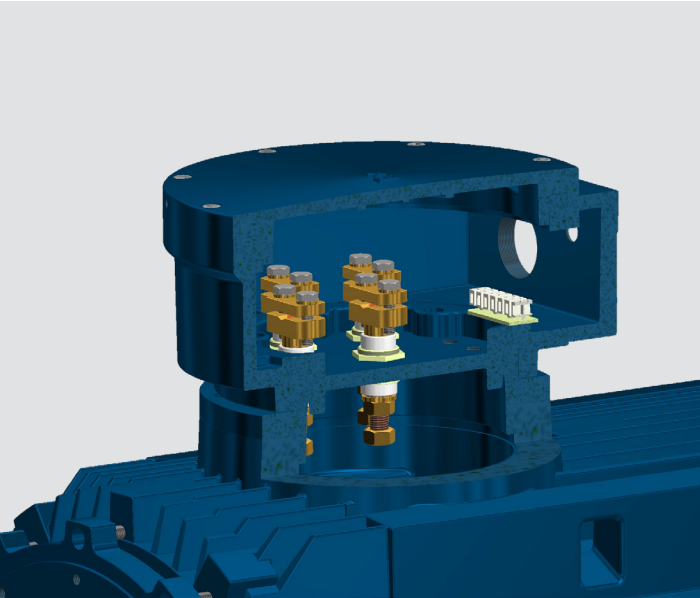
TOS-series

flameproof enclosures and increased safety solutions type TOS***A.***V



TOS-series

flameproof enclosures and increased safety solutions type TOS***A.***V



The maximum current carrying capacity of the bushing conductor stud and the connecting cores has to be established on the basis of the self-heating rate and the heating rate of the enclosure at the place of installation the maximum permissible ambient temperature.

*) depending on the type and version of the cable bushing and the connection head.

Notes for manufacturing and operation

The threaded holes receiving the bushings with their screw thread have to meet the minimum requirements as set forth in EN 60079-1. section 5.3 (table 4).

These bushings are suited for use in electrical equipment designed to Flameproof Enclosure “d” type of protection of groups I, IIA, IIB or IIC.

Flameproof bushing, type: TOS***A.***V, is intended for electrical connection between flameproof enclosures or between flameproof enclosure and enclosure in type of protection increased safety. Wiring connection on the flameproof side shall be performed by brazing or welding, wiring connection on the increased safety side shall be performed by A, C, F, FL, R or RF terminal.

The bushings have to be fixed in the electrical equipment so that rotation and accidental loosening will be prevented. The bushing must be connected in enclosures that comply with a standardised type of protection as set for in EN 60079-0, section 1. The bushing is a structural unit. The reproducible assembly and the installation conditions have been documented. According to EN 60079-1, section 16.2, routine testing together with the flameproof enclosure as required in section 16.1 is therefore, not required.

The component can be used in both group I and group II, because the requirements of the standard are in this case identical. The classification of the temperatures to the temperature class of the cable bushing has to be laid down during the type test of the respective electrical equipment.

Explosion protection

Ex protection type	Ⓜ II 2G Ex db eb IIC Gb Ⓜ I M2 Ex db eb I Mb
Certification	SIQ 22 ATEX 275 U IECEX SIQ 13.0001 U
Temperature range	At the place of installation by rated operation of the electrical apparatus. -55 °C to +130 °C

The maximum current carrying capacity of the bushing conductor stud and the connecting leads shall be established on the basis of the self-heating rate and the enclosure heating rate at the place of installation starting from the maximum permissible ambient temperature.

Technical data

Protection class	EN 60079-0; EN 60079-1; EN 60079-7
Material	Insulation ceramic: C610 Stud: 16 A to 250 A CuZn39Pb2, CuZn39Pb3 400 A to 630 A E-Cu
Current	16 A to 630 A
Voltage	690 V, 1000 V and 1600 V
Connection	1.5 mm² to 300 mm²
Stud size	4 mm to 20 mm
Thread size	M16 x 1.5 to M48 x 1.5

Type	Sleeve size	Diameter thread of the stem	Rated Current [A]	Rated voltage [V]	Cross sections [mm²]					
		DIN 46200								
TOS4.16A.690V	M16 x 1.5	M4	16	690	1.5-6	A	2.5-25	2.5-25	C	
TOS5.25A.690V	M18 x 1.5	M5	25	690	2.5-10					
TOS6.63A.690V	M20 x 1.5	M6	63	690	2.5-16					
TOS8.100A.690V	M24 x 1.5	M8	100	690			6-50	4-35		
	M26 x 1.5									
TOS10.160A.690V	M27 x 1.5	M10	160	690			16-1S5	F FL RF	6-70 or 10-95	
	M30 x 1.5									
TOS12.250A.690V	M33 x 1.5	M12	250	690			10-95		10-95 or 16-150	R
	M36 x 1.5									
TOS16.400A.690V	M36 x 1.5	M16	400	690					16-150 or 16-300	
	M42 x 1.5									
TOS20.630A.690V	M42 x 1.5	M20	630	690			25-300		16-300	
	M48 x 1.5									
TOS4.16A.1000V	M16 x 1.5	M4	16	1000	1.5-6	A	2.5-25	2.5-25	C	
TOS5.25A.1000V	M18 x 1.5	M5	25	1000	2.5-10					
TOS6.63A.1000V	M20 x 1.5	M6	63	1000	2.5-16					
TOS8.100A.1000V	M24 x 1.5	M8	100	1000			6-50	4-35		
	M26 x 1.5									
TOS10.160A.1000V	M27 x 1.5	M10	160	1000			10-95	F FL RF	10-95	
TOS10.200A.1000V	M30 x 1.5									
TOS12.250A.1000V	M33 x 1.5	M12	250	1000			16-1S5		16-150	R
TOS12.315A.1000V	M36 x 1.5									
TOS16.400A.1000V	M36 x 1.5	M16	400	1000					16-300	
	M42 x 1.5									
TOS20.630A.1000V	M42 x 1.5	M20	630	1000			25-300		16-300	
	M48 x 1.5									
TOS4.16A.1600V	M16 x 1.5	M4	16	1600	1.5-6	A	2.5-25	2.5-25	C	
TOS5.25A.1600V	M18 x 1.5	M5	25	1600	2.5-10					
TOS6.63A.1600V	M20 x 1.5	M6	63	1600	2.5-16					
TOS8.100A.1600V	M24 x 1.5	M8	100	1600			6-50	4-35		
	M26 x 1.5									
TOS10.160A.1600V	M27 x 1.5	M10	160	1600			10-95	F FL RF	10-95	
	M30 x 1.5									
TOS12.250A.1600V	M33 x 1.5	M12	250	1600			16-1S5		16-150	R
	M36 x 1.5									
TOS16.400A.1600V	M36 x 1.5	M16	400	1600					16-300	
	M42 x 1.5									
TOS20.630A.1600V	M42 x 1.5	M20	630	1600			25-300		16-300	
	M48 x 1.5									
F	Flat terminal									
FL	Flat L terminal									
RF	Round F terminal									
R	Round terminal									
A	Angular terminal									
C	Joint clamp terminal									

Schedule of Limitations

- If the reference pressure exceeds 32 bar or the free volume of the flameproof enclosure in which the bushing is installed is more than 90 dm3 , the bushing shall be included into the type test according to EN IEC 60079-1:2014, section 15.2.3 (overpressure test) as required by the classification of the electrical apparatus which will include this bushing (grouping I, IIA, IIB, IIC).
- Creepage distances and clearances between the bushing’s wiring and the enclosure arts in type of protection increased safety must be kept according to EN IEC 60079-7:2015, Table 2.
- Flameproof joints of the bushing do not comply with the values specified in the IEC 60079-1:2014 (minimum length of joint is greater than the relevant minimum and maximum gap is less than the relevant maximum). Repair on flameproof joints may only be performed in accordance with the manufacturer’s design specifications.

Maintenance

To form part of maintenance and servicing measures taken for the equipment for which the flameproof conductor bushings are used.

Recommended action:

Depending on the prevailing ambient and operating conditions, all components shall be regularly checked for proper service conditions. Any components and Ex-type elements found not to be without fault shall be replaced or returned to the manufacturer for repair.

Safety Notes

Explosion protection is safeguarded for the **flameproof conductor bushings** only when they are left in their original condition.

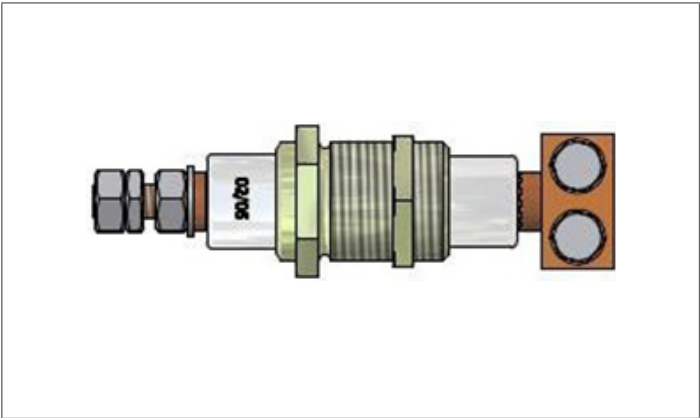
Explosion protection is not or no longer guaranteed if:

- The insulator is damaged, torn, or has come off,
- The thread of the screwed sleeve is damaged,
- The gap surface of the terminal stud has been modified (e.g. machined or damaged),
- The threads have not been tightened as specified, i.e. the torque set forth in the standard has not been complied with,
- The components and Ex-type elements have not been secured to prevent accidental loosening.

For technical reasons, any repairs required must be made by the manufacturer.

For the complete technical data, reference is made to the EC type-examination certificate.

Tightening torque values for connection facilities



For fastening bushing and electrical connections must be applicable the following torque limits.

Threaded joints for electrical connections

Thread	Tightening torque (Nm)
M4	1.2
M5	2
M6	3
M8	6
M10	10
M12	15.5
M16	30
M20	52

Assembly torque limits for bushing TOS

Thread	Tightening torque (Nm)
M16 x 1.5	1.4
M18 x 1.5	2.4
M20 x 1.5	3.6
M24 x 1.5	7.2
M27 x 1.5	12
M33 x 1.5	18
M36 x 1.5	36
M42 x 1.5	60
M48 x 1.5	90

How to correctly tighten cable lug between two screw nuts using two wrenches

At assembly of cable lugs the workers must take care when they tighten the cable lug between two screw nuts, that they use two wrenches (look below picture):



If the worker will use only one wrench, as example torque wrench or even ordinary wrench where the torque cannot be adjusted to prescribed torque, then the TOS bolt can be damaged, because the bolt is already axially loaded with spring washer and if you use only one wrench, you apply additional torque on the bolt – in such cases, the bolt could break if the torque is too high.

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