Isolating spark gaps at an additional earth ring conductor

Isolating spark gaps for Ex zones

For use at roof supports for overhead lines

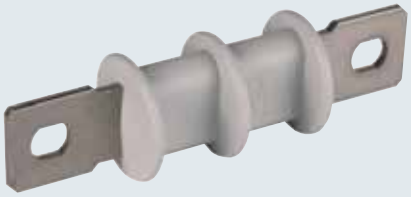
- **For indirect connection of a roof support for overhead lines to the external lightning protection system**
- **Corrosion-resistant stainless steel connections**

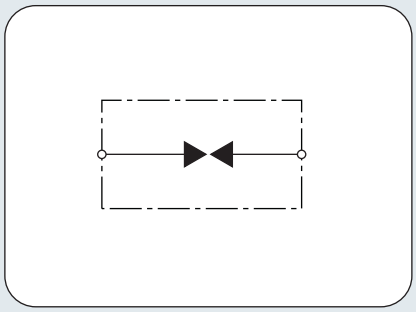
For indirect connection of a roof support for overhead lines with the external lightning protection system in accordance with IEC 62305

DSFS: Protective spark gap, closed unit

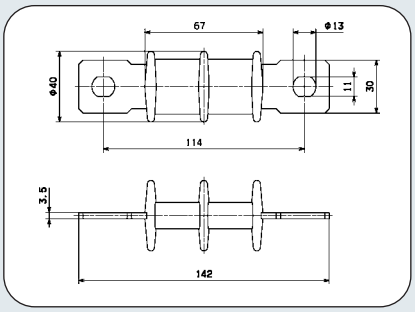
The function of the DSFS spark gap for roof supports is the indirect connection of a roof support for overhead lines to the external lightning protection system in accordance with IEC 62305.

DSFS





Basic circuit diagram DSFS



Dimension drawing DSFS

DSFS: Plastic-insulated protective spark gap for indirect connection of a roof support for overhead lines to the external lightning protection system

	DSFS
100% Lightning impulse sparkover voltage (1.2/50 µs) U_{as100}	~ 25 kV
Nominal discharge current (8/20 µs) I_n	25 kA
Degree of protection	IP 54
Power frequency sparkover voltage (50 Hz) U_{aw}	~ 10 kV
Material (connection)	stainless steel (V2A)
Connection	slot Ø13x11 mm
Coating material	plastic
Ordering information	
Type	DSFS
Part No.	**920 000**
Packing unit	1 pc(s)

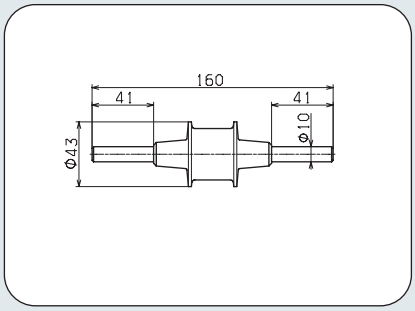
Isolating Spark Gaps
For lightning equipotential bonding

For lightning equipotential bonding according to IEC 62305 as well as for use in IT installations according to IEC 60364-5-54.

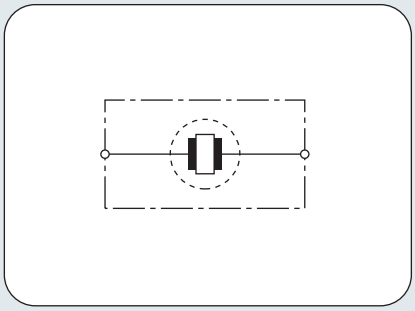
- For indirect connection/earthing of functionally separate parts of installations when being affected by lightning
- For use in correspondence with lightning equipotential bonding according to IEC 62305
- With corrosion-resistant stainless steel connections
- For mounting inside of buildings, outdoors, in damp rooms as well as for underground installation
- Extremely loadable unit

TFS: **High-capacity isolating spark gap**
KFSU: **Isolating spark gap**

TFS / KFSU



Dimension drawing TFS / KFSU



Basic circuit diagram TFS / KFSU

TFS / KFSU: Isolating spark gaps with plastic coating and 2 connections Rd 10 mm made of stainless steel

	TFS	KFSU
Lightning impulse current (10/350 µs) I_{imp}	100 kA	—
Classfication of lightning current carrying capability acc. to EN 50164-3	H	—
Nominal discharge current (8/20 µs) I_n	100 kA	100 kA
100% Lightning impulse sparkover voltage U_{as} 100	≤ 4 kV	≤ 4 kV
Power frequency sparkover voltage (50 Hz) U_{aw}	≤ 2.5 kV	≤ 2.5 kV
Operating temperature range T_U	-20°C...+80°C	-20°C...+80°C
Degree of protection	IP 65	IP 65
Length	160 mm	160 mm
Diameter of enclosure	43 mm	43 mm
Enclosure material	steel-plastic coating	steel-plastic coating
Connection	Rd 10 mm	Rd 10 mm
Material (connection)	stainless steel	stainless steel
Ordering information		
Type	TFS	KFSU
Part No.	**923 023**	**923 021**
Packing unit	1 pc(s)	1 pc(s)

For hazardous areas

- For indirect connection/earthing of functionally separate parts of installations when being affected by lightning
- Unit for lightning equipotential bonding according to IEC 62305 for hazardous areas (Zone 2)
- Corresponds to “ATEX Directive” 94/9/EC
- Corrosion-resistant enclosure of zinc die casting with plastic cover and flexible conductor connection
- For bridging insulating pieces, insulating flanges, etc. in cathodic protected pipe sections
- Highly loadable unit

ATEX-certified isolating spark gap for lightning equipotential bonding according to IEC 62305, approved unit with flexible conductor connection

EXFS L ...: Isolating spark gap for hazardous areas with flexible connecting cable

EXFS KU: Isolating spark gap for hazardous areas with 1.5 m connecting cables for underground installation

The Ex isolating spark gaps of the EXFS L / EXFS KU product family are used for conductive system parts which cannot be interconnected directly in hazardous zones. This affects, for example, pipe sections supplied with a cathodic corrosion protection system.
The spark gaps EXFS L and EXFS KU certified by ATEX provide approved and tested safety according to harmonised European standards.
The arc-resistant tungsten-copper electrodes ensure a long service life of the Ex spark gaps.
The approved type EXFS L with flexible conductor connection adjusts itself quickly to any application environment. The prewired spark gaps include connecting cables with different lengths with cable lugs, M10 screws and nuts. The flat or angled connection brackets (IF), which are available as accessories, allow for easy connection of the spark gap at pipeline flanges.
The EXFS KU type is enclosed by a damp-proof PVC enclosure and can be ideally used for underground installation at insulating couplings.

Prüf- und Zertifizierungsstelle
ZELM Ex

(1) CONFORMITY STATEMENT

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - Directive 94/9/EC

(3) Test Certificate Number:
ZELM 03 ATEX 3192X

(4) Equipment: Spark-gap ExFs, Art.No. : 923060, 923061, 923062 and Type Ex-Fs-KU, Art.-No. 923 019

(5) Manufacturer: DEHN+SÖHNE GmbH + Co. KG

(6) Address: D-92318 Neumarkt/Opf.

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Prüf- und Zertifizierungsstelle ZELM Ex, notified body No. 0820 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the confidential report ZELM Ex 1090315264.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 50 014: 1997+A1+A2 EN 50 021: 1999

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This Conformity Statement relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this Statement.

(12) The marking of the equipment shall include the following:
Ex II 3 G EEx nC II T4

Zertifizierungsstelle ZELM Ex — Braunschweig, February 27, 2004

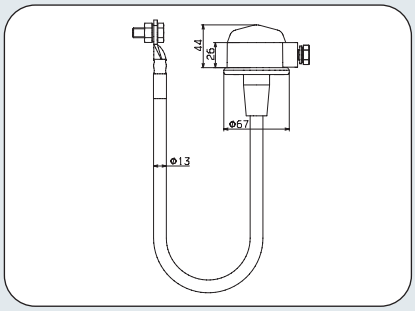
Adolf Gruber

Sheet 1/2

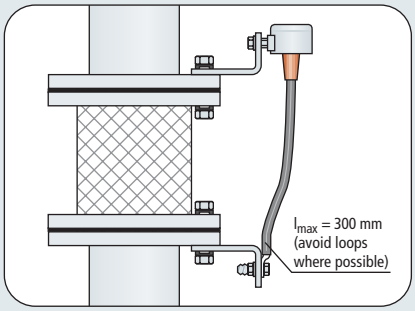
Conformity Statements without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex.
This English version is based on the German text. In the case of dispute, the German text shall prevail.

Prüf- und Zertifizierungsstelle ZELM Ex • Steigraben 36 • D-38124 Braunschweig

EXFS L



Dimension drawing EXFS



Installation of EXFS

EXFS L ...: Ex Isolating spark gap for aboveground installation

	EXFS L100	EXFS L200	EXFS L300
Lightning impulse current (10/350 µs)	50 kA	50 kA	50 kA
Classfication of lightning current carrying capability acc. to prEN 50164-3	N	N	N
Nominal discharge current (8/20 µs)	100 kA	100 kA	100 kA
100% lightning impulse sparkover voltage	≤ 2.5 kV	≤ 2.5 kV	≤ 2.5 kV
Power frequency sparkover voltage (50 Hz)	≤ 1.2 kV	≤ 1.2 kV	≤ 1.2 kV
Type of protection according to EN 50014, EN 50021	Ex II 3 G EEx nC II T4	Ex II 3 G EEx nC II T4	Ex II 3 G EEx nC II T4
Operating temperature range T_U	-20°C...+80°C	-20°C...+80°C	-20°C...+80°C
Degree of protection	IP 54	IP 54	IP 54
Approvals, Certifications	ZELM 03 ATEX 3192X	ZELM 03 ATEX 3192X	ZELM 03 ATEX 3192X
Length of enclosure	90 mm	90 mm	90 mm
Diameter of enclosure	63 mm	63 mm	63 mm
Enclosure material	zinc die casting, plastic	zinc die casting, plastic	zinc die casting, plastic
Connecting cable		H01N2-D 25 mm² with cable lug and M10 screw / nut	
Cable length	100 mm	200 mm	300 mm
Suitable for flange size	20-130 mm	120-230 mm	220-320 mm
Ordering information			
Type	EXFS L100	EXFS L200	EXFS L300
Part No.	**923 060**	**923 061**	**923 062**
Packing unit	1 pc(s)	1 pc(s)	1 pc(s)

Accessory Part for EXFS L / EXFS KU

Pair of Angled Connection Brackets – IF 1 –

Pair of angled connection brackets for EXFS ...;

Diameter corresponds to bolt diameter of the flange screw joint (d1 possible up to max. 60 mm)

Type	Material	PU Pair	Part No.
IF1	St/tZn	1	**923 011**

Accessory Part for EXFS L / EXFS KU

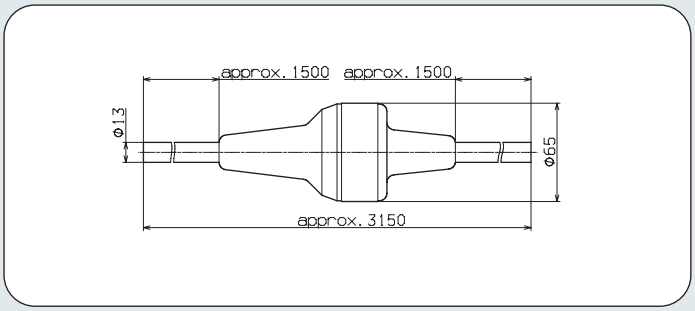
Pair of Flat Connection Brackets – IF 3 –

Pair of flat connection brackets for EXFS ...;

Diameter corresponds to bolt diameter of the flange screw joint (d1 possible up to max. 60 mm)

Type	Material	PU Pair	Part No.
IF3	St/tZn	1	**923 016**

EXFS KU



Dimension drawing EXFS KU

EXFS KU: Ex Isolating spark gap with connecting cables for above- and underground installation

EXFS KU	
Lightning impulse current (10/350 µs)	50 kA
Classfication of lightning current carrying capability acc. to prEN 50164-3	N
Nominal discharge current (8/20 µs)	100 kA
100% lightning impulse sparkover voltage	≤ 2.5 kV
Power frequency sparkover voltage (50 Hz)	≤ 1.2 kV
Type of protection according to EN 50014, EN 50021	Ex II 3 G EEx nC II T4
Operating temperature range T_U	-20°C...+80°C
Degree of protection	IP 67
Approvals, Certifications	ZELM 03 ATEX 3192X
Length of enclosure	90 mm
Diameter of enclosure	63 mm
Enclosure material	zinc die casting, plastic
Connecting cable	NYY-J-1x25 mm²
Cable length	2 x approx. 1500 mm
Ordering information	
Type	EXFS KU
Part No.	**923 019**
Packing unit	1 pc(s)

EXFS C1 / EXFS C1 KU

For hazardous areas

ATEX-certified isolating spark gap for lightning equipotential bonding according to IEC 62305 with low sparkover voltage.

- **For indirect connection/earthing of functionally separate parts of installations when being affected by lightning**
- **Unit for lightning equipotential bonding according to IEC 62305 in hazardous areas**
- **For bridging insulating pieces, insulating flanges, etc. in pipe sections protected against cathodic corrosion**
- **Especially low sparkover voltage**
- **Unit with extremely high loadability and fail-safe performance**

EXFS C1: **Isolating spark gap for hazardous areas with threaded M10 bolt and nut**

EXFS C1 KU: **Isolating spark gap for hazardous areas with 2 m connecting cables for underground installation**

Prüf- und Zertifizierungsstelle

ZELM Ex

(1) **EC-TYPE-EXAMINATION CERTIFICATE**

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-TYPE-EXAMINATION CERTIFICATE Number:

ZELM 02 ATEX 0096X

(4) Equipment: **Spark-gap type ExFS C1**

(5) Manufacturer: **DEHN + SÖHNE GmbH + Co. KG.**

(6) Address: **D-92318 Neumarkt**

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Prüf- und Zertifizierungsstelle ZELM Ex, notified body No. 0820 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report ZELM Ex 0410215130

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 014: 1997 +A1+A2 **EN 50 028: 1987**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this Certificate.

(12) The marking of the equipment shall include the following:

Ex **II 2 G EEx m II T3**

Zertifizierungsstelle ZELM Ex

Braunschweig, July 15, 2002

Adolf Gruber

ZELM Ex

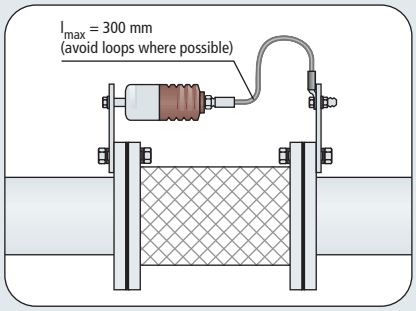
Sheet 1/2

EC-type-examination Certificates without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex.
In the case of dispute, the German text shall prevail.

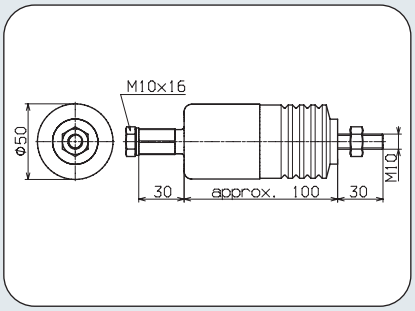
Prüf- und Zertifizierungsstelle ZELM Ex • Siekgraben 56 • D-38124 Braunschweig

The Ex isolating spark gaps of the EXFS C1 / EXFS C1 KU product family are used when conductive parts of installations situated in hazardous areas cannot be connected directly.
The low sparkover voltages of the spark gaps have proved themselves for protection when the separate installation parts had only a low insulation resistance against each other.
The ATEX-certified spark gaps EXFS C1 / EXFS C1 KU provide approved safety according to harmonised European standards.
The powerful Ex isolating spark gaps are supplied with a fail-safe device, which establishes a safe operating state (short circuit) even in case of overloads.
For connecting EXFS C1 spark gaps, prewired connecting cables with different lengths are available as accessories.
Flat and angled connection brackets (IF) make it easier to connect the spark gaps to pipe flanges.
Type EXFS C1 KU is enclosed by a damp-proof plastic coating. Therefore, it is ideal for underground installation at insulating couplings.

EXFS C1



Type EXFS C1



Dimension drawing EXFS C1

EXFS C1: Ex Isolating spark gap made of stainless steel for aboveground installation

EXFS C1	
Lightning impulse current (10/350 µs)	75 kA
Classfication of lightning current carrying capability acc. to prEN 50164-3	N
Nominal discharge current (8/20 µs)	100 kA
100 % Lightning impulse sparkover voltage	≤ 0.95 kV
Power-frequency sparkover voltage (50 Hz)	≤ 0.07 kV
Type of protection according to EN 50014, EN 50021	Ex II 2 G EEx m II T3
Operating temperature range T_U	-25°C...+80°C
Degree of protection	IP 67
Approvals, Certifications	ZELM 02 ATEX 0096X
Length of enclosure	160 mm
Diameter of enclosure	50 mm
Enclosure material	stainless steel / plastic
Connection of enclosure	hexagon screw M10x16 mm and M10 nut

Ordering information	
Type	EXFS C1
Part No.	**923 070**
Packing unit	1 pc(s)

Accessory Part for EXFS C1 / EXFS C1 KU

Connecting Cable Cu 25 mm²

Connecting cable for EXFS C1;

With cable lug Ø10.5 mm, M10 hexagon screw and nut, StSt (V2A) and spring washer

Type	Material	Cross section	Cable length	PU pc(s)	Part No.
AL EXFS L100	Cu/gal Sn	25 mm²	100 mm	1	**923 026**
AL EXFS L200	Cu/gal Sn	25 mm²	200 mm	1	**923 036**
AL EXFS L300	Cu/gal Sn	25 mm²	300 mm	1	**923 046**

Accessory Part for EXFS C1 / EXFS C1 KU

Pair of Angled Connection Brackets – IF 1 –

Pair of angled connection brackets for EXFS ...;

Diameter corresponds to bolt diameter of the flange screw joint (d1 possible up to max. 60 mm)

Type	Material	PU Pair	Part No.
IF1	St/tZn	1	**923 011**

Pair of Flat Connection Brackets – IF 3 –

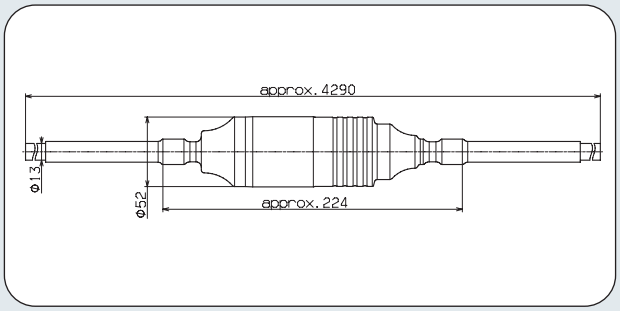
Pair of flat connection brackets for EXFS ...;

Diameter corresponds to bolt diameter of the flange screw joint (d1 possible up to max. 60 mm)

Type	Material	PU Pair	Part No.
IF3	St/tZn	1	**923 016**

EXFS C1 / EXFS C1 KU

EXFS C1 KU



Dimension drawing EXFS C1 KU

EXFS C1 KU: Ex Isolating spark gap with connecting cable for above- and underground installation

	EXFS C1 KU
Lightning impulse current (10/350 µs)	75 kA
Classfication of lightning current carrying capability acc. to prEN 50164-3	N
Nominal discharge current (8/20 µs)	100 kA
100 % Lightning impulse sparkover voltage	≤ 0.95 kV
Power-frequency sparkover voltage (50 Hz)	≥ 0.07 kV
Type of protection according to EN 50014, EN 50021	Ex II 2 G EEx m II T3
Operating temperature range T_U	-25°C...+80°C
Degree of protection	IP 67
Approvals, Certifications (EXFS C1)	ZELM 02 ATEX 0096X
Length of enclosure	160 mm
Diameter of enclosure	50 mm
Enclosure material	stainless steel / plastic
Connection of enclosure	NYY-J-1x25 mm², approx. 2 m long

Ordering information	
Type	EXFS C1 KU
Part No.	**923 071**
Packing unit	1 pc(s)