

ROLLING STOCK

## ESF-S / CCS Pluggable cable termination

 **ALPHA-ET**

Current and voltage – our passion



## General description

### CCS cable termination

The CONNEX Connection System is a dry pluggable cable termination for cable to cable connections of all kind. The connectors on the equipment-side are designed to meet EN 50180, 50181, and DIN 47637. The plug is suitable for all kinds of insulated cables.

### ESF-S cable termination

The ALPHA cable termination ESF type S is a dry, pluggable cable termination made of a CCS-plug. It consists partly of prefabricated, slip-on silicone rubber plug and partly of a silicone rubber insulator bushing with a flange for mounting. The use of a pluggable silicone rubber termination is ideal for all applications to separate the power cable and its connection. In the rolling stock business this is often required for transformer cables which lead to a removable roof. The tested and applied silicone rubber material complies with all electrical, mechanical and also thermal requirements of the cable.

### Special characteristics

The plug and its associated bushing are made of high grade silicone rubber which is cast with the CONNEX-connector. The resultant elasticity enables the termination to accept diameter tolerances as well as

changes in cable diameter caused by variations in load. The low Shore A hardness of the silicone rubber material prevents constriction of the core insulation even under high alternating load, while allowing it to adapt to any unevenness in the stripped core insulation. This prevents formation of cracks. This termination system ensures high operating reliability and is also absolutely maintenance free. The proven slip-on technique requires little assembly work and minimises the fitting risk.

### Contamination class

In addition to its outstanding mechanical and electrical characteristics, silicone rubber is distinguished by its ideal properties against atmospheric pollution. Silicone rubber terminations have been used successfully throughout the world since 1974 under the most severe climatic conditions.

### Application

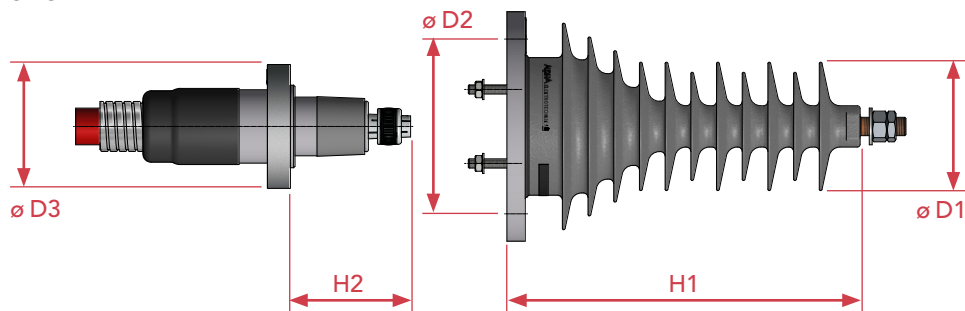
The CCS can be mounted on any polymeric cables (PE, XLPE, EPR) with copper conductors. The terminations ESF-R/D comply with the fire protection standard EN 45545-2:2013, required in the Rolling Stock business.

## Benefits ESF-S/CCS

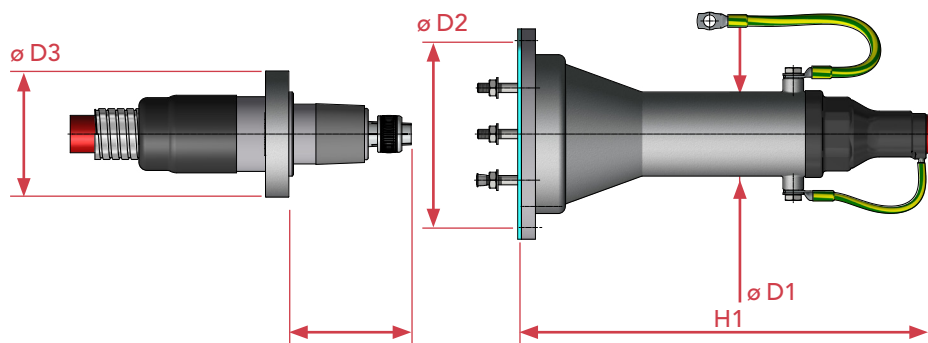
- Cable cross-section 50–240 mm<sup>2</sup>
- Temperature range from -55 °C to +130 °C.
- Both, ESF-S and CCS satisfy the requirements of the fire protection standard EN 45545-2:2013.
- Routine test of all assembled cables: AC/DC voltage withstand test according to the standard DIN EN 50124-1:2006-04 and partial discharge test according to the standard IEC 60270:2000 (<10 pC for each assembled cable).
- Maintenance free ESF-S and CCS cable termination guarantees low life-time costs.

# Technical data

ESF-S



CCS



Type		ESF-S	CCS
Rated voltage	kV	25	25
Maximum operating voltage	kV	36	42
Operating temperature	°C	-55 ... +130	-55 ... +130
Cable cross section	mm	50-240	50-240
Weight	kg	8.2	9.6
Lightning impulse withstand voltage	kV	200	200
Power frequency withstand voltage	kV	95	95
Creepage distance	mm	1035	-
Rating current	A	800	800
Partial discharge (per terminantion)	pC	< 10 at 30kV	< 10 at 30kV
DC voltage test	kV	-	125
Nominal impulse current	kA	-	125
Rated short-time withstand current 0.5s / 1s	kA	-	50/40
H1	mm	385	450
H2	mm	132	132
D1	mm	140	90
D2	mm	Ø 220 / 6x Ø 11	*
D3	mm	135	135

\* according customer requirements

# Highlights



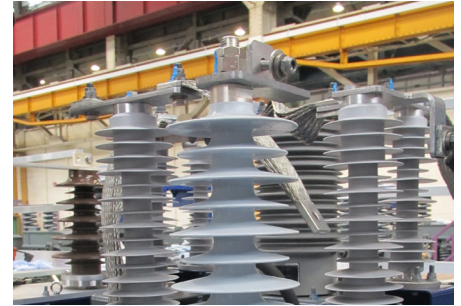
## Easy installation – secure connectivity

- The pluggable connection allows easy assembly within a few minutes.
- The threaded bolts guarantee a secure and maintenance free connection.
- Easy disassembly and reassembly whenever needed.
- The flange of the plug is freely rotatable.



## CCS-Plug for fully insulated car to car connection

- The ALPHA CCS-termination is mainly used for fully insulated car to car connections.
- The System allows an easy replacement of the jumper-cable
- Successfully installed in several train compositions like:  
Bombardier: TWINDEXX SBB, ZEFIRO  
ETR 1000, ZEFIRO China



## ESF-S for pluggable connection through the roof

- The main application for the ALPHA ESF-S cable termination is the pluggable connection through a removable roof.
- The rigid cable termination allows a simple continuation of the HV-cabling.
- Successfully proven in several locomotives like:  
Alstom: KZ4A, KZ8A



# ALPHA-ET

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## Member of PFIFFNER Group

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DISCONNECTORS

