

INNER CONE CONNECTORS

Type CPI, SPI and FPI



Completing the picture

nkt cables GmbH

1999 NKT A/S, Denmark, merged with Felten & Guillaume Kabelwerke GmbH in Germany to form nkt cables group GmbH with headquarters in Cologne. **nkt cables group GmbH** is owned by NKT Holding A/S, an industrial group of companies employing some 9.000 people.

Developing and manufacturing of house service boxes, cable distribution cabinets and cable accessories up to 145 kV is one of the core businesses of nkt cables group GmbH, Nordenham. Since more than 60 years seat Nordenham, Germany (formerly F&G Kabelgarnituren GmbH) is one of the world market leaders in power cable accessories.

As the first company introducing silicone rubber terminations already in the sixties, **nkt cables GmbH**, Nordenham is specialized in production of silicone rubber power cable accessories. The product range covers cable joints, cable connectors for SF6-switchgears and transformers as well as indoor- and outdoor terminations. Tailored products are complementing the product spectrum, e.g. the bus bar system for interconnection of SF6-switchgears, which was established in 1993. Additionally a large assortment of accessories is available.

In our housing department cable distribution cabinets, metering pillars, house service boxes, street lightning cabinets and ready solutions for controlling, traffic lights and many more applications were produced.

Silicone rubber

Silicone rubber is a preferred material for cable accessories due to its excellent mechanical and electrical properties.

For more than 40 years silicone has been used successfully as high-quality electrical insulation for voltages up to 400 kV.

Silicone rubber features high quality electrical insulation, superior corona and tracking resistance, combined with high elasticity. It facilitates multi range application, where one silicone rubber body can be used for various conductor cross sections. Optimal flexibility ensures easy assembly of the accessories.

Outstanding features of the silicone rubber insulation material are:

- UV and ozone resistance
- durable water rejection
- weather and aging resistance
- non-flammable, self-extinguishing, heat resistant
- applicable for use at temperatures between -50° C and +180° C
- high elasticity
- high tracking resistance
- unlimited storage life
- friendly to the environment

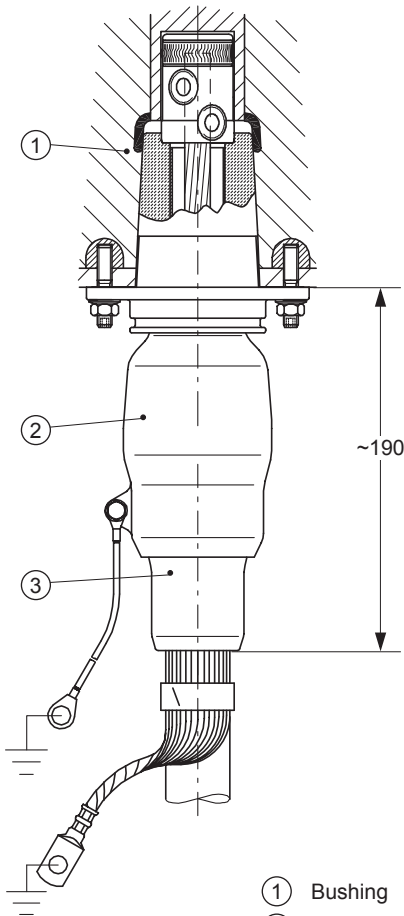


Connector Plug In up to 42 kV

CPI 2

CPI 2 is a screened inner cone cable connector made of silicone rubber for cable connection to switchgear (RMU) and transformers up to 42 kV with bushings size 2 according to EN 50180/50181.

- unique connector casing for 25 up to 300 mm²
- assembling without specially tools
- quick and easy assembly
- compact design
- maintenance free
- connector made from special designed silicone-rubber
 - very high elasticity
 - weather and ageing resistance
 - non-flammable, halogen free
- fully screened by a bonded outer conductive layer of silicone
- integrated stress control system
- max. 4 sizes of stress cones for multirange cable connection
- multirange screw cable lug with contact lamella
- cable sheath testing without dismantling of connector



Size of stress cone	Stretch range Ø over core insulation (mm)	Cross section			
		6 / 10 (12) kV	8.7/15 (17.5) kV	12 / 20 (24) kV	18 / 30 (36) kV
5002	12.7 - 19.2	25 - 70	25 - 50	-	-
5003	17.0 - 24.3	95 - 150	70 - 95	25 - 70	25 - 35
5005	21.2 - 33.6	185 - 300	120 - 240	95 - 240	50 - 120
5027	28.9 - 40,0/44.0*	-	300	300	150 - 300

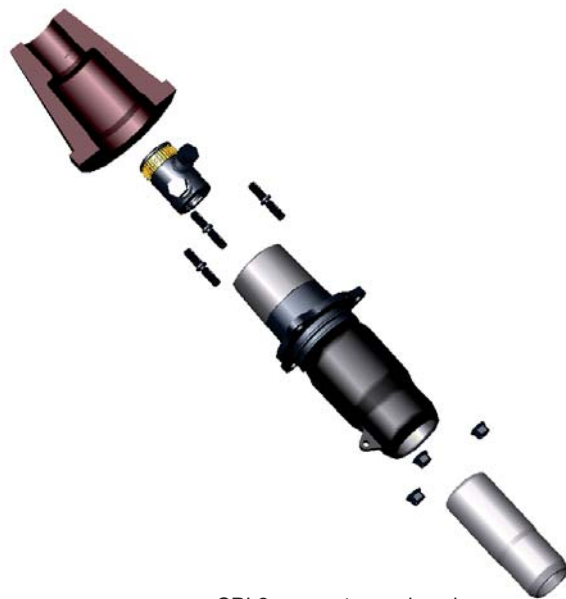
*3-core cables only

- ① Bushing
- ② Connector casing
- ③ Stress cone

Technical Data:

Maximum system voltage	42 kV
Continuous nominal current	800 A
Partial discharge at 2 U ₀	< 5pC
AC withstand voltage, 5 min.	117 kV
DC withstand voltage, 15 min.	125 kV
Impulse withstand voltage	200 kV
Diameter over core insulation	12.7 - 40,0/44.0* mm
Cross section	25 - 300 mm ²
Thermal short circuit	1 sec. 33 kA, 185 mm ² Cu 3 sec. 40 kA, 300 mm ² Cu
Dynamic short circuit	100 kA, 300 mm ² Cu

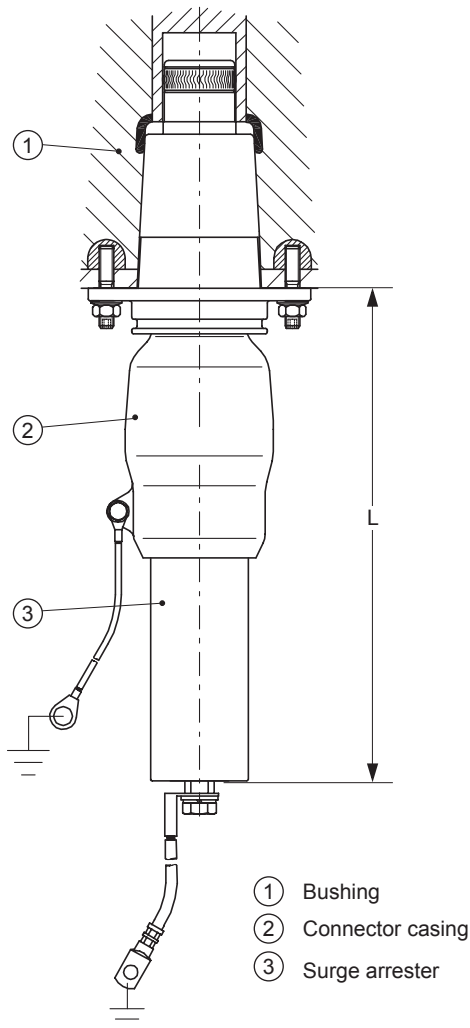
*3-core cables only



CPI 2 connector casing view

Surge arrester

SPI 2



SPI 2 is a screened metal oxide surge arrester with silicone rubber connector for connection to plug in type bushings size 2 acc. EN 50180/50181. Surge arrester protecting medium voltage networks, e. g. transformers, switchgears and cables. Incoming overvoltage waves and voltage increase by reflection are limited. For surge arrester type tests according to IEC 60099-4 are valid.

- compact design
- quick and easy assembly
- assembly without special tools
- fully screened by a bonded outer conductive layer of silicone
- connector made from special designed silicone-rubber
 - very high elasticity
 - weather and ageing resistance
 - non-flammable, halogen free

Arrester housing	$U_c = 24 \text{ kV}$
	$U_r = 30 \text{ kV}$
Impulse voltage 1,2/50 μ s	125 kV
Power frequency voltage	60 kV
Dimension L	340 mm

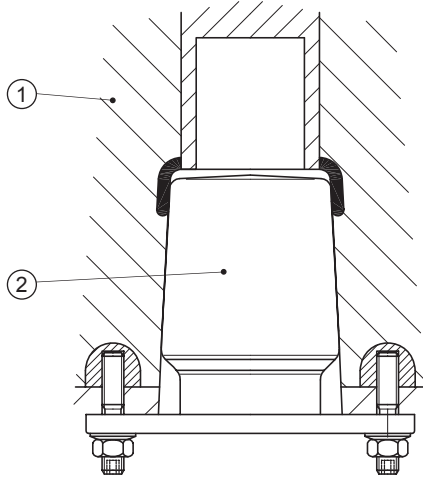
Technical Data:	SPI 2 24-5
continuous operating voltage U_c	24 kV
rated voltage U_r	30 kV
nominal discharge current I_n	5 kA
partial discharge at $1.05 \times U_c$	< 5 pC
residual voltage at:	
- long duration current impulse 125 A, 30/60 μ s	60.6 kV
- lightning current impulse 5/10 kA, 8/20 μ s	79.7 kV
long duration current impulse	150 A
High current impulse	65 kA

Final plug up to 42 kV

FPI 2

FPI 2 is a Final Plug for bushings size 2 according to EN 50180/50181.

- Final Plug complete with metal ring
- assembly without special tools
- Integrated stress control system
- quick and easy assembly



- ① Bushing
- ② Final Plug

Technical Data:

Bushing	Size 2
Maximum system voltage	42 kV
AC withstand voltage, 5 min.	117 kV
DC withstand voltage, 15 min.	125 kV
Impulse withstand voltage	200 kV

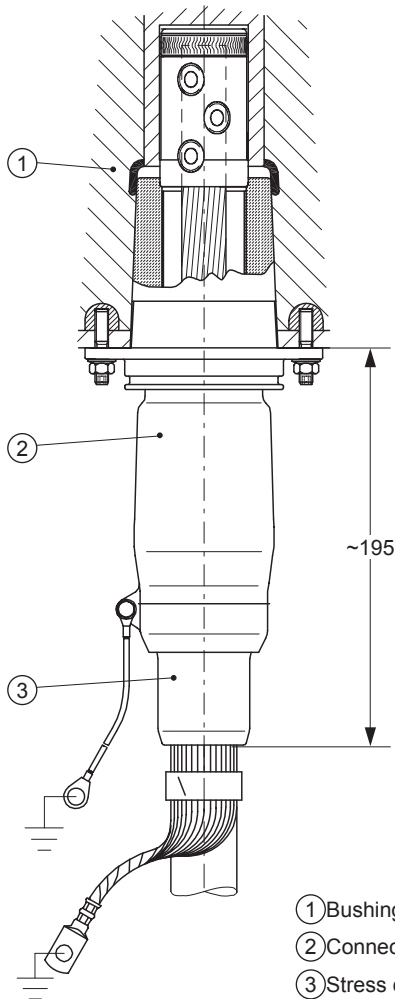


FPI 2



Connector Plug In up to 42 kV

CPI 3



CPI 3 is a screened inner cone cable connector made of silicone rubber for cable connection to switchgear (RMU) and transformers up to 42 kV with bushings size 3 according to EN 50180/50181.

- unique connector casing for 50 up to 630 mm²
- assembling without specially tools
- quick and easy assembly
- compact design
- maintenance free
- connector made from special designed silicone-rubber
 - very high elasticity
 - weather and ageing resistance
 - non-flammable, halogen free
- fully screened by a bonded outer conductive layer of silicone
- integrated stress control system
- 4 sizes of stress cones for multirange cable connection
- multirange screw cable lug with contact lamella
- cable sheath testing without dismantling of connector

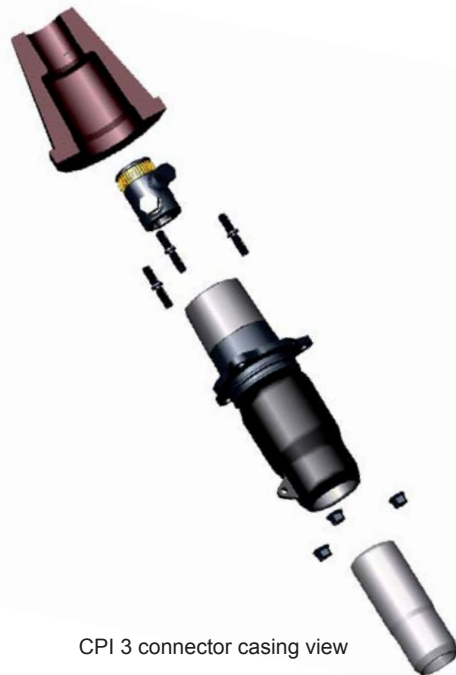
Size of stress cone	Stretch range Ø over core insulation (mm)	Cross section	Cross section	Cross section	Cross section
		6 / 10 (12) kV	8.7/15 (17.5) kV	12 / 20 (24) kV	18 / 30 (36) kV
20	21.2 - 33.6	185 - 400	120 - 300	95 - 240	50 - 150
27	28.9 - 36,4/37.8*	400 - 500	300 - 500	300 - 400	150 - 240
31	34.0 - 45.6	630	500 - 630	500 - 630	300 - 500
37	39.1 - 51.0	-	-	-	630

*3-core cables only

- ① Bushing
- ② Connector casing
- ③ Stress cone

Technical Data:

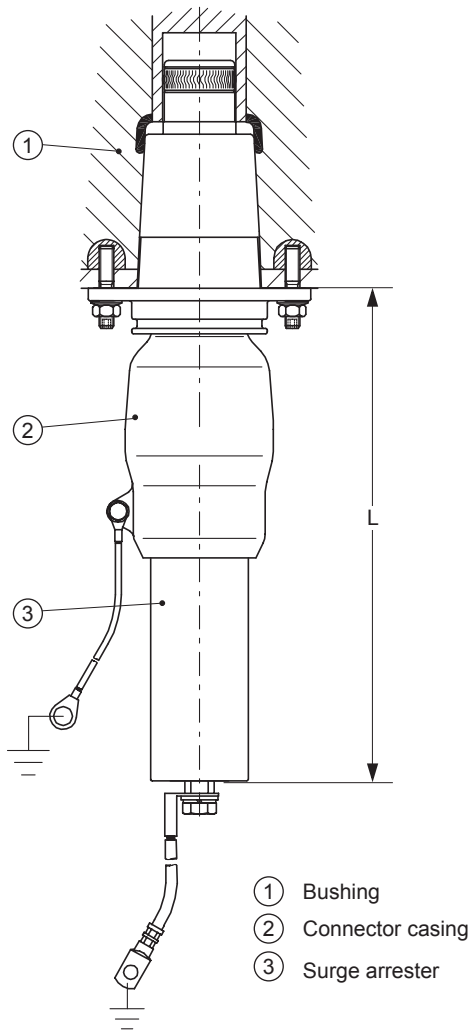
Maximum system voltage	42 kV
Continuous nominal current	up to 1250 A
Partial discharge at 2 U ₀	< 5 pC
AC withstand voltage, 5 min.	117 kV
DC withstand voltage, 15 min.	125 kV
Impulse withstand voltage	200 kV
Diameter over core insulation	21.2 - 51.0 mm
Cross section	50 - 630 mm ²



CPI 3 connector casing view

Surge arrester

SPI 3



SPI 3 is a screened metal oxide surge arrester with silicone rubber connector for connection to plug in type bushings size 3 acc. EN 50180/50181. Surge arrester protecting medium voltage networks, e. g. transformers, switchgears and cables. Incoming overvoltage waves and voltage increase by reflection are limited. For surge arrester type tests according to IEC 60099-4 are valid.

- compact design
- quick and easy assembly
- assembly without special tools
- fully screened by a bonded outer conductive layer of silicone
- connector made from special designed silicone-rubber
 - very high elasticity
 - weather and ageing resistance
 - non-flammable, halogen free

Arrester housing	$U_c = 42 \text{ kV}$
	$U_r = 52.5 \text{ kV}$
Impulse voltage 1,2/50 μ s	200 kV
Power frequency voltage	95 kV
Dimension L	460 mm

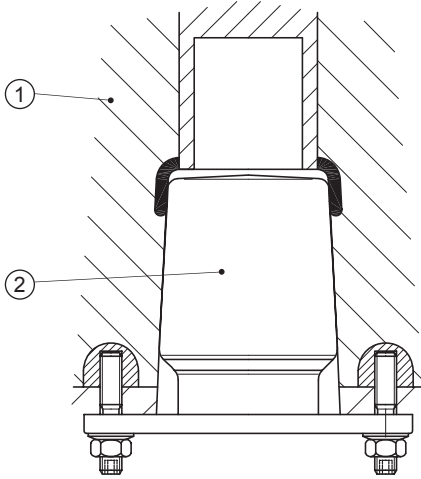
Technical Data:	SPI 3 42-10
continuous operating voltage U_c	42 kV
rated voltage U_r	52.5 kV
nominal discharge current I_n	10 kA
partial discharge at $1.05 \times U_c$	< 5 pC
residual voltage at:	
- long duration current impulse 125 A, 30/60 μ s	99.4 kV
- lightning current impulse 5/10 kA, 8/20 μ s	140 kV
long duration current impulse	325 A
High current impulse	100 kA

Final plug up to 42 kV

FPI 3

FPI 3 is a Final Plug for bushings size 3 according to EN 50180/50181.

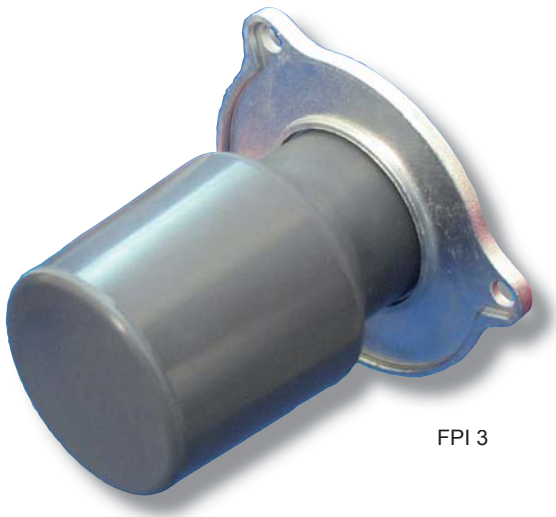
- Final Plug complete with metal ring
- assembly without special tools
- Integrated stress control system
- quick and easy assembly



- ① Bushing
- ② Final Plug

Technical Data:

Bushing	Size 3
Maximum system voltage	42 kV
AC withstand voltage, 5 min.	117 kV
DC withstand voltage, 15 min.	125 kV
Impulse withstand voltage	200 kV



FPI 3



Overview of connector from nkt cables GmbH

Outer cone cable connector for bushings type C up to 630 A (1250 A)

**CB 24-630
CB 36-630**



**CC 24-630
CC 36-630**



CSA



Outer cone cable connector for bushings type B up to 400 A

CE 24-400



CB 36-400



Outer cone cable connector for bushings type A up to 250 A

**CE 24-250
metal flange**



**CE 24-250
bail restraint**



**CE 24-250
metal housing**



CERTIFICATE

Management system as per
DIN EN ISO 9001 : 2008
DIN EN ISO 14001 : 2005

In accordance with TÜV NORD CERT procedures, it is hereby certified that

nkt cables GmbH
Kabelgarnituren
Helgoländer Damm 75
26954 Nordenham
Germany

applies a management system in line with the above standards for the following scope

**Sales, development and production of high, low and medium voltage
cable accessories and cabinets at location Nordenham**

Certificate Registration No. 78 100 993990
Certificate Registration No. 78 104 993990
Audit Report No. 3503 9526 / 3503 9527

Valid until 2012-02-14
Initial certification 1999


Certification Body
at TÜV NORD CERT GmbH

Essen, 2009-03-27

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

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