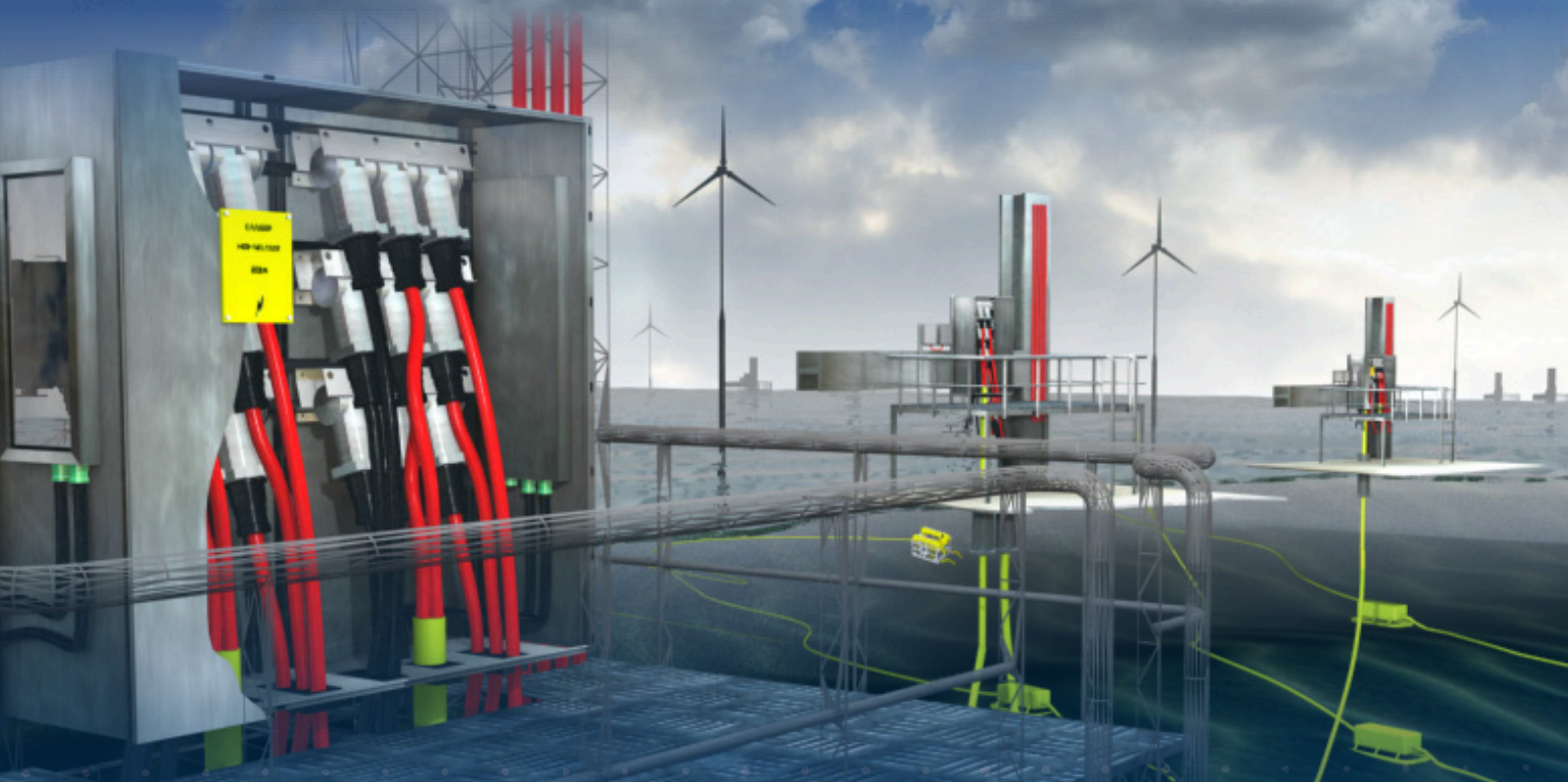




# TRANBERG HIGH VOLTAGE SOLUTIONS



THE STRONGEST LINK.



TRANBERG®

**TRANBERG** was established in 1901 and is located in Stavanger, the "oil capital" on the west coast of Norway.

Due to the oil industry, oil companies and offshore vessel ship owners have found their base in Stavanger. This has made it possible for Tranberg to develop and test products in close cooperation with our customers.

Since the start, Tranberg has designed, manufactured and supplied high quality electromechanical products for use on ships and offshore installations. Equipment capable of performing under all climatic conditions, from arctic cold to tropical heat, is a special feature for products produced by TRANBERG. High product quality and durability have

been developed by TRANBERG through delivery of equipment to the demanding maritime and offshore markets for the last 100 years.

Our flexible production and dedicated workers have made it possible to adapt to quickly changing developments and increased demand for smaller equipment with total lower lifetime cost and products suitable for use in arctic environment.

Manufacture and supply of products with reliable quality for their purpose shall continue to be the image of TRANBERG.



## HV- Certificates

Classification: For use in Hazardous areas Zone 1 or 2, or in safe area.

Atex-Certificate: Presafe 14 ATEX 4124

IECEX Certificate: IECEX PRE 14.0001

Marking Atex: Ex II 2 G Ex d e IIC Gb/**Ex II 2 G Ex eb IIC**/ Ex II 2 G Ex e mb IIC Gb

Marking IECEX: Ex d e IIC Gb/**Ex eb IIC**/Ex e mb IIC Gb T6/T5/T4

Compliance with:

**EN 60079-0:2012** / (EN 60079-1:2007)

**EN 60079-7:2007** / (EN 60079-18:2009)

**IEC 60079-0:2011** / (IEC 60079-1:2007)

**IEC 60079-7:2006** / (IEC 60079-18:2009)



Our company is a qualified supplier in Achilles JQS – A Joint Qualification System for suppliers to the oil industry in Norway and Denmark.

The company's Quality Management System is certified according to ISO9001:2008 by Dekra. Our production holds production quality assurance notification for ATEX and IECEX and Quality assessment according to "Forskrift om skipsutstyr" (Directive 2009/26/EC). Presafe is authorizing body for our EX workshop.



In 2006 Tranberg became a member of the R. STAHL Technology Group. R. Stahl is one of the global market leaders in explosion protection business, and with the integration into this group, Tranberg is now a part of their international distribution network. Within the R. STAHL Technology Group, Tranberg will serve as the competence center for lighting and de-icing on ships, and for process heating systems.

# EX HIGH VOLTAGE SOLUTIONS

## ZONE 1, ZONE 2 & SAFE AREA

### High Voltage Enclosure systems

Tranberg has delivered Medium and High voltage connecting systems for use in hazardous areas for several large projects. We have specialized knowledge for manufacturing approved enclosure systems for Topside Umbilical Termination Units, to assemble complex Umbilical cables consisting of High voltage, Signals and Fibre optical cables. These solutions are also used at refinery installations and Non-Ex areas.

Our knowledge and experience for these solutions has resulted to develop Medium Voltage Enclosure also for minor cable diameters, i.e. 2,5 - 35mm<sup>2</sup>. These are named as Tranberg A-Block solutions.

Our flexible and effective process gives a competitive price for our type TEF1060 HV Solutions.

### System Solutions - Ex workshop

We at Stahl and Tranberg are ready to discuss your Ex needs for standardized solutions or customized solutions. Our structure will support your requirements both for small fast orders as well as bigger more competitive project orders.

Our team of knowledgeable engineers can help to find efficient solutions for both Automation as well as Electro panels. Supported with our wide range of components and enclosures we can design and build all Ex protection methods. With our knowledge of North Sea requirements you can rest assured we will provide fit for purpose solution at a competitive price.

Our Norwegian workshop is approved to build ATEX and IECEx, and with our Factory in Stavanger our capabilities are even stronger now than before.

For your projects abroad we can also build UL, CSA, TR and more at our factories in Germany and The Netherlands.

Challenge us!





# TEF 1060 A-BLOCK SYSTEM

## ZONE 1, ZONE 2 & SAFE AREA



Tranberg A-Block solution with use of Phoenix Ex-Terminals, are developed according to IEC60079. The solution is standardized up to 11kV, and is certified by notified body according to ATEX and IECEx. The assembling with Ex-terminals is a compact and vibration stable solution. The A-Block solution can be used with current load up to 100Amps. The solution is very flexible and Tranberg can customize the A-Block system for maximum 35mm<sup>2</sup> with ferrules, up to 11kV.

### General

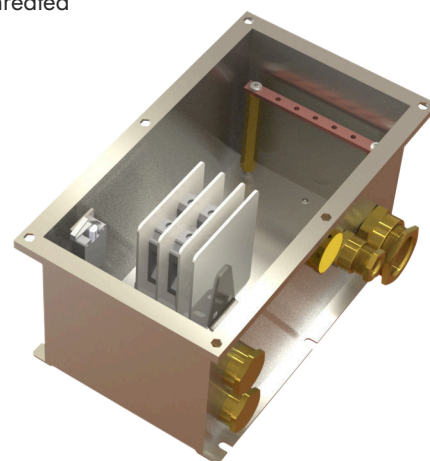
- Compact solution
- Flexible design
- Up to 100A
- Up to 11kV
- CU bar for earthing
- Bottom side entries
- Can be used in Non Ex environments
- Safety covers IP2X
- Padlock facility
- Stainless Steel AISI 316
- Bright chemical dip surface threated
- IP 66
- ATEX and IECEx approved
- Hinged door
- Suitable for DC solutions



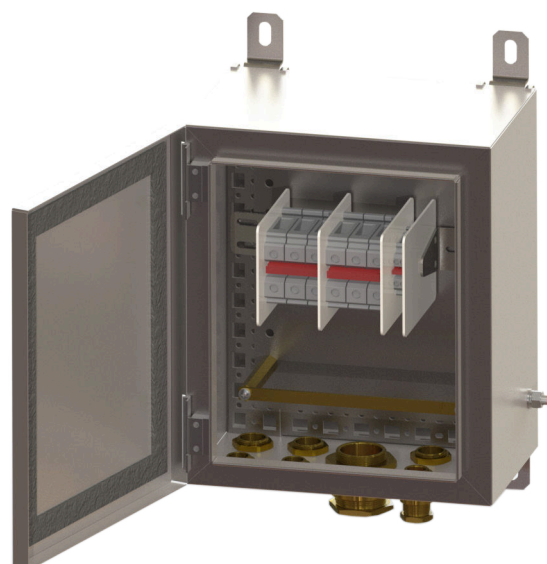
Phoenix Contact - Innovative products and Technology. Products and solutions for all aspects of electrical Engineering and Automation.

### Optional

- Optical Fiber Termination
- Gland plates
- Exi Safety switch
- MCT Frames



Customized solution



## Technical data

Ambient temperature:	-20° to +40°C with standard EPDM gasket, -50° to +60°C with silicone gasket, other ambient temperatures on request.
Enclosure material:	AISI 316L / EN 1.4404
Finish:	Bright chemical dip
Ingress Protection:	IP 66
Safety cover:	IP 20
Earthing:	Internal copper bar or PE terminals
Bonding:	Through studs on enclosure
Cable glands:	Tranberg Ex cable glands as standard

## Approvals and Certificates

Classification: For use in Hazardous areas Zone 1 or 2, or in safe area.

Atex-Certificate: Presafe 14 ATEX 4124

IECEX Certificate: IECEX PRE 14.0001

Marking Atex: Ex II 2 G Ex d e IIC Gb/**Ex II 2 G Ex eb IIC**/ Ex II 2 G Ex e mb IIC Gb

Marking IECEX: Ex d e IIC Gb/**Ex eb IIC**/Ex e mb IIC Gb

T6/T5/T4

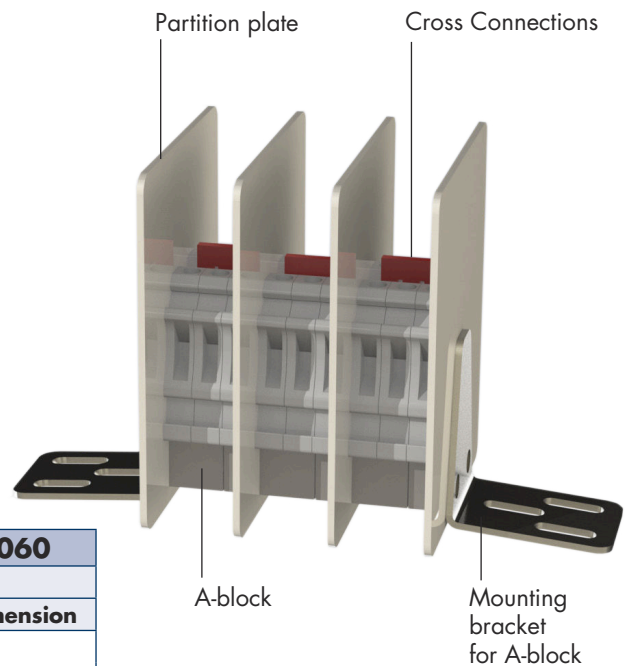
Compliance with:

**EN 60079-0:2012** / (EN 60079-1:2007)

**EN 60079-7:2007** / (EN 60079-18:2009)

**IEC 60079-0:2011** / (IEC 60079-1:2007)

**IEC 60079-7:2006** / (IEC 60079-18:2009)



The picture shows an example of the A-block assembly inside the TEF 1060 enclosure, part no. 1063155, HV 2,2kV L1/L2/L3 x3pce UT6mm<sup>2</sup>

Tranberg Ex Certified High Voltage Enclosure TEF1060			
2,2kV. A-BLOCK Solution			
Setting	Terminal type	Part No	Enclosure dimension
L1/L2/L3 with 2 Terminals each phase	UT6mm <sup>2</sup>	1063151	W250xH250xD125mm
	UT16mm <sup>2</sup>	1063153	
	UT35mm <sup>2</sup>	1063154	
L1/L2/L3 with 3 Terminals each phase	UT6mm <sup>2</sup>	1063155	W225xH250xD125mm
	UT16mm <sup>2</sup>	1063156	W250xH250xD125mm
16 Terminals linked for 8 pairs	UT6mm <sup>2</sup>	1063159	W350xH350xD125mm
3,5kV. A-BLOCK Solution			
Setting	Terminal type	Part No	Enclosure dimension
L1/L2/L3 with 2 Terminals each phase	UT6mm <sup>2</sup>	1063251	W225xH250xD150mm
	UT16mm <sup>2</sup>	1063253	W250xH250xD150mm
	UT35mm <sup>2</sup>	1063254	
L1/L2/L3 with 3 Terminals each phase	UT6mm <sup>2</sup>	1063255	W225xH250xD150mm
	UT16mm <sup>2</sup>	1063256	W250xH250xD150mm
16 Terminals linked for 8 pairs	UT6mm <sup>2</sup>	1063259	W350xH350xD150mm
6,9kV. A-BLOCK Solution			
Setting	Terminal type	Part No	Enclosure dimension
L1/L2/L3 with 2 Terminals each phase	UT6mm <sup>2</sup>	1063351	W250xH300xD210mm
	UT16mm <sup>2</sup>	1063352	
	UT35mm <sup>2</sup>	1063353	
L1/L2/L3 with 3 Terminals each phase	UT6mm <sup>2</sup>	1063355	W300xH350xD210mm
	UT16mm <sup>2</sup>	1063356	
16 Terminals linked for 8 pairs	UT6mm <sup>2</sup>	1063359	W300xH350xD210mm

# TEF 1060 BUS-BAR SYSTEM

## ZONE 1, ZONE 2 & SAFE AREA



Type-C solution

The CU Bus-Bar System system is developed and standardized up to 11kV, and is certified by notified body according to ATEX and IECEx.

The High Voltage solution with tinned copper bus-bars combined with the use of Ex-certified Isolators.

3 different types of bus-bar solutions.

- Type-R is with **Rectangular** bus-bar
- Type-C is with rectangular bus-bar assembled in a **Curved** frame system
- Type-G is with **G-profile** bus-bar

Atex-Certificate: Presafe 14 ATEX 4124

IECEx Certificate: IECEx PRE 14.0001

Atex:

Ex II 2 G Ex d e IIC Gb/Ex II 2 G Ex eb IIC/

Ex II 2 G Ex e mb IIC Gb

IECEx:

Ex d e IIC Gb/**Ex eb IIC/**

Ex e mb IIC Gb T6/T5/T4

Compliance with:

**EN 60079-0:2012** / (EN 60079-1:2007)

**EN 60079-7:2007** / (EN 60079-18:2009)

**IEC 60079-0:2011** / (IEC 60079-1:2007)

**IEC 60079-7:2006** / (IEC 60079-18:2009)



### Tranberg Ex Certified High Voltage Enclosure TEF1060

#### Type R Solution (Rectangular CU Bus-Bars)

Part No	Setting	Enclosure dimension
1063401	3,5kV - 3ph-R-2H-Ø8-250A-30/10	W525xH900xD200mm
1063402	3,5kV - 3ph-R-2H-Ø10-432A	W525xH900xD200mm
1063403	6,9kV - 3ph-R-2H-Ø8-250A-30/10	W575xH1000xD275mm
1063404	6,9kV - 3ph-R-2H-Ø10-432A	W575xH1000xD275mm
1063405	11kV - 3ph-R-2H-Ø8-250A-30/10	W700xH1250xD300mm
1063406	11kV - 3ph-R-2H-Ø10-432A	W700xH1250xD300mm

#### Type C Solution (Curved-profile CU Bus-Bars)

Part No	Setting	Enclosure dimension
1063411	2,2kV - 3ph-C-6H-Ø8-250A-30/10	W600xH900xD350mm
1063412	2,2kV - 3ph-C-6H-Ø10-500A	W600xH900xD350mm
1063413	2,2kV - 3ph-C-6H-Ø10-750A-80/10	W600xH900xD350mm
1063414	2,2kV - 3ph-C-6H-Ø10-950A-100/10	W600xH900xD350mm
1063415	2,2kV - 3ph-C-12H-Ø10-2100A-2x100/10	W1200xH1200xD600mm
1063416	3,5kV - 3ph-C-6H-Ø10-500A	W600xH1000xD400mm
1063417	3,5kV - 3ph-C-6H-Ø10-750A-80/10	W600xH1000xD400mm
1063418	3,5kV - 3ph-C-8H-Ø10-500A-80/10	W675xH1000xD400mm
1063419	3,5kV - 3ph-C-8H-Ø10-950A-100/10	W675xH1100xD400mm
1063420	6,9kV - 3ph-C-6H-Ø10-500A	W700xH1100xD450mm
1063421	6,9kV - 3ph-C-6H-Ø10-500A-80/10	W700xH1100xD450mm
1063422	6,9kV - 3ph-C-8H-Ø10-500A	W800xH1100xD450mm
1063423	6,9kV - 3ph-C-8H-Ø10-950A-100/10	W800xH1100xD450mm
1063424	11kV - 3ph-C-6H-Ø10-500A	W900xH1100xD500mm
1063425	11kV - 3ph-C-12H-Ø12-2100A-2x100/10	W1500xH1500xD700mm

#### Type G Solution (G-profile CU Bus-Bars)

Part No	Setting	Enclosure dimension
1063441	2,2kV - 3ph-G-4H-Ø10-490A	W450xH950xD300mm
1063442	2,2kV - 3ph-G-4H-Ø10-850A-100/10	W500xH950xD300mm
1063443	3,5kV - 3ph-G-4H-Ø10-490A	W500xH950xD350mm
1063444	3,5kV - 3ph-G-4H-Ø10-850A-100/10	W550xH950xD350mm
1063445	6,9kV - 3ph-G-4H-Ø10-490A	W600xH1000xD400mm
1063446	6,9kV - 3ph-G-4H-Ø10-850A-100/10	W700xH1000xD400mm
1063447	11kV - 3ph-G-4H-Ø10-490A	W750xH1200xD500mm
1063448	11kV - 3ph-G-4H-Ø10-850A-100/10	W800xH1200xD500mm

### Technical data

- Standardized for bottom side entries
- All CU connection Bars are tinned
- All products delivered with Tranberg cable glands
- Bright chemical dip surface threated
- Material: AISI316L

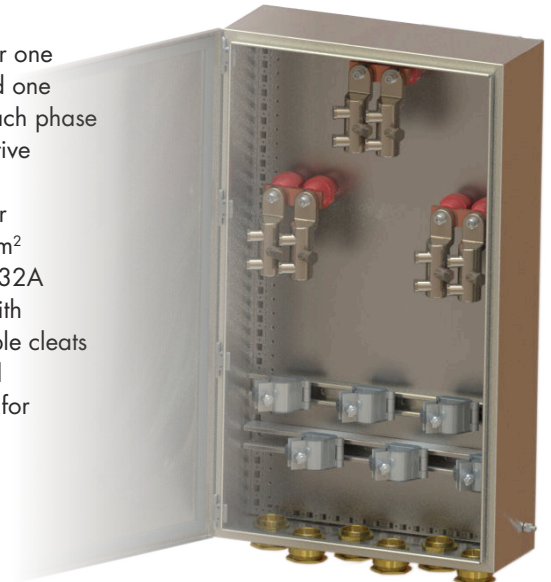
### Optional

- Lifting lugs, Certified to Standard 2.7.1
- Short circuit devices
- Tranberg Enclosure Heater with thermostat
- Cable Cleats
- Optical Fiber Termination
- Padlock facility
- Exi Safety switch
- 3-phase or Single core Plug-in solution
- Non-Ex solutions
- Customizing for top- or side entries
- MCT frames
- Gland plates
- Ex Enclosure heater

**For connection kits and accessories, please contact Tranberg AS for further information.**

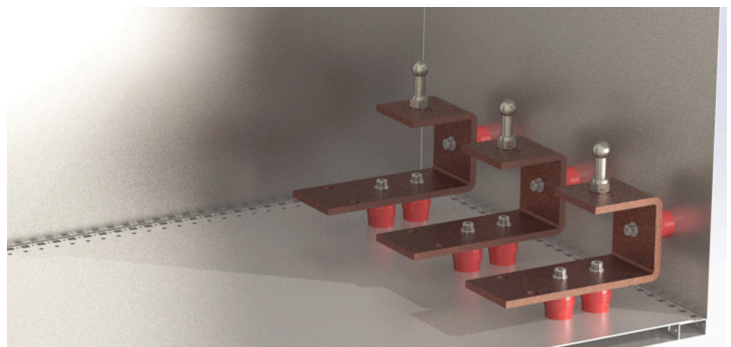
### R – Profile:

- Designed for one cable in and one cable out each phase
- A cost effective solution
- Designed for max 300mm<sup>2</sup>
- Max load 432A
- Available with certified cable cleats
- To withstand Short-circuit for even 50kA



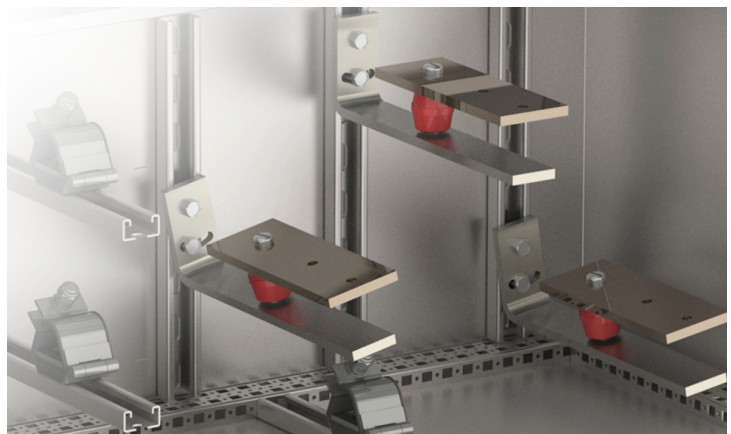
### G – Profile:

- Compact solutions
- Designed for max 4 cables each phase
- Designed for max 300mm<sup>2</sup>
- To withstand Short-circuit for even 50kA
- Max current load 960A



### C – Profile (Curved):

- Easy installation
- Adjustable bars to compensate for bending radius
- Can be delivered up to 2100 A
- "Unlimited" numbers of cables

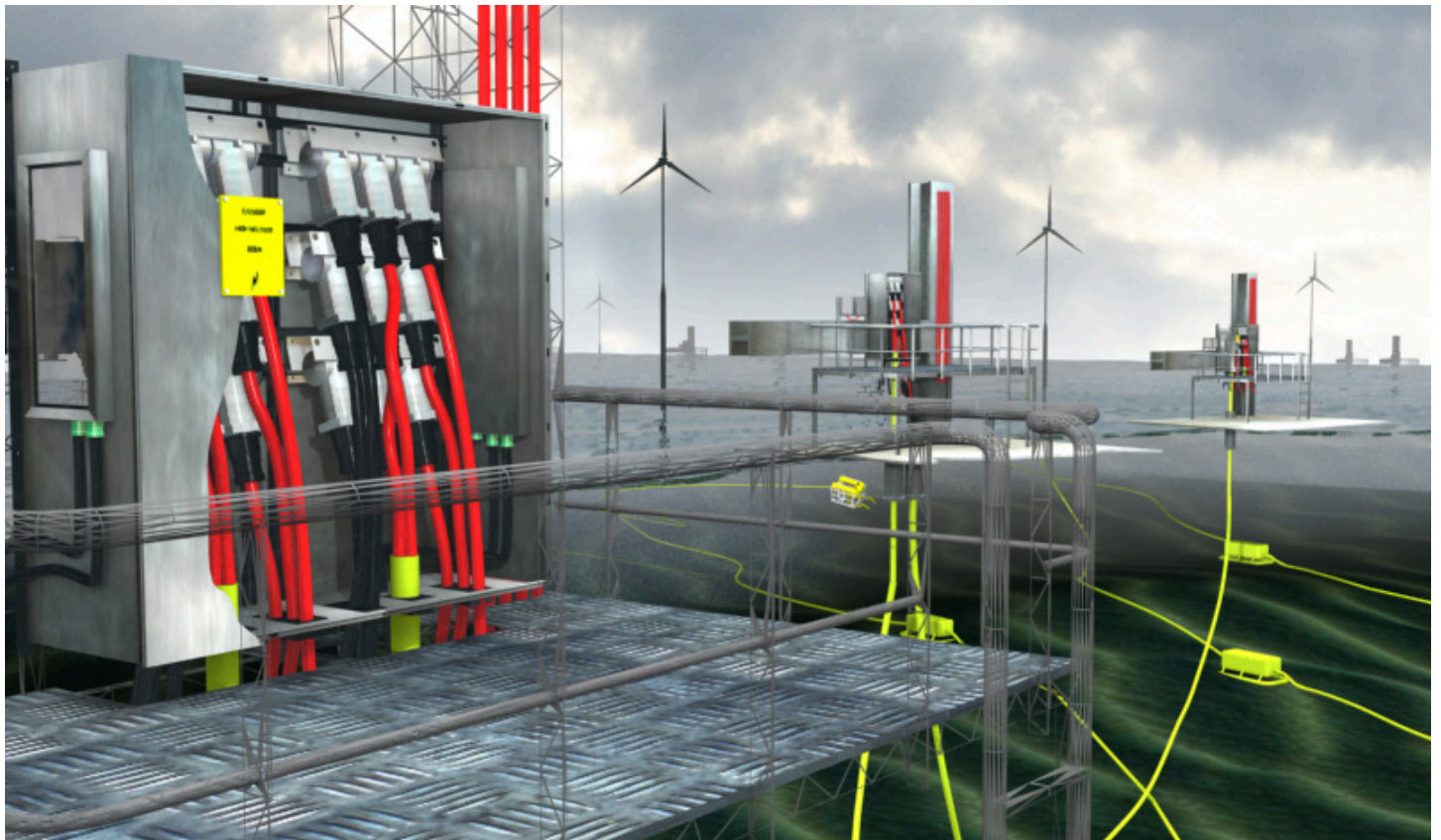


Sectional side view

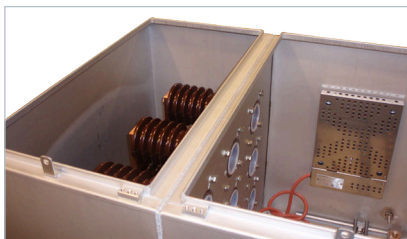


# TOPSIDE UMBILICAL TERMINATION UNITS

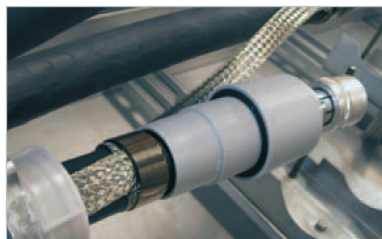
ZONE 1, ZONE 2 & SAFE AREA



Single core contact system cabinet with Enclosure Heater and Optical Fiber Termination



Solution for multi-contact termination



Single core contact system



Installation on site



# PLUG SOLUTIONS



Ex nR solution for 11kV 3x240mm<sup>2</sup>



Cabinet for Optical Fiber Termination (Ex op is) integrated in High Voltage cabinet



3-Phase 11kV Plugable solution, Max 3x240mm<sup>2</sup>

Single core contact system in a combined MV/LV/FO solution. The LV/FO compartment is welded in the MV compartment to simplify dismantling and installation of the umbilical. Outlets and service from the outside provides easy access to the LV/FO compartment.

- High voltage enclosures up to 36kV
- Signal cable junction boxes
- Fibre cable junction boxes
- Complete and customized solutions
- Light weight
- Cost effective installation
- Short delivery times
- Zone 1 Exe max 11kV
- Zone 2 Ex nR above 11 kV
- Exd or Exp for use in Zone 1 above 11 kV

## Type of protection

- Zone 1 Exe max 11kV
- Zone 2 Ex nR above 11 kV
- Exd or Exp for use in Zone 1 above 11 kV

## Applications

- Power distribution for subsea applications
- Hazardous areas
- High voltage solutions
- Solutions for windmills
- Arctic environment
- Saline atmosphere

## Features

The series TEF1060 is the most flexible enclosure system. The enclosures are often used for RIO systems, switching and distribution panels and high voltage solutions. The dimensions span from 200x200x125 mm upwards by 25 mm each direction, making it the perfect tool for customized solutions.

- IP66 up to 2200x1000x700mm pr section
- Stainless steel AISI316
- Doors with or without hinges
- Door stoppers
- Cam locks or screws
- Pad lock solution
- Gland plates
- Windows
- Lifting lugs
- Voltage detection Multi-contact termination for Ex nR and Exp solutions
- MCT's or cable glands
- Base unit for installation on floor
- Brackets for installation on wall
- Internal mounting plate in AISI316L
- Ex Enclosure Heater

# CABLE CLEATS



## SAPPHIRE

### (SHDSS CABLE CLEAT)

The CMP Products SHDSS cable cleat range are metallic cable cleats which have been designed, constructed, and tested in accordance with the International Standard 'cable cleats for Electrical Installations' IEC 61914:2009. The SHDSS cable cleat has been designed and tested for high short circuit conditions on cables held in single, parallel / flat formation, to ensure the securing and retention of cables without damage.

The SHDSS cable cleat is available for single parallel formation for diameters of 26 to 150mm in 12 sizes. The cable cleat is fabricated from 316L stainless steel, giving it high creep strength whilst providing excellent corrosion resistance in the harshest of environments.

The SHDSS cable cleat has one M12 and two M10 fixing clearance holes within its base, allowing versatility to the installer during installation, and is designed to enable the product to be secured to a variety of mounting surfaces. The SHDSS cable cleat hinge opens fully, allowing the cables to be easily placed within the cable cleat, to aid the installer before closing and securing via the mouth piece bolt.

Low Smoke & Fume (LSF) liners are standard helping to restrain the cables within vertical applications, providing a layer of protection between the cable sheath and the cable cleat during normal operation, where thermal elongation of cable occurs, protecting the cable from chafing on any mounting surface due to differential movements such as those found in marine and offshore applications. The Low Smoke & Fume (LSF) liners also assist in the extra protection of cables in the event of short circuit fault conditions.

To secure cables during short circuit or for vertical installation where cable ties are prohibited. Following types are stocked by us in Norway: Patriot, Sovereign, Sapphire and Conqueror.

### FEATURES:

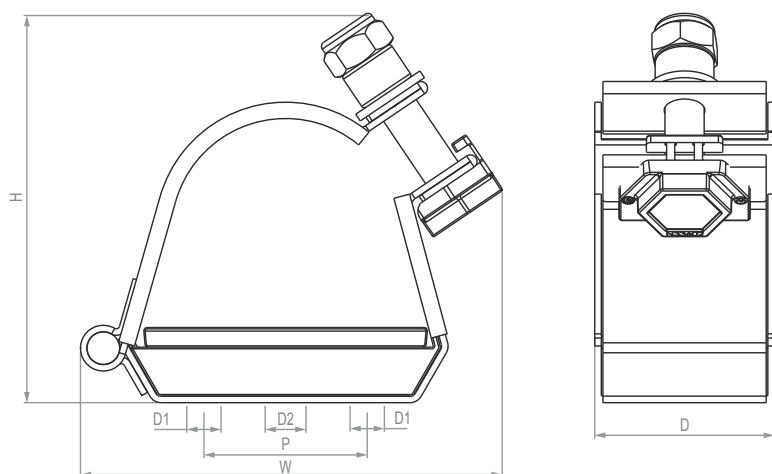
- Third party certification to IEC 61914:2009
- 316L stainless steel
- 26 to 150mm in 12 sizes for single / parallel formation
- Operating temperature -50°C to +60°C
- Low Smoke & Fume (LSF), Zero Halogen (LSOH) and Phosphorus free liners as standard
- Combined single (M12) and two bolt (M10) fixing design



Falcon (2BC Plastic)



## TECHNICAL DATA



## TECHNICAL DATA & CLASSIFICATION

<b>Type</b>	<b>6.1.3 Composite SHDSS - Single Heavy Duty Stainless Steel</b>	
Design Specification	IEC 61914:2009	
Temperature for permanent application	-50°C to +60°C IEC 61914:2009 clause 6.2	
Needle Flame Test	Pass - 120 second flame application time IEC 61914:2009 clause 10.0, 10.1, IEC 60695-11-5	
Lateral Load Test	3.5kN - 14.5kN, IEC 61914:2009 clause 9.3	
Axial Load Test	0.2kN - 0.9kN, IEC 61914:2009 clause 9.4	
Impact Resistance	Pass - Very heavy IEC 61914:2009 clause 6.3, 6.3.5, 9.2	
Short Circuit kA (Multicore Formation) IEC 61949:2009 - 6.4, 6.4.3, 9.5	One short circuit, 600mm fixed cleat centres, 0.1 sec - 105kA Peak, 50.0kA RMS	Two short circuits, 600mm fixed cleat centres, 0.1 sec - 105kA Peak, 50.0kA RMS
Short Circuit kA (Parallel Formation) IEC 61949:2009 - 6.4, 6.4.3, 9.5	One short circuit, 600mm fixed cleat centres, 105mm cable centres, 0.1 sec - 110kA Peak, 50.0kA RMS	Two short circuits, 600mm fixed cleat centres, 105mm cable centres, 0.1 sec - 109kA Peak, 50.0kA RMS
Material	Low Smoke & Fume (LSF), Zero Halogen (LSOH) and Phosphorus free liners as standard	

## CABLE CLEAT SELECTION TABLE

TEF No.	Part No.	Cable Ø range take (mm)	Dimensions mm						Weight (g)
			W	H	D	P	Fixing Hole Ø		
							D1	D2	
50310055	SHDSS026032	26-32	95	88	54	25	2 x M10	1 x M12	402
50310044	SHDSS032038	32-38	96	93	54	25	2 x M10	1 x M12	431
50310045	SHDSS038046	38-46	100	100	54	25	2 x M10	1 x M12	446
50310046	SHDSS046051	46-51	104	103	54	25	2 x M10	1 x M12	456
50310047	SHDSS051058	51-58	108	107	54	25	2 x M12	1 x M12	472
50310048	SHDSS058070	58-70	129	119	54	50	2 x M10	1 x M12	554
50310049	SHDSS070083	70-83	137	120	54	50	2 x M10	1 x M12	581
50310050	SHDSS083097	83-97	157	137	54	75	2 x M10	1 x M12	665
50310051	SHDSS096109	96-109	165	133	54	75	2 x M10	1 x M12	688
50310052	SHDSS106120	106-120	170	142	54	75	2 x M10	1 x M12	713
50310053	SHDSS120135	120-135	197	157	54	75	2 x M10	1 x M12	814
50310054	SHDSS135150	135-150	205	172	54	75	2 x M10	1 x M12	847

Fasteners required to secure the cable cleat to the support structure are not included with the ordering references shown in the selection table but can be supplied on request



**REFERENCES**

<b>Customer</b>	<b>Project</b>	<b>Umbilical</b>	<b>kV</b>
ABB Power System	Kuff Gas	1x3ph 35mm <sup>2</sup>	11 kV
Framo Engineering	Ceiba C3 & C4	1x3ph 70mm <sup>2</sup>	15 kV
Framo Engineering	Ceiba C3 & C4	2x3ph 70mm <sup>2</sup>	15 kV
Scanrope Subsea Cables	Ekofisk Growth	1x3ph 500mm <sup>2</sup>	34 kV
Framo Engineering	Columba E	2x3ph 185mm <sup>2</sup>	11 kV
ABB Denmark	Maersk	3x120mm <sup>2</sup>	3,3 kV
Framo Engineering	Brenda	2x3ph 240mm <sup>2</sup>	11 kV
Statoil Kårstø	Gas power	3x3ph 185mm <sup>2</sup>	6,6 kV
Scanrope Subsea Cables	Qatar Gas	1x3ph 185mm <sup>2</sup>	20 kV
Talisman Energy	Seawater pump	1x3ph 95mm <sup>2</sup>	6,6 kV
Framo Engineering	Ceiba C5	2x3ph 70mm <sup>2</sup>	11 kV
Framo Engineering	Tordis	6x240mm <sup>2</sup>	11 kV
Framo Engineering	Azurite	2x3ph 70mm <sup>2</sup>	11 kV
R.Stahl Far East	North Belut	1x3ph 35mm <sup>2</sup>	20 kV
JDR Cable UK	North Belut	1x3ph 35mm <sup>2</sup>	20 kV
Duco Cable UK	Jacky-Beatrice	3x120mm <sup>2</sup>	11 kV
Aibel	Njord-A	1x3ph 300mm <sup>2</sup>	11 kV
Aibel	Gudrun	12x185mm <sup>2</sup>	11 kV
Framo Engineering	Shelly	3x120mm <sup>2</sup>	11 kV
Johan Sverdrup Field Centre Phase 1 EPma - FLARE TIP & IGNITION PACKAGE. HV-JB A-Block 2,2kV			
Over 100 solutions for 1,4 kV / 3,3 kV and 6,6 kV for use to winch ROV's and subsea pump systems			


**TRANBERG®**

**Tranberg AS** • Strandsvingen 6  
P.O. Box 8033 • N-4068 Stavanger • Norway  
Tel: +47 51 57 89 00 • Fax: +47 51 57 89 50  
E-mail: info@tranberg.com • www.tranberg.com

**Stahl-Syberg AS**  
Luhrtoppen 2 • N-1470 Lørenskog • Norway  
Tel: +47 24 08 44 10 • E-mail: mail@stahl-syberg.no