

# PORCELAIN BUSHINGS

## NEW CEDASPE 1KV SERIES 2021



An innovative design: the most popular and most reliable 1 kV bushing on the market



## LV BUSHINGS EN NEW CEDASPE 1KV SERIES 2021

A new generation for one of the most popular CEDASPE products: **Cedaspe® 1kV series 2021**

ED bushings family has been replaced by a new series of 1kV LV bushings according to EN50386: This series has been designed for a rated voltage of 1kV and a rated current range of 250 A to 4500 A and is fully interchangeable with the old DIN standard which allows easy replacement, offering an easy, fast and reliable solution for the requirements of distribution transformer manufacturers.

An intelligent assembly, packaging and delivery process as well as the optimized tightening solution ensure that this series represents the best value-price guarantee on the market.

The reduced number of components and gaskets significantly reduce maintenance costs. Each bushing is shipped pre-assembled, saving mounting time and reducing costs.

The special design of this series provides better gasket protection against external environmental conditions, ensuring a longer service life for the gaskets, thus reducing maintenance costs as well as leakage issues.

The main feature of these low-voltage bushings is a reinforced nylon insulating support on the oil side that ensures an optimal tightening solution.

### The most important characteristics are:

- Full interchangeability with the old DIN Bushings with same current rating, without need of any change in the design of the transformer as the bushings ED have the same fixing hole on the tank and are protruding under the cover with the same distance.
- Special gaskets design, special top cap and special flange gaskets seats, which contains the gaskets into their seat, avoiding protrusion of the gasket outside the figure of the bushing, as it happens with the DIN design, when the gaskets are compressed at the correct tightening torque. This reduces a lot the risk of gaskets cracks due to UV radiation.
- Minor number of components to make the bushings; it means higher reliability (less pieces less possibilities of failure!!!!), but more important less pieces, less time required for the bushing assembly on the transformer cover.
- Reinforced nylon insulating support on the oil side, instead of the "B" bottom porcelain, which does not require any internal spacer gasket (in fibre or presspan). This is an important advantage as eliminate the risk of breaks of the internal insulator as in the DIN design
- Only two tightening gaskets on the air side instead of the three pieces required by the DIN models: 33 % lower risk of oil leakage
- Special profile of the flange NBR gaskets, with lips to enable an easier centering of the gasket on the porcelain stem
- Oil spade connection design is available for all models from 250 up to 2000 A, alternatively to the traditional nuts or screws connection.

The spade design allows an easy use of the flexible links between LV coils and bushings; connections can be made in two ways: by means of rivets (R execution with 6,7 mm bore) or with screws and nuts M12 (V3 execution).

### Economic Advantages:

The direct economic advantages are:

- Lower price than the corresponding DIN sizes
- Price reduction is amplified in case of the spade models 1-630/1000/1800-Ms, due to the possibility of using a brass rod for currents up to 580/1000/1800A respectively and the spade rod design

There is an important indirect economic advantage:

- Saving of 30 to 50% of the total working time necessary for the assembly of the bushing on the transformer (total working time considering picking of the components, assembly and tightening of the bushing)

### **Important information regarding CURRENT RATINGS:**

For **630 A** bushings the new specification EN50386 state that the conductor can be in brass, instead of copper (as it was before).

Rising temperature test and long experience in this kind of execution made by the major European manufacturers, confirm that with oil at a temperature of 60°C above ambient temperature the bushing 1/630-*Ms* satisfy in full the requirements of IEC 137, with the following results:

- Brass rod over temperature of the oil side connection at 630 A above oil < 10°C
- Brass rod over temperature of the air side connection at 630 A above air < 60°C

A real current of 630A is a not frequent case, occurring on a 250kVA transformer with 230V rated voltage (three phase)

Considering the most common use of this bushing with 400 V rated voltage, on 250 and 400-kVA transformer, the real current, which pass through the bushing, is only 365 and 580 A respectively: in these conditions, the performance of the bushings 630A-*Ms* is even better:

- Brass rod over temperature of the oil side connection at 580 A above oil < 6°C
- Brass rod over temperature of the air side connection at 580 A above air < 55°C

(At 365 A the over temperature is negligible).

For **1250 & 2000 A** bushings the new specification EN50386 state that the conductor must be in copper, but also other materials like brass or aluminium are allowed at condition to underrate the bushing.

A long experience on this kind of bushings with brass rod has been made in the last 30 years by all the major European transformer manufacturers, confirm that brass can be used with extremely good results.

Repeating a test with same procedures described above with oil at a temperature of 60°C above ambient temperature, the bushing 1/1000-*Ms* and 1/1800-*Ms* satisfy in full the requirements of IEC 137, with the following results:

#### **1/1000-*Ms***

- Brass rod over temperature of the oil side connection at 1000 A above oil < 8°C
- Brass rod over temperature of the air side connection at 1000 A above air < 60°C

#### **1/1800-*Ms***

- Brass rod over temperature of the oil side connection at 1800 A above oil < 8°C
- Brass rod over temperature of the air side connection at 1800 A above air < 60°C

The over temperature of the rods much lower than above limits using 1000A-*Ms* on 500 and 630 kVA transformers or 1800A-*Ms* bushing on 500 and 630 kVA transformers with 400 V rated voltage, where the real current which pass through the bushing is much lower than 1000 and 1800 A respectively.

### **Information regarding INSULATION TEST:**

All our bushings have been type tested in a specialized laboratory in Turin (Italy) to check impulse and power frequency withstand voltages. All bushings, mounted on an oil-filled tank, in normal operating conditions passed the following tests:

- **Power frequency withstand voltage for 60 s : 15kV**
- **Lighting impulse withstand voltage (1.2/50) : 30Kv**

### **Information regarding GASKETS:**



CEDASPE S.r.l. Società a Socio Unico  
Soggetta a direzione e coord. di  
Maschinenfabrik Reinhausen GMBH  
Via Colombara 1- Fraz Pedriano  
20098 San Giuliano Milanese (MI), Italy

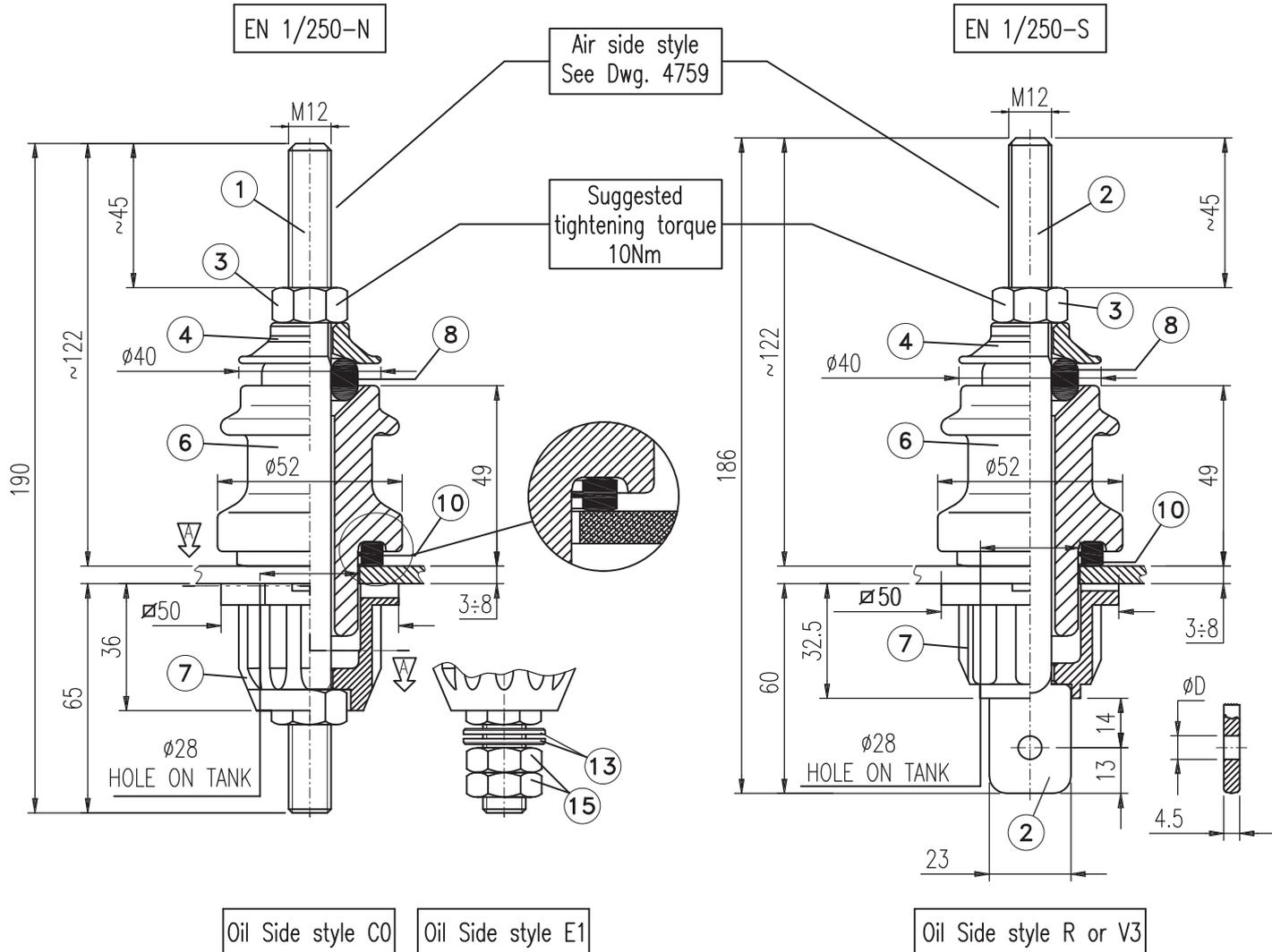
Phone +39 02 98204411  
Fax +39 0298204422  
sales@cedaspe.com  
www.cedaspe.com

Reg. Imprese R.E.A. MI1497054  
Cap. Soc. € 1.000.000 I.V.  
TVA/C.F./P.I. 02570370961

Reinhausen Group

MEMBER OF REINHAUSEN GROUP

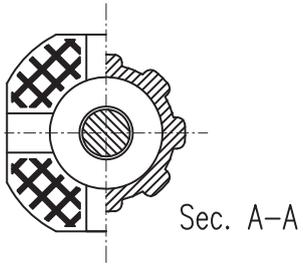
All our bushings are fit with special gasket made in NBR (nitrile rubber) suitable for use in mineral oil at a temperature range between  $-40^{\circ}\text{C}$  and  $+115^{\circ}\text{C}$ .  
Upon request, we can supply "VITON" rubber gaskets



Oil Side style C0

Oil Side style E1

Oil Side style R or V3



Pos	Description
1	Brass rod "N-250"
2	Brass spade "S-250"
3	Brass Nut DIN 934
4	Brass cap EN 1/250
6	Porcelain EN 1/250
7	Bottom insulator body
8	Ring gasket ED/02
10	Flange gasket ED/02
13	Brass cont. washer
14	Spring washer
15	Brass Nut DIN 936

Rated voltage: 1kV  
 P.F. 1': 15kV  
 BIL: 30kV  
 Rated current: 250A  
 Creepage dist.: 60mm

BUSHING TYPE	CODE	SPADE HOLE $\phi D$	NOTE
EN 1/250-C0	BN102BG9CNO	/	STANDARD EXECUTION
EN 1/250-E1	BN102BG9ENO	/	STANDARD EXECUTION
EN 1/250-SR	BH102BG96NO	6.7	STANDARD EXECUTION
EN1/250-SV3	BH102BG97NO	12.2	STANDARD EXECUTION



Titolo  
**Transformer bushings**  
 EN 1/250 (EN50386)  
 (M.Y. 2021)

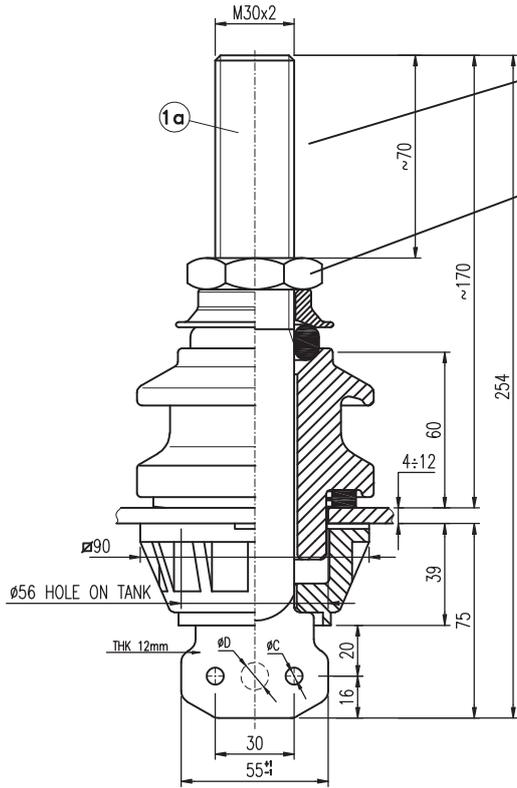
Data 30/01/20  
 Scala 1:2  
 Dis. *F. Gandini*  
 Visto *L.F. Giorgi*

Dis. Nr  
**4745**

1	2	3		
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EN 1/1000-S

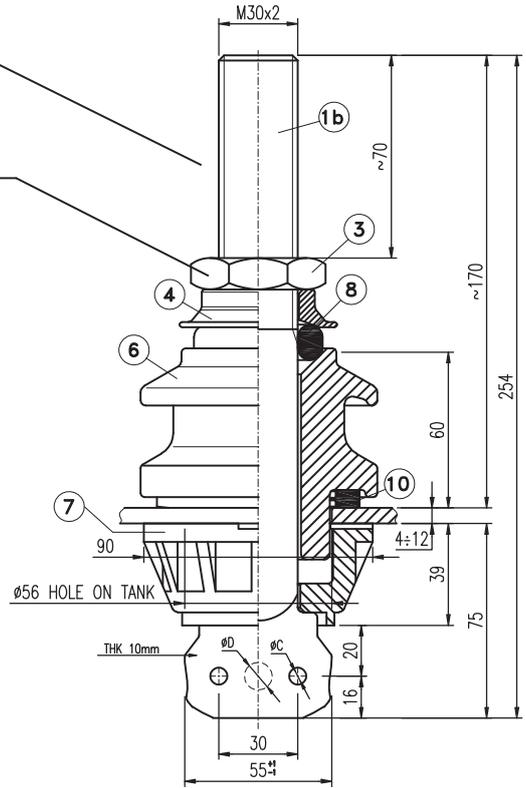


Oil Side style R or V3

BUSHING TYPE (BRASS ROD)		2H	1H
EN 1/1000-SR	BH110BG96NO	6.7	/
EN 1/1000-SV <sub>s</sub>	BH110BG97NO	/	12.2
TYPE	CODE	∅C	∅D

Pos	Description
1a	Brass spade "EN 1/1000"
1b	Cu spade "EN 1/1250"
3	Tightening ring
4	Brass cap EN 1/1000
6	Porcelain EN 1/1000
7	Bottom insulator body
8	Ring gasket EN 1/1000
10	Flange gasket EN 1/1000

EN 1/1250-S



Oil Side style R or V3

BUSHING TYPE (COPPER ROD)		2H	1H
EN 1/1250-SR	BH112BG96NO	6.7	/
EN 1/1250-SV <sub>s</sub>	BH112BG97NO	/	12.2
TYPE	CODE	∅C	∅D

Rated voltage: 1kV  
 P.F. 1': 15kV  
 BIL: 30kV  
 Rated current EN 1/1000: 1000A  
 Rated current EN 1/1250: 1250A  
 Creepage dist.: 80mm

Air side style  
See Dwg. 4759

Suggested  
tightening torque  
48Nm

Titolo  
**Transformer bushings**  
 EN 1/1000-1250 (EN50386)  
 (M.Y. 2021)

Data 30/09/20

Scala 1:3

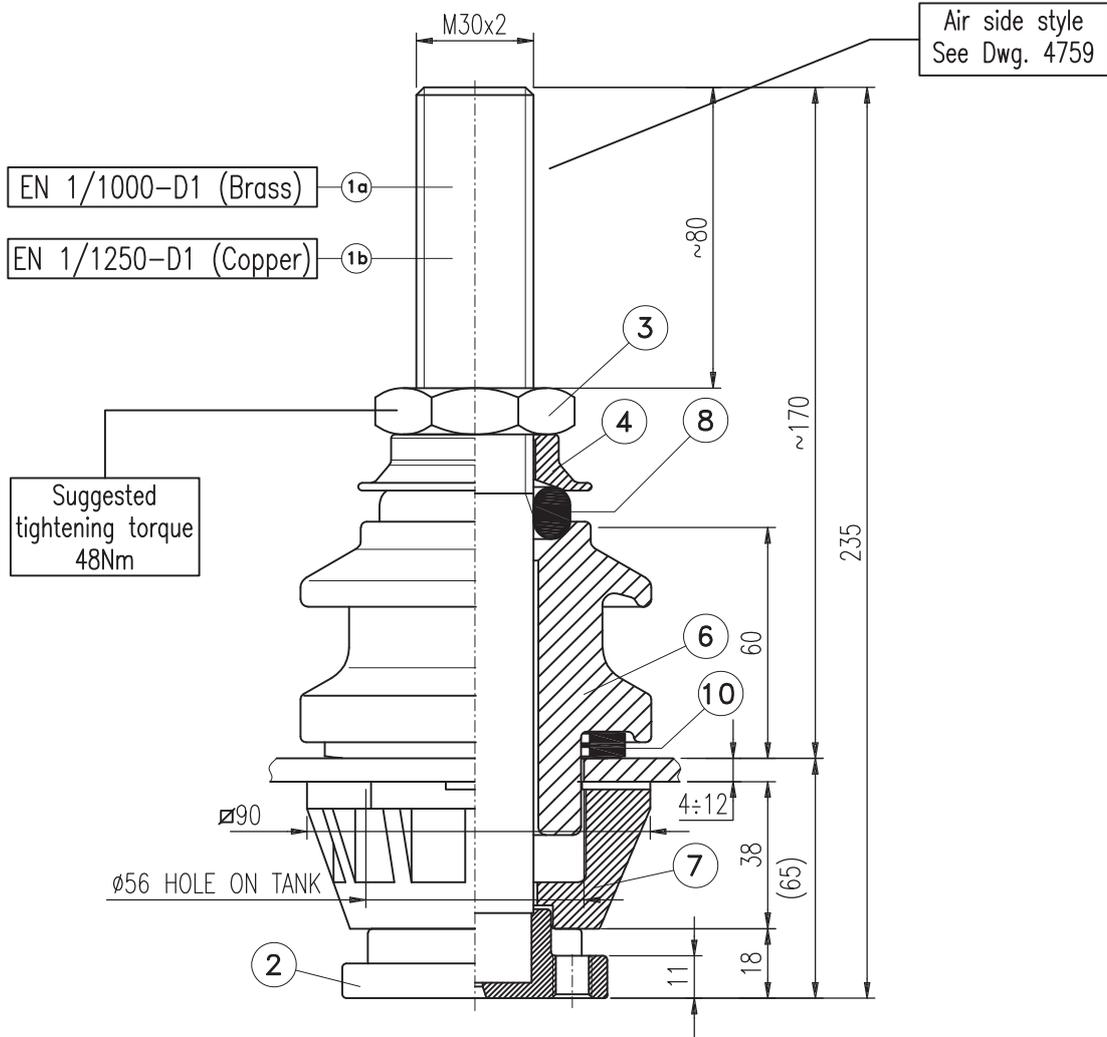
Dis. J. Gandini

Visto G.F. Giorgi

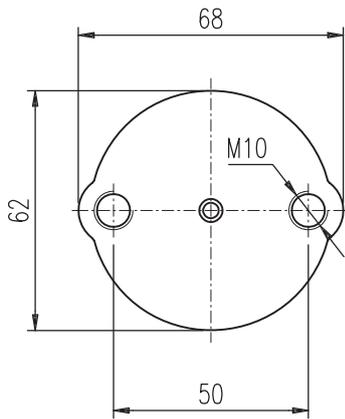
Dis. Nr

4747

1 2



Oil Side style D1



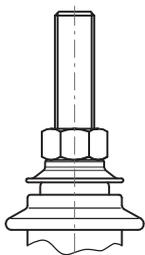
Pos	Description
1a	Brass spade "EN 1/1000"
1b	Cu spade "EN 1/1250"
2	Brass bottom plate
3	Tightening ring
4	Brass cap EN 1/1000
6	Porcelain EN 1/1000
7	Bottom insulator body
8	Ring gasket EN 1/1000
10	Flange gasket EN 1/1000

Rated voltage: 1kV  
 P.F. 1': 15kV  
 BIL: 30kV  
 Rated current EN 1/1000: 1000A  
 Rated current EN 1/1250: 1250A  
 Creepage dist.: 80mm

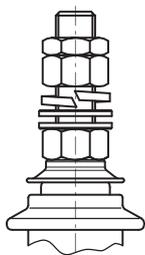
TYPE	ROD MATERIAL	CODE
EN 1/1250-D1	Copper	BN112BG9BNO
EN 1/1000-D1	Brass	BN110BG9BNO



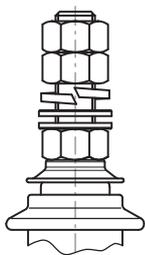
Bushings EN 1/250 & EN 1/630



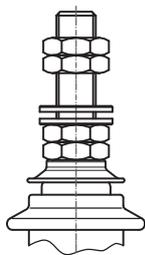
Execution "F0"  
(Naked)



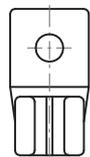
Execution "C1"  
(N°2 full nuts &  
N°1 thin nut)



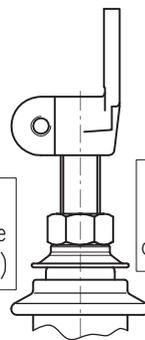
Execution "D3"  
(N°3 full nuts)



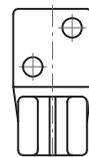
Execution "BS"  
(N°4 thin nuts)



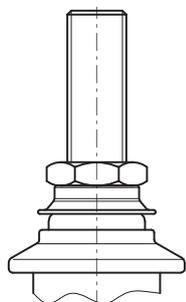
Execution "DP"  
(See the catalogue  
of Flag Drg. 3788)



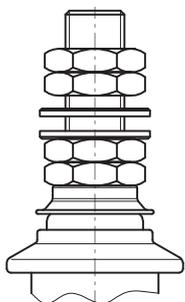
Execution "UN"  
(See the catalogue  
of Flag Drg. 2279/2790)



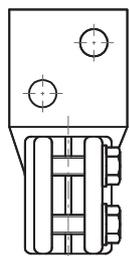
Bushings EN 1/1000 & EN 1/1250



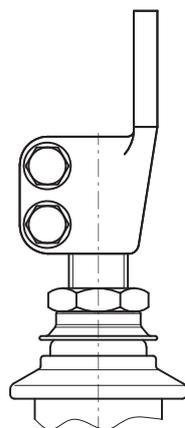
Execution "F0"  
(Naked)



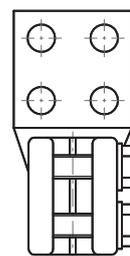
Execution "BS"  
(N°4 thin nuts)



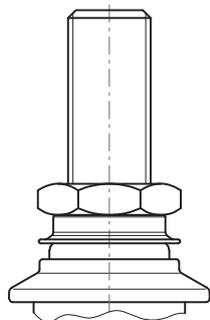
Execution "EP"  
(See the catalogue  
of Flag Drg. 3786)



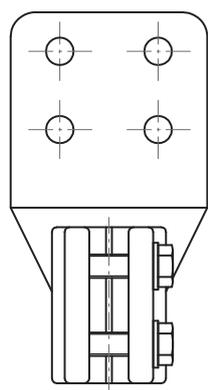
Execution "UN"  
(See the catalogue  
of Flag Drg. 3786)



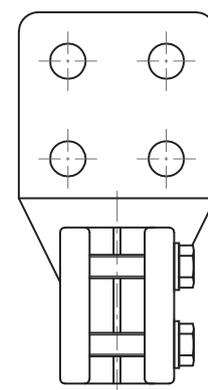
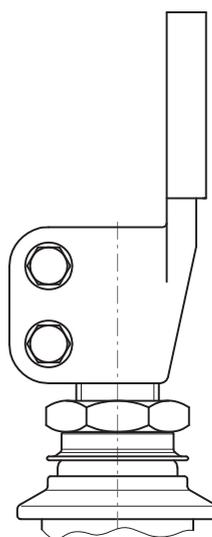
Bushings EN 1/2000 & ED30



Execution "F0"  
(Naked)



Execution "FP"  
(See the catalogue of  
Flag Drg. 3786)



Execution "UN"  
(See the catalogue of  
Flag Drg. 3786)

For ED40 & 3/4500 only  
Execution "UN"

# ORDER FORM

A4 (210x297)  
 LMT [(0,0) (196,286)]  
 DWG  
 FILE = 4400  
 REV. 02 DTD 02/11/21  
 MR si riserva a termini di legge la proprietà del presente disegno con divieto di riproduzione o comunicato a terzi senza sua autorizzazione.

Type of Bushing:

EN Series M.Y. 2021

ED Series

EN 1/630 MS  "Brass Rod"    EN 1/1000  "Brass Rod"    EN 1/1800  "Brass Rod"

EN 1/250

ED30   
(3150A)

ED40   
(4500A)

ED50   
(5000A)

EN 1/630 Cu  "Copper Rod"    EN 1/1250  "Copper Rod"    EN 1/2000  "Copper Rod"

Creepage distance:

..... mm

Airside components:

Naked     Nuts (Only for 250&630A)     DIN Flag     UNEL Flag     NEMA Flag     SPECIAL

Oil side components:

Only for Spade execution

EN 1/250:    N (threded)     S (Spade)

EN 1/630 MS:    N (threded)     S (Spade)

EN 1/630 Cu:    N (threded)

EN 1/1000:    N (Base)     S (Spade)     1 Hole  V3    2 Holes  S

EN 1/1250:    N (Base)     S (Spade)     1 Hole  V3    2 Holes  S

EN 1/1800:    N (Base)     S (Spade)     2 Holes  V3    3 Holes  S

EN 1/2000:    N (Base)     S (Spade)     2 Holes  V3    3 Holes  S

EN Series M.Y. 2021

ED30:    N (Base)     S (Spade)     3 Holes  V3    5 Holes  S

ED40:    N (Base)     S (Spade)     4 Holes  V3    6 Holes  S

ED50:    N (Base)

ED Series

Gasket:

NBR (-30°C/+120°C)     NBC (Cork TD1120) (-30°C/+120°C)     Low temp. (Cork TD7000) (-45°C/+120°C)     Very Low temp. (Blue Fl/Sil) (-60°C/+150°C)     Heavy Duty (VITON) (-20°C/+150°C)

Surface finishing:

Tinplated 6/10 µm     Silver plated 6/10 µm

Only Flag (F)     Flag & Cap (F+C)     Flag/Cap/Rod (F+C+R)

Notes:

.....  
 .....  
 .....  
 .....



Titolo  
 New CEDASPE 1kV  
 Series 2021 Order sheet

Data 02/11/21

Scala ==

Dis.

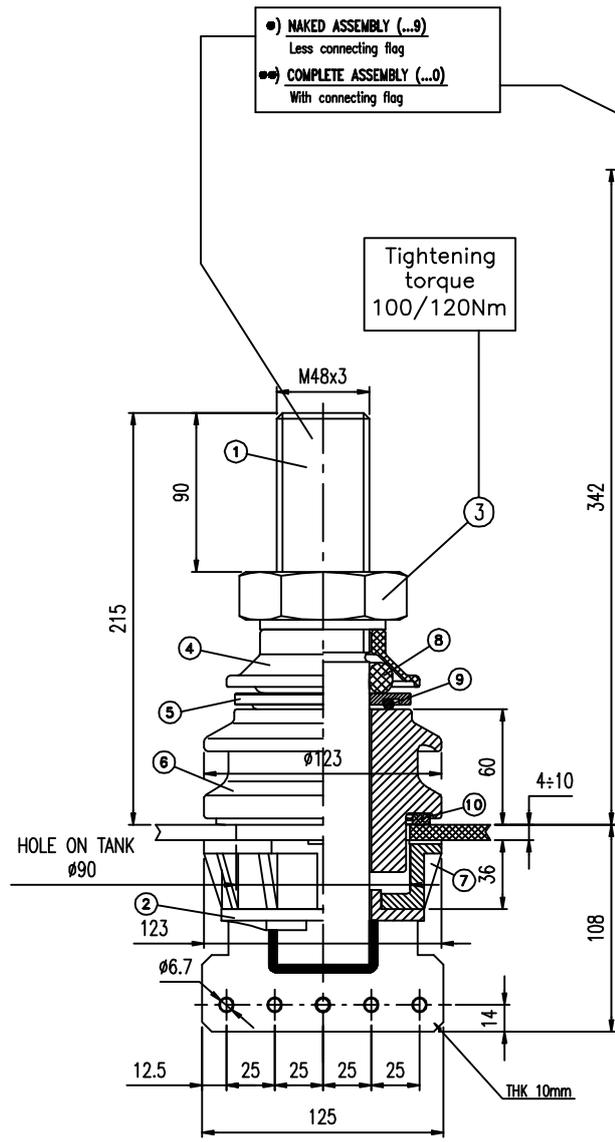
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Dis. Nr

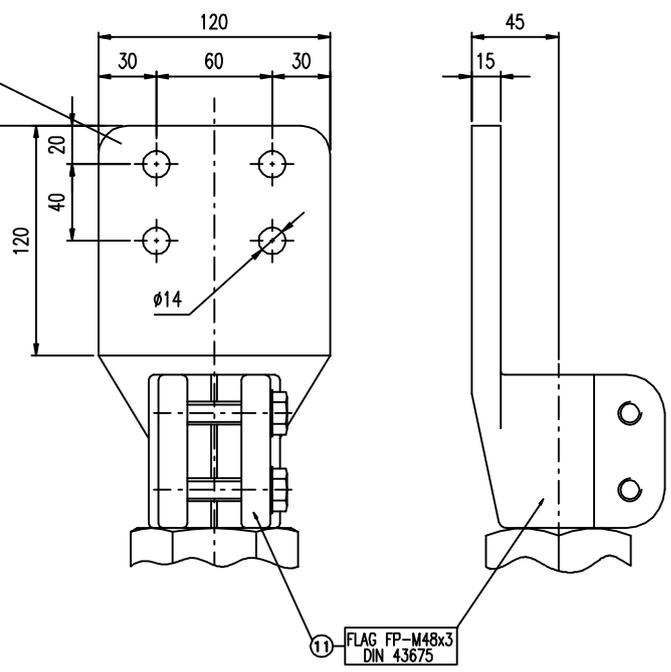
4400

1 2

**LV BUSHINGS ED**  
**1KV -3150/4000/5000A**



ED-S/30 - R  
CEDASPE Code: BE0A30S169



ED-S/30 - V3 (See Drg. 4277)  
CEDASPE Code: BE0A30S179

Pos	Description
1	Copper rod "ED-S/30"
2	Bottom closing piece
3	Tightening ring
4	Brass cap ED 30
5	Medium spacer
6	Porcelain ED 30
7	Bottom insulator body
8	Ring gasket ED 30
9	O-Ring OR6250
10	Flange gasket

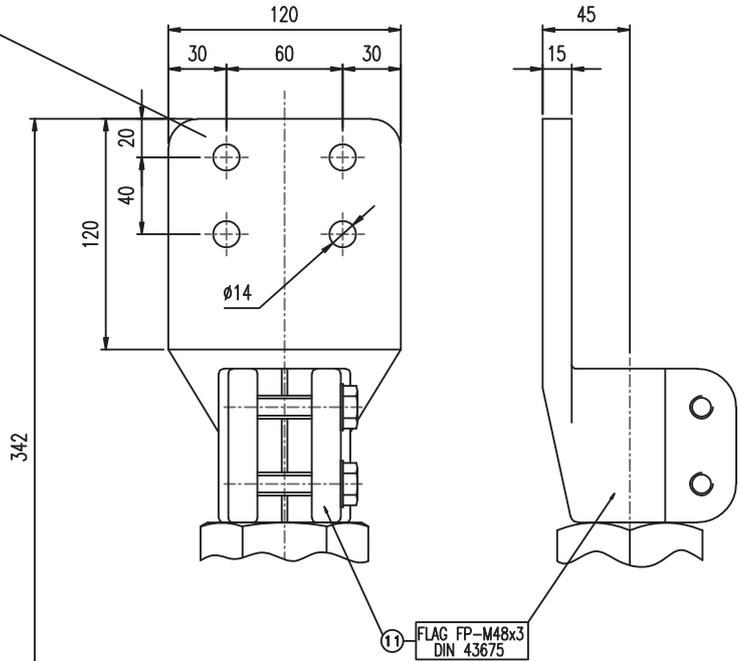
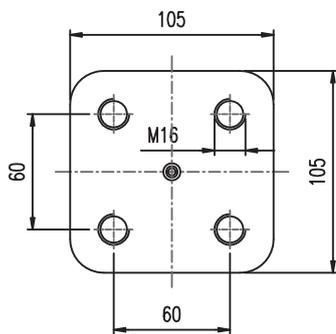
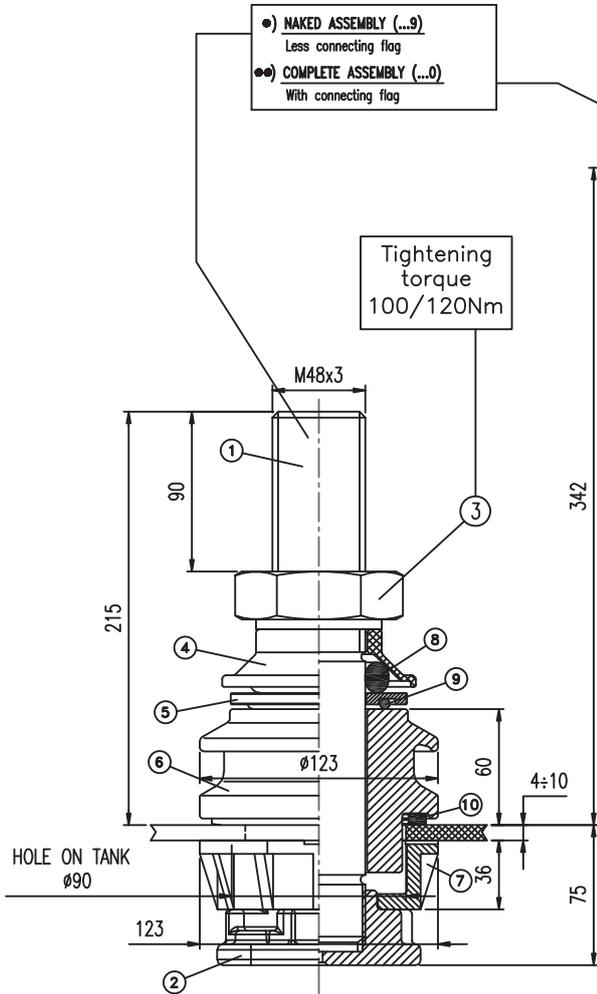
Rated voltage: 1kV  
 P.F. 1': 10kV  
 BIL: 20kV  
 Rated current: 3150A  
 Creepage dist.: 80mm



ISOLATORI PER TRASFORMATORI  
 TRANSFORMER BUSHINGS  
 TYPE ED-S/30 (1/3150 EN 50386)

Data 23/01/06  
 Scala 1:4  
 Dis.  
 Visto

Dis. Nr  
 7350  
 1 2



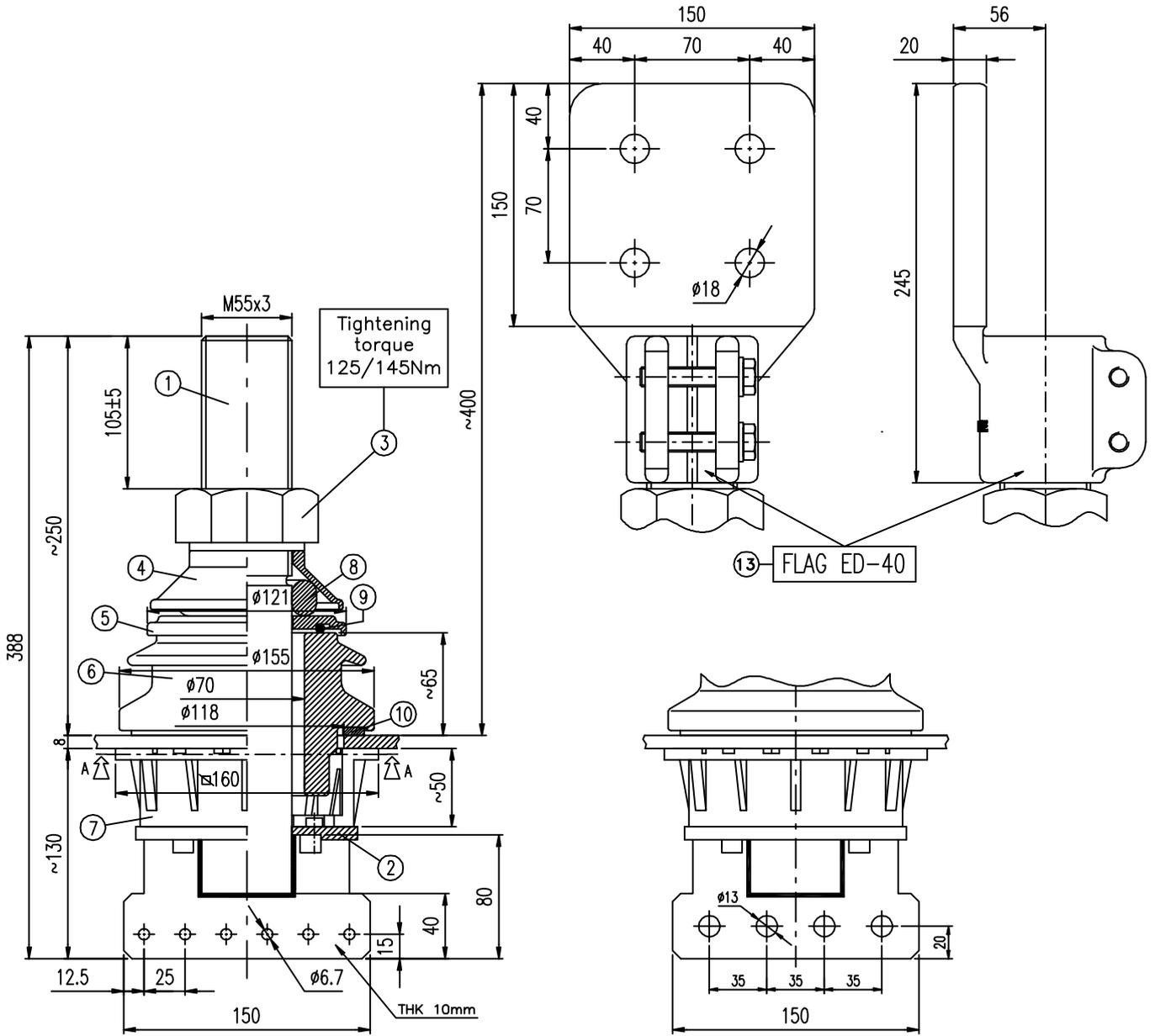
Pos	Description
1	Copper rod "ED-N/30"
2	Brass connection piece
3	Tightening ring
4	Brass cap ED 30
5	Medium spacer
6	Porcelain ED 30
7	Bottom insulator body
8	Ring gasket ED 30
9	O-Ring OR6250
10	Flange gasket

Rated voltage: 1kV  
 P.F. 1': 15kV  
 BIL: 30kV  
 Rated current: 3150A  
 Creepage dist.: 80mm  
 CEDASPE Code: BE0A30N0....



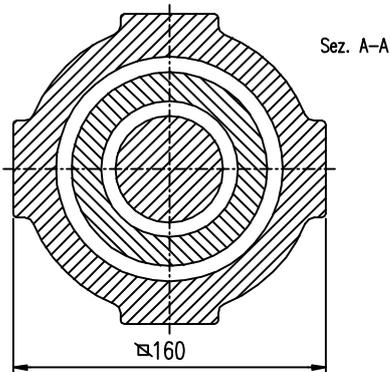
ISOLATORI PER TRASFORMATORI  
*TRANSFORMER BUSHINGS*  
 TYPE ED-N/30 (1/3150 EN 50386)

Data	23/01/06	Dis. Nr <b>7351</b>
Scala	1:4	
Dis.		
Visto		6 7 8



ED-S/40 - R  
CEDASPE Code: BE0A40S169

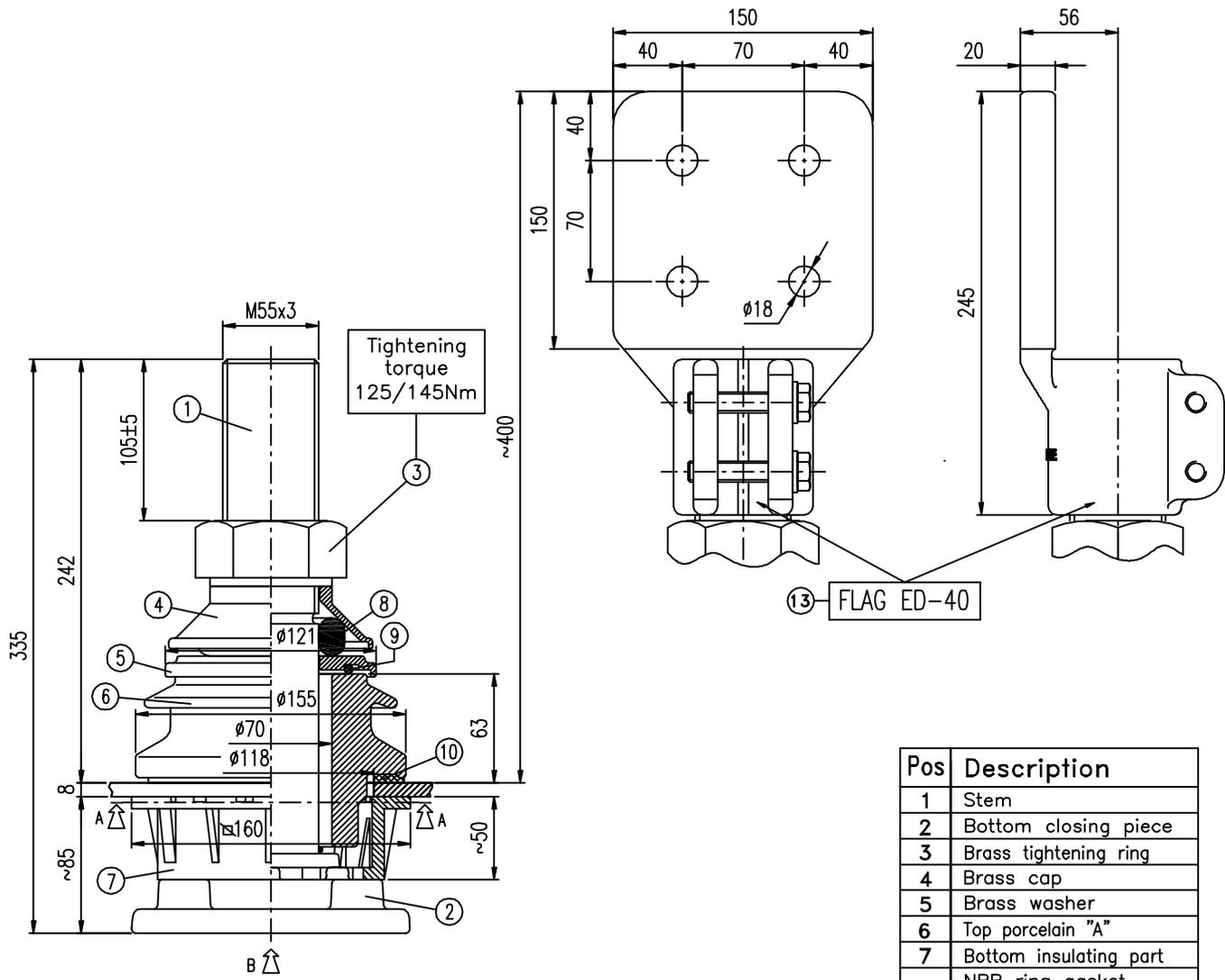
ED-S/40 - V3 (See Drg. 4334)  
CEDASPE Code: BE0A40S179



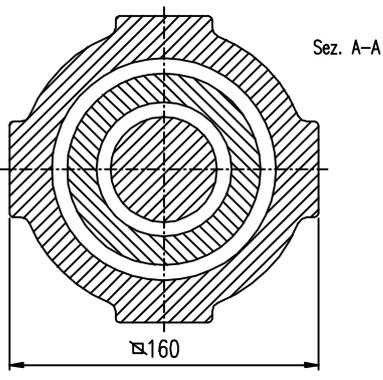
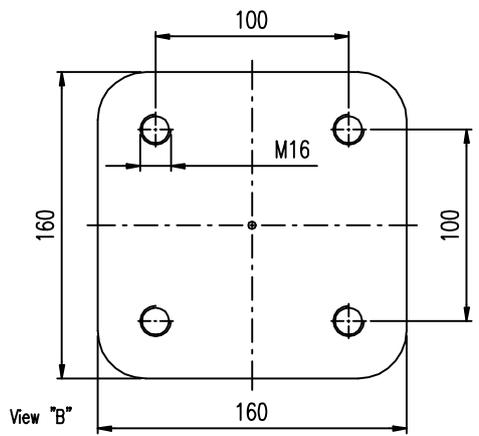
Pos	Description
1	Stem
2	Bottom closing piece
3	Brass tightening ring
4	Brass cap
5	Brass washer
6	Top porcelain "A"
7	Bottom insulating part
8	Viton ring gasket
9	Viton O-Ring OR6337
10	Cork flange gasket

Rated voltage: 1kV  
P.F. 1': 10kV  
BIL: 20kV  
Rated current: 4000A  
Creepage dist.: 90mm

THIS BUSHING IS ACCORDING TO  
EN 50386 SPEC'S SIZE 1/4000



Pos	Description
1	Stem
2	Bottom closing piece
3	Brass tightening ring
4	Brass cap
5	Brass washer
6	Top porcelain "A"
7	Bottom insulating part
8	NBR ring gasket
9	Viton O-Ring OR6337
10	Cork flange gasket



Rated voltage: 1kV  
 P.F. 1': 10kV  
 BIL: 20kV  
 Rated current: 4000A  
 Creepage dist.: 90mm

THIS BUSHING IS ACCORDING TO  
 EN 50386 SPEC'S SIZE 1/4000

