

PORCELAIN BUSHINGS

MV Series



A tried-and-tested bushing for the high-voltage side of distribution transformers



BUSHINGS: GENERAL INFORMATION

1.0 Electrical characteristics (Ir = rated current; Ur = rated voltage)

1.1 Standard insulation levels

Rated voltage Ur kV (r.m.s.)	One minute power frequency withstand voltage wet and dry kV (r.m.s.)	Dry lightning impulse withstand voltage dry (1,2/50 ms) kV
1	10	20
3,6	10	40
12	28	75
24	50	125
36	70	170
52	95	250

1.2 Standard values of rated thermal short time current (I_{th}) 25 times the rated current (I_r) for 2 s ; for I_r equal or greater than 4000A, I_{th} is always 100kA

1.3 Overload conditions (IEC 354): Bushing selected with I_r not less than 120% of the rated current of the transformers are considered to be able to withstand the overload conditions according to IEC 354.

2.0 Mechanical characteristic

2.1 Cantilever operating load (bushing installed less than 30° from vertical)

Ur kV	Ir			
	800 A	1600 A	2500 A	3150 A
36	500 N	625 N	1000 N	1575 N
52	500 N	625 N	1000 N	1575 N

2.2 Cantilever operating load (bushing installed more than 30° from vertical)

Ur kV	Ir			
	800 A	1600 A	2500 A	3150 A
36	300 N	375 N	600 N	945 N
52	300 N	375 N	600 N	945 N

2.3 Cantilever test load

Ur kV	Ir			
	800 A	1600 A	2500 A	3150 A
36	1000 N	1250 N	2000 N	3150 N
52	1000 N	1250 N	2000 N	3150 N

3.0 Tightening torque (suggested values, +/- 10% depending on the quality of the tank cover surface)

3.1 On the central conductor LV/HV in brass or copper




CEDASPE S.p.a
 S.Giuliano MILANE (ITALY)

- ▶ Closing nut partially tightened for transport / storing
 ATTENTION: complete the tightening before testing / commissioning
- ▶ Die Mutter ist aus Transportgruenden Und Lagergründen.
 ACHTUNG: Vor in Betrieb nahme sind alle Teile nochmals anzuziehen.
- ▶ Tuerca parcialmente serrada para transporte y para tenerlo en almacen
 ATENCION: completar el serraje de la tuerca antes de la puesta en marcha
- ▶ ATTENTION: Écrous partiellement vissé pour le transport et stockage.
 Le visser complètement avant essai/mise en service
- ▶ Dado parzialmente serrato per il trasporto / immagazzinamento.
 ATTENZIONE: completare il serraggio prima del collaudo / messa in servizio

Tightening Torque (+/-10%)

Current	Size	Torque
250 A	M12	13 Nm
630 A	M20	30 Nm
1250 A	M30x2	70 Nm
2000 A	M42x3	115 Nm
3150 A	M48x3	150 Nm
4500 A	M55x3	200 Nm
6300 A	M75x3	200 Nm
5000/8000 A	M90x4	200 Nm

3.2 On the steel fixing stud of HV bushings

Size	Torque
M10	15 Nm
M12	25 Nm
M16	40 Nm

3.3 On the locking bolts of the flags

Size	Torque
M10	25 Nm
M12	40 Nm
M16	90 Nm

Sect. 2 **H.V. BUSHINGS FOR DISTRIBUTION TRANSFORMERS**

Page 2.1: It shows the standard executions according to DIN 42531 (UNEL 38144-74 for Italy, UNE 20-176-89 for Spain).

Highlighted the most common connection sketches of the active part :

Fig. A1: Bolt drilled with different diameters for brazing the wire

Fig. HJ4: The bottom of the bolt pos. 2 is fitted with a short flexible 6 sqmm copper wire to enable crimping connection

Fig. HJ5: Same as fig. HJ4, but with an annealed copper rod dia 5mm instead of the copper wire

Fig. WC2: With a special longer bolt and one additional M12 brass nut on the air side connection (SCECO specification)

Page 2.1EN: It shows the bushing according to the new European standard EN 50180 with pollution level (I-II-III-IV IEC815)

Page 2.3: It shows the 36kV bushings, with long creepage, up to 1650mm, using the same components of DIN 42531 with special porcelains

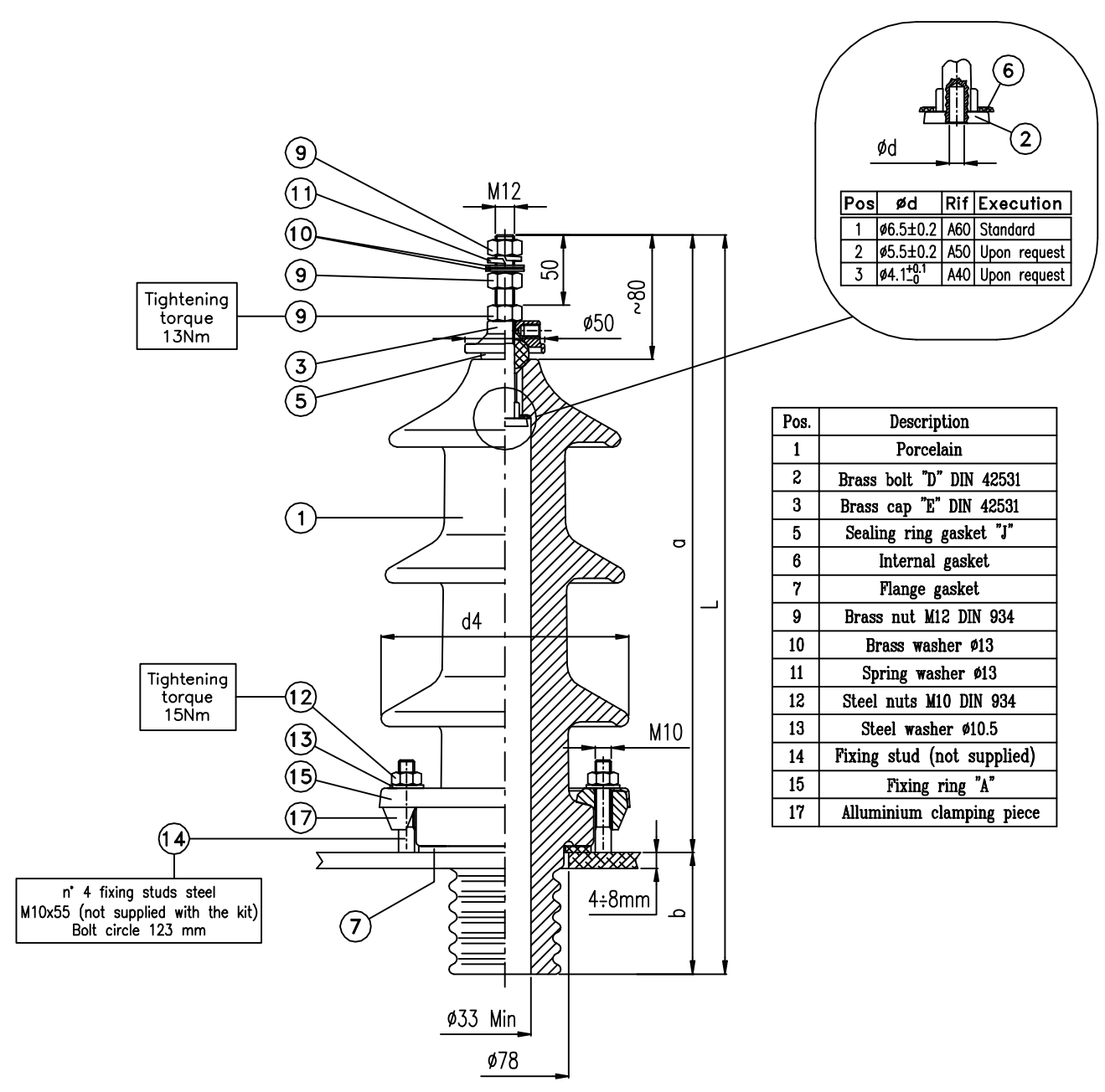
Page 2.4-2.5: Single gap (fig. 2.4) or double gap (fig. 2.5) arcing horns

REMARK: At page 2.1, the components are marked with ref. pos. according to DIN 42531; just to simplify the ref. pos. numbers according to UNEL 38144-74 and UNE 20-176-89 are shown on the right hand side columns.

COMMENTS ON PAGE 2.1 – 2.1EN – 2.2EN – 2.3 – 2.4 – 2.5

Pos. 2	Brass top bolt. <i>Different styles of internal connection at page 2.1</i>
Pos. 3	Brass cap
Pos. 4-16-23- 29-30-31	Arcing horns in mild steel zinkplated. Upon request, in stainless steel AISI 304
Pos. 5	NBR ring gasket "J"
Pos. 6	Fiber gasket "O"
Pos. 7	NBR flange gasket. Upon request, in impregnated cork
Pos. 8-11-12- 13-28	Nuts and washers in mild steel zinkplated. Upon request, in stainless steel AISI 304
Pos. 15	Fixing ring in zinkplated mild steel, or, upon request, in aluminium 99.5 or in stainless steel AISI 304 (thickness 1,2 mm)
Pos. 17	Aluminium clamping piece; upon request, in zink alloy
Pos. 22	"V" bracket in zinkplated mild steel
Pos. 27	Half collar support in zinkplated mild steel for medium arcing horn

FILE = 3775 .DWG LMT [(0,0) (196,286)] A4 (210x297)
 REV. 02 DTD 26/05/2017
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Pos	ϕd	Rif	Execution
1	$\phi 6.5 \pm 0.2$	A60	Standard
2	$\phi 5.5 \pm 0.2$	A50	Upon request
3	$\phi 4.1^{+0.1}_0$	A40	Upon request

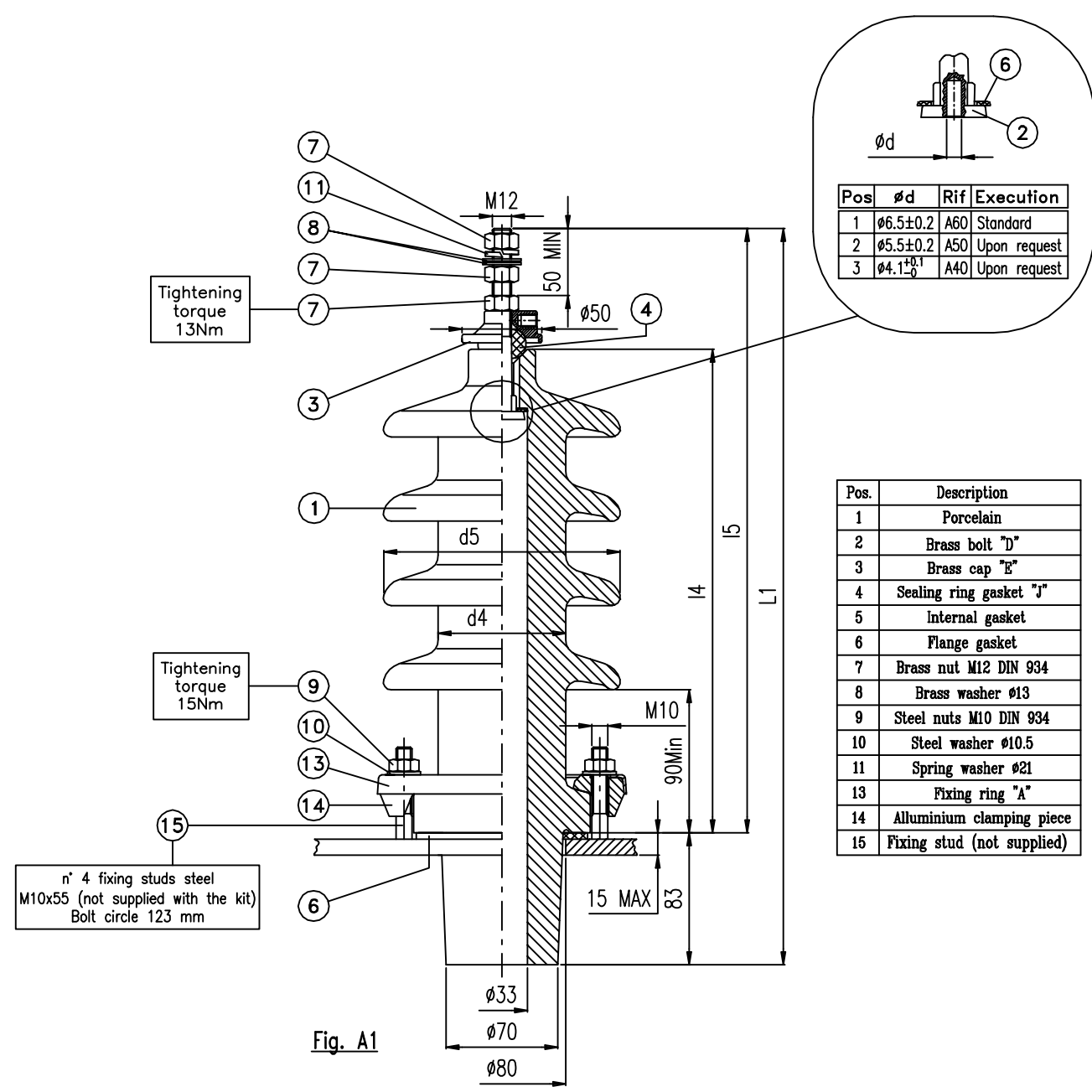
Pos.	Description
1	Porcelain
2	Brass bolt "D" DIN 42531
3	Brass cap "E" DIN 42531
5	Sealing ring gasket "J"
6	Internal gasket
7	Flange gasket
9	Brass nut M12 DIN 934
10	Brass washer $\phi 13$
11	Spring washer $\phi 13$
12	Steel nuts M10 DIN 934
13	Steel washer $\phi 10.5$
14	Fixing stud (not supplied)
15	Fixing ring "A"
17	Alluminium clamping piece

Bushing	Voltage KV	Current A	PF 1' kV	BIL kV	Creepage distance	a mm	b mm	L mm	d4 mm	N° of sheds Z	G.M. Kg	Volume dm ³
10Nf/250	12	250	30	75	290	310	61	371	140	2	4.5	10
20Nf/250	24	250	55	125	440	385	76	461	155	3	6.1	15
30Nf/250	36	250	77	170	580	485	76	561	155	4	7.5	28

THE FIGURE SHOWS THE BUSHING 20/250 (1:3 SCALE)

	Titolo	Data 11/03/13	Dis. Nr				
	Outdoor transformer bushings DIN 42531 Rated current 250A	Scala 1:4	3775				
		Dis.					
		Visto	1	2			

REV. 03 DTD 26/05/17
 FILE = 3776 .DWG LMT [(0,0) (196,266)] A4 (210x297)
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Pos	ϕd	Rif	Execution
1	$\phi 6.5 \pm 0.2$	A60	Standard
2	$\phi 5.5 \pm 0.2$	A50	Upon request
3	$\phi 4.1^{+0.1}_0$	A40	Upon request

Pos.	Description
1	Porcelain
2	Brass bolt "D"
3	Brass cap "E"
4	Sealing ring gasket "J"
5	Internal gasket
6	Flange gasket
7	Brass nut M12 DIN 934
8	Brass washer $\phi 13$
9	Steel nuts M10 DIN 934
10	Steel washer $\phi 10.5$
11	Spring washer $\phi 21$
13	Fixing ring "A"
14	Aluminium clamping piece
15	Fixing stud (not supplied)

Fig. A1

Arcing horns upon request

Bushings	Voltage KV	Current A	PF 1' kV	BIL kV	Porcelain			l4 max mm	l5 max mm	d4 max mm	d5 max mm	L1 max mm	Z n° of sheds	Pollution level and min.creep.distance			
					Creepage distance	Arcing distance	Type							I	II	III	IV
12-250/P2 (12-250/P1)	12	250	30	75	260	145	1	190	270	75	140	353	2	192	240	===	===
24-250/P2 (12-250/P4)	24		55	125	490	260	2	304	384	80	150	467	4	384	480	300	372
36-250/P1 (24-250/P3)	36		77	170	605	315	3	357	437	80	155	520	5	576	===	600	===
36-250/P3 (24-250/P4)	36		77	170	935	465	4	516	596	80	155	679	8	===	720	900	744
36-250/P4	36		77	170	1165	485	5	516	596	80	190	679	8	===	===	===	1116

THE FIGURE SHOWS THE BUSHING 24/250 P2 (1:3 SCALE)

	Titolo		Data 11/03/13		Dis. Nr	
	Outdoor transformer bushing EN Rated voltage 12-24-36 kV Rated current 250A		Scala 1:3		3776	
			Dis.			
			Visto		1 2 3	

FILE = 3778 .DWG LMT (Co.) (196.266) AA (210x297)
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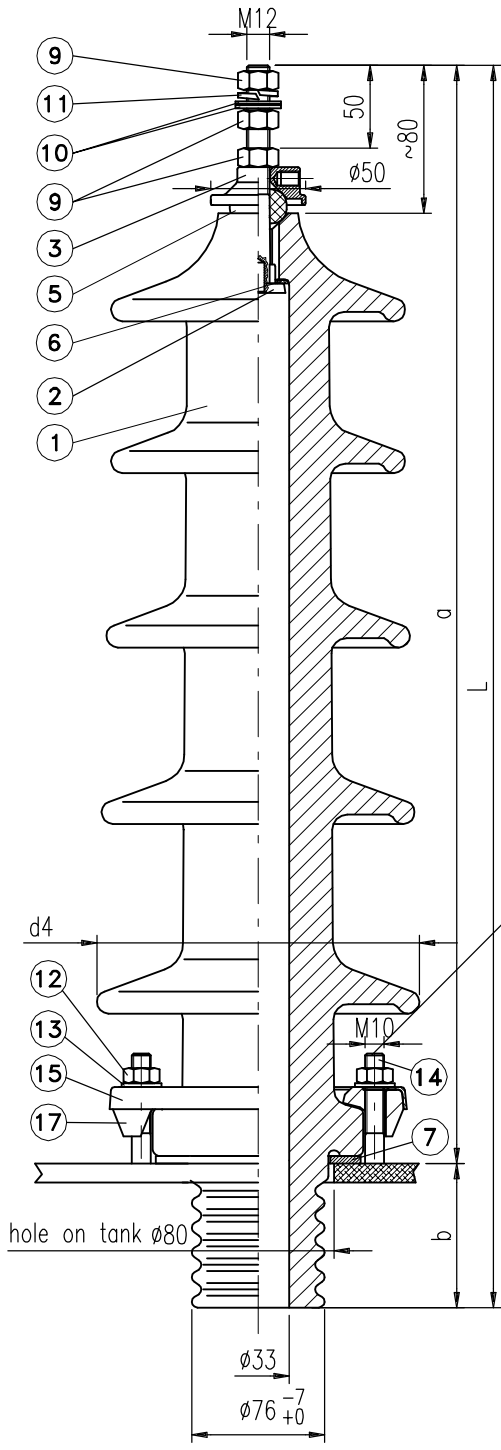


Fig. "A"

Pos	Descrizione / Description	UNEL	UNESA
1	PORCELLANA PORCELAIN	1	1
2	PERNO DI CHIUSURA "D" BRASS BOLT "D" DIN42531	2	2
3	CAPPA "E" BRASS CAP "E" DIN42531	4	4
5	GUARNIZIONE TOROIDALE "J" SEALING RING GASKET "J"	7	5
6	GUARNIZIONE SAGOMATA INTERNAL GASKET	8	6
7	GUARNIZIONE FLANGIA FLANGE GASKET	10	7
9	DADO M12 OT. UNI 5588 BRASS NUTS M12 DIN 934	9	8
10	RONDELLA OTTONE Ø13 BRASS WASHER Ø13	20	9
11	RONDELLA GROWER UNI 1751 SPRING WASHER Ø13	19	-
12	DADO M10 Fe UNI 5588 STEEL NUTS M10 DIN 934	17	-
13	RONDELLA Fe Ø10.5 STEEL WASHER Ø10.5	18	-
14	PRIGIONIERO (** NON FORNITO) WELDING STUD (** NOT SUPPLIED)	16	-
15	ANELLO DI FISSAGGIO FIXING RING "A"	14	-
17	BLOCCHETTO ALLUMINIO ALU-CLAMPING PCE	15	-

n° 4 prigionieri di fissaggio M10x58
 in acciaio su dia 123 mm (non forniti)
 n°4 fixing studs made in steel
 M10x58 Bolt circle 123 mm
 (not supplied with the kit)

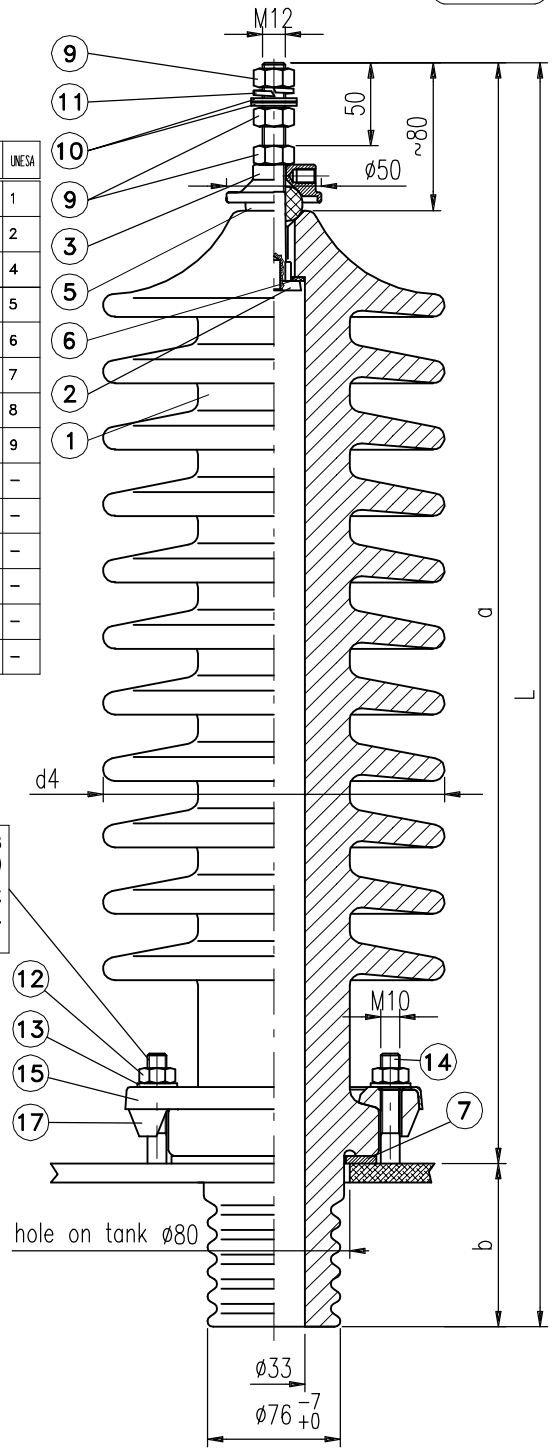


Fig. "B"

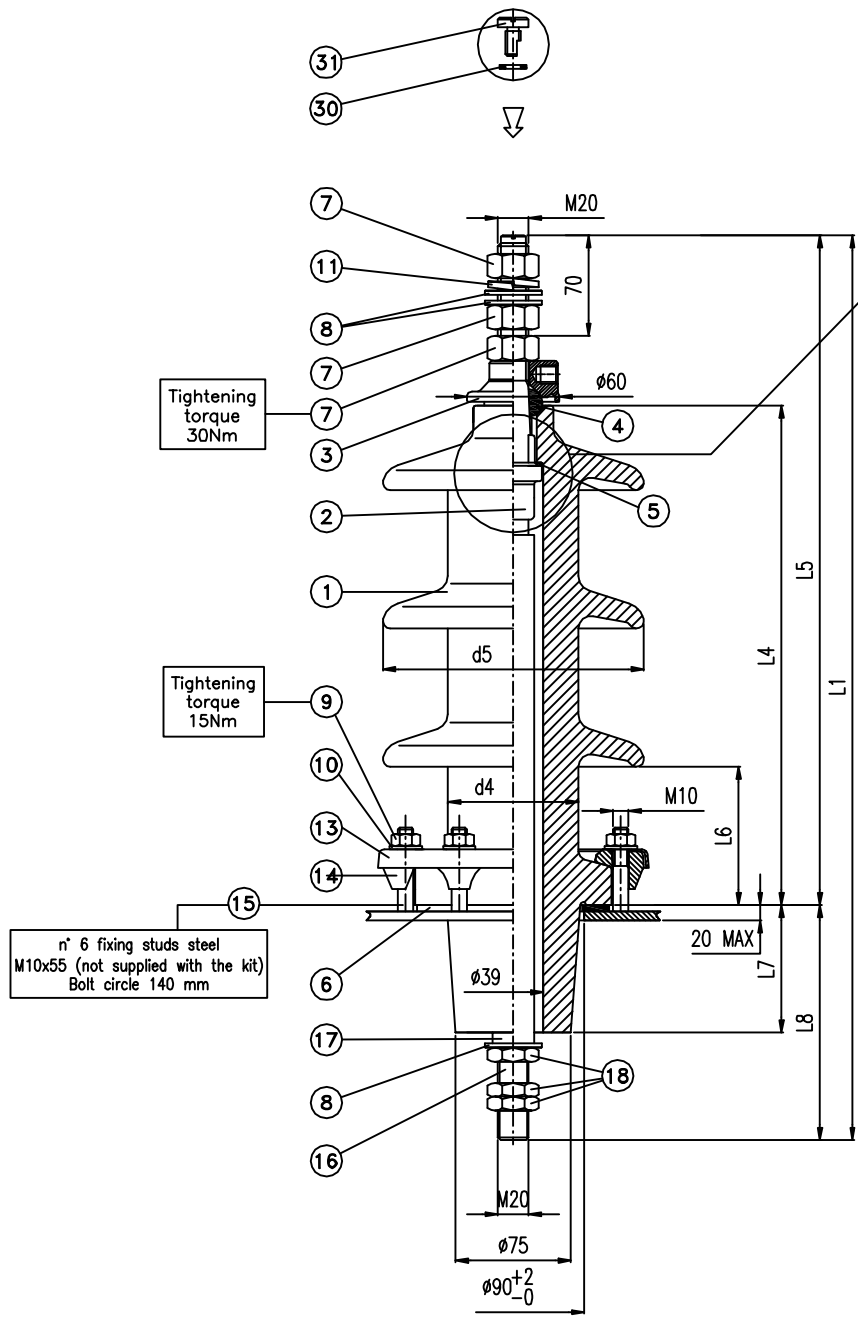
* Su richiesta porcellan 40/250 codolo lato olio b=175
 * On demand porcelain 40/250 oil tail b=175

Isolatore Bushing	Fig. Fig.	Tensione Voltage KV	Corrente Current A	Linea di fuga Creepage distance	PF 1' kV	BIL KV	a mm	b mm	L mm	d4 mm	N°ALETTE N° of sheds Z	Massa Kg	Volume Volume dm³
40/250-810	A	36	250	810	70	200	577	80*	658	170	5	9	36
33/250-1320	B			1320			576	90	666	180	11	12	33
33/250-1650	B			1650			646	100	746	185	13	15	35

LA FIGURA "A" MOSTRA ISOLATORE 40/250 IN SCALA 1:4
 THE FIGURE "A" SHOWS THE BUSHING 40/250 (1:4 SCALE)

LA FIGURA "B" MOSTRA ISOLATORE 33/250 IN SCALA 1:4
 THE FIGURE "B" SHOWS THE BUSHING 33/250 (1:4 SCALE)

	Titolo	Data	11/03/13	Dis. Nr 3778
	Outdoor transformer bushing	Scala	1:4	
	Rated current 250A	Dis.		
	extended creepage distance	Visto		



Pos.	Description
1	Porcelain
2	Brass bolt "D"
3	Brass cap "E"
4	Ring gasket "J"
5	Internal gasket
6	Flange gasket "N"
7	Brass nuts M20 DIN 934
8	Brass washer Ø21 DIN 125
9	Mild steel zinkplated nut M10
10	Mild steel zinkplated washer Ø10.5
11	Spring washer Ø21 DIN 127
13	Fixing ring "B" DIN 42531
14	Alluminium clamping piece "E" DIN 42538
15	Fixing stud M10x55 (not supplied)
16 *	Rigid copper rod
17 *	Insulating tube C.B.
18 *	Brass locknut M20 DIN 936
30-31	Vent screw

* supplied only for Esec. T1 (on request)

Arcing horns upon request

Bushing	Voltage KV	Current A	PF 1' kV	BIL kV	Porcelain			L4 max mm	L5 max mm	L6 min mm	d4 max mm	d5 max mm	L1 max mm	L7 max mm	L8 max mm	G.W. Kg	Z n° of sheds	Pollution level and min.creep.distance			
					Creepage distance	Arcing distance	Type											I	II	III	IV
12-630/P3	12	630	30	75	315	190	6	235	350	90	80	155	503	83	153	7.0	2	192	240	300	===
24-630/P2 (12-630/P4)	24		55	125	490	285	7	325	440	90	85	170	593	83	153	9.5	3	===	===	===	372
36-630/P2 (24-630/P4)	36		77	170	760	375	8	423	540	100	85	180	693	83	153	13.0	5	===	===	600	744
36-630/P4				200	1155	475	9	515	630	100	85	210	850	150	220	18.0	7	===	===	900	1116

THE FIGURE SHOWS THE BUSHING 24/630 P2 (1:4 SCALE)

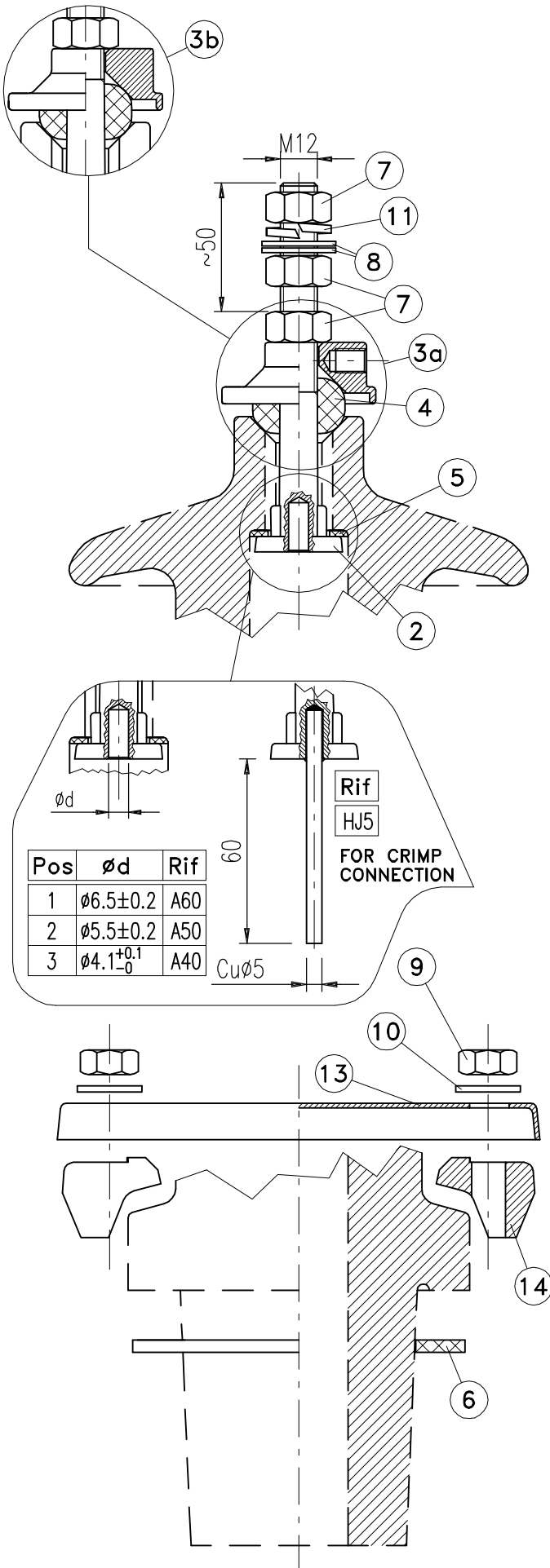


Titolo
Outdoor transformer bushing EN 50180
 Rated voltage 12-24-36kV
 Rated current 630A

Data 11/03/13
 Scala 1:5
 Dis.
 Visto

Dis. Nr
3784

1	2	3	4	
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... CUSTOMIZED : PLEASE FILL THE COLUMN					
Pos	Description	N00	E10	L10	K00
...	CUSTOMIZED : PLEASE FILL THE COLUMN				
K00	BLIND CAP, NO NUTS & NO WASHER (LOW BUDGET)				
L10	KIT WITH INOX RINGS, NUTS & WASHER (NO SPRING)				
E10	KIT WITH ALUM RINGS, INOX NUTS & WASHER				
N00	NORMAL KIT				
2	Bolt H-ED A60 d 6.5 A50 d 5.5 A40 d 4.1 HJ5 ROD ø5	1 Upon Demand Upon Demand Upon Demand	1	1	1
3	Cap H-ED 3a(M8) 3b(blind)	1 -	1	1	- 1
4	Ring gasket "J" NBR	1	1	1	1
5	Fiber spacer D29	1	1	1	1
6	Flange gasket D108 NBR CORK	1 Upon Demand	1	1	1
7	Brass nut M12	3	3	3	1
8	Plain brass washer H-ED	2	2	2	-
9	Nuts M10 Steel White Zinc Plating S/S-A2	4 -	-	-	4 -
10	Plain washer D10.5 Steel White Zinc Plating S/S-A2	4 -	-	-	- 4
11	Spring ring D13 Steel White Zinc Plating S/S-A2	1 -	-	-	- 1
13	Fix ring "A" Steel White Zinc Plating Aluminium S/S-A2	1 -	-	-	1 -
14	Alu clamping piece	4	4	4	4
	Packing Cedaspe box (30 kit)	Y	Y	Y	-
	Loose bags (100 pcs)	-	-	-	Y



Titolo
**KIT H-ED-025
ACC TO EN50180**

Data 11/03/13
Scala 1:3
Dis.
Visto

Dis. Nr
3777

ORDER FORM

A4 (210x297)

Type of Bushing:

DIN

EN

LMT [(0,0) (196,266)]

System Rated Voltage (kV):

12

24

36

.DWG

Rated Current (A):

250

630

FILE = 4402

Creepage distance:

..... mm

OR

..... mm/kV

OR

..... Pollution level IEC 60815
(b;c;d;e / 1;2;3;4)

Airside components:

Nuts

DIN Flag

UNEL Flag

NEMA Flag

SPECIAL



Oil side components:

A1

T1

REV. 00 DTD 05/12/17

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)

La CEDASPE Power S.r.l. si riserva a termini di legge la proprietà del presente disegno con divieto di riproduzione o comunicazione a terzi senza sua autorizzazione.

Surface finishing:

Tinplated 6/10 µm

Silver plated 6/10 µm

Only Flag (F)

Flag & Cap (F+C)

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



Arcing horns:

NO

YES (DIN STYLE)

YES (UNEL STYLE)

Material of fixation Flange:

Aluminium

Stainless steel

Notes:

.....



Titolo
**MV Bushings
 Order sheet**

Data 05/12/17
 Scala ==
 Dis.
 Visto

Dis. Nr
4402