


**CEDASPE**

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TRANSFORMER BUSHINGS



# BUSHING FOR DISTRIBUTION TRANSFORMERS

Made in Italy 



Italian Transformer Components



## LV BUSHINGS “ED” by CEDASPE

- CEDASPE is happy to present a complete new family of LV bushings for distribution transformers with an innovative design (patent pending)
- These new bushings are in accordance with the new European specifications
- **EN 50386**, recently approved by all the European National Committees, but already included in the old Cenelec document HD596
- The design ED bushing is an evolution of the old DIN design and takes in consideration the new technologies and the specific requirements of the major customers.

### The most important characteristics of the ED Bushings are:

- Full interchangeability of all new ED bushings 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 gasket are compressed at the correct tightening torque. This reduce 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 doesn’t 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).

### Economical Advantages of the ED Bushings are:

The direct economic advantages are :

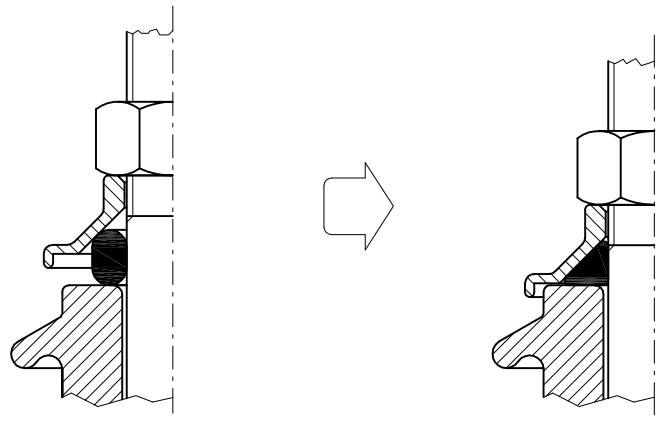
- Lower price of any ED bushing than the corresponding DIN sizes
- Price reduction is amplified in case of the spade models ED-S-06/10/18-MS, due to the possibility of using a brass rod for currents up to 580/1000/1800A respectively and the spade rod design

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)

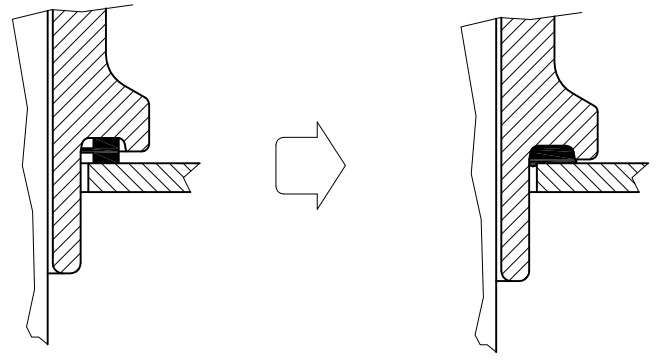


# ED Family

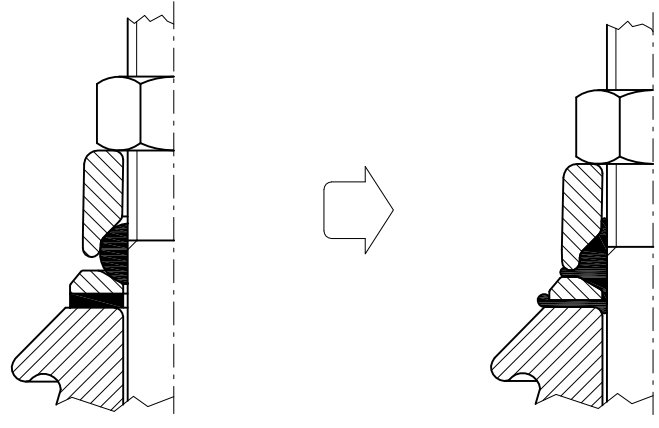


Before tightening with recommended torque

After tightening with recommended torque

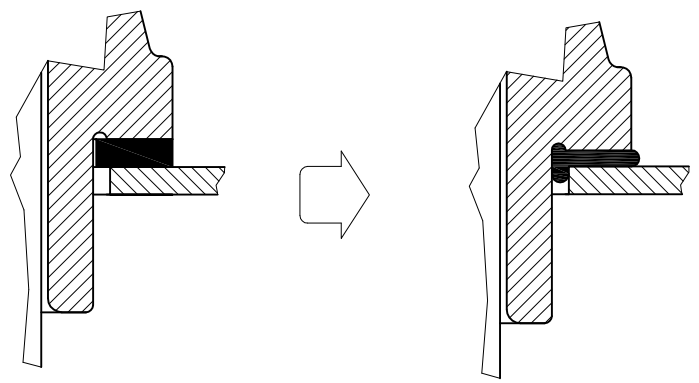


# DIN Family



Before tightening with recommended torque

After tightening with recommended torque



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INNOVATIVE DESIGN OF ED BUSHINGS GRANTING  
- GASKETS PROTECTION  
- GASKET PROPER DEFORMATION

*The picture below shows the two special tightening gasket protected form UV radiation, by the cap and by the flange seat*



## PRODUCT RANGE

### ED 02 - drg 1390

Voltage rating 1 kV

■ Current rating 250 A

■ Nominal creepage distance 60 mm

Brass rod

Two design of the oil side connection:

- ED-N/02, Threaded for traditional connection with brass nuts
- ED-S/02, With bottom spade for rivet connection



**ED 06 - drg 1391**

Voltage rating 1 kV      ■ Current rating 630 A      ■ Nominal creepage distance 75 mm  
Brass rod (Copper rod upon request)

Two design of the oil side connection:

- **ED-N/06**, Threaded for traditional connection with brass nuts (brass or copper rod)
- **ED-S/06**, Brass rod with bottom spade for rivet connection (the cheapest solution)



**ED 10 & 12 - drg 1394 & 1397**

Voltage rating 1 kV      ■ Current rating 1000 & 1250 A      ■ Nominal creepage distance 80 mm  
Brass rods& copper rods

Two design of the oil side connection:

- **ED-N/12**, 1250 A, Copper rod & Flat base and 2 holes M10 for traditional connection
- **ED-S/12**, 1250 A, Copper rod with bottom spade for rivet connection
- **ED-S/10**, 1000 A, Brass rod with bottom spade for rivet connection (the cheapest solution)



**ED 18 & 20 - drg 7300 & 7314**

Voltage rating 1 kV      ■ Current rating 1800 & 2000 A      ■ Nominal creepage distance 80 mm  
Brass rods & copper rods

Two design of the oil side connection:

- ED-N/20, 2000 A, Copper rod & Flat base and 4 holes M16 for traditional connection
- ED-S/20, 2000 A, Copper rod with bottom spade for rivet connection
- ED-S/18, 1800 A, Brass rod with bottom spade for rivet connection (the cheapest solution)



**ED N 30 & 40 - drg 7351 & 7428**

Voltage rating 1 kV      ■ Current rating 3150 A      ■ Nominal creepage distance 80 mm  
 ■ Current rating 4000 A      ■ Nominal creepage distance 90 mm

Design of the oil side connection:

- ED-N/30, 3150 A, Copper rod & Flat base and 4 holes M16 for traditional connection
- ED-N/40, 4000 A, Copper rod & Flat base and 4 holes M16 for traditional connection





### 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 ED 06-Ms satisfy in full the requirements of IEC 137, with the following results:

- Brass rod overtemperature of the oil side connection at 630 A above oil < 10 °C
- Brass rod overtemperature 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 (threephase)

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 ED06-Ms is even better:

- Brass rod overtemperature of the oil side connection at 580 A above oil < 6°C
  - Brass rod overtemperature of the air side connection at 580 A above air < 55°C
- (at 365 A the overtemperature 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 ED-S-10-Ms and ED-S-18-Ms satisfy in full the requirements of IEC 137, with the following results:

#### ED-S-10-Ms

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

#### ED-S-18-Ms

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

The overtemperature of the rods much lower than above limits using ED-S-10-Ms on 500 and 630 kVA transformers or ED-S-18-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 ED 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:

All our ED bushings are fit with special gasket made in NBR (nitrile rubber) suitable for use in mineral oil at a temperature range between -40°C and +115°C.

Upon request we can supply "VITON" rubber gaskets

**Information regarding LOGISTIC:**

- ❑ Highly standardized product means short delivery time
- ❑ Easy storage and easy use of the bushings, partially assembled, inside a dedicated package:
  - ED 02: 16 pcs in board boxes size cm 22x22 h20
  - ED 06: 12 pcs in board boxes size cm 29x22 h26
  - ED 10 & 12: 6 pcs in board boxes size cm 19x18 h28
  - ED 18,20,30,40 individual packing inside pallet box (see below)
- ❑ The result is a reduction of the total mounting time of the bushing on the transformer cover as no longer loss of time for picking components
- ❑ Standard delivery lots, with board boxes (12/16 pcs) in strong pressboard cases with 4ways wooden pallet suitable for truck and container transport, and for warehousing in racks:
  - ED 02: 576 pcs, case size cm 110x80 h 85, gross weight ~kg 330 (volume ~m<sup>3</sup> 0,75)
  - ED 06: 240 pcs, case size cm 110x80 h 73, gross weight ~kg 360 (volume ~m<sup>3</sup> 0,65)
  - ED 10/12: 120 pcs, case size cm 110x80 h 73, gross weight ~kg 350 (volume ~m<sup>3</sup> 0,65) without flags
  - ED 20: 60 pcs, case size cm 110x80 h 60, gross weight ~kg 390 (volume ~m<sup>3</sup> ~0,55) without flags

