Product Information

Neutral Wall Bushing GOFL

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The bushing shall be de-energized and grounded when any kind of works is carried out on the bushing.
Description

Design
The design principle is shown in figure 1. The conductor is an aluminium tube. The condenser body is wound on the conductor tube. A set of concentric tubes, inside the conductor tube, is pre-stressed and serve as a spring that holds the main bushing components together and provides adequate pressure on the gaskets at all expected temperature and load conditions.

The mounting flange on the bushing is a welded steel construction. It has a square inclined mounting plate for bolting the bushing to the wall structure.

The insulators are brown. The insulators are clamped to the clamping flange on the mounting flange.

The outdoor chamber is made of aluminium and has expansion space for the oil, sufficient for the expected temperature variations. The chamber is equipped with an oil level indicator of magnetic type. At the top of the chamber, there are oil filling plugs to be used for oil level adjustments. See maintenance instructions below.

The indoor cover is an aluminium alloy casting. The cover is equipped with an oil drain plug.

The mounting flange, the outdoor chamber and the indoor cover are protected by a two component paint.

The bushing is designed to be mounted from the outside of the wall and with an angle between the bushing centre line and the horizontal of 22.5°. See figure 5.

The mounting flange can be made for mounting one or two current transducers. The flange will then be longer and have holes for mounting brackets to hold the current transducers.

Voltage tap
The mounting flange is equipped with a voltage tap from the outer layer of the condenser body and a voltage limiting device as shown in figure 3a. This device must not be disconnected and the voltage tap circuit left open in service. **The voltage tap must always be earthed or connected to an impedance.**

Dimensions
The dimensions of the bushing GOFL 250 are shown on outline drawing 2756 040-72. The dimensions of the bushing GOFL 325 are shown on outline drawing 2751 323-32.

Terminals
The outdoor and indoor terminal studs are shown in figure 2.
1. Terminal stud
2. End nut
3. Sealing Plug M8 ABB Art No. 2522 731-A
4. Flexible connection
5. Outdoor chamber
6. Oil level indicator, magnetic type ABB art no 2744 322-B
7. Transformer oil
8. Pre-stressed tubes
9. Outdoor insulator
10. Insulator clamping details
11. Insulator clamping flange
12. Voltage tap
13. Rating plate
14. Voltage limiting devise
15. Bushing mounting flange
16. Bracket for current transducer *
17. Current transducer (not delivered by ABB Components) *
18. Condenser body
19. Indoor Insulator
20. Conductor tube
21. Indoor cover
22. Sealing plug M16 ABB art. no 2522 731-B

* Not on all types of GOFL neutral bushings
See the dimensional print

For one current transducer 4 brackets
ABB Art No 9582 927-A is used.

Following components are used to mount 1 bracket
4 pcs Hexagon nut art no 2121 2017-525
4 pcs Washer art no 2151 2075-177

Figure 1. Bushing design
Mounting instruction

Packing

The bushings are delivered from ABB Components in wood cases with the bushing supported by cellular plastic blocks and fibre boards. The case is marked with Top End. On receiving, the bushing shall be inspected with regard to shipping damages.

Storing

The spare bushing shall be stored leaned, with the outdoor terminal at least 1000 mm above the indoor terminal.

Lifting

When lifting the bushing out from the case, a main lifting wire applied in the lifting holes of the mounting flange shall be used. See the rating plat for the weight of the bushing.

If the bushing should be placed on the ground it must be supported by the cellular blocks from the case. Place the cellular blocks on the same positions as they had in the cage.

Mounting

When mounting the bushing in the wall, it is necessary to use a second sling to prevent the bushing from tipping. See figure 5. To let the air enter the expansion space in the outdoor chamber, the bushing must be kept at an angle larger than 30°, see figure 5, for at least 2 minutes. After that, the angle must be kept not lower than 15° to keep the air cushion in the top chamber.

The sheds shall be protected by boards tied around the indoor insulator during mounting the bushing through the wall.

Tightening torque

Tightening torque for bolts M20 to mount the bushing in the wall is 420 Nm. The threads shall be oiled before assembly.

Connection of external conductors

The terminal studs are made of aluminium. Before connection of conductor clamps, the aluminium studs must be carefully wire brushed and greased with a proper contact compound.
**Service and maintenance**

**Maintenance**

Units exposed to salt spray must be cleaned regularly. Upon request, ABB Components will assist to work out a proper maintenance program.

In case of damage to the bushing, it must be sent back to ABB Components for repair and re-testing.

**Control of the oil level**

The oil level indicator, magnetic type, indicates a too low oil level by pointing on the red field on the dial. The oil level indicator shall always indicate on the green field.

![Diagram showing oil level indicator with red and green fields and black pointer.]

**Oil quality**

For topping up of the bushing, dry and clean transformer oil according to IEC 296 shall be used. The plugs in top of the bushing shall be removed and the holes used when adjusting the oil level. See figure 1, item 3 and 20 and the instructions below.

**Opening and sealing of the bushing**

The weather shall be dry if the sealing plugs in top of the bushing shall be opened. *It is of utmost importance that the bushing always is properly sealed. Otherwise inleakage of water in the bushing may cause a catastrophic electrical failure.* To ensure proper sealing when the bushing has been opened, the old gaskets of the sealing plugs shall always be replaced by new ones.

The bushing is designed to work in a specific pressure interval and the internal pressure in the shall be 1 bar sometime when the mean bushing temperature rises from 0° C to 30° C. This means that if the bushing is unsealed (opened) below 0° C or above 30° C, it has to be opened next time the bushing means temperature is between 0° C and 30° C to reach ambient pressure (1 bar). After that, the bushing is sealed again.
Oil sampling for gas in oil analysis

It is not recommended to take oil samples regularly. However, if it is deemed necessary (i.e. after flashovers) oil sample can be taken.

- The bushing shall be de-energized and grounded when oil samples are taken.
- Oil samples shall not be taken when the mean bushing temperature is above 30° C or below 0° C.

Figure 2. Assembly of terminal stud

1. Terminal stud
2. Hexagon screw M8x40
3. Hexagon screw M10x60
4. Conical spring washer 8.4x18x1 (Belewille)
5. Washer 10.5x22x2
6. Gasket (O-ring) 99.1x5.7
7. Retainer ring for gasket

Mounting of outer terminal

The outer terminals are mounted at the factory. However, if the terminals for some reason are disassembled, assembly of the terminals shall be carried out according to the instructions below.

The inner contact surfaces of aluminium, both on the bushing tube and on the terminal stud, are tin plated. Therefore no wire brushing or contact grease is needed.
The surfaces shall be cleaned carefully before assembly. The gasket retainer ring, the gasket itself, and the outer terminal stud is assembled according to figure 2. The bolts that press the stud against the bushing tube must be tightened first. When this is done, the screws that hold the retainer ring is inserted and tightened in order to press the gasket into place. **It is extremely important in both cases to tighten evenly. The bolts shall thus be tightened in steps, alternating on both sides.**

![Diagram](image)

*Figure 3a. Voltage tap, terminal box and voltage limiting device.*
The voltage limiting device is replaced according to the following instructions:

- Remove the cover, item 3.
- Loosen the cables marked F and earth in the terminal box as well as the cable gland.
- Replace the device and assembly according to above.

**Note:** If the bushing shall be packed in the case, the cellular blocks and fibre boards shall be placed in the same way as first delivered from ABB Components. Wood boards is not allowed to be placed under the bushing in the case. These shall be used to fix the bushing in axial direction in the case.
Figure 5. Lifting of bushing at mounting

*Keep the angle a³ 30° before mounting of the bushing for a period of 2 minutes to let the air enter the top of the bushing. After this procedure the angle must be kept ³ 15°.*

**Spare parts**

In case of major damage to the bushing, it shall be sent back to ABB Components AB for repair and re-testing.

For certain parts that may be lost or damaged in transportation or handling, the article numbers or the dimensions are given in the Figures.

Note the design of the sealing plug 2522 731-A is changed.
Any sealing plug ordered as spare part will be of the new design.
1) BOLT WITH FLANGE DIN6921 ABB Art no. 2121 738-1f
2) GASKET ABB Art no. 2152 899-132

Figure 6a New design of sealing plug 2522 731-A

1) HEXAGON SOCKET SCREW ABB art no. 2121 738-4
2) GASKET ABB art no. 2152 899-132
3) CONICAL SPRING WASHER ABB art no. 2154 4004-3

Figure 6b Previous design of sealing plug 2522 731-A