Product Information

Wall Bushing GOFL

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The bushing shall be de-energized and grounded when any kind of work is carried out on the bushing.
Description
The design principle is shown in figure 1.

The bushing is built up around a system of central tubes. The condenser body is wound on a separate tube, concentrically mounted on the conductor tube. The condenser body is clamped to the mounting flange. The conductor tube is made of aluminium and has a flexible coupling to the top parts of the outdoor chamber. The tube system is pre-stressed and holds the main bushing components together.

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 cemented to the fixing flange and bolted to the mounting flange. The indoor insulator is also cemented to a ring at the top that is bolted to the cover. See figure 1, item 22. In case of damage to the outdoor insulator, the indoor side is still sealed and no oil will leak into the valve hall.

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. The mounting angle is shown in the dimension print.

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 3. The voltage tap circuit must not be left open in service.

The voltage tap must always be earthed or connected to an impedance.

Dimensions
The dimensions of the bushing are shown on outline drawing.

Terminals
The outdoor and indoor terminal studs are shown in figure 2.
1. Terminal stud
2. End nut
3. Sealing plug M8
   ABB Part No 2522 731-A
4. Flexible connection
5. Outdoor chamber
6. Oil level indicator, magnetic type
   ABB Part No. 2744 322-DV
7. Spring device
8. Pre-stressed tubes
9. Transformer oil
10. Outdoor insulator
11. Condenser body clamping
12. Condenser body
13. Voltage tap
14. Voltage limiting device
15. Rating plate
16. Bushing mounting flange
17. Indoor insulator
18. Conductor tube
19. Indoor cover
20. Sealing plug M16
   ABB Part No. 2522 731-B
21. 3/4" valve
22. Bolting of indoor cover

Figur 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 bushings shall be stored leaned, mounted in a stand and in the same angle as when installed in the valve hall.

Lifting
When lifting the bushing out from the case, two lifting points have to be used on the bushing. A main lifting wire applied in the lifting holes of the mounting flange, carrying the whole mass of the bushing. A second sling shall be applied to the end of the bushing according to figure 4 to prevent the bushing from tipping. This sling is not allowed to be applied around the sheds because of the risk to damage the sheds.

The weight of the bushing is stated at the rating plate.

If the bushing is to be placed on the ground, the plastic blocks from the case shall be used. Place the blocks under the bushing at the same places as in the case.

Mounting
When mounting the bushing in the wall, the lifting tool according to figure 5 shall be used. The lifting hook is then applied to the lifting tool, which automatically will lean the bushing correctly. 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.

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 M18 to mount the bushing in the wall is 205 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 studs must be carefully wire brushed and greased with a proper contact compound.
Service and maintenance

Maintenance
The outdoor porcelain surface shall be kept hydrophobic. The method to be used is determined by the environment. Upon request, ABB Components will assist to work out a proper maintenance program. Units exposed to salt spray must be cleaned regularly.

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.

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 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 be replaced by new ones.

The bushing is designed to work in a specific pressure interval and the internal pressure in the bushing 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° or above 30°, it has to be opened again the next time the mean bushing 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

ABB Components does not recommend to take the oil samples regularly. However, if it is deemed necessary (i.e. after flashovers) an 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.

Mounting of the outer terminal

The outer terminals are normally 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, both on the bushing tube and on the terminal stud, are tin plated. Therefore no wire brushing is allowed, and no 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.

Figure 2. Assembly of terminal stud.

1. Terminal stud
2. Hexagon screw M8 x 40
3. Hexagon screw M10 x 60
4. Conical spring washer 8.4 x 18 x 1 (Beleville)
5. Washer 10.5 x 22 x 2
6. Gasket (O-ring) 99.1 x 5.7
7. Retainer ring for gasket
The bolts that press the stud against the bushing tube must be tightened first. The tightening torque is 40 Nm. When this is done, the screws that hold the retainer ring are inserted and tightened in order to press the gasket into place. The tightening torque is 20 Nm.

*It is extremely important in both cases to tighten the bolts in steps, alternating on both sides, so the outer terminal or the gasket do not get askew.*

**Figure 3. Voltage tap, connection device and voltage limiting device**

1. Tap
2. Grounding spring
3. Cover
4. Gasket (O-ring) 64.5 x 3
5. Sealing plug M8 (complete)
6. Bushing
7. Pressing screw
8. Disc spring
9. Gasket (O-ring) 24.2 x 3
10. Cable
11. Layer of condenser body
Figure 4. Lifting of bushing out of case

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 are not allowed to be placed under 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 $\alpha \geq 30^\circ$ 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 $\geq 12^\circ$. 