



B-316268: INSTALLATION INSTRUCTIONS FOR HORIZONTALLY MOUNTED POC BUSHINGS 15 kV THROUGH 72.5 kV

Rev. Date: 11/13/2015

The bushings are shipped as standard units with the reservoir-mounting hole on flange plugged and with oil at the standard level for vertical mounting. **PROPER OIL FILLING IS CRITICAL FOR LONG-TERM OPERATION OF THE BUSHING.**

The oil volume in all bushings fluctuates significantly with temperature. Typically this fluctuation is approximately 0.09 percent per degree Celsius. In vertically mounted bushings, this change in volume is accommodated in the metal tank or inside the sight glass on top of the bushing. In horizontally mounted bushings, the oil volume change is accommodated by a flange mounted oil reservoir.

In order for this change in volume to not affect the operation of the bushing, both the highest and lowest temperatures must be considered. PCORE bushings are designed to operate with the air ambient from -50°C to +40°C while carrying rated current. Operating the bushing at higher temperatures and/or currents is not recommended even for short periods of time.

It is important to fill and install the bushing properly to guarantee long life expectancy. Two things are extremely important. First, all air must be out of the bushing, and secondly, the oil level must be adjusted properly according to the bushing oil temperature. **FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE BUSHING FAILURE.**

Before installing the bushing into the equipment (or wall), perform the following:

1. Remove the bushing from the crate and place the bushing horizontally in such a way that the oil fill plug on the bushing top is facing up and the bushing top is slightly higher than the bushing bottom so the air space stays in the sight glass around the oil fill plug. This may be accomplished by leaving the shipping centering board on the bushing and propping up the air end with boards as necessary.
2. Remove the oil fill plug from the flange of the bushing and install the oil reservoir. Be sure the o-ring is properly installed on the oil reservoir.
3. Check the angle of the bushing. Ensure the air end of the bushing is above the oil end of the bushing while the large diameter section of the reservoir tank is higher than the oil fill plug on the air end of the bushing.
4. Remove the oil filler plug from the oil reservoir top. Use a clean funnel to add oil to the reservoir. Use the extra oil supplied with the bushing, or any non-PCB type I or type II transformer oil. The oil must meet the minimum requirements for new transformer oil per IEEE C57.106 and ASTM 1275B.
5. After oil is added to the reservoir, loosen the oil fill plug located on the top cover and let the oil level in the bushing equalize. Once the oil level has equalized or until some oil comes out of the fill hole in the top cover, tighten down the oil fill plug on the top cover.
6. If necessary, repeat steps 4 through 5 until some oil comes out of the fill hole in the top cover and any air bubble that remains in the top cover is less than ¼ inch in diameter.



- a. If air bubble persists in sight glass, with the fill plug on the top cover open, rock the bushing back and forth, while keeping the oil expansion reservoir above the bushing, to release the tapped air bubble. After the removal of the air bubble fasten down the top cover fill plug.
7. Determine the temperature of the oil in the bushing. **THIS MAY BE DIFFERENT THAN THE AMBIENT AIR.** The best method is to use a dial thermometer or a thermocouple inserted as far into the oil reservoir as possible. Try to get into the flange through the neck of the reservoir. **DO NOT USE A GLASS THERMOMETER.** Wait a few minutes for the reading to stabilize.
 - a. The bushing and the extra oil should be stored in same location to ensure that the bushing oil matches the temperature of the oil being added to it.
8. Add oil to the reservoir until the oil level in the reservoir is at the proper level. **FOR PROPER OIL LEVEL INDICATION, THE OIL THAT YOU ADD TO THE BUSHING SHOULD BE THE SAME TEMPERATURE AS THE OIL IN THE BUSHING.** Use the dip stick to measure the oil level. The top mark is for 55°C, the second for 40°C, the middle for 25°C, the fourth for 10°C, and the bottom for -5°C oil temperature. (See Figure 1) Interpolation between marks is not critical. If in doubt, use slightly less oil.
 - a. If too much oil is added during the filling the oil reservoir, use a clean syringe and transformer oil compatible tubing to remove oil from the oil reservoir.
9. Tighten the oil fill plug in the oil reservoir top. Make sure the O-rings are properly installed on the plugs.
10. Rock the bushing back and forth, while keeping the oil expansion reservoir above the bushing, to release any entrapped air remaining in the bushing. Watch the sight glass for air bubbles. Continue rocking until no air is being released into the glass. If air bubble in sight glass is larger than ¼ inch repeat step 5. More oil may have to be added to the reservoir.
11. Install the bushing into the equipment or wall while keeping the oil expansion reservoir above the bushing while keeping the bushing horizontal.

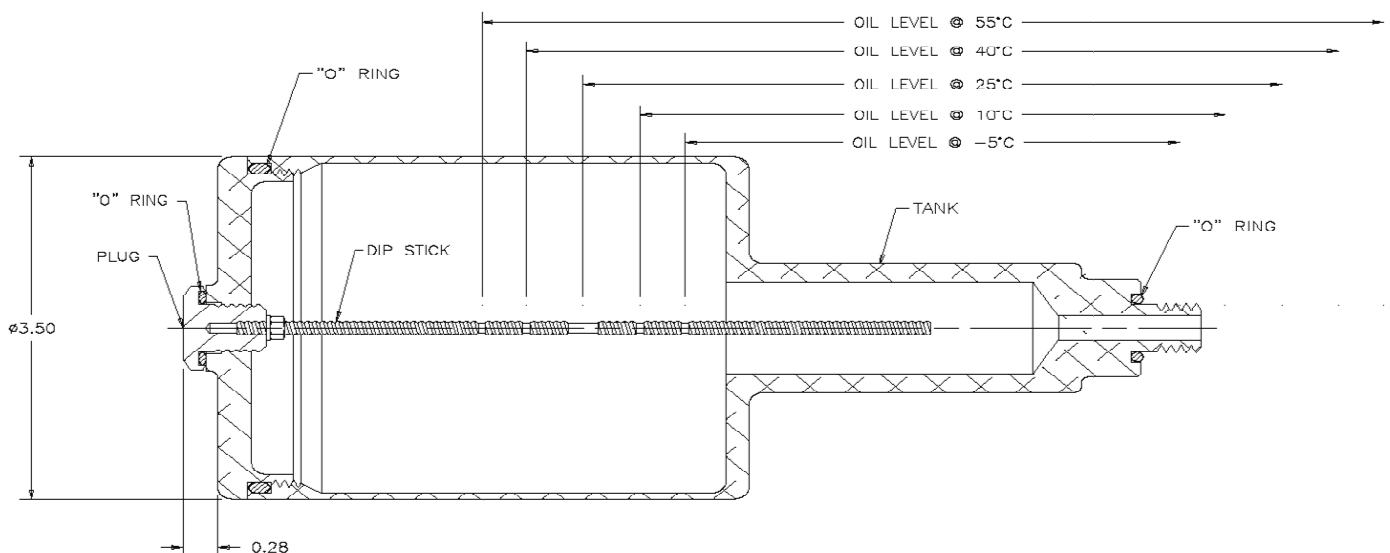


Figure 1: Oil Level Chart