Upgrading of on-load tap-changer types UCG/UCL to vacuum types VUCG/VUCL

The non-vacuum tap-changers UCG and UCL can be upgraded to the vacuum tap-changers VUCG respectively VUCL. This can easily be made by replacing the diverter switch insert and do some more actions included in the upgrade package.

The vacuum upgrade package consists of new vacuum diverter switch insert, pressure relay, shaft system coupling halves, oil draining/sampling tube and rating plate. As an option, oil sampling tube system to ground level (for taking oil samples with the transformer in service) can be provided.

For vacuum tap-changers oil samples should be taken after 2, 6, 11 and 15 years. It should be used for DGA and checks according to IEC 60422.
Check before an upgrade
- For single phase units; that the current rating of the vacuum diverter switch is equal or higher than the existing non-vacuum tap-changer.
- The oil conservator is not placed more than 7m above the tap-changers top.
- Please contact ABB if the on-load tap-changer is used in a demanding network application such as HVDC or demanding industrial applications such as arc furnace characterized by that the tap-changer is operated more than 100 operations/day and also sometimes during this frequent operation maneuvered almost from one end position to the other.

For neutral connected network tap-changers
No further considerations are needed.

For non-neutral connected transformers
Always contact ABB, but check below:
- How many poles in the existing tap-changers that is used and which?
- Is there enforced current splitting in the transformer?

Upgrade package
- Diverter switch insert
- Pressure relay
- Shaft system (Fig. 02)
- Inner oil draining/sampling tube (Fig. 03)
- Option: oil sampling tube system (Fig. 04)

Pressure relay
The tap-changer should be upgraded with the pressure relay used today since 2006. The former pressure relay had a micro switch that in some few cases have had moisture ingress and caused trip signals.

Upgrade the shaft system
The torque needed to load a vacuum tap-changer is higher than for a non-vacuum. The existing coupling halves in the shaft system should be replaced to the couplings halves used today for new tap-changers.

Inner oil draining/sampling tube
To take the oil samples in the tap-changer in the best position a special oil sampling tube should be used.

Oil sampling tube system (option)
To simplify the oil sampling of the tap-changer during service a tube can be taken down to the ground level.
Installation of the vacuum diverter switch

Below are the steps for installation of a new vacuum diverter switch. For complete installation instructions, please see the appropriate installation guide.

1. Drain the oil from the tap-changer compartment.
2. Drain the conservator and flush the conservator, and the piping system down to the tap-changer.
3. Exchange the silica gel.
4. As there is no shaft system on the cover, just loosen the bolts and lift off the cover. (Fig. 05)
5. Lift out the old diverter switch.
6. Change the oil draining tube. (Fig. 03)
7. Clean the diverter switch housing. (Fig. 06)
8. Lower down the new vacuum diverter switch. (Fig. 07)
9. New diverter switched placed in its housing. (Fig. 08)
10. Fill the tap-changer and conservator with new oil.
11. Place the cover on the tap-changer.
12. Maneuver the tap-changer 3 times to have it fully synchronized and in correct position before bolting the cover on.