DC High Speed Switches
DC High Speed Switches

Contents:

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Switching devices

- MRTB,
- MRS(GRTS)
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DC High Speed Switches

Configuration of HVDC system

Bipolar operation
DC High Speed Switches

Configuration of HVDC system

Monopolar, one DC Line &
ground return
DC High Speed Switches

Configuration of HVDC system

Monopolar, metallic return
DC High Speed Switches

Configuration of HVDC system

Monopolar,
2 DC Lines &
ground return
DC High Speed Switches

Transfer between configurations

Bipolar operation
- reconnect pole

Block valves, isolate pole

Monopolar, one DC Line & ground return
DC High Speed Switches

Transfer between configurations

Monopolar, one DC Line & ground return
MRTB close -> MRS (GRTS) open

disconnect pole from pole line -> MRS (GRTS) close -> MRTB open
Monopolar, metallic return
Transfer between configurations by means of MRTB and MRS(GRTS)
DC High Speed Switches
Transfer between configurations
DC High Speed Switches
Transfer between configurations

ground return
<->
metallic return
DC High Speed Switches
Transfer between configurations

Metallic return
DC High Speed Switches
Switching devices - DCHSS
DC High Speed Switches
Switching devices - DCHSS

Task of DC High-Speed Switches

Commutating the respective DC currents for which they are designed
DC High Speed Switches
Switching devices - DCHSS
DC High Speed Switches
Switching devices - DCHSS
DC yard example
DC High Speed Switches
Switching devices - MRTB / MRS(GRTS)
DC High Speed Switches

Switching devices - MRTB / MRS(GRTS)

Metallic Return Transfer Breaker / Metallic Return Switch

Interruption of a DC- current by means of a snubber circuit.

After current interruption in the DCHSS the current flows for a very short time through the elements $C_p$, $L_p$ and $R_p$ until the arrester voltage becomes sufficient high and the parallel arrester takes over the DC current.

While the arrester absorbs the energy, the current through the electrode line for MRTB (or metallic return path for MRS(GRTS)) decreases more and more and commutates into the parallel metallic return path (or into the electrode line for MRS(GRTS)).
DC High Speed Switches
Switching devices - MRTB / MRS(GRTS)
DC High Speed Switches
Switching devices - MRTB / MRS(GRTS)
- large number of arresters -> MRTB
DC High Speed Switches
Switching devices - HSGS

Installed at neutral bus in each converter station…

Main task:

- To ground the neutral bus to the station ground grid in the event that the ground electrode path becomes isolated

- No significant current commutating capability

- Capable of opening during bipolar operation and commutating the bipolar unbalance current into the ground electrode
DC High Speed Switches
Switching devices - HSGS
DC High Speed Switches
Switching devices DCHSS - 3AQ2
DC High Speed Switches
Switching devices DCHSS - 3AQ2

Red: Oil pressure kept at constant level by means of gas storage cylinder and oil pump

Blue: For closing of main contact, oil pressure increased to level of red part by operating valves

Difference of force between red and blue side (as shown here) at piston moves operating rod upwards...
Thank You