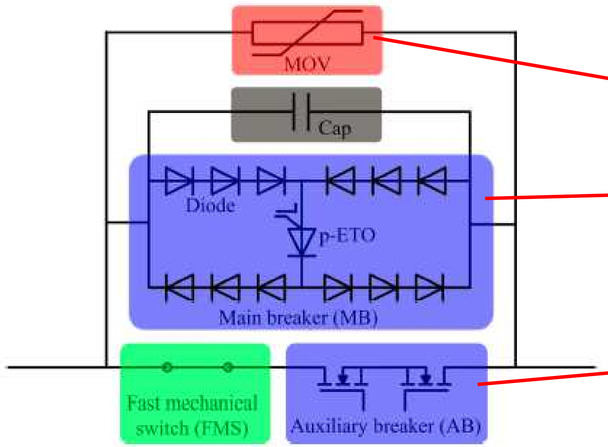
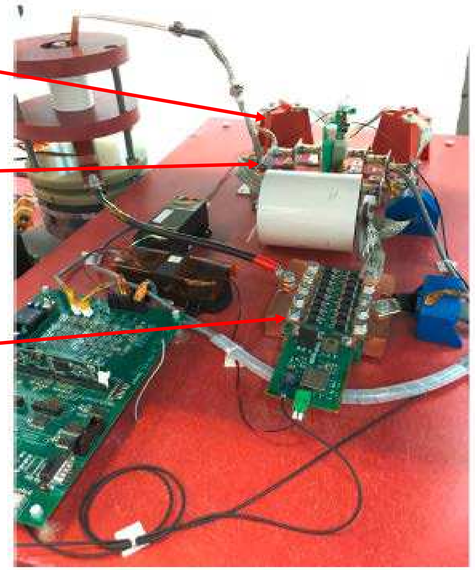
Y9.ET4.2 Hybrid Fault Isolation Device

Soumik Sen, Richard Woodley, Xiaoqing Song, Alex Huang





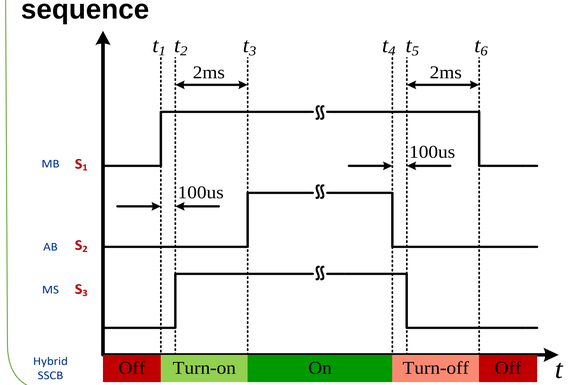
Objective

Develop a hybrid FID (Solid State Circuit Breaker) to

- **Protect a 7.2 kV/200 A single phase lateral line in 12 kV distribution system;**
- **Conduct 200 A load current and interrupt the fault current in less than 2 ms**

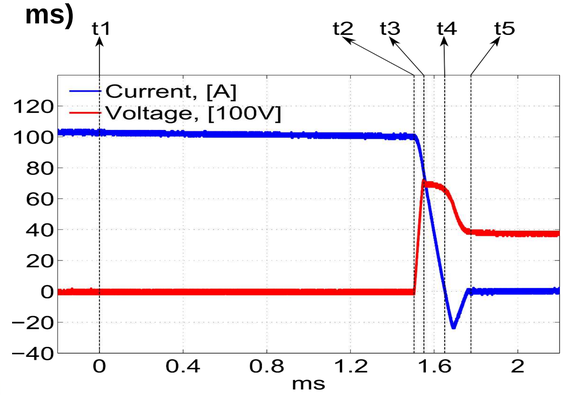
Operation logic

Hybrid FID closing and opening Operation sequence

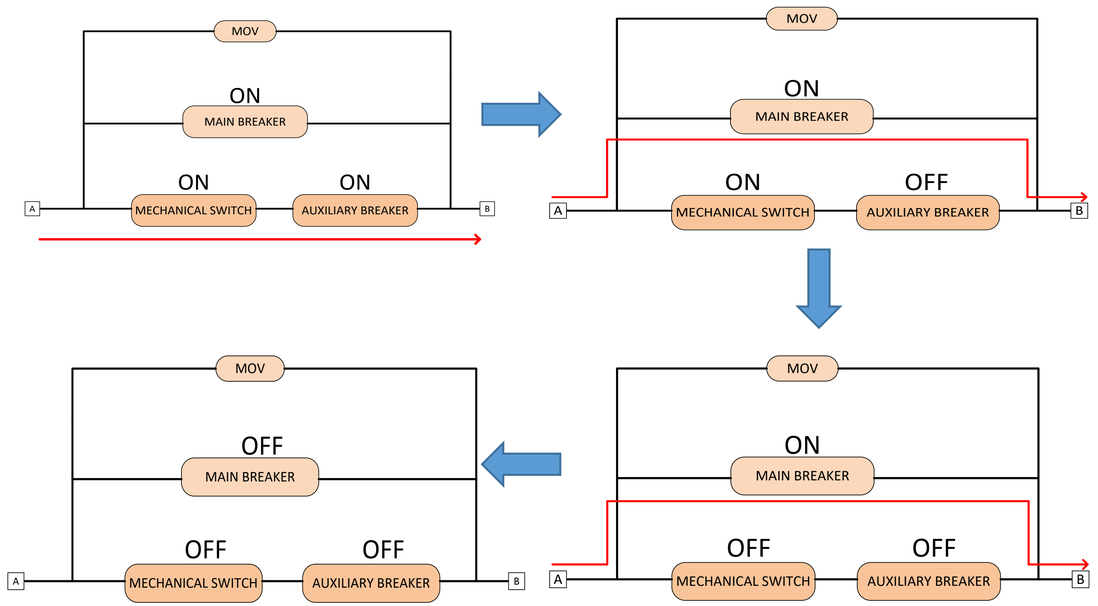


Results

Hybrid FID Interruption Test @100A/7kV. With a MS Developed in Associate Project (Clearance Time=1.75 ms)



Turn off Sequence

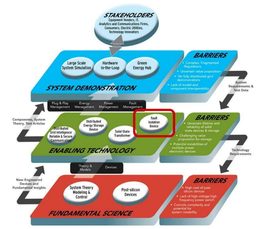


Conclusions

1. Successful integration with NCSU developed mechanical switch based on Thomson coil-actuated fast mechanical switch developed in NCSU.
2. Successful integration with the piezo electric actuated fast mechanical disconnect switch developed in FSU.
3. Successful testing at 100A/7.2kV.
4. Can be used in both AC and DC circuits

Reference

1. X. Song, C. Peng and A. Q. Huang, "A Medium-Voltage Hybrid DC Circuit Breaker, Part I: Solid-State Main Breaker Based on 15 kV SiC Emitter Turn-OFF Thyristor," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 5, no. 1, pp. 278-288, March 2017
2. C. Peng, X. Song, A. Q. Huang and I. Husain, "A Medium-Voltage Hybrid DC Circuit Breaker—Part II: Ultrafast Mechanical Switch," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 5, no. 1, pp. 289-296, March 2017



Partners