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C1Po1F-08: Cool-down logic for cryogenic distribution system of RAON SCL3

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The cool-down logic and the control system for the cryogenic distribution system of RAON Superconducting Linac 3 (SCL3) are described. SCL3 consists of 55 CMs, including 22 quarter wave resonant (QWR) type and 33 half wave resonant (HWR) type CMs, a helium distribution box (DBx), and an end box (EBx). In order to control thousands of actuators, an automatic control system is constructed to control the operation sequence and apply the protection logic. The flow of the operation modes and the operation sequence in each operation mode are designed with consideration of the system structure, the request of the cryogenic system, and the cryogenic fluid properties. The most important tasks during the cool-down process of the superconducting cavities are to shorten the cool-down time during the temperature range of 150 K to 50 K and to keep the steady and low pressure inside the cavities. The cool-down strategy of the cryo-modules (CMs) has been tested in the test facility and applied to SCL3 of RAON. The corresponding cool-down data are presented and analyzed.

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