6 - 32 Design and Operation of Cryogenic Vertical Testing System for Superconducting Cavity

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The superconducting accelerating segment in injector Ⅱ of Accelerator Driven Sub-critical System(ADS) uses superconducting cavities whose frequency are 162.5 MHz. The vertical performance of superconducting cavity devices must be tested at liquid helium temperature(2, 4.2 K) before being assembled in cryostat. To meet the running goal of the 0 $\sim$ 25 MeV linac system, it is necessary to build a set of cryogenic testing system for superconducting cavity, which is used to test the performance of the superconducting cavity and whether cavity meet the design goal.

The vertical testing system for superconducting cavity includes liquid supplying system, the vertical testing dewar, helium recovery and purification system, *etc.* (Fig. 1). The liquid helium is supplied by the cryogenic liquid supplying system. Vertical testing dewar is online operationed in the cryogenic system, and gas return helium pipe linked to recovery and purification system, which reduces the consumption of liquid helium.

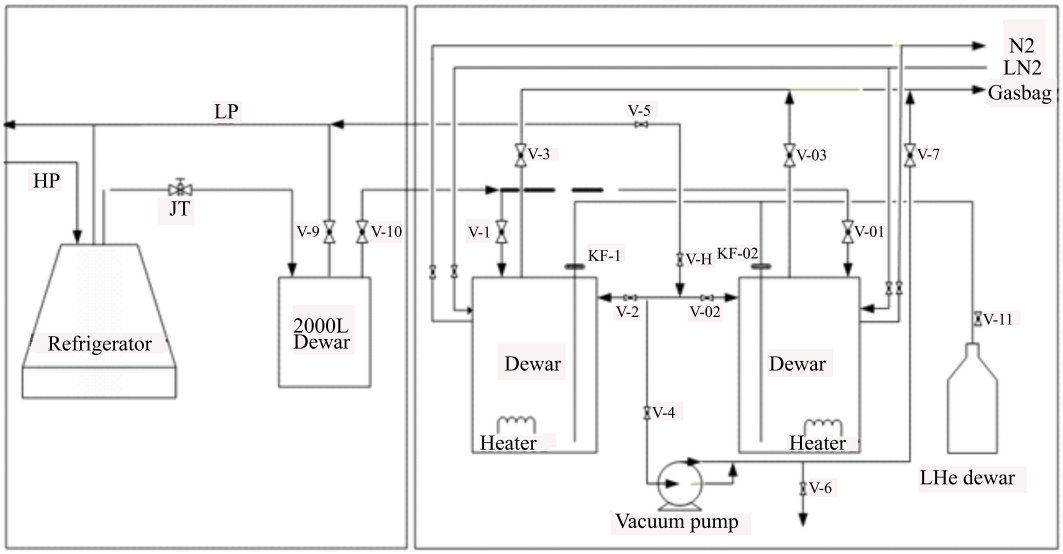

Fig. 1 Flow chart of the vertical testing system.

Because the cycle of warm-up is long, there are 2 testing dewar that can be used by swiching valve, which purpose is to improve the efficiency of vertical testing. In addition vacuum pump can be used for helium pressure relief cooling system, which can make the temperature of liquid helium down to 2 K when the testing dewar vacuum is about 3 000 Pa.

In conclusion, a total of 9 cavities are measured in 2014, including 8 HWR cavities and 1 CH cavity. All cavities meet the design requirements for engineering application, which provides the guarantee for the assembly of next 6 cavity cryostat .