

Vacuum Control System for the SPring-8 Storage Ring

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To achieve a electron beam lifetime of above 20 hours, the vacuum system of the storage ring should be maintained the beam-off pressure of the order of 10^{-8} Pa or less. In order to maintain ultra-high vacuum, it is necessary that the vacuum control system of the storage ring controls harmoniously various vacuum apparatus (vacuum pumps, vacuum gauges, valves, etc.). Therefore, in this system, high reliability is required for performing the long-term continuous operation of the vacuum apparatus and for minimizing the damage on vacuum at an accident. Also, high operability is required for raising the efficiency of such work in the storage ring tunnel as chamber bakeout and NEG (non-evaporable getter) activation. Furthermore, generality, extensibility and easy maintenance are required in this system, as the storage ring will be operated over a long term of years.

As shown in Fig. 1, the vacuum control system is composed of three parts. The outline of each part is described as follows.

1) Local control panel (LCP)

A LCP to each unit cell of the storage ring (total 48 LCP's) is installed in the passage, which is kept inside the tunnel for delivery and maintenance activity. The LCP has a local controller and control units of vacuum apparatus. The local controller keeps guard the apparatus, and controls directly them without a host control system. If the vacuum system make trouble, we consider to deal with this trouble by using the LPC.

2) Local control terminal (LCT)

A LCT is a movable controller and connected to the LCP. It mainly used to control the vacuum apparatus through the LCP for the unit cell when we perform such maintenance work as the chamber bakeout and NEG activation in the storage ring tunnel. The four LCT's in total are perpared because

we plan to bake out simultaneously the vacuum chambers of four unit cell at its maximum.

3) Concentrated control panel (CCP)

The CCP is installed in the control room and generalizes the LCP's of 48 cells. The CCP has functions that indicate the vacuum pressures and the status of the vacuum apparatus and that control some apparatus, for example valves and titanium sublimation pumps. Further, the CCP has the interface between the local network for SR (Storage Ring) control system. We consider that the CCP stores the data such as the vacuum pressures.

In this report, we describe a preliminary plan to the vacuum control system of the storage ring. We are now going to proceed the design work of the vacuum control system.

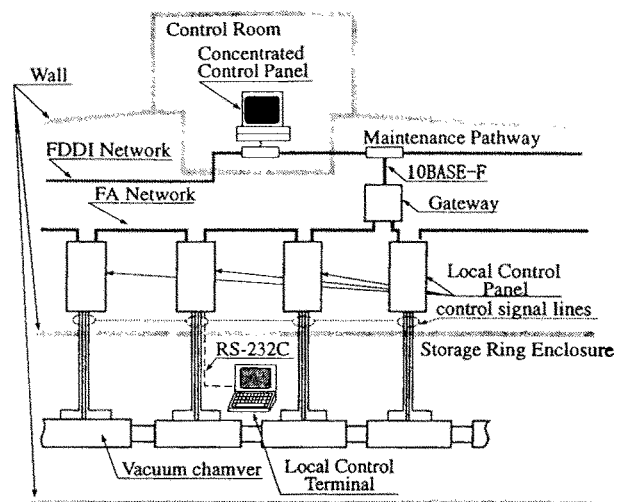


Fig. 1 The abstract of vacuum control system