

## §1. Development of an Access Control System for the LHD Experimental Hall (2)

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An access control system for the LHD experimental hall had been constructed and its practical operation, started simultaneously in March 1998. Continuously, further improvement of the system have been carried out, in which the system was equipped with a set of interlock signals corresponding to operation modes meaning a work in execution in the LHD controlled area, and installed an additional performance on control of the set of interlock signals.

The present system after the improvement in the last fiscal year is graphically shown in Fig.1. As reading from the left side of Fig.1, the system is keeping over watch on involved entrance and exit of persons at four entrances by using five turnstile gates while watching on eight shielding doors, closed or opened, at eight positions (four entrances, three carriage entrances and a hall overview). And besides, for the securement of safety operation of the LHD, fifteen kinds of interlock signals are exchanged between the access control system and the LHD control system.

Seven interlock signals shown at the upper right in Fig.1 are properly sent as the occasion demands from the access control system to the LHD control system, in which three staple signals are "③ Personnel Access to Controlled Area", "⑤ Shielding Door Closed", and "⑥ No Entrance". The signal ③ shows a person being in the LHD control area. The signal ⑤ means that all the shielding doors are strictly closed. It is important that any plasma experiments are not permitted while the signal ③ being sent or ⑤, being not sent. The signal ⑥

is sent to inform the LHD control system that the turnstile gates are locked. All the plasma experiments should not be done unless the lock procedure of the turnstile is confirmed. When the turnstile gates are locked, any persons can not enter into the LHD controlled area, but permissible to exit only.

Six signals shown in the middle of Fig.1 are used to send the information of the working at that time in the LHD controlled area to the access control system. When one signal of the operation mode is sent to the access control system from LHD, the access control system set the turnstile gate in situation corresponding to the operation mode, ① Stop, ② Equipment Operation, ③ Vacuum pumping, ④ Coil Cooling, ⑤ Coil Excitation, and ⑥ Plasma Experiment. If the access control system receive, for example, the signal ③, this system set the turnstile gate in the condition of control such that only persons assigned to the work of vacuum pumping are permitted to enter into the LHD controlled area. We call this function a group control. In the group control system, persons are classified into necessary several groups, and each group is connected to one or more operation modes. We think that the concept of this control system is our original one.

In this report, we introduce the present system of access control, especially interlock signals and a group control. These functions will be make good use to eradicate careless mistakes relating to the LHD control and the plasma experiments.

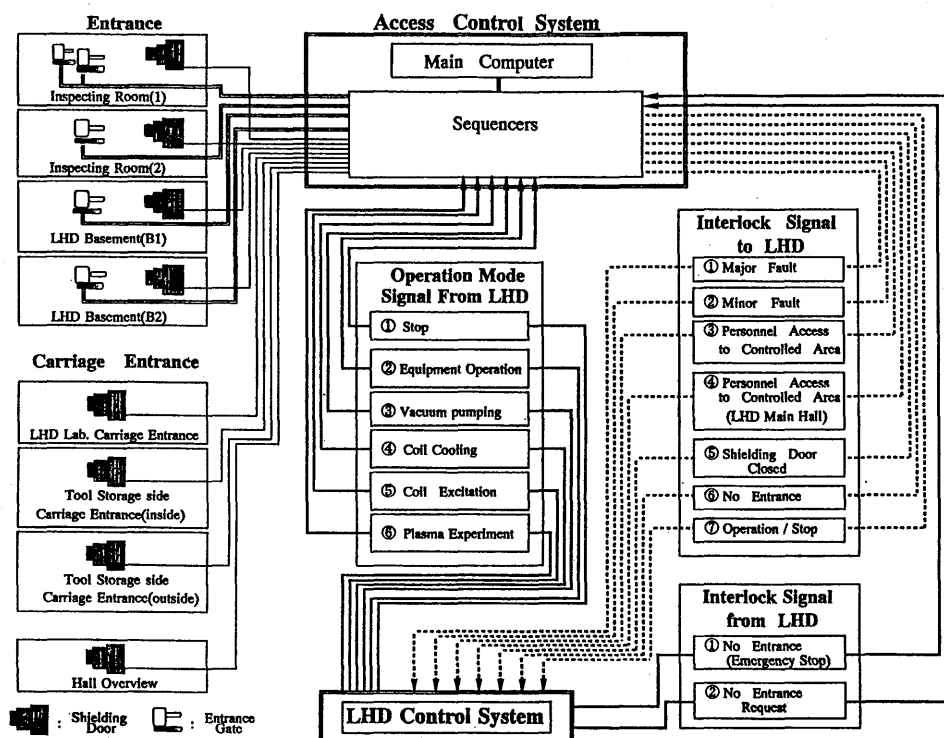


Fig.1 Access Control System and Interlock Signals