

A.3: Indus-1 Magnet Power Supply (MPS) Cycling

The reproducibility of the field in an iron core electromagnet for a particular operating current is ensured by exciting the magnet from a lower limit to an upper limit of currents and back few times before setting the operating current. This is called as cycling of the magnet as shown in Fig.A.3.1.

In routine operation of Indus-1, all the magnets are cycled three times before setting the fixed operating currents to get the required nominal fields as shown in Fig. A.3.2. All dipole (DP) and quadrupole (QP) magnets are cycled. These are controlled by three power supplies - a DP magnet power supply, a QF (Focussing Quadrupole) and a QD (De-focussing Quadrupole) power supply.

bus is used for connecting each supply to the VME equipment controller. The power supply control module contains 16 bit DAC card, 16 bit ADC card and isolated control outputs and status inputs. This module is connected to VME crate through optically isolated bus. Different modules are daisy chained to the VME crate. Rise and fall times of all the modules in the chain were measured, analysed and circuit components were optimised to improve these. The modifications in auto write board were carried out to include interrupt generation and enable update of new reference values supplies undergoing cycling.

The control room software running on PC is a client server application and uses RPC protocol.

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A.4: Control & Integration of Indus-2 Pneumatic Gate Valves (GV0s)

Gate valves, designated GV0s and located at the periphery of Indus-2 ring separate the machine vacuum envelope from those of the beam lines. These are installed at the beginning of beam line front ends (BLFE). A beam line front end is typically the part of beam line which is inside the inaccessible, shielded ring area and connects the actual beam line to the ring with needed regulating and controlling mechanisms for synchrotron beam and vacuum. Recently, many (16) of the GV0s were changed from manual to pneumatic ones. The pneumatic valves allow remote operation. All these were added to the existing BLFE control system to integrate them with machine controls.

The user interface for these valves has been provided in Vacuum control panel as well as BLFE control panel as shown

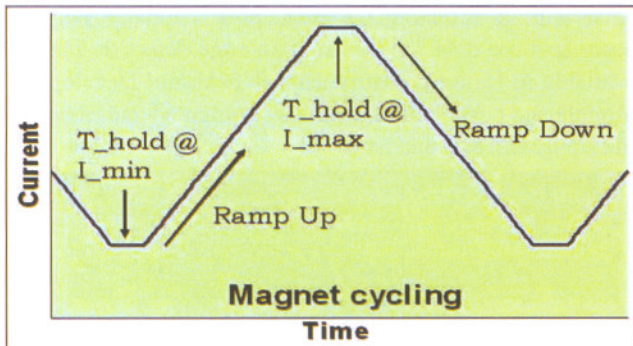


Fig. A.3.1: Indus-1 Magnets Cycling Waveform

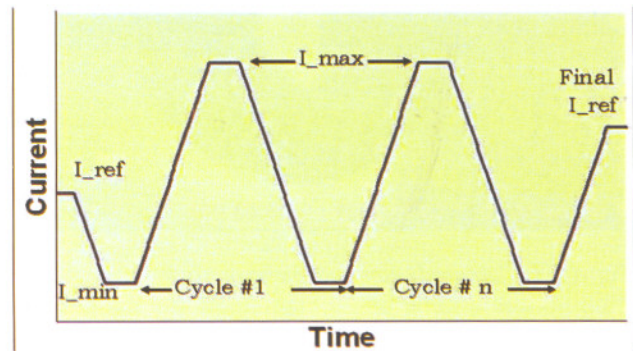


Fig. A.3. 2: Typical Magnet Cycling in Indus-1

The Magnet Power Supply Control System of Indus-1 had to be modified in hardware and software extensively to provide this facility. This control system uses isolation between the references, status and the control signals of all the supplies which is the specialty of this system. All the control and status signals are connected through optically isolated bus. The reference and read back is also optically isolated. A special power supply control module on the optically isolated

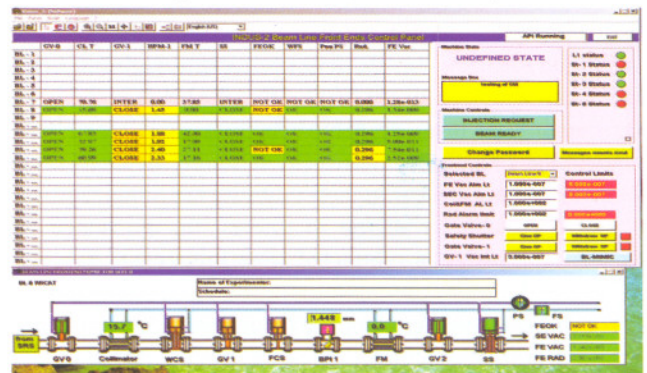


Fig. A.4.1: Beam Line Front Ends GUI Panel with GV0 Controls