High Voltage Power Supply System for ATLAS SCT Requirements and specification

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1 Introduction

This document describes requirements that should be met by the HV power supply system for Atlas SCT. These requirements are related to the design of HV power supplies for p-on-n single-sided strip detectors. The requirements for LV power supply are listed elsewhere [1] however, both HV and LV supplies will share common crate.
All required parameters refer to one detector module.

2 Requirements

2.1 Voltage

- **Every module has an independent high voltage supply channel.**
- **Nominal value range 0 - 410 V - floating, controlled to the precision better then 2 % .**
- **Nominal voltage setting by a digital control input with 10 bit precision**
- **Voltage levels monitored at each channel with the precision better than 2 %**
- **Reaction time for voltage adjustment - 20 ms**
- **The ramp-up and ramp-down speed programmable ; 5 V/s, 10 V/s, 20 V/s or 40 V/s**

[1] Low Voltage Power Supplies for SCT FE Electronics - Prague's groups [presented during SCT week,9-13 March,1998]

- **Allowable noise level 200 mV**
- **Hard-wired over-voltage trip with the trip level programmable by computer**
- **No remote sensing and feedback control**

2.2 Current

- **Current measurement range 50 nA - 5 mA**
- **Current monitoring accuracy - multirange with the highest precision (50 nA) at low current and 10 bit precision at high current.**
- **Hard-wired over-current trip with the trip level programmable by computer**
- **Absolute over current limit protection at 5.2 mA (if the current exceed 5.2 mA the voltage is automatically reduced). In this case software trips this channel.**

2.3 Control

- **External communication protocol - CAN bus - finally CAN-open**
- **Status register latching the trip cause**
- **The logical status of the high voltage supplies monitored and reported as ON/OFF/TRIP/INTERLOCK/OVERTEMPERATURE.**
- **Power-up reset - after power-up, all channels are set to 0 V. To restore old settings, the software action must be taken.**

2.4 Interlocks

All interlocks cause the same action for low voltage and high voltage power supplies

- **Interlock initiated by DCS : switches off the HV channel and equivalent LV channel and sends its status information to DCS**
- **Interlock initiated by internal over-temperature crate control : switches off the whole HV, LV crate and sends its status to DCS.**