High Voltage Power Supply System for ATLAS SCT Requirements and specification

E. Górnicki[1], S. Koperny[2] and B. Madeyski[1]

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[1] *Institute of Nuclear Physics, Kraków, Poland*
[2] *Faculty of Physics and Nuclear Techniques, University of Mining and Metallurgy, Kraków, Poland*

1 Introduction

This document describes requirements that should be met by HV power supply system for Atlas SCT. These requirements are related only to the new 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 have independent high voltage supply**
- **Nominal value range 40 - 350 V - floating, controlled to the precision better then 5 % .**
- **Nominal voltage setting by digital control input**
- **Voltage levels monitored at supply to 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**
- **The maximum ramp-up step size not exceed 5 V**
- **Allowable noise level 200 mV**
- **Over voltage trip level programmable (software control)**

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

- **Hardwired over-voltage trip - not built-in.**
- **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 8 bit precision at high current.**
- **Current trip level programmable by computer (software controled).**
- **HV supplies trip if the current exceed a preset value**
- **Over current hardware protected (if the current exceed 5.2 mA the voltage is automatically reduced). In this case software trip this supply.**

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/OVERTEPERATURE.**
- **Power supply enable line (for sequencer system)**
- **The ramp-down speed hard-wired giving a ramp down speed between 10 μs and 5 s.**

2.4 Interlocks

All interlocks couse the same action for low voltage and high voltage power supply

- **Interlock initiated by DCS :**
  Switch off the HV supply and equivalent LV supply and sends its status information to DCS
- **Interlock which couse switch off all supplies which are situated on one HV card and equivalent LV card and sends the status to DCS.**
- **Internal temperature interlock : switch off the HV supply and equivalent LV supply and sends its status to DCS.**