Power Supply Tests

Checking the stable operation of high-voltage power supplies (voltage, current)
with sapphire detectors from Monocrystal, University and Wuppertal.

INFN Padova

Sergii Vasiukov

24.08.2022

SY 5527 LC

Universal Multichannel Power Supply System

4 slots

A1561H

12 Channel 6 kV/20 µA

Common Floating Return Board

LAN/Ethernet interface

NIM Powered Crates

N1471H

4 Ch Reversible 5.5 kV/20 µA

NIM HV Power Supply High Accuracy Module

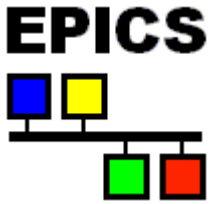
USB interface

HV power supply parameters

Model	Channels Number	Max Output V	Max Output I	Vset/Vmon Resolution	Iset/Imon Resolution
A1561H	12	6000 V	20 uA	100 / 10 mV	1 nA / 50 pA
N1471H	4	5500 V	20 uA	100 mV	0.5 nA / 50 pA

We use these parameters to monitor voltage and current at various HV

Experimental Physics and Industrial Control System



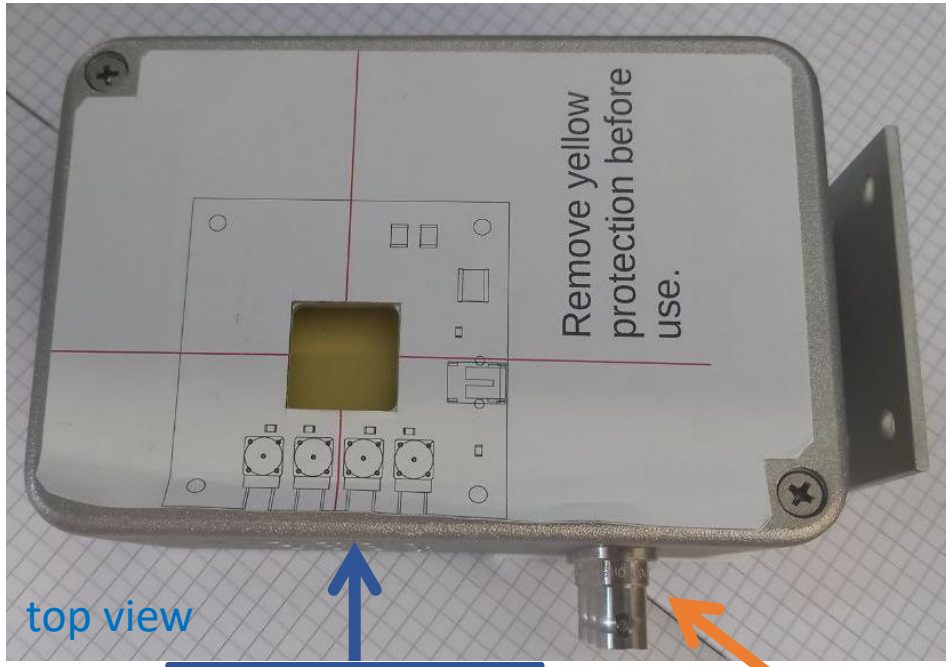
Remote control and Readout.

What we can use in the CERN?

In progress…

Needs to be studied deeply!

4 channel strip detector



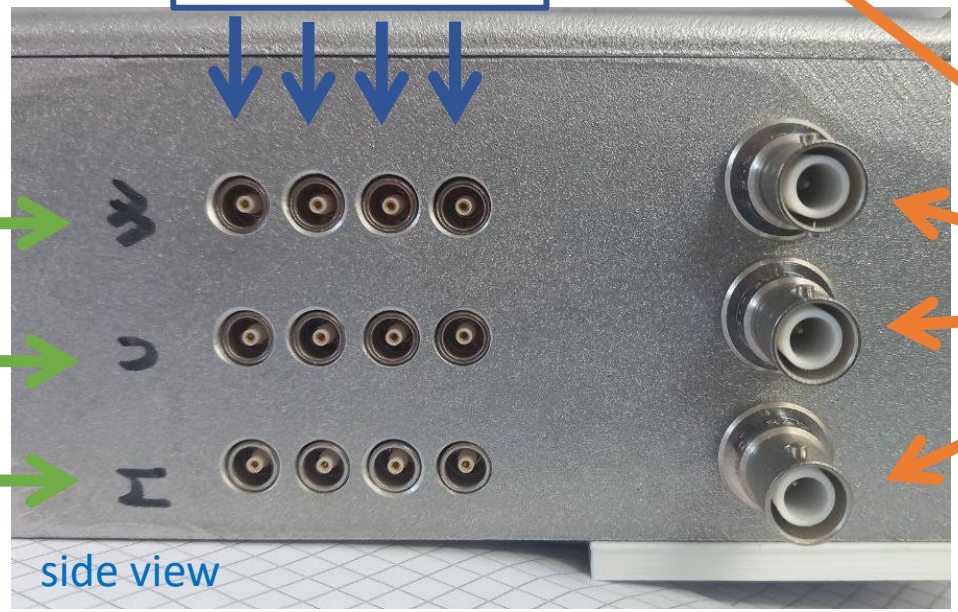
Output Channels

Sapphire Sensors

Wuppertal

University

Monocrystal

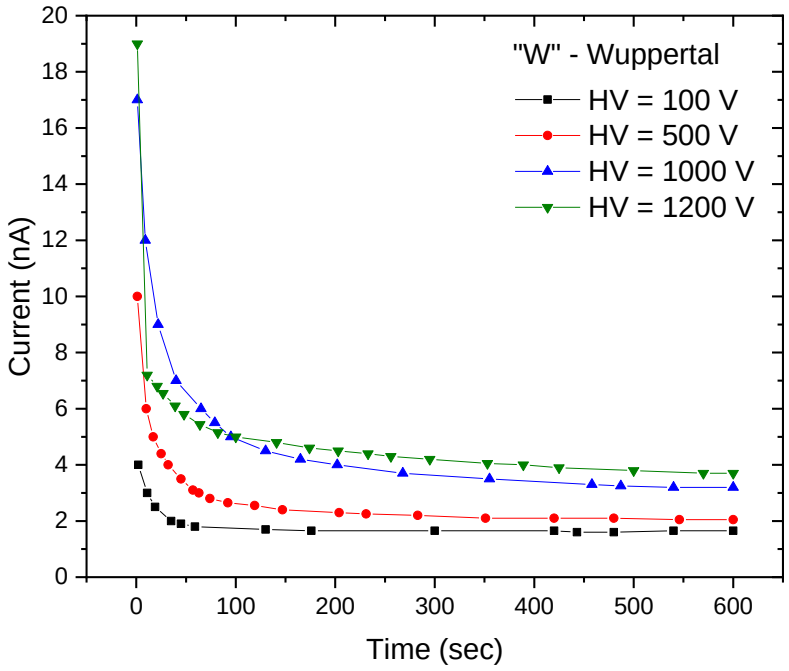


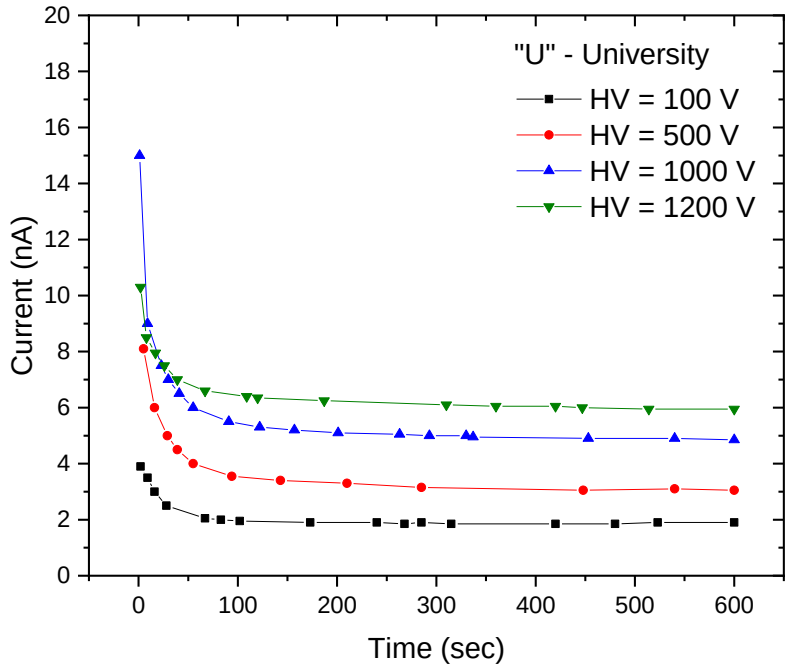
HV Power Supply

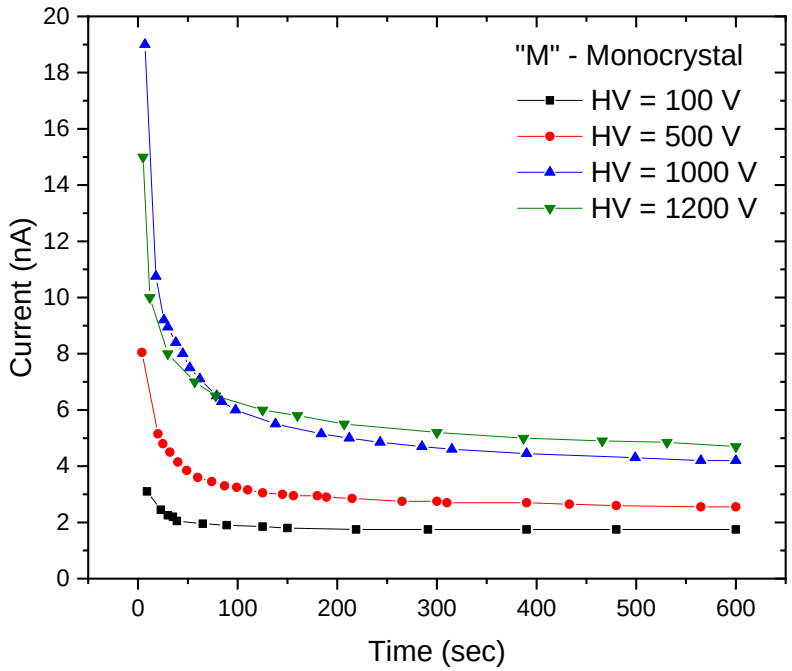
Output Current instability - A1561H power supply

✓ Output Voltage accuracy: +/- 220 mV is comparable with the datasheet

× Output Current accuracy: the current decreases over time!!!





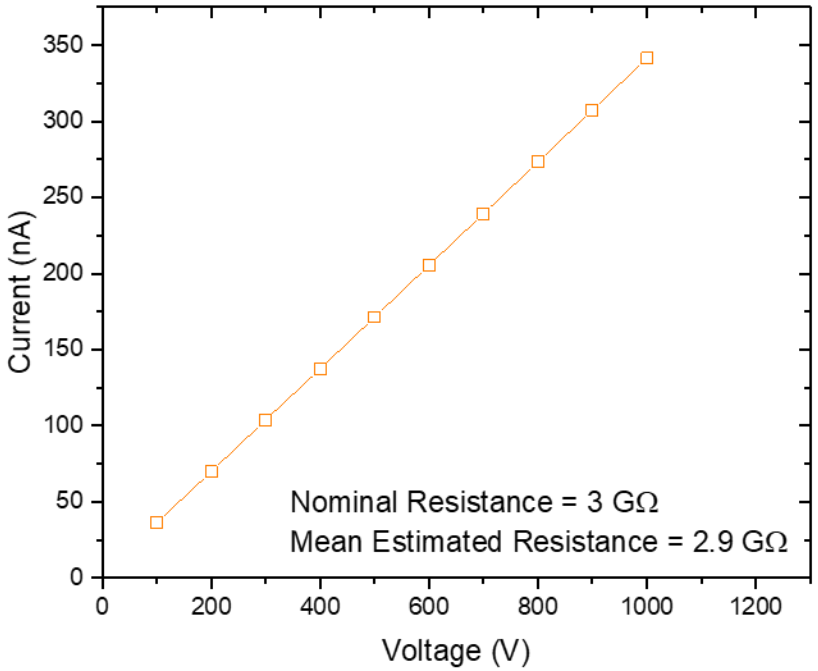


The output current rapidly drops down starting from ~0.2 uA, after reaching the inset HV value.

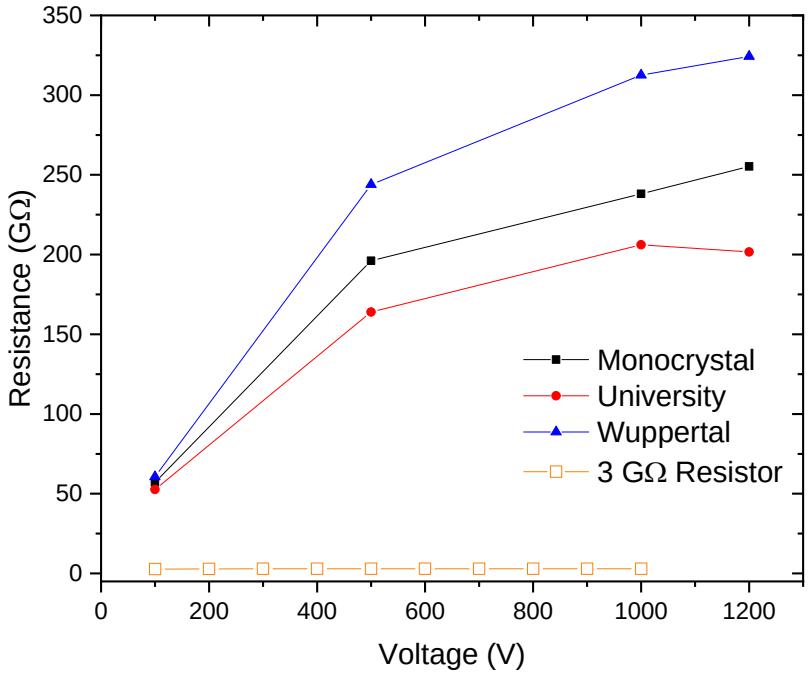
The output current slowly decreases even after 10 minutes.

Output Current instability - A1561H power supply

Reference Resistor



Sapphire Detectors

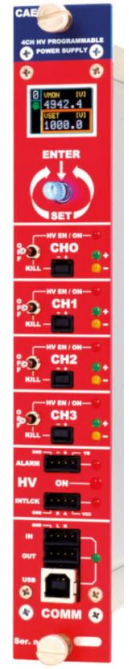


The instability of the output current is observed only with sapphire detectors and, on the contrary, is not detected on the reference resistance.

In the case of the A1561H power supply, the stabilization of the output current requires at least 10 minutes!

The reasons for this effect are not yet clear.

In the case of the N1471H power supply, a long-term effect is not observed.
The output current stabilizes in 10 - 20 s.



Output current value	
A1561H	N1471H
1.5 – 5.9 nA (after 10 min)	0 nA (after 20 sec)

Do To list

- Realize the data readout which is available in the CERN infrastructure
- Check the noise level without radiation source (mean voltage, std) at various HV

(preliminary tests demonstrate the output noise level ~ 0.5-0.6 mV in all channels)

- Check the signal in all 4 channels under the alpha source (^{241}Am)