Notes from meeting to discuss HV Power Supplies for ProtoDUNE detectors on February 10th, 2017

Attendees: Eric James, Flavio Cavanna, Dario Autiero, Sarah Lockwitz, Andrew Renshaw, Franco Sergiampietri, Flor De Maria Blaszczyk, Sebastien Murphy, Laura Molina Bueno

Notes:

Because of the large cost, it may not be possible to order a third 300kV Heinzinger HV supply for use as a joint ProtoDUNE-SP/ProtoDUNE-DP spare.

Although the chance of a HV supply failure during detector operations is small, this still seems like a dangerous situation since loss of a supply could effectively end data taking during the short test beam operations period available in summer/fall 2018.

Eric has talked to Hanguo Wang at UCLA who might be willing to let us keep his 200 kV at CERN during the data taking period in 2018. This supply could serve as the back-up for ProtoDUNE-SP and in the case of a failure of the ProtoDUNE-DP supply could be used to free up the nominal 300 kV ProtoDUNE-SP HV supply, which could then be used as a back-up for ProtoDUNE-DP.

The sizes of the power output supply cables differ between modules:

Current 300 kV supply: 022mm cable

New 300 kV supply: 038mm cable

200 kV supply: 038mm cable (we think)

100 kV supply: 014mm cable

Dual-phase believes that it is safer to run at 300 kV using the thickest (0.038mm) cable, which is why the new supply is being ordered based on this specification. Cable thickness should not be as much of an issue for ProtoDUNE-SP running at 180 kV.

Andrew reports that HV filter box can have adapters to receive the different-sized cables. Differences in the cable sizes should not effect the performance of the HV system below the filter boxes.

Flor reported on several available options the ProtoDUNE-SP team would like to see added to the current 300 kV Heinzinger supplies (both the one in-hand and potentially to the one being ordered). In particular, they would like to have Ethernet/RS232 16-bit control option. Sebastien agrees (based on current experience with the 1x1x3) that this option would be a very valuable addition.

The 200 kV supply being considered as a potential back-up has the Ethernet/RS232 16-bit control option and could be seamlessly integrated into the ProtoDUNE slow controls system if necessary.

Flor also noted that it's important to have a supply with this option available as early as this summer so that needed work on the slow controls interface can be accomplished.

Proposed Plan of action:

Franco agreed that he would contact Heinzinger to see if the Ethernet/RS232 16-bit control option could be added to the recently-placed order for the second 300 kV supply.

It was agreed that this supply (when it arrives at CERN) could be used by the people working on the slow controls interface – hopefully as early as this summer.

We would work to understand when we would need to return the current 300 kV supply used by the 1x1x3 to the company to have the additional option added (probably early fall 2017). In the meantime, this supply would continue to be used for the 1x1x3, although a separate 100 kV supply has been ordered and will be available when the swap out needs to occur.

Flor will continue to study whether there are additional options that we would like to have added to the current 300 kV supply for use in ProtoDUNE-SP, and we will re-visit this topic before it is sent out to the company to have the Ethernet/RS232 16-bit control option added in the fall.

Laura and Sarah will work to set up a regular, on-order-of monthly meeting, for this group in the context of the Joint Single-Phase/Dual-Phase HV Working Group to continue these Technical discussions moving forward.