

## The CRYRING injection bumper power supply selector unit.

CRYRING has two alternative high voltage power supplies for the injection bumper plates. The fast supply, HVmetric 89127, can produce pulses with amplitudes up to plus and minus 30 kV, and slope times in the range of 50 to 100  $\mu$ s. The slow supply, commonly called “Paalometric”, can produce pulses with amplitudes up to plus and minus 1 kV, and slope times in the range of 0.2 to 20 ms. These time ranges are approximate, and longer slope times can be achieved by connecting additional capacitance in parallel to the bumper plates.

The switching between the two supplies is done using a selector unit mounted on the back side of the HVmetric supply. The selection is done by manual intervention. There are two removable plugs, one for the negative and one for the positive output. The plugs can be mounted in two positions, where one selects the 30 kV supply and the other selects the 1 kV supply.

Before changing the selection, the high voltage supplies must always be switched off!

The analogue inputs to the supplies, for setting the voltages and the slope times, are daisy-chained between the two units, so there is no need to change anything there when switching between the supplies.

The HVmetric, but not the “Paalometric”, has a connector for digital command and status bits.

The only thing that needs to be done when switching between the supplies, in addition to what is described here about the selector unit, is to move the pulse monitor cable, if this is used. In Stockholm the pulse monitor output of the selected power supply was connected to an oscilloscope.

Figure 1 shows the selector unit.

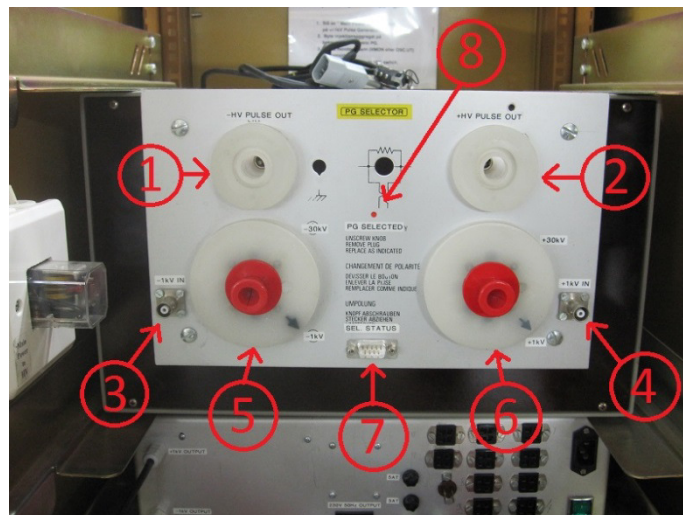


Figure 1

1. Negative pulse output
2. Positive pulse output
3. Negative input from slow supply
4. Positive input from slow supply
5. Selector for negative pulse, mounted in “-1 kV” position
6. Selector for positive pulse, mounted in “+1 kV” position
7. Selector status connector
8. Selector status LED indicator

Figure 2 shows the selector unit with the negative selector plug dismounted. There is a 90 degree angle difference between the two possible positions. When the plugs are mounted, the selected power supply is indicated by the black arrow on the respective plug. Figure 3 shows the positive selector plug, mounted in the “+ 1 kV” position.

The selector unit has a 9-pole D-sub-P connector, indicated in figure 1 as number 7, that can be used to read out information about the positions of the selector plugs. Each plug has two microswitches showing its status. One of the switches shows if the plug is properly mounted. If this is the case, the other switch shows if the plug is mounted in the 1 kV or the 30 kV position.



Figure 2

On the selector unit there is also a LED, indicated in figure 1 as number 8, with the label “PG SELEC-TED”. The two leads of the LED are connected to the D-sub connector, so the LED can be used to show the status of the selector unit. The selector unit is passive, so both the driving of the LED and the logic for using it must be supplied from outside.



Figure 3

Figure 4 is a sketch showing how the D-sub is connected inside the selector.

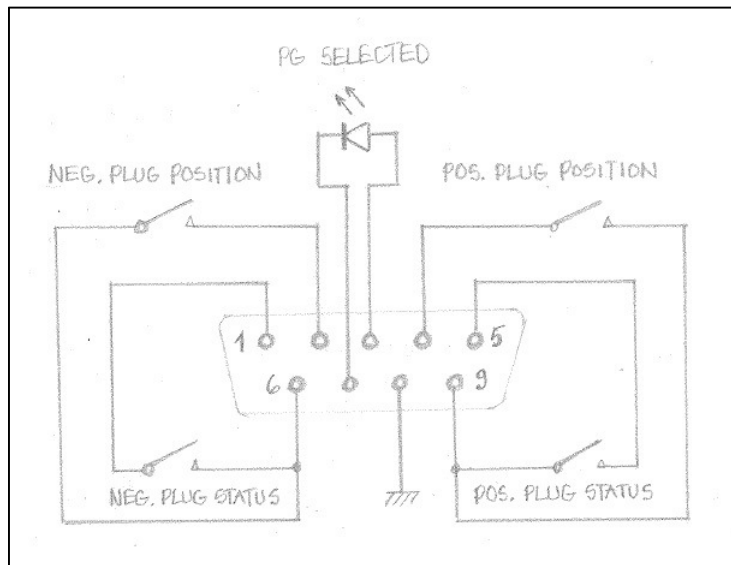


Figure 4

The use of the pins of the D-sub is also described in the following table.

Pin	Description
1	Negative selector plug status switch Open: Error, plug not properly mounted Closed: OK, plug mounted
2	Negative selector plug position switch, valid if status switch (pin 1) is in "closed" position Open: - 30 kV selected Closed: - 1 kV selected
3	PG SELECTED LED, anode side
4	Positive selector plug position switch, valid if status switch (pin 5) is in "closed" position Open: + 30 kV selected Closed: + 1 kV selected
5	Positive selector plug status switch Open: Error, plug not properly mounted Closed: OK, plug mounted
6	Return for negative selector switches
7	PG SELECTED LED, cathode side
8	Ground
9	Return for positive selector switches

If some logic and LED driving capacity is provided by the control system, then the PG SELECTED LED could be used to show the status of the switching unit. A general OK status, for example, would be defined by the four switches showing a situation where both selector plugs are properly mounted, and also mounted in the same position. It is not meaningful to operate if one plug is selecting the 1 kV supply and the other plug is selecting the 30 kV supply.