

215M/215F High Voltage Supply User Notes



Overview

The 215 high voltage supply, available as a module d for use in the 417(T) electronics, or as stand alone element, has been designed for use with photomultipliers, and lead salt detectors operating in the photoconductive mode.

Provided is a stable high voltage variable between -300 and -1500V in up to 2mA. This is typically factory set to 750V.

Mechanical

The 215M is inserted from the front of the 417(T) an attached by four corner screws, the molex connector of the module is connected to the rail at the rear of the 417(T). The 215F simply stands alone.

Electrical

The 215M is powered from the 417(T) via connection of a molex connector to the rail of the latter; the 215F requires a mains supply.

The unit can be switched off independently from the 217 bin by a front panel toggle switch or remotely which provides a shut down facility that can be used with a microswitch in safety interlock systems.

The 215 uses an HV-BNC connector at its output. When supplied as part of a system with a Bentham DH series detector a HV-BNC to HV-BNC cable will be provided. Note that the HV-BNC is similar but not compatible with the standard 50/75Ω BNC connectors. No attempt should be made to use standard BNC connectors in any connection with the high voltage supplied by the 215.

Setting high voltage

The high voltage may either be set from an adjustable potentiometer on the front panel, or via an external 0-10V supply via the control 3.5mm jack socket. The voltage output, in volts, of the 215M can be viewed on channel HV of the 417(T), ignoring the decimal place. Note that the high voltage is not connected to the output of the 417 display.

The control is achieved using a voltage via a two pole 3.5mm jack plug (eg.RS 449-988). When inserted into the control input socket the outer of the jack is connected to ground. Shorting the inner pole to ground will reduce the high voltage output to zero. Applying a voltage (+ve wrt ground) to the inner pole will result in a high voltage output proportional to the applied input. The constant of proportionality is set by the HV ADJUST control.

Specifications

Output	-300 to -1500V
Stability	100 ppm/°C, 25 ppm for 10% change in line voltage
Ripple and noise	100 ppm pk-pk
External control	0 to 10V via 3.5mm jack socket



Using the 215

The 215 includes a high degree of output stabilisation to ensure that the output voltage remains constant even when changes occur in temperature, mains voltage or the current drawn from it's output.

Before connecting and operating any detector with the 215 make sure that the detector circuitry is arranged for negative high voltage and that the level you have set does not exceed the maximum specified by the detector manufacturer.

For photomultipliers connect the negative output (i.e. centre pin of HV-BNC connector) to the cathode. Do not use a load resistor at the anode. Connect the anode to a virtual ground input, current amplifier such as the Bentham 487.

Bentham lead sulphide and lead selenide detectors incorporate the following circuit to reduce the voltage using a potential divider. This scheme has the advantage that a capacitor can be included to give a super-quiet bias voltage to the detector circuit. It is worth noting that, with photoconductive detectors such as lead sulphide and lead selenide, any noise on the bias supply appears in the signal.

The following diagram shows typical circuitry for lead sulphide and lead selenide detectors when used with the 215.

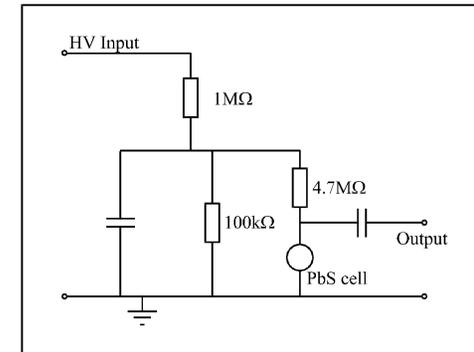


Figure 1: Circuitry for Detectors used with 215

When using the above circuit the bias applied to the photoconductive cell will be nominally 1/11 of the output of the 215.

This arrangement makes it possible to operate a photomultiplier and lead sulphide detector in parallel from a single 215 in dual detector systems. If the PMT is run at a typical level of 750V the PbS bias will be approximately 70V.

Using a small screwdriver or miniature potentiometer adjusting tool rotate the 215 ADJUST control clockwise to increase or anti-clockwise to decrease the amplitude of the high voltage. The ADJUST control needs 20 turns to change the output from the minimum of 300V(-ve) to the maximum of 1500V(-ve).

Block Diagram

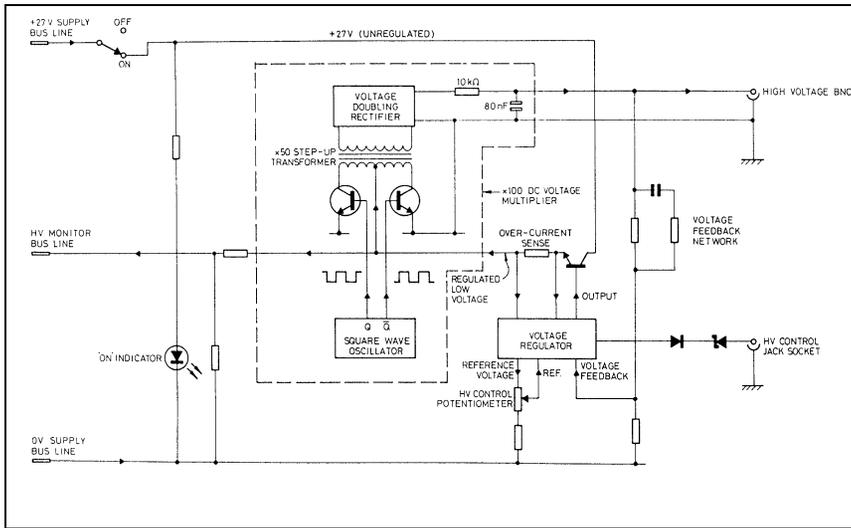


Figure 2: High Voltage Supply Schematic

SYMPTOM	POSSIBLE CAUSES
The green led does not light when the 215 is switched on.	The power connector from the 215 is not connected to the 417 mother board
Although the output is set to mid range with no load, when the detector is connected to the output socket the dvm display indicates that the output is in the region of 1700V.	There is a short circuit or low resistance path in your detector circuitry. Switch off 215 immediately and check cables and wiring at detector assembly.

WEEE statement

Bentham are fully WEEE compliant, registration number is WEE/CB0003ZR. Should you need to dispose of our equipment please telephone 0113 385 4352 or 4356, quoting account number 135419.



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