

1. DESCRIPTION

The CAEN Model SY527, UNIVERSAL MULTICHANNEL POWER SUPPLY SYSTEM, represents a major breakthrough in Power Supply Systems. Its modularity and flexibility, together with accurate control and reliability, have been carefully designed in order to fulfill almost all the requirements of Power Supply Systems for modern High Energy Physics Experiments. The System SY527 is designed to power a whole range of detectors, such as photomultipliers, wire chambers, streamer tubes, etc.: in particular, the System is most appropriate for Silicon Detectors due to the existence of floating power supply boards.

The System is organized into "crates"; each crate is a 19" wide, 8U high euro-mechanics rack. The modules bearing the output channels (Channel Boards) consist of 6U plug-in modules; the remaining 2U are dedicated to house the System's Fan Tray unit.

Up to 10 Channel Boards may be plugged into a single crate. Different plug-in modules are available (Positive, Negative, Floating and Distributor Boards) and can be freely mixed in a single System in order to obtain the necessary configuration. Moreover the System is designed to be easily upgradable and expandable: future boards will be added in a System with no modifications on the System Firmware.

Both the Power-On and the Channel Out Enable of the System can be performed locally or via remote signals sent to the front panel connectors.

Each crate may be controlled locally or remotely. Local control is performed manually through a key-pad and an LCD display located on the Front Panel. Remote control is actuated by means of a video terminal (ANSI VT100 or compatible) plugged into an RS232C connector, which is also located on the Front Panel. In this case, a sophisticated Software User Interface is available, featuring symbolic names for channels, custom status displays and other features designed to help the management of a large number of channels. In order to protect the System from improper use, a password protection can be set for each channel or group of channels.

Each crate houses a HIGH SPEED (H. S.) CAENET node for the remote control; it allows the possibility of linking one or more crates to a H. S. CAENET controller that acts as a System Control Unit. Available controllers are

- A303 H. S. CAENET IBM™/PC Controller;
- C117B H. S. CAENET CAMAC Controller;
- V288 H. S. CAENET VME Controller.

The Model SY527 can also be configured as a H. S. CAENET Controller itself: in this way it allows the control of a multicrate system from a single video terminal plugged in one of the crates. The communication software needed for the operation of multicrate system is built in every unit.

Two voltage values (V0set, V1set) and two current limit values (I0set, I1set) can be programmed for each power channel. The switching from one value to the other is performed via two external (NIM or TTL) input levels (VSEL, ISEL). The maximum rate of change of the voltage (Volt/second) may be programmed for each channel. Two distinct values are available, depending on the sign of the change (Ramp-Up, Ramp-Down). An attempt to change the voltage will result in a linear increase or decrease with time, the rate being determined by the "Ramp-Up" or "Ramp-Down" parameters.

For some of the Floating Power boards, and for all the High Voltage boards, the ISET values of the channels represent a software controlled hardware protection on the channels' currents: the channel cannot draw a current higher than its programmed limit (boards with programmable current hardware protections). Other boards have the current hardware protection fixed to a common value for all the channels; the IMON values are used to signal a fault, but the channels can draw a current larger than the ISET values (boards with fixed current hardware protections).

In both cases, if a channel tries to draw a current larger than the programmed limit, it is signaled to be in "overcurrent". The System detects this state as a fault, and may be programmed to react in different ways, namely:

A. CONSTANT CURRENT

- If the Board has programmable current hardware protections, the output voltage is varied to keep the current below the programmed limit. The channel behaves like a current generator.
- If the Board has fixed current hardware protections, the output current is permitted to exceed the ISET value; the channel behaves like a current generator only if the maximum current value is reached.

B. TRIP

The channel is switched off. The voltage will drop to zero at a rate determined by the value of "Ramp-Down" for that channel.

- If the Board has programmable current hardware protections, the channel behaves like a current generator before being switched off.
- If the Board has fixed current hardware protections, the output current is permitted to exceed the ISET value before the channel is switched off.

All the relevant parameters are kept in a special non volatile memory (EEPROM) so that this information is not lost at Power-Off.

The System may be instructed to react to a Power-On or to a Restart bringing all the channels from zero to the programmed value without the User's intervention. If this option is selected, the System will recover smoothly from a power failure or RESET, automatically restoring the status it had before the power was interrupted.

NOTE: A decrease in the voltage (more than 10% for a time ≥ 10 ms), or any external cause (e.g., an output discharge) that can produce a loss of synchronism in the Software of the SY527 System, generates an automatic Reset.