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VHS Standard HV Modules

with Common-GND and VME Interface

Operator's Manual

Contents

Operator's Manual VHS-Interface

Attention!

-It is not allowed to use the unit if the covers have been removed.

-We decline all responsibility for damages and injuries caused by an improper use of the module. It is highly recommended to read the manual before any kind of operation.

Note

The information in this manual is subject to change without notice. We take no responsibility for any error in the document. We reserve the right to make changes in the product design without notification to the users.

Filename VHSCxxx as of 2012-03-05

1. General information

The 12 channel VHS modules are High Voltage power supplies in 6U VME format in double width. The units are controlled exclusively via the VME bus system. The output voltage features a high stability, low ripple and noise and low temperature coefficient. Each single channel has an independent voltage and current control. The data for set and measure values is given in a format of Floating Point Single Precision values. The modules are equipped with 24 bit ADC and 20 bit DAC circuits.
The channels share a Common-GND, which is connected to the internal Crate-Ground.

The HV output is available as a 51 pin REDEL HV connector or as SHV connectors.

2. Technical data

	VHS C005[1]x	VHS C010[1]x	VHS C020[1]x	VHS C030[1]x	VHS C040[1]x	VHS C060[1]x
HV channels per module	12	12	12	12	12	12
Output voltage $V_{O\ nom}$ [kV]	0.5	1	2	3	4	6
Output current $I_{O\ nom}$ [mA]	15	8	4	3	2	1
Resolution of [mV] voltage setting*)	2	4	5	10	10	15
current setting*) [nA]	150	80	40	30	20	10
voltage measurement*) [mV]	2	4	5	10	10	15
current measurement*) [nA]	150	80	40	30	20	10
*) with standard sample rate 500/s and digital filter 64						
Ripple and noise [mV_{P-P}]	< 10					< 30
	- at max. load and $\lvert V_O \rvert > 1\% * V_{O\ nom}$ - f > 10 Hz					
Stability(no load/load and ΔV_{IN})	$0{,}02\% * V_{O\ nom}$					
Sample rates [samples/s]	5, 10, 25, 50, 60, 100, 500					
Digitalfilter averages	1, 16, 64, 256, 512, 1024					
The resolution of measurable values depends on the settings of the sampling rate and the digital filter!						
Accuracy of voltage measurement	$\pm (0{,}01\% * V_O + 0{,}02\% * V_{O\ nom})$					
Accuracy of current measurement	$\pm (0{,}02\% * I_O + 0{,}02\% * I_{O\ nom})$					
The measurement accuracy is guaranteed in the range $1\% * V_{O\ nom} < V_O \leq V_{O\ nom}$ and for 1 year						
Voltage ramp up / down [V/s]	$1*10\text{-}6 * V_{O\ nom}$ up to $0{,}2 * V_{O\ nom}$					
Temperature coefficient	$< \pm 50 * 10^{-6}/_K$					
Hardware limits V_{max} / I_{max}	potentiometer per module (V_{max} / I_{max} is the same for all channels)					

	VHS C005)1)x	VHS C010)1)x	VHS C020)1)x	VHS C030)1)x	VHS C040)1)x	VHS C060)1)x
Interface	VME-Interface					
Module status	green LED turns on if all channels have the status “ready”					
Protection loop (I_s) potential free (2 pin Lemo-socket and REDEL SL)	5 mA < I_s < 20 mA ⇒ module on I_s < 0,5 mA ⇒ module off					
Power requirements V_{INPUT}	± 12 V (< 5,8 A) and + 5 V (< 0,4 A)					
Packing	6U VME cassette (double width and 164 mm deep)					
Connector on the rear	96-pin connector according to DIN 41612					
HV connector	51 pin REDEL HV connector (R51) SHV connectors (SHV)					
Operating temperature	0 ... +40 °C					
Storage temperature	-20 ... +60 °C					

3. Handling

3.1 Connection

The supply voltages and the VME interface are connected to the module via a 96-pin connector on the rear side of the module.

3.2 Limits

The maximum output voltage for all channels (hardware voltage limit) is defined through the position of the corresponding potentiometer V_{max} .
The maximum output current for all channels (hardware current limit) is defined through the position of the corresponding potentiometer I_{max} .
The greatest possible set value for voltage and current is given by V_{max} – 2% and I_{max} – 2%, respectively.
It is possible to measure the hardware voltage and current limits at the sockets below the potentiometer. The socket voltages are proportional to the relative limits, where 2,5 V corresponds to 102 ± 2 % $V_{O\ nom}$ and 102 ± 2 % $I_{O\ nom}$.
The output voltage and current are limited to the specified value. If a limit is reached or exceeded in any channel the green LED on the front panel turns off.

3.3 Safety Loop

The socket for the safety loop (global interlock signal) is in the middle of the front panel. If the safety loop is active then an output voltage in any channel is only present if the safety loop is closed and an external current in a range of 5 to 20 mA of any polarity is driven through the loop. If the safety loop is opened during the operation the output voltages are shut off without ramp and the corresponding bits in the ‘ModuleStatus’ (see manual “Operator’s Manual VHS-Interface“ 2.2.1 Modul Registers (ModuleStatus and ModuleEventStatus) are cancelled. After closing the loop again the ModuleEventStatus has to be restored and the channels have to be switched ON.
The pins of the loop are potential free, the internal voltage drop is approx. 3 V. In the factory setup the safety loop is not active (the corresponding bits are always set). The loop can be activated by removing the jumper “ILK”, which can be found on the topside of the board (see manual “Operator’s Manual VHS-Interface“, app. B).

3.4 Option: Single Channel INHIBIT

Optionally it is possible to install an INHIBIT for each channel via two Sub-D connectors. Channel 0 to 7 corresponds to Pin 1 to 8 at the 1st Sub-D connector, Pin 9 is connected to GND. Channel 8 to 11 corresponds to Pin 1 to 4 at the 2nd Sub-D connector, Pin 9 is connected to GND. Internally the inputs can be connected either with a pull down (option IND) or a pull up resistor (option INU).

If the INHIBIT contact pin (n) is connected to the GND or a TTL-LOW potential the behavior of HV-PS in this channel depends on the following setting (2.2.1 Modul Register, bit SetKillEnable):

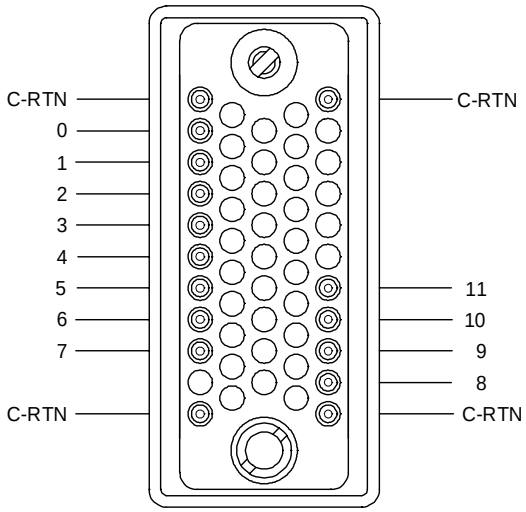
KILL-enable = 1: Voltage is switched off permanently without ramp. ChannelEventStatus flag 'EEINH' is set. The green LED at the front panel turns off.

KILL-enable = 0: ChannelStatus flag 'isEINH' and ChannelEventStatus flag EEINH are set. The action of the HV channel can be defined via the Monitoring group (2.2.3.2.3 Monitoring group, MonitorIsExternalInhibit) . The green LED at the front panel turns off.

When the INHIBIT is no longer active (TTL-HIGH potential or not connected), the INHIBIT flag must be reset before the voltage can be switched ON again (2.2.2 Channel registers ChannelEventStatus).

4. Connector layout

51 pin REDEL HV connector



C-RTN is connected with the Modul-GND and the shield

5. Order Information

Item Code	Type	Polarity	Channels	V_{nom}	I_{nom}	HV Connector
VH120-60p105R51	VHS C060p	positive	12	6000V	1mA	REDEL)1
VH120-60n105R51	VHS C060n	negative	12	6000V	1mA	REDEL)1
VH120-40p205R51	VHS C040p	positive	12	4000V	2mA	REDEL)1
VH120-40n205R51	VHS C040n	negative	12	4000V	2mA	REDEL)1
VH120-30p305R51	VHS C030p	positive	12	3000V	3mA	REDEL)1
VH120-30n305R51	VHS C030n	negative	12	3000V	3mA	REDEL)1
VH120-20p405R51	VHS C020p	positive	12	2000V	4mA	REDEL)1
VH120-20n405R51	VHS C020n	negative	12	2000V	4mA	REDEL)1
VH120-10p805R51	VHS C010p	positive	12	1000V	8mA	REDEL)1
VH120-10n805R51	VHS C010n	negative	12	1000V	8mA	REDEL)1
VH120-05p805R51	VHS C005p	positive	12	500V	10mA	REDEL)1
VH120-05n805R51	VHS C005n	negative	12	500V	10mA	REDEL)1

)1 Option SHV instead of R51 => Connector SHV