VDS Distributor HV Modules
with Common Floating-GND and VME Interface

Operator's Manual

Contents

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 VDxxx as of 2012-03-05

1. General information

The VDS series modules are Distributor multichannel high voltage power supplies in 6U VME format in single width (8 Channels) and in double width (24 Channels). The Modules are equipped with a Live insertion/extraction capability.

The output voltage features a high stability, low ripple and noise and low temperature coefficient. Each single channel has an independent voltage control and voltage and current measurement. 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 Floating-GND (C-RTN), which avoids ground loops and reduces the noise level in large systems. The Common Floating-GND is insulated from the Crate-Ground (CCG) up to ±50 V (with a 60 V hardware limit).

The HV output at the module is available as SHV connectors (for the 8 channel version) or as a 51 pin REDEL HV connector (for the 24 channel version).

2. Technical data

	VDS 8105x[1]	VDS 18105x[1]	VDS 8130x[1]	VDS 18130x[1]
HV channels per module	8	24	8	24
Output voltage $V_{O\ nom}$ [kV]	0.5	0.5	3	3
Output current $I_{O\ nom}$ [mA]	1	1	0.5	0.5
Resolution of voltage setting[*] [mV]	5	5	10	10
voltage measurement[*] [mV]	10	10	30	30
current measurement[*] [nA]	50	50	100	100
[*] with standard sample rate 500/s and digital filter 64				
Ripple and noise [mV_{P-P}]	20			
	if output voltage difference between channels < 600V - at max. load and $\lvert V_O \rvert > 1\% * V_{O\ nom}$ - f > 10 Hz			
Stability (no load/load and ΔV_{IN})	0,005%			
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	$\pm (0,05\% * I_O + 0,05\% * I_{O\ nom})$		$\pm (0,1\% * I_O + 0,1\% * I_{O\ nom})$	
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 $0,2 * V_{O\ nom}$			
Floating voltage	Common-GND to System-GND: $\leq \lvert 50\ V \rvert$			
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)			

	VDS 8105x[)1]	VDS 18105x[)1]	VDS 8130x[)1]	VDS 18130x[)1]
Interface	VME Interface according toVME / VME64 standarts			

Module Status Indicator	⊚ HIM – "here I am" the white LED is flashing during a VME access
	   - blinking with a 1Hz sequence in SPECIAL MODE
	   - blinking with a SOS sequence in re-update mode
	
	⊸▯ LI – "function live insertion" the blue LED turns on if:
	   -the HV module is ready for live extraction (will hold for 30s)
	   -the HV module is in live insertion for at least 2s after plug-in
	
	⚠ HV ON – the yellow LED indicates that HV is on in at least
	   one channel
	
	OK OK – the green LED turns on if all channels and the module
	   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	0.6A	1.5A	1A	2.8A
Power requirements V_{INPUT} +5 V				
Packing	6U VME cassette (single or double width and 164 mm deep)			
Connector on the rear	J1 VME64 160-pin connector according to IEC 61 076-4-113			
HV connector	51 pin REDEL HV connector (R51) (24 Channels) isolated built-in SHV connectors (SHV) (8 Channels)			
Operating temperature	0 ... +40 °C			
Storage temperature	-20 ... +60 °C			

)1 x=p polarity positiv, x=n polarity negativ

3. Handling

3.1 Connection

The supply voltages and the VME interface are connected to the module via a 160-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

A safety loop can be implemented via the safety loop socket (SL) on the front panel and between the SL-contacts (Pin 22 and PIN 30) at the REDEL-connector if equipped. 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. (For modules with a REDEL-connector the other SL input must be closed.) 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 VDS-Interface" 3.2.1 ModuleStatus and ModuleEventStatus) are cancelled. After closing the loop again the ModuleEventStatus flag EventSafetyLoopNotGood has to be reset and the channels have to be switched ON.

The loop connectors 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 VDS-Interface", app. B).

4. Connector layout

51 pin REDEL HV connector
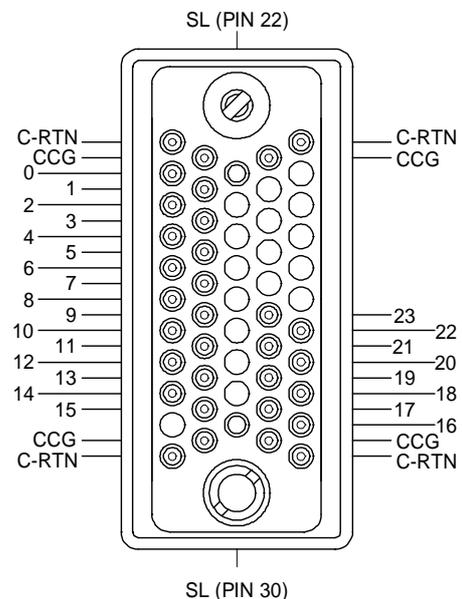
CCG is connected with the Crate-GND and the shield

5. Order Information

Item Code	Type	Polarity	Channels	V_{nom}	I_{nom}	HV Connector
VD081-05p105SHV	VDS 8105p	positive	8	500V	1mA	SHV
VD081-05n105SHV	VDS 8105n	negative	8	500V	1mA	SHV
VD081-30p504SHV	VDS 8130p	positive	8	3000V	0.5mA	SHV
VD081-30n504SHV	VDS 8130n	negative	8	3000V	0.5mA	SHV
VD241-05p105R51	VDS 18105p	positive	24	500V	1mA	REDEL
VD241-05n105R51	VDS 18105n	negative	24	500V	1mA	REDEL
VD241-30p504R51	VDS 18130p	positive	24	3000V	0.5mA	REDEL
VD241-30n504R51	VDS 18130n	negative	24	3000V	0.5mA	REDEL