

# Model SHQ122M to SHQ226M

## Benchtop High Voltage Power Supplies

### Features

- Single and Dual HV supplies in benchtop case
- Regulated 0 to  $\pm 2$ kV, 4kV and 6 kV DC, output current - see table
- programmable HV-ramp 2 .. 255 V/S and 500 V/S ramp hardware settable, up and down
- Simultaneous indication of current and voltage with a two-line LCD display
- Resolution of voltage indication: 100 mV
- Resolution of current indication: 1nA
- Frontpanel LED indicators for polarity
- Low noise and ripple for high resolution detectors:  $\leq 2$  mVpp typical, 5mVpp max.
- Settable voltage and current limiting
- Short circuit and overload protected
- Programmable HV parameter setting and polling of actual values via RS232C interface
- Continuous setting of HV over full range with 10 turn Helipot
- Easy access to manual polarity switch
- External input for HV shutdown

### Description

The Models SHQ 122M-226M HV supplies are single or two channel high voltage version in a benchtop case. Modern patented circuit principles in connection with the latest SMT manufacturing technologies permit the design and construction of very compact high voltage supplies with excellent specifications.

All SHQ models offer either manual control or operation via RS232 Interface. The use of this interface supports more than the manual control functionality.

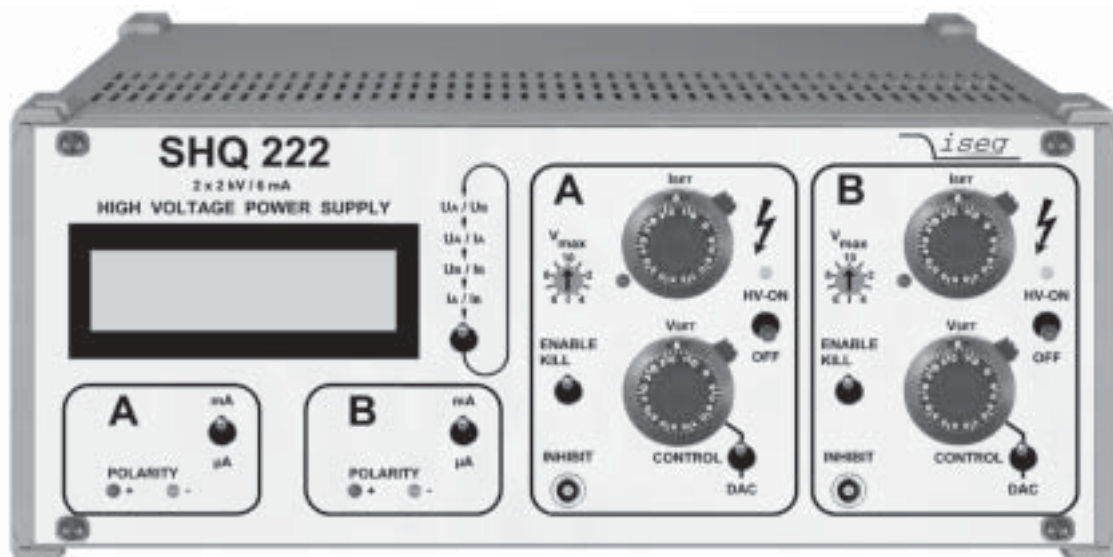
The high voltage supplies provide high precision output voltages together with very low ripple and noise, even under full load. Separate 10%-step hardware switches enable to set voltage and current limits.

An INHIBIT input provides instant shutdown to protect sensitive detector devices.

Additionally, the maximal output current per channel is programmable via the interface. The high voltage outputs protected against overload and short circuit. The output polarity can be selected by manual rotary switches accessible from the rear panel of the case without having to take any covers off.

The output polarity can also be set by software through the RS232C interface. The chosen polarity is displayed by a LED on the front panel and a sign on the LCD display. It is not allowed to change the polarity under power! An undefined switch setting (not at one of the end positions) will cause no output voltage.

For effective protection of connected devices the maximum output voltage and current can be selected in 10%-steps with the rotary switches  $V_{max}$  and  $I_{max}$  (switch dialed to 10 corresponds to 100%). An output voltage or current exceeding the set limit is signalled by the red front panel error LED.



SHQ 12X-22X 23052002

## The range of SHQ 10X and 20X series HV supplies

Model	Output Voltage	Outp. Current per channel	Ripple maximum	LCD res. current	LCD res. voltage	Power requirements Power set to 230 or 115V	Type	Order Number
SHQ 122M	0 .. 2 kV	0 .. 6 mA	< 2 mV pp	1 nA	100 mV	Optional 93.5V .. 265V	Bench top	HVIB122
SHQ 124M	0 .. 4 kV	0 .. 3 mA	< 2 mV pp	1 nA	100 mV	Optional 93.5V .. 265V	Bench top	HVIB124
SHQ 126M	0 .. 6 kV	0 .. 1 mA	< 5 mV pp	1 nA	100 mV	Optional 93.5V .. 265V	Bench top	HVIB126
SHQ 222M	0 .. 2 kV	0 .. 6 mA	< 2 mV pp	1 nA	100 mV	Optional 93.5V .. 265V	Bench top	HVIB222
SHQ 224M	0 .. 4 kV	0 .. 3 mA	< 2 mV pp	1 nA	100 mV	Optional 93.5V .. 265V	Bench top	HVIB224
SHQ 226M	0 .. 6 kV	0 .. 1 mA	< 5 mV pp	1 nA	100 mV	Optional 93.5V .. 265V	Bench top	HVIB226

### Function of the KILL switch:

#### Switch to the upper position: (ENABLE KILL)

The output voltage will be shut off permanently without ramp on exceeding  $V_{max}$ ,  $I_{max}$  or in the presence of an INHIBIT signal (Low=active). Restoring the output voltage is possible after operating the switches HV-ON or KILL or reading "LAM status" and then "Start voltage change" by DAC control.

#### Switch to the lower position: (DISABLE KILL)

The output voltage will be limited to  $V_{max}$ , output current to  $I_{max}$  respectively; INHIBIT shuts the output voltage off without ramp, the previous voltage setting will be restored with hard- or software ramp on INHIBIT no longer being present.

### Operation under RS232 control

The most important parameters of the high voltage supply can be set and read under computer control via the RS232 interface. An optional VI (virtual instrument) is available for easy setting of parameters by simple mouse click.

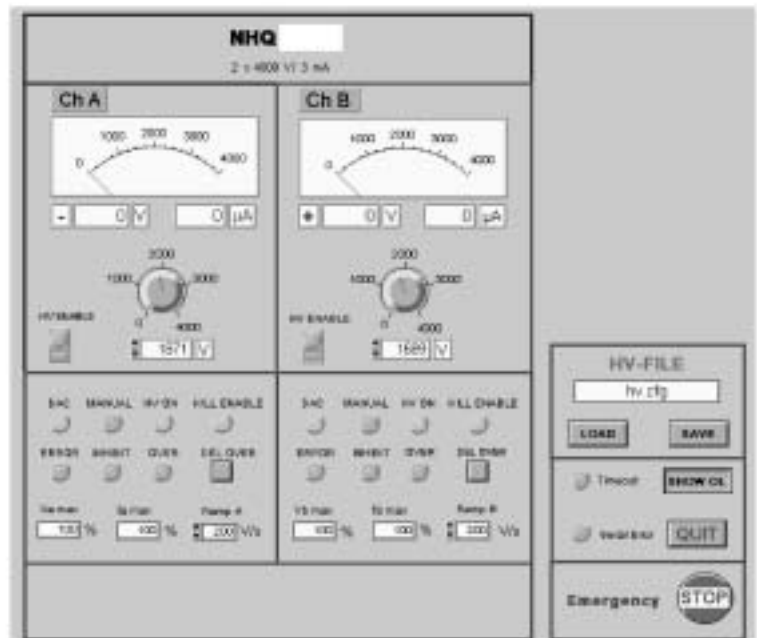
### RS232 control mode

- 1<sup>st</sup> Write function: set voltage; ramp speed; maximal output current (current trip); auto start
- 2<sup>nd</sup> Switch function: output voltage = set voltage, output voltage = 0
- 3<sup>rd</sup> Read function: set voltage; actual output voltage; ramp speed; actual output current; current trip; auto start; hardware limits current and voltage; status

Front panel switches are having priority over software control.

### Options

CAN-Bus interface instead of RS232C interface



Example of a VI Virtual Instrument (optional, ask factory for details of current version)

SHQ 12X-22XM

# Specifications

TECHNICAL DATA	HIGH PRECISION		
Single channel HV Power Supply	SHQ 122	SHQ 124	SHQ 126
Dual channel HV Power Supply	SHQ 222	SHQ 224	SHQ 226
Output voltage $V_O$	0...2 kV	0...4 kV	0...6 kV
Output current $I_O$	0...6 mA	0...3 mA	0...1 mA
Ripple and noise	typ.: < 2 mV <sub>P-P</sub>		max.: 5 mV <sub>P-P</sub>
Stability: $\frac{\Delta V_O}{\Delta V_{INPUT}}$	< 5 * 10 <sup>-5</sup> (after a warm-up period from 30 min)		
$\Delta V_O$ (no load/ load)	< 3 * 10 <sup>-5</sup> (after a warm-up period from 30 min)		
Temperature coefficient	< 3 * 10 <sup>-5</sup> /°C		
Voltage measurement	resolution:	0.1 V / 6-digit LCD display	
	accuracy:	± (0,05% $V_O$ + 0,02% $V_{Omax}$ )	
Current measurement	resolution:	2 ranges / 6-digit LCD display 1 <sup>st</sup> Range $I_{Omax}$ [mA]: resolution 100 nA 2 <sup>nd</sup> Range 100 µA: resolution 1 nA (Option 0n1: 2 <sup>nd</sup> Range 10 µA: resolution 100 pA)	
	accuracy:	± (0,1% $I_O$ + 0,02% $I_{Omax}$ )	
Voltage settings	manual:	10-turn potentiometer	
	DAC:	digital via serial interface	
Rate of change of output voltage		fixed: 500 $\frac{V}{s}$ (at HV-ON/OFF)	variable: 2 ... 255 $\frac{V}{s}$ (at remote control)
Protection	<ul style="list-style-type: none"> <li>-hardware voltage limit (rotary switch in 10%-steps)</li> <li>-hardware current limit (rotary switch in 10%-steps, Option IWP: setting with 10-turn potentiometer)</li> <li>-INHIBIT (external signal, TTL-level, Low = active)</li> <li>- programmable current trip (software)</li> </ul>		
Interface	RS 232-Interface (Option CAN: CAN-Interface)		
Line voltage AC ( $V_{INPUT}$ )	230 $V_{AC}$	(Option ACW: 110 $V_{AC}$ . . . 230 $V_{AC}$ )	
Connectors	HV output:	SHV-Connector	
	INHIBIT:	1-pin Lemo-hub	
	RS 232 (opt.CAN):	9-pin female D-Sub connector	
Desk case	Size (W/H/D) : (236/100/320) mm		
Operating temperature	0 ... +50 °C		
Storage temperature	-20 ... +60 °C		

SHQ 12X-22X