NHQ x1x

Precision NIM High Voltage Supply NHQ LOW COST series

Operator Manual

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 operators manual before any kind of operation.

Note

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

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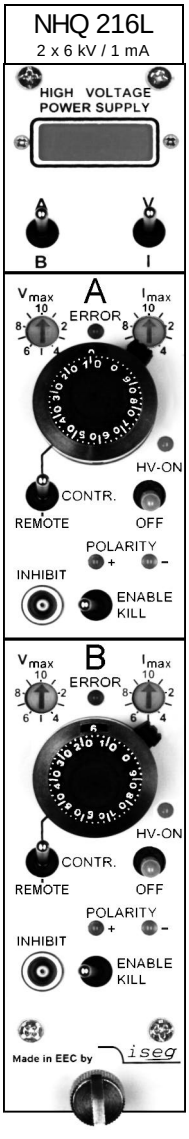
1. General information

The LOW COST NHQ´s are one or two channels high voltage supplies in a NIM chassis, one slot wide. The unit offers manual control and operation via analogue set- and monitor-voltages.
The high voltage supplies special provide high precision output voltage together with very low ripple and noise, even under full load. Separate 10%-steps hardware switches put voltage and current limits. An INHIBIT input protects connected sensitive devices. The high voltage outputs protected against overload and short circuit. The output polarity can be switched over.

2. Technical Data:

One channel HV-PS **NHQ**	**112M**	**113M**	**114M**	**115M**	**116L**
Two channel HV-PS **NHQ**	**212M**	**213M**	**214M**	**215M**	**216L**
Output voltage V_O [kV]	0 to 2	0 to 3	0 to 4	0 to 5	0 to 6
Output current per channel I_O [mA]	0 to 6	0 to 4	0 to 3	0 to 2	0 to 1
	with **option _104**: only 100 µA				
Stability ΔV_O	$<2 * 10^{-4}$ (no load to load)				
Stability $\Delta V_O/\Delta V_{IN}$	$<5 * 10^{-5}$				
Temperature coefficient	$<1 * 10^{-4}$ /K				
Ripple	< 50 mV_{P-P}				
LCD Display	4 digits with sign, switch controlled -voltage display in [V] -current display in [µA]				
Resolution of current measurement	1 µA				
Resolution of voltage measurement	1 V				
Accuracy current	± (0,05% I_O + 0,02% $I_{O\,max}$ + 1 digit) (for one year)				
Accuracy voltage	± (0,05% V_O + 0,02% $V_{O\,max}$ + 1 digit) (for one year)				
Voltage control — CONTROL switch in upper position:	10-turn potentiometer				
Voltage control — CONTROL switch in lower position: (REMOTE)	control via analogue set- and monitor-voltages				
Voltage control — NHQ x12 - x14:	$V_{SET/MON} = V_{OUT} / 400$				
Voltage control — NHQ x15 - x16:	$V_{SET/MON} = V_{OUT} / 1000$				
Rate of change of output voltage	hardware ramp: 500 V/s (at HV-ON/ -OFF)				
Protection	- separate current and voltage limit (hardware, rotary switch in 10%-steps) - INHIBIT (ext. signal, TTL-level, Low = active ⇒ V_{OUT} = 0)				
Power requirements V_{IN}	± 24 V (< 800 mA; one channel < 400 mA) ± 6 V (< 100 mA), with **option N24** only ± 24 V				
Packing	NIM Standard module: NIM 1/12				
Connector	NIM: 5-pin connector, HV: SHV connector Set and Monitor: 9-pin female D-Sub connector INHIBIT: 1-pin Lemo				
Operating temperature	0 ... +50 °C				
Storage temperature	-20 ... +60 °C				



3. Handling

The state of readiness of the unit is produced at the NIM connector, the 9 pin female D-Sub connector and the HV-output on the flipside.

The Output polarity is selectable with help of a rotary switch on the cover side (see appendix A). The chosen polarity is displayed by a LED on the front panel and a sign on the LCD display.

Attention! 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.

High voltage output is switched on with HV-ON switch at the front panel. The viability is signalled by the yellow LED.

Attention! If the CONTROL switch is in upper position (manual control), high voltage is generated at HV-output on the flip side with a ramp speed from 500 V/s (hardware ramp) to the set voltage chosen via 10-turn potentiometer.
This is also the case, if remote control is switched over to manual control while operating.

If the CONTROL switch is in lower position (DAC), high voltage will be activated only corresponding to the analogue set voltage V_{SET}.

On the LCD output voltage in [V] or output current in [µA] will be displayed depending on the position of the Measuring switch.

For the two channel units, one can choose with Channel switch, if channel (A) or channel (B) is displayed.

The actual voltage will be control with the corresponding monitor voltage V_{MON}.

If working with manual control, output voltage can be set via 10-turn potentiometer in a range from 0 to the set maximal voltage.

Maximum output voltage and current can be selected in 10%-steps with the rotary switches V_{max} and I_{max} (switch dialled to 10 corresponds to 100%). The output voltage or current which exceed the limits is signalled by the red error LED on the front panel.

Function of the KILL switch:

Switch to the right position: (ENABLE KILL)	The output voltage will be shut off permanently without ramp on exceeding I_{max} or in the presence of an INHIBIT signal (LOW=active) at the INHIBIT input. Restoring the output voltage is possible after operating the switches HV-ON or KILL.
Note:	When capacitance is effective at the HV-output or when the rate of change of output voltage is high (hardware ramp) at high load, then the KILL function will be released by the current charging the condenser. In this case use a small rate of output change (software ramp) or select ENABLE KILL not until output voltage is set voltage.
Switch to the left 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 hardware ramp on INHIBIT no longer being present.

4. Pin assignment analog I/O

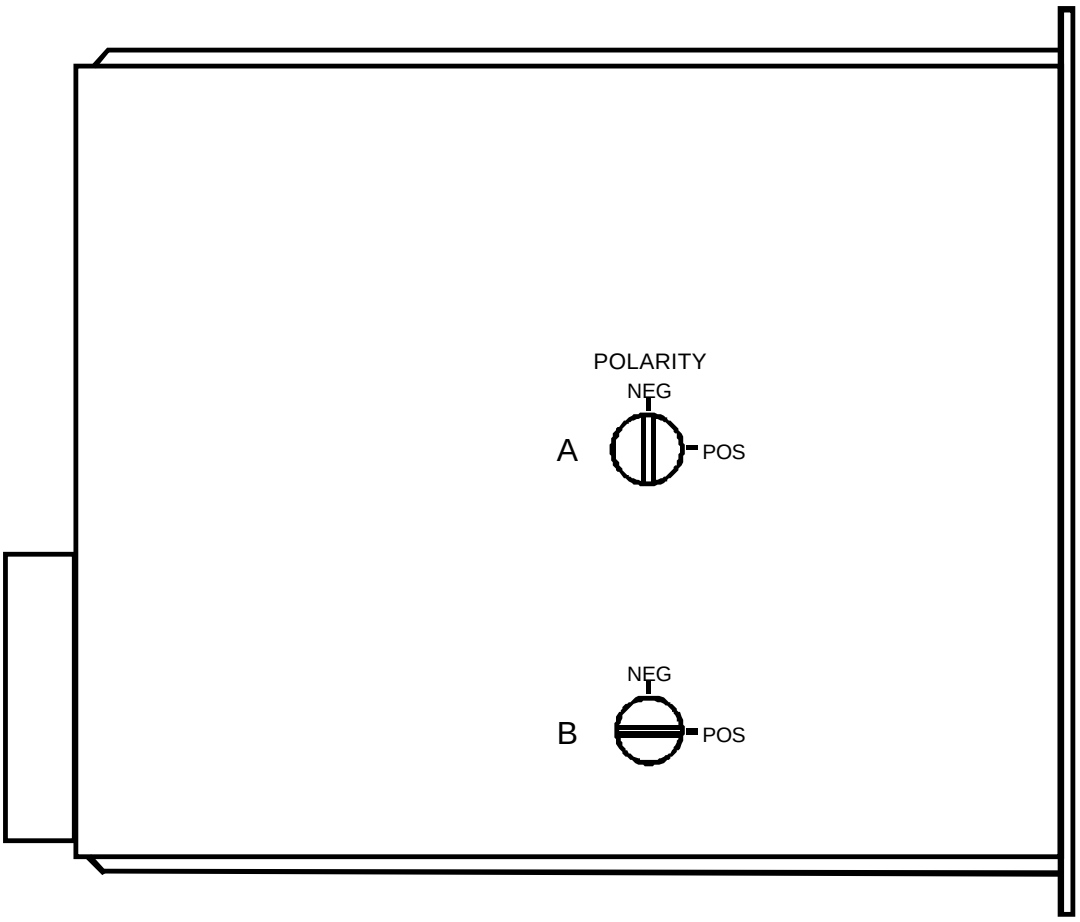
Table 1:

Signal pin assignment

9-pin female
D-Sub connector

on the flip side

Signal	HV-supply DSUB9
V_{SET} - A	1
	2
V_{MON} - A	3
	4
GND	5
	6
V_{SET} - B	7
	8
V_{MON} - B	9



Appendix A: NHQ side cover, Polarity rotary switch

e.g.: channel A, polarity negative
channel B, polarity positive