

N1471

4 Ch Reversible 5.5 kV/300 μ A NIM HV Power Supply Module (USB)



Features



- 4 independent channels in 1U NIM module (2 & 1 channel versions also available)
- 5.5 kV / 300 μ A output range
- Channels with individually selectable positive or negative polarity
- SHV output connectors
- Common floating return
- Low Ripple
- Under/over-voltage alert, overcurrent and max. voltage protection
- Interlock logic for board enable and Individual channel kill
- 5 nA Current monitor resolution (with x10 Imon-Zoom: 500 pA)
- Graphic color display
- Local and Remote control (USB2.0/RS485/RS232)
- Daisy-chain capability
- Optional DC Input Power Equalizer
- Software Tools for easy channel management

Description

The CAEN **Mod. N1471** provides **4** independent High Voltage channels in a single width NIM mechanics. Two and one channel versions (N1471A and N1471B) are also available. Each channel can provide a $\pm 5.5\text{kV} / 300\ \mu\text{A}$ output. The output polarity is independently selectable for each channel.

Channels have **common floating return** (common return insulated from the crate ground); HV outputs are delivered through SHV connectors.

The HV output Ramp-up and Ramp-down rates may be selected independently for each channel in the range 1B500 V/s in 1 V/s steps. The module features 5nA Iset/Imon resolution. A Zoom option (x 10) is available for Imon, increasing resolution to 500pA.

SHV connector

NIM single width, 4 channels for Mod. N1471 (2 Ch for N1471A, 1 Ch for N1471B)

Consult our **connectors reference page** for technical information.

Power supply control can be performed either **locally**, assisted by a Graphic color display or **remotely**, via **USB, RS232** or **RS485**, the latter allowing to build a daisy chain network of modules N14XX. It is also controllable via **TCP/IP** by the Smart Fan Unit of CAEN **NIM8301**. A complete set of **free software Tools** is available to control this unit: **GECO2020** with user friendly GUI and **CAEN HV Wrapper library** for custom SW development. **EPICS** and **LabVIEW** also supported.

Safety features allows the module to perform as a current generator and includes:

Overvoltage and Undervoltage warning when the output voltage differs from the programmed value by more than 2% of set value (minimum 10V).

Overcurrent detection

when a channel attempts to exceed the programmed current limit, it signalled to be in "overcurrent" and enter in a TRIP status. The output voltage is varied to keep the current below the programmed limit for a programmable TRIP time, then the channel is switched off. If TRIP is set to "constant current mode", the channel behaves like a current generator.

VMAX

programmable VMAX protection limit.

Safety Board Interlock

Common Interlock logic for channels enable/disable and individual inputs signal for channel Kill function.

Module control can take place either locally, assisted by a Graphic colour display, or remotely, via USB (1) or RS485 (1). It is also controllable via TCP/IP (2) by the Smart Fan Unit of CAEN NIM 8301 crate:

Special versions available:

- 2 channels version (**N1471A**)
- 1 channel version (**N1471B**)
- 4 channels, 2U NIM module with 220/110 Vac plug for desktop operation, equipped with **2.8" Touchscreen, Ethernet and USB interface (NDT1471)**
- 4 channels, 2U NIM module equipped with **2.8" Touchscreen, Ethernet and USB interface (N1471ET)**
- High-resolution models: 20 μA max output, Iset/Imon: 1 nA, optional Imon-Zoom: 50 pA (**N1471H**, **NDT1471H** and **N1471HET**)

Available Options:

- A1480 DC Input Power Equalizer.
- x 10 Imon Zoom, increasing Imon resolution to 500 pA.

N14xx modules are provided with a USB VCP interface and can be programmed via PC by connecting the PC USB port with the N14xx USB B-type port; the featured controller (FT232BM chip) requires a driver available on **this page** or at **www.ftdichip.com**

Technical Specifications

Packaging

Single width NIM unit

Output channels

4 / 2 / 1 channels, Common Floating Return, SHV connector Positive or Negative Polarity (requires internal setting)

Output ranges

- 5.5 kV / 300 μ A (IMRANGE = High)
- 5.5 kV / 30 μ A (IMRANGE = Low) - Imon Zoom Active (optional)

Max. Ch. Output Power

1.65 W

Vset / Vmon Resolution

100 mV

Iset Resolution

5 nA

Imon Resolution

- 5 nA (IMRANGE = High)
- 500 pA (IMRANGE = Low) - Imon Zoom Active (optional)

Vmax

0 ÷ 5600 V Absolute maximum HV level that the channel is allowed to reach, independently from the preset value Vset. Output voltage cannot exceed the preset value Vmax. The accuracy is 1 % \pm 5 V

Vmax resolution

\pm 1 V

Alarm Output

Open collector, 100 mA maximum sink current

Interlock input

LOW: <1 V; current~5mA; HIGH: 4÷6 V

Ramp Up/Down

1÷500 Volt/s, 1 Volt/s step

Trip

- Max. time an "overcurrent" can last (seconds). A channel in "overcurrent" works as a current generator; output voltage varies in order to keep the output current lower than the programmed value.
- "Overcurrent" lasting more than set value (1 to 9999) causes the channel to "trip".
- Output voltage will drop to zero either at the Ramp-down rate or at the fastest available rate, depending on Power Down setting; in both cases the channel is put in the OFF state.
- Trip range: 0 ÷ 999.9 s; 1000 s = INFINITE. Step = 0.1 s (If trip= INFINITE, "overcurrent" lasts indefinitely).

Voltage Ripple

- 20 ÷ 1000 Hz: Typical: 10 mVpp / Maximum: 15 mVpp
- 1 ÷ 20000 kHz: Typical: 3 mVpp / Maximum: 8 mVpp

Vmon vs. Vout Accuracy

±0.02% of read value ±2V

Vset vs. Vout Accuracy

±0.02% of read value ±2V

Imon vs. Iout Accuracy

- ±2% of read value ±20 nA (IMRANGE = High)
- ±2% of read value ±2 nA (IMRANGE = Low) - Imon Zoom Active (optional)

Iset vs. Iout Accuracy

- ±2% of read value ±30 nA (IMRANGE = High)
- ±2% of read value ±3 nA (IMRANGE = Low) - Imon Zoom Active (optional)

Humidity range

0 ÷ 80%

Operating temperature

0 ÷ 45°C

Storage temperature

-10 ÷ 70°C

Vout / Temperature coefficient

max. 50 ppm / °C

Imon / Temperature coefficient

max 100 ppm/C°; max 300 ppm/C° with Imon X10 zoom

Long term stability Vout vs. Vset

± 0.02% (after one week @ constant temperature)

Ordering Options

Code	Description	
WN1471A05AAC	N1471A - 2 Ch NIM Programmable HV Power Supply ($\pm 5.5\text{kV}$, $300\mu\text{A}$, 5nA res.)	RoHS
WN1471B05AAC	N1471B - 1 Ch NIM Programmable HV Power Supply ($\pm 5.5\text{kV}$, $300\mu\text{A}$, 5nA res.)	RoHS
WN1471X05AAC	N1471 - 4 Ch NIM Programmable HV Power Supply ($\pm 5.5\text{kV}$, $300\mu\text{A}$, 5nA res.)	RoHS

Accessories

A1483

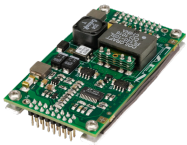
Inhibit - Kill Signal BNC Adapter for HV Power Supply Modules

HV CABLES



High Voltage Cable Assemblies

A1480



DC Power Input Equalizer for N14XX Family

A1481

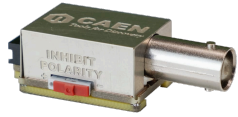


Kill Signal Adapter for N14XX series

A1484

Inhibit - Kill Signal BNC Adapter for HV Power Supply Modules

A148x



Inhibit - Kill Signal BNC Adapter for HV Power Supply Modules

Related Software

GECO2020



General Control Software for CAEN HV Power Supplies

Related Software Libraries

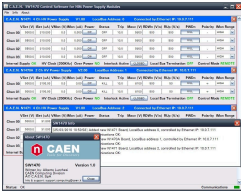
CAEN HV Wrapper Library



Library for CAEN Power Supply Control

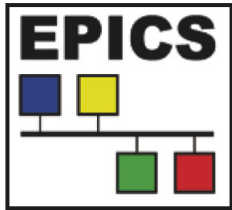
Related Products

SW1470



Control Software for NIM Power Supply Modules

EPICS IOC (PSM Power Supply Modules)



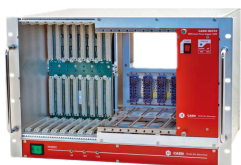
EPICS IOC for Power Supply Modules

NIM8305



2 Slot Switching 450 W Mini Crate

NV8020A



7U CRATE VME/NIM 8 slot VME64 365W, 5 slot NIM 150W

NIM8303



5U 12 slot 300/600 W Crate

LabVIEW Driver (PSM - Power Supply Modules)



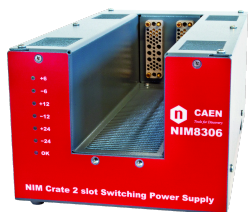
LabVIEW Instrument Driver for Power Supply Modules

NIM8302



5U 10 slot 150 W Compact Crate

NIM8306



2 Slot Switching 750 W Mini Crate

NIM8304



7U 12 slot smart fan unit Switching 2000 W Crate

Gallery

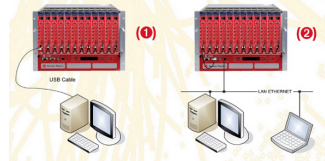


**Voltage & Current
analogue monitor
HV-ON LED**



**New innovative local
control:** encoder and
colour display will
make the setting
easier than ever!

Module control can take place either locally, assisted by a Graphic colour display, or remotely, via USB (1) or RS485 (2). It is also controllable via TCP/IP (3) by the Smart Fan Unit of CAEN NIM 8301 crate



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