Bellnix® 10,000V, 15,000V NHV Series

The NHV series is our mid-to-high voltage DC-DC converter featuring high accuracy and low noise. Its design for minimizing line regulation, load regulation, temperature drift and time-course drift enables highly accurate and stable voltage to be provided. A hexahedron metal shield case ensures low noise along with a selection of a circuit suitable for noise suppression. Output voltage is adjustable by external voltage or an external variable resistor. A built-in short-circuit and over current protection ensure high reliability and a long life.

■ Features

- Temperature drift 50ppm/°C
- Time-course drift 10ppm/1min.
- Low ripple noise 100mVp-p
- Output capacity 7W
- Adjustable output voltage range 0 - 100%
- Hexahedron metal shield case
- Non-isolated type
- Output voltage monitor
- Output current monitor
- Built-in short-circuit, over current protection
- ON/OFF control
- Reference voltage output with high stability
- High reliability / Long life



■ Model/Rating

Table 1

Models NHV Series	Input Voltage Vdc	Output Voltage Vdc	Output Current μA	Input Current mA typ.	Ripple & Noise mVp-p typ.
NHV24-10K700P	22.8 - 25.2	0 - +10,000	0 - 700	650	100
NHV24-10K700N	22.8 - 25.2	0 - -10,000	0 - 700	650	100
NHV24-15K450P	22.8 - 25.2	0 - +15,000	0 - 450	650	100
NHV24-15K450N	22.8 - 25.2	0 - -15,000	0 - 450	650	100

■ Specifications

Table 2

Input voltage range	Refer to Table 1
Rated input voltage	24V
Rated output voltage	Refer to Table 1 (with 100% preset output voltage, Vcont voltage 10V)
Adjustable output voltage range	Refer to Table 1
Rated output current	Refer to Table 1
Ripple noise	Refer to Table 1
Line regulation	10ppm typ. (for input voltage varying from 22.8V to 25.2V)
Load regulation	10ppm typ. (for output current varying from 50% to 100%)
Temperature regulation	50ppm/°C (for the ambient temperature varying from 0°C to +50°C)
Short-term drift	10ppm/1minute (excluding the 1H initial drift)
Long-term drift	100ppm/1hour (excluding the 1H initial drift)
Output voltage monitor terminal	10V ±1% typ. at rated output voltage. (Output current 2mA max.)
Output current monitor terminal	10V ±1% typ. at rated output current (Output current 2mA max.)
Reference voltage terminal	10V ±0.1% max. (Output current 2mA max.)
Over current protection	Yes (Operates at 105% or above of rated load current. Auto restart type.)
Short-circuit protection	Yes
Thermal shutdown	Yes (Restart by reclosing after eliminating the factor)
Remote ON/OFF	Between 6pin (ON/OFF) and 3pin (S.GND): Output is ON when short, output is OFF when open
Operating temperature range	0°C - +50°C
Storage temperature range	-20°C - +60°C
Humidity range	20% - 95% RH (No condensation)
Outer dimensions	W=104 L=180 H=38 mm

* The above specifications are provided with rated value, unless otherwise specified.
* The contents provided in this datasheet may be changed at any time without prior notice.

1. Scope
Specifications shall apply to NHV series.

2. Model/Rating

Model name	Rated input voltage	Rated output	Remarks
NHV24-10K700P	DC24V	+10kV, 700μA	
NHV24-10K700N	DC24V	−10kV, 700μA	
NHV24-15K450P	DC24V	+15kV, 450μA	
NHV24-15K450N	DC24V	−15kV, 450μA	

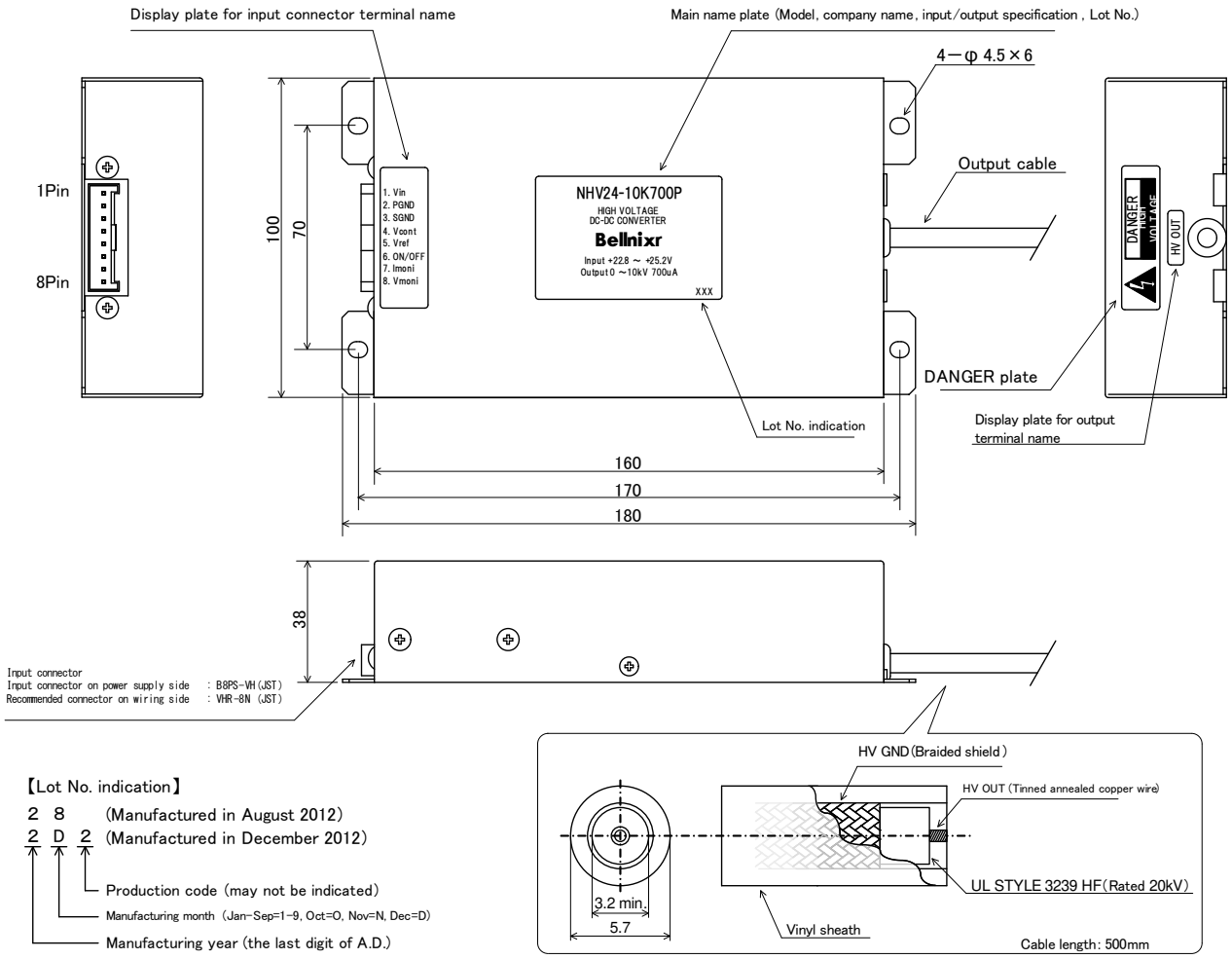
3. Environmental conditions

- Operating temperature range: 0°C - +50°C
- Storage temperature range: -20˚C - +60˚C
- Humidity range: 20% - 95% RH (No condensation)

4. Specifications & Standards
Unless otherwise described in the following table, input shall be rated input voltage, output shall be rated output, and ambient temperature shall be +25°C.

Item	Specifications				Condition
	NHV24-10K700P	NHV24-10K700N	NHV24-15K450P	NHV24-15K450N	
Input voltage range	24V ±5% (22.8V - 25.2V)				
Rated input current	650mA typ.				
Rated output voltage	+10kV	−10kV	+15kV	−15kV	
Output voltage adjustable range	0V - +10kV	0V - −10kV	0V - +15kV	0V - −15kV	
Output voltage linearity	1%				Vout=1% - 100%
Rated output current	700μA	700μA	450μA	450μA	
Rated output power	7W				
Output ripple noise	100mVp-p typ.				
Static line regulation	10ppm typ.				Vin=24V ±5%
Static load regulation	10ppm typ.				Iout=50 - 100%
Temperature stability	50ppm/°C				0°C - +50°C
Short-term stability	10ppm/1minute				Excluding 1H initial drift
Long-term stability	100ppm/1hour				Excluding 1H initial drift
Output voltage control	0V - 10V				
Output voltage preset accuracy	Within ±1% of theoretical output voltage value				
Terminal for output voltage monitoring	Output voltage 10V ±1% typ. (Output current 2mA max.)				At rated output voltage
Terminal for output current monitoring	Output voltage 10V ±1% typ. (Output current 2mA max.)				At rated output current
Reference voltage terminal	Output voltage 10V ±0.1% max. (Output current 2mA max.)				
Over current protection	Yes (Operates at 105% or above. Auto restart type)				
Output short-circuit protection	Yes				
Thermal shutdown	Yes (Restart by reclosing after eliminating the factor)				
ON/OFF control	Yes				

5. Outer dimensions

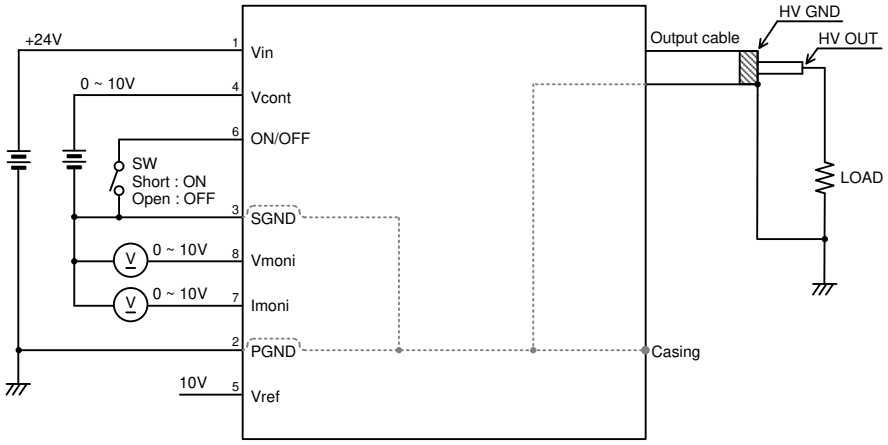


Unit: mm nomi.

6. Description of input connector terminals

No.	Name	Function
1	Vin	Input terminal (+ Vin)
2	PGND	Input GND terminal (- Vin)
3	SGND	Terminal for output voltage control (-)
4	Vcont	Terminal for output voltage control (+)
5	Vref	Reference voltage output terminal
6	ON/OFF	Terminal for ON/OFF control
7	Imoni	Terminal for output current monitoring
8	Vmoni	Terminal for output voltage monitoring

7. Standard connection

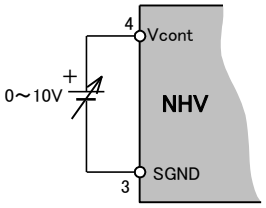


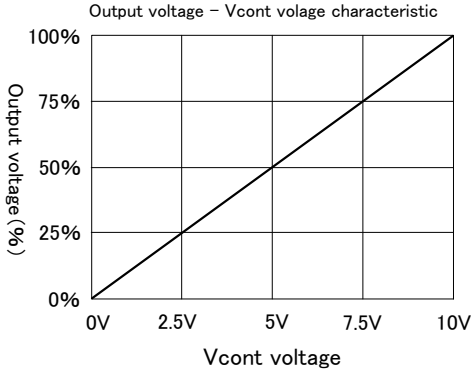
PGND, SGND, casing and HV GND are connected inside.

8. Functions

8-1 Adjustable output voltage

Output voltage can be set by applying 0 to 10V between the terminals for output voltage control, the Vcont (4Pin) and SGND (3Pin). Avoid setting out of the adjustable output voltage range or it may cause trouble.

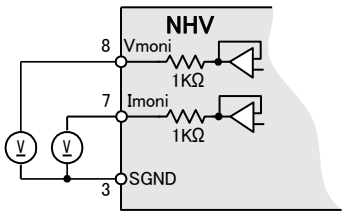


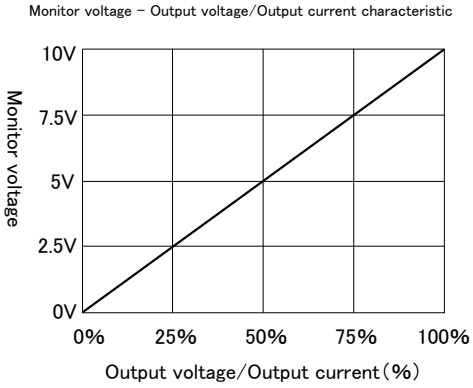


8-2 Monitoring output voltage and output current

Output current monitoring terminal, the Imoni (7pin) and output voltage monitoring terminal, the Vmoni (8pin) generate 0 - 10V proportionate to output of the converter.

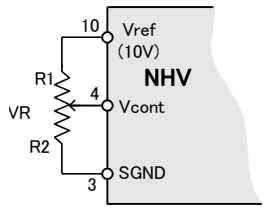
An internal impedance of each terminal for monitoring is 1kohm. The internal impedance of each terminal for monitoring is 1kΩ. Do not allow monitoring current to exceed 2mA

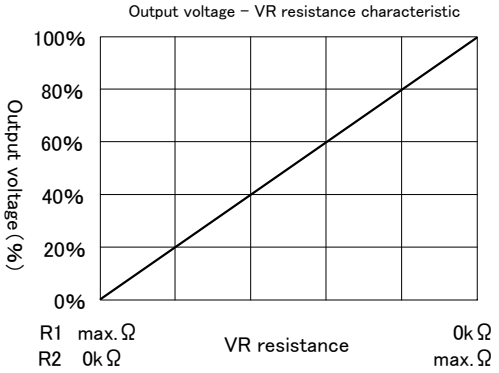




8-3 Reference voltage

Reference voltage output terminal, the Vref (5pin) generates reference voltage of 10V. This terminal is used when controlling output voltage by a variable resistor (5kΩ min.). Leave this terminal open when output voltage is adjusted by external voltage. Do not allow reference current to exceed 2mA.





8-4 Overcurrent protection

If output current becomes 105% or more of the rated current value, over current protection (OCP) functions to lower the output voltage. Since this overcurrent protection is an auto restart type, output will resume upon release of the overcurrent state.

8-5 ON/OFF control

Output voltage can be turned ON/OFF by opening or short-circuiting between the ON/OFF (6Pin) and the SGND (3Pin) without turning on/off the input voltage. In the case of not using the ON/OFF control, short-circuit these two terminals. Use an open collector type.

- Open between 6 and 3 (6V max.): Output Off
- Short between 6 and 3 (0 – 0.3V, 2mA max.): Output On

8-6 Thermal shutdown

This function works upon the abnormal rise of the ambient temperature or the temperature inside this power supply to stop the oscillation of the converter and the supply of output power. If the thermal shutdown functioned, shut down the input and wait some time for the temperature to come down sufficiently (after eliminating the cause) before reclosing.

9. Environmental specifications
This product is RoHS compliant.

10. Precautions for use
To ensure user's safety, check specifications before using the product and always observe the following precautions for use.

- This product is intended for use in general electronics equipment. Do not use the product for medical equipment, nuclear equipment, trains, etc., whereby human life or property may be directly affected by a damaged product. Consult with us for any use other than for such general electronics equipment.
- This product is not suitable for series operation and parallel operation.
- This equipment has a built-in over current protection circuit but avoid a prolonged over current state which may lead to failure.
- This product may be damaged if used under nonstandard electrical conditions or nonstandard environmental conditions including temperature. Ensure use within the standards.
- Avoid using this product in a place that generates corrosive gas or is dusty.
- This product may be damaged by static electricity. Make sure that the workplace is guarded against static buildup and static electricity on operators by use of proper grounding.
- A fuse mechanism is not built in this product. Connect a fuse to the + input line to guard against excessive input current under abnormal circumstances. Allow enough capacity in the power supply for a fuse to blow.
- This product does not come with a test report.

11. Warranty
The warranty term of the product is one year after shipment. Should the product becomes defective within the warranty period due to our design or workmanship, the product will be repaired free of charge or replaced. However, this warranty does not cover products which have been subjected to unauthorized inner modifications.
The scope of our warranty is limited to that of the said product.

12. Contact
If you have any further technical questions for this product, please contact us.
E-mail: info@bellnix.com
URL: http://www.bellnix.com