



# LOW NOISE DC VOLTAGE SOURCE

## LP6016-01

NEW

Low Noise  
High Stability



- **Output Noise** 10  $\mu\text{Vrms}$  or lower typical  
(Bandwidth 10 Hz to 20 MHz)
- **Output Voltage Stability**  $\pm 10$  ppm/ $^{\circ}\text{C}$  typical
- **Setting Accuracy**  $\pm(0.03\% + 250 \mu\text{V})$

**High Control Accuracy for Sensors and Devices!**  
**Precision Voltage Source Corresponding to Shipping Test**

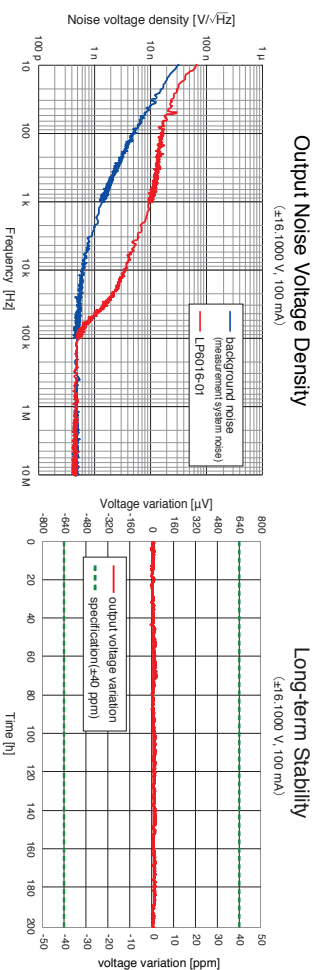
## NF Corporation

# Bias-Voltage and Control-Voltage Source for Sensors and Devices ● ● ● ● ● LOW NOISE DC VOLTAGE SOURCE LP6016-01

Low Noise  
High Stability  
High Accuracy



- Output noise  
(Bandwidth 10 Hz to 20 MHz)  
10  $\mu\text{Vrms}$
- Output voltage stability  
 $\pm 10 \text{ ppm}/^\circ\text{C}$  typical
- Output voltage  
0 to  $\pm 16.1 \text{ V}$
- Setting resolution  
500  $\mu\text{V}$
- Setting accuracy  
 $\pm (0.03\% + 250 \mu\text{V})$
- Maximum current  
100 mA
- External control interface  
USB, RS-232, LAN



## Measurement System

Use as a control-voltage source for equipment and a bias voltage source for sensors.

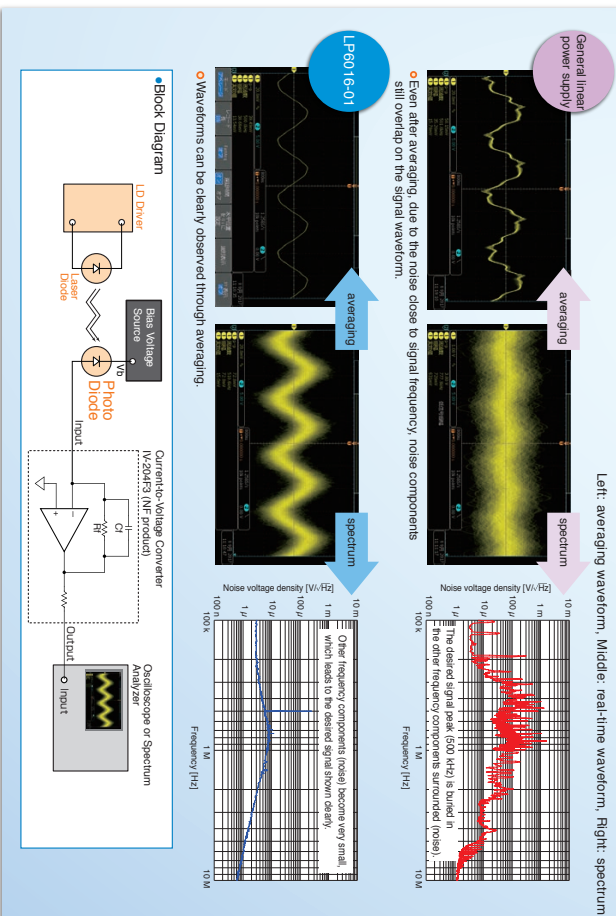
### Photodiode

The signal-to-noise ratio of the detection signal improves when it is used as a bias voltage source.

When measuring the signal from a photodiode, the photodiode output is directly affected by the noise from bias voltage source. Thus, it is important to use a low noise bias voltage source to improve the detecting accuracy of extremely small signals such as biological signals.

Detected Signals Comparison When a Bias Voltage is Applied to Photodiode by Each Voltage Source

The graphs below show measured comparison results of using a general linear power supply and using LP6016-01 as a bias source, along with the corresponding block diagram.



Use as a bias voltage source for high sensitivity sensors, such as magnetic sensors and optical sensors

Improving Signal-to-Noise Ratio

## Shipping Test

Use as a control-voltage source / reference voltage source for testing electronic components

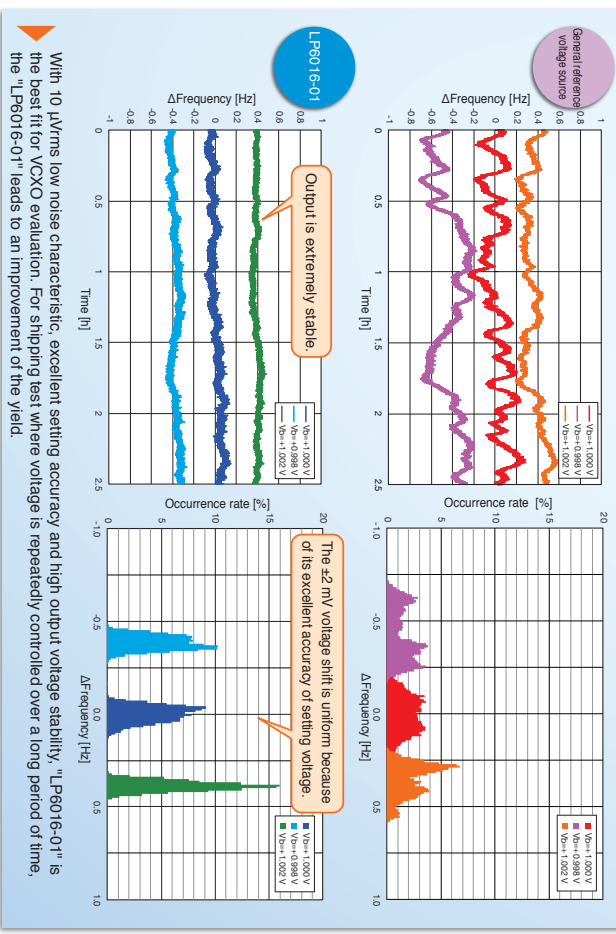
### Crystal Oscillator

Frequency variation is reduced by using LP6016-01 as a control-voltage source.

When evaluating phase noise / frequency accuracy / frequency stability / etc. of the crystal oscillator, the stability of control-voltage source affects the evaluation results. The results are shown as the following, which it is important to use a precision voltage source to evaluate the voltage controlled crystal oscillator (VCXO).

Frequency Measurement of VCXO – output frequency comparison through control-voltage source –

The graphs below show measured results comparing LP6016-01 with a general reference voltage source, as the control-voltage source purpose for VCXO. \* The  $\Delta$  frequency of the graph shows frequency difference from reference frequency (about 30MHz) when control-voltage  $V_B=1.000 \text{ V}$  is applied.



Use as a control-voltage source for testing electronic components such as crystal oscillators, semiconductor devices, and much more.

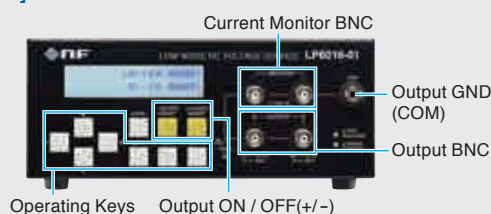
Yield Improvement of Shipping Test

## SPECIFICATIONS

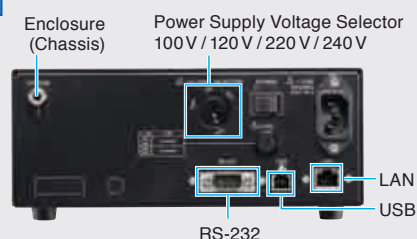
Output voltage	Positive : 0.0000 V to +16.1000 V Negative : 0.0000 V to -16.1000 V	
Setting resolution	0.0005 V (500 μV)	
Setting accuracy	±(0.03% of I Setting value I +250 μV) Ambient temperature 23°C ±5°C	
Temperature coefficient	±10 ppm/°C typical	
Maximum current	±100 mA ( I Output Voltage I ≥ 1V, 0 to 50°C) ±100 mA ( I Output Voltage I < 1V, 0 to 40°C) ±90 mA ( I Output Voltage I < 1V, 40 to 50°C)	
Settling time	100 ms (with no load)	
Line regulation	Within ±0.1 mV (for supply voltage ±10%)	
Load regulation	Within ±5 mV (load 0% reference for 0 to 100%)	
Ripple noise	10 μVrms or lower typical (load 0 mA to 100 mA, bandwidth: 10 Hz to 20 MHz)	
Time drift	±40 ppm (typical, 8 hours after warm-up)	
Output connector	BNC (receptacle), for positive and negative outputs each	
Current monitor	Feature	Voltage output is 1 V/100 mA times the absolute value of output current.
	Accuracy	±(1%+1.5 mA) (23°C ±5°C) ±(1%+2.0 mA) (0°C to 50°C)
	Output impedance	1 kΩ
	Output connector	BNC (receptacle), for positive and negative current monitors each
Power source	Voltage	AC 100, 120, 220 and 240 V (selector switch) ±10% (AC250 V or lower)
	Frequency	50 Hz/60 Hz ±2 Hz
	Power consumption	28 VA or lower

Overvoltage category	II
USB	USB2.0 full speed, Device Class CDC
RS-232	Baud rate : 9600/19200/38400/57600bps
LAN	10 BASE-T/100BASE-TX, TCP/IP
Insulation resistance	Between all power inputs and chassis : 50 M $\Omega$ or more (with DC 500 V) Between all power inputs and outputs : 50 M $\Omega$ or more (with DC 500 V) Between output GND (COM) and chassis: 10 M $\Omega$
Withstanding voltage	Between all power inputs and "outputs/chassis": AC 1500 V for 1 minute Between output GND (COM) and chassis: $\pm 42$ Vpk (DC + AC peak)
Overcurrent protection	"OCP" is signed on the display when exceeding about 100 mA. Drooping characteristic (approx. 150 mA, self recovery type)
Overheat protection	Output is turned off when an internal temperature exceeds threshold "OHP" is signed on the display
Operating temperature/ humidity range	Temperature : 0°C to +50°C Humidity : 5 % to 85 %RH, Absolute humidity: 1 g/m <sup>3</sup> to 25 g/m <sup>3</sup> Non-condensation
Storage temperature/ humidity range	Temperature : -10°C to +60°C Humidity : 5 % to 95 %RH, Absolute humidity: 1 g/m <sup>3</sup> to 29 g/m <sup>3</sup> Non-condensation
Pollution degree	2 (indoor use)
Warm-up time	60 minutes
Dimensions (mm)	215x86x330 (without protrusions)
Weight	Approx. 3.5 kg (without accessories)
RoHS	Directive 2011/65/EU
Accessories	Power cord set (3 pole, 2 m), Fuse (spare), Instruction manual

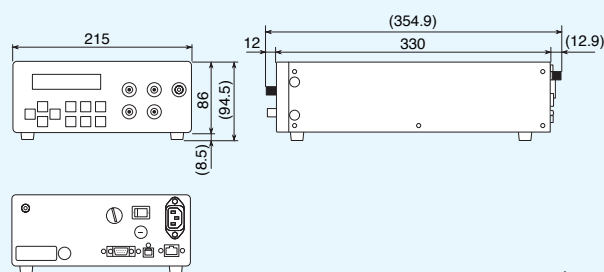
[Front View]



[Rear View]



Dimensions



## OPTIONS

PA-001-3089 : BNC-Binding Post Converts Adapter

PA-001-3230 : Rack Mount Kit (EIA, for 1 unit)

PA-001-3090 : Rack Mount Kit (EIA, for 2 units)

PA-001-3231 : Rack Mount Kit (JIS, for 1 unit)

PA-001-3091 : Rack Mount Kit (JIS, for 2 units)