Specifications (4-channel Unit)

	Bipolar input	FET input
Input coupling	DC / AC	
Input mode	A-B / A / -B / GND	
Input impedance *1	100 kΩ Coupling capacitance: 1μF	1 MΩ Coupling capacitance: 0.1μF
Equivalent input noise voltage density	1.3 nV/√Hz	2.5 nV/√Hz
Equivalent input offset voltage	Adjustable to zero (Input circuit is shorted. DC coupling)	
Input bias current	30 nA	30 pA
Input voltage	Within ±0.1 V	
Maximum output voltage	±10 V	
Maximum output current	±10 mA	
Slew rate	22 V/μs	600 V/μs
Output impedance	50 Ω	
Voltage gain	40 dB (1 kHz)	
Voltage gain frequency characteristic	DC to 1 MHz (+0.5 dB/–3.0 dB)	DC to 20 MHz (+0.5 dB/–3.0 dB)
Lowpass filter (LPF)	fc = 1 MHz (Linear phase, 3-order)	
Dimensions (mm)	105 (W) × 83 (H) × 210 (D)	
Operating supply voltage *2	±15 V	
Consumption current	±240 mA (max.)	

*1 Can be changed upon request
*2 LP5391 (± 300 mA) low-noise DC power supply is recommended. For driving two or more units, a custom dc power supply can be proposed.

Peripheral Equipment LOW NOISE DC POWER SUPPLY

Enables the optimal performance of the low noise amplifiers

Highly stable DC power supply with extremely low output noise voltage, thorough noise resistance, and ultra low noise design.
The multichannel amplification system meets severe low noise demand by using LP power supply.

LP5391

- Output voltage : ±15 V±10%
- Output current : 0.3 A max. (a total of 4 outputs)
- 1/2 rack size

Customized Product

- Max. 32 channels
- Output voltage : ±15 V ±10%
- Output current : ±2 A max.
- Output terminal : D-sub 9-pin connector (female)
- 1/2 rack size

Customization

Input impedance	Can be changed to match the output resistance of the sensor.
Single-ended input	Equivalent input noise voltage density; 0.8 nV/√Hz (bipolar input), 1.6 nV/√Hz (FET input)

*Note: The contents of this catalog are current as of August 31, 2018.
Product appearance and specifications are subject to change without notice.
Before purchase, contact us to confirm the latest specifications, price and delivery date.

COSINUS® MESSTECHNIK GMBH

Small Signal Measurement Solutions

Meet your requirements for low noise, multichannel, and multifunction

MULTICHANNEL LOW NOISE AMPLIFICATION SYSTEM

Sensors, from low resistance to high resistance —— Highly accurate signal processing

SQUID | Thermocouple | Strain Gauge | Piezoelectric | Pyroelectric | Photo Detector | Bio

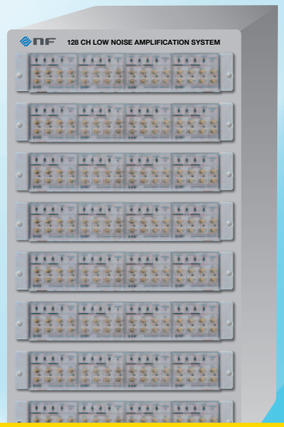
Low Noise

Equivalent input noise voltage density

Bipolar Input **1.3 nV/√Hz** FET Input **2.5 nV/√Hz**

Compact and Optimized for Multichannel Needs

4 channles



128 channels

Multifunction

Cosinus Messtechnik GmbH * Rotwandweg 4 * D-82024 Taufkirchen
Tel.: 089-665594-0 * Fax: 089-665594-30 * Web: www.cosinus.de * eMail: office@cosinus.de

Supports signals from a variety of sensors.

Easily configured for multiple channels

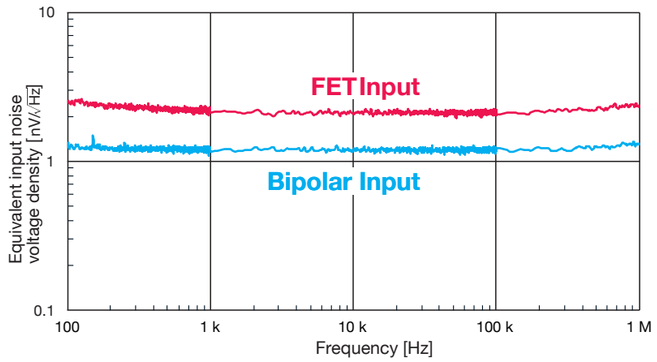
Selectable according to the type of sensor

Differential Input (Can be set to single-ended.)

- **Bipolar Input** — Low drift and low resistance sensors
  Superconducting, thermocouple, strain gauge etc.
- **FET Input** — Low resistance to high resistance sensors
  Superconducting, piezoelectric, pyroelectric, photoelectric etc.

The World Top Level Low Noise Performance

■ Equivalent input noise voltage density (with input shorted)



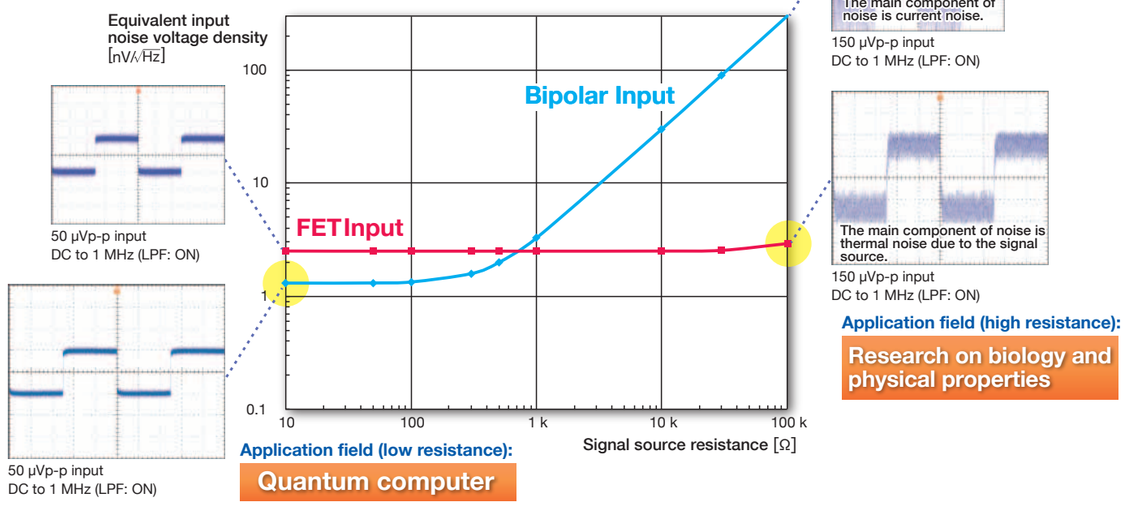
■ Equivalent input noise voltage density vs signal source resistance

- **Bipolr input type**: excellent low noise characteristics at low signal source
- **FET input type**: stable low noise characteristics independent of sensor impedance

Output Waveform

Measured waveforms when square waveforms of 50 µVp-p or 150 µVp-p (1 kHz) are input. The signal source resistances are 10 Ω or 100 kΩ.

Measurement conditions: Post amplifier used (bandwidth: 10 Hz to 30 MHz)



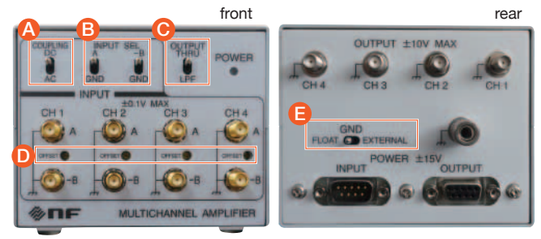
Application field (low resistance): **Quantum computer**

Application field (high resistance): **Research on biology and physical properties**

Multifunction *Enables a variety of settings according to sensor signals and signal-processing systems.*

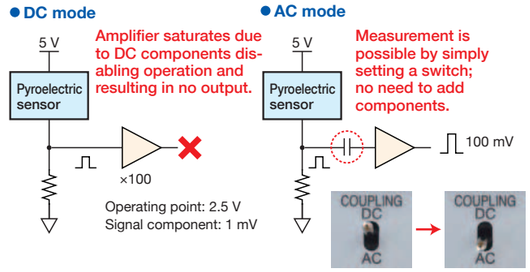
Achieved only by switch control
no need to add components

- Input-coupling : DC / AC — A
- Input-mode : differential / single-ended / GND — B
- LPF : THRU (OFF) / LPF (ON) (fc=1MHz) — C
- Equivalent input offset voltage: adjustment range ±100µV — D
- Amplifier GND : FLOAT / EXTERNAL — E



Input coupling DC / AC

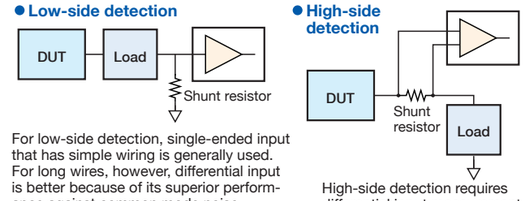
DC mode is applicable to measurement of small signals under ±0.1 V. However, if amplifier output saturates due to DC components above ±0.1 V, selecting AC mode removes those components enabling detection of signal changes.



Input mode Differential / Single-ended

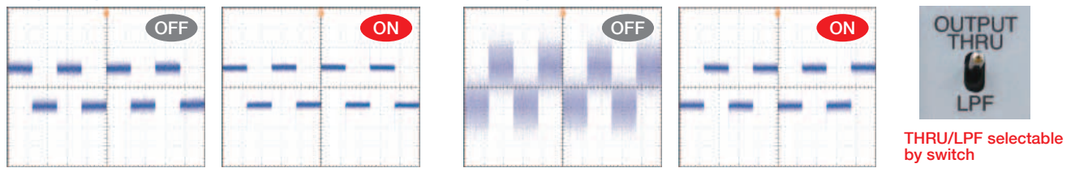
Selecting either differential input or single-ended input according to measurement target is extremely important for faithful signal amplification.
For example, in current measurement using shunt resistance, selection of either differential input or single-ended input depends on location of shunt resistance.

Differential input



LPF ON / OFF

If the signal to be measured is 1 MHz or less, the bandwidth can be limited to 1 MHz or less and noise can be reduced by setting LPF ON.
The following shows output waveforms when inputting 50 µVp-p square waves (1 kHz).

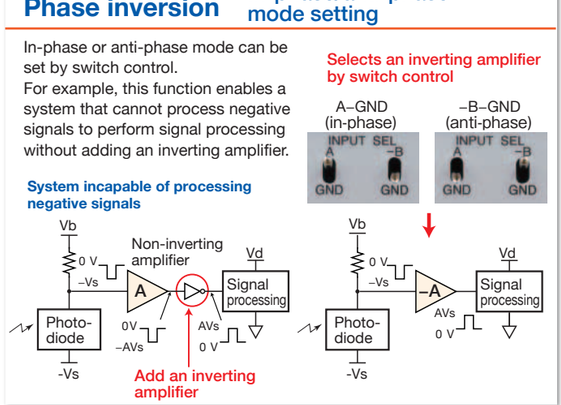


THRU/LPF selectable by switch

Measurement conditions: Signal-source impedance 10 Ω, post amplifier used (bandwidth 10 Hz to 30 MHz)

Phase inversion In-phase/anti-phase mode setting

In-phase or anti-phase mode can be set by switch control.
For example, this function enables a system that cannot process negative signals to perform signal processing without adding an inverting amplifier.



Amplifier GND FLOAT / EXTERNAL

The FLOAT setting that disconnects the system from earth (ground potential) has good noise characteristics. However, the EXTERNAL setting that connects amplifier GND and earth may provide better noise characteristics depending on the measurement environment or measure ment system. Which setting is more appropriate can be easily confirmed by using the switch on the rear panel.