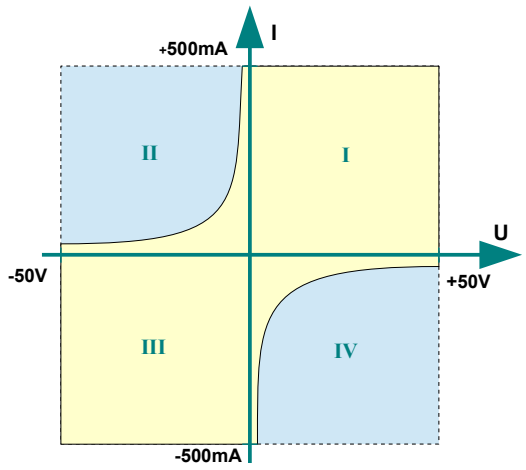
Bilt System module - BE2231

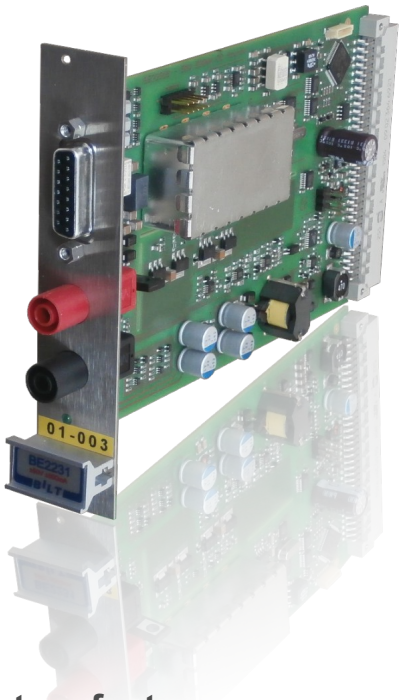
Voltage DC Source ±50V ±500mA

- ✔ *Designed for noise sensitive applications*
- ✔ *Clean output noise spectrum with no spike*
- ✔ *Isolated with very low common mode noise*
- ✔ *Low cost reliable power supply*

Main features

- 4-quadrant isolated DC source and 5½-digit digital multimeter (DMM)
- Voltage source with current compliance limit
- 16 bit source resolution and 19 bit measurement resolution for both voltage and current
- 2 voltage ranges: ±50V and ±5V, down to 20µV measurement resolution
- 1 current range: 500mA
- Stable with high output capacitors, providing higher noise reduction and tight voltage regulation
- Down to 100µV peak-to-peak output noise
- 0,02% measurement accuracy, 4-wire operation
- Built-in Waveform Generator: exponential, ramp, stair, step, pattern. Trigger input to synchronize multiple sources.
- No voltage transient when powering on/off or switching on/off
- Operating area:
  DC: yellow area
  Transient: yellow + blue areas





Bilt System features

- Up to 13 BE2231 source modules into a 19” Bilt chassis
- Host connections at chassis level including Ethernet and USB
- Complete software package provided, including a turnkey PC software, Labview driver

Application examples

- Noise-sensitive device power supply, such as PLL, VCO
- Polarization of nanoscale, mesoscopic, nanotube, graphene, quantum devices... requiring very low noise
- Reliability tests / life test for active or passive components
- Semiconductor I-V characterization and testing

BE2231 module specifications

Source and measurement accuracy

Accuracy specified on an 18°C-28°C ambient temperature range, after a 1 hour warm-up.
Range switching when the source is off, with automatic range selection capability.

Voltage

	Resolution		1-year accuracy (1)	
Range	Source	Measurement	Source	Measurement
± 50V	1,6mV	200µV	±3mV±250ppm	±1,3mV±200ppm
± 5V	160µV	20µV	±0,3mV±250ppm	±0,13mV±200ppm

Current

	Resolution		1-year accuracy (1)	
Range	Source	Measurement	Source	Measurement
± 500mA	15µA	1,9µA	±115µA±850ppm	±100µA±800ppm

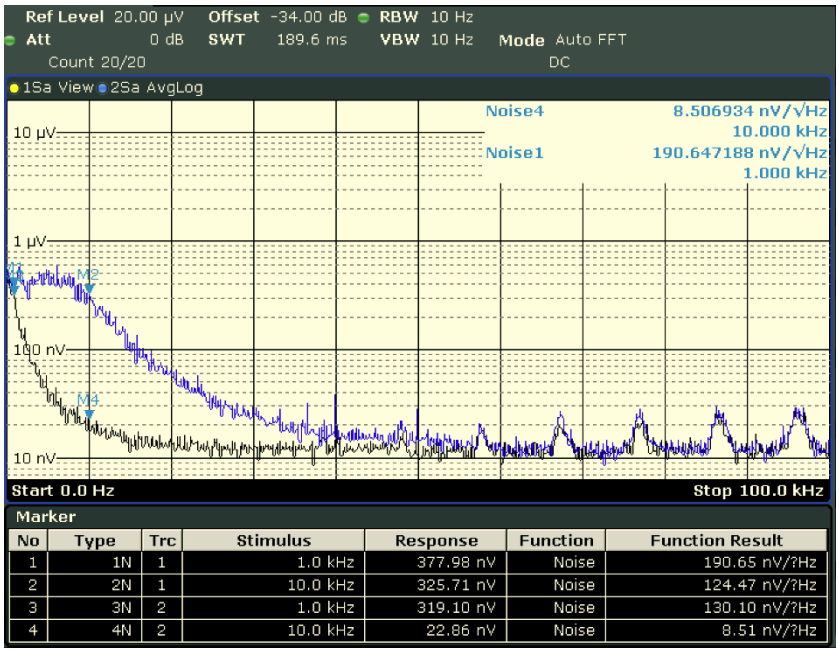
(1) ± offset ± ppm of the setting or the measured value, 95% confidence level

Noise and settling time

	Settling time(1)		Noise(3)			Voltage noise density(5)	
Range	To 95%	To LSB(2)	0,1Hz-10Hz(4)	10Hz-10kHz	10Hz-1MHz	1kHz	10kHz
± 50V	30ms	150ms	250µVp-p	1mVp-p (0µF) 380µVp-p (150µF)	1mVp-p (0µF) 380µVp-p (150µF)	1,3µV/√Hz (0µF) 0,9µV/√Hz (150µF)	850nV/√Hz (0µF) 25nV/√Hz (150µF)
± 5V	30ms	150ms	20µVp-p	170µVp-p (0µF) 100µVp-p (150µF)	240µVp-p (0µF) 120µVp-p (150µF)	220nV/√Hz (0µF) 130nV/√Hz (150µF)	140nV/√Hz (0µF) 10nV/√Hz (150µF)

(1) step settling mode, with no output capacitor, resistive load, exponential waveform
(2) Settling to the 16 bit LSB resolution
(3) with 0µF or 150µF low esr output decoupling capacitor, peak-to-peak noise measured with the output loaded at 200mA
(4) expressed in volt peak-to-peak, over the full voltage range, whatever the load
(5) averaging measurement, worst case value over the full operating range

Output noise spectrum from DC to 100kHz, 5V range, 200mA output current:
In blue (trace 1): no output capacitor, in black (trace 2): 150µF low ESR output capacitor.
Measurement noise floor is about 10nV.



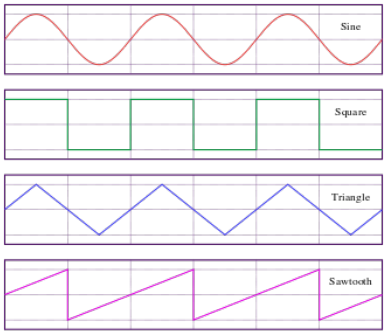
BE2231 module specifications

Operating area

Parameters	Conditions/Comments	Min.	Max.
Voltage programming range		-50V	+50V
Voltage slope	*ramp settling mode*		1000V/s
Current compliance range	*Programmed in absolute value*	2mA	500mA
Sourced output power	*DC or transient operation*		25W
Sink output power	*DC operation. Automatic shutdown if limit exceeded for more than 50ms*	0,5W	1W
Output impedance	*If sense signals are used* *If sense signals are left floating*		0,00Ω 0,06Ω
Output capacitor	*For stable operation ; consider a longer settling time using large values according to the current compliance limit.* *Before proceeding, read the User Manual.*	0µF	250µF
Operating temperature	*Ambient temperature (in front of the chassis openings), 80% RH non condensing. Power derating if temperature exceeded.*	15°C	30°C
Remote sense operating range	*Max. voltage drop in the power or ground cable when sense connected*	-0,5V	+0,5V
Voltage output headroom	*Max module output voltage above voltage range for sense compensation*	-1V	1V
OFF impedance	*Impedance between both output terminals when the module is off, max allowed current 1A.*		0,02Ω
Earth isolation	*40nF between any terminal and the earth*	5GΩ	
Earth isolation voltage	*Limited by TVS, 0.5W max.*	-150V	150V

Waveform generator and trigger functions

A built-in waveform generator allows to choose between four basic settling waveform (step, ramp, exponential or stair) or to use a pattern (up to 1024 points) that can be looped, enabling any kind of output waveform.



The setting update can be obtained in 4 different ways :
- untriggered: immediate update upon new setting reception
- triggered:
    - hardware trigger on the module's trigger input
    - hardware trigger on the chassis' trigger input
    - software trigger of the module (USB, Ethernet...)

Connection

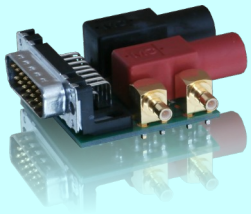
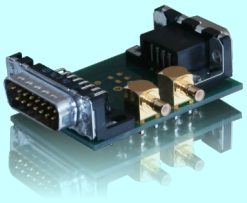
- 2 laboratory jacks Ø4mm for power output
- 15 pin D-SUB connector, providing power output, sense and trigger signals

Accessories are available to convert the D-SUB15 connectors to other connector types, see the “accessories” table further on.

BE2231 module specifications

Related products	
BE2101 ***BE2102***	Very low noise, very low drift, 21-bit resolution DC Voltage source modules, up to ±12V ±200mA, down to 1µV resolution
BE2141	4-channel very low noise, very low drift, 21-bit resolution DC Voltage source module, up to ±12V ±10mA, down to 1µV resolution
BE2811	Low noise, low drift, 19-bit resolution DC current source modules, ±18V ±5A
BE2812	Low noise, low drift, 19-bit resolution DC current source modules, ±8V ±15A

Date	Firmware revision	Hardware revision	Brochure revision	Modification
12 Apr. 2016	407	C	2.4	
13 Jan. 2021	407	C	2.5	Accuracy specification changed to account for the new calibration bench

Accessories	
AT201	**AT202**
DSUB-15 adapter to: - 2 laboratory jacks Ø4mm for sense signals - 2 SMB coax. for “Trig IN” and “Trig OUT” signals	DSUB-15 adapter to: - DSUB-9 (pinout of older iTest DC source modules) - 2 SMB coax. for “Trig IN” and “Trig OUT” signals
	

Standards, Calibration,Warranty and Maintenance

Bilt system is compliant with the applicable European Directives and holds the CE mark.
Any iTest product comes with a two-year parts and labour guarantee and a calibration certificate if applicable. A telephone support service is also available for the same period.
Our calibration laboratory performs according to ISO/CEI 17025 “*General requirements for the competence of testing and calibration laboratories*”. All measurements are traceable to the International System of Unit.
The recommended calibration interval of this product is 1 year.
On request, Itest can proceed to scheduled calibration (in our workshop or at the customer's site).
Maintenance can also be performed on-site or in our workshop.

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