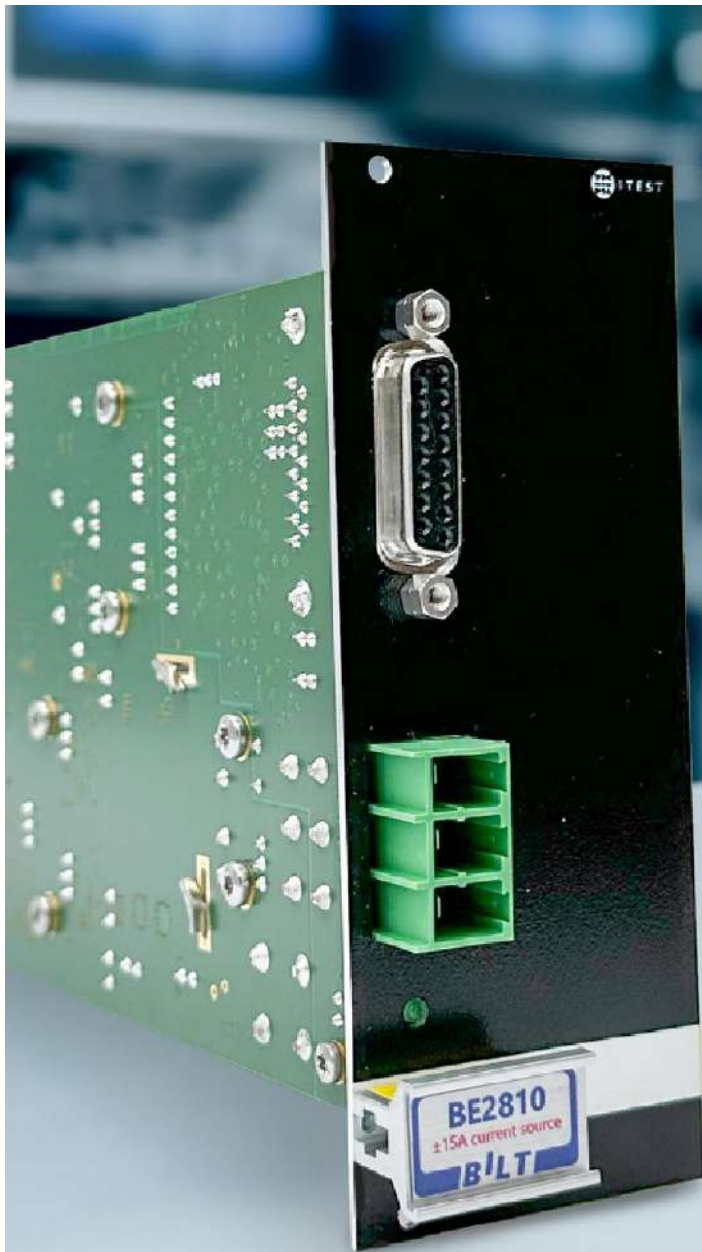




# Bilt System module **BE2810**

High Stability Current  
Source  $\pm 15\text{A}$   $\pm 15\text{V}$



## HIGH STABILITY CURRENT SOURCES

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- Magnet or Diode Power Supply
- Operates from 0 $\mu$ H to 20mH
- 19 bits programming resolution
- Very high proven MTBF

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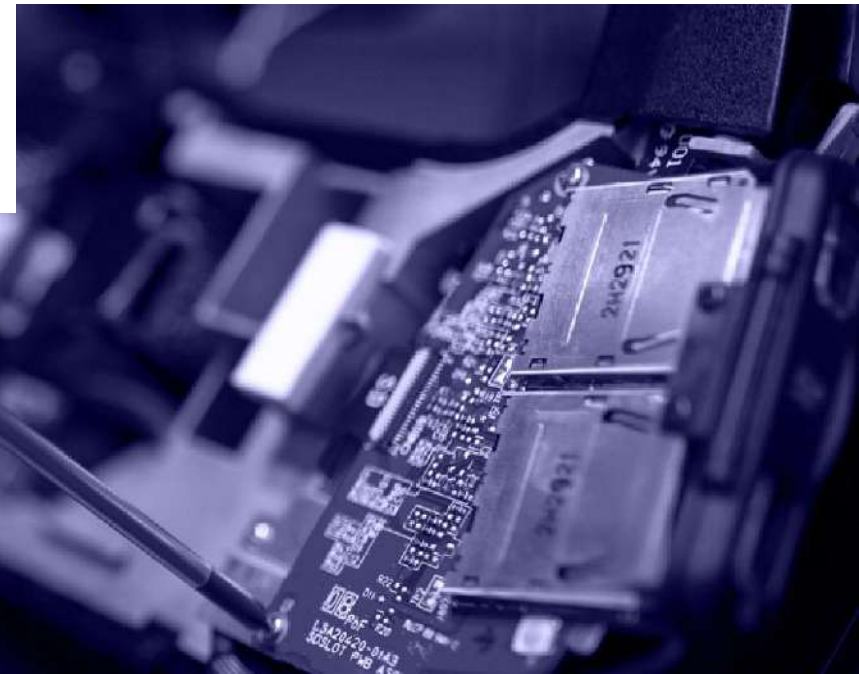
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# BE2810 OVERVIEW

## MAIN FEATURES

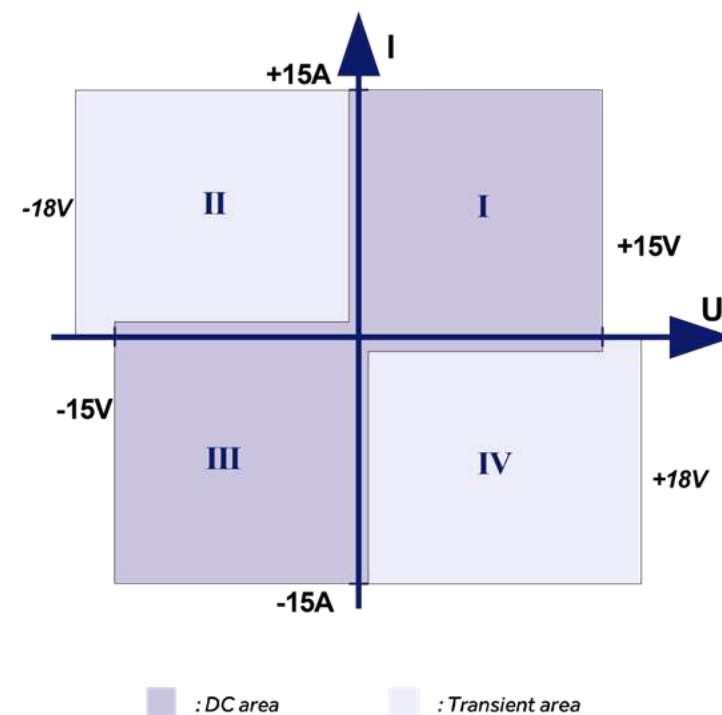
- Bipolar current source with no zero-crossing distortion
- Analog and digital control loops offer outstanding noise and stability performances
- Very Low noise: <25 ppm peak-to-peak
- Voltage and current read-back
- Programmable current slope from : 1A/s à 100A/ss
- Parallelable power supplies for higher current
- Synchronization between multiple sources in the same chassis or in several chassis ( $\pm 0,9\text{ms}$  jitter) using either:
  - power supply's trigger input
  - chassis BNC trigger input
  - software command on Ethernet
  - UDP broadcasting
- Interlock input
- No transient when powering on/off
- Proven MTBF > 1M hour
- Safe stop even in case of power outage
- Custom version on-demand



# Technical SPECIFICATIONS

## Operating Area

Parameters	Conditions/Comments	Min	Max
Current	Programming range	-15A	+15A
Voltage	Guaranteed ; source stops if $\pm 260\text{mA}$ is exceeded	-15V	+15V
Load inductance	"Low Inductance mode" selected	0 $\mu\text{H}$	20mH
	"High Inductance mode" selected		225W
Source power	DC power		270W
Temperature <sup>2</sup>	For full load operation	10°C	40°C
Efficiency	At full load, BE2810 model	82%	



(1) For inductors  $>1\text{H}$ , ensure the load has at least  $0,3\Omega$  series resistance (2) BE2801: 30°C max. for rated stability and TCR

# Current DC Performances

All figures are expressed in ppm of the current full scale range.

For better performances, contact ITEST.

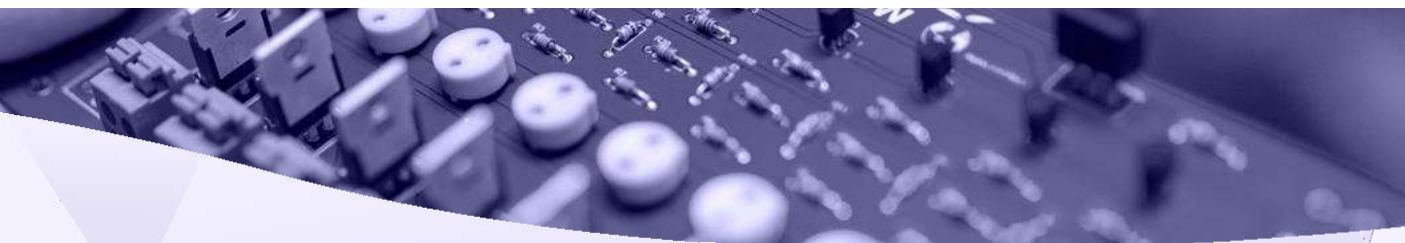
Parameters	Conditions/Comments	Specification
Programming resolution	including polarity bit	19bit (4ppm)
Differential linearity error	DNL; guaranteed 19-bit monotonicity	2ppm
Integral linearity error	INL; typical value	150ppm
Long term drift (stability) <sup>1</sup>	After 30mn self-heating, at constant ambient temp. ±15A, for 8 hours, typical	20ppm
Thermal drift (TCR)	Maximum value	±10ppm/°C
Absolute accuracy <sup>2</sup>	1 year, ppm of range + ppm of programmed value	±200ppm ±1200ppm
Line regulation	Line voltage steps between 180Vac and 230Vac, maximum value	4ppm
Reproducibility	24 hours ON, 30 minutes OFF, constant ambient temperature, typical	15ppm
Read-back resolution	Current Voltage	19 bits 16 bits

**(1)** After 30mn self-heating, constant ambient temp ; drift figures are non cumulative **(2)** Ambient temp.: 23°C±5°C

# Dynamic Performances

Parameters	Conditions/Comments	Specification		
		Min	Typ	Max
Current Settling time <sup>1</sup>	Small step, at max. current slope, settling to 90%		10ms	
Current Slope Programming range <sup>2 3</sup>	Resistive or diode loads.	1A/s		100A/s
	Inductive loads, 0μH to 500μH	1A/s		100A/s
	500μH to 2,5mH	1A/s		50A/s
	2,5mH to 6mH	1A/s		25A/s
	6mH to 20mH	1A/s		5A/s
Current Noise (ripple) <sup>1</sup>	0,1Hz–10Hz (p-p) / 10Hz–10kHz (p-p)		8ppm 40ppm	
Current programming rate	Ethernet, USB (depending on PC & network performances)			50Hz
	Internal buffer reading a waveform	10Hz		200Hz
Voltage noise	10Hz–1MHz, peak value		50mV	

(1) Used load: 20mH + 0,5Ω (2) MUsed loads for qualifying current slopes (at ±15A) : 10μH + 3.4mΩ, 2.5mH + 13mΩ, 6mH + 210mΩ and 20mH + 45mΩ (3) Start up only



## Parallel operation

Several BE2810 current sources can be connected in parallel. Parallel operation requires no complex configuration. Any number of paralleled modules will be seen as a single power supply when using ITEST control software or drivers.

Outputs of several BE2810 can be directly connected together<sup>1</sup>.



***User Manual must be read carefully before proceeding. Damage can occur if User Manual guidelines are not respected.***

(1) Current slopes given previously are specified for one module only. For parallel operation, current slopes depend on both inductance and current values. Contact us for further information.

## Source description

The BE2810 module is a non-isolated high performance true current source designed to safely and reliably drive magnet loads up to 20mH with excellent noise and stability performances. It is also perfectly suited to drive diodes in burn-in or characterization benches for instance.

The BE2810 is a 2-quadrant current source with transient 4-quadrant operation in order to sink the energy stored in the magnet when stopping the power supply or when applying large current changes.

The architecture does not require tuning by complex algorithm to get control loop stability on a large load inductance range. Current is controlled thanks to an analog control loop, for best stability and noise, and a digital control loop for best stability. Thanks to the analog control loop whose bandwidth is not limited by a switching frequency, the BE2810 benefits from a greater control loop bandwidth to better reject noise coupled on the load by its environment, it exhibits lower wide- band noise, and a high MTBF.

To avoid any problem, the BE2810 output must be off when the BILT system switches off : the inductive load is thus correctly discharged and it avoids unstable behaviors on the output voltage. Moreover, an internal relay short-circuits the output when the source is switched off in the event of a power failure, thus protecting the current source from the energy stored in the inductive load if such event happens.

A chassis global interlock input is available to control all inserted modules.

Trigger inputs are available at the chassis and at the BE2810 module's level. BE2810 can thus be individually or synchronously triggered thanks to these trigger inputs or thanks to a command sent by Ethernet or USB or thanks to UDP broadcasting (packet sent to all devices on a same sub-network).

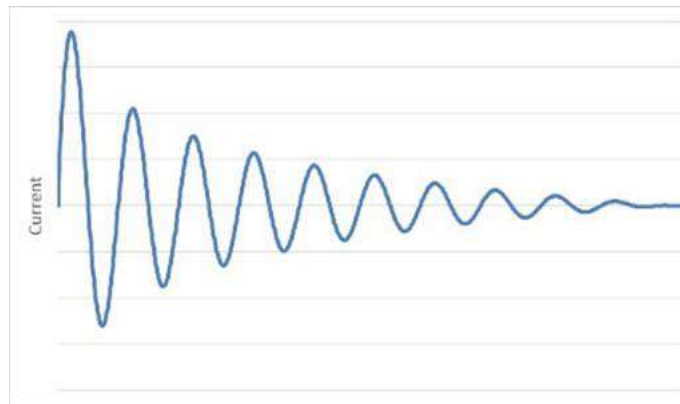
## Connectors

- Industry-standard 3-way screw Terminal Block:
  - very reliable and long-life contact
  - up to 4mm<sup>2</sup> conductor
  - no crimping tool required
  - compatible with shielded or unshielded twisted pairs
- a 15-pin D-SUB connector including power output, voltage sense signals, trigger and status signals is also available for use in test benches. It is also compatible with twisted pairs.



## Source description

A setting buffer allows the user to output any kind of waveform. The sampling period is programmable from 5ms to 100ms. The buffer can be read once or looped.

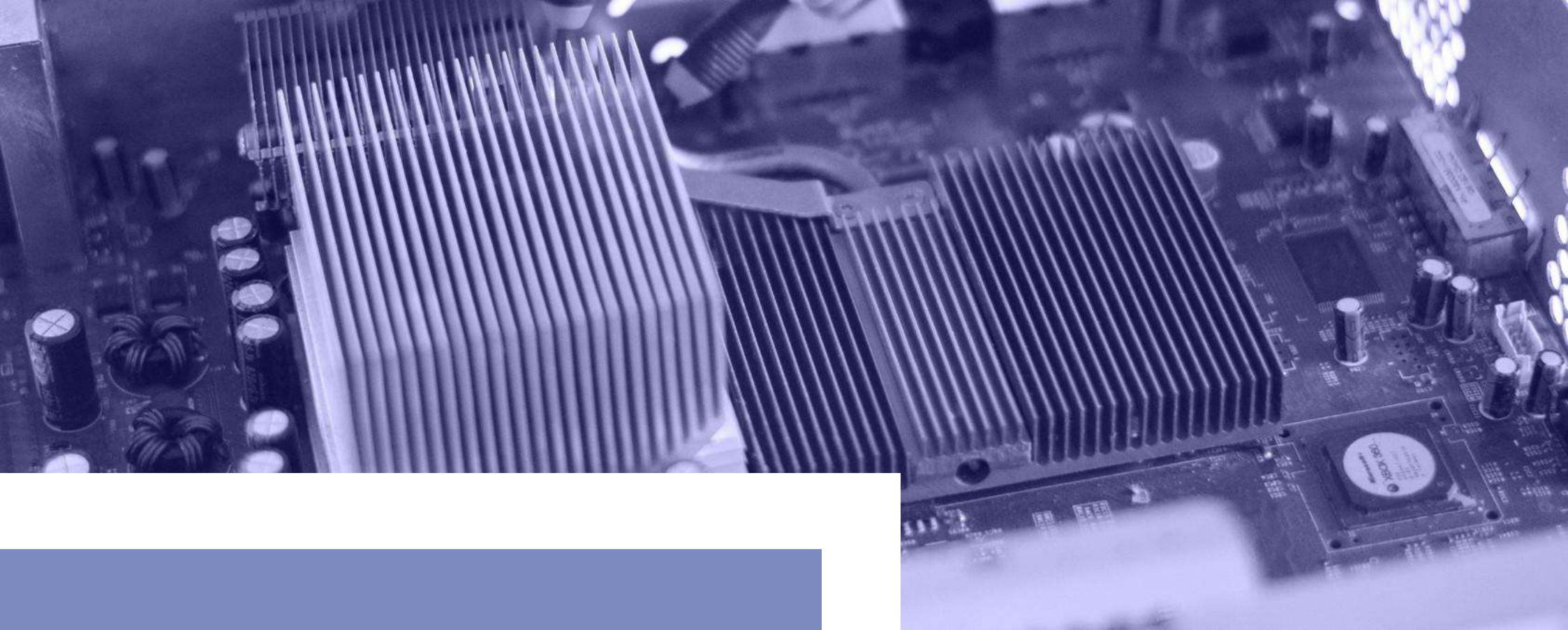


Rear view

# Application **EXAMPLES**



- Magnet power supply for beam correctors in particle accelerators
- Low noise supply for superconducting coils
- Alignment coils in Scanning Electron Microscope (SEM)
- Laser or power diode biasing and aging test



## BILT SYSTEM FEATURES

- Module to be inserted in a BiLT® chassis, 5 to 14-slot versions available, up to 1000W output power, no external bulk power supply needed
- Chassis standard interface: Ethernet and USB
- Complete software package provided, including a turnkey control PC software (Windows™ or Linux) and NI Labview® driver.
- xxcds Easy remote firmware update of modules and chassis control board

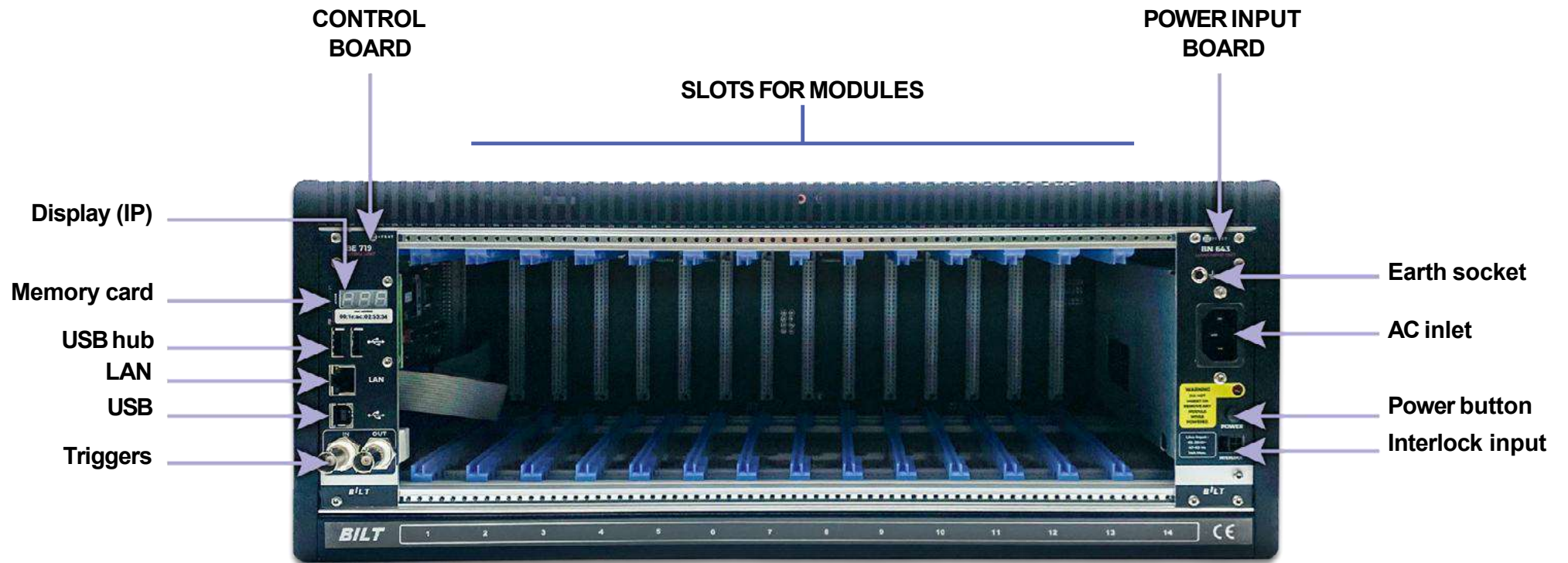


*Front view of a 19" wide, 4U high BiLT chassis*



## The BiLT System

The best companion for the BE2810 module is the BN210 or BN220 BiLT chassis. This 19", 4U chassis is self-ventilated and offers 14 slots to insert modules, the maximum output power is up to 1000W.



Rear view

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## Standards, Calibration, Warranty and Maintenance

Bilt system is compliant with the applicable European Directives and holds the CE mark.

All ITEST products come with a two-year parts and labour warranty and a calibration certificate if applicable. An email or phone 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 instruments is one or two years, depending on instrument model.

On request, ITEST can proceed to scheduled calibration (in our workshop or at the customer’s site).



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