Bilt System module

BE5151

Multirange bipolar DC Source
40V 200mA

DC SOURCE 40V 200MA

- 8 current ranges: versatile use from a few nA to 0,2A
- 4 voltage ranges: ±5V, ±10V, ±20V, ±40V
- 120W max. output power
- Low cost

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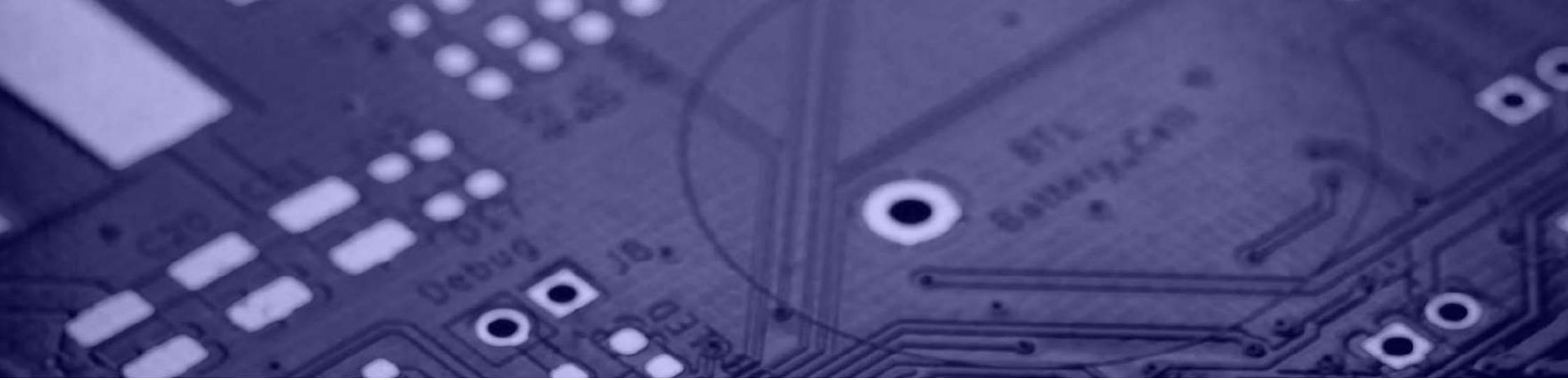
BE5151

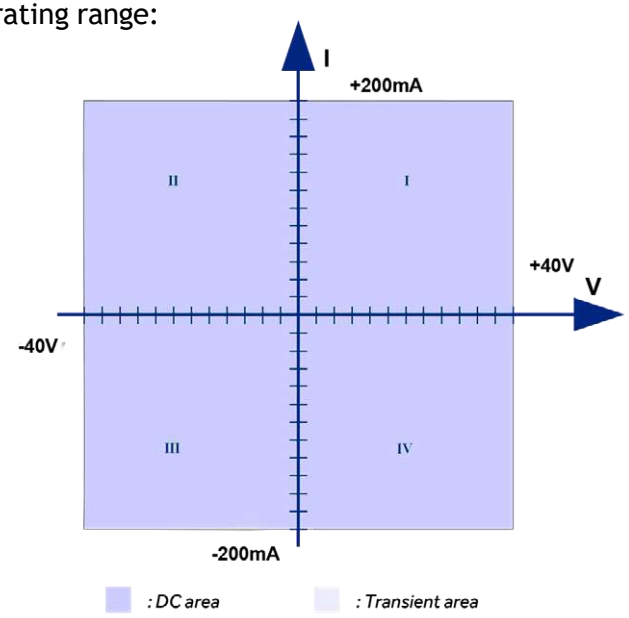
OVERVIEW

MAIN FEATURES

- Bipolar ground referenced DC source
- True 4-quadrant, voltage and current programmable
- Linear final regulation with sense lines
- 4 voltage ranges: ±5V, ±10V, ±20V, ±40V
- 8 current ranges: versatile use from a few nA to 0,2A.
- Good accuracy on setting and read-back (0,05% of range typ.)
- Low noise, typ. 2mVp-p
- Fast transient response time to load variation: 300µs typ.
- Programmable very fast protection against overvoltage and short-circuit
- Available coupling option for automatic regulation of transistors at constant power



Operating range:



STANDARD
Capabilities

- Large software capabilities: programmable thresholds on voltage and current, trace memory with envelopewaveform,synchronousgroup of instruments with programmable start and stop delay...
- Easy-to-use SCPI commands with NI LabView, Agilent Vee...
- Large system connectivity : GPIB, USB, Ethernet ...
- Ready-to-use with EasyStress software for Burn-in and Life-test settings

HIGH
Reliability level

- High reliability and safety : no transient during On/Off phase, no line perturbation, safe stop on mains default...
- 2 year calibration periodicity
- 2 year warranty as standard

Technical
SPECIFICATIONS

Operating Area

Parameters	Conditions/Comments	Min.	Typ.	Max.
Voltage setting range	% of the range, bipolar operation : continuous voltage setting between polarities, normal operation around 0V	-100%		+100%
Current setting range	Programmed in absolute value, % of the range	1%		100%
Overvoltage threshold setting range	Overvoltage or Undervoltage thresholds, % of the voltage range			±110%
Remote sense operating range	Max. voltage drop in the power cables when sense connected	-1V		+1V
Voltage output headroom	Max module output voltage above voltage range for sense compensation		1V	
Sourced output power				8W
Sink output power				8W
Operating temperature	Ambiant temperature in front of Bilt's rear fan openings	15°C		30°C

Range and Accuracy

Range switching by relay in standby mode with automatic range selection capability. Accuracy specified on a 18°C-28°C module temperature range, 30min warm-up.

Voltage

Range	Resolution	2 year Accuracy(1) (3)	Ripple & Noise	
	Setting & Read-back		10Hz-10kHz	10Hz-20Mhz (2)
± 5V	1,3mV	0.2% (10mV)	2mVp-p	2,6mVp-p
± 10V	2,6mV	0.2% (20mV)	2,3mVp-p	2,8mVp-p
± 20V	5,3mV	0.2% (40mV)	3mVp-p	3,5mVp-p
± 40V	10,5mV	0.2% (80mV)	4,2mVp-p	4,6mVp-p

(1) *in % of the range, typical accuracy 0,05%* **(2)** *1µF ceramic output decoupling capacitor, 150Ω load, worst peak-to-peak value* **(3)** *Additional voltage offset error if sense lines not used: <5mV.*

Current

Range	Resolution	2 year Accuracy(1)	Load capacitance	
	Setting & Read-back		Recommended (2)	Max (3)
± 200mA	53µA	0.2% (400µA)	10µF - 100µF	Iset/150 Uset or 1mF
± 50mA	13µA	0.2% (100µA)	10µF - 47µF	Iset/150 Uset or 1mF
± 10mA	2,6µA	0.2% (20µA)	1µF – 10µF	Iset/150 Uset or 100µF
± 2,5mA	0,66µA	0.2% (5µA)	1µF – 10µF	Iset/150 Uset or 100µF
± 500µA	130nA	0.2% (1µA)	---	2.2µF
± 125µA	33nA	0.2% (250nA)	---	2.2µF
± 25µA	6,6nA	0.2% (50nA)	---	2.2µF
± 6,25µA	1,6nA	0.2% (12,5nA)	---	2.2µF

(1) *in % of the range, typical accuracy 0,05%* **(2)** *for best noise and transient response results, low esr ceramic and/or electrolytic type.* **(3)** *The minimum of both values. Iset and Uset are the user programmed current (in A) and voltage setting (in V). The resulting capacitance is in mF. This limit guarantees that the source will switch off within the specified fall time. Exceeding this value can damage the module. The second value guarantees regulation stability.*

Regulation/measurements

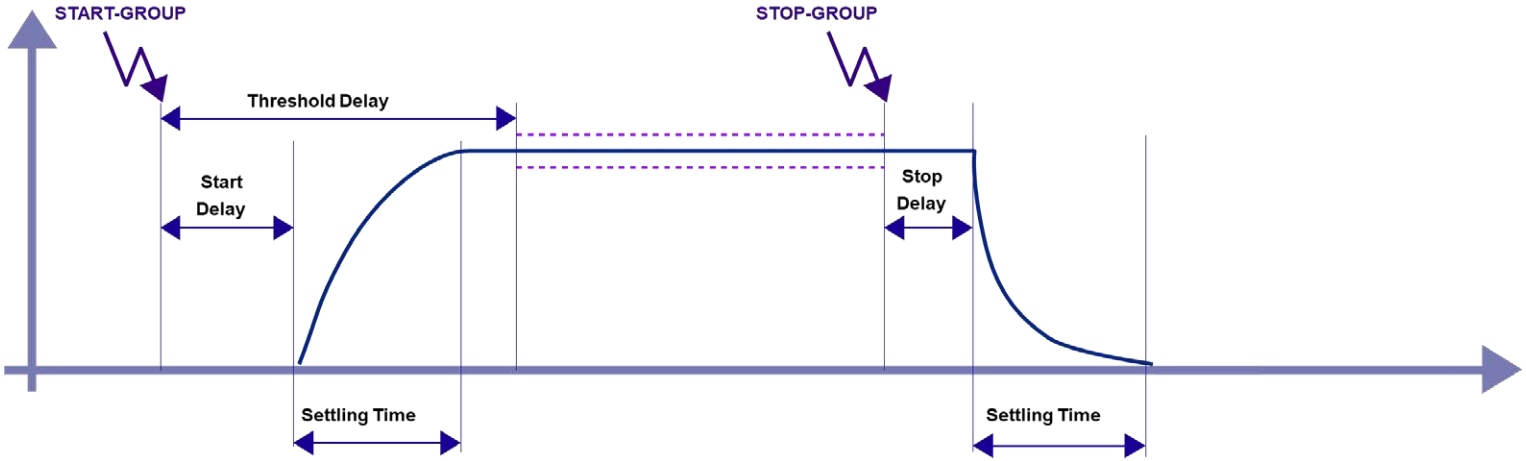
Parameters	Conditions/Comments	Min.	Typ.	Max.
Voltage transient response time (1)	From 0µF to max recommended output decoupling capacitor Min. value : 5V and 0,2A range, 1µF decoupling capacitor Max. value : 40V and 0,2A range, 100µF decoupling capacitor	200µs	300µs	800µs
Voltage to current transient response time (2)	200mA range, no output decoupling capacitor		300µs	
	10mA range, no output decoupling capacitor		150µs	
Short-circuit response time	Time for the source to limit short-circuit current to 150% of the range		1µs	
Line regulation	No line regulation error, guaranteed by design			0%
Load regulation	Sense lines connected, 0 to max. source current, guaranteed by design			0%
Measurements sampling frequency	Envelope trace capability at this rate, meas. Bandwidth 720Hz.		1 ks/s	

(1) *response time to a 20% to 40% load step, time to stabilize to within 100mV of setting (40V range), 50mV (20V range), 25mV (10V range) and 10mV (5V range)* **(2)** *time to stabilize from a constant voltage (CV) regulation to a constant current (CC) regulation after a load step*

Module start/stop

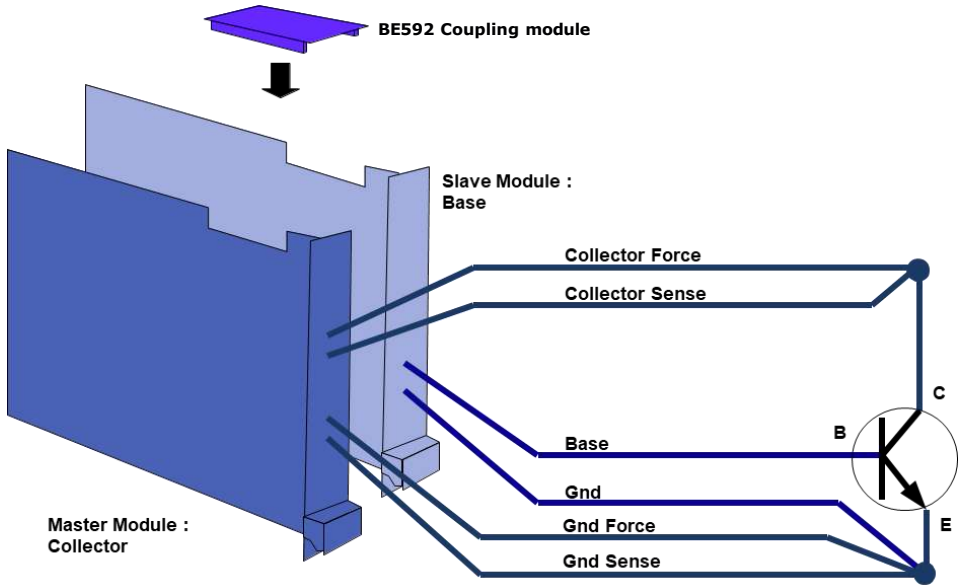
Parameters	Conditions/Comments	Min.	Typ.	Max.
Settling time (1)	source switching on or off, or any setting change, 95% of the step (first order step response time waveform. The time constant is typically 12ms)		40ms	
Start delay		100ms		250ms
Stop delay		0ms		50ms
Threshold delay	Time after which the measurement thresholds are monitored	0ms		60s
Off output impedance	Source off, max current 2A, impedance of the relay contact		25mΩ	

(1) *no output transient perturbation during output rise/cut-off and mains Starting/ Stopping, several possibilities for programmable sequences*



Application
EXAMPLES

- Reliability tests for sensitive components
- Accurate power supply for measurements bench
- Transistors tests at constant power and DC characterization (coupling available between sources)



Vce and *Ic* constant thanks to automatic *Ib* control

Safety features

- User programmable overvoltage thresholds: the module output is tied to ground within a few µs then shut down if the overvoltage or undervoltage threshold is exceeded. Same resolution and accuracy as measurements, monitored upon module start command
- User programmable measurement thresholds: the module is shut down or sends a warning if a threshold is exceeded. Typical response time: 2 times the sampling period. Current or voltage threshold, monitored after a programmable delay
- Over temperature protection: internally sensed temperature overload shuts the source down
- Short-circuit management circuitry limits the current to about 150% of the current range within specified short- circuit response time. The current regulation then limits the current to the user programmed current setting within a few ms. There is typically no voltage overshoot after a short-circuit release thanks to a dedicated slew rate control circuitry

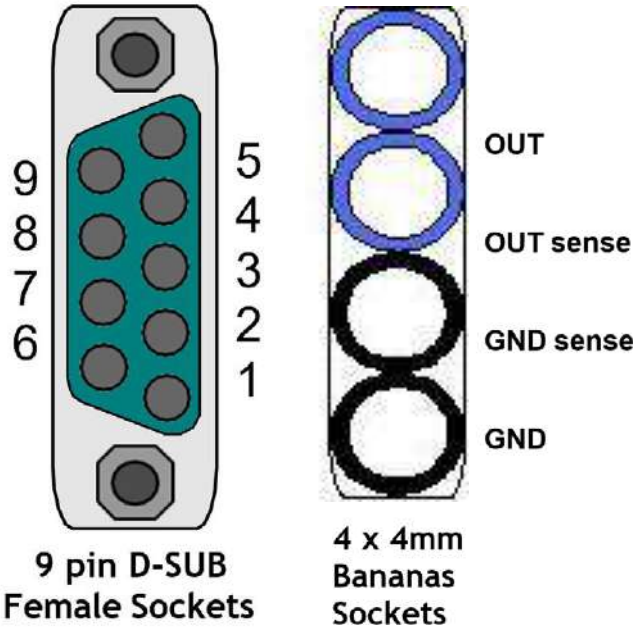
Primary power requirements

Parameters	Conditions/Comments	Min.	Typ.	Max.
Primary power needed for biasing	Module switched off, minimum consumption on ±25V rail		5W	
Primary power needed for starting	Transient power needed to switch on the module, on +25V power rail		10W	
Primary power needed at full load	±250V ±1mA sourced on the 4 sources, on +25V power rai		15W	

Connection

2 types of output available:

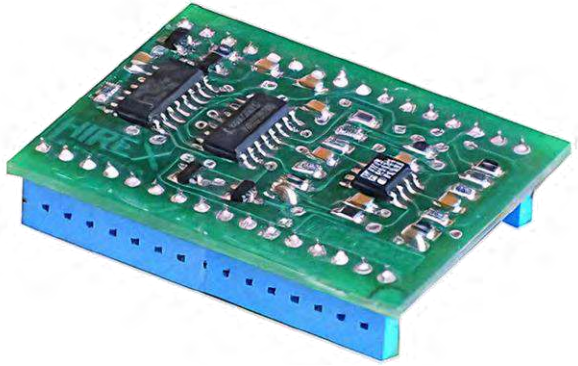
- 4 Ø4mm banana jacks providing power output and sense High (blue) then power ground and sense low (black)
- 1 standard Bilt (type A) SUBD9 connector. Pinout is compatible for crimped connectors and twisted pair ribbon cables
    - Sense signals are available for remote voltage measurement and regulation. Guard signal is available for high impedance tri-axial wiring
    - Synchro signal allows to install a remote «voltage presence» LED (with no resistor, 10mA max) and behaves as an «emergency stop » button, shutting down the module if tied to ground



Pin	Name	Function
1	Synchro	Board ON : 5V, Board OFF : 0V.
2	Out Sense	Sense high
3	Output	Power Output
4	Output	Power Output
5	Guard	Guard Ring
6	GND Sense	Sense low
7	GND	Power Ground
8	GND	Power Ground
9	GND	Power Ground

Accessories

AM264
DSUB 9 pin / BNC female converter.



BE592
Inter-module coupling for regulating NPN, PNP, MOS-P, MOS-N, FET, etc transistors.

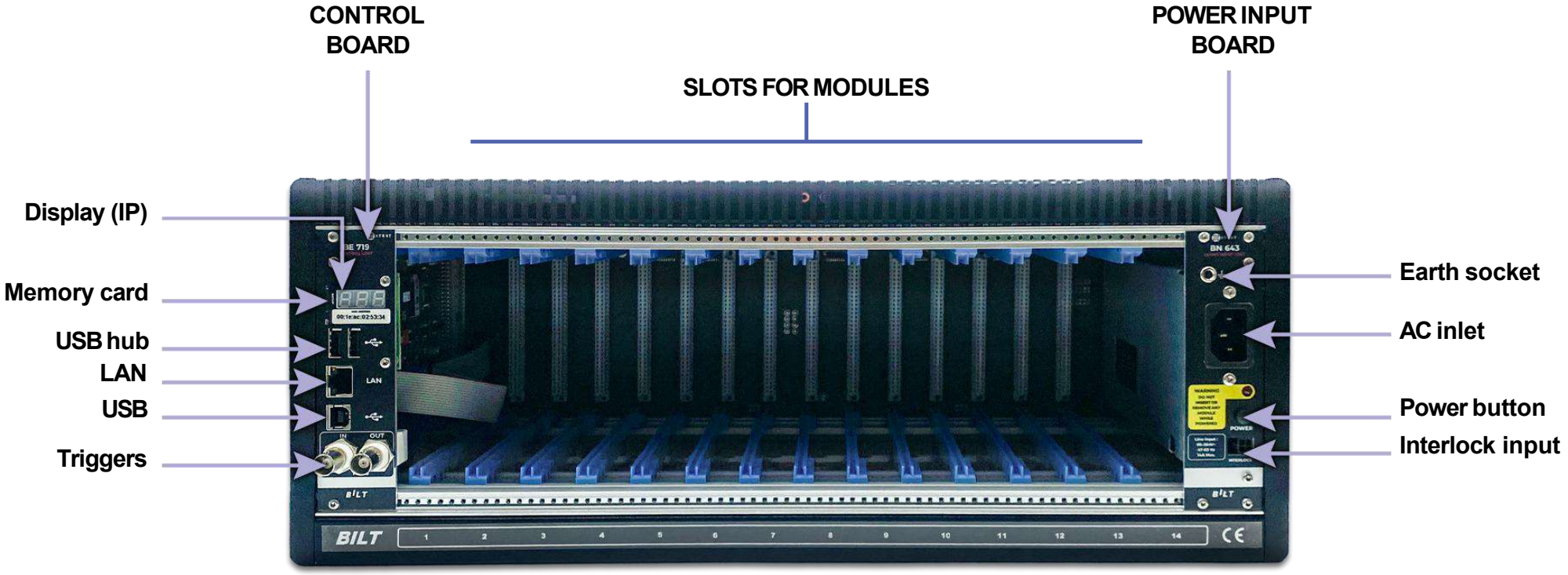
BILT SYSTEM FEATURES

- 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.
- 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 BE5151 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

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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