

Main Specifications

- Single range, unipolar, ground referenced DC sources
- 12 different source models available, including polarity:

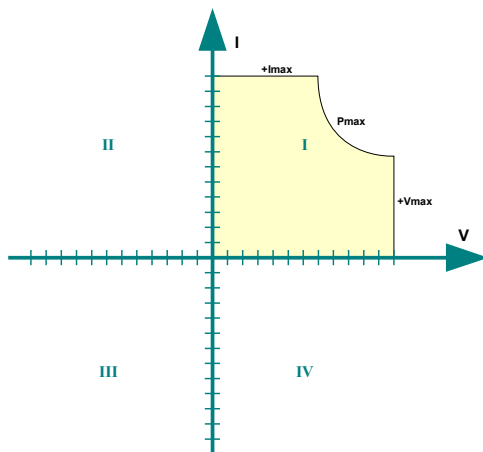
Name	Voltage	Current	Power
BE534 P/N	30V	4A	120W
BE535 P/N	60V	2A	120W
BE536 P/N	120V	1A	120W
BE537 P/N	250V	0,48A	90W
BE538 P/N	500V	0,24A	90W
BE539 P/N	1100V	0,1A	80W

- Voltage and current programmable, sense lines
- Switching converter with very low internal output capacitance
- Good accuracy on setting and read-back (0,05% of range typ.)
- Low noise, typ. 0,03% of the range
- Available coupling option for automatic regulation of transistors at constant power
- Higher voltage model on request

Applications examples

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

Operating area for a positive model



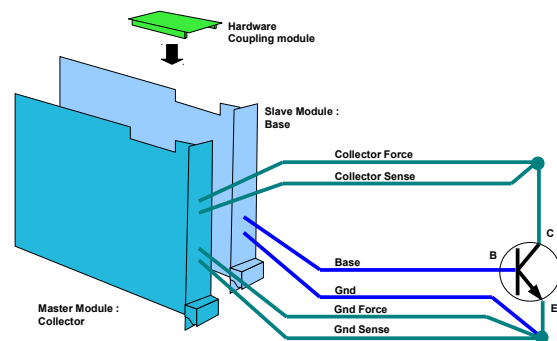
Standard capabilities

- Large software capabilities: programmable thresholds on voltage and current, trace memory with envelope waveform, synchronous group 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

Application example



Vce and Ic constant thanks to automatic Ib control

Operating area

Parameters	Conditions/Comments	Min.	Typ.	Max.
Voltage setting range	% of the range	1%		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, % of the range			3%
Voltage output headroom	Max. module output voltage above voltage range for sense compensation, % of the range		3%	
Sourced output power	Depending on the source model	80W		120W
Sink output power	DC sink power			0W
Operating temperature	Ambiant temperature in front of Bilt's rear fan openings	15 °C		30 °C

Ranges and Accuracy

Accuracy specified on a 18 °C-28 °C module temperature range, 30min warm-up.

Voltage and current:

Parameter	Range	Voltage resolution	Current resolution	2 year Accuracy ⁽¹⁾	Ripple & Noise	Load capacitance
Model		Setting & Readback			10Hz-10kHz ⁽²⁾	Max value ⁽³⁾
BE534 P/N	30V 4A	8mV	1mA	0,2%	9mVp-p	10µF
BE535 P/N	60V 2A	16mV	500µA	0,2%	18mVp-p	5,6µF
BE536 P/N	120V 1A	32mV	250µA	0,2%	36mVp-p	820nF
BE537 P/N	250V 0,48A	65mV	125µA	0,2%	70mVp-p	47nF
BE538 P/N	500V 0,24A	130mV	62µA	0,2%	145mVp-p	100nF
BE539 P/N	1100V 0,1A	290mV	31µA	0,2%	330mVp-p	47nF

(1) in % of the range, voltage or current. Typical value 0,05%

(2) peak-to-peak typical value

(3) Max value allowing the source to stop within the specified settling time. The max output capacitance value can be increased, if the load is resistive, by a value of $C=8/R$ (C in mF, R in ohms)

Regulation/Measurement

Parameters	Conditions/Comments	Min.	Typ.	Max.
Voltage transient response time ⁽¹⁾	no output decoupling capacitor		1ms	
Voltage to current transient response time ⁽²⁾	6A and 1A range, no output decoupling capacitor		0,8ms	
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 33% to 66% load step, time to stabilize to within 50mV of setting (20V range), 10mV (5V range)

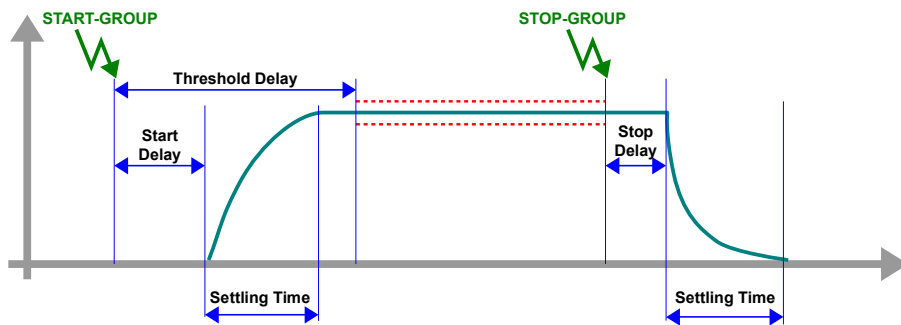
(2) time to stabilize from a constant voltage (CV) regulation to a constant current (CC) regulation after a load step

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 9ms)		30ms	
Start delay	User programmable	100ms		250ms
Stop delay	User programmable	0ms		50ms
Threshold delay	Time after which the measurement thresholds are monitored	0ms		60s
Off state ⁽²⁾	Model BE534 to BE537, output voltage		0,7V	
	Model BE538, impedance		66kΩ	
	Model BE539, impedance		85kΩ	

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

(2) When BE534 to BE537 modules are off, a triac shorts the output to ground. The output is low impedance but exhibits a diode threshold voltage. BE538 and BE539 module do not own a triac. When these two modules are off, the output voltage is null but not low impedance.



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
- User protection: emergency stop if the “safety stop” loop of the mains power supply opens. Refer to the Bilt user manual.

Primary power requirements

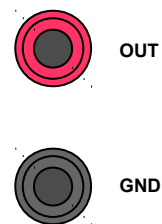
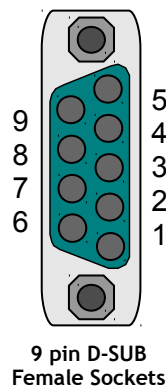
Parameters	Conditions/Comments	Min.	Typ.	Max.
Primary power needed for biasing	Module switched off, minimum consumption on ±25V rail		2W	
Primary power needed for starting	Power needed to switch on the module, on +25V power rail, no load		11W	
Primary power needed at full load	120W models 90W models 80W models		145W 110W 100W	

Connection

2 types of output available:

- 2 high voltage Ø4mm banana jacks providing power output (red) and power ground (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

STANDARD CONNECTION Type 9-A		
Pin	Name	Function
1	Synchro	Board ON : 5V, Board OFF : 0V.
2	Out Sense	Remote Voltage Measurement (for sources up to 250V only)
3	Output	Power Output (for sources up to 250V only)
4	Output	Power Output (for sources up to 250V only)
5	-	Not used
6	GND Sense	Ground Remote Input (for all sources)
7	GND	Power Ground
8	GND	Power Ground
9	GND	Power Ground



2 x 4mm Bananas Sockets

SCPI specific commands

Command	Comments	Default
*idn?	Complete identification for the BE530 mother board and BX53x daughter board: Revision, date, serial number, software revision, calibration ...	--
VOLTage [val][?] CURRent [val][?]	Voltage and current settings. Use of m,μ,n coefficient allowed , Ex : volt 541 m. = volt 541E-3 = volt 0,541 When module is off and autorange active (volt/curr:rang:auto ? → on), the range closer to the setting value is automatically set. Polarity is imposed by the voltage setting sign.	0V (SV) 50μA (SV)
VOLTage:PROTection [on/off][?]	Enabling / Disabling under/overvoltage protection. The command is prohibited if the module is on.	ON (SV)
VOLTage:PROTection: PERCent [val/max][?]	Set the overvoltage threshold, expressed as a percentage of the voltage setting. The protection triggers at an absolute value of "setting+setting*val/100" for a positive model and "setting-setting*val/100" for a negative one. Minimum value is 10%. "MAX" sets the threshold at 110% of the range, no matter the voltage setting.	MAX (SV)
MEASure:VOLTage ?	Reading of the voltage measurement	--
MEASure:CURRent ?	Reading of the current measurement	--
MMX:VOLTage ?	Reading of the voltage envelope. Returns min and max values of the output voltage since the last request.	--
MMX:CURRent ?	Reading of the current envelope. Returns min and max values of the output current since the last request.	--
OUTPut [on/off][?]	Enabling / Disabling output	OFF
STARt:DELAy [val][?] STOP:DELAy [val][?]	Start / Stop delay in ms for the between-sources sequences when synchronised start are requested (groups). See the "Module start/stop" section of this document for the range of these parameters.	100 / 0 (SV)
FUNC[CV/CC][?]	this setting is only intended for threshold control ; it indicates which parameter is to be used for monitoring the thresholds (LIM:UPP and LIM:LOW) : func:cv (current threshold monitoring as constant voltage regulation occurs) func:cc (voltage threshold monitoring as constant current regulation occurs) note: the actual regulating mode is determined by the load impedance with respect to the voltage and the current regulation setting values.(volt val / curr val)	CV (SV)
LIMit:STATe[on/off][?]	Enabling / Disabling of the software thresholds monitoring .	OFF (SV)
LIMit:UPPer [val][?] LIMit:LOWer [val][?]	High/low threshold programming (voltage or current according to FUNC). Any values are accepted, without any warning message if out of range. It's then possible to disable one threshold monitoring using any inaccessible out of range value : limit:upp 100m;low -1000;state on (set only UPP threshold to 100mA)	0 (SV)
LIMit:DELAy [val][?]	Setting of delay before applying thresholds. (0-60000 ms) . This delay start at OUTP ON or P:STATE ON received. It is independent of the start:delay .	150 (SV)
LIMit:CLEAR	Thresholds reset	--
LIMit:FAIL?	Reading of alarm return : 0,"NO": No alarm 1,"LOW" : LOWer software threshold occurred. 2,"HIGH" : UPPer software threshold occurred. 5,"STOP" : Stop by user ("synchro" pin on SUBD9 output connector) 6,"OVER" :Over-voltage or under-voltage thresholds occurred. 7,"TEMP" : internal over-temperature threshold occurred.	--
CPL [val][?]	Useful when the module is connected as Master with the coupling jumper board BE592 (intended for transistor test using constant power regulation...). reading/setting of the coupling mode : (NC ,OFF,FETP,PNP,FETN,NPN). NC = no coupling board installed	NC / OFF (SV)

Notes: Defaut: Value after *rst command or new module installation. SV: Parameter in nonvolatile memory.

EasyStress Usage

The traffic light gives the current status of the module :

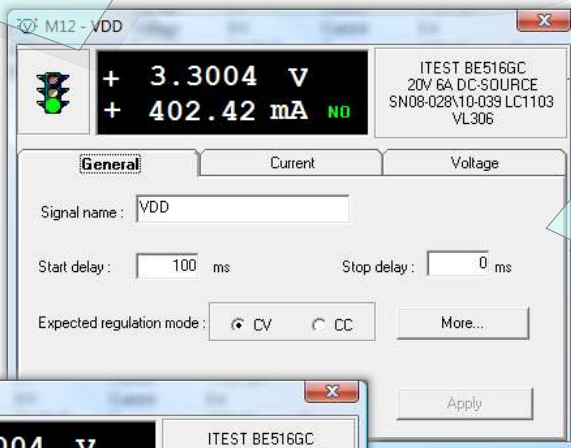
- Green = ON
- Orange = ON with a threshold exceeded but not activated at group level.
- Red = Threshold exceeded thus triggering a stop.
- Off = Stop.

The black window gives the real time measurements state

"No" in green, will become "Low", "High"... in red after threshold exceeding.

Module identification :

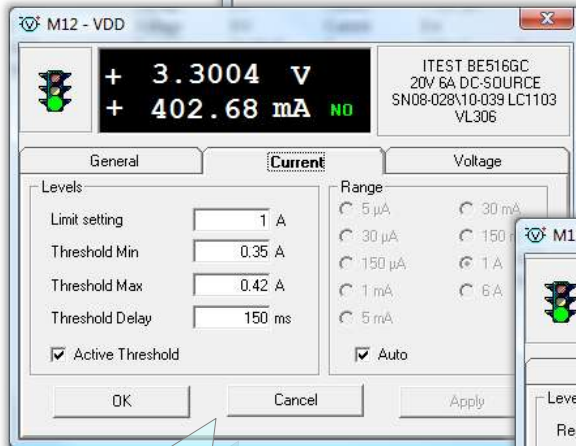
- BE516 = Board name
- GC = Hardware review.
- No 08-028\10-039 = Serial Numbers
- LC 11-03 = Last calibration date (year/week)
- VL306 = firmware software revision



Signal Name: Name given to signal.
Start/Stop delay: Is used to define time lapses between the different modules of a given group in order to perform powering up and stopping sequences.

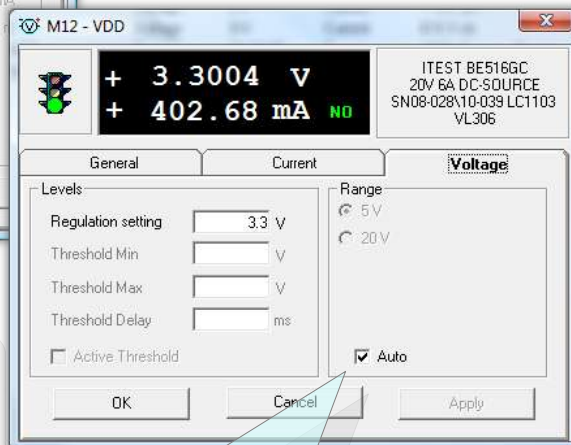
Expected regulation mode : "The expected regulation mode" is used to specify on which value (voltage or current) the measurement thresholds are to be monitored. If the expected regulation mode is in voltage (CV), the value monitored will be current and vice versa.

More: gives access to unusual advanced functions.



Limit Setting / Regulation Setting

(the name change according to CC/CV status) : display the set up. You could use directly "m" in place of milli (e-3), "µ" for e-6...
Threshold Min/Max/Delay is used to set up threshold monitoring and time to applied after switching ON.



Range/Auto : If auto is selected the system automatically chooses the suitable range according to the setting entered. Warning : The range can only be changed when the module is off. If you have to change setting values for a large range in On mode, switch to manual mode and choose the suitable range before switching on. Be careful nevertheless not to program a range which is too large in relation to the expected setting or measurement , as you will lose in resolution and accuracy !


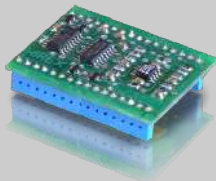
Revision History

Rev	Date	Changes
1	2006-02-01	First release
2	2007-10-03	Added specifications, BE539 1000V becomes 1100V
3	2009-01-13	New picture
4	2011-11-07	New data-sheet format, added specifications

Related product

BE516	20V 6A 120W 4 quadrant bipolar source	120W	2 voltage ranges: $\pm 5V$, $\pm 20V$ 9 current ranges from $5\mu A$ to 6A
BE517	120V 4A 120W max unipolar 2 quadrant	120W	2 voltage ranges: +30V, +120V 9 current ranges from $5\mu A$ to 4A
BE556	4 channels 1200V $10\mu A$ unipolar, very low noise, high accuracy	12mW	1 voltage range, positive or negative model, 1200V 1 current range $10\mu A$, $100\mu A$ or higher on request

Accessories

	AM264 DSUB 9 pin / BNC female converter.		BE592 Inter-module coupling for regulating NPN, PNP, MOS-P, MOS-N, FET, etc transistors.
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Metrology and maintenance

Initial calibration principle

For each kind of module, iTest develops a test and calibration programs. They use external references which are regularly checked by authorized companies.

Our products are delivered after going through a test cycle: preliminary calibration, Burn-In, initial calibration.

For each module, an individual report of the initial calibration is delivered onto a CD-ROM.

Regular calibration

The recommended periodicity is 2 years for standard modules (13 to 16 bit), and 1 year for high accuracy modules (18 to 21 bit).

iTest offers to perform the regular calibration, either on site or while returning the hardware back to our workshop.

Some customers have to proceed regularly to their own accuracy check. In case the modules have drifted out of their specification limits, they have to be sent back to iTest.

Guarantee and maintenance

All the Bilt products come with a two-year parts and labor guarantee, when returned to our workshops.

A telephone support service is also available for the same period.

At the end of the initial two-year period, a further contract can be subscribed, including a new calibration and a further two-year guarantee.

In any case, iTest will supply on request maintenance and calibration.



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