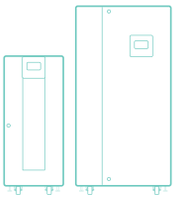


GE+ vAC/DC ePlus

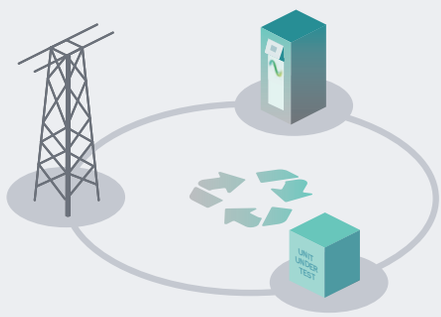
Regenerative AC/DC Grid Emulator

GE+ vAC is a 4Q programmable AC Voltage Source designed to create both stable and distorted AC grids, adding now a predefined IEC testing software for pre-compliance. This cost-competitive solution is specially suitable to perform AC testing in the fields of: Renewable Energy Sources, Smartgrids, EV and EVSE and, in general, grid connected devices.

Regenerative Technology

Thanks to our bi-directional topology, the AC/DC Grid Emulator are regenerative, resulting in a reduction of both the consumed energy during the tests and the power required from the electrical installation.

This technology allows us to work in both directions, as power generators or offering a consumption for the realization of all types of tests.



Main Applications

- Electromobility
- Smart Grids
- Anti-Islanding
- IEC Testing (pre-compliance)
- Photovoltaic
- Academical & Industrial Test
- Power HiL
- Energy Storage System

Bidirectional and Regenerative

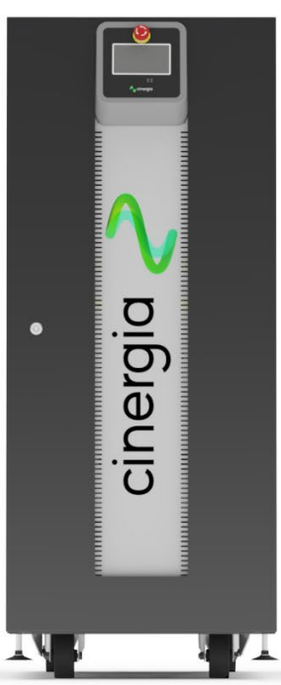
Clean grid current
THDi <3% and PF > 0.98

13 Models
from 7.5kW to 160kW

Parallelization of units to increase the power

Generation of Worldwide Electrical Grids
3-phase/ 1-phase/ split phase/ Multichannel

Independent Phase Configuration of
voltage rms, phase angle, frequency and harmonics



Same Power in DC and AC

Generation of Disturbances
harmonics, interharmonics, subharmonics, voltage dips frequency variaton, flicker

Disturbance Generation Editor
compatible with IEC, LVRT, SEMI-F47, CBEMA test standards, for pre-compliance

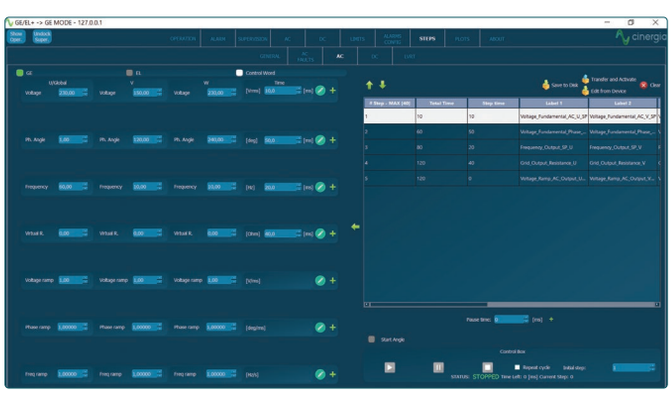
Intuitive User Interface

Modbus/Ethernet Open protocol, Labview drivers

Friendly Interface

SOFTWARE

The user interface used by CINERGIA devices has been developed by our R&D team, to offer total control of the device, with a comfortable and intuitive design. This allows us to take full advantage of the capabilities of the device, as well as the programming and execution of standardized or self-created tests.



Remote Control port
~LAN Ethernet with Modbus/TCP protocol.
~Labview Drivers
~RS485 (optional)

Digital IO port
~4 digital inputs
~3 relay outputs
~1 emergency stop

Optional analogue port
~6 analogue input 0-10V
~6 analogue output 0-10V

Windows 7/10 user interface for remote operation and data acquisition.

Features and capabilities

*The software functions available on each product depends of its features.

- AC Operation — **AC Operation**
- **Harmonics**
- **Power and Impedance Control**
- **Disturbance Generation**
- IEC — **IEC Testing** Optional Pre-compliance
- DC Operation — **DC Operation**
- **Multichannel**
- **Battery Pack Tester**
- **Battery Emulation**
- **Steps Mode**
- **Sequence**
- **PV Panel Emulation**

INPUT SIDE (GRID SIDE)

AC Voltage
Rated: 3x400Vrms +Neutral+ Earth
Range: +15% / -20%
Rated AC Current
Depends on model (see Wiring Manual)
Frequency
48-62 Hz
Current Harmonic Distortion
THDi < 3% at rated power
Current Power factor
PF > 0.98 at rated power
Current Power factor
≥ 89% (7.5 & 10), ≥ 91% (15 to 30), ≥ 92% (40 to 200)

OUTPUT SIDE IN AC (EUT SIDE)

Terminals
Number: 4 (3 phases + 1 neutral)
Configuration of Channels
3-channels: 4Q, independent setpoints per phase
1-channel: 4Q, global setpoints for all phases (only in GE+)
Multichannel: 4Q, independent start/stop, alarm status and setpoints per phase (note: multichannel is an option for ≥ 80kVA)

OUTPUT SIDE GE-AC (EUT SIDE)

Voltage Mode (CV)
Peak: ± 400V phase-neutral
Range: 0[1] to 277Vrms phase-neutral (295Vrms with HV option) 0[1] to 480Vrms phase-phase (510Vrms with HV option)
THDv: < 0.1% rated linear load at 230Vrms, 50/60Hz < 0.9% rated non linear load CF=3 at 230Vrms, 50/60Hz
Setpoint Resolution: 10mVrms
Effective Resolution[2]: < 0.05% of FS[3]
Setpoint Accuracy[4]: < ± 0.1% of FS[3]
Transient Time[5]: < 1.5ms (10% to 90% at a step to Vrated)
Ripple[7] (peak-peak): < 0.55% of FS[3]
Harmonics
Range: up to 50th (at 50/60 Hz fundamental)
50 independent harmonics per phase: 20 free programmable frequency and phase from 0.1 to 50 times f_0 30 fixed frequency
Harmonics content: V·f < 46000 (with current derating)
Setpoint Accuracy[4]: same as voltage accuracy
Small Signal Bandwidth: up to 5000Hz[9]
Transient Time[5]: < 2ms (10% to 90% at a step change)
Frequency
Fundamental Frequency Range: 10 to 100Hz (up to 400Hz option)
Small Signal Bandwidth: up to 5000Hz[9]
Resolution: 1mHz
Phase Angle
Range: 0 to 360°
Resolution: 0.01°

OVERLOAD/OVERCURRENT

Admissible AC overcurrent: 125% of rated value during 10 minutes, 150% during 1 minute, 200% during 2 seconds
Admissible overloads: 125% of rated value during 10 minutes, 150% during 1 minute, 200% during 2 seconds

OUTPUT SIDE IN DC (EUT SIDE)

Terminals
Number: 6 (3 positive + 3 negative)
Configuration of Channels
Unipolar 3-channels 2Q, independent setpoints per channel
Unipolar 1-channel 2Q, one global setpoint for all channels
Multichannel: 2Q, independent start/stop, operation mode and setpoints per channel (note: multichannel is an option for ≥ 80kVA)
Bipolar (4Q two independent setpoints)
Voltage Mode (CV)
Range: 2Q: 20[1] to 750V (800V with High Voltage option) 4Q: 0 to +350V / 0 to -350 (+ rail / 0 / - rail, Bipolar configuration)
Setpoint Resolution: 10mV
Effective Resolution[2]: < 0.05% of FS[3]
Setpoint Accuracy[4]: ± 0.1% of FS[3]
Transient Time[5]: < 1ms (10% to 90% at a step to Vrated)
Ripple[7] (peak-peak): < 0.55% of FS[3]
Current Mode (CC)
Range: from 0 to ± 110% of Irated (see models table)
Setpoint Resolution: 10mA
Effective Resolution[2]: < 0.05% of FS[3] (< 0.1% models 7.5 & 10)
Setpoint Accuracy[4]: ± 0.2% of FS[3]
Transient Time[5]: < 1ms (10% to 90% at a step to Irated)
Ripple[7] (peak-peak): < 0.7% of FS[3]
Power Mode (CP)
Range: from 0 to ± 200%[8] of Prated (see models table)
Derived current setpoint: Psetpoint / Vmeasured
Setpoint Resolution: 1W
Effective Resolution[2]: < 0.1% of FS[3] (< 0.25% models 7.5 & 10)
Setpoint Accuracy[4]: ± 0.4% of FS[3]
Transient Time[5]: < 2.5ms (10% to 90% at a step to Prated)
Resistance Mode (CR)
Range: from 0.1 to 1000 Ohm
Derived current: Vmeasured / Rsetpoint
Setpoint Resolution: 0.01 Ohm
Setpoint Accuracy[4]: ± 0.2% of FS[3]
Transient Time[5]: < 2ms (10% to 90% at a step to Rrated)

PROTECTIONS

Overvoltage (peak, rms), Overcurrent (peak, rms), Overload Shortcircuit, Emergency Stop, Watchdog, Heart Beat, Output Contactor, Wrong Configuration
Alarms and Limits are user configurable and can be saved in a password protected EEPROM

MESURAMENTS

Grid Voltage (rms), Current (rms), Power (P,Q) and Frequency
Output Voltage (rms, avg), Current (rms, avg), Power (P,Q) and Frequency
Heatsink Temperatures (x2) and DC Link Voltage
Datalogging available through FTP connection

To view the complete datasheet, scan the following QR code

Models

GE+ vAC/DC Full

Reference	AC Power Rated[9]	AC Current Rated[9] RMS 3 channels / 1 channel	DC Power Rated[9]	DC Current Rated[9] RMS 3 channels / 1 channel	Weight (kg) (lbs)	Dimensions DxWxH (mm) (inch)
GE+ 7.5 vAC/DC	7.5 kW	11 A / 33A	7.5 kW	±10A / ±30A	155 kg 341.71 lbs	770 x 450 x 1100 mm 30.31 x 17.71 x 43.30 "
GE+ 10 vAC/DC	10 kW	15 A / 45 A	10 kW	±15A / ±45A		
GE+ 15 vAC/DC	15 kW	22 A / 66 A	15 kW	±20A / ±60A		
GE+ 20 vAC/DC	20 kW	29 A / 87 A	20 kW	±25A / ±75A		
GE+ 30 vAC/DC	27 kW	40 A / 120 A	27 kW	±30A / ±90A		
GE+ 40 vAC/DC	40 kW	58 A / 174 A	40 kW	±40A / ±120A	200 kg 440.92 lbs	
GE+ 50 vAC/DC	50 kW	73 A / 219 A	50 kW	±50A / ±150A		
GE+ 60 vAC/DC	54 kW	80 A / 240 A	54 kW	±57A / ±171A		
GE+ 80 vAC/DC	80 kW	116 A / -	80 kW	±105A / ±315A	320 kg 705.48 lbs	870 x 590 x 1320 mm 34.25 x 23.22 x 51.97 "
GE+ 100 vAC/DC	100 kW	145 A / -	100 kW	±130A / ±390A		
GE+ 120 vAC/DC	108 kW	157 A / -	108 kW	±130A / ±390A		
GE+ 160 vAC/DC	145 kW	211 A / -	145 kW	±155A / ±465A	680 kg 1499.14 lbs	850 x 900 x 2000 mm 33.46 x 35.43 x 78.74 "
GE+ 200 vAC/DC	160 kW	232 A / -	160 kW	±185A / ±555A		

All specifications are subject to change without notice.

Galvanic Isolation

		Circuit Breaker Recommended	Weight (kg) (lbs)
Inside the cabinet	IT 7.5i	Type C - 25 A	145 kg 319.67 lbs
	IT 10i	Type C - 25 A	
	IT 15i	Type C - 32 A	
	IT 20i	Type C - 40 A	
	IT 30i	Type C - 50 A	195 kg 429.90 lbs
	IT 40i*	Type C - 63 A	
	IT 50i*	Type C - 83 A	

*In the **IT 40i** and **IT 50i** models the size of the cabinet increases to a total of 770 x 835 x 1100 mm (27.55 x 32.87 x 43.31 "). The others keep the original size.

		Circuit Breaker Recommended	Weight (kg) (lbs)	Dimensions D x W x H (mm) (inch)
In external cabinet IP20	IT 30e	Type D - 80 A	174 kg 383.60 lbs	595 x 415 x 708 mm 23.42 x 16.33 x 27.87 "
	IT 40e	Type D - 100 A	217 kg 478.40 lbs	725 x 525 x 773 mm 28.54 x 20,67 x 30.43 "
	IT 50e	Type D - 125 A	280 kg 617.29 lbs	
	IT 60e	Type D - 160 A	381 kg 839.96 lbs	875 x 600 x 900 mm 34.44 x 23.62 x 35.43 "
	IT 80e	Type D - 200 A	435 kg 959.01 lbs	
	IT 100e	Type D - 250 A	458 kg 1009.72 lbs	
	IT 120e	Type D - 315 A	514 kg 1133.18lbs	
	IT 160e	Type D - 400 A	612 kg 1349.23 lbs	964 x 648 x 1252 mm 37.95 x 25.51 x 49.29 "
	IT 200e	Type D - 500 A	753 kg 1660.10 lbs	1192 x 744 x 1430 mm 46.92 x 29.29 x 56.29 "

Configuration Modes

GE+ AC | PHiL DC | PHiL AC | DC

Master / Slave

Parallel				in AC modes (GE & EL)
Parallel	Serial	Serial Parallel		in DC mode

Channel Configuration in GE

3 channels | * 1 channel

*1-channel mode available in standard units up to 60kVA. Consult us for parallel mode above 60kVA.

Channel Configuration in DC

3 channels | 1 channel | Bipolar | Unipolar

Regenerative Power Electronic Solutions

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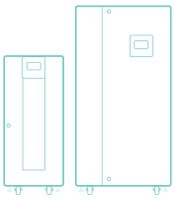


EL+ vAC/DC ePlus

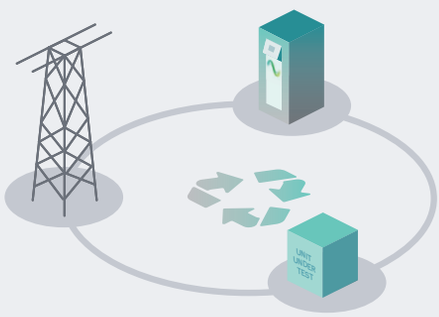
Regenerative AC/DC Electronic Load

CINERGIA's EL+ vAC/DC is the most versatile regenerative Current Source in the market for energy testing in AC and DC applications. Thanks to its flexibility, this device becomes crucial for testing and R&D purposes in Smartgrids, Renewable Energy, Storage Systems, Electromobility, Avionics and Power HiL. Moreover, its regenerative hardware allows saving energy and power.

Regenerative Technology

Thanks to our bi-directional topology, the Electronic Load AC/DC Converter are regenerative, resulting in a reduction of both the consumed energy during the tests and the power required from the electrical installation.

This technology allows us to work in both directions, as power generators or offering a consumption for the realization of all types of tests.



Main Applications

Electromobility | Smart Grids | Avionics | Photovoltaic | Power HiL

Bidirectional and Regenerative

Clean grid current

THDi <3% and PF > 0.98

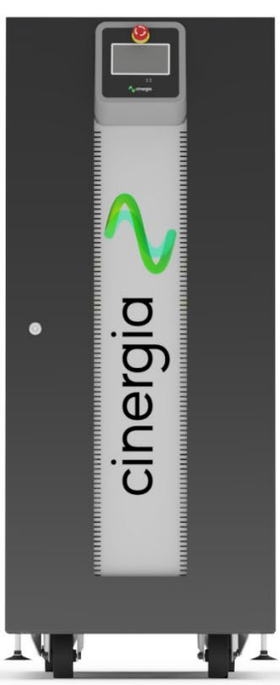
13 Models

from 7.5kW to 160kW

Parallelization of units to increase the power

Independent phase configuration of

rms current, phase angle, harmonics, interharmonics, generation of fast transients ("Current Dips")



Emulation of grid connected devices

Loads absorbing energy from grid
Generators injecting energy to the grid
Programmable Active/Reactive consumption
Non-linear currents up to CF of 3

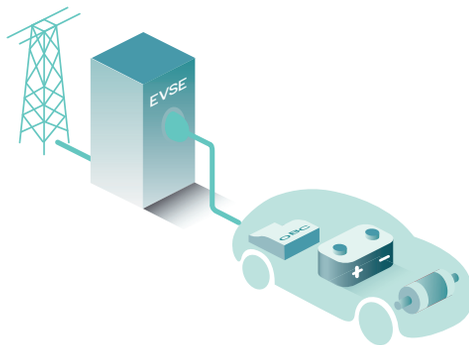
Overload of 200% P_{rated}

Modbus/Ethernet Open protocol, Labview drivers

Electromobility Test Platform

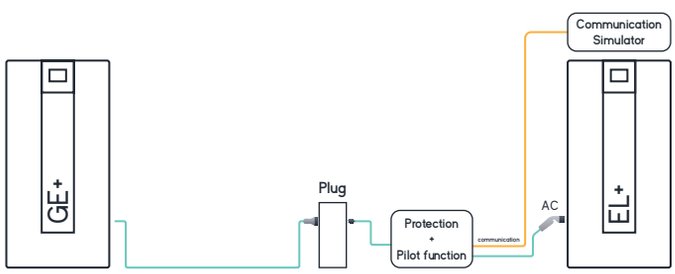
Mobility is one of the main challenges of the 21st century. Environmental concerns are driving a growing demand for more efficient and cleaner means of transportation. Advances in the field of electromobility are mainly linked to the development of battery technology and power electronics for charging, discharging and driving electrical motors.

Our **Regenerative Electronic Load** will emulate the electrical behaviour of an EV to test the output of a charger or a mode 2 cable.



EVSE Mode 2

Test Plataform for Type 2 Charging Cables

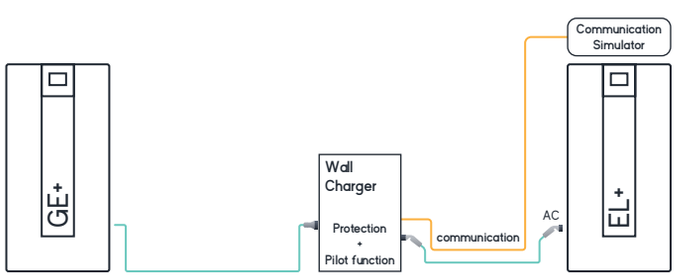


Suitable Products

- GE+ to emulate the grid
- EL+ to simulate EV
- GE&EL+ for non-simultaneous use (suitable in all applications)

EVSE Mode 3

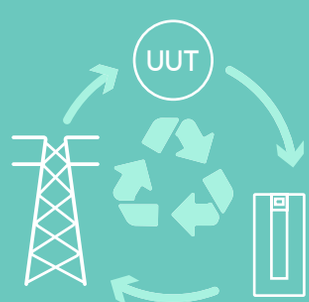
Test Plataform for Wall Chargers



Suitable Products

- GE+ to emulate the grid
- EL+ to simulate EV
- GE&EL+ for non-simultaneous use (suitable in all applications)

CINERGIA's Electronic Loads have the capability to recover energy during the testing procedures and return it to the grid, providing significant savings in energy consumption and power required.



INPUT SIDE (GRID SIDE)

AC Voltage
Rated: 3x400Vrms +Neutral+ Earth
Range: +15% / -20%
Rated AC Current
Depends on model (see Wiring Manual)
Frequency
48-62 Hz
Current Harmonic Distortion
THDi < 3% at rated power
Current Power factor
PF > 0.98 at rated power
Current Power factor
≥ 89% (7.5 & 10), ≥ 91% (15 to 30), ≥ 92% (40 to 200)

OUTPUT SIDE IN AC (EUT SIDE)

Terminals
Number: 4 (3 phases + 1 neutral)
Configuration of Channels
3-channels: 4Q, independent setpoints per phase
1-channel: 4Q, global setpoints for all phases (only in GE+)
Multichannel: 4Q, independent start/stop, alarm status and setpoints per phase (note: multichannel is an option for ≥ 80kVA)

OUTPUT SIDE EL-AC (EUT SIDE)

Admissible Voltage
Connection: 1-phase, 3-phase star or 3-phase delta
Maximum: ± 400V peak
Range: 10-100Hz 35(1) to 277Vrms phase-neutral (295Vrms with HV option) 35(1) to 480Vrms phase-phase (510Vrms with HV option) > 100Hz: maximum rms voltage follows V·f < 46000
Frequency: 10 to 400Hz
Current Mode (CC)
Range: from 0 to ± 200%(8) of Irated (see models table)
Setpoint Resolution: 10mArms
Effective Resolution(2): < 0.05% of FS(3)(< 0.1% models 7.5 & 10)
Setpoint Accuracy(4): < ± 0.2% of FS(3)
Transient Time(5): < 1.5ms (10% to 90% at a step transient)
Ripple(7)(peak-peak): < 0.7% of FS(3)(with Low Ripple Inductor option)
Phase Angle (cos ø)
Range: -90 to 90° in Sink / Source
Resolution: 0.01°
Harmonics
Range: up to 50th
50 independent harmonics per phase: 20 free programmable frequency and phase from 0.1 to 50 times f0 30 fixed frequency
Harmonics content: V·f < 46000 (with current derating)
Setpoint Accuracy(4): same as current accuracy
Small Signal Bandwidth: up to 5000Hz(9)
Transient Time(5): < 2ms (10% to 90% at a step change)
Power Mode (CP/CS)
Range: from 0 to ± 200%(8) of Prated (see models table)
Derived current setpoint: calculated from |S| and Φ(S)
Setpoint Resolution: 1W, 1VA
Effective Resolution(2): < 0.1% of FS(3)(< 0.25% models 7.5 & 10)
Setpoint Accuracy(4): ± 0.4% of FS(3)
Transient Time(5): < 2.5ms (10% to 90% at a step to Prated)
Impedance Mode (CZ)
Calculation method configurable (rms, instantaneous)
Range: from 0.8 to 1000 Ohm, 0.1 to 2000mH, 0 to 3.7mF
Derived current/phase setpoint: calculated from |Z| and Φ(Z)
Setpoint Resolution: 0.01 Ohm/mH/mF
Setpoint Accuracy(4): see current accuracy
Transient Time(5): < 2.5ms (10% to 90% at a step to Rrated)

OUTPUT SIDE IN DC (EUT SIDE)

Terminals
Number: 6 (3 positive + 3 negative)
Configuration of Channels
Unipolar 3-channels 2Q, independent setpoints per channel
Unipolar 1-channel 2Q, one global setpoint for all channels
Multichannel: 2Q, independent start/stop, operation mode and setpoints per channel (note: multichannel is an option for ≥ 80kVA)
Bipolar (4Q two independent setpoints)
Voltage Mode (CV)
Range: 2Q: 20(1) to 750V (800V with High Voltage option) 4Q: 0 to +350V / 0 to -350 (+ rail / 0 / - rail, Bipolar configuration)
Setpoint Resolution: 10mV
Effective Resolution(2): < 0.05% of FS(3)
Setpoint Accuracy(4): ± 0.1% of FS(3)
Transient Time(5): < 1ms (10% to 90% at a step to Vrated)
Ripple(7)(peak-peak): < 0.55% of FS(3)
Current Mode (CC)
Range: from 0 to ± 110% of Irated (see models table)
Setpoint Resolution: 10mA
Effective Resolution(2): < 0.05% of FS(3)(< 0.1% models 7.5 & 10)
Setpoint Accuracy(4): ± 0.2% of FS(3)
Transient Time(5): < 1ms (10% to 90% at a step to Irated)
Ripple(7)(peak-peak): < 0.7% of FS(3)
Power Mode (CP)
Range: from 0 to ± 200%(8) of Prated (see models table)
Derived current setpoint: Psetpoint / Vmeasured
Setpoint Resolution: 1W
Effective Resolution(2): < 0.1% of FS(3)(< 0.25% models 7.5 & 10)
Setpoint Accuracy(4): ± 0.4% of FS(3)
Transient Time(5): < 2.5ms (10% to 90% at a step to Prated)
Resistance Mode (CR)
Range: from 0.1 to 1000 Ohm
Derived current: Vmeasured / Rsetpoint
Setpoint Resolution: 0.01 Ohm
Setpoint Accuracy(4): ± 0.2% of FS(3)
Transient Time(5): < 2ms (10% to 90% at a step to Rrated)

OVERLOAD/OVERCURRENT

Admissible AC overcurrent: 125% of rated value during 10 minutes, 150% during 1 minute, 200% during 2 seconds
Admissible overloads: 125% of rated value during 10 minutes, 150% during 1 minute, 200% during 2 seconds

To view the complete datasheet, scan the following QR code

Models

EL+ vAC/DC

Reference	AC Power Rated[9]	AC Current Rated[9] RMS 3 channels / 1 channel	DC Power Rated[9]	DC Current Rated[9] RMS 3 channels / 1 channel	Weight (kg) (lbs)	Dimensions DxWxH (mm) (inch)
EL+7.5 vAC/DC	7.5 kW	11 A / 33A	7.5 kW	±10A / ±30A	155 kg 341.71 lbs	770 x 450 x 1100 mm 30.31 x 17.71 x 43.30 "
EL+10 vAC/DC	10 kW	15 A / 45 A	10 kW	±15A / ±45A		
EL+15 vAC/DC	15 kW	22 A / 66 A	15 kW	±20A / ±60A		
EL+20 vAC/DC	20 kW	29 A / 87 A	20 kW	±25A / ±75A		
EL+30 vAC/DC	27 kW	40 A / 120 A	27 kW	±30A / ±90A		
EL+40 vAC/DC	40 kW	58 A / 174 A	40 kW	±40A / ±120A	200 kg 440.92 lbs	
EL+50 vAC/DC	50 kW	73 A / 219 A	50 kW	±50A / ±150A		
EL+60 vAC/DC	54 kW	80 A / 240 A	54 kW	±57A / ±171A		
EL+80 vAC/DC	80 kW	116 A / -	80 kW	±105A / ±315A	400 kg 881.84 lbs	870 x 875 x 1320 mm 34.25 x 34.44 x 51.97 "
EL+100 vAC/DC	100 kW	145 A / -	100 kW	±130A / ±390A		
EL+120 vAC/DC	108 kW	157 A / -	108 kW	±130A / ±390A		
EL+160 vAC/DC	145 kW	211 A / -	145 kW	±155A / ±465A	680 kg 1499.14 lbs	850 x 900 x 2000 mm 33.46 x 35.43 x 78.74 "
EL+200 vAC/DC	160 kW	232 A / -	160 kW	±185A / ±555A		

*For EL mode is not available a physical 3 channel/1 channel switch. To work in a single phase mode, it's necessary to introduce a monphasic grid at the output.
**All specifications are subject to change without notice.

Galvanic Isolation

		Circuit Breaker Recommended	Weight (kg) (lbs)
Inside the cabinet	IT 7.5i	Type C - 25 A	145 kg 319.67 lbs
	IT 10i	Type C - 25 A	
	IT 15i	Type C - 32 A	
	IT 20i	Type C - 40 A	
	IT 30i	Type C - 50 A	195 kg 429.90 lbs
	IT 40i*	Type C - 63 A	
	IT 50i*	Type C - 83 A	

*In the **IT 40i** and **IT 50i** models the size of the cabinet increases to a total of 770 x 835 x 1100 mm (27.55 x 32.87 x 43.31"). The others keep the original size.

		Circuit Breaker Recommended	Weight (kg) (lbs)	Dimensions D x W x H (mm) (inch)
In external cabinet IP20	IT 30e	Type D - 80 A	174 kg 383.60 lbs	595 x 415 x 708 mm 23.42 x 16.33 x 27.87 "
	IT 40e	Type D - 100 A	217 kg 478.40 lbs	725 x 525 x 773 mm 28.54 x 20,67 x 30.43 "
	IT 50e	Type D - 125 A	280 kg 617.29 lbs	
	IT 60e	Type D - 160 A	381 kg 839.96 lbs	875 x 600 x 900 mm 34.44 x 23.62 x 35.43 "
	IT 80e	Type D - 200 A	435 kg 959.01 lbs	
	IT 100e	Type D - 250 A	458 kg 1009.72 lbs	
	IT 120e	Type D - 315 A	514 kg 1133.18lbs	
	IT 160e	Type D - 400 A	612 kg 1349.23 lbs	964 x 648 x 1252 mm 37.95 x 25.51 x 49.29 "
	IT 200e	Type D - 500 A	753 kg 1660.10 lbs	1192 x 744 x 1430 mm 46.92 x 29.29 x 56.29 "

Configuration Modes

EL+ AC | PHiL DC | PHiL AC | DC

Master / Slave

Parallel				in AC modes (GE & EL)
Parallel	Serial	Serial Parallel		in DC mode

Channel Configuration in EL

3 channels | * 1 channel

*For 1-channel configuration contact us.

Channel Configuration in DC

3 channels | 1 channel | Bipolar | Unipolar

Regenerative Power Electronic Solutions

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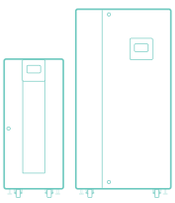


B2C ePlus

Bidirectional DC Converter

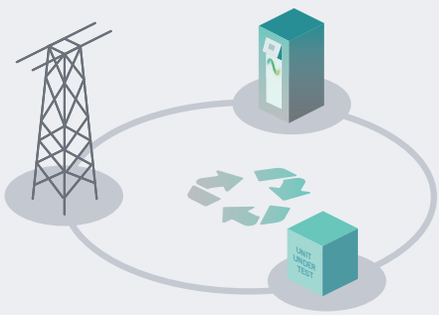
cinergia

B2C+ is CINERGIA's solution for Regenerative and Bidirectional DC Test Platforms. Thanks to its unique flexibility, it can be used in multiple applications: Renewable Energy Sources, Energy Storage Systems, Battery Testing and Characterization, Electrical Vehicles, EV Charging Infrastructure, Traction Converters and Avionics.

Regenerative Technology

Thanks to our bi-directional topology, the Bidirectional DC Converter B2C+ are regenerative, resulting in a reduction of both the consumed energy during the tests and the power required from the electrical installation.

This technology allows us to work in both directions, as power generators or offering a consumption for the realization of all types of tests.



Main Applications

Electromobility | Smart Grids | Avionics | Photovoltaic | Power HiL | Energy Storage System

Bidirectional and Regenerative

Clean grid current
THDi <3% and PF > 0.98

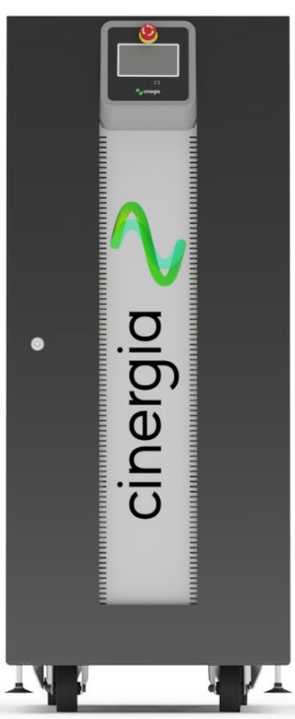
2 Quadrants and 4 Quadrants Configuration

13 Models
from 7.5kW to 160kW

Voltage Range
up to 800V and 1500V

Parallelization of units to increase the power

Overload of 200% P_{rated}



Battery Pack Testing (included)

Battery Emulation (option)

PV Panel Emulation (option)

Automated Test profiles
(csv file)

Power Amplifier Mode
for PHiL applications

Modbus/Ethernet Open protocol, Labview drivers

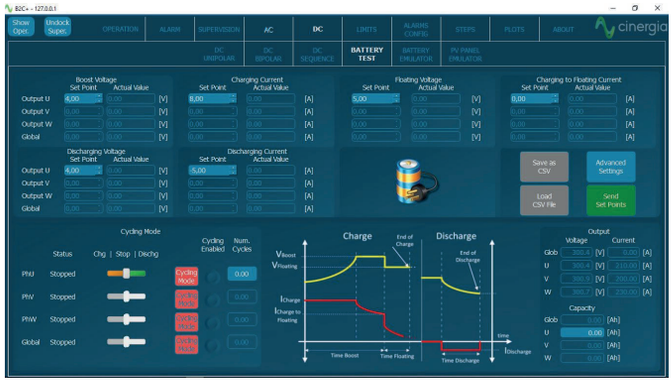
Advanced DC Applications

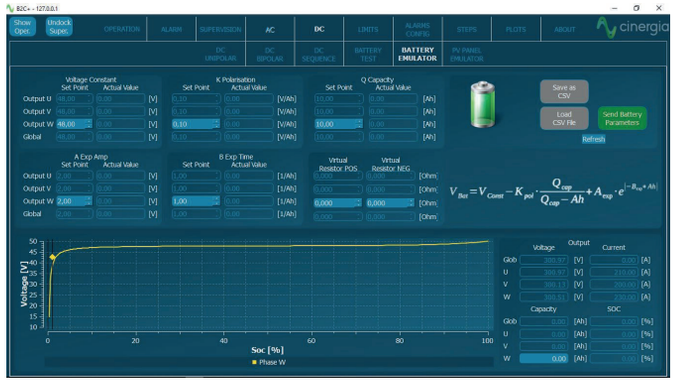
BATTERY PACK TESTING / CYCLING

Enables the user to precisely control the charge, discharge and cycling of a Battery. Basic parameters include the charge/discharge current, fast charge and floating voltages while Advanced parameters add Energy (Ah) and Time as transition conditions. Profiles for each Battery technology can be saved and imported in .CSV files.

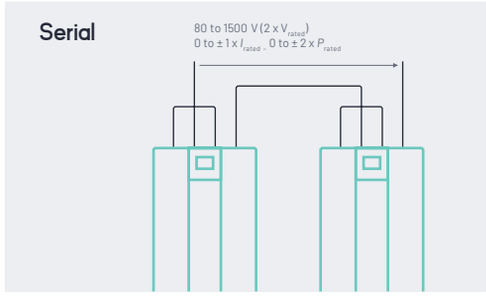
BATTERY EMULATION

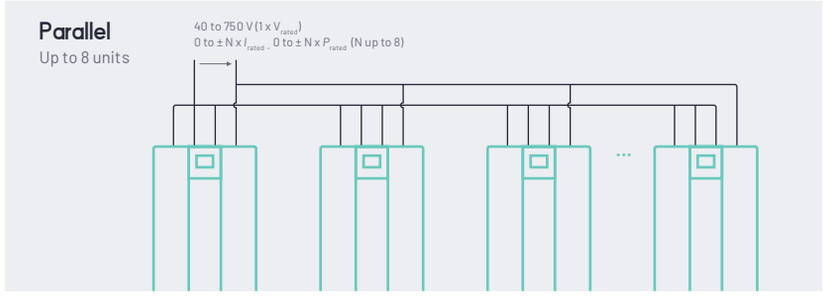
The B2C+ integrates a mathematical model to emulate the voltage behaviour of a real battery pack. The output voltage will change as a function of the SOC and Current. By configuring the provided parameters, the voltage profile can be adjusted to match different technologies: LiIon, NiMH, NiCd, Pb, Flux, etc.

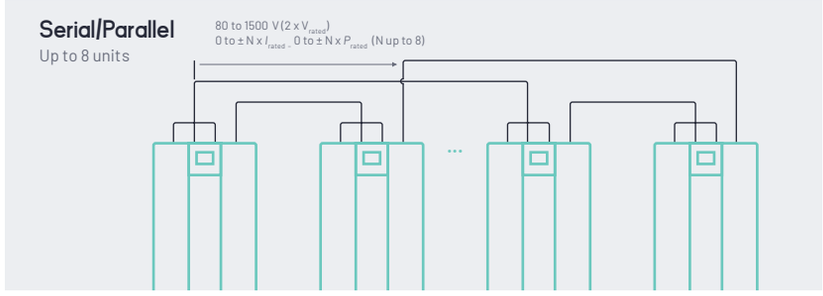




Master/Slave Connection Possibilities







INPUT SIDE (GRID SIDE)

AC Voltage
Rated: 3x400Vrms +Neutral+ Earth
Range: +15% / -20%
Rated AC Current
Depends on model (see Wiring Manual)
Frequency
48-62 Hz
Current Harmonic Distortion
THDi < 3% at rated power
Current Power factor
PF > 0.98 at rated power
Current Power factor
89% (7.5 & 10), 91% (15 to 30), 92% (40 to 200)

OUTPUT SIDE IN DC (EUT SIDE)

Terminals
Number: 4 (3 phases + 1 neutral)
Configuration of Channels
Unipolar 3-channels 2Q, independent setpoints per channel
Unipolar 1-channel 2Q, one global setpoint for all channels
Multichannel: 2Q, independent start/stop, operation mode and setpoints per channel (note: multichannel is an option for ≥ 80kVA)
Bipolar (4Q two independent setpoints)
Voltage Mode (CV)
Range: 2Q: 20[1] to 750V (800V with High Voltage option) 4Q: 0 to +350V / 0 to -350 (+ rail / 0 / - rail, Bipolar configuration)
Setpoint Resolution: 10mV
Effective Resolution[2]: < 0.05% of FS[3]
Setpoint Accuracy[4]: ± 0.1% of FS[3]
Transient Time[5]: < 1ms (10% to 90% at a step to Vrated)
Ripple[7] (peak-peak): < 0.55% of FS[3]
Current Mode (CC)
Range: from 0 to ± 110% of Irated (see models table)
Setpoint Resolution: 10mA
Effective Resolution[2]: < 0.05% of FS[3] (< 0.1% models 7.5 & 10)
Setpoint Accuracy[4]: ± 0.2% of FS[3]
Transient Time[5]: < 1ms (10% to 90% at a step to Irated)
Ripple[7] (peak-peak): < 0.7% of FS[3]
Power Mode (CP)
Range: from 0 to ± 200%[8] of Prated (see models table)
Derived current setpoint: Psetpoint / Vmeasured
Setpoint Resolution: 1W
Effective Resolution[2]: < 0.1% of FS[3] (< 0.25% models 7.5 & 10)
Setpoint Accuracy[4]: ± 0.4% of FS[3]
Transient Time[5]: < 2.5ms (10% to 90% at a step to Prated)
Resistance Mode (CR)
Range: from 0.1 to 1000 Ohm
Derived current: Vmeasured / Rsetpoint
Setpoint Resolution: 0.01 Ohm
Setpoint Accuracy[4]: ± 0.2% of FS[3]
Transient Time[5]: < 2ms (10% to 90% at a step to Rrated)

OPERATION MODES

DC
Programmable Current (CC)
Power Amplifier (HiL)
Programmable Voltage (CV)
Programmable Power (CP)
Programmable Resistance (CR)
Steps
Battery Testing (BTest) (charge/discharge/cycling) optional
Battery Emulation (Bemu) optional
PV Panel Emulation (PVEmu) optional

OVERLOAD/OVERCURRENT

Admissible DC overcurrent is: 110% of rated value during 1 minute
Admissible overloads: 125% of rated value during 10 minutes, 150% during 1 minute, 200% during 2 seconds

USER INTERFACE

Local Control (4.3" Touchscreen panel)
Isolated Digital port: 6 inputs, 4 outputs
Isolated Analogue port: 6 inputs (rms setpoints or power amplifier), 6 outputs (rms readback or real-time readback)
Interlock port: 1 NC Input, 1 NO Output
Emergency Stop pushbutton
Remote Control Port
LAN Ethernet with Open Modbus-TCP protocol
RS485 (option), CAN and RS232 (using external gateway)
Software
Graphical User Interface for Windows 7/10
LabView drivers and open Labview interface example
Master/Slave Operation
Connection: fiber optics link (x6)
Configuration: from software user interface/MODBUS
up to 8 units: AC: parallel

PROTECTIONS

Overvoltage (peak, rms), Overcurrent (peak, rms), Overload Shortcircuit, Emergency Stop, Watchdog, Heart Beat, Output Contactor, Wrong Configuration
Alarms and Limits are user confi gurable and can be saved in a password protected EEPROM

MESURAMENTS

Grid Voltage (rms), Current (rms), Power (P,Q) and Frequency
Output Voltage (rms, avg), Current (rms, avg), Power (P,Q) and Frequency
Heatsink Temperatures (x2) and DC Link Voltage
Datalogging available through FTP connection

AMBIENT

Operating temperature[8]: 5-40°C
Relative Humidity: up to 95%, non-condensing
Cooling: Forced air
Acoustic noise at 1m: < 52dB(A) (7.5 to 60), < 65dB(A) (80 to 120), < 70dB(A) (160 and 200)

To view the complete datasheet, scan the following QR code

Models

B2C

Reference	DC Power Rated[9]	DC Voltage Normal Range / HV Option	DC Current Rated 3 channels Unipolar Mode	DC Current Rated 1 channel Unipolar Mode	DC Current Rated +/0/- Bipolar 40 Mode	Weight (kg) (lbs)	Dimensions DxWxH (mm) (inch)
B2C+7.5	7.5 kW	30-750 / 800 V	±10 A	±30 A	±10 A	155 kg 341.71 lbs	770 x 450 x 1100 mm 30.31 x 17.71 x 43.30 "
B2C+10	10 kW	30-750 / 800 V	±15 A	±45 A	±15 A		
B2C+15	15 kW	30-750 / 800 V	±20 A	±60 A	±20 A		
B2C+20	20 kW	30-750 / 800 V	±25 A	±75 A	±25 A		
B2C+30	27 kW	30-750 / 800 V	±30 A	±90 A	±30 A		
B2C+40	40 kW	30-750 / 800 V	±40 A	±120 A	±40 A	200 kg 440.92 lbs	
B2C+50	50 kW	30-750 / 800 V	±50 A	±150 A	±50 A		
B2C+60	54 kW	30-750 / 800 V	±57 A	±171 A	±57 A		
B2C+80	80 kW	30-750 / 800 V	±105 A	±315 A	±105 A	320 kg 705.48 lbs	870 x 590 x 1320 mm 34.25 x 23.22 x 51.97 "
B2C+100	100 kW	30-750 / 800 V	±130 A	±390 A	±130 A		
B2C+120	108 kW	30-750 / 800 V	±130 A	±390 A	±130 A		
B2C+160	145 kW	30-750 / 800 V	±155 A	±465 A	±155 A	680 kg 1499.14 lbs	850 x 900 x 2000 mm 33.46 x 35.43 x 78.74 "
B2C+200	160 kW	30-750 / 800 V	±185 A	±555 A	±185 A		

All specifications are subject to change without notice.

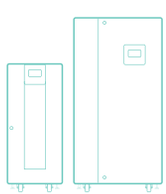
Galvanic Isolation

		Circuit Breaker Recommended	Weight (kg) (lbs)
Inside the cabinet	IT 7.5i	Type C - 25 A	145 kg 319.67 lbs
	IT 10i	Type C - 25 A	
	IT 15i	Type C - 32 A	
	IT 20i	Type C - 40 A	
	IT 30i	Type C - 50 A	195 kg 429.90 lbs
	IT 40i*	Type C - 63 A	
	IT 50i*	Type C - 83 A	

*In the **IT 40i** and **IT 50i** models the size of the cabinet increases to a total of 770 x 835 x 1100 mm (27.55 x 32.87 x 43.31 "). The others keep the original size.

		Circuit Breaker Recommended	Weight (kg) (lbs)	Dimensions D x W x H (mm) (inch)
In external cabinet IP20	IT 30e	Type D - 80 A	174 kg 383.60 lbs	595 x 415 x 708 mm 23.42 x 16.33 x 27.87 "
	IT 40e	Type D - 100 A	217 kg 478.40 lbs	725 x 525 x 773 mm 28.54 x 20,67 x 30.43 "
	IT 50e	Type D - 125 A	280 kg 617.29 lbs	
	IT 60e	Type D - 160 A	381 kg 839.96 lbs	875 x 600 x 900 mm 34.44 x 23.62 x 35.43 "
	IT 80e	Type D - 200 A	435 kg 959.01 lbs	
	IT 100e	Type D - 250 A	458 kg 1009.72 lbs	
	IT 120e	Type D - 315 A	514 kg 1133.18lbs	
	IT 160e	Type D - 400 A	612 kg 1349.23 lbs	964 x 648 x 1252 mm 37.95 x 25.51 x 49.29 "
	IT 200e	Type D - 500 A	753 kg 1660.10 lbs	1192 x 744 x 1430 mm 46.92 x 29.29 x 56.29 "

High Power Platforms Examples



Model	Unit Power	Nº Units	Total Power
B2C+80	80 kW	2	160 kW
B2C+120	108 kW	2	216 kW
B2C+160	145 kW	2	290 kW
B2C+200	160 kW	2	320 kW
B2C+160	145 kW	3	435 kW
B2C+200	160 kW	4	640 kW
B2C+200	160 kW	6	960 kW
B2C+200	160 kW	8	1280 kW

Configuration Modes

DC | PHiL DC

Master / Slave

Parallel | Serial | Serial Parallel — in DC mode

Channel Configuration in DC

3 channels | 1 channel | Bipolar | Unipolar

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