cinergia

cinergia

Control
Intel.ligent
de l'energia

GENERAL PRESENTATION
January, 2017

The Company

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Who we are:

CINERGIA is an engineering company that provides high technology products and services in the field of electrical power conversion. Our areas of expertise are:

- Power electronics
- Digital control for power conversion
- Industrial communications and Automation

Our engineering team has the knowledge and experience to customize our solutions to the needs of our customers.

We provide solutions in:

- Smart Grids
- Electromobility
- Test equipment for R&D and Industrial laboratories

The company

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Founded on 2008

The original activity was focused in the **Engineering Services** and **Custom Power Electronics** developments. In 2011 the development of the **Standard Product** line for laboratories started. In 2013 the Standard Product Line started to be commercialized and in 2014 the distributors and sales representatives were appointed.

Experience in power electronics R&D

CINERGIA is the result of **more than ten years of experience** in the conception, design, manufacture and commissioning of customized power electronics solutions. Firstly, developing power converters for third parties in a R&D center of the Polytechnical University of Catalonia (UPC). Afterwards, in CINERGIA, developing our own product line.

Industrial partnership

With SALICRU, a UPS manufacturer that developed the power hardware platform used in CINERGIA's standard product line. The control system hardware and software are property of CINERGIA and have been developed in-house to perform different applications.

The company today

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Engineer's company

CINERGIA's professional team is formed by 12 people, 10 of them Electrical, Control and Computing Engineers. Our technical team has the experience and knowledge to provide high technology customized solutions.

Distributors

We have distributors in Spain, UK, Germany, France, Italy, Netherlands, Belgium, Luxemburg, Austria, Switzerland, Israel, China, Singapore and India.

International market

The main market of CINERGIA is outside Spain. We are glad to have customers in Italy, UK, Netherlands, Sweden, Finland, France, Germany, Serbia, Mexico, USA, Canada, Singapore, Abu Dhabi, Saudi Arabia...

>3660kVA of power supplied

Since 2014 when the Standard Product catalogue was officially launched.

Why choose CINERGIA?

Robust equipment

All products are based on an on-line UPS power hardware, designed to work 24h per day / 7 days per week / 365 days per year.

Regeneration of energy

All models are regenerative producing economical savings by reducing the energy consumed from the grid and the power installation.

Flexibility and adaptation to future needs

Flexible devices with the possibility of upgrading the power or functionality to attend future necessities in the research and test

Quality at a competitive price

The use of an industrial UPS as the power platform allows CINERGIA to provide high quality solutions at a competitive budget.

Involvement with our clients

Our team will work close to you for the adaptation of the products to the needs of the application and to provide support during its use.

Some of our clients

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

University of Novi Sad

Some of our clients

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Valeo

Enel

Jofemar

THE UNIVERSITY OF WARWICK

acciona

UNIVERSITEIT GENT

ÉCOLE POLYTECHNIQUE MONTRÉAL

COMSA EMTE

MetaSystems

Applus IDIADA

VTT Technical Research Centre of Finland
Corporation

VTT

European Commission
JOINT RESEARCH CENTRE
The European Commission's in-house science service

a-eberle

cinergia

Some of our clients

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Some of our clients

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Contact us

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

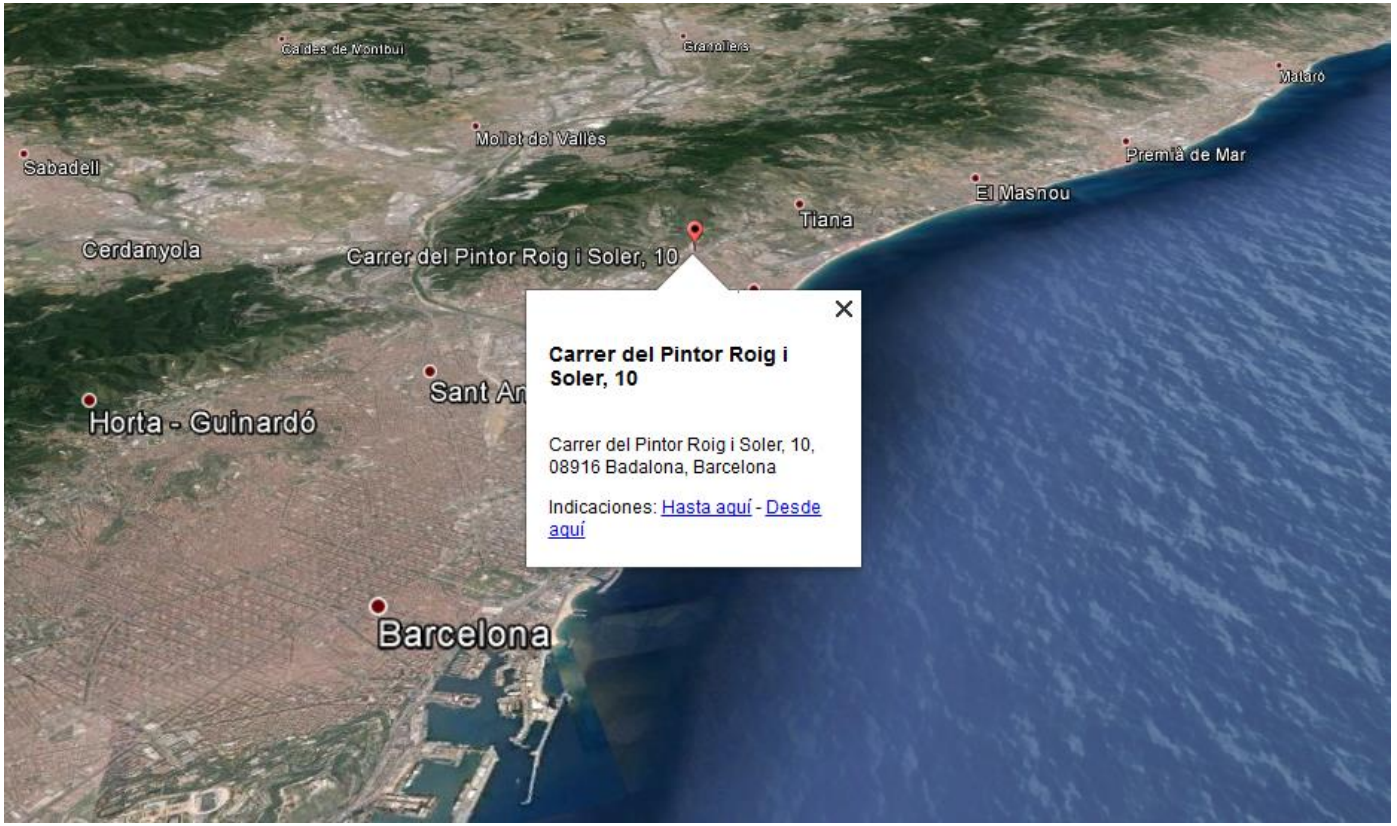


Image from Google Earth

www.cinergia.coop
cinergia@cinergia.coop
+34 934864358

c/ Pintor Roig I Soler, 10
08916, Badalona
BARCELONA, Spain

Standard Product Line: main characteristics

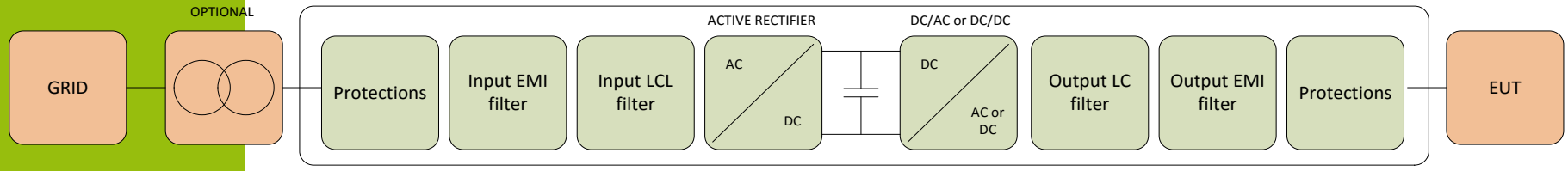
All products are based on the **same power and control hardware platform.** The different models are created by using a specific firmware, developed in-house and property of CINERGIA

Bidirectional power flow hardware: **the energy can be regenerated** to the grid producing energy savings and decreasing the power demand

Power range from **7.5 to 200kVA**

Input current current: **sinusoidal, PF>0.99** (controllable) with low harmonic distortion **(THDi < 3%)**.

Regenerative Power Hardware



Back-to-back topology

Grid-side (input) converter: An Active Rectifier regulates the voltage at the DC-link while sinks/sources sinusoidal current in/to the AC-grid

EUT-side (output) converter: a DC-AC inverter or DC-DC converter controls the output voltage / current / power / frequency

Regenerative Power Hardware: AC units

	AC only		
	≤400Hz	>400Hz	AC&DC
Voltage Source	GE-AC	-	GE-AC&DC
Current Source	EL-AC	EL-AC800	EL-AC&DC

The GE is a Voltage Source converter: generates and controls the voltage magnitude and frequency. **The current will depend on the EUT (Equipment Under Test)**.

The EL is a Current Source converter: generates and controls the current magnitude and phase delay (or power or impedance). **The voltage and frequency will be imposed by the EUT**.

Regenerative Power Hardware: DC units

	DC only				AC&DC	
	DCPS	EL-DC	B2C	BE	GE-AC&DC	EL-AC&DC
Constant Voltage	√	√	√	√	√	√
Constant Current	√	√	√		√	√
Constant Power	√	√	√		√	√
Constant Resistance		√	√			√
Battery Charge			√			
Battery Emulation				√		

DC units can operate as voltage sources (controlling voltage magnitude) or current sources (controlling current magnitude) depending on the chosen operation mode.

Regenerative Power Hardware: AC&DC units

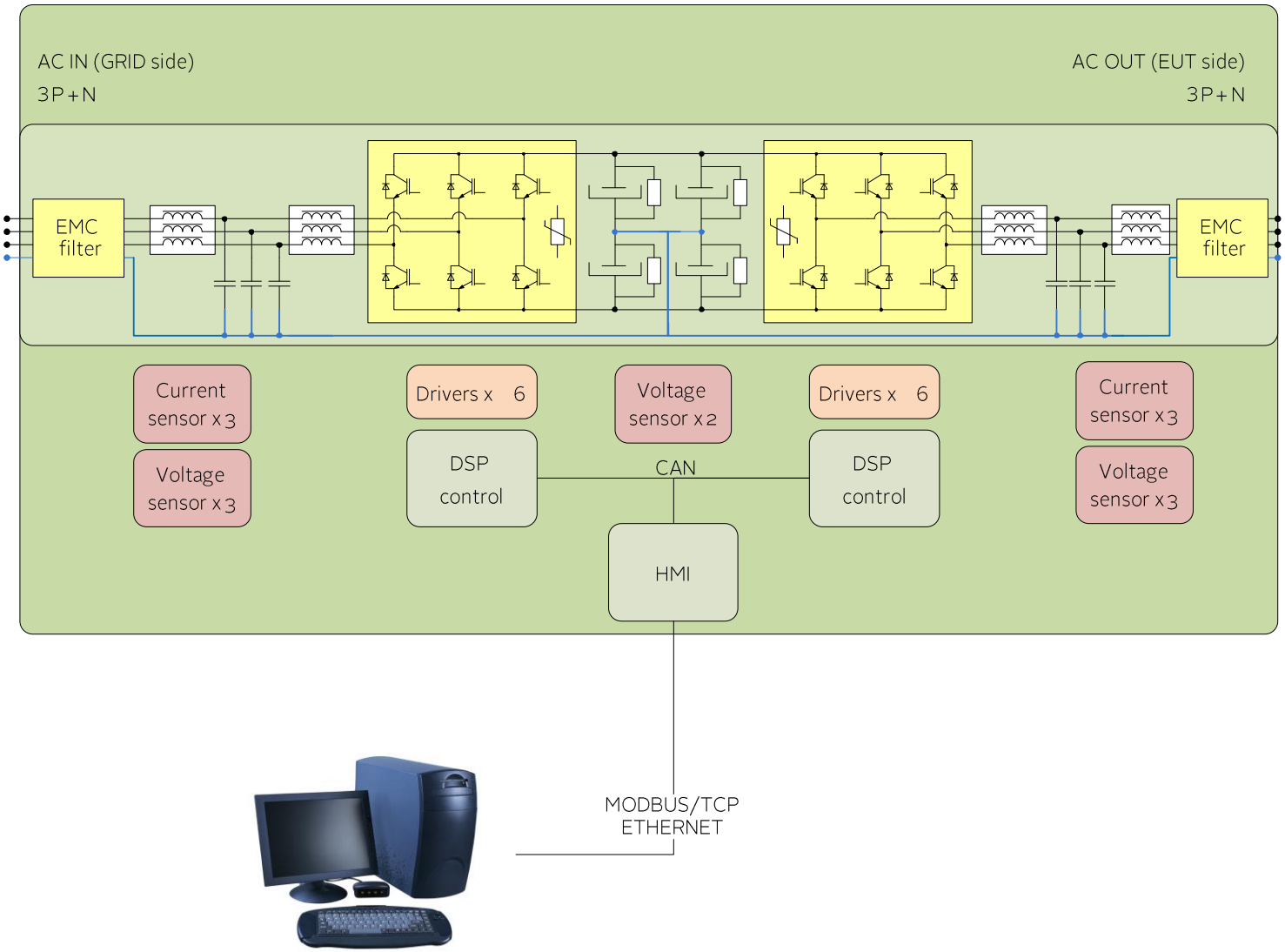
AC&DC units allow either the AC or DC operation (*)in a single cabinet at a very competitive price.

The Grid Emulator AC&DC will allow the operation as an AC Grid Emulator, in AC mode, or as a DCPS, in DC mode. It is therefore a voltage source power supply in AC.

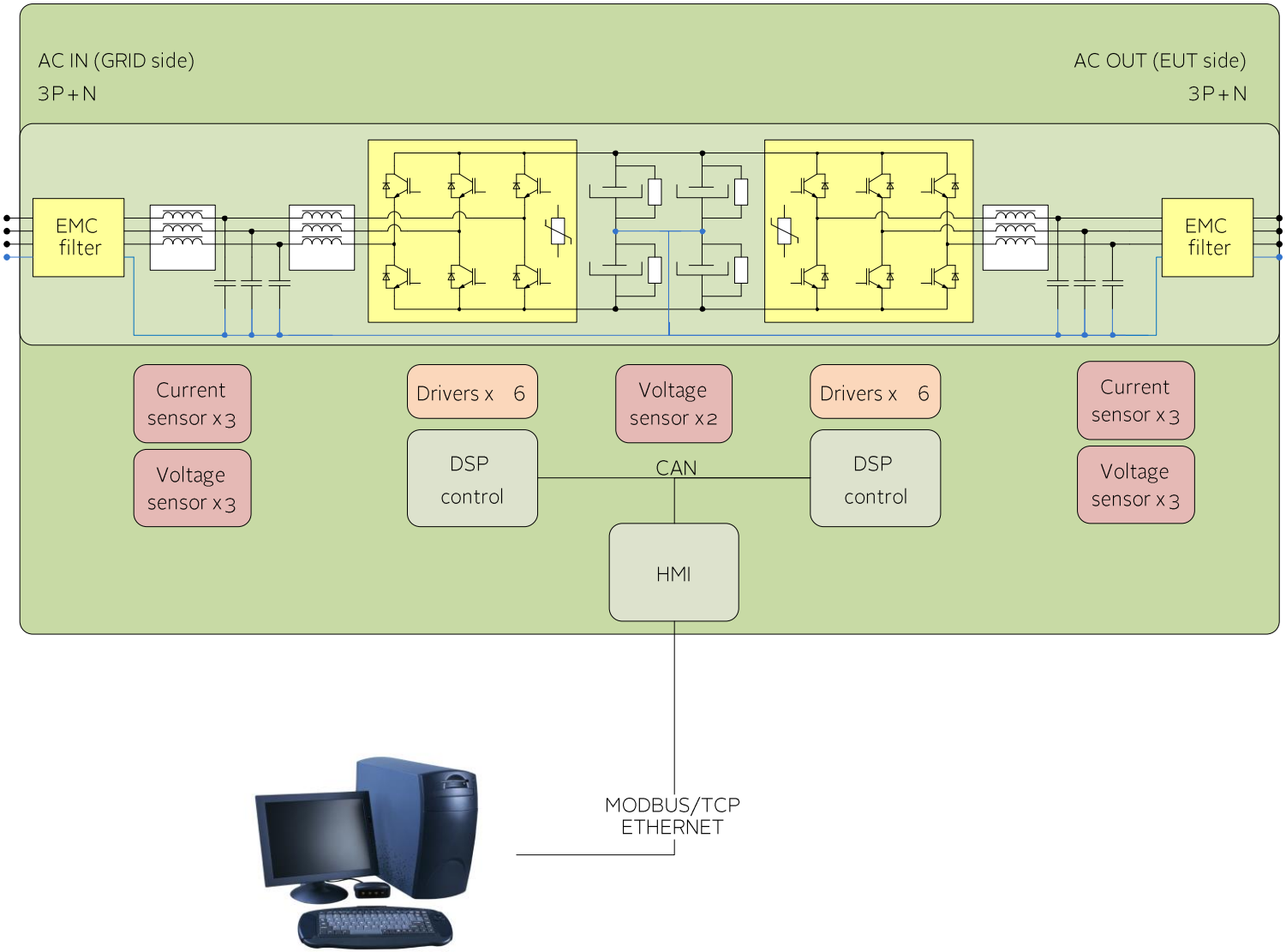
The Grid Emulator AC&DC will allow the operation as an AC Grid Emulator, in AC mode, or as a DCPS, in DC mode. It is therefore a voltage source power supply in AC.

(*) AC+DC operation at the same time is not possible

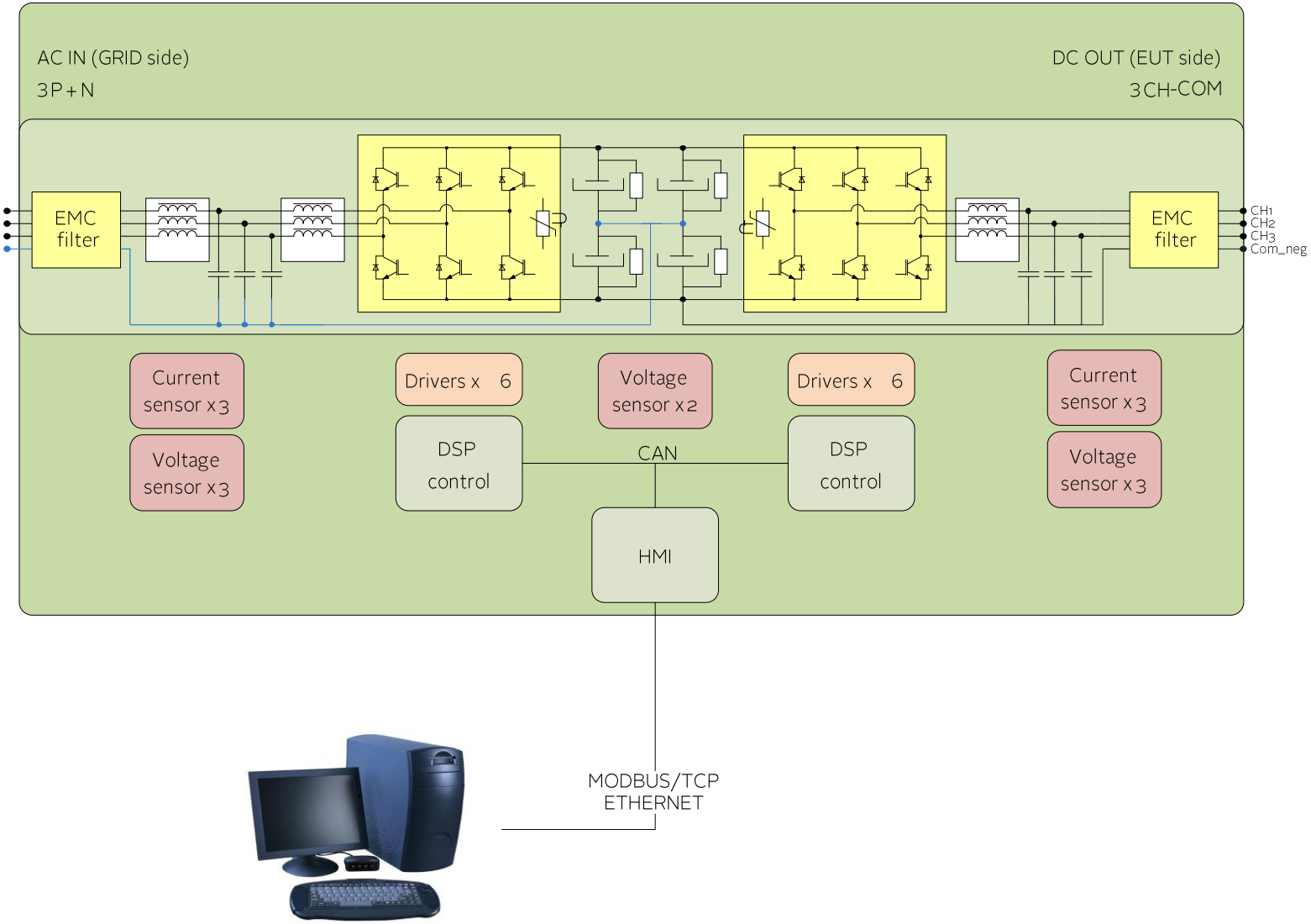
Regenerative Power Hardware: AC version (EL)



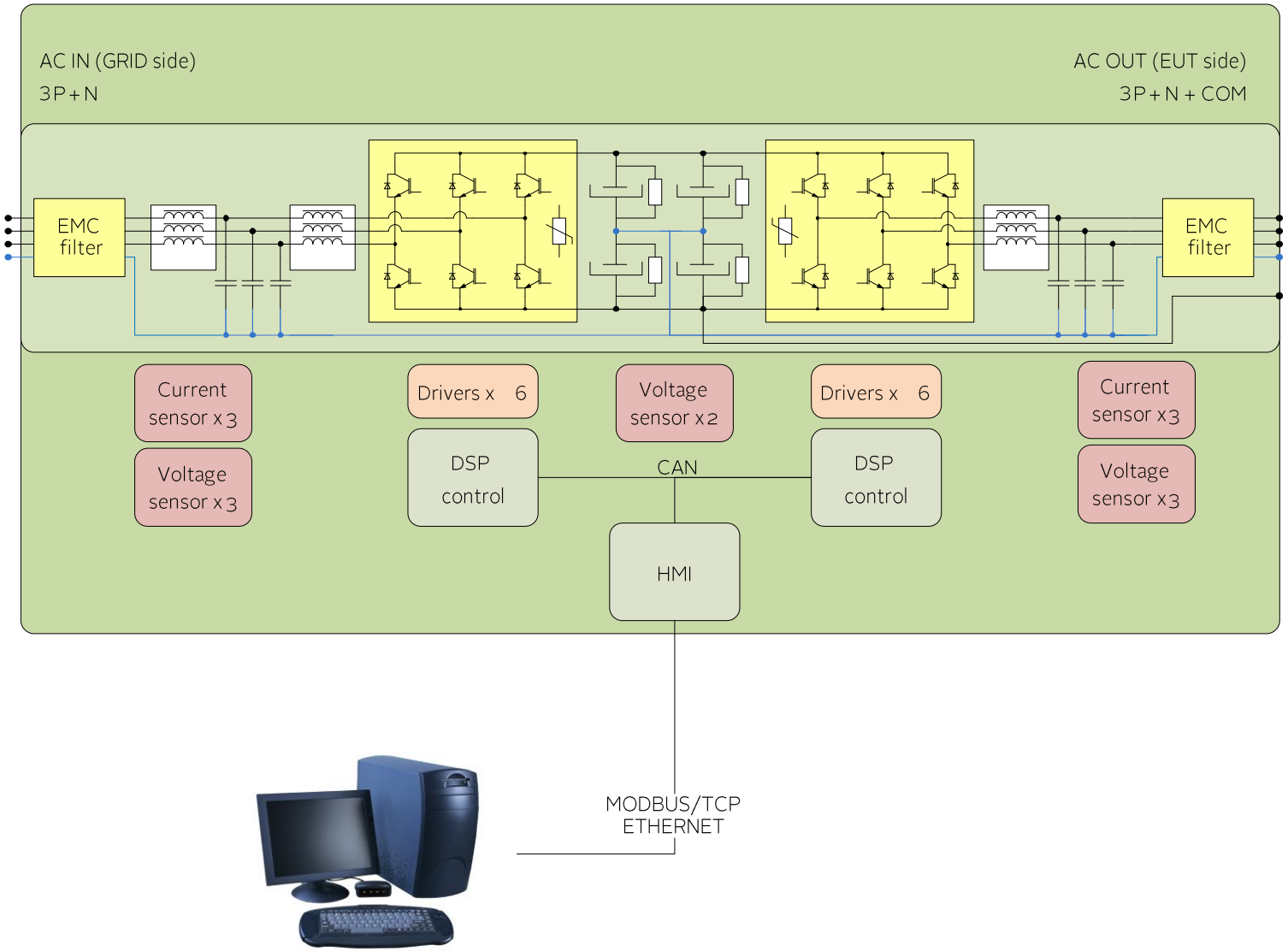
Regenerative Power Hardware: AC version (GE)



Regenerative Power Hardware: DC version



Regenerative Power Hardware: AC&DC version



GRID EMULATOR

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Grid emulators are designed to emulate Electrical Grids in AC and DC (optional). The equipment is 4 quadrant regenerative so the energy can be re-injected to the power grid.

As an AC programmable voltage source, It can create different electrical networks:

- Three phase power grid (3F+N) from 0 to 480Vac
- Power grid with variable frequency from 0 to 400Hz
- 400Hz Aeronautic network
- (optional) DC Voltage Source from -750 to 750Vdc

It can also create disturbances for testing purposes as:

- Voltage harmonics, up to 15th independent per phase
- Flickers (programmable amplitude and frequency)
- Overvoltage
- Interruptions and voltage dips (balanced and unbalanced)
- Programmable variations in frequency
- Programmable Z Impedance of grid

GRID EMULATOR

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Typical applications:

- AC “clean” power source, programmable V, f and phase
- Testing of electric and electronic equipment under special conditions: 60 Hz, 400 Hz; 110 Vrms , 127 Vrms
- Test of electric and electronic equipment against electrical disturbances (inverters, UPS, battery chargers, rectifiers, transformers, etc…)
- PCC (point of common coupling) emulation
- Research of control algorithms for electrical microgrids and smartgrids
- Aircraft grid tests & disturbances
- DC voltage source (optional): photovoltaic panels, batteries...

Note:

The functionality of AC and DC equipment in the same unit is an option and will be quoted separately

Range

REFERENCE	RATED kVA	kW	RATED CURRENT AC rms / phase	AC rms / parallel	WEIGHT kg	DIMENSIONS DxWxH (mm)
GE7.5	7.5	6.75	10A	30A	100	770x450x1100
GE10	10	9	15A	45A	100	
GE15	15	13.5	20A	60A	102	
GE20	20	18	25A	75A	105	
GE30	30	27	40A	120A	150	
GE40	40	36	50A	150A	175	
GE50	50	45	65A	195A	185	
GE60	60	54	80A	240A	185	
GE80	80	72	105A	315A	265	880x590x1320
GE100	100	90	130A	390A	290	
GE120	120	108	155A	465A	290	
GE160	160	128	185A	555A	540	850x900x2000
GE200	200	160	230A	690A	550	

Note:
The functionality of AC and DC equipment in the same unit is an option and will be quoted separately

ELECTRONIC LOAD

Electronic loads are designed to test electric and electronic equipment in linear and non-linear AC and DC loading. The product range of CINERGIA includes AC and DC Electronic Loads (different products).

AC Electronic Loads can emulate single phase and three phase (balanced and unbalanced, linear and non-linear) loads. The following operating modes are available:

- Constant Impedance (CI)
- Constant Current (CC) with harmonic definition
- Constant Power (CP)

DC Electronic Loads provide 3 channels that can work As independent loads or parallelized to increase the current. The following operating modes are available:

- Constant Resistance (CR)
- Constant Current (CC)
- Constant Power (CP)
- Constant Voltage (CV)

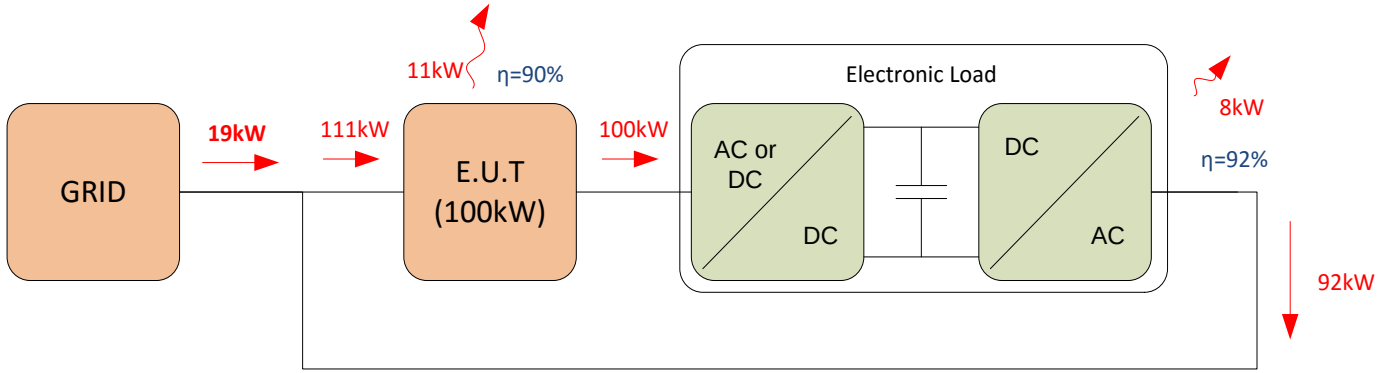
Note:

The functionality of AC and DC equipment in the same unit is an option and will be quoted separately

ELECTRONIC LOAD

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

CINERGIA electronic loads have energy recovery capability which allows **energy saving** during the tests by returning the energy to the power grid.



The re-injection/bidirectional capability also allows the **reduction of power contracted** to the Electrical company.

In the above example, it is shown that less than 20kW are needed to test a 100kW equipment producing more than 80% energy saving. Additional operative savings come from the reduction of time to prepare the test setup.

Range (AC-only)

REFERENCE	RATED kVA	RATED kW	RATED CURRENT AC rms / phase 3ch mode	RATED CURRENT AC rms 1ch mode	WEIGHT kg	DIMENSIONS DxWxH (mm)
EL7.5-AC	7.5	6.75	10A	30A	100	770x450x1100
EL10-AC	10	9	15A	45A	100	
EL15-AC	15	13.5	20A	60A	102	
EL20-AC	20	18	25A	75A	105	
EL30-AC	30	27	40A	120A	150	
EL40-AC	40	36	50A	150A	175	
EL50-AC	50	45	65A	195A	185	
EL60-AC	60	54	80A	240A	185	
EL80-AC	80	72	105A	315A	265	880x590x1320
EL100-AC	100	90	130A	390A	290	
EL120-AC	120	108	155A	465A	290	
EL160-AC	160	128	185A	555A	540	850x900x2000
EL200-AC	200	160	230A	690A	550	

Note:
The functionality of AC and DC equipment in the same unit is an option and will be quoted separately

Range (DC-only)

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

REFERENCE	RATED kVA	RATED kW	RATED CURRENT Independent 0-750V	Parallel 0-750V	Bipolar -350 to 350V	WEIGHT kg	DIMENSIONS DxWxH (mm)
EL7.5-DC	7.5	6.75	±10A	±30A	±10A	150	770x450x1100
EL10-DC	10	9	±15A	±45A	±15A	150	
EL15-DC	15	13.5	±20A	±60A	±20A	150	
EL20-DC	20	18	±25A	±75A	±25A	150	
EL30-DC	30	27	±30A	±90A	±30A	150	
EL40-DC	40	36	±38A	±115A	±38A	185	
EL50-DC	50	45	±47A	±140A	±47A	185	
EL60-DC	60	54	±57A	±180A	±57A	185	
EL80-DC	80	72	±105A	±315A	±105A	265	880x590x1320
EL100-DC	100	90	±130A	±390A	±130A	290	
EL120-DC	120	108	±130A	±390A	±130A	290	
EL160-DC	160	128	±155A	±465A	±155A	540	850x900x2000
EL200-DC	200	160	±185A	±555A	±185A	550	

Note:
The functionality of AC and DC equipment in the same unit is an option and will be quoted separately

DCPS: DC Power Source

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

CINERGIA's DC Programmable Power Supplies are regenerative power supplies designed to generate a controlled DC source or load. This equipment has energy recovery capability which allows saving energy by returning the energy to the mains (saves up to 92%).

The equipment includes 3 independent DC output channels. Each channel can be regulated independently or they can be parallelized for high current applications. The following operating modes can be selected by the user:

- Constant Voltage (CV)
- Constant Current (CC)
- Constant Power (CP)
- User defined points (I,V)
- Analogical inputs (I,V)

B2C: Bidirectional Battery Charger

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

The Bidirectional Battery Charger (B2C) is a regenerative AC/DC converter designed to generate a controlled DC output from 0 to 750V. Its main application is the charge and discharge of batteries, or other DC storage systems. Basically, it is a DCPS with special software for battery charge/discharge.

The equipment includes 3 independent DC output channels. Each channel can be regulated independently or they can be parallelized for high current applications. The following operating modes can be selected by the user:

- Battery Charge (BC)
- Constant Voltage (CV)
- Constant Current (CC)
- Constant Power (CP)
- User defined points (I,V)
- Analogical inputs (I,V)

BE: Battery Emulator

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

A Battery Emulator is a power electronics equipment that behaves as a real battery pack. CINERGIA's BE is based on a regenerative power DC supply. When emulating a battery charge, the energy will be injected back to the electrical grid consuming a sinusoidal current with unity power factor and low harmonic distortion. Using a BE will save space in the laboratory, avoiding safety issues of real batteries and allow a high flexibility in the tests.

Three DC channels:

-Independent control, allowing different battery emulation

-Parallel control, emulating the same battery and providing 3 times the current

Static mode: the emulated battery voltage will depend on the open-circuit voltage and internal charge and discharge resistances.

Dynamic mode: the emulated battery voltage will depend, additionally, on the SOC and the rate of discharge.

Range

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

REFERENCE	RATED kVA	RATED kW	RATED CURRENT Independent 0-750V	Parallel 0-750V	Bipolar -350 to 350V	WEIGHT kg	DIMENSIONS DxWxH (mm)
DCPS7.5	7.5	6.75	±10A	±30A	±10A	150	770x450x1100
DCPS10	10	9	±15A	±45A	±15A	150	
DCPS15	15	13.5	±20A	±60A	±20A	150	
DCPS20	20	18	±25A	±75A	±25A	150	
DCPS30	30	27	±30A	±90A	±30A	150	
DCPS40	40	36	±38A	±115A	±38A	185	
DCPS50	50	45	±47A	±140A	±47A	185	
DCPS60	60	54	±57A	±180A	±57A	185	
DCPS80	80	72	±105A	±315A	±105A	265	880x590x1320
DCPS100	100	90	±130A	±390A	±130A	290	
DCPS120	120	108	±130A	±390A	±130A	290	
DCPS160	160	128	±155A	±465A	±155A	540	850x900x2000
DCPS200	200	160	±185A	±555A	±185A	550	

Range

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

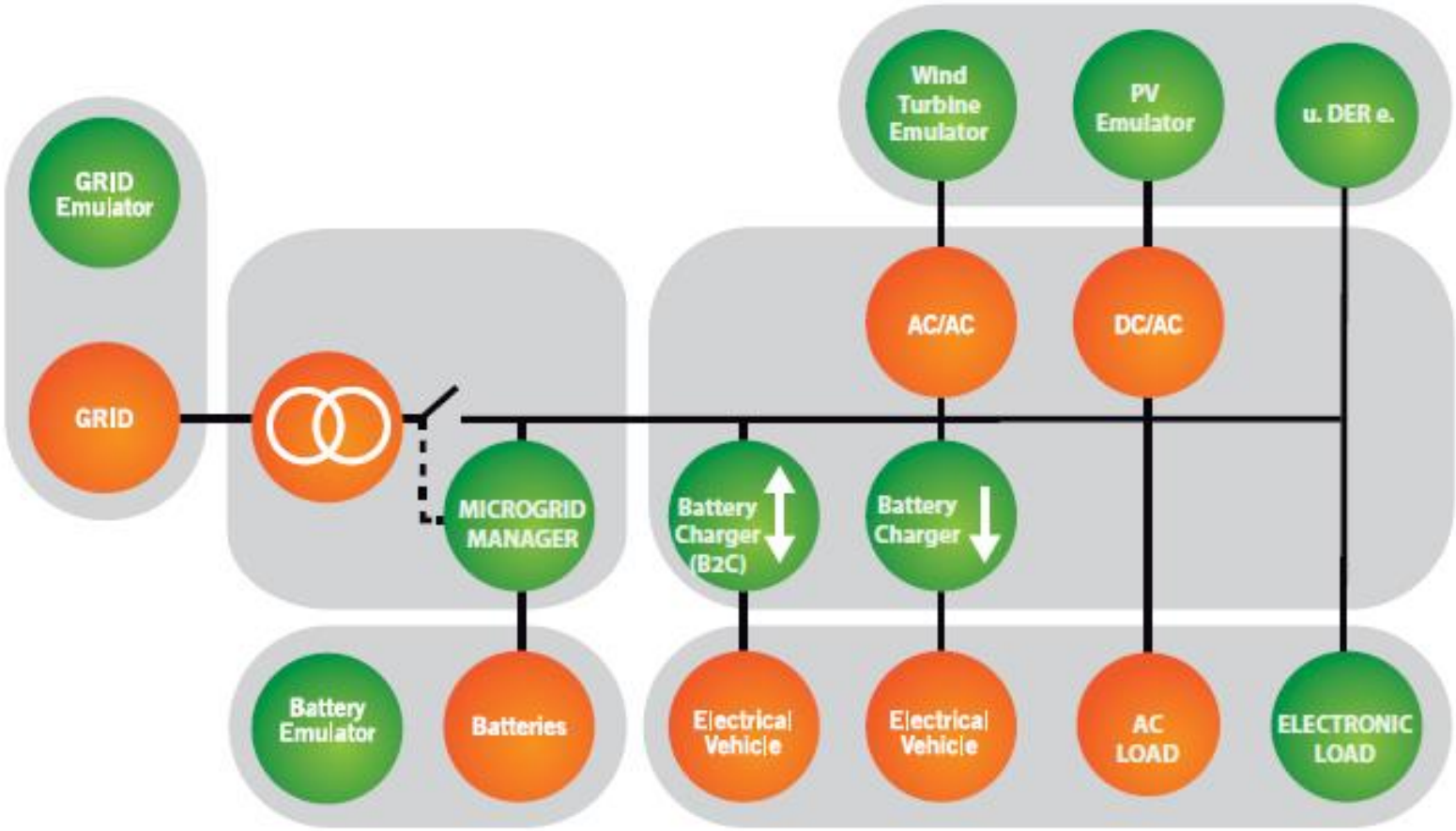
REFERENCE	RATED kVA	RATED kW	RATED CURRENT Independent 0-750V	Parallel 0-750V	Bipolar -350 to 350V	WEIGHT kg	DIMENSIONS DxWxH (mm)
B2C7.5	7.5	6.75	±10A	±30A	±10A	150	770x450x1100
B2C10	10	9	±15A	±45A	±15A	150	
B2C15	15	13.5	±20A	±60A	±20A	150	
B2C20	20	18	±25A	±75A	±25A	150	
B2C30	30	27	±30A	±90A	±30A	150	
B2C40	40	36	±38A	±115A	±38A	185	
B2C50	50	45	±47A	±140A	±47A	185	
B2C60	60	54	±57A	±180A	±57A	185	
B2C80	80	72	±105A	±315A	±105A	265	880x590x1320
B2C100	100	90	±130A	±390A	±130A	290	
B2C120	120	108	±130A	±390A	±130A	290	
B2C160	160	128	±155A	±465A	±155A	540	850x900x2000
B2C200	200	160	±185A	±555A	±185A	550	

Range

REFERENCE	RATED kVA	RATED kW	RATED CURRENT Independent mode 0-750V	RATED CURRENT Parallel mode 0-750V	WEIGHT kg	DIMENSIONS DxWxH (mm)
BE7.5	7.5	6.75	±10A	±30A	150	770x450x1100
BE10	10	9	±15A	±45A	150	
BE15	15	13.5	±20A	±60A	150	
BE20	20	18	±25A	±75A	150	
BE30	30	27	±30A	±90A	150	
BE40	40	36	±38A	±115A	185	
BE50	50	45	±47A	±140A	185	
BE60	60	54	±57A	±180A	185	
BE80	80	72	±105A	±315A	265	880x590x1320
BE100	100	90	±130A	±390A	290	
BE120	120	108	±130A	±390A	290	
BE160	160	128	±155A	±465A	540	850x900x2000
BE200	200	160	±185A	±555A	550	

Smart Grid and Micro Grid platforms

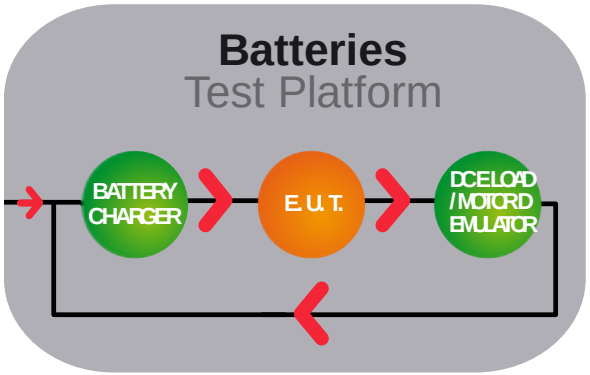
- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

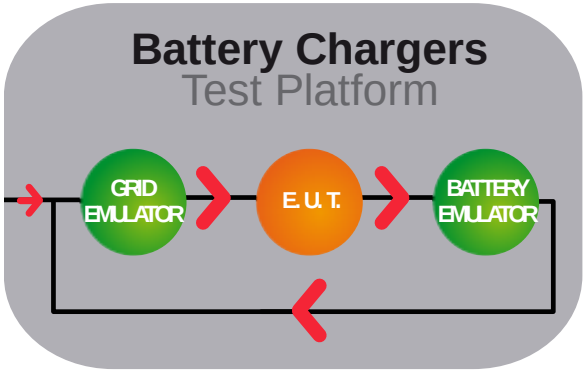


Smart Grid and Micro Grid solutions

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Platforms for testing batteries and battery chargers:





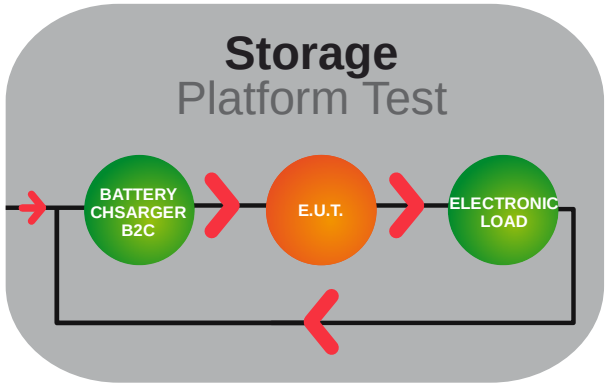
CINERGIA Products:

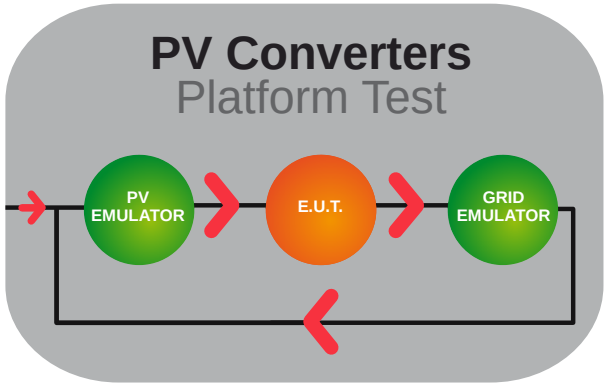
- Grid Emulator (GE)
- DC Electronic Loads (EL-DC) (emulation of traction)
- Battery Emulator (BE)
- Bidirectional Battery Chargers (B2C)

Smart Grid and Micro Grid solutions

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Platforms for testing Storage Systems and PV inverters:





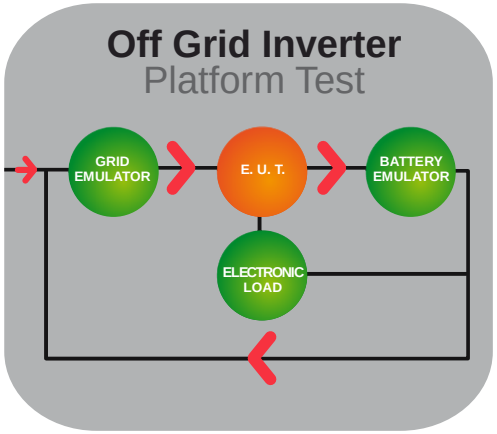
CINERGIA Products:

- Grid Emulator (GE-AC) (for Energy Storage Systems containing the Converter)
- DC Electronic Load (EL-DC)
- PV emulator (B2C with option)
- Bidirectional Battery Chargers (B2C)

Smart Grid and Micro Grid solutions

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Platforms for testing off grid inverters (battery inverter/chargers) or Energy Storage Systems (ESS) :



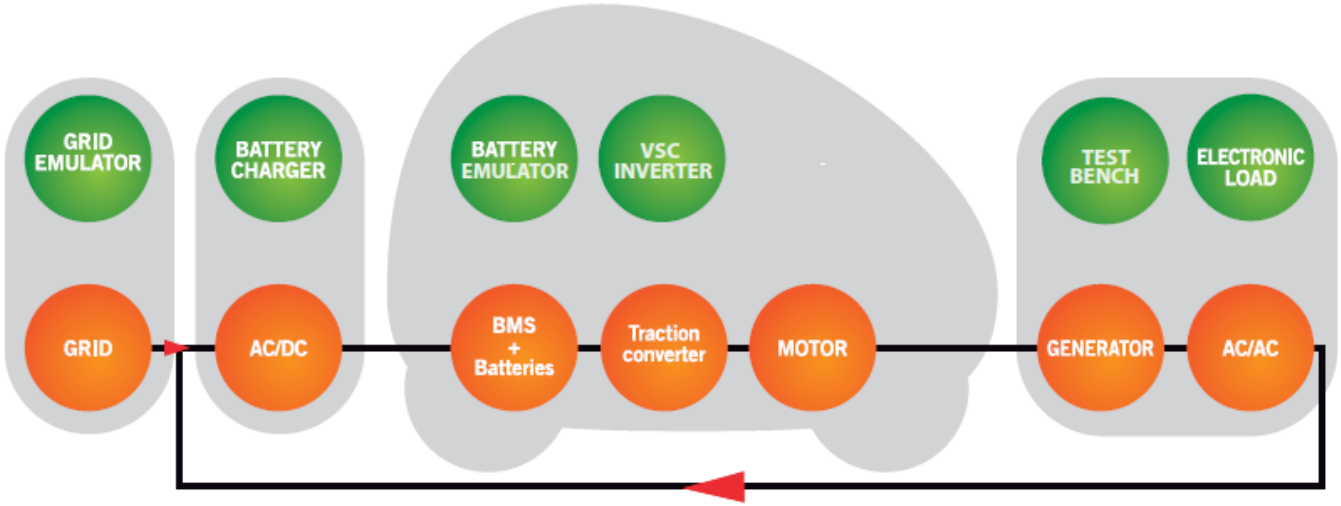
CINERGIA Products:

- Grid Emulator (GE)
- DC Electronic Loads (EL-DC)
- Battery emulator (BE)
- Bidirectional Battery Chargers (B2C)
- Microgrid Managers (MM)
- Universal DER emulator (EL-AC)

Electromobility solutions

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

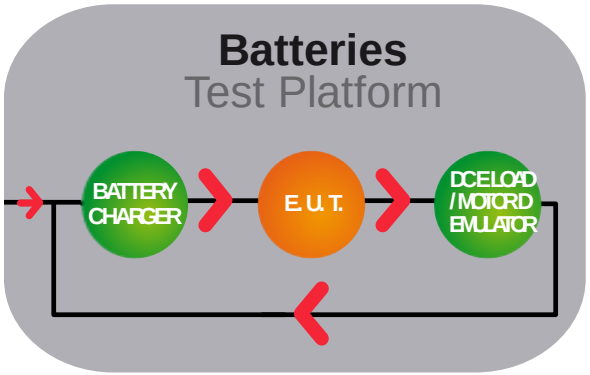
Electric Vehicle Lab:

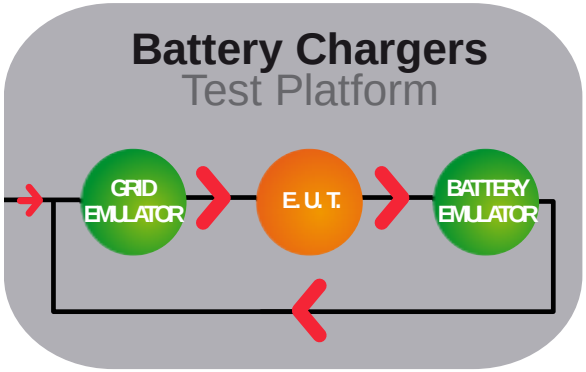


Electromobility solutions

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Platforms for testing batteries and battery chargers:



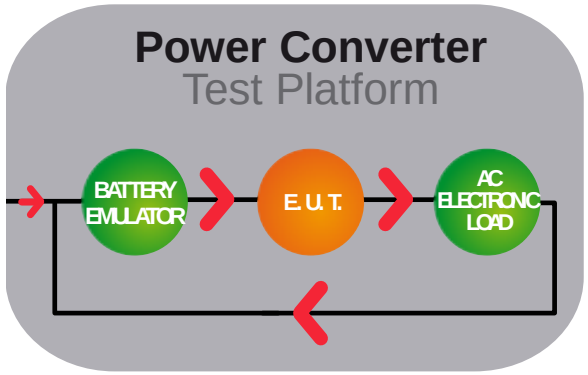


CINERGIA Products:

- Grid Emulator (GE)
- DC Electronic Loads (EL-DC) (emulation of traction)
- Battery Emulator (BE)
- Bidirectional Battery Chargers (B2C)

Electromobility solutions

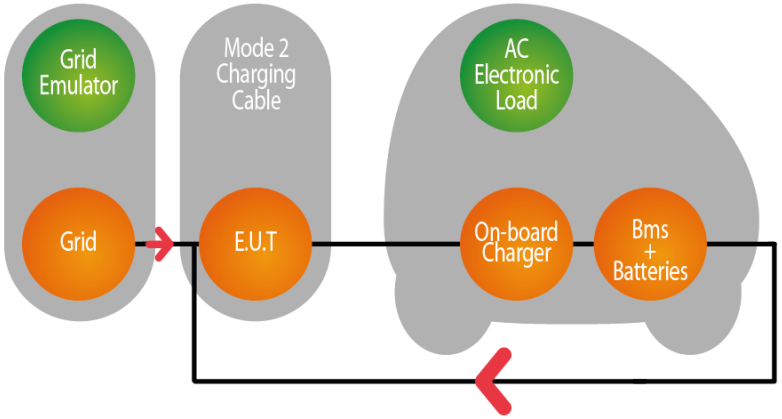
Platforms for testing traction converters:



CINERGIA products:

- AC Electronic Loads (EL-AC) (please, consult this application. Additional LC filters may be required)
- Battery Emulators (BE)

Platform for testing Charging Cables:



CINERGIA products:

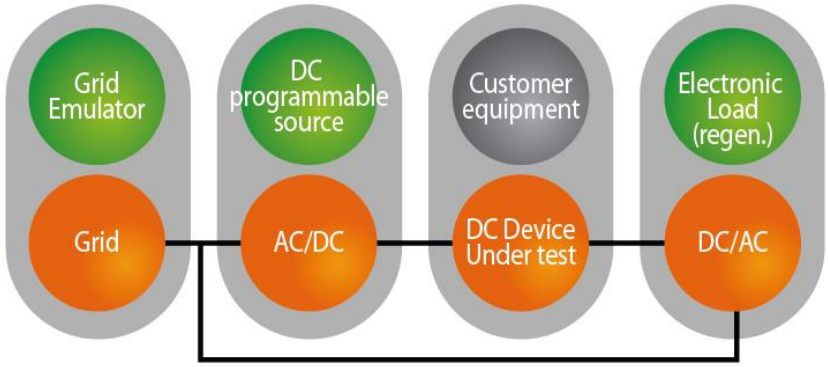
- Grid Emulator (GE)
- AC Electronic Load (EL-AC)

Equipment for Energy Test Platforms

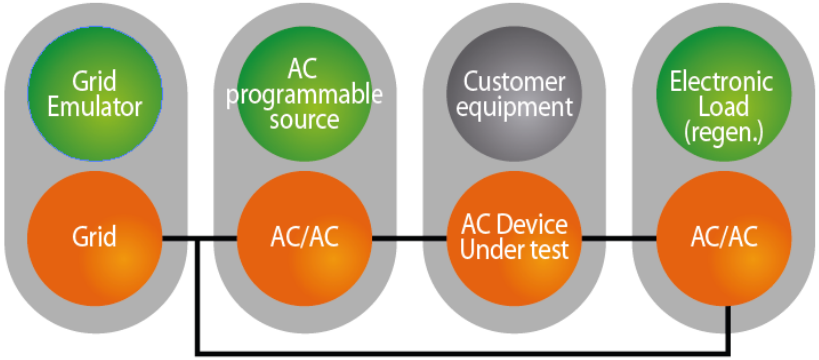
- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

Platforms for academic, R&D and Industrial Labs (R&D, production line, Quality and Certification):

DC platform

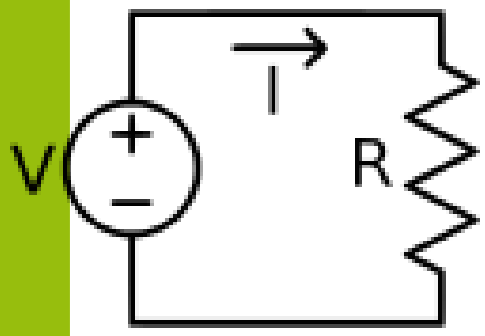


AC platform

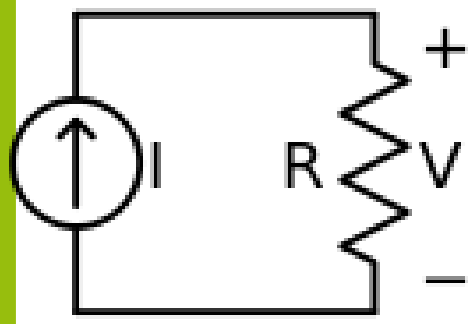


Voltage source or current source?

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters



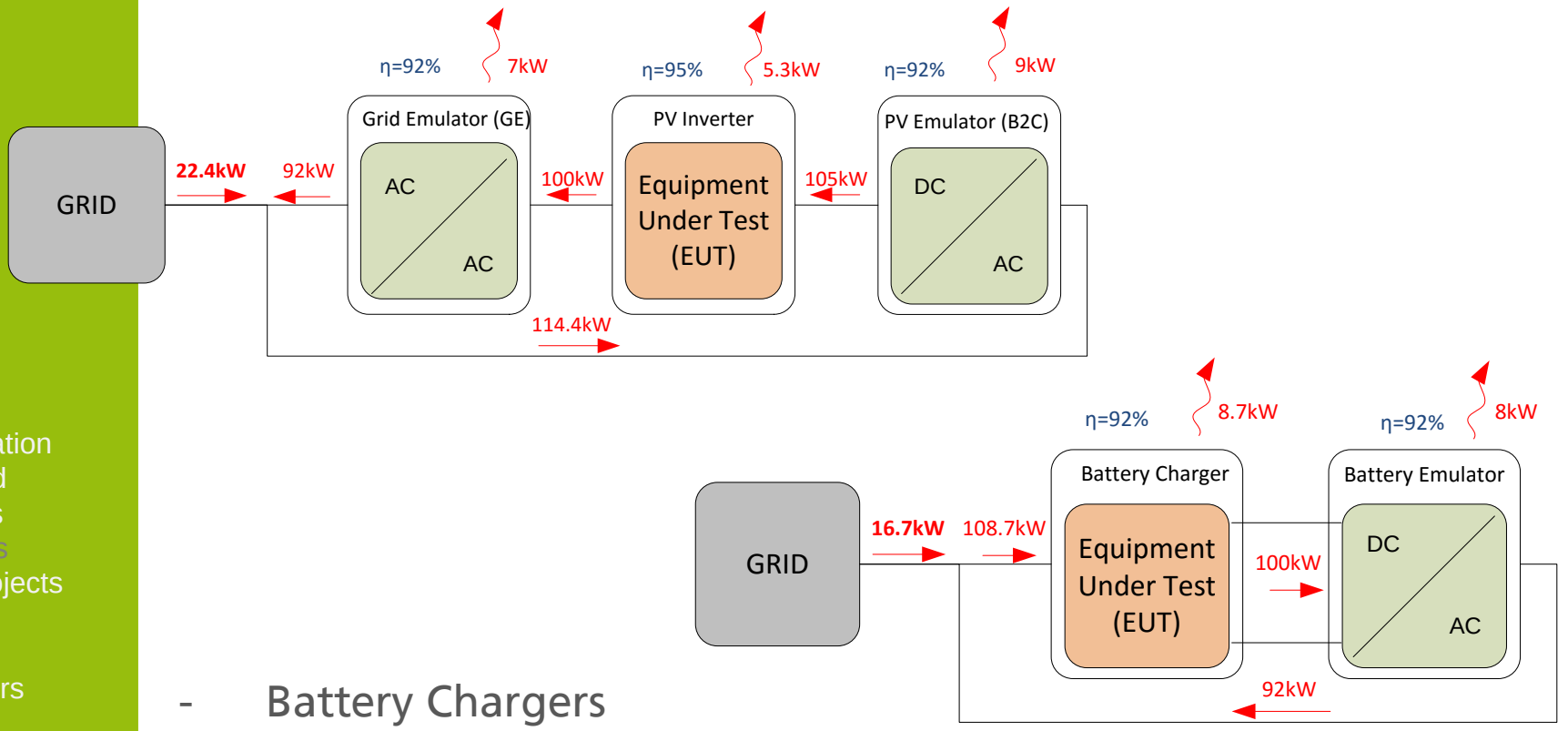
A controlled voltage source fixes the voltage (and frequency) even when the load changes. The Grid, a generator, batteries, UPS, power supplies, … are voltage sources. **To test a voltage source it is necessary a current source.**



A controlled current source fixes the current even when the voltage (and frequency) changes. Grid-tied inverters (PV, Eolic, Inverters/Chargers…) are current sources. **To test a current source it is necessary a voltage source.**

Note: parallel connection of voltage sources is not possible. Serial connection of current sources is not possible

Regenerative Voltage Source Applications

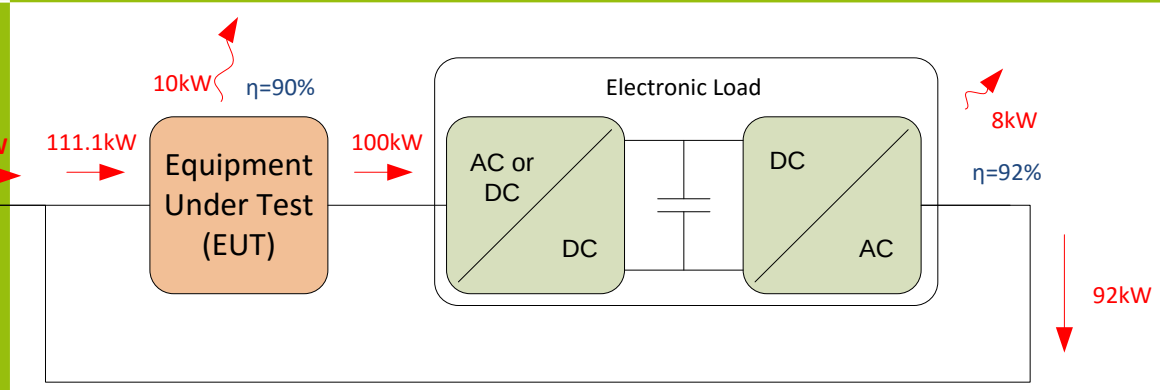


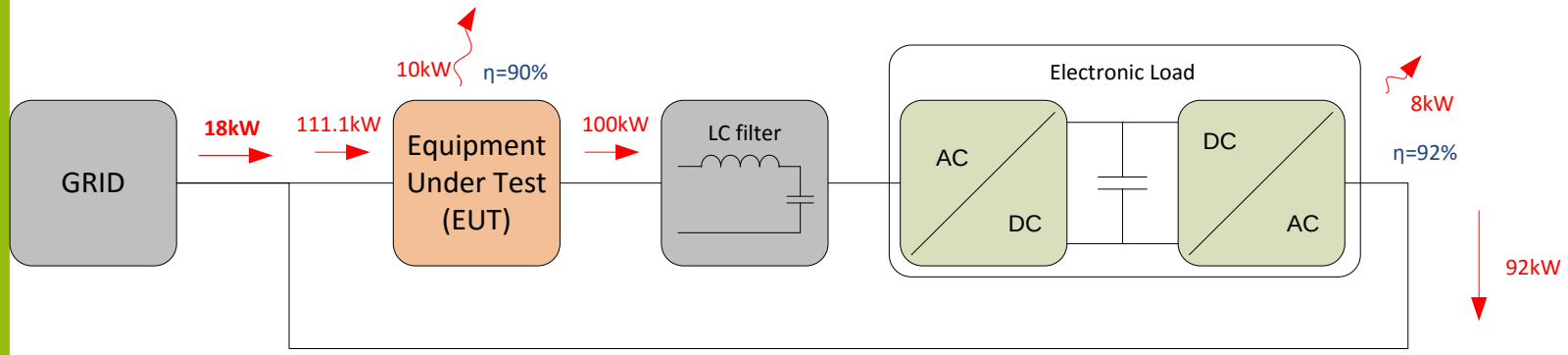
- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

- Battery Chargers
- Renewable Inverters (PV, Eolic)
- CHP, Diesel generators (grid-tied)
- Regenerative (Braking) Motor Inverters

Regenerative Current Source Applications

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters

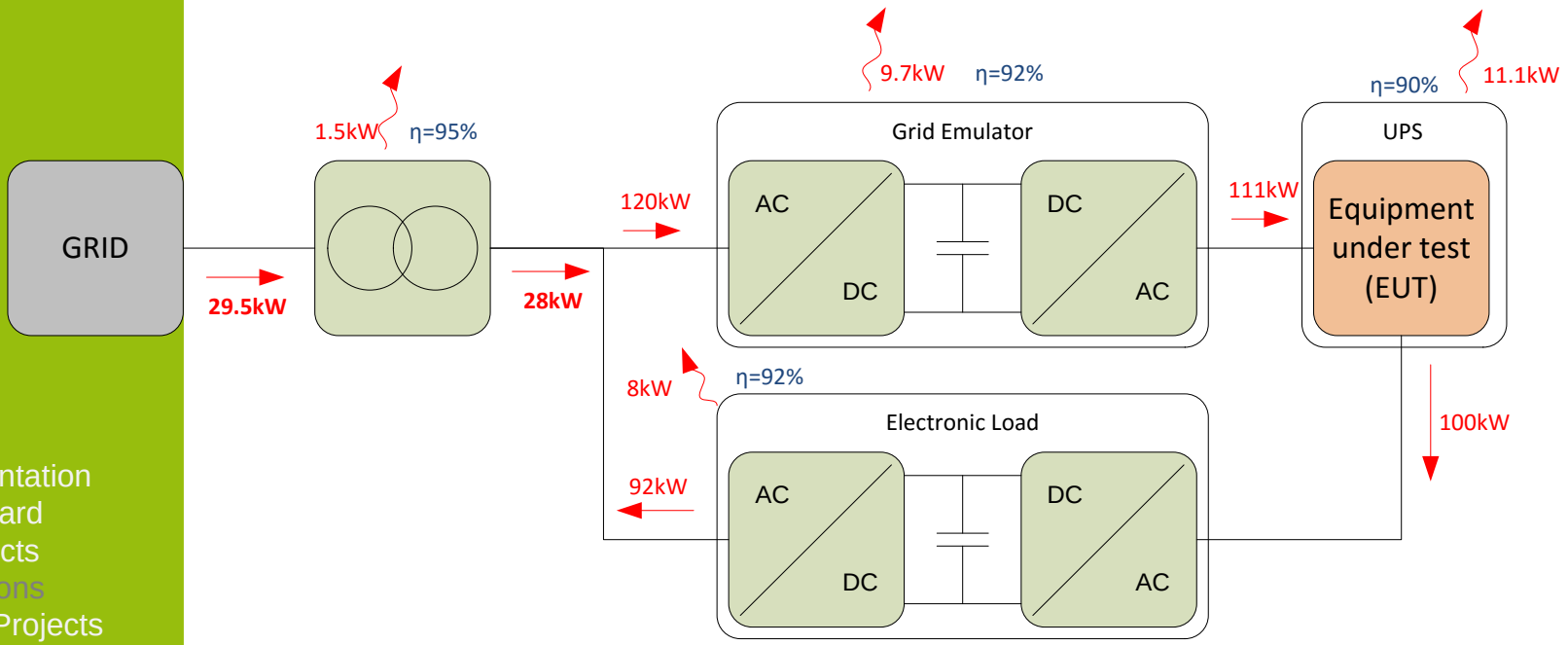


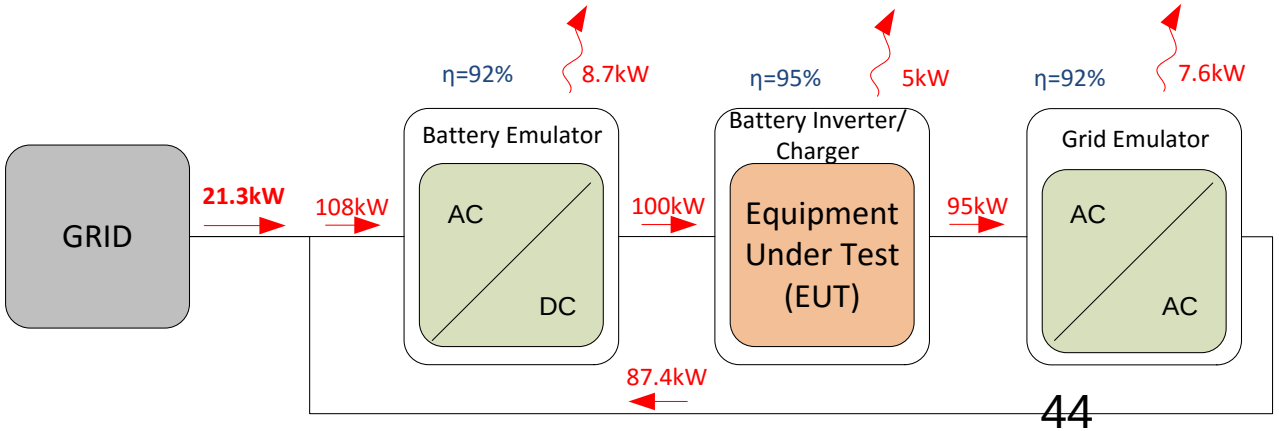


- UPS (AC or DC)
- Electrical Generators, Power Supplies
- Transformers, circuit breakers, fuses
- PWM Inverters

Voltage and Current Source Platforms

- Presentation
- Standard Products
- Solutions
- R&D Projects
- Services
- Custom converters





More information at:

www.cinergia.coop

cinergia@cinergia.coop