

EL – AC&DC Electronic Load

Electronic Loads are designed to test electric and electronic equipment in linear and non-linear AC and DC loading. Our electronic loads have energy recovery capability which allows energy saving during the tests by returning the energy to the power grid.

The main applications of Electronic Load are testing UPS, Renewable Inverters, AC and DC sources and electrical equipment (inductors, transformers, switches, fuses and circuit breakers) in Industrial and R&D environment. With the EL is possible to verify the functionality of the power source or the electrical equipment under test in normal and fault operation.

7.5kVA – 200kVA
Regenerative
Emulation of AC & DC loads
AC: 0-480Vrms 10-230Arms 40-400Hz
DC: 0-750V 10-230A

Functional description

The converter is composed by an Active Rectifier, a DC link, and 3 independent IGBT output branches with filters and sensors.

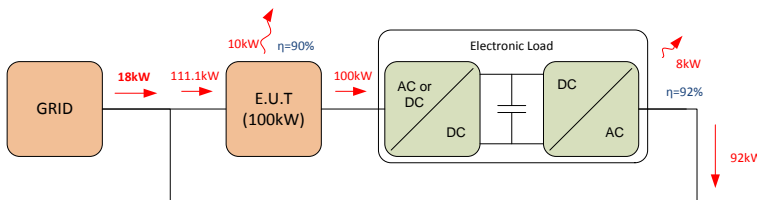
The output is configured to work in AC mode and (**optionally**) in DC mode. **In AC mode** the equipment can emulate single phase and three phase (balanced and unbalanced, linear and non-linear) loads. **In DC mode** option, one output channel can work in DC.

The following **operating modes** are available:

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

Regenerative equipment

The regenerative topology used in our electronic loads allows significant savings in test platforms.

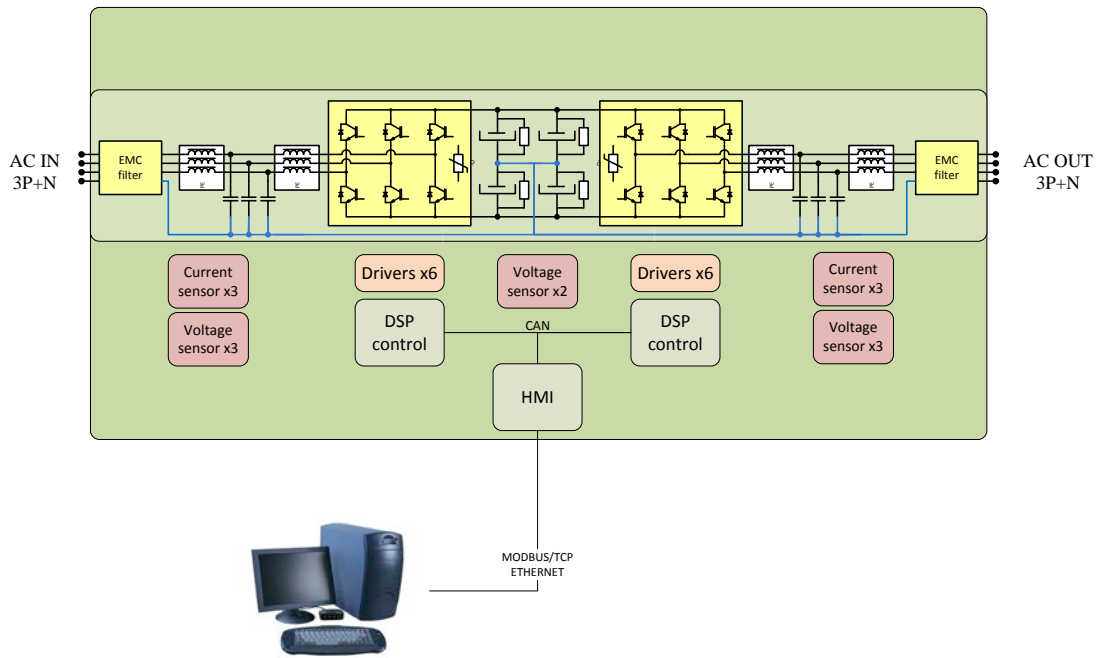


In the above example of application it is shown that only 18kW are needed to test 100kW equipment producing more than 80% energy saving. And the power installed in the grid only needs to be of 22kW to test an equipment of 100kW.



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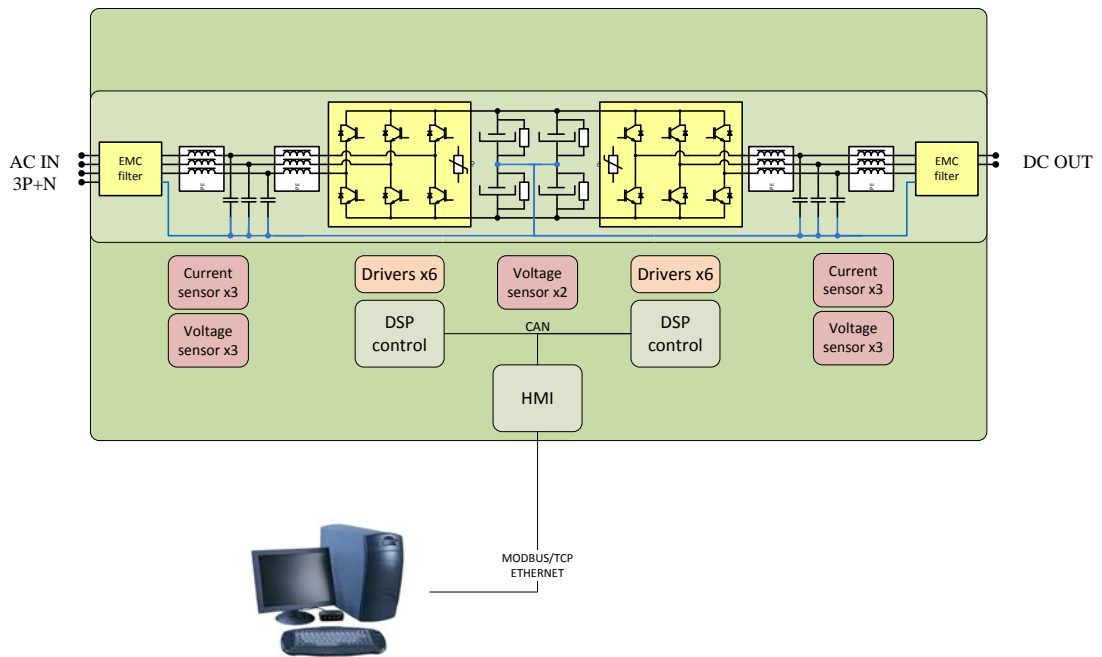
Technical Diagram – AC load



AC input is connected to the grid.

AC output is connected to the Equipment Under Test (EUT) and can be configured as three independent single-phase channels or three phase load.

Technical Diagram – DC load (optional)



AC input is connected to the grid. DC output consists in 1 single channel.

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AC load emulation (optional AC & DC)

The equipment has predefined functions in order to simplify operation:

CONSTANT IMPEDANCE

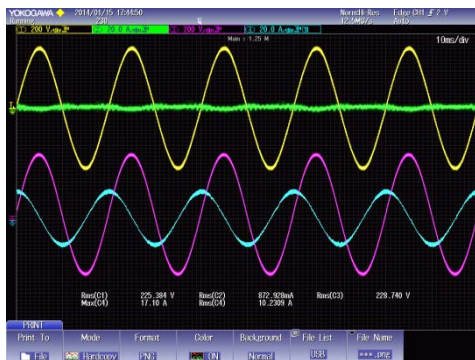
The emulator will perform as a constant R, L, C in AC mode while in DC mode a constant R will be emulated.

CONSTANT CURRENT

In this operating mode the current drawn by the equipment will be controlled to the setpoint value.

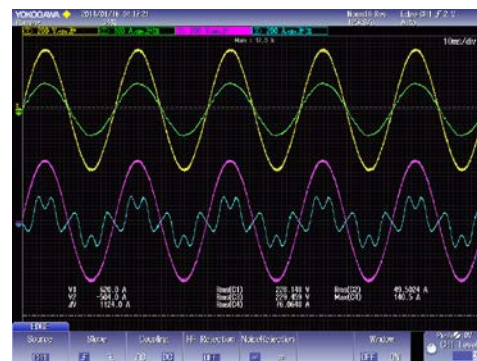
CONSTANT POWER / PQ_LOAD:

In AC mode the equipment regulates the Active and Reactive Power to the set point value. In DC mode the Active Power is regulated.



HARMONIC_LOAD:

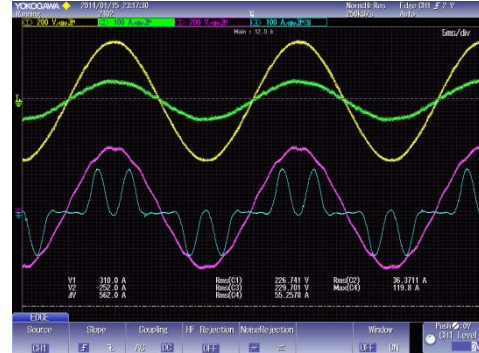
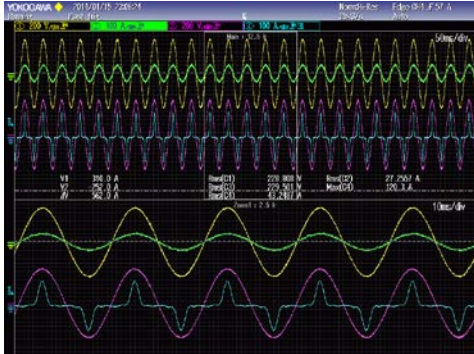
In constant current mode, the harmonic content of the current drawn by the equipment is configurable up to 15th.



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CREST FACTOR:

Single phase or diode rectifier consumption until crest factor 3:

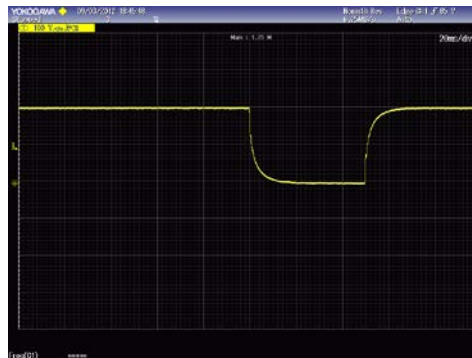


UNBALANCED_LOAD:

The equipment allows unbalanced single-phase and three-phase load emulation. Each phase is controlled independently and can be configured as a phase-phase as well as phase-neutral load.

DC_LOAD (optional):

The equipment sinks the programmed DC current.



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User interface

Local 3.2" Touchscreen

Control port:

- 3 analog inputs +/-10V
- 3 analog outputs 0-10V
- 5 digital inputs
- 3 relay outputs
- 1 Emergency stop

Note: all inputs/outputs are isolated

Remote interface: Modbus/TCP

Windows 7/XP application for remote operation and data acquisition.

Cooling

The power supply is air-cooled internally.

Mechanical housing

The power supplies are housed in compact mechanical cabinets with wheels (up to 120kVA) for easier transportation.

Options

IEC61850

RS485

DC Current Source

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Range & specifications

Magnitude		Value		
Power		7.5kVA-200kVA		
Input (Grid side)				
AC Voltage	Rated	3x400V+Neutral+Earth		
Voltage range		+15% / -20 %		
AC Current		10A-290Arms		
Frequency		50/60Hz		
Power Factor	Controllable	-1/1 (capacitive/inductive)		
Efficiency	at full load	>92%		
Overload		125% for 10 min / 150% for 60 s		
AC Outputs (EUT side)				
AC Current	Single-phase	0-230Arms		
AC Voltage	Phase-phase	0-480Vrms		
Frequency		40-400Hz		
Power Factor		-1/1 (capacitive/inductive)		
Harmonic control	Per phase	1 st – 15 th at 50Hz, 1 st – 13 th at 60Hz (only 1 st harmonic for 400Hz)		
Crest Factor		<3		
DC Outputs (EUT side)		(Optional)		
DC Current	1 channel	0-230A		
DC Voltage		0-750V		
Modes of operation		Range	Resolution	Ripple
Constant Impedance		0-100%	<±0.1%	<1%
Constant Current		0-100%	<±0.1%	<1%
Constant Power		0-100%	<±0.1%	<1%
GENERAL				
Measurements	Input Voltage (Vrms) and Current (Irms)			
	Active and Reactive Input Power (P,Q)			
	Output Voltage and Current			
	Output Power			
	Temperatures			
User interface	3.2" Touchscreen			
	Control port: 3 analog inputs, 3 analog outputs, 5 inputs, 3 relay outputs			
	Communication Ports: Ethernet, RS485 (optional)			
	Communication Protocols: Modbus/TCP			
Customized communications for IEC61850, ERP or MATLAB® (optional)				
Humidity	10-90% (Absolute maximum, without condensation)			
Temperature	5-40°C (Absolute maximum)			
Refrigeration	Forced air			
Protections	Over Current, Over Voltage, Over Temperature			
	Shortcircuit			
	Differential (optional)			
Standards				
Safety	EN-62040-1-2, EN-60950-1			
EMC	EMC: EN-62040-2			

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EL models

Reference	Rated Power (Grid side)		Rated Current (EUT side)			Dimension DxWxH
	kVA	kW	AC (rms)	DC (per channel)	DC (total)	
EL7.5	7.5	6.75	10A	10A	30A	700x450x1100
EL10	10	9	15A	15A	45A	700x450x1100
EL15	15	13.5	20A	20A	60A	700x450x1100
EL20	20	18	25A	25A	75A	700x450x1100
EL30	30	27	40A	40A	120A	805x590x1320
EL40	40	36	50A	50A	150A	805x590x1320
EL50	50	45	65A	65A	195A	805x590x1320
EL60	60	54	80A	80A	240A	805x590x1320
EL80	80	72	105A	105A	315A	805x590x1320
EL100	100	90	130A	130A	390A	805x590x1320
EL120	120	108	155A	155A	465A	805x590x1320
EL160	160	128	185A	185A	555A	850x900x2000
EL200	200	160	230A	230A	690A	850x900x2000