- **Rated power 55 kW, 110 kW, 330 kW (other powers available)**
- **Supply voltage 400 V 3 ~ 50/60 Hz**
- **Emulation of 1, 2 or 3 Fuel Cell Branches. Voltages 24 V, 125 V, 360 V**
- **Bidirectional Battery Emulator: Voltages 48V, 60V, 120V, 360V up to 1250 A.**
- **Automated control with generation of test protocols**
- **Database storage of all tests performed**
- **Interface with customer´s SCADA, control by MODBUS, ETHERNET, etc.**
- **User software with all processes controlled from a PLC**

General description

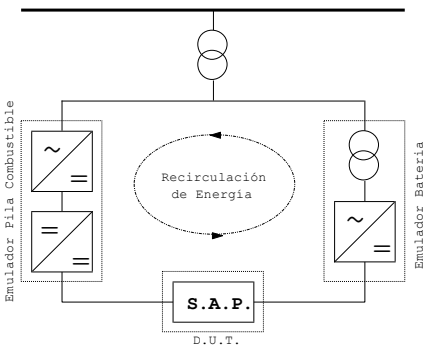
The test bench for Power Adaptation Systems (S.A.P.) with recovery to the electric grid developed by SUPSONIK, S.L.. allows full testing of equipment that exchanges energy between two DC voltage sources, such as:

- System of power adaptation between Fuel Cell and Battery.
- System of power adaptation between DC bus and Battery.

These SAP systems are an integral part in the propulsion of electric cars and buses, tramways and traction equipment, railways, submarines, and in any application where energy needs to be exchanged between a battery or supercapacitors and a main source of direct voltage, capable of generating and regenerating.

The bank is composed of three main systems that allow to carry out a complete test cycle:

- Unidirectional or bidirectional AC / DC input converter, which performs the function of Fuel Cell Emulator or DC BUS Emulator.
- Bidirectional DC / AC output converter which makes the function of Battery Emulator.
- Control and Measurement Unit (PC, PLC)



Basic operation is as follows: The first converter takes the power from the distribution network, delivering it to S.A.P. This transforms the energy by transferring it to the second converter, which injects it back into the network. In case of regenerative tests with bidirectional S.A.P., the process is just the reverse. Due to this recovery of energy, it is possible to test high power S.A.P. with a reduced input power, typically between 10 and 15% of the total power, reducing energy costs up to 85-90%.

Another of the peculiarities of this bench is its complete automation in the carrying out of tests. The whole system is governed by a central control, performing the tests automatically and providing the user with a friendly and simple system-wide interface.

SUPSONIK offers the possibility of adapting each equipment to the specific needs of the customer.

CE

AC / DC Converter FUEL CELL EMULATOR	
Rated power	330 kW
Rated AC input voltage	400 V 3~ 50 Hz ± 10%
Number of Output Fuel cell Branches	3
Control by branch	Independent / Set / Programmable
Output power per rated / maximum branch	100 kW / 110 kW
Output DC current per rated / maximum branch	265 A / 300 A
Minimum / nominal / maximum output DC Voltage	260 V / 380 V / 525 V
Maximum voltage variation by branch	± 1%
Maximum voltage ripple by branch	5% for f> 30 Hz, 0.1% for f <30 Hz
Fuel Cell characteristic curves	BoL / EoL / programmable
Galvanic isolation	Yes. Line transformer
Regenerative capacity	No. Unidirectional converter
DC / AC converter BATTERY EMULATOR	
Rated power	330 kW
DC input rated voltage (nominal battery voltage)	360 V
Minimum / maximum battery voltage	270 V / 500 V
Number of input battery branches	1
Input power per rated / maximum branch	300 kW / 330 kW
Input DC current per rated / maximum branch	830 A / 1250 A
Maximum voltage variation by branch	± 1%
Maximum voltage ripple by branch	2%
Rated AC output voltage	400 V 3~ 50 Hz ± 10%
Galvanic isolation	Yes. Line transformer
Regenerative capacity	Yes. Bidirectional converter
Output Power Factor Typical/ minimum full load	0.99 / 0.97
Typical / maximum harmonic distortion	3% / 5%
ENVIRONMENTAL CHARACTERISTICS	
Protection degree	IP20 (optional IP54)
Working temperature	-15ºC to 50ºC
Storage temperature	-25ºC to 65ºC
Relative humidity	15% to 95% with no condensation
Altitude	1000 m.
DIMENSIONS AND WEIGHT	
AC / DC Converter Fuel Cell Emulator	
Dimensions (Width x Depth x Height)	6000 x 900 x 2100 (mm)
Weight	3750 Kg
DC / AC converter Battery Emulator	
Dimensions (Width x Depth x Height)	6000 x 1000 x 2100 (mm)
Weight	3300 Kg
PLC Control Panel	
Dimensions (Width x Depth x Height)	800 x 400 x 2100 (mm)
Weight	200 Kg
Colour	RAL 7035
Refrigeration	AF

USER INTERFACE

- Graphic touch screen with performance mimics
- Communications via wired signals, MODBUS, PROFIBUS, TCP / IP via RS485 and Ethernet.
- Local / Remote Control.
- Integration with customer´s SCADA