Technical Specification:

Power Electronics Stack

Programmable AC and DC Electronic load

Programmable AC and DC electronic load can be a single unit of three phase programmable load with neutral or three units of single phase programmable load which must act synchronously as a three phase load with neutral. Each phase of the load must have independent control. Programmable load must act as a single phase load and three phase load. The programmable AC and DC load must have the following features

- Simulation/Emulation of constant impedance (RLC) load, constant current load and constant power load in AC.

- Simulation/Emulation of linear loads with sinusoidal voltage and sinusoidal current with lagging and leading power factor ranging from 0 to 1. Simulation of pure inductive and capacitive loads must be possible. Load must be able to be connected in star and delta configurations.

- Simulation/Emulation of Inrush currents.

- Simulation/Emulation of short circuit condition to test the short circuit protection mode of the EUT.

- Simulation/Emulation of nonlinear loads with different crest factor and power factor.

- Simulation/Emulation of unbalanced load.

- Simulation/Emulation of load currents with harmonic injected.

- Simulation/Emulation of constant current, constant impedance, constant voltage, constant power and nonlinear load modes in DC.

- Should support power hardware in loop.

Specifications

Rating

Power	: 10 kVA
Voltage	: 425 V (line to line RMS voltage), 400 V DC
Current	: 15-20 A (RMS per phase current), 5-10 A DC
Frequency	: DC, 40 to 400 Hz
Power factor	: 0 to 1 lag and lead

Crest factor   : 1.414 to 4

Harmonics   : range upto 20th harmonic order

Operating modes

Constant Current mode   : Range 0 to (15-20) Arms, Accuracy-0.2% of full scale,
Resolution- 0.5% of full scale.

Constant power mode   : Range 0 to 10 kVA, Accuracy-0.2% of full scale, 0.05
% of full scale.

Constant Impedance mode   : Range 0.8 to 1000 ohm, 0.1 to 2000 mH, 0 to 3.7mF,
Accuracy-1% of full scale, Resolution-0.05% of full scale.

Constant Voltage mode (DC)   : Range 15 to 400 V, Accuracy-0.2% of full scale,
Resolution- 0.05% of full scale.

Crest factor   : Range 1.414 to 4, Accuracy-1% of full scale,
Resolution- 0.1% of full scale.

Power factor   : Range 0 to 1 lag and lead, Accuracy-1% of full scale,
Resolution- 0.1% of full scale.

Optional   : possibility of using the AC/DC electronic for Battery
Emulation and PV panel Emulation.

Measurement

RMS Voltage, RMS Current, active power, reactive power, apparent power, crest factor, power factor, THD, frequency, timing measurement function to measure the trip time of fuses and circuit breakers, battery discharge time.

Protection

Overvoltage, Overcurrent, Overload short-circuit, over temperature protection must be given.

Interfaces

Graphical user interface software for programming and monitoring the load parameters through PC must be provided. Software must provide built in function test modes for PV Inverter efficiency testing. It must have external analog and digital I/O ports for control and monitoring.

Remote control   : LAN Ethernet, RS232, GPIB connector

Cooling must be provided for the loads with operating temperature 5-40 degree Celsius. Loads should have acoustic noise less than 70 dBA. All safety and EMC standards must be followed. Supply to the programmable load is three phase, line to line RMS Voltage of 415 V, 50 Hz or single phase 230 V, 50 Hz. Supply side THD must be less than 5% and power factor less than 0.85.

Warranty : One year from the date of successful installation/commisioning of equipment