

# Technical Specification

No. F-IMU SLAVE SMART.doc  
Revised 29 April 2014

## 1 Tester Type IMU SLAVE SMART

IMU SMART fitted with EXT-SMART V1 and EXT-SMART I1 modules is designed to fulfil the requirements of IEC 61000-4-19. It is an extension to the IMU3000 and IMU4000 series of generators. Designed to generate and inject, differential mode disturbances, IMU SMART can be used as part of a system to test electronic electricity meters (smart meters) or other devices (PLC) connected to the AC power network where disturbance from mains signalling (BPL) or power electronics (inverters) is present.

Adding accessories such as PS3 power supply for voltage and the EXT-SMART PSC10 current sources enables a complete fully automated test system.

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### 1.1 Introduction

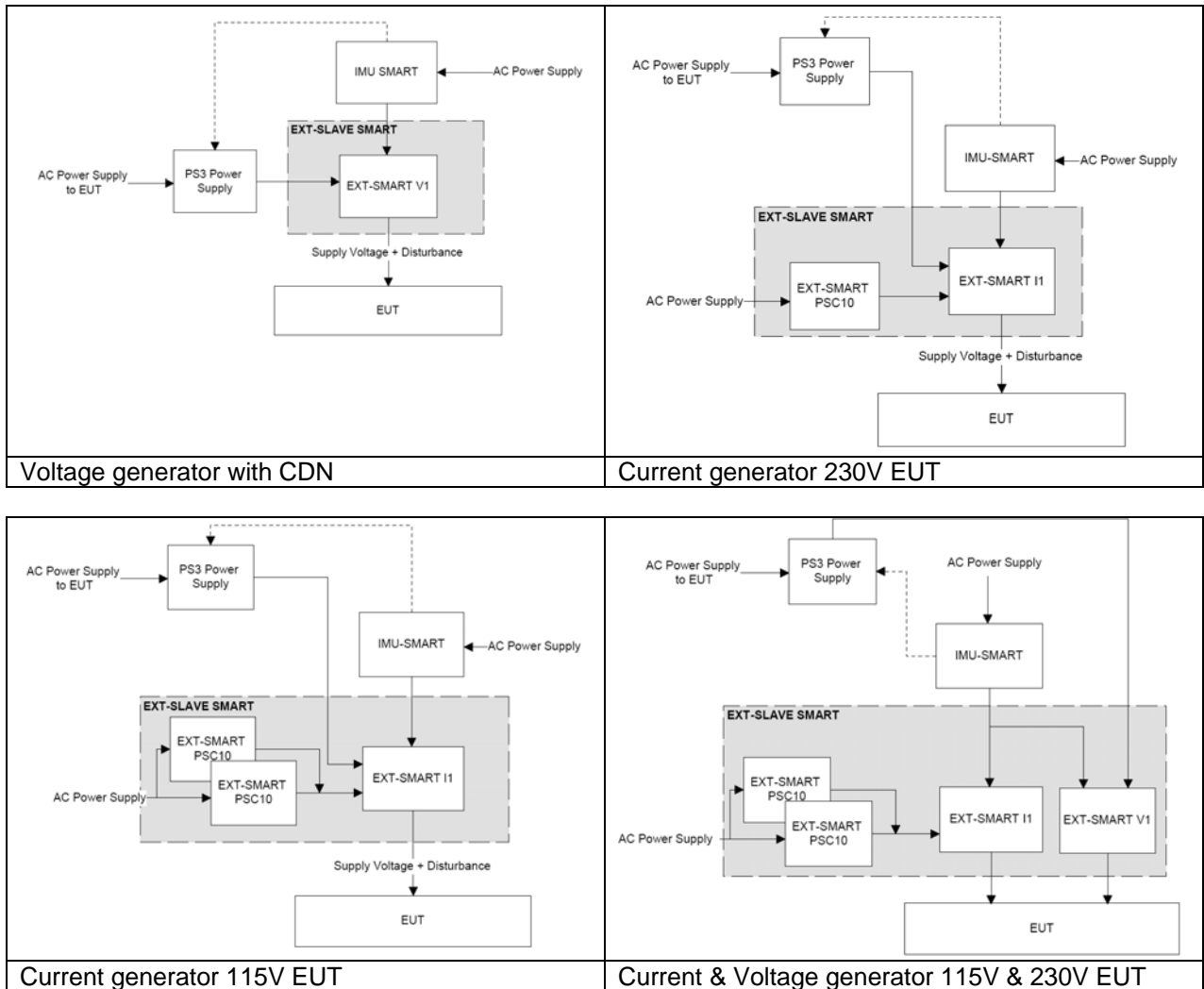
In the frequency range 2 kHz to 150kHz some EMC tests were missing. In practical terms, this showed itself as disturbance of electrical devices connected to the power distribution grid. The standard IEC 61000-4-19 was conceived to fill this gap and increase reliability of electrical devices, particularly electronic energy (smart meters). The perfect addition to IMU3000 or IMU4000, IMU SLAVE SMART offers a full compliance laboratory testing solution in a compact form.

- Environmentally friendly
- Modular architecture
- Protocol using web server
- Ethernet and USB interfaces
- Differential mode testing with both continuous and square-wave modulation.
- Controlled from EMC Partner Operating System (EPOS) user interface

## 2 General

### 2.1 Brief description of the generator

IMU SMART can be combined into a fully automated system including IMU3000 / IMU4000 and PS3 power supply for voltage tests. Different configurations are available dependant on the test to be performed. Configurations are available as differential current or voltage test systems, or with voltage and current combined.



### 2.2 EUT connection (Equipment Under Test)

The EUT power input is connected on the front panel of the IMU SLAVE SMART. Disturbance signals are then superimposed onto the EUT power supply.

For some special tests, a port is provided for a second reference EUT which can be connected for comparison with the disturbed EUT.

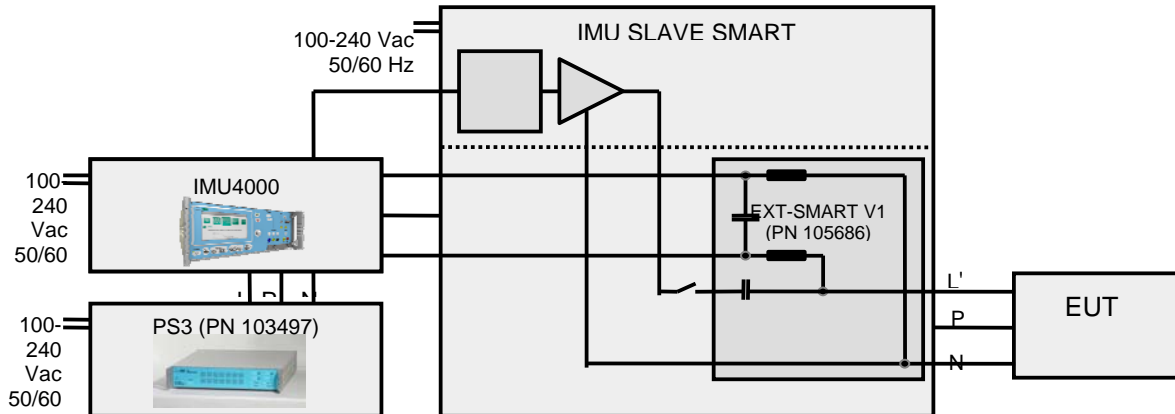
### 2.3 Standards, applications

IEC 61000-4-19 Ed. 1.0 IEC 61000-4-19: Electromagnetic Compatibility (EMC) - Part 4-19: Testing and measurement techniques - Test for immunity to conducted, differential mode disturbances and signalling in the frequency range from 2 kHz to 150 kHz, at a.c. power ports

### 3 System Configuration & EUT Connections

#### 3.1 Voltage Tests

The voltage generator is used to test high impedance loads such as PLCs and Broad Band over Powerline (BPL) equipment.

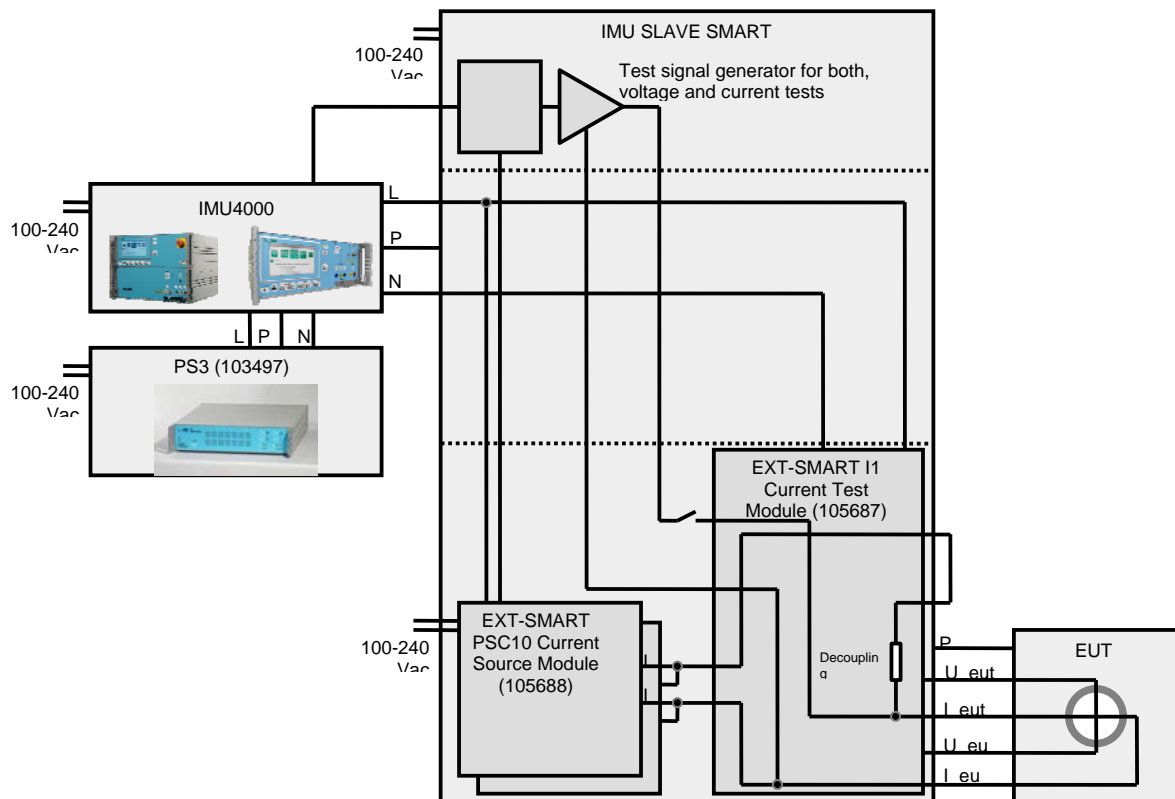


#### 3.2 Current Tests

The current generator simulates disturbances generated by inverters and other power electronics. It is used to test low impedance circuits such as energy meters, circuit breakers, etc..

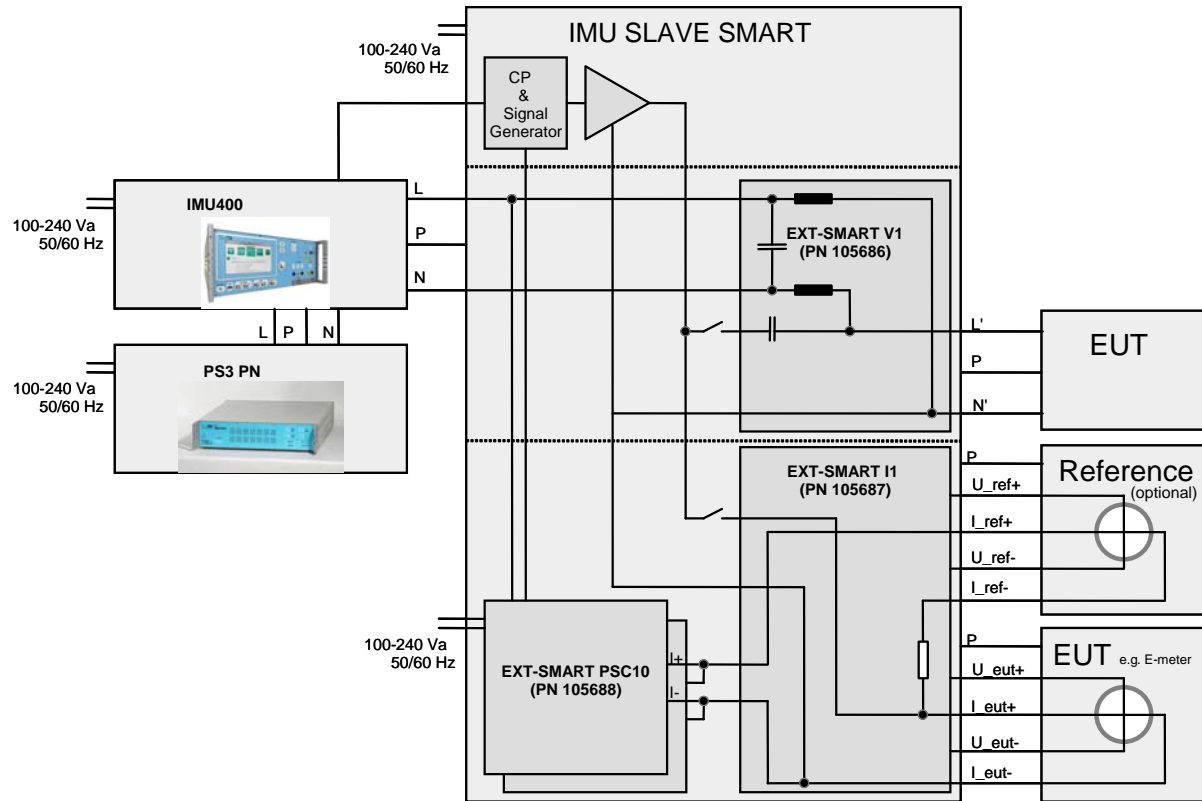
For 230V systems, a single EXT-SMART PSC10 current source is required to deliver 10A to the EUT. For 110V systems two EXT-SMART PSC10 current sources must be fitted in parallel to deliver 20A to the EUT.

If current sources are already available, the EXT-SMART PSC10 modules need not be ordered.



### 3.3 Voltage and Current Tests

Both circuits can be combined into the IMU SLAVE SMART to enable testing of both voltage and current circuits. An example would be an electronic energy meter.



## 4 Generator circuit, Technical Data

### 4.1 Mechanical dimensions, climatic conditions

The IMU SLAVE SMART is a 19" plug-in system for a 19" rack.

Type	Dimension [ mm ]	Weight	Version
	width x depth x height [ mm ]	[ kg ]	
IMU SLAVE SMART	520 x 433 x 180 mm	28	19" 4UH

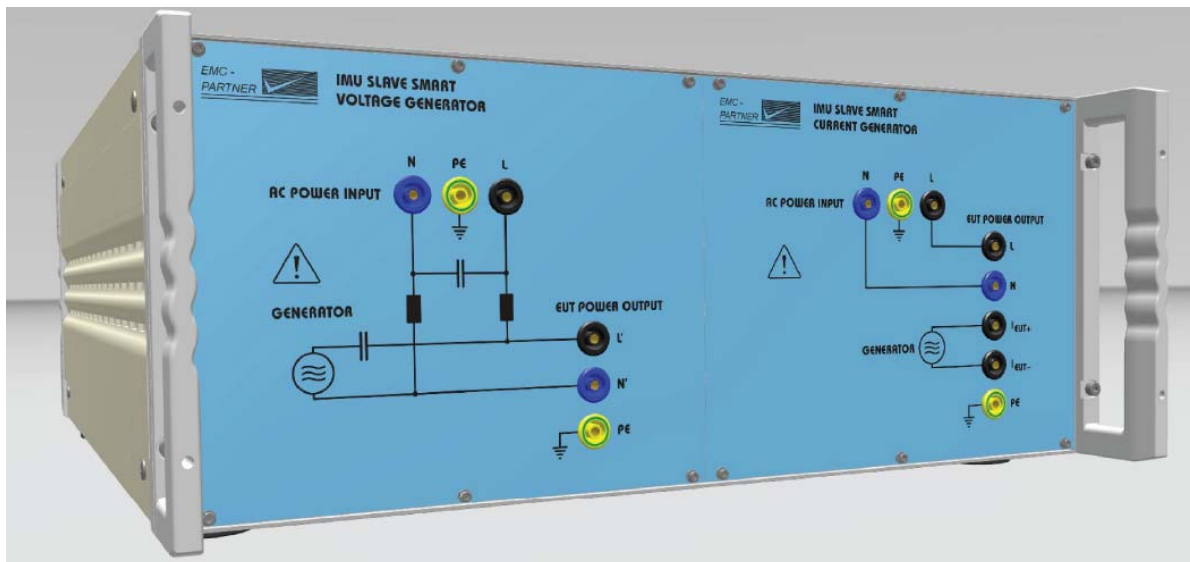
The power line input is located at the rear side of the IMU SLAVE SMART.

Operating voltage range (Mains)	100 - 240 V ( 50/60 Hz )	± 10 %
Power consumption	operation mode < 1kW Standby < 5 VA Power ON < 50 VA	

Following power cords can be ordered:

Europe ( CEE-7/VII )    England ( BS-1363 )    Switzerland ( SEV Type 12 )    USA ( NEMA5-15P )

Environment conditions		
Temperature range	°C	0 to 35 °C
Humidity	rh %	25 to 80%
Pressure	kPa	86 to 106



IMU SLAVE SMART (voltage and current circuits mounted)

#### Accessories included:

- Power cord (1 x 2m): D Schuko (16A), CH (10A), USA (16A), UK (13A), IN (10A)
- MC cables with protected banana plugs; black, blue and green/yellow (3 x 2m)
- User manual (1 pce) including:
  - Declarations of conformity: EMC, LVD, BASIC
  - Verification protocol EMC PARTNER

## 4.2 Technical data

### 4.2.1 IMU SLAVE SMART

#### 4.2.2 Differential Voltage Disturbance Source

Open circuit voltage range	0.1V to 20V	± 5%	
Impedance at EUT terminals	10Ω	± 30%	
Waveform	Sine		
Frequency ranges	2kHz to 150kHz		
Frequency change	2% Logarithmic		
Modulation Frequencies 50Hz	1 to 1000kHz		
Modulation Frequencies 60Hz	1 to 1000kHz		
Modulation Time	(modulation frequency) <sup>-1</sup>		
Dwell Time	1 to 300s		
Pause Time	100ms to 3s		
<b>Coupling Decoupling Network</b>			
Maximum Voltage	230V		
Maximum Current	16A		

#### 4.2.3 Differential Current Disturbance Source

Short circuit current	0.5A to 4A	± 5%	
Impedance at EUT terminals	1Ω	± 30%	
Waveform	Sine		
Frequency ranges	2kHz to 150kHz		
Frequency change	2% Logarithmic		
Modulation Frequencies 50Hz	1 to 1000kHz		
Modulation Frequencies 60Hz	1 to 1000kHz		
Modulation Time	(modulation frequency) <sup>-1</sup>		
Dwell Time	1 to 300s		
Pause Time	100ms to 3s		

#### 4.2.4 Current Power Supply EXT-SMART PSC10

Maximum Current	10A <sub>RMS</sub>		Into 1Ω
Frequency Range	DC to 400Hz		

Note for 230V equipment only one EXT-SMART PSC10 is required. For 115V equipment two EXT-SMART PSC10 current sources must be used to reach 20A test current.

## 5 Overview accessories

### 5.1 Hardware Accessories

#### PS3 Power Supply

Voltage source controlled from IMU3000 or IMU4000



#### RS485 - RS232 ADAPTER

Needed to connect PS3 to IMU3000 or IMU4000



### 5.2 Software Accessories

#### TEMA3000

Remote control software  
Test and sequence programming

