

## Product Datasheet - Technical Specifications



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# IT7900

## Regenerative Grid Simulator (HV)



*Your Power Testing Solution*

# IT7900

## Regenerative Grid Simulator (HV)

Voltage Up to 700 VL-N, 1050 VL-N



The IT7900 high-voltage series represents a new generation of programmable four-quadrant grid simulators. It can also operate as a four-quadrant power amplifier for testing various types of grid-connected products, such as PCS, energy storage systems, microgrids, BOBC (V2X), and power hardware-in-the-loop (PHIL) applications. With built-in programmable RLC function, it is suitable for testing requirements related to IEEE 1547 and UL 1741. It also features power regeneration capability, with 100% current absorption and feedback to the grid, helping reduce electricity consumption and cooling costs.

The IT7900 high-voltage series provides up to 700 V L-N, and can even meet 1050 V L-N requirements. Through parallel operation, the power can be easily expanded up to 900 kVA. Equipped with a touchscreen design, a simple and intuitive user interface, and powerful arbitrary waveform editing capability, it can simulate various grid disturbance waveforms, making it an ideal choice for testing and R&D laboratories.

### Features

- Voltage up to 700 VL-N, 1050 VL-N
- 16Hz~100Hz
- Used as regenerative grid simulator, four-quadrant source
- CV/Current Limit/Power Limit
- AC, AC+DC output capability
- Three-phase output capability
- Programmable Output Impedance, power impedance simulation
- LVRT /Phase Jump/Frequency variation /Harmonic Injection
- Touch screen; AC power meter and digital oscilloscope
- Harmonic and interharmonic waveform synthesis\*2
- LIST/SWEEP simulate grid disturbances
- Voltage and current harmonics measurement, up to 50 times.\*1
- Front USB interface, support data and waveform import and export
- Relay Ctrl output for electrical isolation between DUT and grid simulator.
- Built-in USB/CAN/LAN/LXI compliant LAN interface/DigitalIO, optional GPIB /RS232

\*1 Voltage and current harmonic analysis, Voltage harmonic simulation

\*2 Coming soon

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## Applications

### Photovoltaic

Grid-connected inverters,  
power conditioning systems

### Electric Vehicle

Vehicle chargers, AC charging piles, EV  
power supply, bidirectional vehicle  
chargers (V2X)

### Energy Storage

PCS energy storage converter,  
home PV energy storage device

### Research Institute

AC-DC Power Adapter, EMC Test

### Power Electronics

Transformer, AC fan, UPS, AC motor



Electric  
Transportation

PV Energy  
Storage



| Model            | Output Voltage Vac |       | Output Amps | Output Power | Phase | Height |
|------------------|--------------------|-------|-------------|--------------|-------|--------|
|                  | V L-N              | V L-L | Phs         | Pac          |       |        |
| IT7990-700-90    | 700V               | 1200V | 90A         | 90kVA        | 3Φ    | 27U    |
| IT79180-700-180  | 700V               | 1200V | 180A        | 180kVA       | 3Φ    | 27U*2  |
| IT79270-700-270  | 700V               | 1200V | 270A        | 270kVA       | 3Φ    | 27U*3  |
| IT79360-700-360  | 700V               | 1200V | 360A        | 360kVA       | 3Φ    | 27U*4  |
| IT79450-700-450  | 700V               | 1200V | 450A        | 450kVA       | 3Φ    | 27U*5  |
| IT79540-700-540  | 700V               | 1200V | 540A        | 540kVA       | 3Φ    | 27U*6  |
| IT79630-700-630  | 700V               | 1200V | 630A        | 630kVA       | 3Φ    | 27U*7  |
| IT79720-700-720  | 700V               | 1200V | 720A        | 720kVA       | 3Φ    | 27U*8  |
| IT79810-700-810  | 700V               | 1200V | 810A        | 810kVA       | 3Φ    | 27U*9  |
| IT79900-700-900  | 700V               | 1200V | 900A        | 900kVA       | 3Φ    | 27U*10 |
| IT79135-1050-90  | 1050V              | 1818V | 90A         | 135kVA       | 3Φ    | 37U    |
| IT79270-1050-180 | 1050V              | 1818V | 180A        | 270kVA       | 3Φ    | 37U*2  |
| IT79405-1050-270 | 1050V              | 1818V | 270A        | 405kVA       | 3Φ    | 37U*3  |
| IT79540-1050-360 | 1050V              | 1818V | 360A        | 540kVA       | 3Φ    | 37U*4  |
| IT79675-1050-450 | 1050V              | 1818V | 450A        | 675kVA       | 3Φ    | 37U*5  |
| IT79810-1050-540 | 1050V              | 1818V | 540A        | 810kVA       | 3Φ    | 37U*6  |

\*For higher power, please call for availability

\*Above specifications are subject to change without prior notice

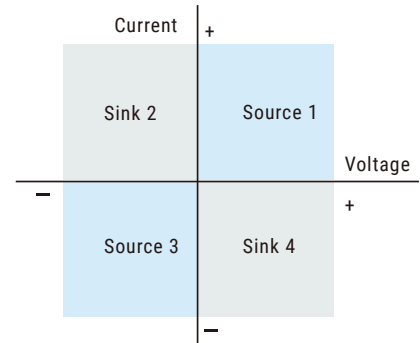
# Your Power Testing Solution

IT7900 Regenerative Grid Simulator(HV)

## Outstanding Features

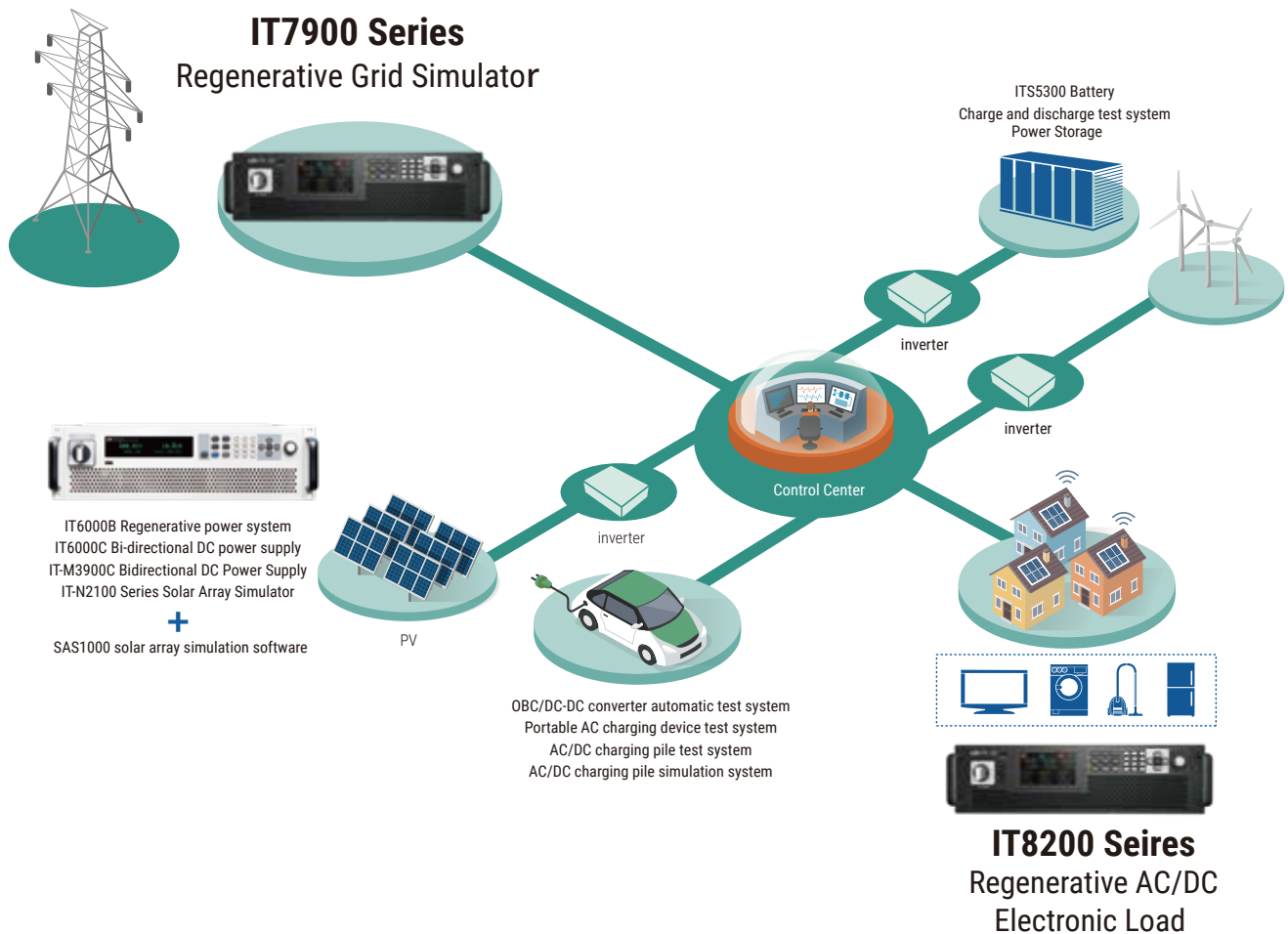
### Regenerative 4-Quadrant AC Grid Simulator

The IT7900 series are four-quadrant grid simulators with 100% of current source and sink and 88% energy recovery capability. The power generated by the DUT can be fed back to the grid, rather than being dissipated as heat. Suitable for testing grid-connected products that inject energy into the grid, such as frequency changes, voltage transients and anti-island testing of grid-connected photovoltaic inverters.



### Application: Micro-grid test

Microgrids can be viewed as small power systems, also a typical distributed power generation system, so equipment manufacturers and grid research labs need to establish simulation test. The IT7900 series not only meets the microgrid test requirements for phase angle jumps, LVRT, frequency variations, harmonic injection, etc., but also feeds power back into the AC grid, which meets the microgrid test requirements.



### Easy-to-operate interface, abundant operation modes

#### Touch screen , built-in oscilloscope function

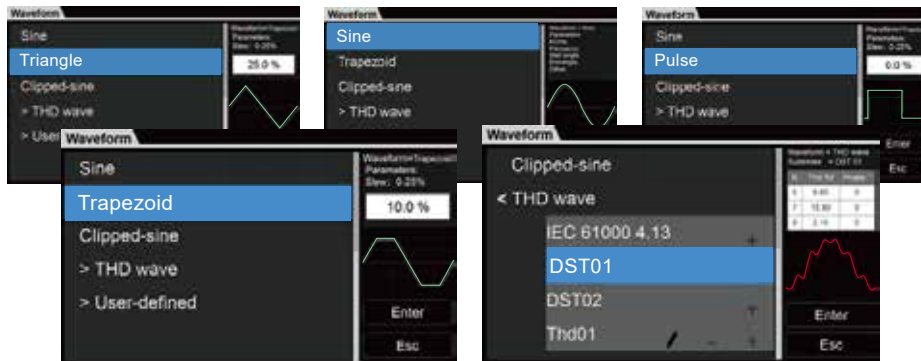
IT7900 series is equipped with innovative touch screen, simple and intuitive UI interface, and the keyboard knob design allows users to directly and quickly perform operations such as mode setting and waveform editing. The built-in digital oscilloscope function collects time-domain signals of voltage and current, phase relationship and performs waveform trigger functions. The oscilloscope sampling rate is up to 10us, and up to 6 oscilloscope curves can be displayed at the same time. Users can perform instantaneous analysis without an oscilloscope and save them in time.



### Waveform editing functions for grid-connection regulations and power electronic disturbance test

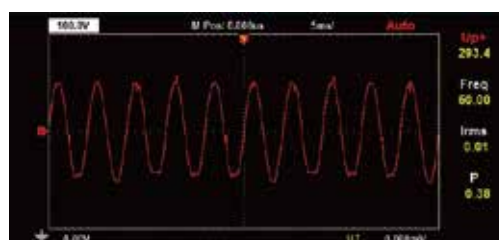
#### Built-in various type of waveforms

In addition to the basic sine wave, the IT7900 series offers a variety of built-in AC waveforms such as triangle, sawtooth, square, trapezoidal and clipped. Users can recall through the menu and display the selected waveform on the LCD screen. Combined with the device's sequence programming function, the continuous output of different waveforms can be combined to cope with complex power electronic disturbance tests.



#### Customized Waveform Functions

The IT7900 series provides a custom waveform editing function that allows users to optimize and improve DUT circuit design by importing real waveform data into the device to simulate the effects of real AC or DC power supply systems on DUT in different test environments. The IT7900 Custom Mode supports up to 1024 points of data import.



# Your Power Testing Solution

## IT7900 Regenerative Grid Simulator(HV)

| IT7990-700-90                     |                    |                                                 |                                            |
|-----------------------------------|--------------------|-------------------------------------------------|--------------------------------------------|
| Input Parameters                  |                    |                                                 |                                            |
| AC input                          | Wiring connection  | 3 phase 3wire + ground(PE)                      |                                            |
|                                   | Line voltage       | RMS                                             | ( 200 ~ 220V ) ±10% *1 ( 380 ~ 480V ) ±10% |
|                                   | Line current       | RMS                                             | < 200A                                     |
|                                   | Apparent ower      |                                                 | < 104kVA                                   |
|                                   | Frequency range    |                                                 | 45 ~ 65Hz                                  |
|                                   | Power factor       | typ                                             | 0.98                                       |
| Input Parameters                  |                    |                                                 |                                            |
| AC output                         | Output voltage     | VLN                                             | 0 ~ 700V                                   |
|                                   |                    | VLL                                             | 0 ~ 1212V                                  |
|                                   | Output current     | RMS (3phase)                                    | 90A                                        |
|                                   |                    | Peak(3phase)                                    | 270A                                       |
|                                   | Output power       | Max. Power(3phase)                              | 90kVA                                      |
|                                   | Voltage setting    |                                                 |                                            |
|                                   | Range              | 0 ~ 700V(3phase)                                |                                            |
|                                   | Resolution         | 0.01V                                           |                                            |
|                                   | Accuracy           | < 0.1%+0.2% F.S.                                |                                            |
|                                   | Current setting    |                                                 |                                            |
|                                   | Range              | RMS                                             | 90A                                        |
|                                   | Resolution         | 0.01A                                           |                                            |
|                                   | Accuracy           | < 0.2% + 0.3% F.S.                              |                                            |
|                                   | Frequency          |                                                 |                                            |
|                                   | Setting range      | 16 ~ 100Hz                                      |                                            |
|                                   | Setting resolution | 0.01Hz                                          |                                            |
|                                   | Setting accuracy   | 0.01%                                           |                                            |
|                                   | Waveform synthesis | 50/60Hz                                         | up to 50 orders                            |
|                                   | Phase              |                                                 |                                            |
|                                   | Range setting      | 0 ~ 360°                                        |                                            |
|                                   | Setting resolution | 0.01°                                           |                                            |
| Voltage stability                 | Voltage setting    |                                                 |                                            |
|                                   | Line regulation    | < 0.05% F.S.                                    |                                            |
|                                   | Load regulation *2 | < 0.1% + 0.1% F.S.                              |                                            |
|                                   | THD*3              | < 1%                                            |                                            |
|                                   | Voltage ripple     | RMS                                             | < 1.2V                                     |
|                                   | Dynamic response   | typ                                             | 200μs                                      |
| Voltage creepage                  |                    | ≥2 V/μs with full-scale programmed voltage step |                                            |
| Output isolation                  |                    | 750Vac                                          |                                            |
| Measured parameters               |                    |                                                 |                                            |
| Voltage                           | Resolution         | 0.01V                                           |                                            |
| Effective value                   | Accuracy           | < 0.1%+0.2% F.S.                                |                                            |
| Current                           | Resolution         | 0.01A                                           |                                            |
| Effective value                   | Accuracy           | < 0.2% + 0.3% F.S.                              |                                            |
| Output power                      | Resolution         | 0.001kW                                         |                                            |
|                                   | Accuracy           | < 0.4% + 0.6% F.S.                              |                                            |
| Harmonics measurement             | Analysis Limit     | 50/60Hz                                         | up to 50 orders                            |
| Regenerative                      |                    |                                                 |                                            |
| Maximum regenerative power        |                    | 90kVA                                           |                                            |
| Output current THD                |                    | < 5%                                            |                                            |
| Other                             |                    |                                                 |                                            |
| Efficiency                        |                    | 91% (typ*4)                                     |                                            |
| Protection                        |                    | OVP, OCP, OPP, OTP, FAN, ECP, Sense             |                                            |
| Work temperature                  |                    | 0 C -50 C                                       |                                            |
| Programming response time         |                    | 2ms                                             |                                            |
| Sense compensating voltage        |                    | 20V                                             |                                            |
| Maximum Working Isolation Voltage |                    | ±1000Vdc                                        |                                            |
| Withstand Voltage                 | Input to Ground    | 3000Vdc/1min                                    |                                            |
|                                   | Input to Output    | 2250Vdc/1min                                    |                                            |
|                                   | Output to Ground   | 2100Vdc/1min                                    |                                            |

## 05 IT7900 Regenerative Grid Simulator(HV)

\*1 ( 200 to 220 )  $\pm 10\%$ , 60% of rated output power output

\*2 Cabinets need to be tested in sense remote measurement mode

\*3 Test condition: purely resistive load, at full power

\*4 Test condition: input 380VLL/50Hz, output three-phase 700Vrms/50Hz at full power

\* Above information is subject to change without notice

# Your Power Testing Solution

## IT7900 Regenerative Grid Simulator(HV)

| IT79135-1050-90                   |                    |                                                 |                                            |
|-----------------------------------|--------------------|-------------------------------------------------|--------------------------------------------|
| Input Parameters                  |                    |                                                 |                                            |
| AC input                          | Wiring connection  | 3 phase 3wire + ground(PE)                      |                                            |
|                                   | Line voltage       | RMS                                             | ( 200 ~ 220V ) ±10% *1 ( 380 ~ 480V ) ±10% |
|                                   | Line current       | RMS                                             | < 299A                                     |
|                                   | Apparent power     |                                                 | < 157kVA                                   |
|                                   | Frequency range    |                                                 | 45 ~ 65Hz                                  |
|                                   | Power factor       | typ                                             | 0.98                                       |
| Input Parameters                  |                    |                                                 |                                            |
| AC output                         | Output voltage     | VLN                                             | 0 ~ 1050V                                  |
|                                   |                    | VLL                                             | 0 ~ 1818V                                  |
|                                   | Output current     | RMS (3phase)                                    | 90A                                        |
|                                   |                    | Peak(3phase)                                    | 270A                                       |
|                                   | Output power       | Max. Power (3phase)                             | 135kVA                                     |
|                                   | Voltage setting    |                                                 |                                            |
|                                   | Range              | 0 ~ 1050V(3phase)                               |                                            |
|                                   | Resolution         | 0.1V                                            |                                            |
|                                   | Accuracy           | < 0.1%+0.2% F.S.                                |                                            |
|                                   | Current setting    |                                                 |                                            |
|                                   | Range              | RMS                                             | 90A                                        |
|                                   | Resolution         | 0.01A                                           |                                            |
|                                   | Accuracy           | < 0.2% + 0.3% F.S.                              |                                            |
|                                   | Frequency          |                                                 |                                            |
|                                   | Setting range      | 16 ~ 100Hz                                      |                                            |
|                                   | Setting resolution | 0.01Hz                                          |                                            |
|                                   | Setting accuracy   | 0.01%                                           |                                            |
|                                   | Waveform synthesis | 50/60Hz                                         | up to 50 orders                            |
|                                   | Phase              |                                                 |                                            |
|                                   | Range setting      | 0 ~ 360°                                        |                                            |
|                                   | Setting resolution | 0.01°                                           |                                            |
| Voltage stability                 | Voltage setting    |                                                 |                                            |
|                                   | Line regulation    | < 0.05% F.S.                                    |                                            |
|                                   | Load regulation *2 | < 0.1% + 0.1% F.S.                              |                                            |
|                                   | THD*3              | < 1%                                            |                                            |
|                                   | Voltage ripple     | RMS                                             | < 1.8V                                     |
|                                   | Dynamic response   | typ                                             | 200μs                                      |
| Voltage creepage                  |                    | ≥2 V/μs with full-scale programmed voltage step |                                            |
| Output isolation                  |                    | 1100Vac                                         |                                            |
| Measured parameters               |                    |                                                 |                                            |
| Voltage                           | Resolution         | 0.1V                                            |                                            |
| Effective value                   | Accuracy           | < 0.1%+0.2% F.S.                                |                                            |
| Current                           | Resolution         | 0.01A                                           |                                            |
| Effective value                   | Accuracy           | < 0.2% + 0.3% F.S.                              |                                            |
| Output power                      | Resolution         | 0.1kW                                           |                                            |
|                                   | Accuracy           | < 0.4% + 0.6% F.S.                              |                                            |
| Harmonics measurement             | Analysis Limit     | 50/60Hz                                         | up to 50 orders                            |
| Regenerative                      |                    |                                                 |                                            |
| Maximum regenerative power        |                    | 135kVA                                          |                                            |
| Output current THD                |                    | < 5%                                            |                                            |
| Other                             |                    |                                                 |                                            |
| Efficiency                        |                    | 91% (typ*4)                                     |                                            |
| Protection                        |                    | OVP, OCP, OPP, OTP, FAN, ECP, Sense             |                                            |
| Work temperature                  |                    | 0 C - 50 C                                      |                                            |
| Programming response time         |                    | 2ms                                             |                                            |
| Sense compensating voltage        |                    | 20V                                             |                                            |
| Maximum Working Isolation Voltage |                    | ±1500Vdc                                        |                                            |
| Withstand Voltage                 | Input to Ground    | 3000Vdc/1min                                    |                                            |
|                                   | Input to Output    | 2250Vdc/1min                                    |                                            |
|                                   | Output to Ground   | 2250Vdc/1min                                    |                                            |

\*1 ( 200 to 220 )  $\pm 10\%$ , 60% of rated output power output

\*2 Cabinets need to be tested in sense remote measurement mode

\*3 Test condition: purely resistive load, at full power

\*4 Test condition: input 380VLL/50Hz, output three-phase 1050Vrms/50Hz at full power

\* Above information is subject to change without notice