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TECHNICAL PRODUCT INFORMATION

Test & measurement instruments

- high - quality
- moderate prices
- excellent precision

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IT7900EP High Performance Regenerative Grid Simulator



The IT7900EP series high-performance regenerative grid simulator provides an advanced all-in-one test solution. Built on SiC technology, it can operate not only as a high-power AC source, but also as a grid simulator, a four-quadrant power amplifier, and a regenerative AC/DC electronic load. With built-in programmable RLC function, it is suitable for testing requirements related to IEEE 1547 and UL 1741. Full four-quadrant operation and efficient regenerative capability allow power to be fed back cleanly to the grid, meeting environmental requirements while significantly reducing electricity consumption and heat dissipation costs. Its compact, modular, and efficient design enables the IT7900EP to deliver up to 21 kVA in a 3U unit, with total power expandable to over 1 MVA through master-slave paralleling. The intuitive color touchscreen interface allows users to define different waveforms directly. Rich operating modes support single-phase, three-phase, and reverse-phase testing, providing high flexibility for applications in PV, ESS, EV, and more.



ESS

PCS energy storage converters, microgrids, home PV energy storage devices



PV

PV inverter, grid power system



EV

V2G, V2X, EVSE, vehicle type converters, electric vehicle power supply



Power Electronics

Uninterruptible Power Supply System (UPS), AC power supply, inverter Generators, transformers, AC fans



Electronic Components

Circuit breakers, fuses, connectors



Scientific research, universities, laboratories, certification bodies

AC-DC power adapter testing, electromagnetic compatibility testing

Model	Output voltage Vac		Output current Aac		Output power Pac	Phase	Height
	V L-N	V L-L	Arms(1Φ)	Arms(3Φ)			
IT7921EP-350-105	350V	606V	105A	35A	21kVA	1Φ,3Φ,reversed phase	3U
IT7942EP-350-210	350V	606V	210A	70A	42kVA	1Φ,3Φ,reversed phase	6U
IT7963EP-350-315	350V	606V	315A	105A	63kVA	1Φ,3Φ,reversed phase	15U
IT7984EP-350-420	350V	606V	420A	140A	84kVA	1Φ,3Φ,reversed phase	27U
IT79105EP-350-525	350V	606V	525A	175A	105kVA	1Φ,3Φ,reversed phase	27U
IT79126EP-350-630	350V	606V	630A	210A	126kVA	1Φ,3Φ,reversed phase	27U
IT79147EP-350-735	350V	606V	735A	245A	147kVA	1Φ,3Φ,reversed phase	27U
IT79168EP-350-840	350V	606V	840A	280A	168kVA	1Φ,3Φ,reversed phase	37U
IT79189EP-350-945	350V	606V	945A	315A	189kVA	1Φ,3Φ,reversed phase	37U
IT79210EP-350-1050	350V	606V	1050A	350A	210kVA	1Φ,3Φ,reversed phase	37U
IT79231EP-350-1155	350V	606V	1155A	385A	231kVA	1Φ,3Φ,reversed phase	37U

*Please contact ITECH for higher power needs.

*The above specifications are subject to update without notice.

IT7921EP-350-105			
Input parameters (connect to grid)			
AC Input	wiring connection	3 phase 3wire + ground(PE)	
	Line voltage	RMS	(200V ~ 220V) ±10% *1 (380V ~ 480V) ±10%
	Line current	RMS	< 47A
	Apparent Power		< 24.4kVA
	Frequency		45 ~ 65Hz
	Power factor	typ	0.98
Output parameters (connect to EUT) (connect to grid)			
AC Output	Output voltage	VLN *2	0 ~ 350V
		VLL	0 ~ 606V (3phase) / 0 ~ 700V (reverse)
	Output current	RMS	105A (1phase) / 35A (3phase/reverse)
		Crest Factor *3	6
		Peak	315A (1phase) / 105A (3phase/reverse)
	Output power	Per Phase/Per Channel	7kVA
		Max. Power	14kVA (reverse phase) / 21kVA (1phase/3phase)
	Voltage setting		
	Range	0 ~ 350V (1phase/3phase) / 0 ~ 700V (reverse)	
	Resolution	0.01V	
	Accuracy	< 0.1%+0.1% F.S. (16Hz ~ 500Hz) / < 0.1%+(0.2%*kHz)F.S. (500.01Hz ~ 2.4kHz)	
	DC offset voltage	typ	0.02Vdc
	Current Limit setting		
	Range	RMS	105A (1phase) / 35A (3phase/reverse)
	Resolution	0.01A	
	Accuracy	< 0.1% + 0.2% F.S. (16Hz ~ 150Hz) / < 0.2% + 0.3% F.S. (150.01Hz ~ 500Hz) / < 0.3%+(0.6%*kHz) F.S (500.01Hz ~ 2.4kHz)	
	Frequency		
	Range	16 ~ 500Hz (Low *4) / 16 ~ 2.4k (High *4)	
	Resolution	0.01Hz	
	Accuracy	0.01% (16Hz ~ 500Hz) / 0.1% (500.01Hz ~ 2.4kHz)	
	waveform synthesis	50/60Hz	up to 50 orders
	Phase		
	Range	0 ~ 360°	
	Resolution	0.01°	
DC Output	voltage setting		
	Range	-499 ~ 499Vdc (1phase) / -998 ~ 998Vdc (reverse)	
	Resolution	0.01V	
	Accuracy	< 0.1%+0.1% F.S	
	Current setting		
	Range	-35 ~ 35Adc (reverse) / -105 ~ 105Adc (1phase)	
	Resolution	0.01A	
	Accuracy	< 0.1% + 0.2% F.S.	
	Max. power		
	Phase power	Per Channel	7kW
Max. power (reversephase)	Max. Power (reverse phase)	14kW	
Total power	Max. Power (1phase)	21kW	
Voltage stability	Line regulation	< 0.05% F.S.	
	Load regulation*5	< 0.05% + 0.05% F.S.(DC,16Hz ~ 500Hz) / < 0.05% + (0.1%*kHz) F.S(500.01Hz ~ 2.4kHz)	
	THD *6	< 0.5%(16Hz ~ 100Hz) / < 1%(100.01Hz ~ 500Hz) / < 1%+(1%*kHz) F.S.(500.01Hz ~ 2.4kHz)	
	Voltage ripple	RMS	< 0.4V
	Dynamic response*7	typ	200us
Programmable impedance	R Range	0 ~ 1000mΩ(3phase) / 0 ~ 333.333mΩ(1phase) / 0 ~ 2000mΩ(reverse)	
	L Range	0 ~ 1000uH (3phase) / 0 ~ 333.333uH (1phase) / 0 ~ 2000uH (reverse)	
RLC	P Range	0 ~ 7kW (3phase) / 0 ~ 21kW (1phase) / 0 ~ 14kW (reverse)	
	QL Range	0 ~ 7kVar (3phase) / 0 ~ 21kVar (1phase) / 0 ~ 14kVar (reverse)	
	QC Range	0 ~ 7kVar (3phase) / 0 ~ 21kVar (1phase) / 0 ~ 14kVar (reverse)	
	R Range	1 ~ 1000Ω (3phase) / 0.333 ~ 333.333Ω (1phase) / 2 ~ 2000Ω (reverse)	
	L Range	1 ~ 5000mH (3phase) / 0.333 ~ 1666.667mH (1phase) / 2 ~ 10000mH (reverse)	
	C Range	0.001 ~ 5mF (3phase) / 0.003 ~ 15mF (1phase) / 0.001 ~ 2.5mF (reverse)	
	Voltage Slew Rate, Typical	≥2 V/μs with full-scale programmed voltage step	
Output Isolation		550Vac	
Output parameters (electronic load mode)			
AC Mode	Input voltage	VLN	30 ~ 350V
		VLL	51.96 ~ 606V (3phase) 30 ~ 700V (reverse)
	Input frequency	16~500Hz	
		RMS	105A (1phase) / 35A (3phase/reverse)
	Input current	Crest Factor *8	5
		Peak	315A (1phase) / 105A (3phase/reverse)
		Per Phase	7kVA (3phase)
	Input power	Max. Power	14kVA (reverse phase) / 21kVA (1phase/3phase)
	CC Mode		
	Current range	RMS	105A (1phase) / 35A (3phase/reverse)
	Resolution	0.01A	
	Accuracy*9	< 0.1% + 0.2% F.S. (DC,16Hz ~ 150Hz) / < 0.2% + 0.3% F.S.(150.1Hz ~ 500Hz *10)	
	CP Mode		
	Range	Max. Power	21kW (1phase/3phase) / 14kW (reverse phase)
		Per Phase	7kW (3phase)
	Resolution	0.001kW	
	Accuracy	< 0.4%+0.4% F.S. (DC,16Hz ~ 500Hz)	

AC Mode	CS Mode		
	Range	Max. Power	21kVA (1phase/3phase) / 14kVA (reverse phase)
		Per Phase	7kVA (3phase)
	Resolution	0.001kVA	
	Accuracy	<0.4% +0.4% F.S. (16Hz ~ 500Hz)	
	CR Mode		
	Range	0.334 ~ 388.88Ω(1phase) / 1.002 ~ 1166.6Ω (reverse phase) / 1.002 ~ 1166.6(3phase)	
	Resolution	0.001Ω	
	Accuracy*11	0.4%+0.4%F.S.	
	Parallel rlc: Circuit Emulation(CE)-Parallel rlc		
	R Range	0.334 ~ 388.88Ω(1phase) / 1.002 ~ 1166.6(reverse phase) / 1.002 ~ 1166.6(3phase)	
	L Range	1 ~ 2000mH (1phase) / 3 ~ 2000mH (reverse phase) / 3 ~ 2000mH(3phase)	
	C Range	0.001 ~ 9900uF (1phase) / 0.001 ~ 3300uF (reverse phase) / 0.001 ~ 3300uF (3phase)	
	Rc Range	0.334 ~ 388.88Ω(1phase) / 1.002 ~ 1166.6Ω (reverse phase) / 1.002 ~ 1166.6 (3phase)	
	RL Range	0.334 ~ 388.88Ω(1phase) / 1.002 ~ 1166.6Ω(reverse phase) / 1.002 ~ 1166.6(3phase)	
	IL Range	0 ~ 318.15A (1phase) / 0 ~ 106.05A (reverse phase) / 0 ~ 106.05A (3phase)	
	Max peak current	318.15A (1phase) / 106.05A (reverse phase) / 106.05A (3phase)	
	Rectifier single phase rlc: Circuit Emulation(CE)-Rectifier single phase rlc		
	R Range	0.334 ~ 388.88Ω(1phase) / 1.002 ~ 1166.6(reverse phase) / 1.002 ~ 1166.6(3phase)	
	L Range	0.1 ~ 2000mH(1phase) / 0.3 ~ 2000mH (reverse phase) / 0.3 ~ 2000mH (3phase)	
	C Range	0.001 ~ 9900uF (1phase) / 0.001 ~ 3300uF (reverse phase) / 0.001 ~ 3300uF (3phase)	
	RS Range	0 ~ 388.88Ω(1phase) / 0 ~ 1166.6Ω (reverse phase) / 0 ~ 1166.6Ω(3phase)	
	Vcap Range	0 ~ 499.924V (1phase) / 0 ~ 499.924V (reverse phase) / 0 ~ 499.924V (3phase)	
	Vdiode Range	0 ~ 5V (1phase) / 0 ~ 5V (reverse phase) / 0 ~ 5V (3phase)	
	Max peak current	318.15A (1phase) / 106.05A (reverse phase) / 106.05A (3phase)	
	Phase Range		
	Range	Rectified Mode *12	-82.8°~+82.8°
		-180° ~ +180°(Current Source Mode: +90.01° ~ +180° & -90.01° ~ -180°)	
	Resolution	0.01°	
	Accuracy*13	1% F.S.	
	CF setting		
	Range	1.414 ~ 5.0	
	Resolution	0.001	
	PF setting		
	Range	0 ~ 1.00	
	Resolution	0.01	
DC Mode	voltage range	30 ~ 499 (1phase) / 30 ~ 998 (reverse phase)	
	current range	0 ~ 105A (1phase) / 0 ~ 35 (reverse phase)	
	current rise time	200us	
	working mode	CC, CV, CR, CP, CC+CV, CR+CV, CP+CV, CC+CR, CC+CV+CP+CR	
	Measurement parameter (grid simulator mode)		
Voltage RMS	Resolution	0.01V	
	Accuracy	<0.1%+0.1% F.S. (DC,16Hz ~ 500Hz) / <0.1%+(0.2%*kHz) F.S (500.01Hz ~ 2.4kHz)	
Current RMS	Resolution	0.1A	
	Accuracy	<0.1% + 0.2% F.S. (DC,16Hz ~ 150Hz) / <0.2% + 0.3% F.S. (150.01Hz ~ 500Hz) / <0.3% + (0.6%*kHz) F.S (500.01Hz ~ 2.4kHz)	
Peak current	Resolution	0.1A	
	Accuracy	<0.4% + 0.6% F.S. (16Hz ~ 500Hz) / <0.4% + (1.2%*kHz) F.S (500.01Hz ~ 2.4kHz)	
Output power	Resolution	0.001kW	
	Accuracy	<0.4% +0.4% F.S. (DC,16Hz ~ 500Hz) / <0.4% +<(0.8%*kHz) F.S (500.01Hz ~ 2.4kHz)	
Harmonic measurement	Max.	50/60Hz	up to 50 orders
Measurement parameter (electronic load mode)			
Voltage RMS	Range	0 ~ 350Vrms	
	Resolution	0.01V	
	Accuracy	<0.1%+0.1% F.S. (DC,16Hz ~ 500Hz)	
Current RMS	Range	0 ~ 105A	
	Resolution	0.1A	
	Accuracy	<0.1% + 0.2% F.S. (DC,16Hz ~ 150Hz) / <0.2% + 0.3% F.S. (150.1Hz ~ 500Hz)	
Peak current	Range	0 ~ 315A	
	Resolution	0.1A	
	Accuracy	<0.3% + 0.6% F.S. (16Hz ~ 500Hz)	
Active power	Range	0 ~ 21kW	
	Resolution	0.001kW	
	Accuracy	<0.4% +0.4% F.S.	
Reactive power	Range	0 ~ 21kVAR	
	Resolution	0.001kVAR	
	Accuracy	<0.4% +0.4% F.S.	
Apparent power	Range	0 ~ 21KVA	
	Resolution	0.001KVA	
	Accuracy	<0.4% +0.4% F.S.	
CF measurement	Range	1 ~ 5	
	Resolution	0.01	
PF measurement	Range	0.1 ~ 1	
	Resolution	0.01	
	Accuracy	1%F.S.	

IT7900EP High Performance Regenerative Grid Simulator

Harmonic measurement	Max.	50/60Hz	up to 50 orders
Regenerative			
Max. Regenerative power		21kVA	
THD		< 5%	
Others			
Efficiency	typ*14	91%	
Protection		OVP, OCP, OPP, OTP, FAN, ECP, Sense, UVP(load), FE(load)	
dimension		483.00mm(W)*151.30mm(H)*777.50mm(D)(841.6mm cover and holder included)	
Weight		42kg	
Working temperature		0 C -50 C	
Programming response time		2ms	
Remote Sense Compensation Voltage		20V	
Communication interface		Built in USB/CAN/LAN/digital IO communication interface, optional GPIB/analog&RS232 communication interface	

*1 (200 ~ 220) $\pm$ 10%, power is 60% of the rated.

*2 Depending on the frequency, the output voltage will decrease. The rated voltage can be output below 1.4kHz, the maximum output voltage at 2kHz is 250.76Vrms, and the maximum output voltage at 2.4kHz is 208.97Vrms.

*3 When the output frequency is below 50Hz/60Hz, and the peak current is not exceeded, the maximum CF is 6; under the condition of full current and full power, the maximum CF is 3.

*4 When loopSpeed is low, it can better complied DUT's characteristics; When LoopSpeed is High, the dynamic response time will be faster.

*5 Parallel models need to use sense remote measurement mode for testing.

*6 Test condition: pure resistive load, under full power condition.

*7 Dynamic response time test condition, DC mode, high speed, capacitance of DUT < 10uF.

*8 When the input frequency is below 50Hz/60Hz, and the peak current is not exceeded, the maximum CF is 5; under the condition of full current and full power, the maximum CF is 3.

*9 For frequency < 150Hz, the minimum current for accuracy test is 1%F.S., for frequency > 150Hz, the minimum current for accuracy test is 3%F.S.

*10 When LoopSpeed is Low, it is more adaptable to the load; when LoopSpeed is Fast, the dynamic response is faster; when the frequency is high, please use Fast mode.

*11 Under condition: $I > 10\%$ F.S., $F < 150$ Hz

*12 In the rectifier load mode, the setting range of the phase angle is related to CF. The larger the CF, the larger the set range of the phase angle.

*13 ≤ 150 Hz, 1%F.S., > 150 Hz, 5%F.S.

*14 Test conditions: Input 380VLL/50Hz, output three-phase, each phase 350Vrms/50Hz/7kW.

*All the above parameters are subject to change without prior notice from ITECH.



This information is subject to change without notice. For more information, please contact ITECH.

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