SL1200A Series Regenerative AC / Grid Emulator, 3-phase (3Φ), Single- and Dual-Range Up to 1.35 MW_{AC}, 1.8 MW_{DC}

SL1201A 600 V_{L-L}, 63 A, 30 kW / 42 kVA
SL1202A 600 V_{L-L}, 63 A, 45 kW / 66 kVA
SL1203A 600 V_{L-L}, 125 A, 90 kW / 130 kVA
SL1212A 1200 V_{L-L}, 32.5 A, 45 kW / 68 kVA
SL1213A 1200 V_{L-L}, 65 A, 90 kW / 135 kVA
SL1214A 600 / 1200 V_{L-L}, 65 / 32.5 A, 45 kW / 68 kVA
SL1215A 600 / 1200 V_{L-L}, 130 / 65 A, 90 kW / 135 kVA

Now with ≤ 21 µs Delay for PHIL

SL1200A Software Front Panel (SFP)
SL1200A Grid Integration and Compliance Test Automation Suite



Figure 1. SL1215A Dual-Range, 600 and 1200 VAC, 90 kW / 135 kVA

KEYSIGHT

Introduction

Today's energy/grid infrastructure is changing and growing rapidly. Variable renewable energy (VRE) and inverter-based distributed energy resources (DERs) in the form of solar, wind, and battery storage are the dominant theme in global grid modernization initiatives. Within the automotive industry, the electrification of vehicles is expected to create significant demand on the grid for charging, while also expanding the opportunity for energy storage through vehicle-to-grid (V2G) power applications.

As the energy mix intensifies, so does the challenge of managing the way we produce, distribute, and consume electricity. "Smart" inverters with grid support functionality have emerged as a key enabler to overcoming such challenges. As a result, inverter manufacturers are required to adhere to a specific set of grid compliance/interconnection standards that necessitate the need for extensive test. To test, grid emulation equipment is required.

DERs are also moving to higher output voltages to reduce losses and costs, moving from 600 to 800 VAC, and potentially up to 1,000 VAC in the future (IEC-LV directive allows up to 1000 VAC). The goal of higher voltages combined with the requirement to provide grid support functions, such as high-voltage ride-through (HVRT), creates the need to test to even higher than the 1000 VAC limit.

To achieve the high voltages needed to test new inverter/control designs, inverter engineers often must either connect multiple power supplies in series or use an external transformer. This leads to costly, complex test setups with an inability to easily expand, along with reduced performance, wasted space, and other additional downsides.

Reduce system costs, complexity, and space with dual-voltage ranges and direct output up to 1200 VAC with no transformer!

Decrease your time to market with easy-to-use software for automating grid conformance standard test. Use the SL1220A to create your own tests. Use the SL1221A for automated anti-islanding test.

Achieve low- and high-voltage[1] without addition of large, expensive transformer

The SL1200A series was designed to handle all your AC / grid test needs up to 1200 VAC, from 30 kW / 66 kVA to 1.35 MW / 2.0 MVA[2] without the need for a transformer. Two voltage ranges are available: 600 VAC and 1200 VAC, as well as two dual-range models. The 600 VAC models are ideal for low voltage inverter test as well as EV and EVSE charging test applications. The 1200 VAC models allow for (HVRT) testing at the IEC LV-AC limit without the need for a large, complex test setup. The dual-range models can achieve both low- and high-voltage test in the same form factor.



Figure 2. Transformer

[1] Dual-range models: SL1214A and SL1215A only
[2] Parallel up to fifteen (15) to achieve up to 1.35 MW / 2.0 MVA (±1.8 MWDC).

Key features of the SL1200A three-phase AC emulator

NEW!

- Use as a power amplifier in PHIL power / grid simulation applications, ≤ 21 µs delay[3]
- Dual-range models for low- and high-voltage AC and DC test in the same rack space
- High-Power AC (1, 2, or 3Φ) and DC power source
- Up to 1200 V_{L-L} (±1000 V_{DC}) is achieved at full specifications without a transformer
- Up to 1875 Arms (±5400 A_{DC}); up to 1.35 MW / 2.0 MVA by paralleling (15) units
- Test to standards, such as IEC 61000, UL 1741 SB, IEEE 1547-2018 / 1547.1-2020, GB/T 37408…
- Regenerative, bidirectional power solution with CV and CC modes, standard on all models
- Get up and running quickly with intuitive SFP, test sequencing software, or automated test software[4]
- A complete, one-vendor solution of hardware, software, consulting, and support services worldwide for all grid-edge applications, such as anti-islanding test, EVSE / EV charging test, V2G, solar / PV inverter test, battery energy storage system test

Low-Latency PHIL Real-Time Grid Simulation[3]

Keysight's Real-Time PHIL solution is designed for engineers who need to test equipment against fast-changing, realistic grid conditions. It supports real-time simulation workflows by combining high-power AC / DC output capability, low-latency control, high-speed measurement feedback, and flexible operation modes in one integrated platform.

The result is a practical way to validate DERs, EV charging systems, energy storage systems, grid-edge controls, and other connected energy technologies before they are exposed to real grid events.

Characteristic	Description	Customer Value
Low-Latency PHIL	CV actuation delay (open circuit): ≤ 21 µs CV measurement delay: ≤ 21 µs	• Reduces loop delay for improved real-time PHIL performance
Power / Size	90 kW AC, 120 kW DC per rack Up to 1.35 MW AC, 1.8 MW DC	• Supports right-sized configurations • Provides AC and DC capability in one system
Voltage Range	Low range: 1.275 pu (612 V_{RMS}) High range: 2.55 pu (1,224 V_{RMS}), I_{PhMax} = 36 A_{RMS}	• Extends testing beyond nominal 480 V grids • Supports high-voltage testing without a transformer
Instant. Peak Curr.	2.0 pu	• Supports short-duration current and power transients • Enables dynamic grid-event validation
Instant. Peak Volt.	2.3 pu (480 V_{RMS}L-L)	
Real-Time Interface	Aurora support via soft front panel (SFP) Measurement / setpoint update rate: 1 Msps	• Provides high-speed interface for real-time simulation • Enables rapid command and measurement updates
CV Amplified Bandwidth	-3 dB: ≥ 60 kHz	• Supports high-fidelity emulation of dynamic grid conditions
Max. Volt. Slew	15 V/µs (resistive load)	
CV Output Impedance[4]	1% at 60 Hz 35% at 2 kHz	• Maintains controlled voltage-source behavior across frequency
Meas. Bandwidth	≥ 100 kHz (Voltage -3 dB)	• Captures fast voltage behavior for analysis
Control	Constant-current operation	• Expands flexibility beyond constant-voltage operation

For more information, please see the data sheet (Publication number 3126-1765)

[3] Available on all SL1200A models with a simple upgrade; Contact Keysight to find out more.

[4] Applies to the low range only; impedance in high-range is 4X; $|Z_{OUT}| / R_{LNOM}$ where $R_{LNOM} = V_{NOM}^2 / P_{NOM}$

Automation of Test Standards

KS8400B PathWave Test Automation provides powerful, flexible, and extensible test sequencing and test plan creation with additional capabilities that optimize your test software development and overall performance. The SL1200A Grid Integration and Compliance Test Automation Suite is a package of plugins to the KS8400B that enable automation of many grid compliance tests.

IEEE 1547	AS/NZS 4777.2	GB/T 37408	VDE-AR-N 4105	CEI 0-16
UL 1741 SB	G98/G99	GB/T 36547	VDE-AR-N 4110	CEI 0-21

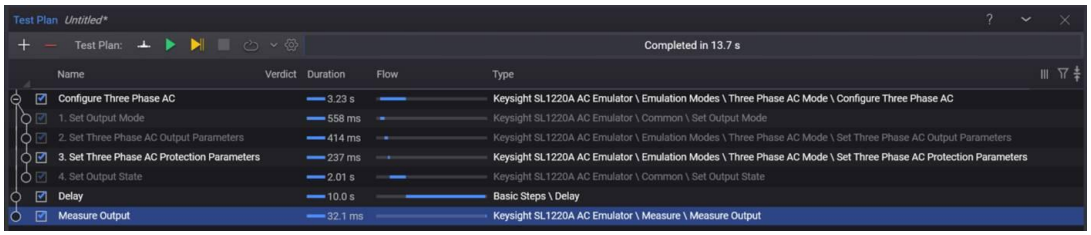


Figure 4. SL1200A test suite running a test sequence

To learn more about the SL1200A and grid compliance test, please read our Automated IEEE 1547.1 Test brochure.

To learn more about the SL1221A, please read the PHIL-based, Automated Anti-Islanding Test solution brochure

Harmonics and Interharmonics

The SL1200A series has the capability of injecting and measuring even and odd harmonics and interharmonics up to the 50th order. With programming accuracy of 0.01% and measurement accuracy of ±0.05 Hz, harmonics and interharmonics can be injected as well as measured accurately, eliminating the need for an external power analyzer in most cases. A Software Front Panel (SFP) is included standard, making creation and measurement of harmonics for the SL1200A quick and easy.



Figure 3. SL1200A Software Front Panel – Harmonics injection and analysis tab

Balancing Real and Reactive Power Capability

Grid test standards require the grid emulator to source or load reactive power (PF < 1). For example, IEEE 1547.1-2020 states the need for PF = 0.9. This makes Apparent Power a key specification of a grid emulator. However, most standards tests are performed at PF = 1 making maximum Real Power an even more important specification. The ideal grid emulator provides as much real power (power density) as possible, with sufficient apparent power to provide for sourcing / loading with power factors < 1.

It is also clear from the definition of power factor: PF = Real Power (kW) / Apparent Power (kVA),

the maximum Apparent Power of a grid emulator can't be provided at PF = 1 (see left graph in Figure 3). Keysight can provide graphs, such as Figure 3 below, to show the relationship between voltage, current, PF, kVA, and kW, enabling a clear understanding of the capabilities of the SL1200A.

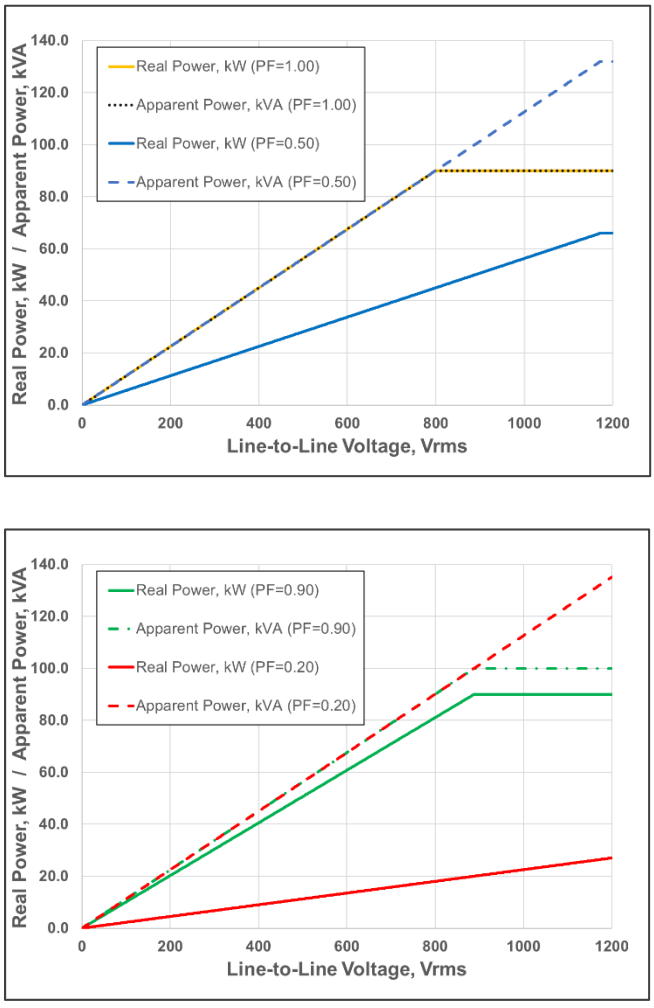


Figure 5. Operating voltage vs. real and apparent power by power factor for one (1) SL1213A

Test Flexibility

Dual AC and DC Voltage Ranges in Same Space

The SL1214A and SL1215A models are dual-range AC and DC. The AC ranges are 600 VL-L and 1200 VL-L. Option SDC enables dual-range DC of ±500 V and ±1000 V. The dual ranges allow for testing to low- and high-voltage standards without compromising valuable lab space. It's like having two AC / grid emulators in one. If your current test needs only call for low-voltage, but you anticipate high-voltage test needs in the future, these dual-range models are a futureproof investment.

Paralleling and "de-paralleling"

Up to fifteen (15) SL1200As with the same voltage range and power level can be arranged in parallel to achieve higher power up to 1.35 MW / 2.0 MVA (1.8 MW_{DC} with Option SDC). A simple output combiner box and one cable for communication between the director and each follower are all that is needed. For example, any combination of fifteen (15) SL1212A (1200 VAC, 45 kW) and SL1214A (Dual-Range, 45 kW) units can be paralleled if the SL1214A is in the high-voltage range (1200 VAC). SL1200A units can be easily paralleled and "de-paralleled" as many times as necessary to meet the needs of your current application.

High-Power DC operation up to ±1.8 MW (Option SDC)

Option SDC provides the additional hardware necessary to operate the SL1200A as a high-power, regenerative (bidirectional, 4-quadrant) DC power supply / electronic load up to ±1.8 MW. In today's ever-changing energy market, having AC and DC in one solution provides an extraordinary level of flexibility and futureproofing. There are many applications, such as AC and DC charging test, where AC and DC operation in the same system saves costs and space.



Figure 6. Three (3) SL1215A in parallel can achieve 270 kW / 405 kVA

SL1200A Regenerative AC Emulator Soft Front Panel (SFP)

The SL1200A Series of Regenerative AC Emulators are controlled using a user-friendly software front panel (SFP). All functions of the SL1200A are configured through the SFP, including firmware updates.

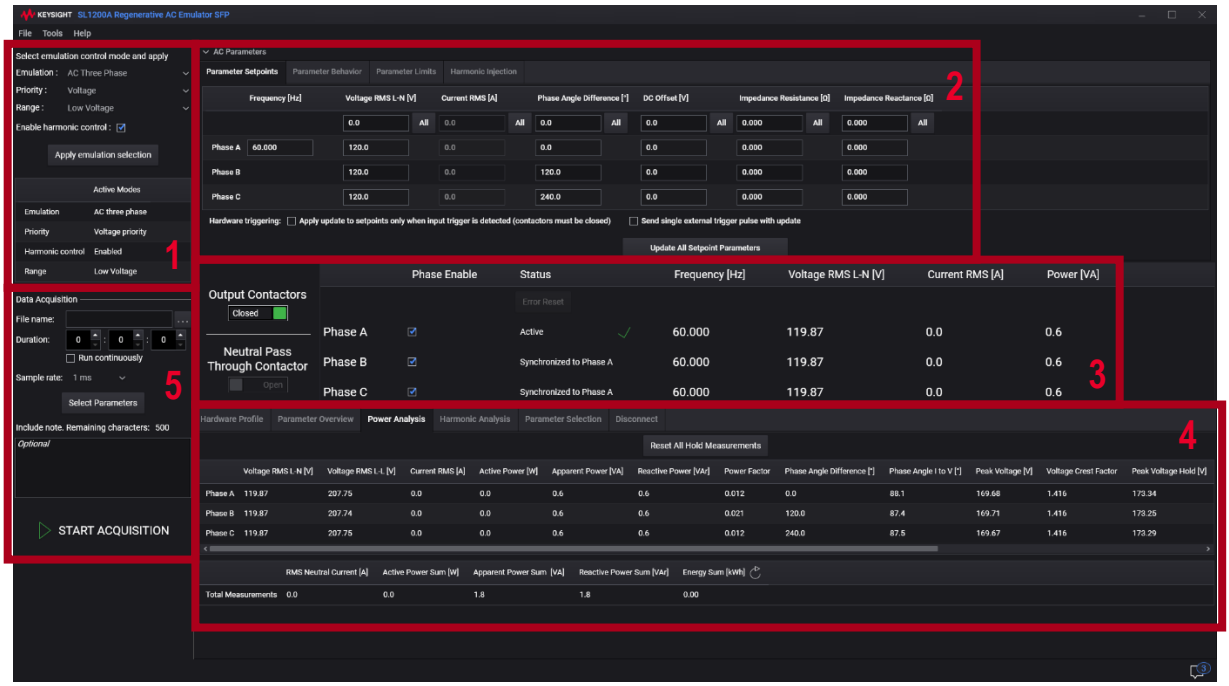


Figure 7. The SL1200A was designed for usability.

SFP functionality areas

1. Emulator configuration: Set emulation mode (1, 2, 3Φ, or DC), priority (voltage, current, or power), or range (dual-range models only)
2. Control parameters: Setpoints, behavior, and limits
3. On/Off control and measurements: Turn output/phases on/off control and basic measurements
4. Information tabs: System Profile, Parameter Overview, Power Analysis, Harmonic Analysis, Status, and Disconnect
5. Data acquisition: Create a file name, set duration and sample rate, enter notes, and click Start to begin capturing data.

Complete Solutions for Automotive and Energy Applications

When paired with Keysight's energy test solutions, the SL1200A Series provides a complete solution for PV Inverter, Energy Storage System inverter, and Charging (EV and EVSE) test.

Keysight's Photovoltaic / Solar Inverter Test Solutions

Whether your inverter has one or twelve inputs / MPPTs, Keysight's Photovoltaic / Solar Inverter Test Solution, shown in Figure 8, can help you go beyond the test standards to maximize performance and bankability.



Figure 8. SL1202A AC Emulator with PV8900A Solar Array Simulators and DG9000A PV software.

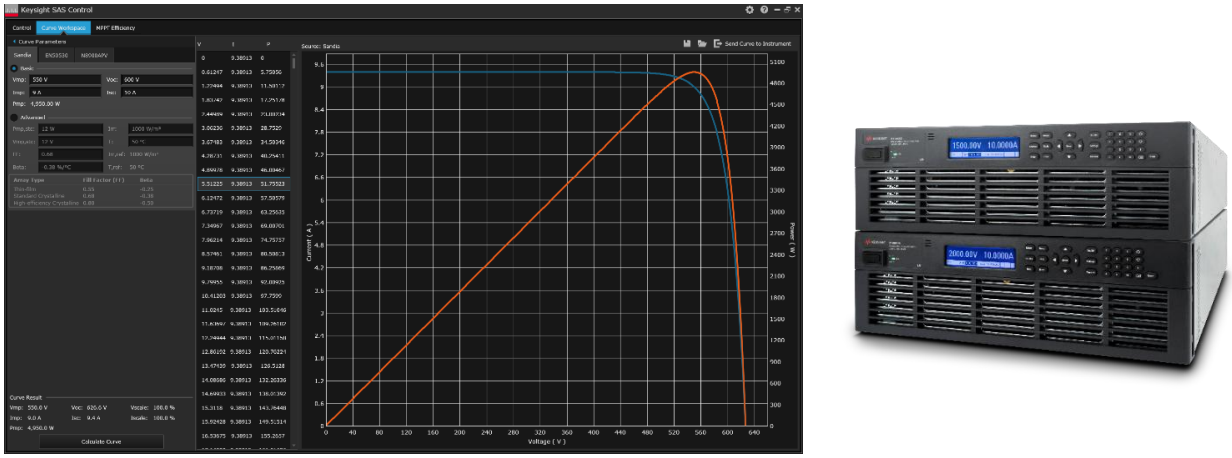


Figure 9. PV8900 Series (right) with DG9000A Software (left).

Learn more about the DG9000A and PV8900A Solar Array Simulator solutions at keysight.com.

Keysight's charging test solutions

Keysight's Charging Discovery System Series (CDS) is a breakthrough solution for holistic test of all AC and DC charging interfaces of electric vehicles (EV) and electric vehicle supply equipment (EVSE). When coupled with an SL1214A AC emulator perform AC charging test, as shown below in Figure 10. The SL1214A can also test the AC input side of an EVSE as well as the high-voltage DC output side for DC fast charging (Option SDC required).



Figure 10. AC charging test with SL1214A Dual-Range AC Emulator and SL1040A Charging Discovery System test.



Figure 11. (From left to right) SL1040A EMC, SL1040A Portable, and SL1047A High-Power.

Learn more about the SL1040A EMC and Portable Series and the SL1047A High-Power Series at keysight.com.

Specifications

Unless otherwise noted, specifications are warranted over the ambient temperature range of 10 to 40 °C after a 30-minute warm-up period. Specifications apply at the output terminals, with the sense terminals connected to the output terminals (local sensing).

	SL1201A	SL1202A	SL1203A	SL1212A	SL1213A	SL1214A	SL1215A
Operating modes[5]	AC, AC + DC offset DC, DC + AC ripple						
Output connections[5]	L1, L2, L3, N, PE DC+, DC-, PE						
AC output ratings							
Output phase	1, 2, or 3 (3-phase selectable, 1-phase @ max power[6])						
Max. real power[7] (Per phase[5])	30 kW (10 kW)	45 kW (15 kW)	90 kW (30 kW)	45 kW (15 kW)	90 kW (30 kW)	45 kW (15 kW)	90 kW (30 kW)
Max. apparent power[7] (Per phase[8])	42 kVA (14 kVA)	66 kVA (22 kVA)	130 kVA (43.3 kVA)	68 kVA (22.7 kVA)	135 kVA (45 kVA)	67.5 kVA[9] (22.5 kVA)[9] 68 kVA[10] (22.7 kVA)[10]	135 kVA (45 kVA)
Voltage (rms)							
Range	600 V_{L-L} 346 V_{L-N}	600 V_{L-L} 346 V_{L-N}	600 V_{L-L} 346 V_{L-N}	1200 V_{L-L} 692 V_{L-N}	1200 V_{L-L} 692 V_{L-N}	LV: 600 V_{L-L}, 346 V_{L-N} HV: 1200 V_{L-L}, 692 V_{L-N}	
Prog. accuracy	0.2% FS[11]						
Prog. resolution	0.1 V						
Current (rms)							
Max. current (3-phase) rms	63 A	63 A	125 A	32.5 A	65 A	65 A[9] 32.5 A[10]	130 A[9] 65 A[10]
Current rms @ Max. voltage	28.9 A	43.3 A	86.6 A	21.6 A	43.2 A	43.3 A[9] 21.6 A[10]	86.6 A[9] 43.2 A[10]
Max. current (1-phase) rms	189 A	189 A	375 A	97.5 A	195 A	195 A[9] 97.5 A[10]	390 A[9] 195 A[10]
Prog. Accuracy	0.2% + 0.4 A						
Prog. Resolution	0.1 A						

[5] DC operation requires Option SDC.
[6] In 1-phase mode all three phases are used in parallel to achieve the max power specification.
[7] Parallel up to fifteen (15) units for up to 1.35 MW / 2.0 MVA (Contact Keysight for solutions > 1.35 MW / 2.0 MVA).
[8] Max power spec. available in single-phase mode.
[9] Low-voltage (LV) range
[10] High-voltage (HV) range
[11] LV models / range: for an output of 15 – 346 VL-N, 26 – 600 VL-L; HV models / range: for an output of 15 – 692 VL-N, 26 – 1200 VL-L

	SL1201A	SL1202A / SL1214A LV range	SL1203A / SL1215A LV range	SL1212A / SL1214A HV range	SL1213A / SL1215A HV range
Frequency					
Range[12]	40 to 75 Hz				
Prog. accuracy	0.01% FS (FS = 75 Hz)				
Prog. resolution	1 mHz				
DC output ratings[13]					
Voltage range	±500 V	±500 V	±500 V	±1000 V	±1000 V
Current	±180 A	±180 A	±360 A	±90 A	±180 A
Current @ Max. voltage	±80 A	±120 A	±240 A	±60 A	±120 A
Power	40 kW	60 kW	120 kW	60 kW	120 kW
Voltage (DC)					
Prog. accuracy	0.03% + 75 mV			0.03% + 150 mV	
Prog. resolution	0.1 V				
Current (DC)					
Prog. accuracy	0.03% + 18 mA		0.03% + 36 mA	0.03% + 9 mA	0.03% + 18 mA
Prog. resolution	0.1 A				
Measurement (AC)	Vrms, Vpk, Vinst, Arms, Apk, Ainst, W, VAR, VA, Hz, PF, kWh, phase angle, crest factor				
Voltage accuracy	0.15% + 0.25 Vrms				
Voltage resolution	0.01 Vrms				
Current accuracy	0.2% + 0.4 Arms				
Current resolution	0.1 Arms				
Freq. accuracy	0.01% FS				
Freq. resolution	1 mHz				
Measurement (DC)					
Voltage accuracy	0.03% + 75 mV			0.03% + 150 mV	
Voltage resolution	0.1 V				
Current accuracy	0.03% + 18 mA		0.03% + 36 mA	0.03% + 9 mA	0.03% + 18 mA
Current resolution	0.1 A				

Physical specs	**SL1201A / SL1202A / SL1212A**	**SL1203A / SL1213A**	**SL1214A**	**SL1215A**
Height	1360 mm	1760 mm	1265 mm	1665 mm
Width	600 mm	600 mm	605 mm	605 mm
Depth	1050 mm	1050 mm	1020 mm	1020 mm
Weight	350 kg	500 kg	350 kg	500 kg

[12] Fundamental frequency up to 75 Hz with full specifications.
[13] DC mode requires Option SDC.

Supplemental Characteristics

Supplemental characteristics are not warranted but are descriptions of performance determined either by design or by type testing. Supplemental characteristics are typical unless otherwise noted and apply at the DUT in compliance to the specified load line length, with local sensing.

	SL1201A	SL1202A / SL1214A LV	SL1203A SL1215A LV	SL1212A / SL1214A HV	SL1213A / SL1215A HV
Voltage					
Load regulation (DC)	0.25% FS				
Slew rate[14] (DC)	500 V / ms				
Crest factor (AC)	Up to 3.6				
THD (AC)	0.25% (resistive load)				
Phase Loss/Dropout[15]	≤ 50 µs				
Current					
Rise time (DC)	< 2 ms (10% to 90%)				
Leakage Curr. (AC)	Test data available on request				
Real Power, Apparent Power, Reactive Power					
Meas. accuracy	0.2% + 0.1% FS				
Meas. resolution	10 W, 10 VA, 10 VAr				
Phase angle					
Range	0 to 360 deg				
Meas. accuracy	< ±2 deg				
Meas. resolution	0.5 deg				
Prog. accuracy	1.5 deg				
Prog. resolution	0.1 deg				
Peak current (AC)					
Meas. accuracy	0.5% + 0.5 A (< 100 Hz)				
Power Factor					
Meas. accuracy	0.1% FS				
Meas. Resolution	0.01				
Energy					
Meas. accuracy[16]	0.153%		0.213%	0.155%	0.185%
Meas. Resolution[17]	1 Wh (for cumulative energy measurements up to 1 MWh				
AC input ratings (source and regenerative operation)					
Voltage	380 to 480 VAC ±10%, 50 or 60 Hz ±2%,				
Connections[18]	L1, L2, L3, N, PE (5-wire) L1, L2, L3, PE (4-wire)[19]				
Current (option STD)[20]	53 A	79 A	156 A	79 A	156 A
Current (option SDC)[20]	70 A	105 A	210 A	105 A	210 A
Efficiency @ max pwr.	87.7%				
Power factor	0.99				

[14] Transition time from any voltage to 0 V
[15] Full voltage dropouts at faster speeds (~50 µs) can be achieved using Phase Loss / Dropout (see Getting Started Guide)
[16] Working point 230 VAC, 30 A (rms)
[17] For cumulative energy measurements up to 1 MWhr
[18] All SL1200 models with serial numbers below DE62330000 require all five wires, including Neutral to operate; Serial numbers DE62330000 and above only require four wires, Neutral is not needed
[19] Delta connections are not supported
[20] At 380 VAC input

All SL1200A Models

Harmonics and interharmonics Synthesis	
Voltage injection	up to 50th
Voltage harmonic amplitude accuracy	0.5% + 0.25 V
Voltage harmonic phase angle accuracy	0.1 deg x N + 1 (N = 2 to 50)
Current injection	up to 50th
Current harmonic amplitude accuracy	0.5% + 0.5 A
Current harmonic phase angle accuracy	0.1 deg x N + 1 (N = 2 to 50)
Harmonics and interharmonics Measurements	
Voltage THD meas.	up to 50th
Current THD meas.	up to 50th
Voltage harmonic amplitude accuracy	0.5% + 0.25 V
Voltage harmonic phase angle accuracy[21]	0.1 deg X N + 1 (N = 2 to 50)
Current harmonic amplitude accuracy	0.5% + 0.5 A
Current harmonic phase angle accuracy[21]	0.1 deg x N + 1 (N = 2 to 50)
Freq. meas. bandwidth	20 kHz

[21] Measurement of Harmonic Phase Angle when in Current Priority mode requires current flow; 1 A minimum load per phase is recommended.

Input / Output Connections

All SL1200A models have input and output connections that are easy to access and connect. The image below shows the connection cabinets on the rear-top of the system. The left cabinet is for the AC and DC output connections providing power to the device under test. The right cabinet is for the AC input connections providing power to the SL1200A system.



Figure 12. Rear connection cabinets (may differ slightly from actual product).

How to Order

Each model in the SL1200A Regenerative AC Emulator Series has two options available: STD and SDC. Test automation software is also available.

SL12xxA-STD standard system

This is the standard system. It supports AC and “AC + DC” modes.

SL12xxA-SDC standard system with DC hardware

This is the standard system with the hardware necessary to switch from AC-mode to DC-mode.

SL1200A Soft Front Panel

The SL1200A SFP is available for free download at www.keysight.com/find/SL1200software.
A license is not required.

SL1200A Grid Integration and Compliance Test Automation Suite

The SL1200A Grid Integration and Compliance Test Automation Suite is a collection of test automation software packages, or “plugins,” for Keysight’s KS8400B PathWave Test Automation Platform (TAP). The suite is designed to support grid integration and compliance testing for distributed energy resources (DERs) and grid-connected systems. The following plugins are available within the SL1200A suite:

- SL1220A AC / Grid Test Sequencing Plugin
- SL1221A PHIL-based Anti-Islanding Compliance Test Automation Software
- SL1222A Automated IEEE 1547 Electric Type Test – Frequency / Voltage Disturbance
- SL1241A SunSpec Modbus DER Communications Library for IEEE 1547
- SL1282A Automated Communications for SL1222A

The SL1200A Grid Test Suite is available for free download at www.keysight.com/find/SL1200gridtest.
The KS8400B can be downloaded for free at www.keysight.com/find/tap.

SL1200A Low-Latency PHIL Upgrade

For more information, please see the data sheet (Publication number 3126-1765).

You can also contact Keysight to find out upgrade options for your specific model.

Project Management, Commissioning, and Engineering Services

The following services are offered by Keysight to ensure smooth laboratory delivery, installation, commissioning, and reduce ramp-up time for our customers. Exact definition of services depends on the facilities, customer expertise, and overall scope of the project. Please work with your Keysight sales representative to discuss your specific needs.

PS-XPM-100-SL Project Management Services

Keysight recommend Project management services for each test bench project. By ordering the Project management services, an experienced project manager is dedicated to your project and acts as a direct communication interface from Keysight to the customer's project management team.

The project manager takes over responsibility to:

- Develop and manage the project plan
- Track project progress and milestones
- Communicate project status regularly and ensure any unscheduled project events or project deviations are communicated and promptly discussed with the customer project team
- Coordinate applicable delivery, installation, and commissioning on site
- Provide complete and accurate project documentation to the customer

PS-XCOM-100-SL Project Commissioning Services

Project commissioning services for the test solution provide an experienced test bench engineer to validate and complete the test bench setup in readiness for the customer's initial usage. It includes validating specific hardware and software configurations per the project requirements and any specific consulting agreed to beforehand, given the test bench's customer-specific usage.

PS-XENG-100-SL Engineering Services

Project engineering services provide specialized engineering services during project development and implementation. The customers project team will have access to engineering expertise to aid in various tasks specific to their project including but not limited to. Safety matrix and test bench guard, facilities and lab layout, special power requirements, etc.

KeysightCare for Solutions

KeysightCare for Solutions services goes beyond basic warranty, providing a priority-one connection between our resources and your teams. Every support tier includes access to the Keysight Support Portal and Knowledge Center. There you can find answers, manage service requests, and interact with Keysight experts familiar with the instruments and software you are using and the challenges you face. And all the packages offer onsite options for large systems which cannot be moved.

- Warranty Plus – Reduce risk and avoid project delays with technical support coverage.
- Assured – Increase supportability to match your application needs with a committed turnaround time.
- Enhanced – Keep your project schedules on track and receive priority support and even faster turnaround times for repairs and calibration to optimize your solution compared to the other tiers.

Service deliverables

	KeysightCare for Solutions Warranty Plus	KeysightCare for Solutions Assured	KeysightCare for Solutions Enhanced
	Onsite Upgrade R-55T-005- X[1]	Onsite Upgrade R-55U-005-X[1]	Onsite Upgrade R-55V-006-X[1]
Solution Technical Support (SW[2] & HW)			
Keysight Support Portal & Knowledge Center, 24x7	•	•	•
Remote technical support response time[3]	2 business days	4 business hours	2 business hours
Onsite Technical Support[4]		•	•
Solution Hardware Support			
Repair service coverage	Onsite	Onsite	Onsite
Onsite response time	No commitment	12 business days response time[6]	5 business days response time[6]
Solution calibration[7]			Up to Keysight calibration + uncertainty + guard banding - Onsite
Calibration turnaround time			Scheduled
Application of service notes	Safety and recalls	Recommended - during service	Recommended - proactive
Preventative maintenance[5]			•
Proactive firmware release notifications		•	•

1 When ordering, update with the relevant (Solution Product Number (SPN) based on the length of service required (e.g., -1, -2, -3, or -5 for 1 year, 2 years, 3 years or 5 years).

2 KeysightCare Software Agreement required for software support.

3 Remote Technical Support Response time is measured from the time you contact the KTAS team to have an initial meaningful response from the case owner.

4 Onsite technical support is provided or at the discretion of Keysight.

5 3rd party products are excluded for assured and enhanced packages.

6 Response time is measured from the date the service request is received to the date Keysight arrives at your site.

7 Recommended re-calibration period is 12 months.

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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