RLS Series

Regenerative AC & DC Load
6 to 24kVA/kW, Scale up to 1.296 MVA/MW

Most Flexible, Highest Performing & Intelligent AC & DC Regen Load

High Power Density
Now up to 24kVA/kW in 4U

Key Features

- Regenerative Power > 90% Energy Efficiency
- High Power Density – Up to 24kVA/kW in 4U
- Parallel up to 216kVA/kW per cabinet
- Parallel cabinets up to 432kVA/kW
- Three-Phase High Power Systems to 1.296 MVA/MW
- AC, DC and AC+DC Output Capability
- Single, Split, Three-Phase; Multi-Channel Mode
- Input Voltage Range: 350Vac L-N/606Vac L-L or ±475Vdc
- Exceptionally High AC Current
- RMS current up to 48A per phase (45Hz to 200Hz)
- Wide Load Frequency Range: DC, 15Hz - 1200Hz
- Full Galvanic Isolation
- Isolated Neutrals Available (Option W)
- Dynamic, Quiet, Efficient Operation
- Reduced Capacitance for High Freq. Optimization
- Low Leakage Output For Enhanced Load Optimization
- Advanced Waveform Capture Scope Display
- Powerful Current Transient Programming
- Generate Harmonics and Interharmonics Currents
- Inter-Harmonics Test Option
- Built-in **SmartSource Suite** Remote Control
- AC Load Modes: **CC, CP, CR, CC+CR, CC / CS Rectifier 1ø & 3ø**
- DC Load Modes: **CC, CP, CR, CR+CC**

Flexible Control

GPIB RS232 USB LAN LXI

Regen Load Simulator RLS Series

The RLS Regenerative Load Simulator is used to emulate real-world normal and abnormal load conditions for testing a wide range of electrification applications. **Delivering up to 24 kVA/kW in a compact 4U, this unit scales from 6 to 432 kVA/kW, with three-phase high-power configurations available up to 1.296 MVA/MW+**.

The RLS is the highest performance regenerative load in its class with a wide operating range across voltage, current, and frequency. With advanced loading options, get the perfrmance you need to meet any test challenge.

Application Examples

- Aerospace & Defense
- EV Charging, On Board Chargers (OBC), V2G, V2X
- Smart-Grid Simulation, Solar PV/Grid-Tied Inverters
- Energy Storage Systems (ESS), Home ESS
- AI Power Servers
- Compliance Testing, Test Labs, Research Labs

Highlights

Regenerative Power
Over 90% Energy Efficiency

High Performance,
High Frequency, Extra Current

Advanced Loading Capabilities
and Control

Modular, Scalable
High MW Power

Regenerative Power > 90%

The RLS Regenerative load provides over 90% energy efficiency and significant cost savings. Energy is returned to the facility or the grid rather than converting to heat.

Consider a burn-in test requiring 10 kW for 10 hours. In this simplified example to the right, the use of regenerative loads results in an energy savings of 189 kWh, which significantly reduces both electricity and HVAC costs.

Simplified Example of Regenerative Cost Savings

Resistive Load

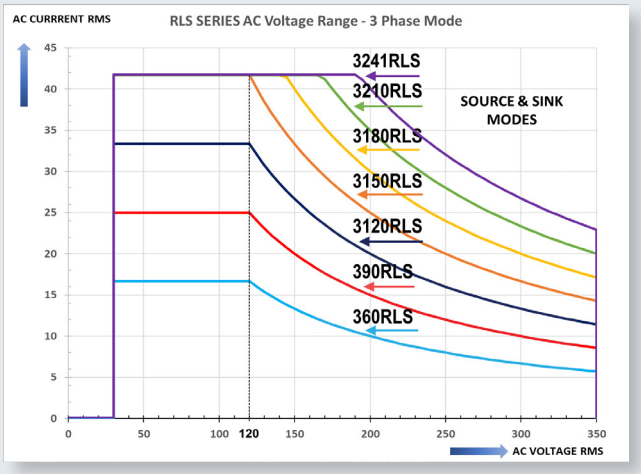
- Energy Consumed = 10kW * 10 hours = 100kWh
- HVAC Energy (Assuming 1:1 ratio for simplicity) = 100kWh
- Total Energy = 200kWh

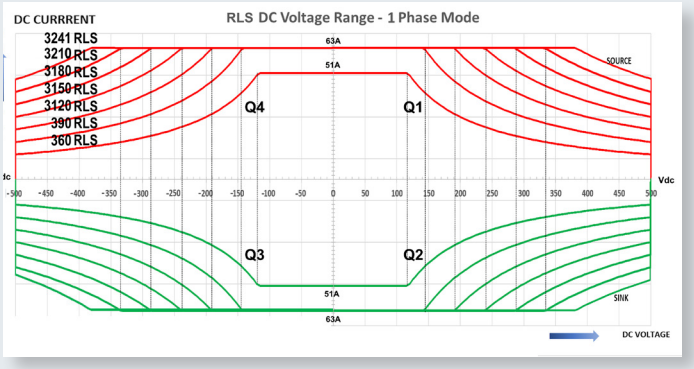
Regenerative Load

- Energy Consumed = 10kW * 10 hours = 100kWh
- Energy Recycled (Assuming 90% efficiency) = 90kWh
- Net Energy Consumed = 10kWh
- HVAC Energy (Minimal due to low heat output) ≈ 1kWh
- Total Energy = 11 kWh

Wide Input Voltage Range

The RLS Series uses a single, constant power voltage input range for both higher current at lower voltage and higher voltage at lower current load testing, eliminating the need to switch between multiple voltage ranges. This capability allows for testing a broad range of conditions and test requirements without interruption.



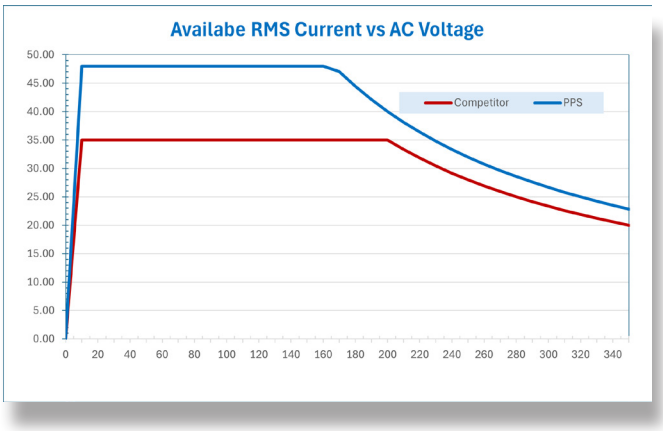


Charts of AC & DC Voltage Ranges in 3 Phase Mode. The values in this chart apply over full 1200Hz operating range. 48A rms max available from 45Hz to 200Hz.

Get Max RMS Current up to 48A More Current at Low Voltage

The RLS supports a broader range of load current from the UUT. The RLS provides a **max current per phase of 48A available up to 166.7Vrms from 45 to 200Hz**, capable of sinking up to 37% more current at lower voltage compared to a typical unit on the market that maxes out at 35A/phase.

- Higher RMS current rating at lower voltage settings
- Reduces capital investment
- Eliminate the risk of over or under sizing the load.



Test Applications

Regenerative AC/DC Load capability with both AC and DC operating modes pushes the boundaries of your test environment.

Supports testing of microgrids, PV inverters, V2G systems, EV chargers (EVSE), batteries, UPS systems, AC/DC power supplies, and more.

Several AC/DC Load Operating Modes

Simulate AC/DC linear and non-linear loads (rectified), inductive and capacitive loads with precision.

AC Load Modes			
Constant Current (CC)		CR + CC	
Constant Power (CP)		CC / CS Rectifier 1 Phase	
Constant App Power (CS)		CC / CS Rectifier 3 Phase	
Constant Resistance (CR) RMS or Instantaneous Mode			

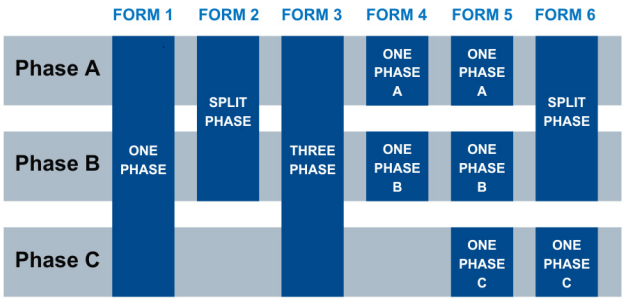
DC Load Modes	
Constant Current (CC)	
Constant Power (CP)	
Constant Resistance (CR) RMS or Instantaneous Mode	
CR + CC	

Ultimate Multi-Channel Testing Flexibility with Six Input Configurations

Flexibly test a wide range of EUTs selecting from six different load input configurations.

- Unique input configuration modes allow different functions per phase: AC or DC mode, or both.
- Forms 1 through 3 are typical for single, split or three-phase
  AC connections.
- The RLS Series has three isolated neutral connections, one for each phase/channel. This supports testing up to three independent sources.

Simultaneous AC & DC Operation on Individual Phases

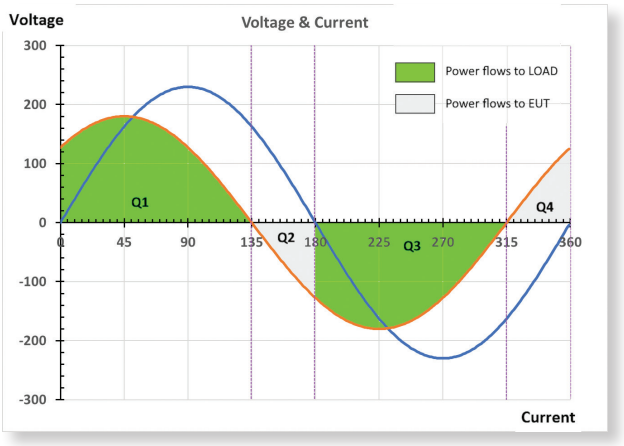


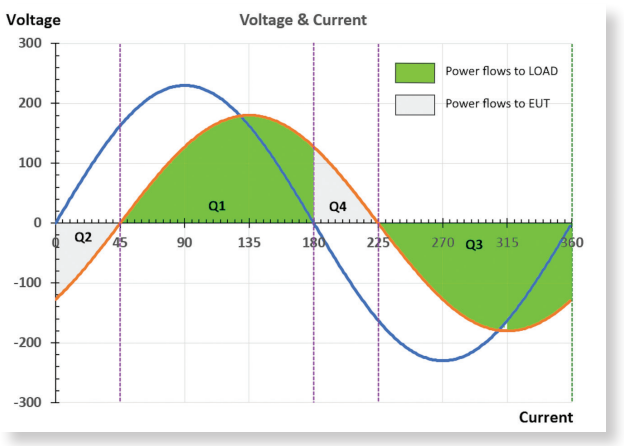
Automatic Switching of Operation Modes

Fully Test AC Power with 4-Quadrant Load

Full four-quadrant operation with programmable phase shift enables simulation of inductive, capacitive, linear, non-linear (rectified), leading, and lagging power factor loads.

- AC Modes: Constant Current, Constant Power & Apparent Power, Constant Resistance, CR + CC, CC / CS Rectifier Mode 1ø & 3ø
- DC Modes: Constant Current, Constant Power, Constant Resistance, CR+CC





Reduced Capacitance Option for High Frequency Load Mode Optimization (M25057)

- Mod is available to enhance loading capability to further reduce output capacitance and optimize load performance
- Reduced output capacitance for enhanced high-frequency load operation
- Optimized AC Load Performance in all applications where AC input Voltage has HF Switching Noise
- Output LC filter minimizes unwanted reactive current caused by high frequency voltage at Load input
- Enables increased operation stability when input AC voltage has high frequency content

Built-in Galvanic Isolation Reduces Safety Risks

RGS provides facility-to-output and phase-to-phase/channel-to-channel galvanic isolation, ensuring no electrical connection between channels. Each phase can operate as an independent source with full voltage and frequency control. This fully isolated design improves operator safety, prevents ground loops and UUT damage, and eliminates the need for external transformers - reducing system cost and footprint.

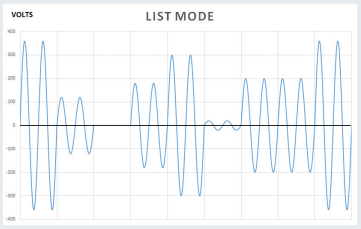
Low Leakage Optimization Option (M26007)

- Reduced AC input common-mode capacitance minimizes leakage current to earth
- Prevents nuisance tripping of RCD*/GFCI protection devices.
- Maintains full voltage and current source operation
- Simplifies integration into protected laboratory and production environments
- Ideal for installations with sensitive protection devices or strict leakage current requirements
- M26002 combines both reduced output capacitance AND low leakage (M25057 and M26007

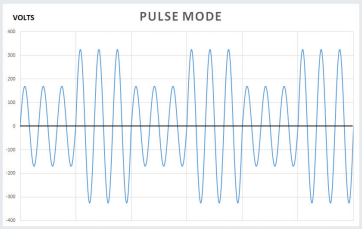
RCD* (Residual-Current Device): Residual-current circuit breaker or ground fault circuit interrupter)

Powerful Waveform & Measurement Tools

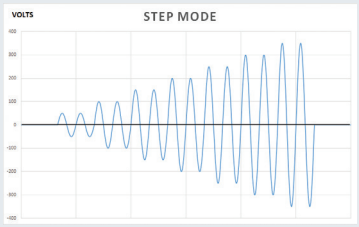
- Built-in waveform digitizer with scope function
- Fast transient capabilities at 200µsec
- LIST, PULSE and STEP Transients
- Over 200 Arbitrary Waveform
- 10 Standard, Sine, Square, Triangle, Clipped
- Harmonic generation (Inter-harmonics - Option C)



List Mode



Pulse Mode

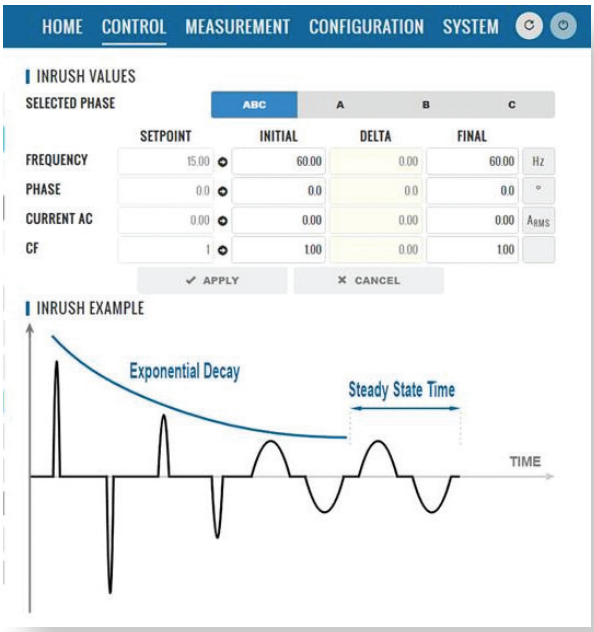


Step Mode

User Friendly Control Options

Multiple Control Options

- Intuitive Touch Screen LCD Display
- Soft Key driven Menus
- Built-In SmartSource Suite Web Interface
- LAN, GPIB, RS232 & USB Interfaces, and ModBus (optional)
- Supports external touch screen monitor via Video Output Interface



Simplify Test Automation with SmartSource Suite Remote Control Platform

Easily monitor, control, and manage testing with the RLS's SmartSource Suite remote control platform. Use the embedded, web browser interface with real-time control. Access control panels and test sequences on-premises or on any mobile device (laptop, phone, tablet) via secure client access.

- Full control and measurement capability
- Program settings and measurement read back including digital scope and harmonics data
- Extensive safety protection settings
- Waveform selection, preview and edit modes
- Execution of user's custom test sequences
- Transient data entry and execution screen using spreadsheet layout
- Advanced load function control screens such as Inrush Current (Shown left)

Modular & Scalable Power up to 1.296MW

Easily parallel multiple chassis to reach up to 216kW with 432Amps / phase per cabinet. Parallel cabinets up to 432kW. Three-Phase High Power System configurations available up to 1.296MW using a three-phase central controller.

- Easy configuration, flexible set up and reduced downtime
- Scalable power - expand now or later
- Mix different power ratings in parallel systems
- Cost-effective auxiliary no-controller models available
- Integrated 19” Rack systems offered in 18U, 32U, 42U cabinets.
- **Parallel configuration kits available** for custom cabinet integration.

NOTE: Cabinet sizes vary in EU, UK, India, China. Contact Global Sales Centers for more information

Parallel Systems Installed in 19” Rack Cabinet

Models	Rated Power[1] AC / DC mode	Voltage Ranges[2] Vac L-N / Vdc	Max. AC/DC Current per phase in 3 & 2 Phase Mode	Rack Space
3300RLS-4UC	30 kVA, kW / 30 kW	30-350 Vac / ± 0-475 Vdc	84.0 Arms / 42.0 Adc	18U
3360RLS-4UC	36 kVA, kW / 36 kW	30-350 Vac / ± 0-475Vdc	84.0 Arms / 42.0 Adc	18U
3481RLS-4UC	48 kVA, kW / 48 kW	30-350 Vac / ± 0-475 Vdc	96.0 Arms / 42.0 Adc	18U
3630RLS-4UC	63 kVA, kW / 63 kW	30-350 Vac / ± 0-475 Vdc	126.0 Arms / 63.0 Adc	18U
3721RLS-4UC	72 kVA, kW / 72 kW	30-350 Vac / ± 0-475 Vdc	144.0 Arms / 63.0 Adc	18U
3961RLS-4UC	96 kVA, kW / 96 kW	30-350 Vac / ± 0-475 Vdc	192.0 Arms / 84.0 Adc	32U
31050RLS-4UC	105 kVA, kW / 105 kW	30-350 Vac / ± 0-475 Vdc	210.0 Arms / 105.0 Adc	32U
31201RLS-4UC	120 kVA, kW / 120 kW	30-350 Vac / ± 0-475 Vdc	240.0 Arms / 105.0 Adc	32U
31441RLS-4UC	144 kVA, kW / 144 kW	30-350 Vac / ± 0-475 Vdc	288.0 Arms / 126.0 Adc	32U
31681RLS-4UC	168 kVA, kW / 168 kW	30-350 Vac / ± 0-475 Vdc	336.0 Arms / 147.0 Adc	42U
31921RLS-4UC	192 kVA, kW / 192 kW	30-350 Vac / ± 0-475 Vdc	384.0 Arms / 168.0 Adc	42U
32161RLS-4UC	216 kVA, kW / 216 kW	30-350 Vac / ± 0-475 Vdc	432.0 Arms / 189.0 Adc	42U

Note 1: For Split Phase mode, rated power is 2/3.
Note 2: For Voltage ranges above 333Vac some frequency and Vthd restrictions apply.

Additional Information:

- Paralled systems up to 432kVA/kW.
- Three-Phase high power system configurations available up to 1.296 MVA/MW; Contact Factory for details.
- Legacy model numbers are still available for ordering.
- Contact factory for cabinet output wiring modifications to support single phase AC mode on cabinets above 84kVA

Technical Specifications

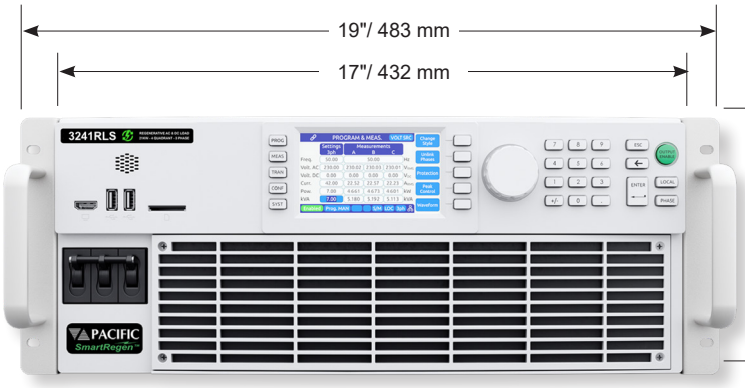
MODEL:	360RLS-4U	390RLS-4U	3120RLS-4U	3150RLS-4U	3180RLS-4U	3210RLS-4U	3241RLS-4U
Modes of Operation: AC Modes: Constant Current, Constant Power & Apparent Power, Constant Resistance, CR + CC, CC / CS Rectifier Mode 1ø & 3ø DC Modes: Constant Current, Constant Power, Constant Resistance, CR+CC							
AC or DC Input							
Phase Modes (Form)	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3	1, 2 or 3
Maximum Power (Total)	6 kW/kVA	9 kW/kVA	12 kW/kVA	15 kW/kVA	18 kW/kVA[1]	21 kW/kVA[1]	24 kW/kVA[1]
Per Phase / Channel	2 kW/kVA	3 kW/kVA	4 kW/kVA	5 kW/kVA	6 kW/kVA	7 kW/kVA	8 kW/kVA
DC Offset: < 20 mV | Output Noise (DC – 300 kHz) < 150 mV rms							
Load Input Voltage							
Input Range[2]	AC Range: 30 - 350 VLN / 50 - 606 VLL RMS (Sync Mode) | DC Range: 0 - ±475 VDC						
Resolution: 0.01 | Accuracy: ± 0.25% F.S							
Line Regulation	< 0.1% for 10% Line Change						
Current Regulation	± 0.02% (CSC Mode)						
Phase Angle - Range (B, C): 0 - 359.9° | Resolution: 0.1°							
Maximum Current							
3 & 2 Phase modes AC / DC	17.0 Arms / 17.0 Adc	25.0 Arms / 21.0 Adc	34.0 Arms / 16.7 Adc	48.0 Arms / 21.0 Adc [4]	48.0 Arms / 21.0 Adc [4]	48.0 Arms / 21.0 Adc [4]	48.0 Arms / 21.0 Adc [4]
1 Phase mode AC / DC	51 Arms / 25.0 Adc	75.0 Arms / 63.0 Adc	100.0 Arms / 63.0 Adc	144.0 Arms / 63.0Adc [4]	144.0 Arms / 63.0Adc [4]	144.0 Arms / 63.0Adc [4]	144.0 Arms / 63.0Adc [4]
Current Crest Factor (AC)	6.2 : 1	4.2 : 1	3.0 : 1	2.2 : 1	2.5 : 1	2.5 : 1	2.5 : 1
Frequency							
Range: 15.00 – 1200.0 Hz							
Mains Input							
Input Voltage Range / Frequency: 380Vac – 480Vac ± 10%, 4 Wire, L1, L2, L3 and PE / 47 - 63 Hz							
Nom. Phase Current @ 400Vac / 480Vac	10 Arms / 8 Arms	14 Arms / 12 Arms	21 Arms / 18 Arms	26 Arms / 22 Arms	31 Arms / 26 Arms	36 Arms / 30 Arms	42 Arms / 35 Arms
Input Power Factor: 0.99 | Efficiency: 90%+							
Measurement							
Vrms Range / Accuracy	0 – 350 VLN / 0-606 VLL / ± 0.25% F.S.						
Irms Range[3] / Accuracy	50.0 A / ± 0.5% F.S.						
Power Range[3] / Accuracy	2 kW / ± 1.5 % F.S.	3 kW /± 1.5 % F.S	4 kW /± 1.5 % F.S.	5 kW/±1.5 % F.S.	6 kW/± 1.5 % F.S.	7 kW/± 1.5 % F.S.	8 kW/± 1.5 % F.S
Scope Function	Sample Rate: 54932.47 Hz / Window: 1024 Samples / Bandwidth: 1200 Hz						
Transient Functions							
Programming: 200 Steps / 400 Segments, LIST, PULSE & STEP Modes, Frequency, Volt AC, Volt DC, Waveform, Ramp Time, Dwell Time. Time range: 0.1 - 10000000.0 ms, Time resolution 0.1 ms							
Execution: Run from step # to step #, Run, Step, Restart, Stop | Program Storage: Non-volatile, 100 Programs + Transients							

Note 1: Maximum Power rating is reduced below 40Hz on 3180RLS, 3210RLS and 3240RLS models
Note 2: Extended Voltage Range: 0 - 365 VLN / 0 - 632 VLL, with VTHD < 1.0% @ 50~60Hz
Note 3: Measurement range is times three in single phase mode.
Note 4: RMS current up to 48A per phase (45Hz to 200Hz); Max current for F settings 200Hz to 1200Hz
Above 200Hz - up to 42.0 Arms / 21.0 Adc per phase in 3 & 2 Phase Mode, and 126 Arms / 63.0Adc in 1 Phase Mode.

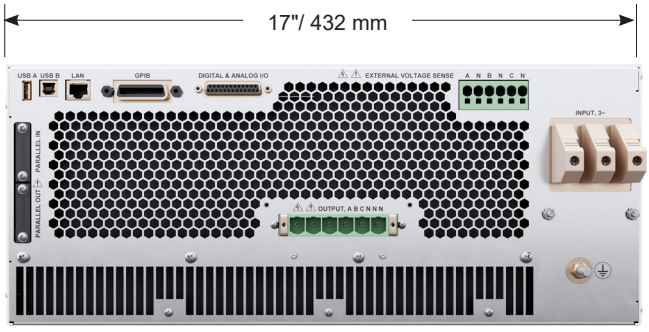
Technical Specifications

PARAMETERS	SPECIFICATIONS
Remote Control Interfaces / Analog & Digital I/O	
USB Type B, LAN (LXI), GPIB / IEEE488, RS232, all on rear panel; External USB WIFI adapter / ModBus TCP / CAN/CAN-FD	
Analog Inputs (4): AI1, AI2, AI3, A14, User defined functions. | Outputs(4): AO1 AO2, AO3, AO4 , User-defined measurement unctions	
Digital Inputs (6): Remote, Inhibit, Trans. Trig., Phase Sync, User | Digital Outputs(6): Output Relay, Transient, Function Strobe, Sync	
Environmental	
Cooling: Variable speed fan, front intake, rear exhaust; Energy Saving Modes: Standby & Sleep	
Temperature: Operating: 0 to 40 °C / 32 to 104 °F | Storage: -20 to 70 °C/-4 to 158 °F	
Humidity < 80%, non-condensing | Altitude: 2000 m / 6500 feet	
System Features	
USB Ports: 2 on Front Panel, 1 on Rear Panel, All Type A | SD Card: 32 GB max. Capacity | Video Output Port" Monitor Out, Front Panel	
Dimensions & Weights	
Chassis Size H x W x D: 7.0"x17.0"x25.0" / 178x432x635 mm | Shipping: 20" x 27" x 38" / 508 x 686 x 965 mm	
Weight Per 4U Unit	Net: 111.2 lbs. / 50.4 kg | Shipping: 151 lbs / 68.5 kg
Regulatory Compliance	
Safety	IEC 61010-1:2010 (Edition 3)
EMC Emissions / Immunity: EN 55011:2009+A1:2010 / EN 61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8 and EN 61000-4 -11	
Product Category	EN 61326-1:2013 (Measurement, Laboratory and Control Equipment)
Agency Approvals	CE Mark, NRTL Nemko US/Canada | RoHS (2011/65/EU): EN50581:2012

Unit Dimensions



The RGS is designed for bench top or 19" equipment rack operation.

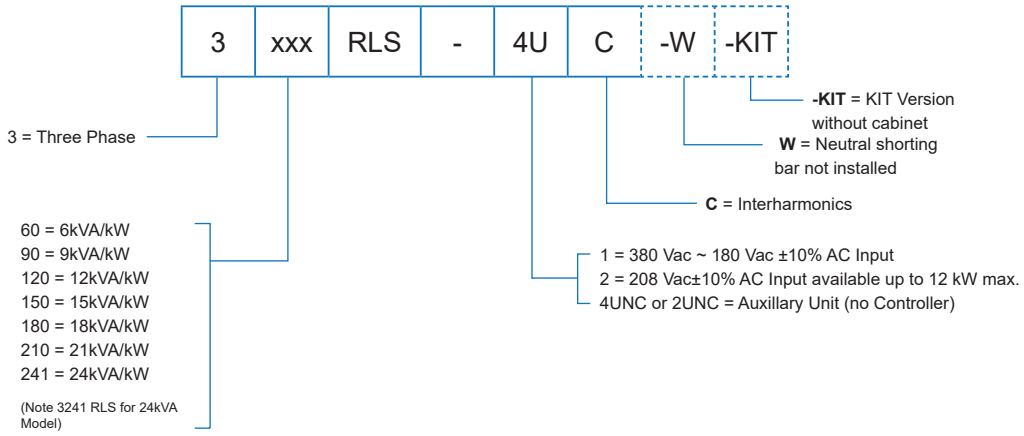


The Rear Panel provides connections for AC Input, External Sense, Aux I/O and remote control interfaces.

Ordering Information

RLS Series Model Number Encoder

Note: Solid outlined fields must be specified. Dashed outlined fields are optional



NOTE: 4U indicates that the shorting bar for output neutrals will be installed on the units by default. If Option W is selected, the units will be shipped with shorting bar for neutrals removed and provided in the ship kit instead.

Order Example: 3241RLS-4U

- Bench Model, 24 kVA, 3-Phase, Regenerative Electronic Load, USB, RS232, LAN, GPIB & AUX I/O, Isolated Neutrals
- Auxiliary Models (No controller)
  Order Example: 3241RLS-4UNC

Typical Delivery Items

- Electronic Load
- Rack Mount Handles
- Certificate of Compliance

Available Accessories

- Input shorting adapter for single phase input mode use. P/N 160086 (not for W)
- Paralleling Cable, 1 Ft. (Included with Aux NC models). P/N 778036
- Rack slides. P/N 703251

Additional Load Options

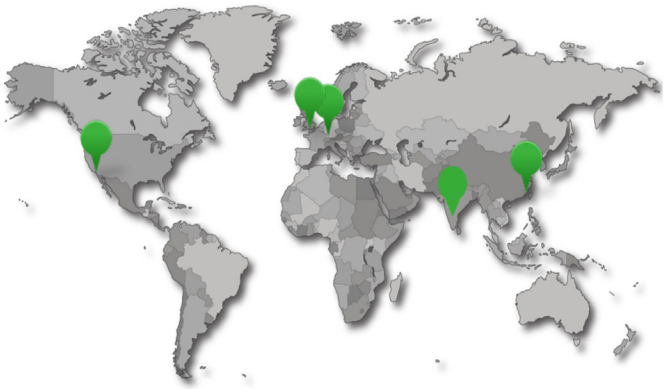
- M26002 - High-Frequency Load Optimization'
- M25057 - Low-Leakage Load Optimization
- M26007 - Both M25057 and M26002 combined

PACIFIC POWER SOURCE

Innovate the Way You Test

by making it simpler, safer, more productive, and sustainable.

Global Sales & Service Centers



The Power of Expertise

About Pacific Power Source

Founded in 1971, Pacific Power Source is an industry leading manufacturer of AC and DC power test solutions. Our reputation as a market and technology leader stems from our best-in-class products, commitment to R&D investments, and exceptional worldwide customer support.

Pacific Power Source is a PPST Solutions Company.

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