

WRx Series

Water Cooled Active Resistance DC Electronic Load

MAGNALOAD



Feature Highlights

- 15 models within 12.5 kW to 100 kW maximum power ranges
- Models up to 1000 Vdc and up to 1040 Adc
- MagnaLINK™ Distributed DSP Architecture
- 16-bit digital programming and monitoring resolution
- Many control modes, including: voltage, current, power, resistance
- Wide voltage-current-power operating profile
- Integrated front and rear full control (host) USB ports, RS485, and dual MagnaLINK™ ports
- LXI TCP/IP Ethernet and IEEE-488 GPIB available
- Configurable external analog-digital user I/O
- Designed and manufactured in the USA

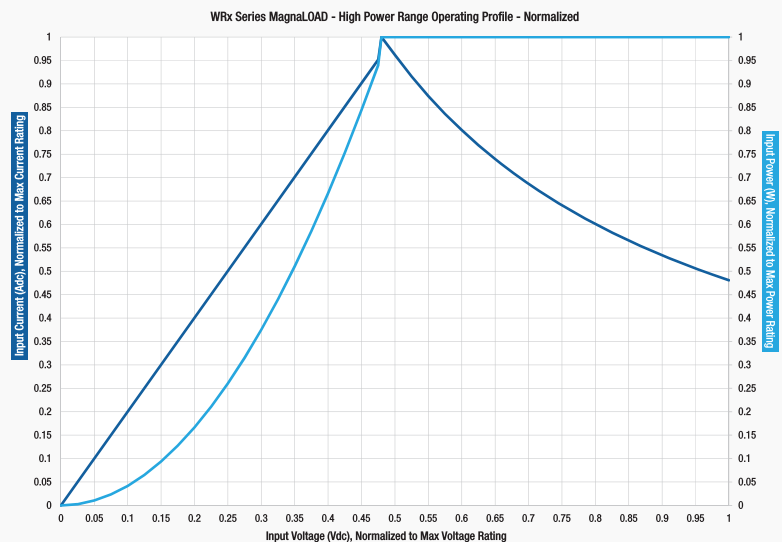
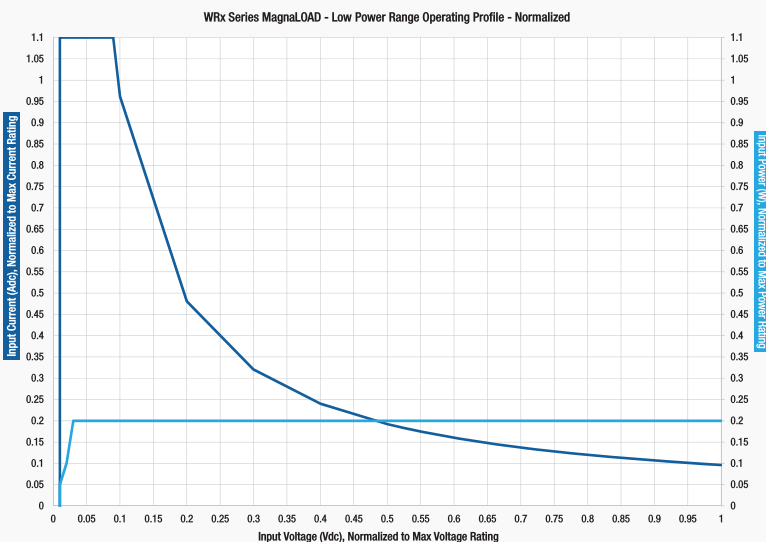
Active Resistance + Microchannel Water Cooling

Utilizing Magna-Power's patented (U.S. Patent 9,429,629) Active Resistance Technology in combination with the company's internally manufactured microchannel water-cooled heat-sinks, the WRx Series addresses high-power DC applications where exhaust heat control is essential. The WRx Series greatly increases power density compared air-cooled alternatives. An integrated solenoid controls the flow of water to avoid condensation. Full power can be achieved using conventional water, with water inlet temperatures up to 25 °C.

Magna-Power's Active Resistance heat dissipation technology utilizes a switched binary matrix of resistances and MOSFET network, combined with Magna-Power's new MagnaLINK™ distributed DSP architecture, the WRx Series delivers the same features and performance as traditional electronic loads, at a fraction of the price. Beyond voltage, current, resistance, power and shunt regulator control modes, the WRx Series also provides a rheostat control mode, allowing direct control of the product's internal resistance network.

Operating Profile

With its combination of resistor and linear elements, the WRx Series DC electronic load provides two distinct operating profiles: High Power Range and Low Power Range. The operating profiles figures below apply to to all WRx Series models, normalized about the model's maximum voltage, current, and power ratings.



WRx Series

Models and Specifications

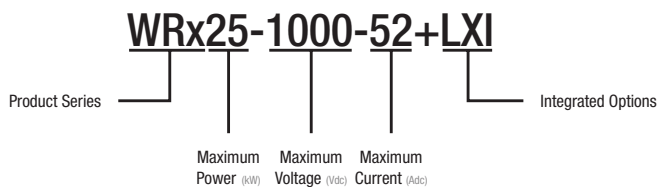
Models

The following table details the available standard ARx Series models. Refer to the Operating Profile for the product's available operating region over a given model's maximum power, voltage and current specifications.

Model	Maximum Power	Maximum Voltage	Maximum Current	Package Type
WRx12.5-200-130	12.5 kW	200 Vdc	130 Adc	Rack-mount
WRx12.5-500-52	12.5 kW	500 Vdc	52 Adc	Rack-mount
WRx12.5-1000-26	12.5 kW	1000 Vdc	26 Adc	Rack-mount
WRx25-200-260	25 kW	200 Vdc	260 Adc	Floor-standing
WRx25-500-104	25 kW	500 Vdc	104 Adc	Floor-standing
WRx25-1000-52	25 kW	1000 Vdc	52 Adc	Floor-standing
WRx50-200-520	50 kW	200 Vdc	520 Adc	Floor-standing
WRx50-500-208	50 kW	500 Vdc	208 Adc	Floor-standing
WRx50-1000-108	50 kW	1000 Vdc	108 Adc	Floor-standing
WRx75-200-780	75 kW	200 Vdc	780 Adc	Floor-standing
WRx75-500-312	75 kW	500 Vdc	312 Adc	Floor-standing
WRx75-1000-156	75 kW	1000 Vdc	156 Adc	Floor-standing
WRx100-200-1040	100 kW	200 Vdc	1040 Adc	Floor-standing
WRx100-500-416	100 kW	500 Vdc	416 Adc	Floor-standing
WRx100-1000-216	100 kW	1000 Vdc	216 Adc	Floor-standing

Model Ordering Guide

There are many possible configurations for the ARx Series product. Using the following ordering guide and models chart to define the best model for your application.



Size

Power	Size (H x W x D)	Weight
12.5 kW	7" x 19" x 24" in (17.8 x 48.2 cm x 60.9)	165 lbs (74.8 kg)
25 kW	30.7" x 24" x 31.5" in (78.0 x 61.0 x 80.0 cm)	455 lbs (206.4 kg)
50 kW	58¼" x 24" x 31.5" in (148.0 x 61.0 x 80.0 cm)	785 lbs (356.1 kg)
75 kW	58¼" x 24" x 31.5" in (148.0 x 61.0 x 80.0 cm)	1115 lbs (505.8 kg)
100 kW	74" x 24" x 31.5" in (188.0 x 61.0 x 80.0 cm)	1445 lbs (655.4 kg)

Note: Specifications and features are subject to change at any time without notice.

Specifications

Connectivity Specifications

USB Host (Front)	Standard, Type B
USB Host (Rear)	Standard, Type B
RS485 (Rear)	Standard, RJ-45
LXI TCP/IP Ethernet (Rear)	Optional, RJ-45
IEEE-488 GPIB (Rear)	Optional
MagnaLINK™	Standard, RJ-25 x 2
External User I/O	Standard, 25-pin D-sub

Environmental Specifications

Operating Temperature	0 to 50 °C
Storage Temperature	-25 to 85 °C
Humidity (Non-Condensing)	≤ 95%
Altitude	Up to 10,000 ft (3,000 m)
Air Intake (All Models)	Front
Air Exhaust (All Models)	Rear

External User I/O Specification

Digital Input Voltage	5V
Digital Input Impedance	10 kΩ
Digital Monitoring Voltage	5V, 32 mA capacity
Digital Reference Voltage	5V, 20 mA capacity
Analog Programming Voltage	0-10V
Analog Programming Resolution	12-bit, 0.025%
Analog Monitoring Voltage	0-10V, 3 mA capacity
Analog Reference Voltage	10V, 20 mA capacity
Provided Reference Voltages	5V, 10V
Interlock Input	5V

Digital Programming Resolution

Current Resolution	16-bit, 0.0015%
Voltage Resolution	16-bit, 0.0015%
Power Resolution	16-bit, 0.0015%
Resistance Resolution	16-bit, 0.0015%

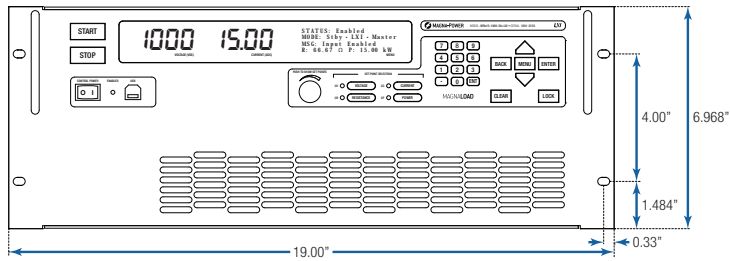
Water Cooling Specifications

Maximum Inlet Temperature	25 °C
Minimum Inlet Pressure	80 PSI
Minimum Flow Rate (12.5 kW)	1.5 GPM
Minimum Flow Rate (25 kW)	3.0 GPM
Minimum Flow Rate (50 kW)	6.0 GPM
Minimum Flow Rate (75 kW)	9.0 GPM
Minimum Flow Rate (100 kW)	12.0 GPM

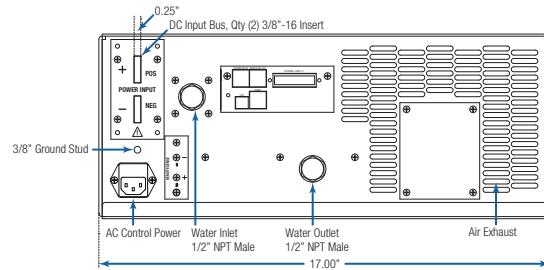
WRx Series

Diagrams

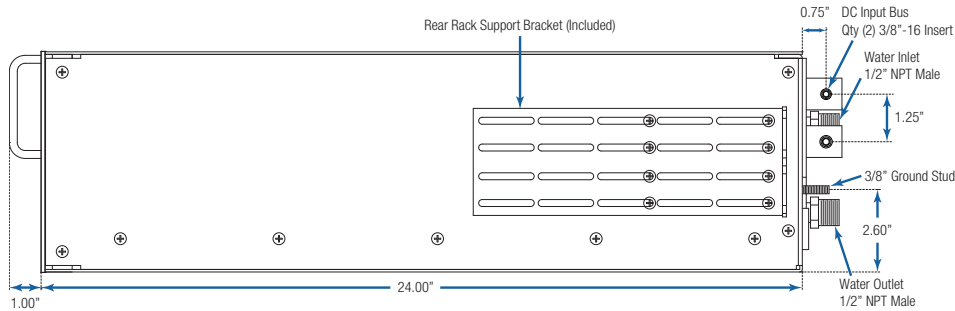
WRx Series
12.5 kW, Front View



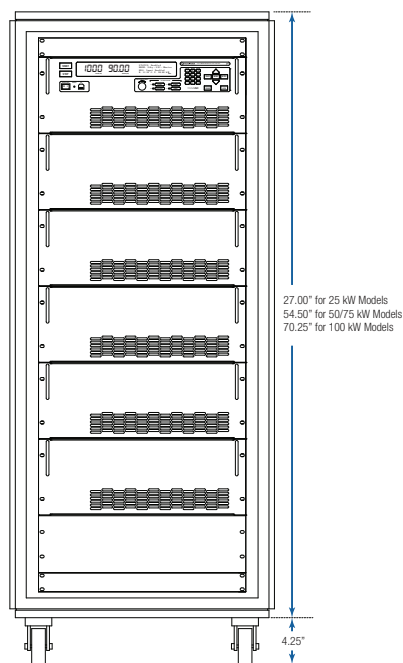
WRx Series
12.5 kW, Rear View



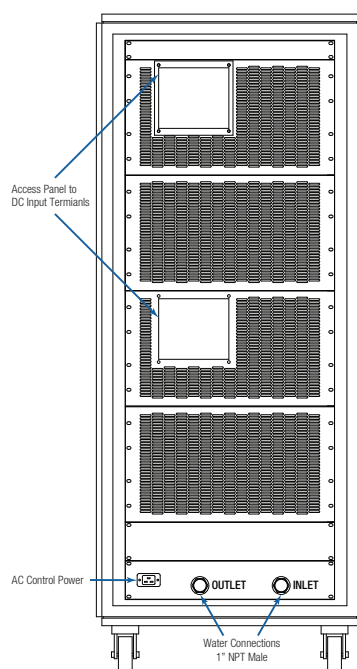
WRx Series
12.5 kW, Side View



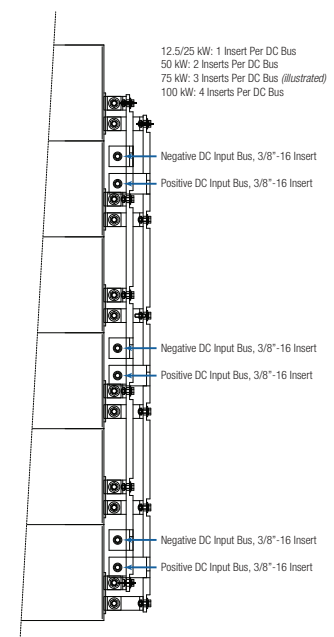
WRx Series
25 kW to 100 kW, Front View



WRx Series
25 kW to 100 kW, Rear View



WRx Series
25 kW to 100 kW, DC Input Bus



Product Range Features

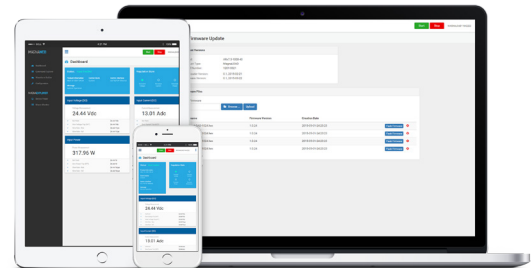
MagnaLINK™ Distributed DSP Architecture

Magna-Power's MagnaLINK™ technology provides distributed Texas Instrument DSP control across power processing stages inside the MagnaLOAD DC electronic load. This technology follows a significant internal development cycle from Magna-Power to provide a unified digital control platform across its electronic loads, featuring fully digital control loops, adjustable control gains, programmable slew rates, and many new advanced control technologies.



MagnaWEB Server-Client Software

Magna-Power's next generation software interface, MagnaWEB, provides intuitive and user-friendly web-browser based controls for programming and measurement read-back of the MagnaLOAD's activity. Virtually all of the MagnaLOAD's available functions can be controlled and monitored from the MagnaWEB software over any of product's installed communication interfaces.

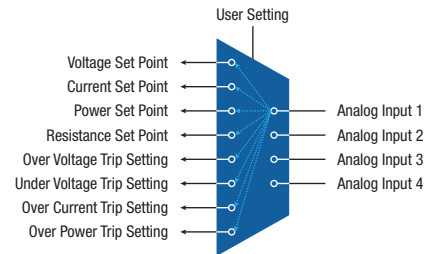


MagnaWEB uses a server-client software model to provide access to the MagnaLOAD from nearly any device and operating system. Install and run the MagnaWEB software locally on Windows, OSX or Linux and, using a web browser, access the server connected to the MagnaLOAD from a variety of devices including other desktops, tablets or smart-phones.

Configurable External User I/O

Beyond the front panel and computer controls, all MagnaLOADs come standard with a 25-pin D-Sub connector designated as the External User I/O. This connector provides: 8 Digital Outputs, 4 Digital Inputs, 4 Analog Outputs, 4 Analog Inputs.

The analog-digital I/O pins are configurable, allowing the user to select which parameters they want to control and monitor. Nearly all of the MagnaLOAD's parameters are selectable. This configurable I/O scheme reduces complexity, eases PLC integration and allows control parameters from various interfaces simultaneously. 0-10V is used for analog I/O, while and 5V is used for digital I/O; both +10V and +5V reference signals are provided.

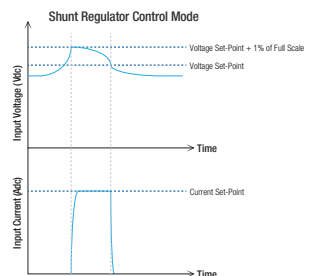
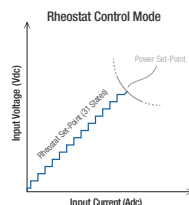
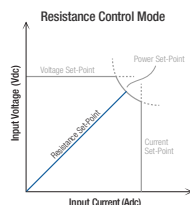
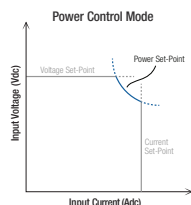
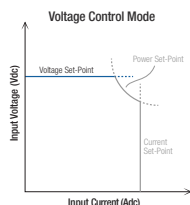
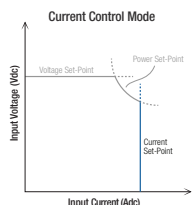


Extensive Programming Support

All MagnaLOADs come with support for a wide range of Standard Commands for Programmable Instrumentation (SCPI), allowing the product to be controlled from virtually any software environment. These commands provide support full control, measurement, and monitoring of the MagnaLOAD. All of the MagnaLOAD's available communication interfaces are supported by these drivers and command sets, including: USB, RS485, LXI TCP/IP Ethernet, and IEEE-488 GPIB.

Many Control Modes

To accommodate a variety of DC sources, all MagnaLOADs come with many distinct control modes, including: Voltage Mode, Current Mode, Power Mode, and Resistance Mode. Preference for DC regulation is given to the parameter in the selected mode within the programmed set-points. Using the MagnaLOAD's set-points and trip settings, the product can be configured to either trip with a fault when a limit is exceeded or to cross-over into a different regulation state.

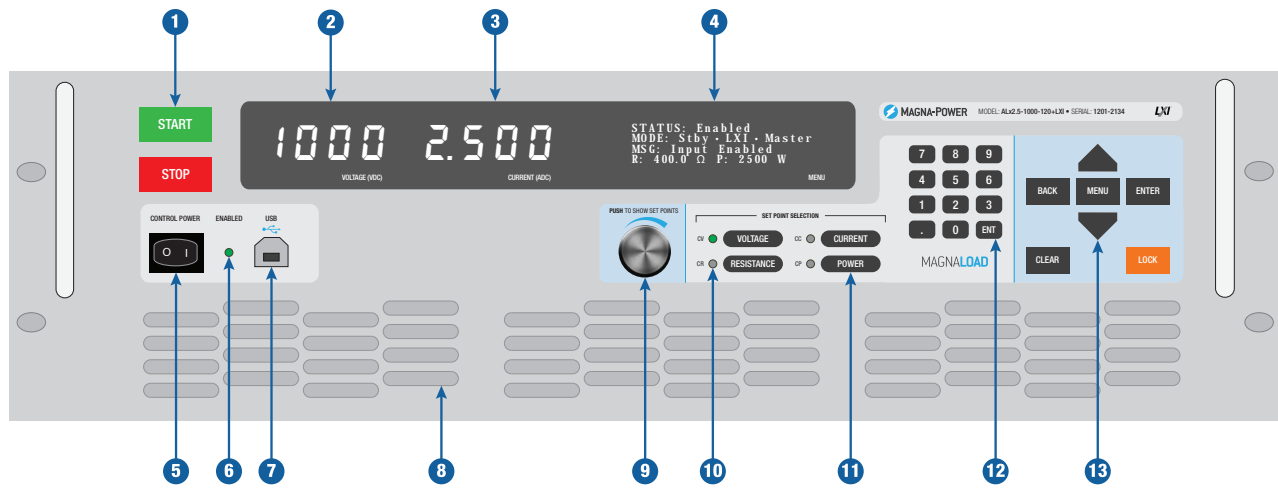


Feature Spotlight

Shunt Regulator Control Mode, available on all MagnaLOADs, turns the MagnaLOAD into a high-speed smart braking resistor, engaging the DC input only when a specified voltage is exceeded by 1%, while limiting the shunt current to a programmed set-point.

Rheostat Control Mode, unique to the ARx and WRx Series, bypasses the digital controls to provide direct control of the MagnaLOAD's internal resistor network. Using this mode, true resistance step load response can be achieved without the traditional bandwidth limitations. While the standard operating modes offer 16-bit programming resolution, Rheostat Mode provides 31 different resistor states.

Standard Front Panel



Blank Front Panel



- | | | |
|--|---|---|
| <p>1 Start Button: Enables the DC input bus
Stop Button: Disable the DC input bus</p> <p>2 Voltage measurement display</p> <p>3 Current measurement display</p> <p>4 4-line character display featuring a menu system, operating status and modes, product messages with diagnostic codes, resistance measurement display, and power measurement display</p> | <p>5 Control power switch, energizes the control circuits without engaging DC bus</p> <p>6 LED indicator that the DC input is enabled</p> <p>7 Full control (host) front panel USB port</p> <p>8 Clean air intake, with integrated fans</p> <p>9 Aluminium digital encoder knob for programming set-points</p> | <p>10 LED indicator of the MagnaLOAD's present regulation state, which can include: constant voltage (CV), constant current (CC), constant power (CP), or constant resistance (CR)</p> <p>11 Selector buttons to choose which set-point the digital encoder knob and digital keypad buttons will modify.</p> <p>12 Menu Button: Enters the menu system on the 4-line display
Back Button: Moves back one level in the menu
Enter Button: Selects the highlighted menu item
Clear Button: Removes the product from a faulted state
Lock Button: Locks the front panel, with password protection available</p> |
|--|---|---|



About Magna-Power Electronics

Magna-Power, founded in 1981, designs and manufactures robust programmable power products in the USA that set industry standards for quality, size, and control. The company's experience in power electronics is reflected in its 1.25 kW to 2000 kW+ product line, quality service, and reputation for excellence. Today, you will find Magna-Power's standard products at its thousands of customers worldwide, aiding in the manufacture of electric vehicles, simulating solar arrays for development of inverters, steering magnets for particle accelerators, powering radar systems, driving traction controllers for locomotive development, or at a wide range of Universities for cutting-edge energy research.

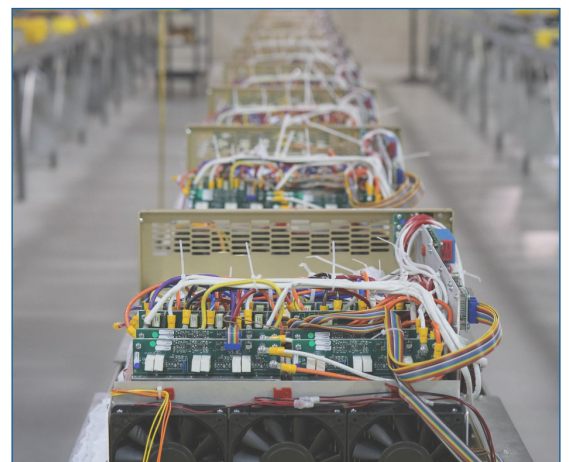
Vertically Integrated USA Manufacturing

Magna-Power Electronics products are proudly made in the USA at the company's vertically integrated, company designed and owned 73,500 ft² headquarters in Flemington, New Jersey. All engineering, manufacturing and North America product servicing is performed at the company's headquarters.

Magna-Power Electronics utilizes vertical integration in its manufacturing process for complete control over quality, cost, and lead-time of its made-to-order products. As the company has grown, more operations have been internalized.

Vertical integration enables Magna-Power to manufacture a very broad line of sophisticated electronic products, while still maintaining industry leading lead-times. Housing engineering and manufacturing teams in the same facility forces strong collaboration between the two teams for continual process and product improvements. Internal company processes include:

- Research and development
- Magnetics winding
- Magnetic core punching and cutting
- Full sheet metal operations
- EDM and CNC machining
- Cable harnessing
- Powder coating
- Air- and water-cooled heat-sink fabrication
- Surface-mount and through-hole PCB assembly
- Final assembly, testing, and burn-in



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