



mPower™ DC 3 Series Power Supplies

Programmable Autoranging DC Power Supplies



Marway's lab quality mPower DC power supplies expand on our commitment to provide power solutions specializing in the optimization of space and features to meet the unique needs of our customer's development and test applications.

Convenience

- Complete configuration, control, and monitoring from graphical control panel.
- Touchscreen interface (311 Series) or navigation keys (300 Series) with multi-function rotary controls simplify operation, and speed up test settings entry.
- Easy locking of controls to prevent unintended changes.
- Control bus (311) shares data among parallel units providing a true single-point for control and monitoring. 300 Series share bus is similar.

Control

- Constant voltage, constant current, constant power, and (for 311) constant resistance modes.
- Protection circuits and alarms for over voltage, current, power, and temperature.
- Output voltage Sense bus monitors voltage at the load, instead of the output terminals, to compensate for minor losses in output cables.
- USB, RS232, Ethernet, CAN, CANopen, Profibus, Profinet, ModbusTCP, EtherCAT, and analog interfaces. Modbus and SCPI command protocols. Windows® application, LabView® VIs, and your own custom scripts for remote control.

Power

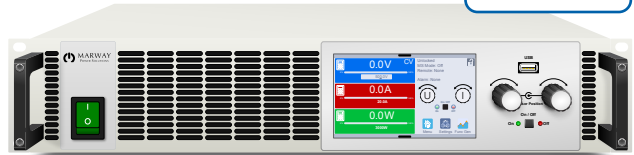
- Autoranging power output delivers 100% power over a wide range of voltage and current allowing wider test range or a wider set of devices to be tested with the same unit.
- 1, 1.5, 3, 5, 10, 15, 30 kW capacities.
- Up to 2000 Vdc and up to 1000 amps.
- Parallel capacity and control up to 64 units (311), or 10 units (300) for up to 1,920 kW capacity.
- Discharge circuit reaches safe Vdc in ≤ 10 seconds.

300 Series

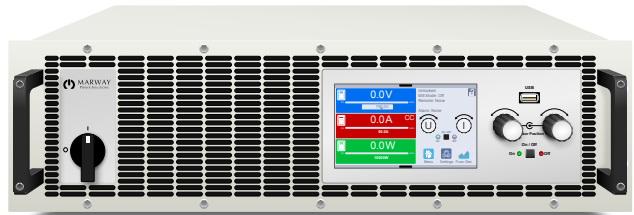


1U • 80 to 750 Volts • 6 to 100 Amps • 1.5 kW, 3.0 kW

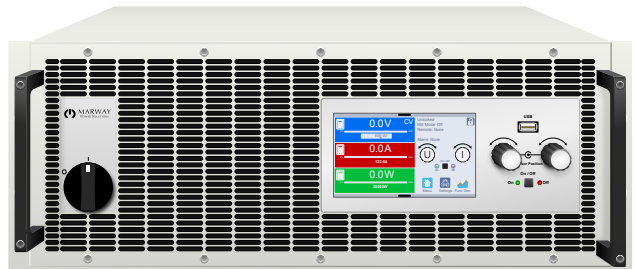
311 Series



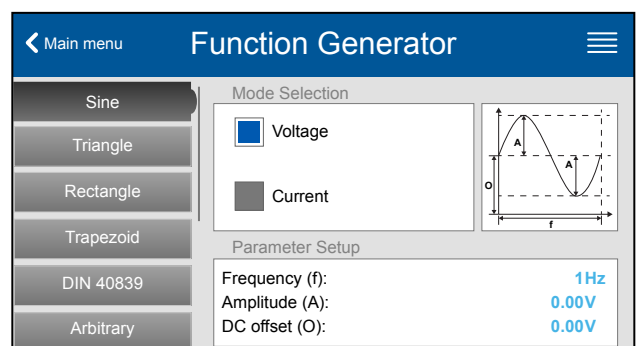
2U • 60 to 1500 Volts • 6 to 120 Amps • 1.0 kW, 1.5 kW, 3.0 kW



3U • 60 to 2000 Volts • 20 to 510 Amps • 5 kW, 10 kW, 15 kW



4U • 60 to 2000 Volts • 40 to 1000 Amps • 30 kW

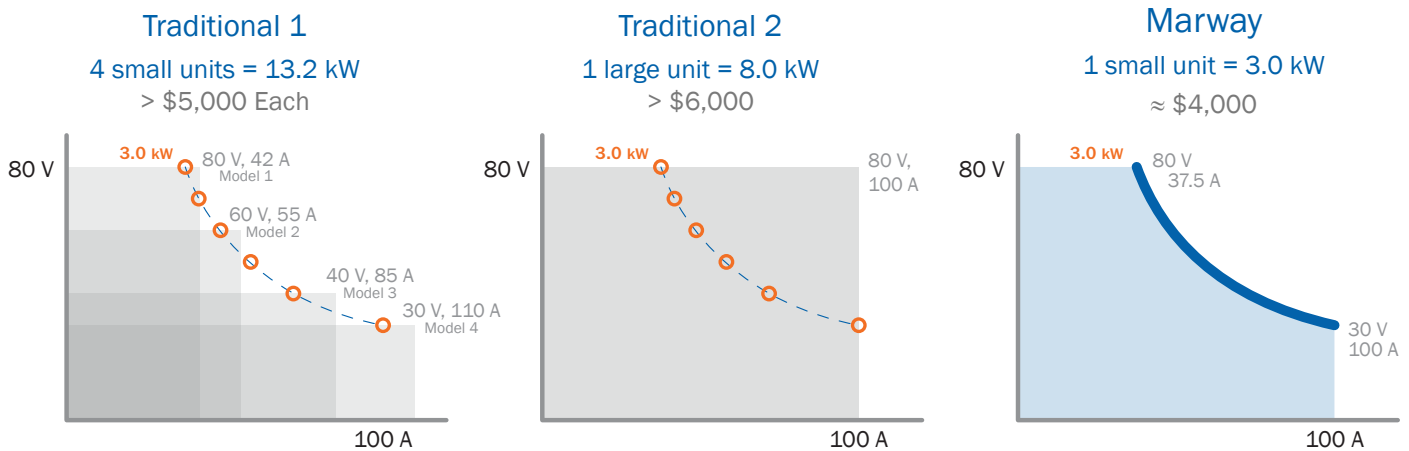


Autoranging Output Power

Autoranging enables mPower to operate at full power over a wider range than traditional power supplies. Traditional “rectangular envelope” power supplies can provide peak power (watts) at only one specific voltage and current configuration. mPower’s autoranging power envelope can deliver peak power along many voltage and current configuration points.

You’ll notice that any given mPower model’s maximum DC output voltage multiplied by it’s maximum current is much higher than the power rating of the system. When a system is

able to run at a lower than maximum current, the voltage can be adjusted higher to still yield the maximum power of the system. Likewise, when running the system at a lower voltage, the current can be increased—again, up to the limit of the full power rating. In fact, running in constant power mode, both voltage and current can change while the unit holds a steady power output. The autoranging envelope maintains a high quality output signal with voltages down to about 30% of the rating, but can be operated as low as 10%.



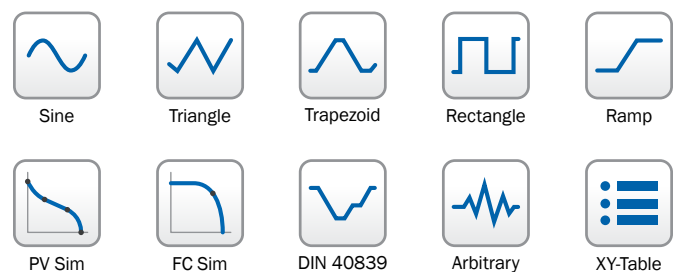
Let’s look at an example with multiple test points at a consistent 3000 watts total load. It can take multiple power supplies to meet this 80 Vdc and 100 amp test range example—and for some tests, some points may not even be within available unit ranges. Another option is to use one large 8 kW system which can be an inefficient option for cost, power, and space.

For that same test suite, a single 3 kW mPower DC with autoranging can serve all tests. Autoranging enables a greater range of voltage and current in lower kW power packages while being able to deliver 100% of a power supply’s capacity. This efficiency means fewer, smaller power supplies—saving space, cost, power consumption, and even installation costs.

Function Generator

mPower has two foundational function generators to define signal forms, and apply them to either voltage or current. An arbitrary generator allows up to 99 sequences to be repeated up to 999 times or infinitely. An XY table-based generator accepts up to 4,096 UI/IU mapped values. Both generator types are fully customizable with remote control programming, and table data can even be loaded and saved to USB thumb drives.

There are several pre-defined common waveforms which are configured on the control screen through data entry of parameters such as offsets, time, frequency, amplitude, etc. making them very quick to set up and run. Likewise, there are built-in aids for simulations of photovoltaic and fuel cell power sources to aid in device testing by simply defining a few parameters prior to execution.

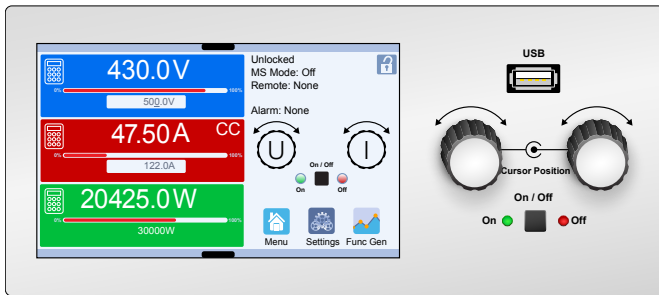
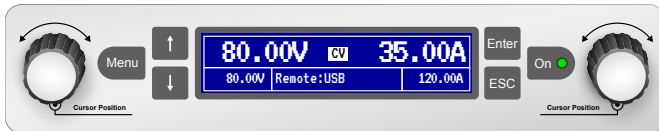


mPower Autoranging DC Power Supplies

Controls & Locking

- Menu driven, multi-parameter display.
- Rotary pushbutton controls for quick data entry.
- Up to 5 profiles to quickly swap settings.
- Control panel locking prevents accidental changes.
- Remote control lockout protects operators working on the equipment setup between tests.

All system configuration, test parameters, and even function generator details (in 311 models) are adjustable from the control panel. To avoid accidental changes, the control panel can be quickly locked. For models with a touchscreen, a simple press of the lock status button initiates locking. For the 300 Series, it takes three button pushes. The control lock mode can include or not include the DC output on/off button. Optionally, a 4-digit PIN can be required to unlock the controls. For safety, remote control can be locked out for when an operator must make setup or wiring adjustments.

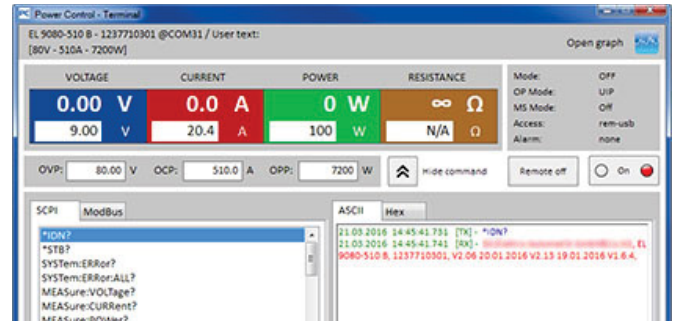


In all series, the control panels include a graphical display with a menu-driven interface. Power output, settings, and status indicators are visible during operation. The control panel can be locked to prevent accidental changes. All system configuration, test parameters, and even function generator details (where available) are adjustable from the control panels.

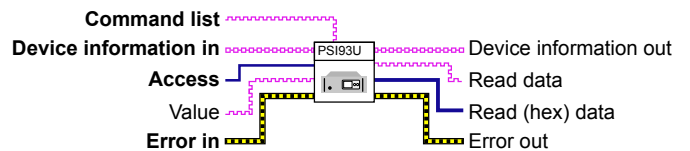
Protective Features

- Over-voltage, over-current, over-power, and over-temperature shutdown and alerts.
- Alerts available on digital and analog interfaces.

For protecting connected equipment, there are adjustable settings for overvoltage, overcurrent, and overpower. There is also an overtemperature protection for the power supply itself. As soon as one of these thresholds is reached, the DC output is switched off, and a status signal is generated on the display and remote interfaces.



mPower control and configuration, including defining signal function profiles can be done through the on-board control panel, and through a Windows® application. Function definitions can be imported from and exported to the on-board USB port.



LabView VIs provide control for power settings and function generators.

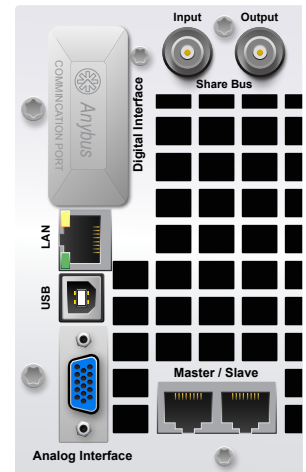
Remote Control

- Modbus and SCPI command protocols.
- Scriptable control of power and function generator.
- LabView® VIs for power and function generator.
- Windows® application for desktop control.
- USB, Ethernet, CAN, CANopen, Profibus, Profinet, ModbusTCP, EtherCAT, GPIB, RS232, and analog interfaces available—not all on all models.

All series can be remotely controlled by scripting, by LabView, or with a Windows application.

All models include a USB port, Ethernet port, and analog interface for remote control. The analog interface allows custom hardware or PLCs to switch the DC outlet on/off, adjust setpoints, retrieve measurements, and monitor alarms.

The 311 Series also includes the Anybus digital interface port. This port facilitates a number of optional modules to support additional field buses including CAN, CANopen, EtherCAT, Modbus TCP, Profibus, Profinet, RS232, or additional Ethernet ports. The modules are field exchangeable.



Parallel Expansion

- 300 Series up to 10 units in parallel (30 kW total)
- 311 Series up to 64 units in parallel (1,920 kW total)

Both the 300 and 311 Series allow for parallel connection of the DC outputs to increase current and power capacity. Control buses are daisy chained to share data.

With the 300 Series, each unit is individually configured, monitored for status, and controlled. While current and power sharing is automated, there is no single unit in control of the whole setup. To provide unified control of DC output on/off, the analog interface can be wired in parallel to a common switch. Remote control can be used to unify other capabilities behind a common user interface.

The 311 Series models include a more full featured control and expansion system. This system allows one unit to be configured as the control unit, while other units are configured as expansion units. Once set up, the control unit is aware of the total capacity. The new capacity of the whole system is displayed on the touchscreen, and all settings are relative to that capacity. For example, with six 10 kW systems in parallel, the power setting value can be adjusted from 0–60 kW. The control unit communicates with all units regarding settings and status.

For 300 Series parallel setups, each unit in the system must be the same model—same series, voltage, current, and power rating. For 311 Series setups, all units must be 311 Series, but the latest production units allow for a mixture of current and power capacities. (It is recommended that all units have the same voltage rating if possible.)

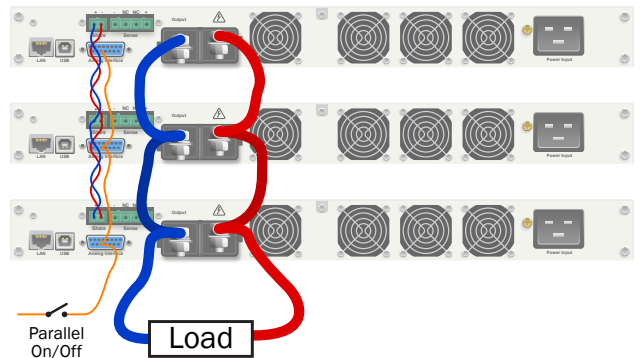
Series Expansion

A limited number of units can be combined in serial where the DC output poles are daisy chained plus to minus. This allows a set of smaller unit operate an attached device at higher voltage. Each unit is manually controlled individually (there's no one unit in control of everything).

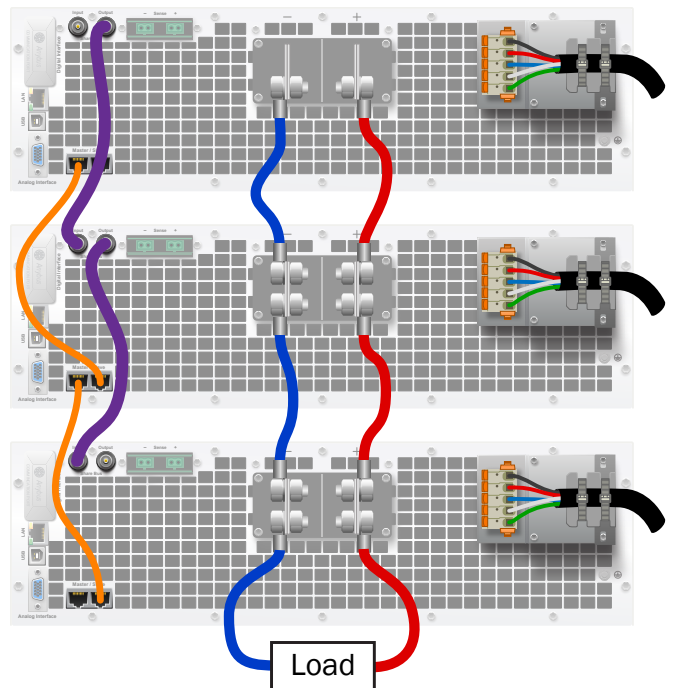
Voltage Drop Compensation

- Up to 5% of the rated voltage in compensation for voltage drops at the load (e.g. 4 V for an 80 Vdc unit).

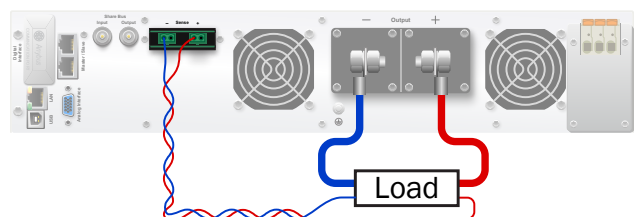
For more accurate constant-voltage operation at the load, the system can compensate for some voltage loss in the DC cables. A voltage Sense bus connects remote voltage sensing to the load. The system recognizes the remote sensing mode automatically, and regulates the output voltage at the load rather than at its own DC terminals.



Both the 300 and 311 Series allow for parallel connection of the DC outputs to increase current and power capacity. Control buses are daisy chained to share data.



The voltage sense bus connects to the load terminals, and adjusts the power supply output to compensate for voltage drops of up to 5% of the rated voltage.



mPower Autoranging DC Power Supplies

Series General Configuration

	300 Series	311 Series		
Chassis Size	1U	2U	3U	4U
Power Range ^[1]	1.5, 3.0 kW	1.5, 3.0 kW	5, 10, 15 kW	30 kW
Input Voltages ^[2]	(110/120 Vac) 220–240 Vac 1-phase	(110/120 Vac) 208–240 Vac 1-phase	380–480 Vac 1-phase 3-phase Δ	380–480 Vac 3-phase Δ
Available DC Output Voltages ^[1]	80, 200, 360, 500, 750	60, 80, 200, 360, 500, 750, 1000, 2000	60, 80, 200, 360, 500, 750, 1000, 1500, 2000	60, 80, 200, 360, 500, 750, 920, 1000, 1500, 2000
Available DC Output Currents ^[1] (See the following pages)	10 models ranging from 100A to 6A	14 models ranging from 120A to 6A	23 models ranging from 510A to 20A	10 models ranging from 1000A to 40A
Autoranging	Yes	Yes		
Expansion for High Power	Parallel up to 10 units	Parallel up to 64 units		
Function Generator	—	Yes		
Programmable Impedence	—	Yes		
Analog	Standard	Yes		
USB	Standard	Yes		
Ethernet	Standard	Yes		
Anybus	—	Yes		
Operating conditions	0–50 °C, < 80% R.H., < 2000 m altitude			

[1] There are multiple models each with a maximum voltage and current limit determined by the overall power capacity (kW). Not every model is capable of the range of voltages and currents listed. These are intended to indicate the range covered by the entire product line. See the Catalog for exact models.

[2] All units have some flexibilities to use a lower than nominal input voltage with the consequence of automatic derating of DC output capacity. Refer to the mPower DC Product Catalog or the Operating Guides for details as to the allowed voltages and resulting deratings. We do not generally promote the use of the lower voltages, but they are an option when a need arises.

300 Series Specification Highlights

1.5 kW

80 Vdc	50 Amps
200 Vdc	25 Amps
360 Vdc	15 Amps
500 Vdc	10 Amps
750 Vdc	6 Amps

3.0 kW

80 Vdc	100 Amps
200 Vdc	50 Amps
360 Vdc	30 Amps
500 Vdc	20 Amps
750 Vdc	12 Amps

220-240 1ph Vac

Nominal input power of 220–240 ±10% Vac single phase is needed to reach output maximum for 1.5 kW and 3.0 kW models. [2]

Output Voltage Specs

Over-voltage range	110% of rating
Target setting range	102% of rating
Accuracy (at 23 ±5 °C / 73 ±9 °F)	≤ 0.1% of rating
Line regulation (at ±10% ΔUAC)	≤ 0.02% of rating
Load regulation (at 0–100% load)	≤ 0.05% of rating
Rise time 10–90% ΔU	15 ms maximum
Load step transient time	≤ 2.2 ms
Ripple P-P [1] (model dependent)	from < 76 mV to < 293 mV
Ripple RMS [1] (model dependent)	≤ 5.2 mV for 80V; from ≤ 33 mV to ≤ 63 mV for other models
Load sense compensation	up to 5% of rating

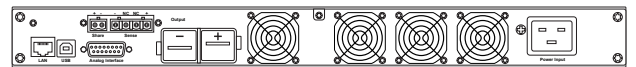
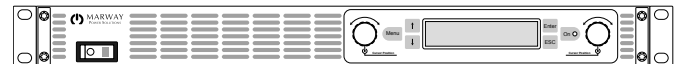
Output Current Specs

Over-current range	110% of rating
Target setting range	102% of rating
Accuracy (at 23 ±5 °C / 73 ±9 °F)	≤ 0.2% of rating
Line regulation (at ±10% ΔUAC)	≤ 0.05% of rating
Load regulation (at 0–100% load)	≤ 0.15% of rating
Ripple P-P [1] (model dependent)	from ≤ 4.1 mV to ≤ 114 mV

Output Power Specs

Over-voltage range	110% of rating
Target setting range	102% of rating
Accuracy (at 23 ±5 °C / 73 ±9 °F)	≤ 1% of rating
Line regulation (at ±10% ΔUAC)	≤ 0.05% of rating
Load regulation (at 0–100% load)	≤ 0.75% of rating
Efficiency @ 100% V (model dependent)	≈ 91% – 95%
Efficiency @ 100% I (model dependent)	≈ 89% – 94%

Layout of 300 Series 1U models



Chassis depth is approximately 19.7" with 1.6" front protrusion and 1.3" rear protrusion not including cable bends.

[1] Range shown for examples. Please check the model-specific spec sheets in the Operating Guide for details.

[2] Above approximately 207 Vac, maximum output power is available. Below approximately 207 Vac, maximum power is reduced by 500 W. Below approximately 180 Vac, DC output is shut off. This means running at a nominal 208 V input power is not recommended as it would likely result in fluctuating power capacity.

311 Series 2U Specification Highlights

1.5 kW

60 Vdc	60 Amps
80 Vdc	60 Amps
200 Vdc	25 Amps
360 Vdc	15 Amps
500 Vdc	10 Amps
750 Vdc	6 Amps

3.0 kW

60 Vdc	120 Amps
80 Vdc	120 Amps
200 Vdc	50 Amps
360 Vdc	30 Amps
500 Vdc	20 Amps
750 Vdc	12 Amps
1000 Vdc	10 Amps
1500 Vdc	6 Amps

208–240 1ph Vac

Nominal input power of 208/220/230/240 ±10% Vac single phase is needed to reach output maximum for 1.5 kW and 3.0 kW models. [3]

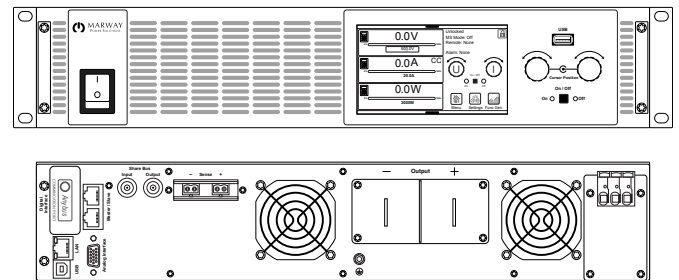
Performance Specs [1]

Load regulation CV (at 0–100% load)	≤ 0.05% of rating
Line regulation CV (at ±10% max. ΔVac)	≤ 0.01% of rating
Stability CV	≤ 0.02% of rating
Load regulation CP (at 0–100% load)	≤ 0.3% of rating
Stability CC	≤ 0.02% of rating
Load regulation CR	≤ 0.3% + 0.1% current rating
Voltage rise/fall time CV 10–90% ΔU	≤ 20 ms
Current rise/fall time CC 10–90% ΔI	≤ 10 ms
Ripple RMS CV at 300 kHz (model dependent) [2]	1 kW 80 V • ≤ 10 mV 1 kW 500 V • ≤ 40 mV 3 kW 80 V • ≤ 10 mV 3 kW 500 V • ≤ 40 mV
Ripple and noise p-p at 20 MHz (model dependent) [2]	1 kW 80 V • ≤ 100 mV 1 kW 500 V • ≤ 500 mV 3 kW 80 V • ≤ 100 mV 3 kW 500 V • ≤ 500 mV
Efficiency up to	95% model dependent

Misc Specs

Alarm Value range	110% of rating
Set Value range	102% of rating
Display accuracy	≤ 0.05% of V rating ≤ 0.1% of I rating
Analog interface accuracy U/I/P/R	0–10 V ≤ 0.2% 0–5 V ≤ 0.4%
Load Sense compensation	up to 5% of rating

Layout of 311 Series 2U models



Chassis depth is approximately 18.2" with 1.6" front protrusion and 1.8" rear protrusion not including cable bends.

[1] Performance is generally determined after 30 minutes warmup, and stable AC, load, and environmental conditions.

[2] Selected units shown for examples. Please check the model-specific spec sheets in the Operating Guide for details.

[3] 110/120 Vac single phase can be used, but the 1.5 kW unit derates to 1.2 kW, and the 3 kW unit derates to 1.5 kW. We generally do not promote use of 120 Vac, but it can be used if a need arises.

311 Series 3U Specification Highlights

5 kW

80 Vdc	170 Amps
60 Vdc	170 Amps
200 Vdc	70 Amps
360 Vdc	40 Amps
500 Vdc	30 Amps
750 Vdc	20 Amps

10 kW

60 Vdc	340 Amps
80 Vdc	340 Amps
200 Vdc	140 Amps
360 Vdc	80 Amps
500 Vdc	60 Amps
750 Vdc	40 Amps
1000 Vdc	30 Amps
1500 Vdc	20 Amps

15 kW

60 Vdc	510 Amps
80 Vdc	510 Amps
200 Vdc	210 Amps
360 Vdc	120 Amps
500 Vdc	90 Amps
750 Vdc	60 Amps
1000 Vdc	40 Amps
1500 Vdc	30 Amps
2000 Vdc	20 Amps

380–480 Vac

All models 380–480 Vac. ^[3]
5 kW models use two phases, while 10 kW and 15 kW use all three phases.

Performance Specs ^[1]

Load regulation CV (at 0–100% load)	≤ 0.05% of rating
Line regulation CV (at ±10% max. ΔVac)	≤ 0.01% of rating
Stability CV	≤ 0.02% of rating
Load regulation CP (at 0–100% load)	≤ 0.3% of rating
Stability CC	≤ 0.02% of rating
Load regulation CR	≤ 0.3% + 0.1% current rating
Voltage rise/fall time CV 10–90% ΔU	≤ 20 ms
Current rise/fall time CC 10–90% ΔI	≤ 10 ms
Ripple RMS CV at 300 kHz (model dependent) ^[2]	5 kW 80 V • ≤ 10 mV 5 kW 500 V • ≤ 70 mV 15 kW 80 V • ≤ 10 mV 15 kW 750 V • ≤ 200 mV
Ripple and noise p-p at 20 MHz (model dependent) ^[2]	5 kW 80 V • ≤ 100 mV 5 kW 500 V • ≤ 350 mV 15 kW 80 V • ≤ 100 mV 15 kW 750 V • ≤ 800 mV
Efficiency up to	95.5% model dependent

[1] Performance is generally determined after 30 minutes warmup, and stable AC, load, and environmental conditions.

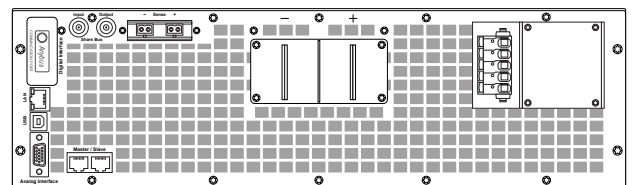
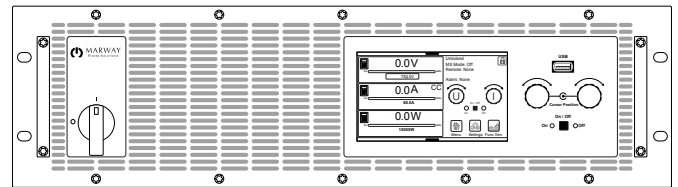
[2] Selected units shown for examples. Please check the model-specific spec sheets in the Operating Guide for details.

[3] 208 Vac 3-phase input can be used with significant power derating. 5 kW rating becomes 3 kW, 10 kW becomes 6 kW, and 15 kW becomes 9 kW. We generally do not promote use of 208 Vac, but it can be used if a need arises.

Misc Specs

Alarm Value range	110% of rating
Set Value range	102% of rating
Display accuracy	≤ 0.05% of V rating ≤ 0.1% of I rating
Analog interface accuracy U/I/P/R	0–10 V ≤ 0.2% 0–5 V ≤ 0.4%
Load Sense compensation	up to 5% of rating

Layout of 311 Series 3U models



Chassis depth is approximately 26.8" max. with 1.6" front protrusion and 2.5" rear protrusion not including cable bends.

311 Series 4U Specification Highlights

30kW

60 Vdc	1000 Amps	750 Vdc	120 Amps
80 Vdc	1000 Amps	920 Vdc	125 Amps
200 Vdc	420 Amps	1000 Vdc	80 Amps
360 Vdc	240 Amps	1500 Vdc	60 Amps
500 Vdc	180 Amps	2000 Vdc	40 Amps

Performance Specs ^[1]

Load regulation CV (at 0–100% load)	≤ 0.05% of rating
Line regulation CV (at ±10% max. ΔVac)	≤ 0.01% of rating
Stability CV	≤ 0.02% of rating
Load regulation CP (at 0–100% load)	≤ 0.3% of rating
Stability CC	≤ 0.02% of rating
Load regulation CR	≤ 0.3% + 0.1% current rating
Voltage rise/fall time CV 10–90% ΔU	≤ 20 ms
Current rise/fall time CC 10–90% ΔI	≤ 10 ms
Ripple RMS CV at 300 kHz (model dependent) ^[2]	30 kW 80 V • ≤ 25 mV 30 kW 1000 V • ≤ 300 mV
Ripple and noise p-p at 20 MHz (model dependent) ^[2]	30 kW 80 V • ≤ 320 mV 30 kW 1000 V • ≤ 1600 mV
Efficiency up to	96.5% model dependent

- [1] Performance is generally determined after 30 minutes warmup, and stable AC, load, and environmental conditions.
- [2] Selected units shown for examples. Please check the model-specific spec sheets in the Operating Guide for details.
- [3] 208 Vac 3-phase input is possible with significant power derating. 30 kW rating becomes 18 kW. We generally do not promote use of 208 Vac, but it can be used if a need arises.

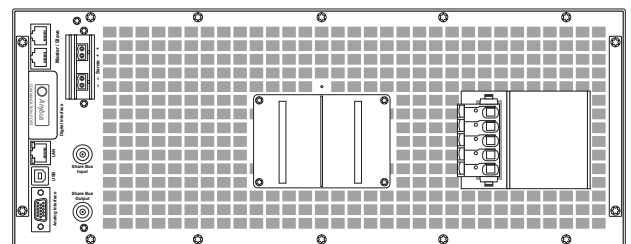
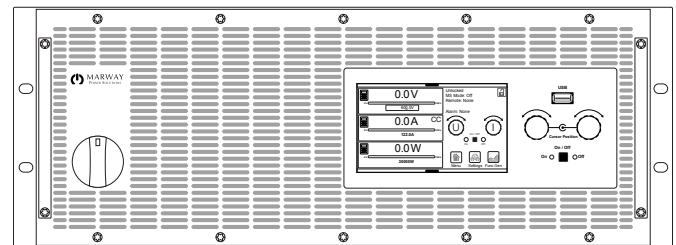
380–480 Vac

All model ratings are available with ac input of 380–480 Vac 3-phase only. ^[3]

Misc Specs

Alarm Value range	110% of rating
Set Value range	102% of rating
Display accuracy	≤ 0.05% of V rating ≤ 0.1% of I rating
Analog interface accuracy U/I/P/R	0–10 V ≤ 0.2% 0–5 V ≤ 0.4%
Load Sense compensation	up to 5% of rating

Layout of 311 Series 4U models



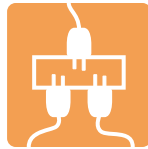
Chassis depth is approximately 26.3" with 1.7" front protrusion and 3.4" rear protrusion not including cable bends.



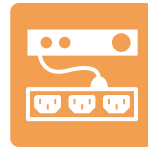
Optima™ PDUs
Custom and Standard
for Ac, Dc, 400Hz



mPower™ PPSs
Programmable DC
power supplies



TwinPower™ ATs
Auto Transfer Switches
for power redundancy



Commander™ UCPs
Remote and EPO
control panels



PowerPlus™
Turn-key rack
power integration

Contact Our Power Specialists
info@marway.com • 800-462-7929