MT Series VI

100 kW to 2000 kW+ Programmable DC Power Supply

MT Series VI

Rugged Current-Fed Technology

MAGNA-POWER ELECTRONICS

Innovative and Scalable

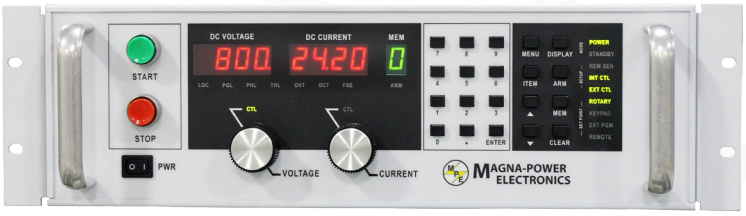
Magna-Power Electronics MT Series combines the best of DC power processing with ***microprocessor embedded control***. Magna-Power Electronics'innovative power processing technology improves response, shrinks package size, and reduces cost. MT Series power supplies are ***current-fed*** and are more tolerant to abusive loads than conventional switching power supplies. This technology allows the power supply to operate under short-circuit conditions, open-circuit conditions, and everything in between.

MT Series power supplies offer both ***master/slave parallel and series*** operation. This enables two or more power supplies to be placed in parallel for increased output current or in series for increased output voltage. With master/slave operation, power supplies operate at near equal voltage and current.

MT Series power supplies can operate as a ***voltage source*** or ***current source*** depending on the control settings and load conditions. If the power supply is operating as a voltage source and the load increases to a point beyond the current command setting, the power supply automatically crosses over to current mode control and operates as a current source at that setting.

Attention to Power Quality

MT Series power supplies contain circuitry to work harmoniously with other power equipment. Step-start contactors are used to keep inrush current below full scale operating current. Filter components lower current harmonic content emanating from the power supply and increase power factor to levels beyond 90%. Every power supply is tested at 90% to 125% nominal line to insure satisfactory operation even under the worst line voltage conditions.



KEY FEATURES:

- **Wide voltage and current range:**
  0-16 Vdc to 0-4000 Vdc and 0-40 Adc to 0-24000 Adc
- **Wide range of input voltages as standard:**
  From 380 Vac to 480 Vac at 50 Hz and 60 Hz
- **High Accuracy Programming and Monitoring**
- **37-pin optically isolated user I/O circuitry standard:**
  No additional isolation circuitry necessary
- **High efficiency operation:**
  Up to 92% efficiency under full load
- **RS232 interface standard with SCPI Commands:**
  GPIB, USB, Ethernet, RS485 interfaces optional
- **Optional LXI-certified ethernet communications:**
  Embedded web-server
- **OVT and OCT shutdown standard:**
  Mechanical contactors disconnect input mains
- **Integrated harmonic neutralizer (Models 250 kW+):**
  Autotransformer, produces 12-pulse waveform
- **IVI Drivers**
- **Front Panel Calibration**

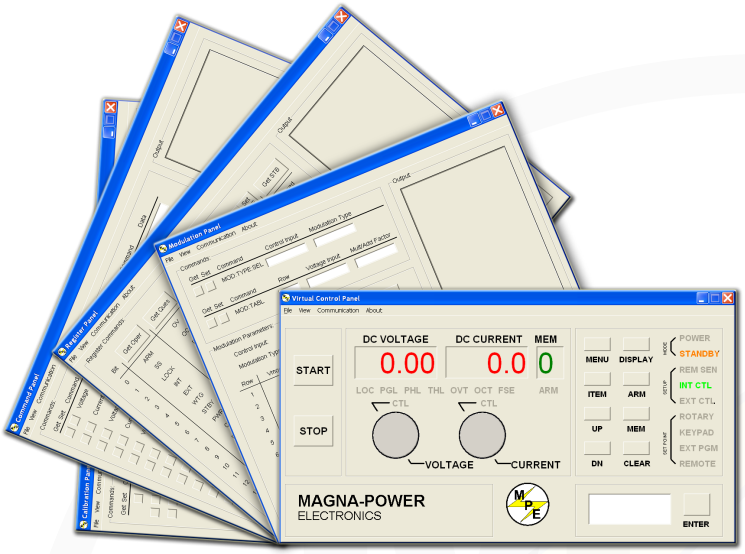
Designed for Safety

MT Series power supplies have extensive diagnostic functions -- all of which, when activated, take command to shut down the system. Diagnostic functions include phase loss, excessive thermal conditions, over voltage trip, over current trip, circuit breaker tripping, and program line. Program line monitors externally applied analog set point signals to ensure they are within the specified range. Upon a diagnostic fault condition, main power is disconnected and the diagnostic condition is latched into memory. Pressing the clear key clears the memory. All diagnostic functions can be monitored through a rear connector.

MT Series VI

Reliable Control Technology

MAGNA-POWER ELECTRONICS



Remote Interface Software

The Remote Interface Software ships with all MT Series power supplies. The software provides the user with an easy and intuitive method to operate a Magna-Power Electronics' power supply with computer control. The Remote Interface Software has six windows:

- Virtual Control Panel
- Command Panel
- Register Panel
- Calibration Panel
- Firmware Panel
- Modulation Panel

The Virtual Control Panel emulates the MT Series front panel, the Command panel programs and reads SCPI commands with user friendly buttons, the Register Panel programs and reads registers, the Calibration Panel enables calibration of the digital potentiometers, the Firmware Panel enables the program stored internal to the power supply to be upgraded, and the Modulation Panel eases programming of modulation parameters.

Power Source Emulation

Output modulation enables Magna-Power Electronics' power supplies to emulate a variety of user-defined power sources, such as ***Fuel Cells***, ***Photovoltaic Arrays***, ***Batteries***, etc. The power supplies follow an I-V curve programmed either through Magna-Power's Remote Interface Software (modulation panel), LabVIEW with certified NI LabVIEW drivers, or through other programming means using SCPI commands.

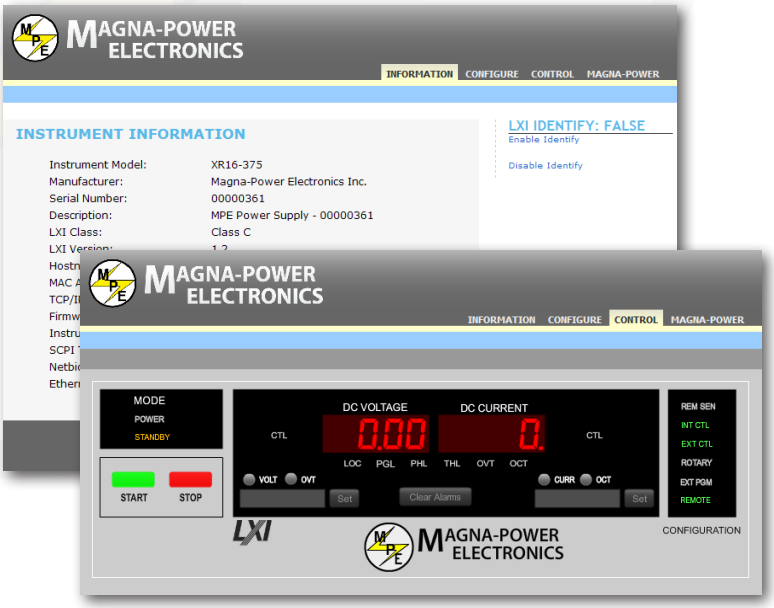
Isolated External I/O for Automation

Using the rear 37-pin I/O connector, the MT Series power supplies can be completely controlled and monitored using external signals. The voltage, current, over voltage trip, and over current trip set points are set by applying a 0-10 Vdc analog signals. Each diagnostic condition is given a designated pin, which reads 5 Vdc when high. Also, the power supply features an external interlock, which when enabled, allows the power supply to be tied in with other emergency stop equipment. All these pins are isolated to earth-ground as standard--no additional isolation circuitry necessary!

LXI-Compliant Embedded Ethernet

LXI is an instrumentation platform based on industry standard Ethernet technology designed to provide modularity, flexibility and performance to small- and medium-sized systems. LXI's advantages are exemplified in its compact, flexible package providing high-speed I/O and reliable measurements. These features meet the needs of R&D and manufacturing engineers delivering electronics for the aerospace/defense, automotive, industrial, and medical markets.

Certified to the LXI Standard (Class C), the MT Series Ethernet option includes an embedded web-server, allowing web browser power supply control and monitoring from virtually anywhere.



MT Series VI

Enhanced Front Panel Control

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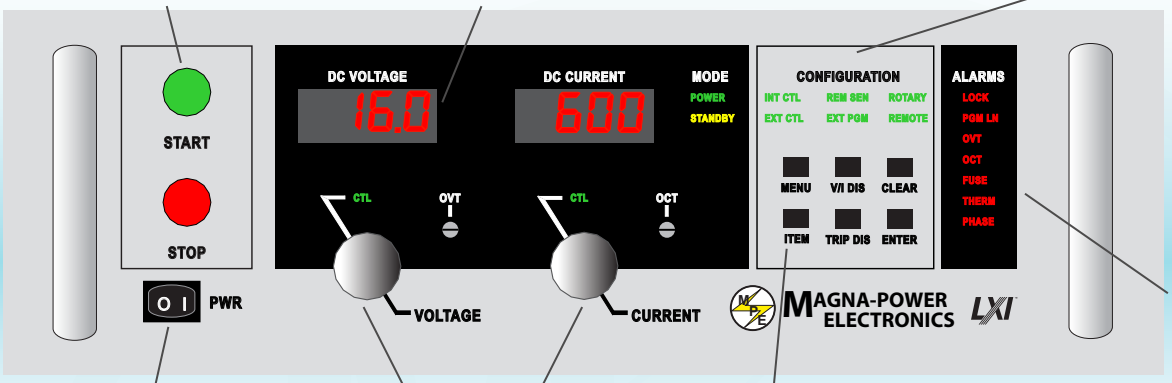
A Version Front Panel



Switches main power on and off

Meters display voltage, current, over voltage protection, over current protection

MODE AND CONFIGURATION
POWER: Indicates power output
STANDBY: Indicates control power only
INT CTL: Front panel controls enabled
EXT CTL: External controls enabled
REM SEN: Indicates remote sense
EXT PGM: External voltage/current control
ROTARY: Potentiometer voltage/current control
REMOTE: RS232 control enabled

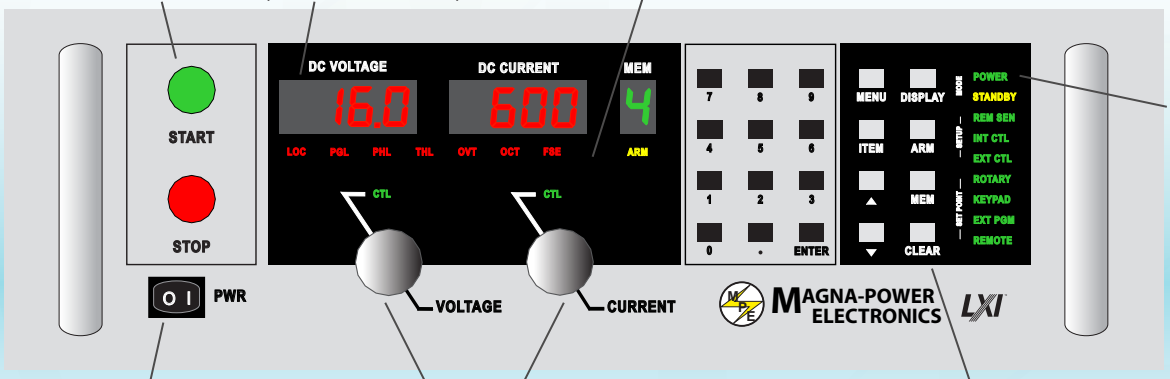
ALARMS
LOCK: Interlock
PGM LINE: External input beyond limits
OVT: Shows over voltage protection has tripped
OCT: Show over current protection has tripped
FUSE: Warns that a fuse has cleared
THERM: Indicates overheating
PHASE: Indicates a problem with the input voltage

Energizes control circuits without turning the main power on

Sets voltage and current in rotary mode

FUNCTION KEYS
MENU: Select function
V/I DIS: Displays V/I set points
CLEAR: Clear setting or reset fault
ITEM: Select item within function
TRIP DIS: Displays OVT and OCT setting
ENTER: Enter Setting

D Version Front Panel



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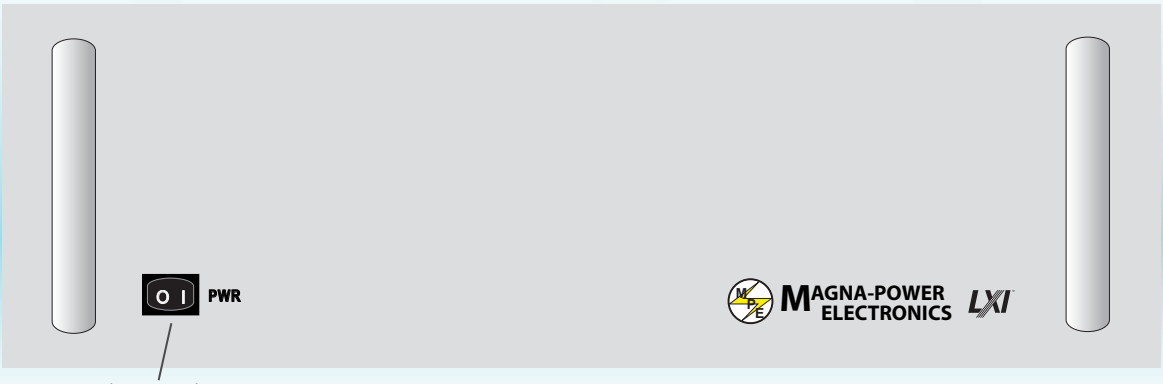
Energizes control circuits without turning the main power on

Sets voltage and current in rotary mode

FUNCTION KEYS
MENU: Select function
DISPLAY: Displays V/I set points
ITEM: Select item within function
ARM: arms power supply for auto sequencing through states stored in memory
ENTER: Enter Setting
CLEAR: Clear setting or reset fault
MEM: Sets memory
▲ : Up
▼ : Down

C Version Front Panel



Energizes control circuits without turning the main power on

MT Series VI

Models and Ratings

MAGNA-POWER ELECTRONICS

100 kW Models

Model	Voltage (Vdc)	Current (Adc)	Ripple (mVrms)	Eff. %	Input Current (Aac)	
					380/415 V	440/480 V
MTA16-6000	0-16	0-6000	35	90	191	165
MTA20-5000	0-20	0-5000	40	90	191	165
MTA32-3000	0-32	0-3000	40	90	191	165
MTA40-2500	0-40	0-2500	40	91	191	165
MTA50-2000	0-50	0-2000	50	91	191	165
MTA80-1250	0-80	0-1250	60	91	191	165
MTA100-1000	0-100	0-1000	60	91	186	160
MTA125-800	0-125	0-800	100	91	186	160
MTA160-620	0-160	0-620	120	91	186	160
MTA200-500	0-200	0-500	125	91	186	160
MTA250-400	0-250	0-400	130	92	186	160
MTA375-270	0-375	0-270	170	92	186	160
MTA400-250	0-400	0-250	180	92	186	160
MTA500-200	0-500	0-200	220	92	186	160
MTA600-160	0-600	0-160	250	92	186	160
MTA800-120	0-800	0-120	300	92	186	160
MTA1000-100	0-1000	0-100	400	92	186	160
MTA1250-80	0-1250	0-80	500	92	186	160
MTA1600-62	0-1600	0-62	600	92	186	160
MTA2000-50	0-2000	0-50	800	92	186	160
MTA2500-40	0-2500	0-40	900	92	186	160
MTA3000-32	0-3000	0-32	1000	92	186	160
MTA4000-24	0-4000	0-24	1100	92	186	160

150 kW Models

Model	Voltage (Vdc)	Current (Adc)	Ripple (mVrms)	Eff. %	Input Current (Aac)	
					380/415 V	440/480 V
MTA25-6000	0-25	0-6000	40	90	287	248
MTA32-4500	0-32	0-4500	40	90	287	248
MTA40-3750	0-40	0-3750	40	90	287	248
MTA50-3000	0-50	0-3000	50	91	287	248
MTA80-1850	0-80	0-1850	60	91	287	248
MTA100-1500	0-100	0-1500	60	91	278	240
MTA125-1200	0-125	0-1200	100	91	278	240
MTA160-900	0-160	0-160	120	91	278	240
MTA200-750	0-200	0-750	125	91	278	240
MTA250-600	0-250	0-600	130	92	278	240
MTA375-400	0-375	0-400	170	92	278	240
MTA400-375	0-400	0-375	180	92	278	240
MTA500-300	0-500	0-300	220	92	278	240
MTA600-240	0-600	0-240	250	92	278	240
MTA800-180	0-800	0-180	300	92	278	240
MTA1000-150	0-1000	0-150	400	92	278	240
MTA1250-120	0-1250	0-120	500	92	278	240
MTA1600-90	0-1600	0-90	600	92	278	240
MTA2000-75	0-2000	0-75	800	92	278	240
MTA2500-60	0-2500	0-60	900	92	278	240
MTA3000-48	0-3000	0-48	1000	92	278	240
MTA4000-36	0-4000	0-36	1100	92	278	240

250 kW Models

Model	Voltage (Vdc)	Current (Adc)	Ripple (mVrms)	Eff. %	Input Current (Aac)	
					380/415 V	440/480 V
MTA40-6000	0-40	0-6000	40	90	478	413
MTA50-5000	0-50	0-5000	50	90	478	413
MTA80-3000	0-80	0-3000	60	90	478	413
MTA100-2500	0-100	0-2500	60	91	478	413
MTA125-2000	0-125	0-2000	100	91	478	413
MTA160-1500	0-160	0-1500	120	91	478	413
MTA200-1250	0-200	0-1250	125	91	478	413
MTA250-1000	0-250	0-1000	130	91	465	400
MTA375-660	0-375	0-660	170	91	465	400
MTA400-625	0-400	0-625	180	91	465	400
MTA500-500	0-500	0-500	220	91	465	400
MTA600-400	0-600	0-400	250	92	465	400
MTA800-300	0-800	0-300	300	92	465	400
MTA1000-250	0-1000	0-250	400	92	465	400
MTA1250-200	0-1250	0-200	500	92	465	400
MTA1600-150	0-1600	0-150	600	92	465	400
MTA2000-125	0-2000	0-125	800	92	465	400
MTA2500-100	0-2500	0-100	900	92	465	400
MTA3000-80	0-3000	0-80	1000	92	465	400
MTA4000-60	0-4000	0-60	1100	92	465	400

500 kW Models*

Model	Voltage (Vdc)	Current (Adc)	Ripple (mVrms)	Eff. %	Input Current (Aac)	
					380/415 V	440/480 V
MTA40-12000	0-40	0-12000	40	90	956	826
MTA50-10000	0-50	0-10000	50	90	956	826
MTA80-6000	0-80	0-6000	60	90	956	826
MTA100-5000	0-100	0-5000	60	91	956	826
MTA125-4000	0-125	0-4000	100	91	956	826
MTA160-3000	0-160	0-3000	120	91	956	826
MTA200-2500	0-200	0-2500	125	91	956	826
MTA250-2000	0-250	0-2000	130	91	930	800
MTA375-1320	0-375	0-1320	170	91	930	800
MTA400-1250	0-400	0-1250	180	91	930	800
MTA500-1000	0-500	0-1000	220	91	930	800
MTA600-800	0-600	0-800	250	92	930	800
MTA800-600	0-800	0-600	300	92	930	800
MTA1000-500	0-1000	0-500	400	92	930	800
MTA1250-400	0-1250	0-400	500	92	930	800
MTA1600-300	0-1600	0-300	600	92	930	800
MTA2000-250	0-2000	0-250	800	92	930	800
MTA2500-200	0-2500	0-200	900	92	930	800
MTA3000-160	0-3000	0-160	1000	92	930	800
MTA4000-120	0-4000	0-120	1100	92	930	800

MT Series VI

Models and Ratings (Continued)

MAGNA-POWER ELECTRONICS

750 kW Models*

Model	Voltage (Vdc)	Current (Adc)	Ripple (mVrms)	Eff. %	Input Current (Aac)	
					380/415 V	440/480 V
MTA40-18000	0-40	0-18000	40	90	1434	1239
MTA50-15000	0-50	0-15000	50	90	1434	1239
MTA80-9000	0-80	0-9000	60	90	1434	1239
MTA100-7500	0-100	0-7500	60	91	1434	1239
MTA125-6000	0-125	0-6000	100	91	1434	1239
MTA160-4500	0-160	0-4500	120	91	1434	1239
MTA200-3750	0-200	0-3750	125	91	1434	1239
MTA250-3000	0-250	0-3000	130	91	1395	1200
MTA375-1980	0-375	0-1980	170	91	1395	1200
MTA400-1875	0-400	0-1875	180	91	1395	1200
MTA500-1500	0-500	0-1500	220	91	1395	1200
MTA600-1200	0-600	0-1200	250	92	1395	1200
MTA800-900	0-800	0-900	300	92	1395	1200
MTA1000-750	0-1000	0-750	400	92	1395	1200
MTA1250-600	0-1250	0-600	500	92	1395	1200
MTA1600-450	0-1600	0-450	600	92	1395	1200
MTA2000-375	0-2000	0-375	800	92	1395	1200
MTA2500-300	0-2500	0-300	900	92	1395	1200
MTA3000-240	0-3000	0-240	1000	92	1395	1200
MTA4000-180	0-4000	0-180	1100	92	1395	1200

1000 kW Models*

Model	Voltage (Vdc)	Current (Adc)	Ripple (mVrms)	Eff. %	Input Current (Aac)	
					380/415 V	440/480 V
MTA40-24000	0-40	0-24000	40	90	1912	1652
MTA50-20000	0-50	0-20000	50	90	1912	1652
MTA80-12000	0-80	0-12000	60	90	1912	1652
MTA100-10000	0-100	0-10000	60	91	1912	1652
MTA125-8000	0-125	0-8000	100	91	1912	1652
MTA160-6000	0-160	0-6000	120	91	1912	1652
MTA200-5000	0-200	0-5000	125	91	1912	1652
MTA250-4000	0-250	0-4000	130	91	1860	1600
MTA375-2640	0-375	0-2640	170	91	1860	1600
MTA400-2500	0-400	0-2500	180	91	1860	1600
MTA500-2000	0-500	0-2000	220	91	1860	1600
MTA600-1600	0-600	0-1600	250	92	1860	1600
MTA800-1200	0-800	0-1200	300	92	1860	1600
MTA1000-1000	0-1000	0-1000	400	92	1860	1600
MTA1250-800	0-1250	0-800	500	92	1860	1600
MTA1600-600	0-1600	0-600	600	92	1860	1600
MTA2000-500	0-2000	0-500	800	92	1860	1600
MTA2500-400	0-2500	0-400	900	92	1860	1600
MTA3000-320	0-3000	0-320	1000	92	1860	1600
MTA4000-240	0-4000	0-240	1100	92	1860	1600

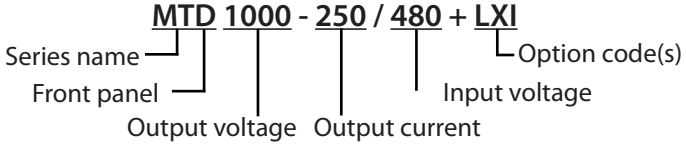
*By paralleling multiple 250 kW modules using the UID46 device

Options

Title	Option Code
LXI TCP/IP Ethernet Interface (Internal)	+LXI
IEEE 488.2 GPIB Interface (Internal)	+GPIB
USB Edgeport Interface (External)	+USB
RS-485DSS Interface (External)	+RS485
High Slew Rate Output	+HS
UID46: Universal Interface Device	+UID46
EMI Filter	+EMI

Model Ordering System

Series Name	Front Panel	Output Voltage	Output Current	Input Voltage	Option Code(s)
XR	A: Analog	See Tables	See Tables	208 SP	+LXI
TS	D: Digital			240 SP	+GPIB
MS	C: Computer			208	+USB
MT	Blank: XR			240	+RS485
				380	+HS
				415	+UID46
				440	+EMI
				480	



MT Series VI
Specifications

MAGNA-POWER ELECTRONICS

Input

Nominal Voltage **3 phase, 3 wire + ground**	380 VAC 3ϕ (operating range 342 - 418 VAC) 415 VAC 3ϕ (operating range 373 - 456 VAC) 440 VAC 3ϕ (operating range 396 - 484 VAC) 480 VAC 3ϕ (operating range 432 - 528 VAC)
Frequency	50 Hz or 60 Hz (operating range 45-55 Hz or 54-66 Hz)
Power Factor	> 92% at max. power 100 kW and 150 kW modules > 96% at maximum power 250 kW modules

Environmental

Operating Temperature	0 °C to 50 °C
Storage Temperature	-25 °C to 85 °C
Ambient Temperature	0 to 50 °C
Temperature Coefficient	0.04 % / °C of maximum output voltage, 0.06 % / °C of maximum output current.
Air Cooling	Front and rear intake, top exhaust

Physical

Power (kW)	Size (H" x W" x D")	Weight
100 kW	62.5 x 48 x 31.5 in (158.8 x 121.9 x 80.0 cm)	1600 lbs (725.8 kg)
150 kW	62.5 x 48 x 31.5 in (158.8 x 121.9 x 80.0 cm)	2100 lbs (952.5 kg)
250 kW	62.5 x 72 x 31.5 in (158.8 x 182.9 x 80.0 cm)	3300 lbs (1496.9 kg)
500 kW	62.5 x 144 x 31.5 in (158.8 x 365.8 x 80.0 cm)	6600 lbs (2993.7 kg)
750 kW	62.5 x 216 x 31.5 in (158.8 x 548.7 x 80.0 cm)	9900 lbs (4490.6 kg)
1000 kW	62.5 x 288 x 31.5 in (158.8 x 731.6 x 80.0 cm)	13200 lbs (5987.4 kg)

Control Limits

Remote Sense Limits	3% maximum voltage drop from output to load (Remote sense only available on models ≤ 1000 Vdc)
Period Programming Limits	Minimum period: 10 msec Maximum Period: 9997 sec or 2.77 hours
Digital control inputs and outputs limits	Input voltage: 0 to 5 V Output voltage: 0 to 5 V, 5 mA drive capacity

Experience you can rely on.

With decades of experience, Magna-Power Electronics has honed its product line to provide robust current-fed power conversion along with user friendly sophisticated microprocessor control. Magna-Power Electronics' products can be found around the world processing power for national labs, industrial sites, and universities.

Our products have evolved by listening to our customers and working with them to find solutions to their problems. Our continual growth is based upon our innovative engineering, superior manufacturing methods, and dedicated employees. Today, all engineering and manufacturing is performed in Flemington, NJ.

Output

Ripple	See Model Charts
Line Regulation	Voltage Mode: ± 0.004% of full scale Current Mode: ± 0.02% of full scale
Load Regulation	Voltage Mode: ± 0.01% of full scale Current Mode: ± 0.04% of full scale
Load Transient Response	2 ms to recover within ±1% of regulated output, with a 50% to 100% or 100% to 50% step load change
Efficiency	≥ 90% at full load (See Model Charts)
Stability	± 0.10% for 8 hrs. after 30 min. warmup
Isolation	User inputs and outputs: referenced to earth ground. Maximum input voltage to ground: ±2500 Vac. Maximum output voltage to ground: ±1000 Vdc for models less than or equal to 1000 Vdc, ±4000 Vdc for models greater than 1000 Vdc.
Maximum Slew Rate	Standard Models: 100 ms for output voltage change from 0 to 63%, 100 ms for output current change from 0 to 63%. With High Slew Rate Option: 4 ms for output voltage change from 0 to 63%, 8 ms for output current change from 0 to 63%.
Bandwith	Standard Models: 3 Hz with remote analog voltage programming, 2 Hz with remote analog current programming. With High Slew Rate Option: 60 Hz with remote analog voltage programming, 45 Hz with remote analog current programming.
Analog Output Impedances	Voltage output monitoring: 100 ohm, Current output monitoring: 100 ohm, +10V Ref: 1 ohm.

Programming Levels and Accuracy of Full Scale

	Voltage Set Point	Current Set Point	OVT Set Point	OCT Set Point
Remote Analog Programming Accuracy	± 0.075%	± 0.075%	± 0.075%	± 0.075%
Digital Programming Accuracy	± 0.075%	± 0.075%	± 0.075%	± 0.075%
Remote Analog Programming Levels	0 - 10.0 V	0 - 10 .0 V	0 - 10.0 V	0 - 10.0 V

Monitoring Levels and Accuracy of Full Scale

	Output Voltage	Output Current
Remote Analog Monitoring Accuracy	± 0.2%	± 0.2%
Digital Monitoring Accuracy	± 0.2%	± 0.2%
Remote Analog Monitoring Levels	0 - 10.0 V	0 - 10.0 V

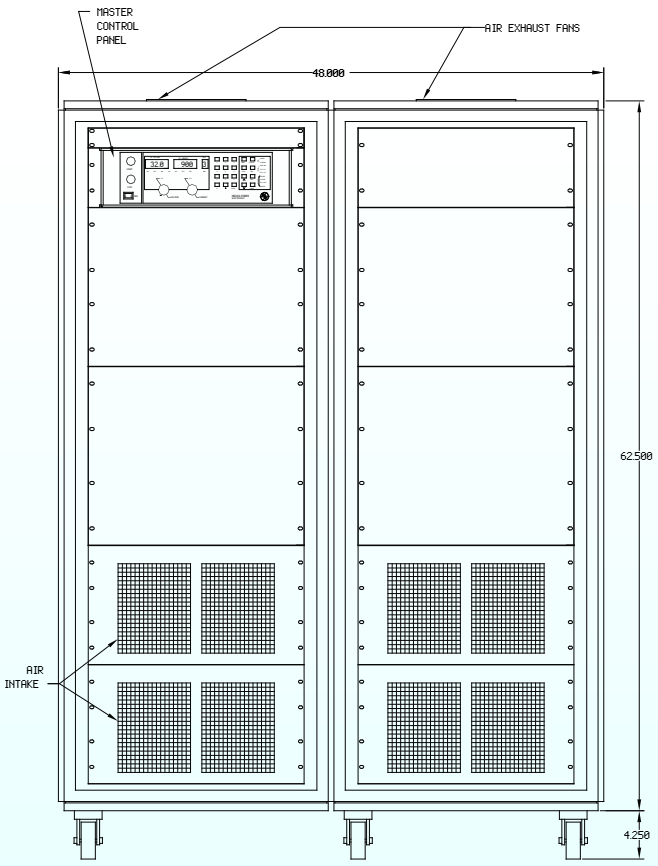
Note: Specifications are subject to change without notice. For three-phase configurations, specifications are line-to-neutral. Unless otherwise noted, input voltages and currents are specified for three-phase configurations.

MT Series VI

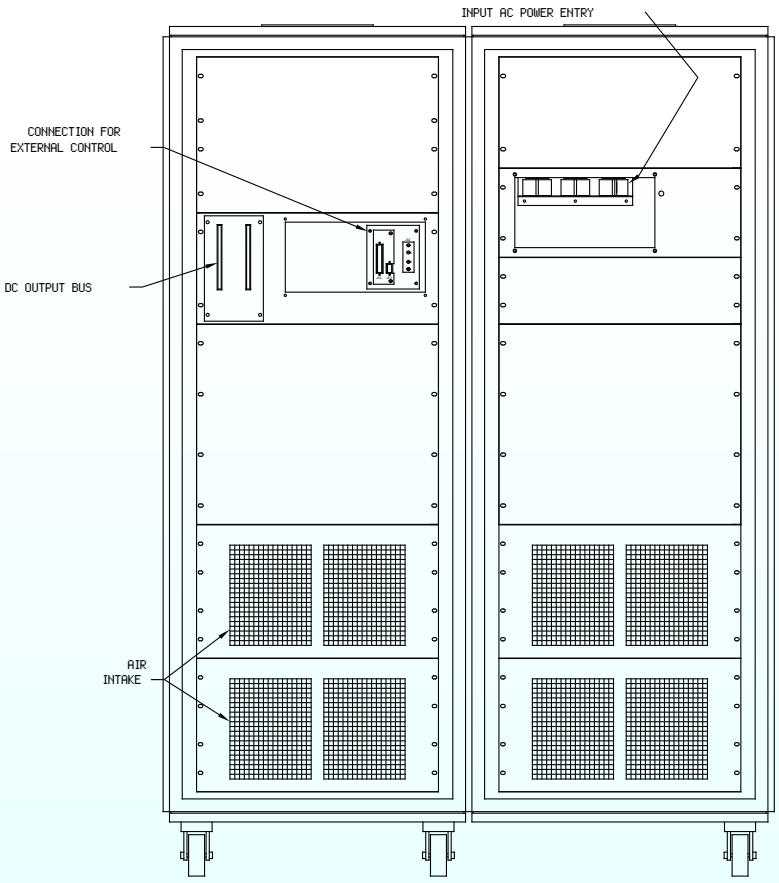
Size Diagrams: 100 kW and 150 kW Modules

MAGNA-POWER ELECTRONICS

Front Panel: 100 kW and 150 kW

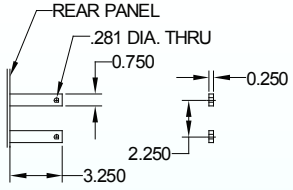


Rear Panel: 100 kW and 150 kW

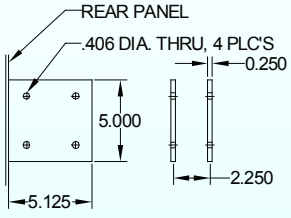


Output Bus

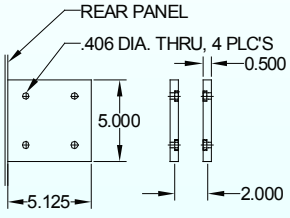
DETAILS OF OUTPUT BUS
VERY HIGH VOLTAGE UNITS



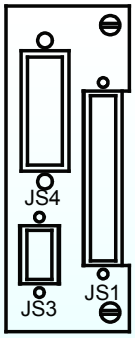
DETAILS OF OUTPUT BUS
MEDIUM/HIGH VOLTAGE UNITS



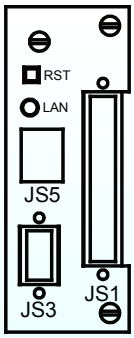
DETAILS OF OUTPUT BUS
LOW VOLTAGE UNITS



Interfaces



OPTIONAL IEEE-488 INTERFACE



OPTIONAL ETHERNET INTERFACE

Did you know?

Magna-Power Electronics power supplies:

- Are all designed, manufactured, and supported in the USA
- Come standard with I/O isolation
- Have an added power-processing stage for superior performance

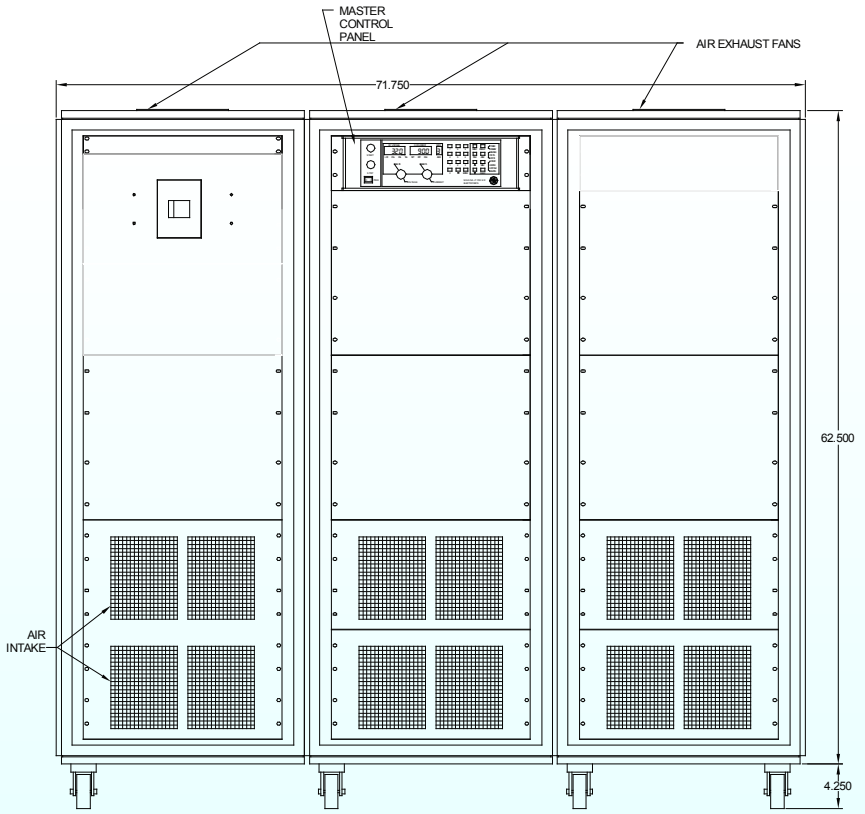
Doc Rev D, 6/7/2011

MT Series VI

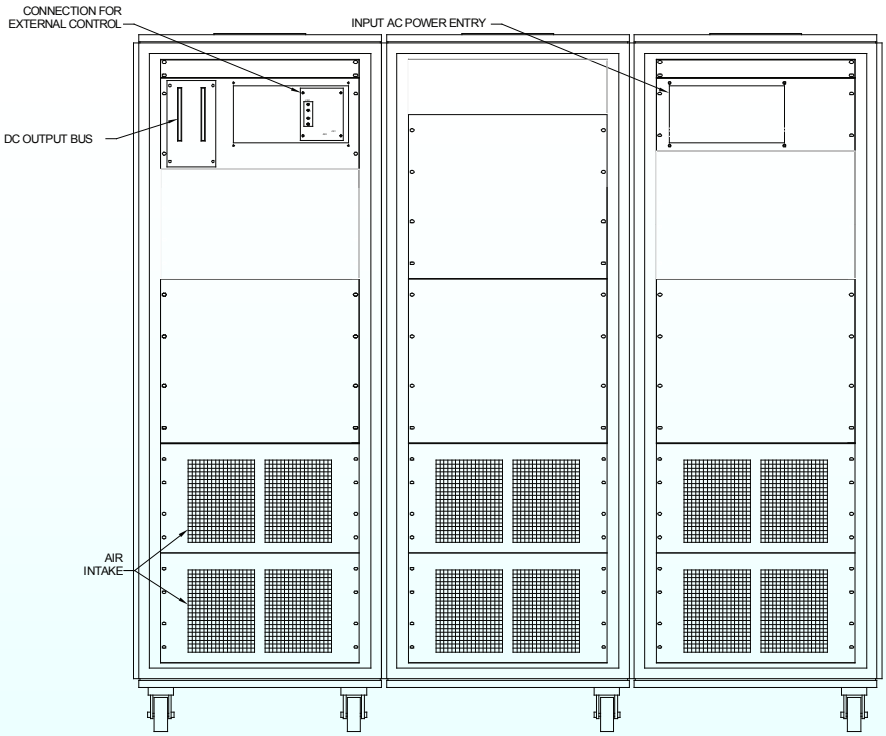
Size Diagrams: 250 kW Modules

MAGNA-POWER ELECTRONICS

Front Panel: 250 kW



Rear Panel: 250 kW



Connector JS1

TERM	PARAMETER	TERM	PARAMETER
1	REF GND	20	REF GND
2	REF GND	21	+10V REF
3	VREF EXT	22	IREF EXT
4	TVREF EXT	23	TIREF EXT
5	VO2	24	IO2
6	+2.5V REF CAL	25	VMOD
7	GND	26	+5V
8	POWER	27	PGM LINE
9	THERMAL	28	STANDBY
10	INTERLOCK	29	PHASE LOSS
11	CUR CTL	30	VOLT CTL
12	STANDBY/ALM	31	RESERVE
13	ALM	32	OCT
14	EXT CTL	33	INT CTL
15	INP	34	OVT
16	RESERVE	35	RESERVE
17	START	36	ARM
18	CLEAR	37	INTERLOCK SET
19	STOP		

Connector JS2

TERM	PARAMETER
1	VO1REM-
2	VO1REM+

Connector JS3

TERM	PARAMETER
1	NC
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	NC