

Programmable DC Power Supplies 200W/400W/600W/800W in 2U Built-in USB, RS-232 & RS-485 Interface

Optional Interface: LAN IEEE488.2 SCPI (GPIB) Multi-Drop Isolated Analog Programming



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TDK·Lambda

## TDK-Lambda

### **Features Include:**

- High Power Density 200W/400W/600W/800W in 2U: 3.5 Inch (89mm) height
- Wide Range Input (85-265Vac continuous)
- Active Power Factor Correction (0.99 typical)
- Output Voltage up to 650V, Current up to 5A
- Constant Voltage (CV)/(CC) Constant Current auto-crossover
- Built-in RS-232/RS-485 Interface Standard
- Global Commands for Serial RS-232/RS-485 Interface
- Auto-Re-Start / Safe-Start: user selectable
- Last-Setting Memory
- High Resolution 16 bit ADCs & DACs
- Low Ripple & Noise
- Front Panel Lock selectable from Front Panel or Software
- · Reliable Encoders for Voltage and Current adjustment
- · Parallel Operation with Active Current Sharing, for up to six identical units
- · Advanced Parallel Master / Slave. Total Current is programmed and measured via the Master
- External Analog Programming and Monitoring (user selectable 0-5V & 0-10V)
- Reliable Modular and SMT Design
- 19" Rack Mount Capability for ATE and OEM applications
- Optional Interfaces

Isolated Analog Programming and Monitoring Interface (0-5V/0-10V & 4-20mA) IEEE 488.2 SCPI (GPIB) Multi-Drop

LAN

LabView® and LabWindows® drivers

• Arbitrary functions for:

Automotive or laser simulation / 4 Pre-Programmed Functions

- · Fast Command Processing Time
- Output Sequencing
- Four-cell Memory Settings
- User Programmable Signal Pins
- Five Year Warranty
- Worldwide Safety Agency Approvals; CE Mark for LVD and EMC regulations





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# **Front Panel Description**







- 1. AC ON/OFF Switch
- 2. Air Intake allows zero stacking for maximum system flexibility and power density.\*
- 3. Reliable encoder controls Output Voltage and power supply setting.
- 4. Volt Display shows Output Voltage and directly displays and power supply settings.
- 5. Reliable encoder controls Output Current, and power supply setting.
- 6. Current Display shows Output Current and power supply setting.
- 7. Function/Status LEDs:
- AlarmFine ControlPreview SettingsFoldback ModeRemote ModeOutput On
- 8. Pushbuttons allow flexible user configuration
- Coarse and Fine adjustment of Output Voltage/Current and Advanced Parallel Master or Slave
- Preview settings and set Voltage/Current with Output OFF, Front Panel Lockout
- · Set OVP, UVP, UVL Limits
- Set Current Foldback
- Local/Remote Mode and select Address and Baud Rate
- Output ON/OFF and Auto-Start/Safe-Start Mode
- Menu
- 9. Optional front panel insulated output sockets (Ø 4mm) for modules up to 650V: 5A Max

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<sup>\*</sup> Zero stacking - side-by-side mounting of 6 units in a 19" Rack

# **Rear Panel Description**





- 1. Connector allows (Non-isolated) Analog Program and Monitor and other functions.
- 2. Remote/Local Output Voltage Sense Connections.
- 3. Signal Connector
- 4. RS-232/RS-485 INPUT Remote Serial Programming.
- 5. RS-485 OUTPUT to other Z<sup>+</sup> Power Supplies.
- 6. USB Interface
- 7. Wide-Range Input 85-265VAC continuous, 47/63Hz with Active Power Factor Correction (0.99 typical) AC Input Connector: IEC320 -C16.
- 8. Exhaust air exits at the back. Allows vertical stacking of units without any separation between units
- 9. Output Connections:
  - MALE CONNECTOR (IC 2,5/4-G-5,08, PHOENIX CONTACT).
  - FEMALE PLUG (IC 2,5/4-ST-5,08, PHOENIX CONTACT).
- 10. Optional Interface Position for LAN Interface.
- 11. Optional Interface Position for GPIB Interface (shown) or Isolated Analog Interface.



# **\*** Power Benchtop Parallel and Series Configurations

### **Benchtop Power Supply**

Parallel operation - Master/Slave:

Active current sharing allows up to six identical units to be connected in an auto-parallel configuration for six times the output power.

In Advanced Parallel Master/Slave Mode, total current is programmed and reported by the Master, Up to six supplies act as one.



### **Series operation**

Up to two units may be connected in series to increase the output voltage or to provide bipolar output.

## Remote Programming via Built-in USB, RS-232 & RS-485 Interface

Standard Serial Interface allows daisy chain control of up to 31 power supplies on the same bus with built-in RS-232 & RS-485 Interface.

# **Optional Interface:** LAN & IEEE488.2 SCPI (GPIB)

### Multi-Drop

Allows LAN/IEEE Master to control up to 31 slaves over RS-485 daisy-chain Only the Master needs be equipped with LAN/IEEE Interface













## **Applications**

 $Z^{\dagger}$  series power supplies have been designed to meet the demands of a wide variety of applications.

### **Test and Measurement**

Built-in Last-Setting memory based on Flash Memory no battery or capacitor backup. Simplifies test design and requirements.

Built-in RS-232/RS-485 gives maximum system flexibility along with 0-5V and 0-10V, selectable analog programming.

Wide range of available inputs allows testing of many different devices.

### **Semiconductor Burn-in**

Safe-Start mode ENABLED - to re-start at Output OFF to protect load.

Wide range input (85-265Vac) with Active Power Factor correction rides through input transients easily.

### **Component Test**

High power density, zero stacking and single wire parallel operation, give maximum system flexibility.

### **Laser Diode**

OVP is directly set on Voltage Display, assuring accurate protection settings.

Fast Constant Current response, no over shoot. Current Limit Fold Back assures load is protected from current surges.

### **Heater Supplies**

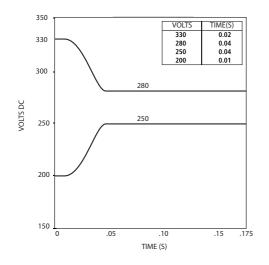
Smooth, reliable encoders enhance front panel control. Remote analog programming is user selectable 0-5V or 0-10V.

### **RF Amplifiers and Magnets**

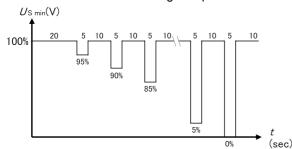
Robust design assures stable operation under a wide variety of loads. High linearity in Voltage & Current mode.

# **Z**<sup>+</sup> Series Sequence Programming Applications:

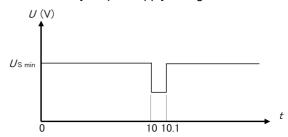
### MILITARY STANDARD 704E Testing



### Reset behaviour at voltage drop



### Discontinuities in supply voltage Momentary drop in supply voltage



## **Options: (200W/400W/600W/800W)**

### **Front Panel insulated Output sockets**

Up to 650V Output Module

P/N: Z\_\_--\_L2



Optional front panel insulated output sockets (Ø 4mm) for modules up to 650V: 5A Max - L2

### **Z**<sup>+</sup> Assemblies

Dual Output Housing (for 105mm) 200W/400W/600W/800W Triple Output Housing (for 70mm) 200W/400W/600W/800W P/N: Z-NL200 (same p/n for both Dual & Triple Output Housing)w





### 19" Rack Mounted to 4.8kW

Six units (70mm) can be assembled into 19-Inch rack/2U high Four units (105mm) can be assembled into 19-Inch rack/2U high to meet your configuration requirements.

In cases where the entire rack is not occupied with power units, P/N: Z-BP for 70mm, P/N: Z-WBP for 105mm blank panels can be installed:

P/N: Z-NL100





### **Power Modules Table**

Module Type	200W	400W	600W	800W
0~160V	1.3A	2.6A	4A	5A
0~320V	0.65A	1.3A	2A	2.5A
0~650V	0.32A	0.64A	1A	1.25A
19" rack width	1/6 width	1/6 width	1/6 width	1/6 width
19" rack width	1/4 width	1/4 width	1/4 width	1/4 width





## **Programming Options (Factory Installed)**

## **Digital Programming via IEEE Interface**

- IEEE 488.2 SCPI Compliant
- Program Voltage
- Measure Voltage
- Over Voltage setting and shutdown
- Error and Status Messages
- Multi-Drop
- Allows IEEE Master to control up to 31 slaves over RS-485 daisy-chain
- Only the Master needs be equipped with IEEE Interface

### **Isolated Analog Programming**

Four Channels to Program and Monitor Voltage and Current.

Isolation allows operation with floating references in harsh electrical environments.

Choose between programming with Voltage or Current.

Connection via removable terminal block: Phoenix MC1,5/8-ST-3.81.

Voltage Programming, user-selectable 0-5V or 0-10V signal.
 Power Supply Voltage and Current Programming Accuracy ±1%
 Power Supply Voltage and Current Monitoring Accuracy ±1.5%

Current Programming with 4-20mA signal.
 Power Supply Voltage and Current Programming Accuracy ±1%
 Power Supply Voltage and Current Monitoring Accuracy ±1.5%

P/N: IS420

P/N: IS510

P/N: IEEE

LAN Interface P/N: LAN

- VISA & SCPI Compatible
- Address Viewable on Front Panel
- Fixed and Dynamic Addressing
- Compatible with most standard Networks
- TCP / UDP Socket Programming
- LAN Fault Indicators

Program Current

Measure Current

Current Foldback shutdown

- Auto-detects LAN Cross-over Cable
- Fast Startup

### **AC Cord**

Region	Europe	Japan	North America	Israel
Output Power	850W	850W	850W	850W
AC Cords	10A/250Vac L=2m	15A/125Vac L=2m	13A/125Vac L=2m	10A/250Vac L=2m
Wall Plug	INT'L 7/VII	JIS C8303	NEMA 5-15P	SI-32
Power Supply	IEC320-C15	IEC320-C15	IEC320-C15	IEC320-C15
Connector				
Part Number	P/N: Z-E	P/N: Z-J	P/N : Z-U	P/N: Z-I

### **Communication Cable**

RS-232/RS-485 Cable is used to connect the power supply to the PC Controller

		· ·
Mode	RS-485	RS-232
PC Connector	DB-9F	DB-9F
Communication Cable	Shield Ground L=2m	Shield Ground L=2m
Power Supply Connector	EIA/TIA-568A (RJ-45)	EIA/TIA-568A (RJ-45)
P/N	Z/485-9	Z/232-9

### Serial Link Cable\*

Daisy-chain up to 31 Z<sup>+</sup> Series power supplies.

Mode	Power Supply Connector	Communication Cable	P/N
RS-485	EIA/TIA-568A (RJ-45)	Shield Ground	Z/RJ45

<sup>\*</sup> Included with power supply

# Power Supply Identification / Accessories How to order

Z	650 -	1.25-			
Series Name	Output Voltage (0~650V)	Output Current (0~1.25A)	Factory Options:	Output Jack	AC cord Options: Region :
			IEEE LAN IS510 IS420	L2	E - Europe J - Japan U - North America I - Middle East C - China

Factory option
USB Interface built-in Standard
RS-232/RS-485 Interface built-in Standard
GPIB Interface
Voltage Programming Isolated Analog Interface
Current Programming Isolated Analog Interface
LAN Interface
LAN
Front panel insulated output sockets (Ø 4mm)

for modules up to 650V or 5A Max

L2

Model	Output Voltage (VDC)	Output Current (A)	Output Power (W)
Z160-1.3		0~1.3	208
Z160-2.6	0~160 VDC	0~2.6	416
Z160-4	0~160 VDC	0~4	640
Z160-5		0~5	800
Z320-0.65	0~320 VDC	0~0.65	208
Z320-1.3		0~1.3	416
Z320-2		0~2	640
Z320-2.5		0~2.5	800
Z375-2.2	0~375VDC	0~2.2	825
Z650-0.32	0~650 VDC	0~0.32	208
Z650-0.64		0~0.64	416
Z650-1		0~1	650
Z650-1.25		0~1.25	812



# Z<sup>+</sup>200 Series Specifications

MODEL   Z   169-13   329-065   599-122	2 200 Series Specific				
2. Reted outputs current (*28)			160-1.3	320-0.65	650-0.32
3. Rated output prover					
CONSTANT VOLTAGE MODE					
1.Max   Lost regulation (**)	3. Rated output power	W	208	208	208
1.Max   Lost regulation (**)	CONSTANT VOLTAGE MODE	7	160 12	220.065	650.0.22
2 Max Load regulation (??)			100-13		030-0.32
3. Rippe and noise to pp. 200HHz (114)					
6, Rippele true. SH2-1MHz (**14*)   mV   10		mV	100		250
Semperature coefficient					
2. Warmung drift	5. Temperature coefficient	PPM/°C			
8. Remote sense compensation/wire			0.02% of rated Vout over 8hrs.	interval following 30 minutes warn	n-up. Constant line, load & temp.
9. Up prog. Response time					
10. Down-prog response time   full load (1°9)   m5   180   270					
No load (*10)   S   2   2.5   3					-
Time for output voltage to recover within 6.5% of its rated output for a load change 10–00% of rated output current. Output set-point: 10–100%, local sense tests han 2ms.  12. Hold-up time (**19)  ———————————————————————————————————					
11. Instance response time	No load (*10)	5	2	2.5	3
CONSTANT CURRENT MODE  Z 160-13 0.320-0.65 659-0.32  1. Max. Lubar regulation (**6) 0.05% of rated output current  0.15% of rated output current  0.5 S. Temperature coefficient  PRVC  1. GOPPM/C from rated output current over 30 minutes following load change.  1. February C 100PPM/C from rated output current over 30 minutes warm-up.  5. Temperature coefficient  PRVC  1. GOPPM/C 100PPM/C from rated output current over 30 minutes warm-up.  6. Temperature stability  0.05% of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability of rated output current over 30 minutes soflowing power on.  1. Follows from the company of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability	11. Transient response time	mS			
CONSTANT CURRENT MODE  Z 160-13 0.320-0.65 659-0.32  1. Max. Lubar regulation (**6) 0.05% of rated output current  0.15% of rated output current  0.5 S. Temperature coefficient  PRVC  1. GOPPM/C from rated output current over 30 minutes following load change.  1. February C 100PPM/C from rated output current over 30 minutes warm-up.  5. Temperature coefficient  PRVC  1. GOPPM/C 100PPM/C from rated output current over 30 minutes warm-up.  6. Temperature stability  0.05% of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability of rated output current over 30 minutes soflowing power on.  1. Follows from the company of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability of rated output current over 30 minutes soflowing power on.  1. Follows from the company of the stability	12. Hold-up time (*19)		16mSec	Typical.	15mSec Typical.
1.Max. Line regulation (*6)			. 5.11500		, , , , , , , , , , , , , , , , , , , ,
2. Max Load regulation (*11) —	CONSTANT CURRENT MODE	Z	160-1.3	320-0.65	650-0.32
2. Max Load regulation (*11) —	1. Max. Line regulation (*6)				
4. Ripple rms. Sitz- Miltz (*12)(*14)  The perature coefficient  PPM/**C  100PPM/**C from rated output current, following 30 minutes warm-up.  0.05% of rated fout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature stability					0.15% of rated output current
S.Temperature coefficient   PPM/C   100PPM/C from rated output current following 30 minutes warm-up.   Constant line load & temperature with the stability				,	
6. Temperature stability — 0.05% of frated lout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature profit					***
Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.					
PROTECTIVE FUNCTIONS  Z 160-13 320-055 650-032  1. Foldback protection  Reset by AC input recycle in autostart mode or by COTPUT button or by rear panel ENABLE, or by communication port.  2. Over-voltage protection (OVP)  Inverter Shut down method. Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.  2. Over-voltage protection (OVP)  Inverter Shut down method. Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.  3. Over-voltage trip point  V 5-176  S-253  Output under voltage limit (UVL)  Preset by front panel or communication port. Prevents from adjusting Vour below limit. Does not affer in analog programming.  5. Output under voltage protection (UVP)  Quitput shut-down when power supply output voltage below UVP programming. User presetable Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.  6. Over temperature protection  User selectable, latched or non latched.  ANALOG PROGRAMMING AND MONITORING  1. Yout voltage programming  Q-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-5% of rated Vout.  2. Over temperature programming (*13)  Q-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-5% of rated Vout.  3. Yout resistor programming (*13)  Q-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-6 frated Vout.  5. Shut Off (SO) control  D-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-6 frated Vout.  5. Shut Off (SO) control  D-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-6 frated Vout.  5. Shut Off (SO) control  D-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-6 frated Vout.  6. Output current monitor (*13)  Q-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-19-6 frated Vout.  9. Power supply OK signal  9. Power supply OK signal  10. Series operation					
Output shut-down when power supply change mode from CV to CC or CC to CV. User presetable. Reset by AC input recycle in autostart mode or by OUTPUT but not not by rear panel ENABLE, or by communication port.  2. Over-voltage protection (OVP)  3. Over-voltage protection (OVP)  3. Over-voltage trip point  4. Output under voltage limit (UVL)  4. Output under voltage limit (UVL)  5. Output shut-down when power supply output volted and subtart mode or by OUTPUT but nor nor by panel ENABLE, or by communication port.  5. Output under voltage limit (UVL)  6. Over temperature protection (UVP)  6. Over temperature protection  7. Output shut-down when power supply output voltage goes below UVP programming. User presetable Reset by AC input recycle in autostart mode or by OUTPUT but nor or by rear panel ENABLE, or by communication port.  8. Over temperature protection  8. Over temperature protection  8. Over temperature protection  9. User selectable, latched or non latched.  8. Over temperature protection  9. User selectable, Accuracy and linearity: +/-15% of rated Vout.  1. Vout voltage programming  1. Over 100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-15% of rated Iout.  3. Vout resistor programming (*13)  9. 0-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-15% of rated Iout.  5. Shut Off (SO) control  10. Shut Off (SO) c	7. Warm-up drift		Less than +/-0.1% of I	rated output current over 30 minut	es following power on.
Output shut-down when power supply change mode from CV to CC or CC to CV. User presetable. Reset by AC input recycle in autostart mode or by OUTPUT but not not by rear panel ENABLE, or by communication port.  2. Over-voltage protection (OVP)  3. Over-voltage protection (OVP)  3. Over-voltage trip point  4. Output under voltage limit (UVL)  4. Output under voltage limit (UVL)  5. Output shut-down when power supply output volted and subtart mode or by OUTPUT but nor nor by panel ENABLE, or by communication port.  5. Output under voltage limit (UVL)  6. Over temperature protection (UVP)  6. Over temperature protection  7. Output shut-down when power supply output voltage goes below UVP programming. User presetable Reset by AC input recycle in autostart mode or by OUTPUT but nor or by rear panel ENABLE, or by communication port.  8. Over temperature protection  8. Over temperature protection  8. Over temperature protection  9. User selectable, latched or non latched.  8. Over temperature protection  9. User selectable, Accuracy and linearity: +/-15% of rated Vout.  1. Vout voltage programming  1. Over 100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-15% of rated Iout.  3. Vout resistor programming (*13)  9. 0-100%, 0-5V or 0-10V, user selectable. Accuracy and linearity: +/-15% of rated Iout.  5. Shut Off (SO) control  10. Shut Off (SO) c	DROTECTIVE FUNCTIONS	7	160.13	220.0.65	650.032
1. Foldback protection	PROTECTIVE FUNCTIONS				
2. Over-voltage protection (OVP)  3. Over-voltage trip point  4. Output under voltage limit (UVL)  5. Output under voltage limit (UVL)  6. Output under voltage protection (UVP)  7. Output under voltage protection (UVP)  8. Output under voltage protection (UVP)  8. Output under voltage protection (UVP)  9. Output shut-down when power supply output voltage goes below UVP programming. User presetab Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.  6. Over temperature protection  9. Output shut-down when power supply output voltage goes below UVP programming. User presetab Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.  1. Vout voltage programming  1. Vout volt	1. Foldback protection			itostart mode or by OUTPUT butto	
4. Output under voltage limit (UVL)	2. Over-voltage protection (OVP)			by AC input recycle in autostart m	
in analog programming.  Output shut-down when power supply output voltage goes below UVP programming. User presetab Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.  6. Over temperature protection	3. Over -voltage trip point	V	5~176	5~353	5~717
S. Output under voltage protection (UVP)   Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.	4. Output under voltage limit (UVL)		Preset by front panel or communi		ng Vout below limit. Does not affect
ANALOG PROGRAMMING AND MONITORING	5. Output under voltage protection (UVP)		Output shut-down when power s Reset by AC input recycle in au	utostart mode or by OUTPUT butto	JVP programming. User presetable. n or by rear panel ENABLE, or by
1. Vout voltage programming "13)	6. Over temperature protection		U		ed.
1. Vout voltage programming "13)	ANALOS PROSPANANTAS AND MONITORING				
2. lout voltage programming (*13)			0.4000/ 0.51/ 0.40//		
3. Vout resistor programming					/
4. lout resistor programming (*13)					
5. Shut Off (SO) control 6. Output current monitor (*13) 7. Output voltage monitor 8. Power supply OK signal 7. Output voltage monitor 8. Power supply OK signal 8. Power supply OK signal 9. Parallel operation (*8) 9. Parallel operation (*8) 9. Parallel operation 9. Possible, up to 6 units in master/slave mode with single wire current balance connection. 10. Series operation 10. Series operation 11. CV/CC indicator 12. Interlock (ILC) control 13. Local/Remote mode Control 14. Local/Remote mode Control 15. Trigger out 16. Trigger in 16. Trigger in 17. Programmed signal 1 18. Programmed signal 2  Possibles the PS output by dry contage (Shy, Minimum high level input = 3.5V, Maximum high level input = 5V, Maximum sink current 10mA. (Shunted by 27V zener) 18. Programmed signal 2  Protection Functions 10. Series operation 1					
6. Output current monitor (*13)					
7. Output voltage monitor					
8. Power supply OK signal					
9. Parallel operation (*8) Possible, up to 6 units in master/slave mode with single wire current balance connection.  10. Series operation 2 identical units (with external diodes).  11. CV/CC indicator Open collector. CC mode: On, CV mode: Off. Maximum voltage: 30V, maximum sink current: 10mA  12. Interlock (ILC) control Enables/Disables the PS output by dry contact (Short: On, Open: Off, Source current: less than 0.5mA). Ena/Dis is activated by front pa  13. Local/Remote mode Control By electrical signal or Open/Short: 0-0.6V or short: Remote, 2~15V or open: Local  14. Local/Remote mode Indicator Open collector (shunted by 36V zener). On (0-0.6V, 10mA sink current max)-Remote. Off-Local (30V maximum low level output =0.8V, Minimum high level output =3.8V, Maximum high level output =5  Maximum low level input =1.2V, Minimum high level input =3.5V, Maximum high level input =5V, Maximum low level input =1.2V, Minimum high level input =3.5V, Maximum high level input =5V, Maximum sink current =16mA, positive edge, trigger: tw =10µs minimum, Tr/Tf =1µs maximum  17. Programmed signal 1 Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  18. Programmed signal 2 Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  FRONT PANEL  Multiple options with 2 Encoders  Vout/lout manual adjust  OVP/UVL/UVP manual adjust  OVP/UVL/UVP manual adjust  OVP/UVL/UVP manual adjust  Protection Functions - OVP, UVL,UVP, Foldback, OCP, INT, SO  Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB					
10. Series operation	117 3				
11. CV/CC indicator 12. Interlock (ILC) control 13. Local/Remote mode Control 14. Local/Remote mode Indicator 15. Trigger out 16. Trigger in 17. Programmed signal 1 17. Programmed signal 2 18. Programmed signal 2 19. Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener) 18. Programmed signal 2 19. Control functions 10. Control functions 10. Control functions 10. Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB					
12. Interlock (ILC) control  13. Local/Remote mode Control  14. Local/Remote mode Control  15. Trigger out  16. Trigger in  17. Programmed signal 1  17. Programmed signal 2  18. Programmed signal 2  19. Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  19. PRONT PANEL  10. Control functions  10. Control functions  10. Control functions  10. Interlock (ILC) control  10. Enables/Disables the PS output by dry contact (Short: On, Open: Off, Source current: less than 0.5mA). Ena/Dis is activated by front paid activated by 36V zener). On (0~0.6V, TomA sink current max.)—Remote, 2~15V or open: Local  10. Den collector (shunted by 36V zener). On (0~0.6V, 10mA sink current max.)—Remote, 0ff-Local (30V maximum low level output = 0.8V, Minimum high level output = 3.8V, Maximum high level output = 5. Maximum source current = 16mA, pulse = 20µs Typical.  10. Trigger in  11. Aximum low level output = 1.2V, Minimum high level input = 3.5V, Maximum high level input = 5V, Maximum sink current = 16mA, positive edge, trigger: tw = 10µs minimum, Tr/Tf = 1µs maximum.  17. Programmed signal 1  18. Programmed signal 2  19. Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  19. Multiple options with 2 Encoders  10. Vout/lout manual adjust  11. Control functions  11. Control functions  12. Communication Functions - OVP, UVL,UVP, Foldback, OCP, INT, SO  13. Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB					
14. Local/Remote mode Indicator  15. Trigger out  16. Trigger in  17. Programmed signal 1  18. Programmed signal 2  19. Proport collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  19. PRONT PANEL  10. Control functions  10. Control functions  10. Communication Functions - Selection of LAN, IEEE (*17),RS232,RS485,USB					
15.Trigger out  Maximum low level output =0.8V, Minimum high level output =3.8V, Maximum high level output =5 Maximum source current =16mA, pulse =20μs Typical.  16.Trigger in  Maximum low level input =1.2V, Minimum high level input =3.5V, Maximum high level input =5V, Maximum sink current =16mA, positive edge, trigger: tw =10μs minimum, Tr/Tf =1μs maximum.  17. Programmed signal 1  Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  18. Programmed signal 2  Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  FRONT PANEL  Multiple options with 2 Encoders  Vout/lout manual adjust  OVP/UVL/UVP manual adjust  OVP/UVL/UVP manual adjust  OVP/UVL/UVP, Foldback, OCP, INT, SO  Communication Functions - OVP, UVL, UVP, Foldback, OCP, INT, SO  Communication Functions - Selection of LAN, IEEE (*17), RS232, RS485, USB	13. Local/Remote mode Control		By electrical signal or 0	Open/Short: 0~0.6V or short: Remo	te, 2~15V or open: Local
Maximum source current =16mA, pulse =20μs Typical.	14. Local/Remote mode Indicator		Open collector (shunted by 36V zer	ner). On (0~0.6V, 10mA sink current	max.)-Remote. Off-Local (30V max.)
16.Trigger in	15.Trigger out				
17. Programmed signal 1 Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  18. Programmed signal 2 Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)  FRONT PANEL Multiple options with 2 Encoders Vout/lout manual adjust OVP/UVL/UVP manual adjust  1. Control functions Protection Functions - OVP, UVL,UVP, Foldback, OCP, INT, SO Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB	16.Trigger in		Maximum low level input =1.2	V, Minimum high level input =3.5V	, Maximum high level input =5V,
Tender   Programmed signal 2	17. Programmed signal 1				
Multiple options with 2 Encoders Vout/lout manual adjust OVP/UVL/UVP manual adjust OVP/UVL/UVP manual adjust Protection Functions - OVP, UVL,UVP, Foldback, OCP, INT, SO Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB			1 - 1 - 1 - 1 - 1	_ ,	, ,
Multiple options with 2 Encoders Vout/lout manual adjust OVP/UVL/UVP manual adjust OVP/UVL/UVP manual adjust Protection Functions - OVP, UVL,UVP, Foldback, OCP, INT, SO Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB					
Vout/lout manual adjust OVP/UVL/UVP manual adjust OVP/UVL/UVP manual adjust Protection Functions - OVP, UVL, UVP, Foldback, OCP, INT, SO Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB	FRONT PANEL				
OVP/UVL/UVP manual adjust Protection Functions - OVP, UVL, UVP, Foldback, OCP, INT, SO Communication Functions - Selection of LAN, IEEE (*17), RS232, RS485, USB					
1. Control functions - Protection Functions - OVP, UVL,UVP, Foldback, OCP, INT, SO Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB					
1. Control functions - Selection of LAN,IEEE (*17),RS232,RS485,USB					
Communication Functions - Selection of LAN,IEEE (*17),RS232,RS485,USB	1. Control functions				
Communication Functions - Selection of Baud Rate Address					
Analog Control Functions - Selection Voltage/resistive programming, 5V/10V, 5K/10K programming Analog Control Functions - Selection of Voltage/Current Monitoring 5V/10V, Output ON/OFF, Front Panel Lo					

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FRONT PANEL							
2. Display					accuracy: 0.5% of rated output vo		
Z. Dispidy					accuracy: 0.5% of rated output cu		
3. Indications					s: FINE, MENU, PREV, PROT, REM, O		
					LED: PROT (OVP, UVP, OTP, FOLD, A		
4. Function buttons				F	NE, MENU, PREV, PROT, REM, OUT	PUT	
PROGRAMMING AND REA	ADBACK (RS2	32/485,USB, Op	tional: IEEE(	*17), LAN)			
1. Vout programming accu	uracy			0.05%	of actual + 0.05% of rated output	t voltage	
2. lout programming accu	racy (*13)				0.2% of rated output current		
3. Vout programming reso	lution			0.012% of full scale			
4. lout programming reso	lution				0.012% of full scale		
5. Vout readback accuracy				0.05%	of actual + 0.05% of rated output	t voltage	
6. lout readback accuracy	(*13)			0.1%	of actual +0.3% of rated output of	current	
7. Vout readback resolution	n				0.012% of full scale		
8. lout readback resolution	n				0.012% of full scale		
INPUT CHARACTERISTICS			Z	160-1.3	320-0.65	650-0.32	
1. Input voltage/freq. (*3)					65Vac continuous, 47~63Hz, singl	_ \	
2. Maximum Input current	t 100/200VAC	(*4) (*15)		2.64/1.30	2.64/1.30	2.64/1.30	
3. Power Factor (Typ)		( 1, ( 12)			99 at 100Vac, >0.98 at 200Vac,100		
4. Efficiency (Typ) 100/200	OVAC (*4) (*15	)	%	79/81	79/81	79/81	
	5. Inrush current 100/200VAC (*5) Less than 25A						
			-				
ENVIRONMENTAL CONDI			1	I	0. 5005 1000/ 1		
1. Operating temperature					0~50°C, 100% load.		
2. Storage temperature				-20~85°C			
3. Operating humidity			%		20~90% RH (no condensation).		
4. Storage humidity			%	10~95% RH (no condensation).			
5. Altitude					n 3000m. Derate ambient temp ab temperature, From 2000m up to 3	oove 2000m. 000m Ambient temperature 40°C.	
SAFETY/EMC							
SALET I/EMC		5.5.		UL61010-1, EN610	10-1, IEC61010-1. Built to meet UL	_60950-1, EN60950-1	
1. Applicable standards:		Safety		160V≤Vout≤650V: Output,J1,J2 are Hazardous. J3,J4,USB, IEEE/ISOLATED Analog ,LAN are Non Hazardous			
		EMC		IEC/EN61326-1 (Built to meet EN55022/EN55024)			
				Output floating: Output, J1, J2 are	Hazardous; J3, J4, USB, LAN, IEEE/IS	OLATED ANALOG are Non Hazardous	
2.Interface classification						EEE/ISOLATED ANALOG are Non Hazardous	
				Vout>400V, +Output grounded: 0	Output, J1, J2, J3, J4, USB, LAN, IEE	E/ISOLATED ANALOG are Hazardous	
Output&J1,J2,-Ground: 2000V   Input-J3,J4,USB,LAN/IEEE/ISOLATED   Input-J3,J4,USB,LAN/IEEE/ISOLATED			Output&J1,J2,-Ground: 2000VDC/ Input-J3,J4,USB,LAN/IEEF/ISOLATED ANAL( 650V model: Input- Output&J1,J2,-Ground: 2780VDC/ Input-J3,J	Output&J1,J2: 3704VDC/1min; Input-Gi Imin; Output&J1,J2- J3,J4,USB,LAN/IEEE 4,USB,LAN/IEEE/ISOLATED ANALOG: 424	//SOLATED ANALOG:3200VDC/1min; LATDE ANALOG Input-Ground: 707VDC/1min. round: 2828VDC/1min. //SOLATED ANALOG:4244VDC/1min; 42VDC/1min;		
4. Insulation resistance					I/IEEE/ISOLATDE ANALOG Input-Ground More than 100Mohm at 25°C, 70%		
5. Conducted emission							
6. Radiated emission					6-1 Industrial Location - B, FCC pa		
					,		
1. Cooling	MECHANICAL  1. Cooling Forced air cooling by internal fan.					1	
	СТЛ	STANDARD Kg Less than 1.9Kg.					
2. Weight		DE BODY	Kg	l acc than	Less than 1.9kg. 2.4Kg. Wide body with Isolated an	alog or IEEE	
	1	NDARD			xcluding bus bars, handles). (Re		
3. Dimensions (WxHxD)		DE BODY	mm mm		excluding bus bars, nandles). (Re		
4. Vibration					According to: IEC60068-2-64		
4. VIDIALIOII				1 1 205 1 16 3	44 6 11 11 1 1 4	l:	

### NOTES:

5. Shock

- \*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage.
- \*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
- \*3: For cases where conformance to various safety standards (UL, IEC, etc...) is required, to be described as 100-240Vac (50/60Hz).
- \*4: Ta=25°C with rated output power.
- \*5: Not including EMI filter inrush current, less than 0.2mSec at cold start Ta=25°C
- \*6: At 85~132Vac or 170~265VAC, constant load.
- \*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
- \*8: For parallel operation up to 4 units, 5% of total output current is required.
- For parallel operation more than 4 units, 20% of total output current is required. \*9: From 10% to 90% or 90% to 10% of Rated Output Voltage, with rated resistive load.
- \*10: From 90% to 10% of Rated Output Voltage.
- \*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
- \*12: Ripple is measured at 10~100% of rated output voltage and rated output current.
- \*13: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.

Less than 20G, half sine, 11mS. Unit is unpacked. According to: IEC60068-2-27

- \*14: Measured with 10:1 probe.
- \*15: P.S with Lan, IEEE, models decrease efficiency by 0.5% and increase input current by 0.5%. P.S with Isolated analog option decreases efficiency by 1.5% and increases input current by 1.5%.
- \*16: At rated output power.
- \*17: Max. ambient temperature for using IEEE is 45°C.



# Z<sup>+</sup>400 Series Specifications

MODEL	Z	160-2.6	320-1.3	650-0.64
1. Rated output voltage(*1)	V	160	320	650
2. Rated output current (*2)	Α	2.6	1.3	0.64
3. Rated output power	W	416	416	416
	_			
CONSTANT VOLTAGE MODE	Z	160-2.6	320-1.3	650-0.64
1. Max. Line regulation (*6)			0.01% of rated output voltage	
2. Max. Load regulation (*7)		100	0.01% of rated output voltage	250
3. Ripple and noise (p-p, 20MHz) (*14) 4. Ripple r.m.s. 5Hz~1MHz (*14)	mV mV	100 10	150 25	250 60
5. Temperature coefficient	PPM/°C		rated output voltage, following 30 n	1
6. Temperature stability			interval following 30 minutes warm	
7. Warm-up drift			ited output voltage over 30 minute	
8. Remote sense compensation/wire	V	5	5	5
9. Up-prog. Response time, 0~Vomax.(*9)	mS	80	150	150
10. Down-prog. response time: Full load (*9)	mS	100	150	150
No load (*10)	S	2	2.5	3
11. Transient response time	mS		hin 0.5% of its rated output for a load ch	
·			set-point: 10~100%, Local sense. Less th	1
12. Hold-up time (*19)		16mSec	Typical.	15mSec Typical.
[				
CONSTANT CURRENT MODE	Z	160-2.6	320-1.3	650-0.64
1. Max. Line regulation (*6)			0.02% of rated output current	
2. Max. Load regulation (*11)		Leasther Opport	0.09% of rated output current	fallanda a la ad about
3. Load regulation thermal drift	 m A	Less than 0.05% of rat 1.5	ed output current over 30 minutes	following load change. 0.6
4. Ripple r.m.s. 5Hz~1MHz (*12) (*14) 5. Temperature coefficient	mA PPM/°C		rated output current, following 30 r	
6. Temperature stability				minutes warm-up. . Constant line, load & temperature.
7. Warm-up drift			rated output current over 30 minute	
7. Walli up allit		EC33 triair 17 0.170 011	ated output current over 50 minute	23 TOHOWING POWER OIL
PROTECTIVE FUNCTIONS	Z	160-2.6	320-1.3	650-0.64
			ower supply change mode from CV to CC o	
1. Foldback protection			mode or by OUTPUT button or by rear par	
2.0			et by AC input recycle in autostart i	
2. Over-voltage protection (OVP)			panel ENABLE, or by communication	
3. Over -voltage trip point	V	5~176	5~353	5~717
4. Output under voltage limit (UVL)		Preset by front panel or communication	port. Prevents from adjusting Vout below limit.	Does not affect in analog programming.
5. Output under voltage protection (UVP)			er supply output voltage goes below UVP	
3. Output under voltage protection (OVI )		Reset by AC input recycle in autostart	mode or by OUTPUT button or by rear par	nel ENABLE, or by communication port.
6. Over temperature protection			ser selectable, latched or non latche	
5. Output under voltage protection (UVP)			er supply output voltage goes below UVP	
			mode or by OUTPUT button or by rear par	
6. Over temperature protection		U	ser Selectable. Latched or non latch	lea
ANALOG PROGRAMMING AND MONITORING				
1. Vout voltage programming		0~100% 0~5V or 0~10V	user selectable. Accuracy and linear	rity: ±/-0.5% of rated Vout
2. lout voltage programming (*13)			, user selectable. Accuracy and line	
3. Vout resistor programming			cale, user selectable. Accuracy and I	
4. lout resistor programming (*13)			ale, user selectable. Accuracy and li	
5. Shut Off (SO) control			ge: 0~0.6V/4~15V or dry contact, us	
6. Output current monitor (*13)			or 0~10V, user selectable. Accuracy:	
7. Output voltage monitor			or 0~10V, user selectable. Accuracy:	
8. Power supply OK signal		4~5	V-OK, 0V-Fail. 500ohm series resista	ance.
9. Parallel operation (*8)		Possible, up to 6 units in m	aster/slave mode with single wire o	current balance connection.
10. Series operation			identical units (with external diode	
11. CV/CC indicator			V mode: Off. Maximum voltage: 30	
12. Interlock (ILC) control			act (Short: On, Open: Off, Source current: less tha	
13. Local/Remote mode Control		,	Open/Short: 0~0.6V or short: Remot	
14. Local/Remote mode Indicator			ener). On (0~0.6V, 10mA sink current r	
15.Trigger out			/, Minimum high level output =3.8V	
			n source current =16mA, pulse =20	
16.Trigger in			V, Minimum high level input =3.5V,	
17. Programmed signal 1			n, positive edge, trigger: tw =10μs n Stage 25V, maximum sink current 10	
18. Programmed signal 2			Itage 25V, maximum sink current 10	
10.1 Togrammed signal 2		open collector, maximum vo	rage 201, maximum sink current 10	John (Shumed by 27 V Zener)
FRONT PANEL				
			Multiple options with 2 Encoders	
			Vout/lout manual adjust	
			OVP/UVL /UVP manual adjust	
1. Control functions		Protection F	unctions - OVP, UVL, UVP, Foldback,	, OCP, INT, SO
1. CONTROL IMPERIORS			ınctions - Selection of LAN,IEEE (*20	
			tion Functions - Selection of Baud F	
			ction Voltage/resistive programmin	
		Analog Control Functions - Selection	of Voltage/Current Monitoring 5V/1	0V, Output ON/OFF, Front Panel Lock.



FRONT PANEL	
2. Display	 Vout: 4 digits, accuracy: 0.5% of rated output voltage+/-1 count.
2. Display	 lout: 4 digits, accuracy: 0.5% of rated output current+/-1 count.
3. Indications	 GREEN LEDs: FINE, MENU, PREV, PROT, REM, OUTPUT, CV, CC
3. Indications	 RED LED: PROT (OVP, UVP, OTP, FOLD, AC FAIL).
4. Function buttons	 FINE, MENU, PREV, PROT, REM, OUTPUT

PROGRAMMING AND READBACK (RS232/485,USB, Optional: IEEE(*17), LAN)				
1. Vout programming accuracy		0.05% of actual + 0.05% of rated output voltage		
2. lout programming accuracy (*13)		0.2% of rated output current		
3. Vout programming resolution		0.012% of full scale		
4. lout programming resolution		0.012% of full scale		
5. Vout readback accuracy		0.05% of actual + 0.05% of rated output voltage		
6. lout readback accuracy (*13)		0.1% of actual +0.3% of rated output current		
7. Vout readback resolution		0.012% of full scale		
8. lout readback resolution		0.012% of full scale		

INPUT CHARACTERISTICS	Z	160-2.6	320-1.3	650-0.64	
1. Input voltage/freq. (*3)		85~265Vac continuous, 47~63Hz, single phase			
2. Maximum Input current 100/200VAC (*4) (*15)		5/2.44	5/2.44	5/2.44	
3. Power Factor (Typ)		0.99 at 100/200Vac,100% load			
4. Efficiency (Typ) 100/200VAC (*4) (*15)	%	84/86	84/86	84/86	
5. Inrush current 100/200VAC (*5)		Less than 25A			

ENVIRONMENTAL CONDITIONS		
1. Operating temperature		0~50°C, 100% load.
2. Storage temperature		-20~85℃
3. Operating humidity	%	20~90% RH (no condensation).
4. Storage humidity	%	10~95% RH (no condensation).
5. Altitude		Maximum 3000m. Derate ambient temp above 2000m.  Operating: Maximum ambient temperature, From 2000m up to 3000m Ambient temperature 40°C.

SAFETY/EMC			
1. Applicable standards:	Safety		UL61010-1, EN61010-1, IEC61010-1. Built to meet UL60950-1, EN60950-1 160V≤Vout≤650V: Output,J1,J2 are Hazardous. J3,J4,USB, IEEE/ISOLATED Analog ,LAN are Non Hazardous
	EMC		IEC/EN61326-1 (Built to meet EN55022/EN55024)
			Output floating: Output, J1, J2 are Hazardous; J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Non Hazardous
2.Interface classification			Vout≤400V, +Output grounded: Output, J1, J2 are Hazardous; J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Non Hazardous
			Vout>400V, +Output grounded: Output, J1, J2, J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Hazardous
3. Withstand voltage			160≤Vout≤320V models: Input-Output&J1,J2: 2970VDC/1min; Input-Ground: 2828VDC/1min. Output&J1,J2;-Ground: 2000VDC/1min; Output&J1,J2- J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 3200VDC/1min; Input-J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min; J3,J4,USB,LAN/IEEE/ISOLATED ANALOG Input-Ground: 707VDC/1min. 650V model: Input-Output&J1,J2: 3704VDC/1min; Input-Ground: 2828VDC/1min. Output&J1,J2,-Ground: 2780VDC/1min; Output&J1,J2- J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min; Input-J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min; J3,J4,USB,LAN/IEEE/ISOLATDE ANALOG Input-Ground: 707VDC/1min.
4. Insulation resistance			More than 100Mohm at 25°C, 70%RH.
5. Conducted emission	mission		IEC/EN61326-1 Industrial Location - B, FCC part 15-B, VCCI-B
6. Radiated emission			IEC/EN61326-1 Industrial Location - A, FCC part 15-A, VCCI-A

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### NOTES:

- \*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage.
- \*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
- \*3: For cases where conformance to various safety standards (UL, IEC, etc...) is required, to be described as 100-240Vac (50/60Hz).
- \*4: Ta=25°C with rated output power.
- \*5: Not including EMI filter inrush current, less than 0.2mSec at cold start Ta=25°C
- \*6: At 85~132Vac or 170~265VAC, constant load.
  \*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
- \*8: For parallel operation up to 4 units, 5% of total output current is required.
  For parallel operation more than 4 units, 20% of total output current is required.
- \*9: From 10% to 90% or 90% to 10% of Rated Output Voltage, with rated resistive load.
- \*10: From 90% to 10% of Rated Output Voltage.
- \*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
- \*12: Ripple is measured at 10~100% of rated output voltage and rated output current.
- \*13: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
- \*14: Measured with 10:1 probe.
  \*15: P.S with Lan, IEEE, models decrease efficiency by 0.25% and increase input current by 0.25%.
  P.S with Isolated analog option decreases efficiency by 0.75% and increases input current by 0.75%.
- \*16: At rated output power.
- \*17: Max. ambient temperature for using IEEE is 45°C.



# Z<sup>+</sup>600 Series Specifications

z ooo series spe	••••						
OUTPUT RATING		Z	160-4	320-2	650-1		
1.Rated output voltage (*1)		V	160	320	650		
2.Rated output current (*2)		Α	4.0	2.0	1.00		
3.Rated output power at 100≤Vin≤265Vac, Ta ±	≤ 50°c	W	640	640	650		
CONSTANT VOLTAGE MODE		Z	160-4	320-2	650-1		
1. Max. Line regulation (*6)				0.01% of rated output voltage			
2. Max. Load regulation (*7)				0.01% of rated output voltage			
3. Ripple and noise (p-p, 20MHz) (*14) (*17)		mV	100	150	250		
4. Ripple r.m.s. 5Hz~1MHz (*14) (*17)		mV	10	30	60		
5. Temperature coefficient		PPM/°C		30PPM/°C from rated output voltage, following 30 minutes warm-up.  0.02% of rated Vout over 8hrs. interval following 30 minutes warm-up. Constant line, load			
6. Temperature stability 7. Warm-up drift				ated output voltage over 30 minutes			
8. Remote sense compensation/wire		V	5	5	5		
9. Up-prog. Response time, 0~Vomax.(*9)		mS	55	75	75		
	load (*9)	mS	65	85	85		
	load (*10)	S	2	2.5	3		
11. Transient response time		mS		ver within 0.5% of its rated output f Output set-point: 10~100%, Local se			
				· · · · · · · · · · · · · · · · · · ·			
12. Hold-up time (*15)			16mSec	Typical.	14mSec Typical.		
CONSTANT SUPPRINT							
CONSTANT CURRENT MODE		Z	160-4	320-2	650-1		
1. Max. Line regulation (*6)				0.02% of rated output current			
2. Max. Load regulation (*11)			Lander 0.050/ S	0.09% of rated output current	fallouing land shares		
3. Load regulation thermal drift				ted output current over 30 minutes	1 -		
4. Ripple r.m.s. 5Hz~1MHz (*12) (*14)		mA	2	1.5	1		
5. Temperature coefficient     6. Temperature stability		PPM/°C		rated output current, following 30	minutes warm-up.  . Constant line, load & temperature.		
7. Warm-up drift				rated output current over 30 minut			
7. Waini-up unit	l		Less than +/-0.170 of	rated output current over 30 minut	es following power on.		
PROTECTIVE FUNCTIONS		Z	160-4	320-2	650-1		
				er supply change mode from CV to			
1. Foldback protection				utostart mode or by OUTPUT butto			
			communication port.				
2. Over-voltage protection (OVP)					ode or by OUTPUT button or by rear		
				nel ENABLE, or by communication			
3. Over -voltage trip point		V	5~176	5~353	5~717		
4. Output under voltage limit (UVL)			Preset by front panel or commun		g Vout below limit. Does not affect		
			0.444-4	in analog programming.	JVP programming. User presetable.		
5. Output under voltage protection (UVP)				utostart mode or by OUTPUT butto			
3. Output under voltage protection (ovi )			nesce by he input recycle in at	communication port.	nor by rear parier ENABLE, or by		
6. Over temperature protection			U	Iser selectable, latched or non latch	ed.		
, and the second							
ANALOG PROGRAMMING AND MONITORING							
1. Vout voltage programming			0~100% 0~5V or 0~10V	user selectable. Accuracy and linea	urity: +/-0.5% of rated Vout		
2. lout voltage programming (*13)				/, user selectable. Accuracy and line			
3. Vout resistor programming				cale, user selectable. Accuracy and			
4. lout resistor programming (*13)				cale, user selectable. Accuracy and			
5. Shut Off (SO) control				ge: 0~0.6V/4~15V or dry contact, u			
6. Output current monitor (*13)			0~5V or 0~10V, user selectable. Accuracy: +/-1%.				
7. Output voltage monitor			0~5V	or 0~10V, user selectable. Accuracy	: +/-1%.		
8. Power supply OK signal			4~5	V-OK, 0V-Fail. 500ohm series resist	ance.		
9. Parallel operation (*8)				naster/slave mode with single wire			
10. Series operation				identical units (with external diode			
11. CV/CC indicator				V mode: Off. Maximum voltage: 30			
12. Interlock (ILC) control			1 / /		nan 0.5mA). Ena/Dis is activated by front panel.		
13. Local/Remote mode Control				Open/Short: 0~0.6V or short: Remo			
14. Local/Remote mode Indicator			<u> </u>		max.)-Remote. Off-Local (30V max.).		
15.Trigger out					/, Maximum high level output =5V,		
_				m source current =16mA, pulse =20			
16.Trigger in				V, Minimum high level input =3.5V			
17. Programmed signal 1	17 Programmed signal 1		Maximum sink current =16mA, positive edge, trigger: tw =10µs minimum, Tr/Tf =1µs maximum.				
			Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)				
18. Programmed signal 2 Open collector, maximum voltage 25V,maximum sink current 100mA. (Shunted by 27V zener)							
FROME DANIEL							
FRONT PANEL				Multiple antique of the 2 Feet 1			
FRONT PANEL				Multiple options with 2 Encoders			
FRONT PANEL				Vout/lout manual adjust			
			Protection	Vout/lout manual adjust OVP/UVL/UVP manual adjust			
FRONT PANEL  1. Control functions				Vout/lout manual adjust OVP/UVL/UVP manual adjust Functions - OVP, UVL,UVP, Foldback	, OCP, INT, SO		
			Communication F	Vout/lout manual adjust OVP/UVL/UVP manual adjust	, OCP, INT, SO 7),RS232,RS485,USB		

Analog Control Functions - Selection Voltage/resistive programming, 5V/10V, 5K/10K programming Analog Control Functions - Selection of Voltage/Current Monitoring 5V/10V, Output ON/OFF, Front Panel Lock.



FRONT PANEL	
2 Display	 Vout: 4 digits, accuracy: 0.5% of rated output voltage+/-1 count.
2. Display	 lout: 4 digits, accuracy: 0.5% of rated output current+/-1 count.
2.1.1	 GREEN LEDs: FINE, MENU, PREV, PROT, REM, OUTPUT, CV, CC
3. Indications	 RED LED: PROT (OVP, UVP, OTP, FOLD, AC FAIL).
4. Function buttons	 FINE, MENU, PREV, PROT, REM, OUTPUT
4. Function buttons	

1. Vout programming accuracy		0.05%	of actual + 0.05% of rated output	voltage	
2. lout programming accuracy (*13)		310373	0.2% of rated output current	Tollage	
3. Vout programming resolution			0.012% of full scale		
4. lout programming resolution			0.012% of full scale		
5. Vout readback accuracy		0.05%	of actual + 0.05% of rated output	voltage	
6. lout readback accuracy (*13)		0.1% of actual +0.3% of rated output current			
7. Vout readback resolution		0.012% of full scale			
8. lout readback resolution		0.012% of full scale			
INPUT CHARACTERISTICS	Z	160-4	320-2	650-1	
1. Input voltage/freq. (*3)		85~26	55Vac continuous, 47~63Hz, single	phase	
2. Maximum Input current 100/200VAC (*4)		7.5/3.7 7.5/3.7 7.6/3.75			
3. Power Factor (Typ)		>0.99 at 100Vac, >0.98 at 200Vac, 100% load			
4. Efficiency (Typ) 100/200VAC (*4)	%	86.5/88.5 87/88.5 86.5/88.5			
5. Inrush current 100/200VAC (*5)		Less than 30A			

ENVIRONMENTAL CONDITIONS		
1. Operating temperature		0~50°C, 100% load.
2. Storage temperature		-20~85°C
3. Operating humidity	%	20~90% RH (no condensation).
4. Storage humidity	%	10~95% RH (no condensation).
5. Altitude		Maximum 3000m. Derate ambient temp above 2000m. Operating: Maximum ambient temperature, From 2000m up to 3000m Ambient temperature 40°C.

SAFETY/EMC			
1. Applicable standards:	Safety		UL61010-1, EN61010-1, IEC61010-1. Built to meet UL60950-1, EN60950-1 160V≤Vout≤650V: Output,J1,J2 are Hazardous. J3,J4,USB, IEEE/ISOLATED Analog ,LAN are Non Hazardous
	EMC		IEC/EN61326-1 (Built to meet EN55022/EN55024)
			Output floating: Output, J1, J2 are Hazardous; J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Non Hazardous
2.Interface classification			Vout≤400V, +Output grounded: Output, J1, J2 are Hazardous; J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Non Hazardous
			Vout>400V, +Output grounded: Output, J1, J2, J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Hazardous
3. Withstand voltage			160≤Vout≤320V models: Input-Output&J1,J2: 2970VDC/1min; Input-Ground: 2828VDC/1min.
			Output&J1,J2,-Ground: 2000VDC/1min; Output&J1,J2- J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 3200VDC/1min;
			Input-J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min; J3,J4,USB,LAN/IEEE/ISOLATDE ANALOG Input-Ground: 707VDC/1min.
			650V model: Input-Output&J1,J2: 3704VDC/1min; Input-Ground: 2828VDC/1min.
			Output&J1,J2,-Ground: 2780VDC/1min; Output&J1,J2- J3,J4,USB,LAN/IEEE/ISOLATED ANALOG :4244VDC/1min;
			Input-J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min;
			J3,J4,USB,LAN/IEEE/ISOLATDE ANALOG Input-Ground: 707VDC/1min.
4. Insulation resistance			More than 100Mohm at 25°C, 70%RH.
5. Conducted emission			IEC/EN61326-1 Industrial Location - B, FCC part 15-B, VCCI-B
6. Radiated emission	·		IEC/EN61326-1 Industrial Location - A, FCC part 15-A, VCCI-A

MECHANICAL							
1. Cooling			Forced air cooling by internal fan.				
2. Weight	STANDARD	Kg	Less than 2Kg				
2. Weight WIDE BODY		Kg	Less than 2.5Kg. Wide body with isolated analog or IEEE				
2 Dimensions (Modern)	3 Di STANDARD		H: 83, W: 70, D: 350 (excluding bus bars, handles). (Refer to Outline drawing).				
3. Dimensions (WxHxD) WIDE BODY		mm	H: 83, W: 105, D: 350 (excluding bus bars, handles…). (Refer to Outline drawing).				
4. Vibration	Vibration According to: IEC60068-2-64		According to: IEC60068-2-64				
5. Shock	5. Shock		Less than 20G, half sine, 11mS. Unit is unpacked. According to: IEC60068-2-27				

### NOTES:

- \*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage.
- \*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
- \*3: For cases where conformance to various safety standards (UL, IEC, etc...) is required, to be described as 100-240Vac (50/60Hz).

  \*4: Ta=25°C with rated output power.

  \*5: Not including EMI filter inrush current, less than 0.2mSec.

- \*6: At 85~132Vac or 170~265VAC, constant load.
- \*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense.
- \*8 For Parallel operation up to 4 units, 5% of total output current is required.
  - For Parallel operation more than 4 units, 20% of total output current is requierd.
- \*9: From 10% to 90% or 90% to 10% of rated output voltage, with rated resistive load. \*10: From 90% to 10% of rated output voltage.
- \*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
- \*12: Ripple is measured at 10~100% of rated output voltage and rated output current.
- \*13: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
- \*14: Measured with 10:1 probe.
- \*15:At rated output power.
- \*16 Max. ambient temperature for using IEEE is 45°C. \*17: start in low ambient temp. (0°C), 1 min. warm up is required



# Z<sup>+</sup>800 Series Specifications

OUTPUT RATING	Z	160-5	320-2.5	375-2.2	650-1.25
1.Rated output voltage (*1)	V	160	320	375	650
2.Rated output current (*2) at $100 \le Vin \le 265 Vac$ , $Ta \le 50^{\circ}c$ Rated output current (*2) at $85 \le Vin < 100 Vac$ , $Ta \le 40^{\circ}c$ Rated output current (*2) at $85 \le Vin < 100 Vac$ , $40^{\circ}c < Ta \le 50^{\circ}c$		5.0	2.5	2.2	1.25
	А	5.0	2.5	2.2	1.25
		4.7	2.35	2.0	1.15
3.Rated output power at 100≤Vin≤265Vac, Ta ≤ 50°c Rated output power at 85≤Vin<100Vac, Ta ≤ 40°c Rated output power at 85≤Vin<100Vac, 40°c < Ta ≤ 50°c	W	800	800	825	812.5
		800	800	825	812.5
		752	752	750	747.5

CONSTANT VOLTAGE MODE		Z	160-5	320-2.5	375-2.2	650-1.25
1. Max. Line regulation (*6)			0	0.01% of rated output voltage		
2. Max. Load regulation (*7)			0	.01% of rated output voltag	ge	
3. Ripple and noise (p-p, 20MHz) (*14) (*	17)	mV	100	150	150	250
4. Ripple r.m.s. 5Hz~1MHz (*14) (*17)		mV	10	30	30	60
5. Temperature coefficient			30PPM/°C from rated output voltage, following 30 minutes warm-up.			
6. Temperature stability			0.02% of rated Vout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temp			stant line, load & temp.
7. Warm-up drift			Less than 0.05% of rated output voltage over 30 minutes following power on.			ng power on.
8. Remote sense compensation/wire		V	5	5	5	5
9. Up-prog. Response time, 0~Vomax.(*9)		mS	45	55	55	55
10. Down-prog. response time:	Full load (*9)	mS	55	65	65	65
	No load (*10)	S	2	2.5	2.5	3
11. Transient response time		mS		e to recover within 0.5% of urrent. Output set-point: 1		

11. Transient response time	mS	output current. Output set-point: 10~100%, Local sense Less than 2mS.			
12. Hold-up time (*15)	mS	13msec Typical. 11.5msec Typical.			

CONSTANT CURRENT MODE	Z	160-5	320-2.5	375-2.2	650-1.25	
1. Max. Line regulation (*6)		0.02% of rated output current				
2. Max. Load regulation (*11)		0.09% of rated output current				
3. Load regulation thermal drift		Less than 0.05% of rated output current over 30 minutes following load change.				
4. Ripple r.m.s. 5Hz~1MHz (*12) (*14)	mA	2	1.5	1.5	1	
5. Temperature coefficient	PPM/°C	100PPM/°C from rated output current, following 30 minutes warm-up.				
6. Temperature stability		0.05% of rated lout over 8hrs. interval following 30 minutes warm-up. Constant line, load & temperature.				
7. Warm-up drift		Less than +/-0.1% of rated output current over 30 minutes following power on.				

PROTECTIVE FUNCTIONS	Z	160-5	320-2.5	375-2.2	650-1.25	
			node from CV to CC or CC			
1. Foldback protection		Reset by AC input recycle in autostart mode or by OUTPUT button or by rear pa				
		communication port.				
2. Over-voltage protection (OVP)		Inverter Shut down method. Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.				
3. Over -voltage trip point	V	5~176	5~353	5~413	5~717	
4. Output under voltage limit (UVL)		Preset by front panel or communication port. Prevents from adjusting Vout below limit. Does not affect in analog programming.				
5. Output under voltage protection (UVP)		Output shut-down when power supply output voltage goes below UVP programming. User presetable.  Reset by AC input recycle in autostart mode or by OUTPUT button or by rear panel ENABLE, or by communication port.				
6. Over temperature protection		User selectable, latched or non latched.				

ANALOG PROGRAMMING AND MONITORING	
1. Vout voltage programming	 0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-0.5% of rated Vout.
2. lout voltage programming (*13)	 0~100%, 0~5V or 0~10V, user selectable. Accuracy and linearity: +/-1% of rated lout.
3. Vout resistor programming	 0~100%, 0~5/10Kohm full scale, user selectable. Accuracy and linearity: +/-1% of rated Vout.
4. lout resistor programming (*13)	 0~100%, 0~5/10Kohm full scale, user selectable. Accuracy and linearity: +/-1.5% of rated lout.
5. Shut Off (SO) control	 By electrical Voltage: 0~0.6V/4~15V or dry contact, user selectable logic.
6. Output current monitor (*13)	 0~5V or 0~10V, user selectable. Accuracy: +/-1%.
7. Output voltage monitor	 0~5V or 0~10V, user selectable. Accuracy: +/-1%.
8. Power supply OK signal	 4~5V-OK, 0V-Fail. 500ohm series resistance.
9. Parallel operation (*8)	 Possible, up to 6 units in master/slave mode with single wire current balance connection.
10. Series operation	 2 identical units (with external diodes). 650VDC MAX. From chassis to ground
11. CV/CC indicator	 Open collector. CC mode: On, CV mode: Off. Maximum voltage: 30V, maximum sink current: 10mA
12. Interlock (ILC) control	 Enables/Disables the PS output by dry contact (Short: On, Open: Off, Source current: less than 0.5mA). Ena/Dis is activated by front panel.
13. Local/Remote mode Control	 By electrical signal or Open/Short: 0~0.6V or short: Remote, 2~15V or open: Local
14. Local/Remote mode Indicator	 Open collector (shunted by 36V zener). On (0~0.6V, 10mA sink current max.)-Remote. Off-Local (30V max.).
15.Trigger out	 Maximum low level output =0.8V, Minimum high level output =3.8V, Maximum high level output =5V,  Maximum source current =16mA, pulse =20µs Typical.
16.Trigger in	Maximum low level input =1.2V, Minimum high level input =3.5V, Maximum high level input =5V,
	 Maximum sink current =16mA, positive edge, trigger: tw =10μs minimum, Tr/Tf =1μs maximum.
17. Programmed signal 1	 Open collector, maximum voltage 25V, maximum sink current 100mA. (Shunted by 27V zener)
18. Programmed signal 2	 Open collector, maximum voltage 25V, maximum sink current 100mA. (Shunted by 27V zener)

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FRONT PANEL								
I NONI FAINEL			T		Multiple anti	with 2 Encoders		
			Multiple options with 2 Encoders  Vout/lout manual adjust					
				OVP/UVL/UVP manual adjust Protection Functions - OVP, UVL, UVP, Foldback, OCP, INT, SO				
1. Control functions				Communication Functions - OVP, OVL, OVP, FOIDDACK, OCP, INT, SO  Communication Functions - Selection of LAN,IEEE (*16),RS232,RS485,USB				
				Communication Functions - Selection of Baud Rate, Address				
				Analog Control Functions - Selection Voltage/resistive programming, 5V/10V, 5K/10K programming				
				Analog Control Functions - Selection Voltage/resistive programming, 5V/10V, 5N/10V programming  Analog Control Functions - Selection of Voltage/Current Monitoring 5V/10V, Output ON/OFF, Front Panel Lock				
					Vout: 4 digits, accuracy: 0.5% of rated output voltage+/-1 count.			
2. Display				lout: 4 digits, accuracy: 0.5% of rated output current+/-1 count.				
			GREEN LEDs: FINE, MENU, PREV, PROT, REM, OUTPUT, CV, CC					
3. Indications				RED LED: PROT (OVP, UVP, OTP, FOLD, AC FAIL).				
4. Function buttons				FINE, MENU, PREV, PROT, REM, OUTPUT				
PROGRAMMING AND REA		232/485,USB, Op	tional: IEEE	(*16), LAN)				
1. Vout programming accur				0.05% of actual + 0.05% of rated output voltage				
2. lout programming accura				0.2% of rated output current				
3. Vout programming resol				0.012% of full scale				
4. lout programming resolu	ition			0.012% of full scale				
5. Vout readback accuracy	*12)					of rated output voltage		
6. lout readback accuracy (				0.1% of actual +0.3% of rated output current				
7. Vout readback resolution	1					f full scale		
8. lout readback resolution					0.012% 0	f full scale		
INPUT CHARACTERISTICS			Z	160-5	320-2.5	375-2.2	650-1.25	
1. Input voltage/freq. (*3)					85~265Vac continuous	, 47~63Hz, single phase		
2. Maximum Input current	100/200VAC	(*4)		9.35/4.61	9.35/4.59	9.58/4.7	9.44/4.64	
3. Power Factor (Typ)					0.99 at 100Vac, 0.98	at 200Vac, 100% load		
4. Efficiency (Typ) 100/200VAC (*4)		%	86.5/88.5	86.5/89	87.5/89.5	87/89		
5. Inrush current 100/200V	AC (*5)			Less than 30A				
ENVIRONMENTAL CONDIT	IONS							
1. Operating temperature					0~50°C, 1	00% load.		
2. Storage temperature				-20~85°C				
3. Operating humidity			%	20~90% RH (no condensation).				
4. Storage humidity		%	10~95% RH (no condensation).					
5. Altitude				Maximum 3000m. Derate ambient temp above 2000m.  Operating: Maximum ambient temperature, From 2000m up to 3000m Ambient temperature 40°C.				
SAFETY/EMC				Operating: Maximum	ambient temperature, From	1 2000m up to 3000m Ami	oient temperature 40 C.	
		Safety		UL61010-1, EN61010-1, IEC61010-1. Built to meet UL60950-1, EN6095				
1. Applicable standards:				160V≤Vout≤650V: Output,J1,J2 are Hazardous. J3,J4,USB, IEEE/ISOLATED Analog ,LAN are No				
		EMC		0		meet EN55022/EN55024)		
				Output floating: Output, J1, J2 are Hazardous; J3, J4, USB, LAN, IEEE/ISOLATED ANALOG are Non Hazardous				
2.interface classification	2.Interface classification				Vout<400V, +Output grounded: Output, J1, J2 are Hazardous; J3, J4, USB, LAN, IEEE/ISOLATED ANALOG Vout>400V, +Output grounded: Output, J1, J2, J3, J4, USB, LAN, IEEE/ISOLATED ANALOG			
					ounded: Output, J1, J2, J3, J 0V models: Input-Output&J1,J2:			
					: 2000VDC/1min; Output&J1,J2:			
				Input-J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min; J3,J4,USB,LAN/IEEE/ISO			ATDE ANALOG Input-Ground: 707VDC/1min.	
3. Withstand voltage				375≤Vout≤650V model:	Input-Output&J1,J2: Input-Outp	ut&J1,J2: 3704VDC/1min; Inpu	it-Ground: 2828VDC/1min.	
or manage				Output&J1,J2,-Ground:2154VDC/1min for 375VDC, 2780VDC/1min for 65VDC;				
			Output&J1,J2- J3,J4,USB,LAN/IEEE/ISOLATED ANALOG :4244VDC/1min; Input-J3,J4,USB,LAN/IEEE/ISOLATED ANALOG: 4242VDC/1min;					
			J3,J4,USB,LAN/IEEE/ISOLATDE ANALOG Input-Ground: 707VDC/1min.					
4. Insulation resistance				More than 100Mohm at 25°C, 70%RH.				
5. Conducted emission	5. Conducted emission			IEC/EN61326-1 Industrial Location - B, FCC part 15-B, VCCI-B				
6. Radiated emission			IEC/EN61326-1 Industrial Location - A, FCC part 15-A, VCCI-A					
MECHANICAL								
1. Cooling			Forced air cooling by internal fan.					
2.14/-1-1-1	STA	NDARD	Kg		Less than 2Kg			
2. Weight		DE BODY	Kg	Less than 2.5Kg. Wide body with isolated analog or IEEE			E	
2.5:		NDARD	mm	H: 83, W: 70, D: 350 (excluding bus bars, handles). (Refer to Outline drawing).				
3. Dimensions (WxHxD)		DE BODY	mm	H: 83, W: 105, D: 350 (excluding bus bars, handles). (Refer to Outline drawing).				
4. Vibration	<del></del>					IEC60068-2-64		
T. VIDIGUOTI			-	<del> </del>	/iccording to.			

### 5. Shock NOTES:

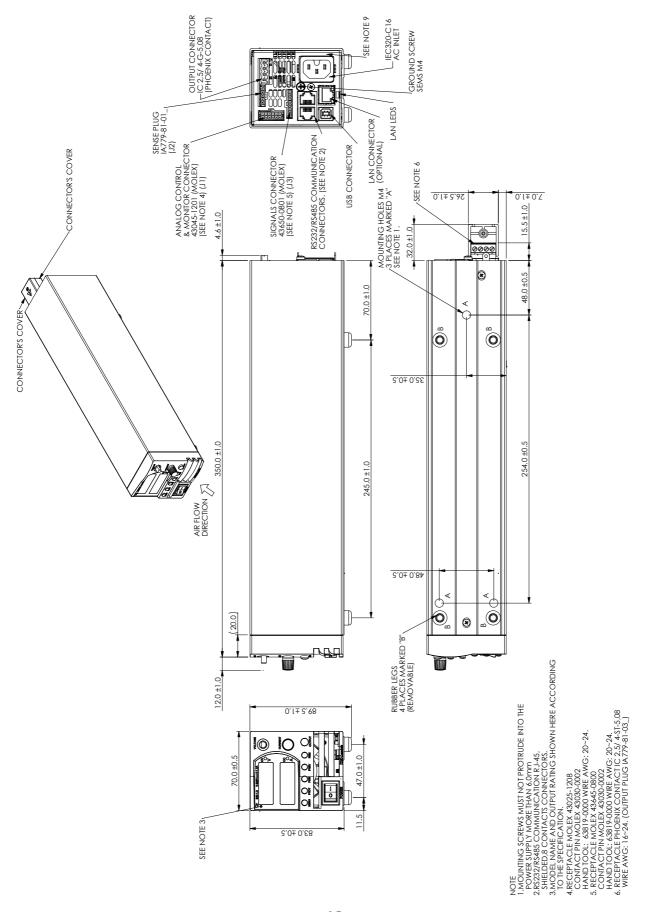
- \*1: Minimum voltage is guaranteed to maximum 0.1% of rated output voltage. \*2: Minimum current is guaranteed to maximum 0.2% of rated output current.
- \*3: For cases where conformance to various safety standards (UL, IEC, etc...) is required, to be described as 100-240Vac (50/60Hz).

Less than 20G, half sine, 11mS. Unit is unpacked. According to: IEC60068-2-27

- \*4: Ta=25°C with rated output power.
  \*5: Not including EMI filter inrush current, less than 0.2mSec.
- \*6: At 85~132Vac or 170~265VAC, constant load.
- \*7: From No-Load to Full-Load, constant input voltage. Measured at the sensing point in Remote Sense. \*8 For Parallel operation up to 4 units, 5% of total output current is required.
- For Parallel operation more than 4 units, 20% of total output current is requierd. \*9: From 10% to 90% or 90% to 10% of rated output voltage, with rated resistive load.
- \*10: From 90% to 10% of rated output voltage.

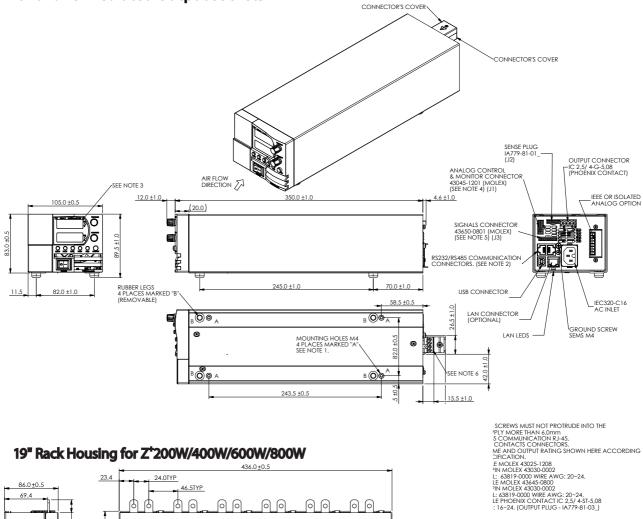
- \*11: For load voltage change, equal to the unit voltage rating, constant input voltage.
  \*12: Ripple is measured at 10~100% of rated output voltage and rated output current.
  \*13: The Constant Current programming, readback and monitoring accuracy do not include the warm-up and Load regulation thermal drift.
- \*14: Measured with 10:1 probe.
- \*15:At rated output power.
- \*16 Max. ambient temperature for using IEEE is 45°C.
- \*17: start in low ambient temp. (0°C), 1 min. warm up is required

## 2.6 Z200W/400W/600W/800W Outline Drawing

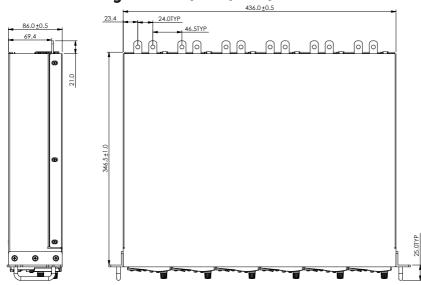


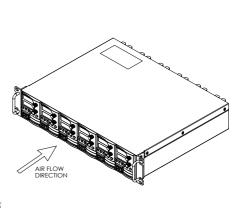


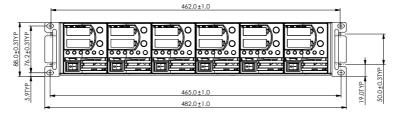
## 2.7 Z200W/400W/600W/800W Optional IEEE, Isolated Analog Interface, **Front Panel insulated Output sockets**



# 19" Rack Housing for Z\*200W/400W/600W/800W







# **GLOBAL NETWORK**

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