

# TDK-Lambda

# Z UP

## **ZERO-UP** 200W/400W/800W Programmable DC Power Supplies

**Built-in RS-232 & RS-485 Interface  
with IEEE488 (GPIB) optional.**

- Constant Voltage/Constant Current
- Built-in RS-232 & RS-485 Interface
- An embedded Microprocessor controller
- Digital Encoder Knob
- Software Calibration
- Last Setting Memory
- Parallel Operation (Master/Slave) Active Current Sharing
- External Voltage or Resistance Programming
- Voltage up to 120V, Current up to 132A
- Active Power Factor Correction: 99%
- 85~265Vac Universal Input Voltage
- 19" Rack Mounted ATE and OEM
- Worldwide Safety Agency Approvals
- CE Mark for LVD and EMC Regulation



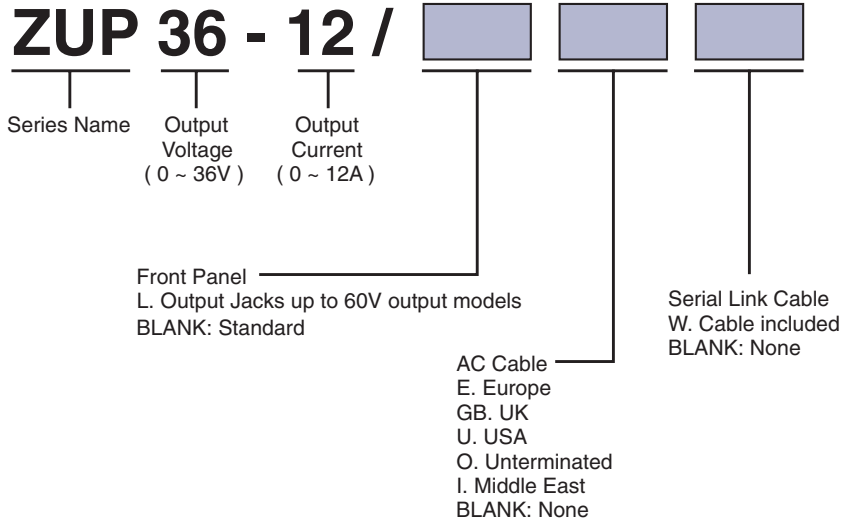
Control Flexibility for Worldwide Applications



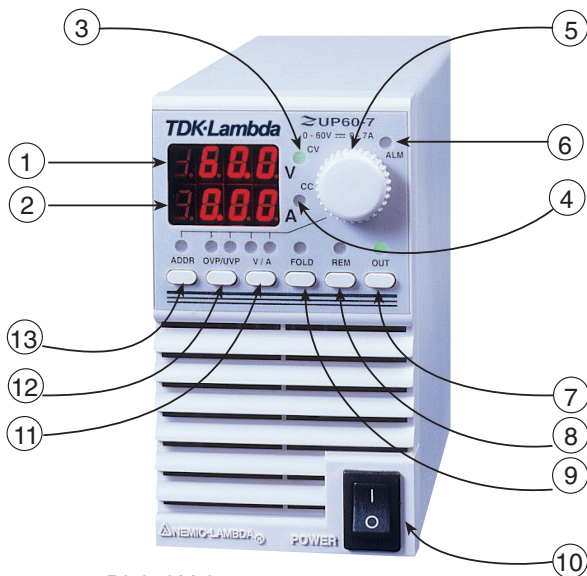
### Product Line Up

Model	Output Voltage (VDC)	Output Current (A)	Output Power (W)
ZUP6-33	0 ~ 6 VDC	0 ~ 33	198
ZUP6-66		0 ~ 66	396
ZUP6-132		0 ~ 132	792
ZUP10-20	0 ~ 10VDC	0 ~ 20	200
ZUP10-40		0 ~ 40	400
ZUP10-80		0 ~ 80	800
ZUP20-10	0 ~ 20VDC	0 ~ 10	200
ZUP20-20		0 ~ 20	400
ZUP20-40		0 ~ 40	800
ZUP36-6	0 ~ 36VDC	0 ~ 6	216
ZUP36-12		0 ~ 12	432
ZUP36-24		0 ~ 24	864
ZUP60-3.5	0 ~ 60VDC	0 ~ 3.5	210
ZUP60-7		0 ~ 7	420
ZUP60-14		0 ~ 14	840
ZUP80-2.5	0 ~ 80VDC	0 ~ 2.5	200
ZUP80-5		0 ~ 5	400
ZUP120-1.8	0 ~ 120VDC	0 ~ 1.8	216
ZUP120-3.6		0 ~ 3.6	432

### Power Supply Identification / Accessories

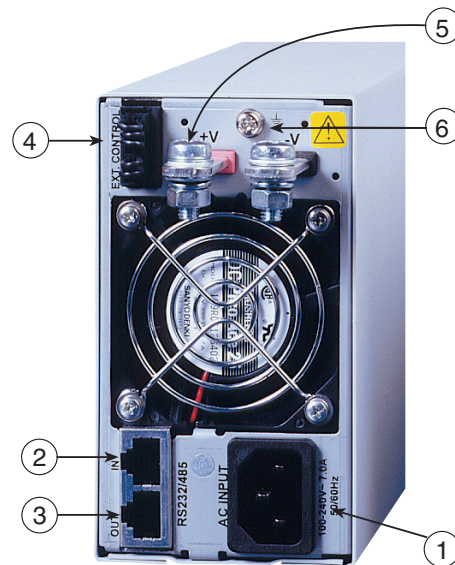


### Front Panel



1. Digital Voltmeter
2. Digital Amperemeter
3. Constant Voltage Mode Indicator
4. Constant Current Mode Indicator
5. Voltage/Current, OVP/UV, Address Adjust
6. Alarm ( OVP, OTP, FOLD )
7. Output ON/OFF Control
8. Local/Remote Select
9. Foldback Protection Control
10. AC Power Switch
11. Voltage/Current Mode Control
12. Overvoltage/Undervoltage Setting
13. Address Setting

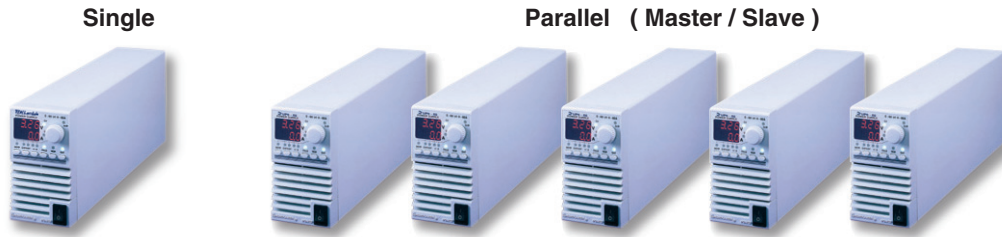
### Rear Panel



1. IEC320 AC Input Connectors
2. Remote IN Programming via RS-232/RS-485
3. Remote OUT Via RS-485 Communications Chaining Power Supplies to Serial Communication Bus.
4. External Analog Programming Control Connector
5. Output Bus Bars (6V to 60V) model shown. 80V to 120V models PHOENIX: PSC Plug Connectors
6. Ground Thread

## ZUP Configurations

### BENCHTOP POWER SUPPLY

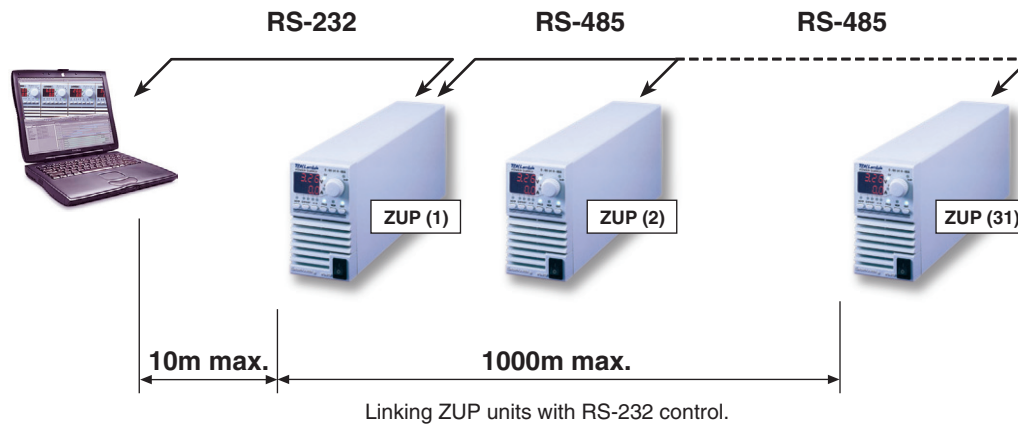


### PARALLEL OPERATION

Master - Slave method: Active current sharing up to 5 units.

### REMOTE PROGRAMMING VIA RS-232

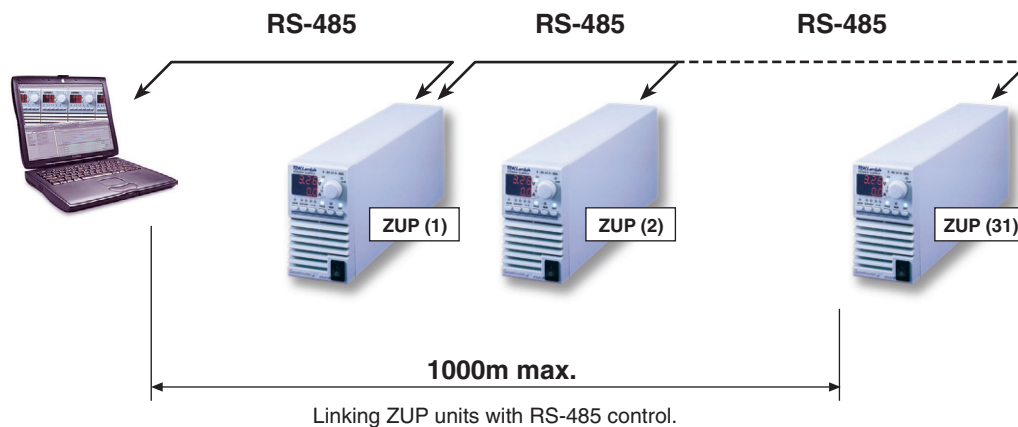
Up to 31 ZUP units can be controlled via RS-232 interface.



### REMOTE PROGRAMMING VIA RS-485

Up to 31 ZUP units can be controlled via RS-485 interface

For operation environments that require high noise immunity or long distance communication, it is recommended to use the built-in RS-485 interface.

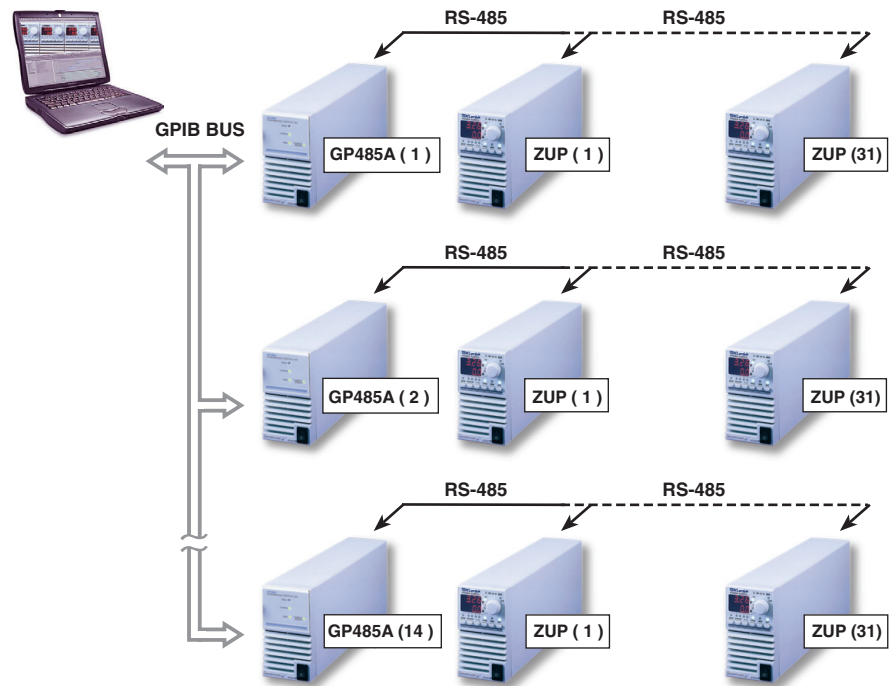


## Remote Programming Via GPIB.

### GPIB ↔ RS-485 CONTROLLER

The GP485A is a high performance serial to GPIB Interface  
 It enables a ZUP series with RS-485 port to be a Talker, Listener, or controller on the GPIB

- \* Controls up to 31 ZUP units through a single GPIB address.
- \* Conforms to all versions of the IEEE488 standard, including IEEE488.2.
- \* 19" racking possibility.
- \* Application software - LabView, LabWindows.



## Rack Mounted ATE and OEM up to 2.4KW

Six units can be assembled into 19-inch rack / 3U high to meet your configuration requirements

### Power Modules Table

Module Type	200W	400W	800W
0 ~ 6V	33A	66A	132A
0 ~ 10V	20A	40A	80A
0 ~ 20V	10A	20A	40A
0 ~ 36V	6A	12A	24A
0 ~ 60V	3.5A	7A	14A
0 ~ 80V	2.5A	5A	
0 ~ 120V	1.8A	3.6A	
19"rack width	1 / 6 width	1 / 6 width	2 / 6 width



## Zup Series Specifications

MODEL			ZUP6-33	ZUP6-66	ZUP6-132	ZUP10-20	ZUP10-40	ZUP10-80	ZUP20-10	ZUP20-10		
OUTPUT VOLTAGE (*1)		V	0-6			0-10						
OUTPUT CURRENT (*2)		A	0-33	0-66	0-132	0-20	0-40	0-80	0-10			
RATED OUTPUT POWER		W	198	396	792	200	400	800	200			
CONSTANT VOLTAGE	LOAD REGULATION		- 0.005%+2mV From No load to Full load, constant input voltage.									
	LINE REGULATION		- 0.005%+1mV From 85-132VAC or 170-265VAC, constant load.									
	RMS RIPPLE (5Hz-1MHz Bandwidth)		mV	5	5	8	5	5	8	5		
	RIPPLE (pk to pk) (20MHz Bandwidth)		mV	50	50	100	50	50	90	50		
	RECOVERY TIME (*3)		mS	1			0.5					
	TEMPERATURE COEFFICIENT		-	30ppm/°C from rated voltage following 30-minute warm-up.								
	TEMPERATURE DRIFT		-	0.01%+2mV Change in output over 8-hour interval under constant line, load and ambient temp following 30-minute warm-up.								
	UP PROGRAMMING RESPONSE TIME (*4)		mS	50	50	60	50	50	60	50		
	DOWN PROGRAMMING RESPONSE TIME		FULL LOAD	50	50	50	50	50	50	50		
		NO LOAD	250			350						
CONSTANT CURRENT	LOAD REGULATION (*5)		-	0.01%+5mA	0.01%+5mA	0.07%+10mA	0.01%+5mA	0.01%+5mA	0.07%+10mA	0.01%+5mA	0.01%+5mA	
	LINE REGULATION (*6)		-	0.01%+2mA	0.01%+2mA	0.01%+5mA	0.01%+2mA	0.01%+2mA	0.01%+5mA	0.01%+2mA	0.01%+2mA	
	RMS RIPPLE (5Hz-1MHz Bandwidth)		mA	50	100	200	25	50	100	15		
	TEMPERATURE COEFFICIENT		-	100ppm/°C from rated current following 30-minute warm-up.								
	TEMPERATURE DRIFT (*8)		-	0.02%+5mA	0.02%+5mA	0.05%+10mA	0.02%+5mA	0.02%+5mA	0.05%+10mA	0.02%+5mA	0.02%+5mA	
PROGRAMMING (*9)	RESOLUTION		- Better than 0.028% of rated output voltage									
	VOLTAGE ACCURACY		- 0.02%+5mV			- 0.02%+8mV					0.02%	
	RESOLUTION		- Better than 0.03% of rated output current									
	CURRENT ACCURACY		- 0.4%+40mA									
OVERVOLTAGE PROTECTION (*10)		V	0-7.5			0-13						
HOLD-UP TIME		-	20mS At 100V/200VAC, rated output voltage and output current.									
DISPLAY	VOLTAGE		- 3 digits ( 6v; 20v; 36v; 60v; 80v); 3.5 digits ( 10v; 120v ) accuracy: 0.2% +/- 2 digits.									
	CURRENT		- 3.5 digits (132A); All others 3 digits, accuracy: 0.5% +/- 3 digits.									
	STATUS		- CV/CC, Alarm, Fold, Local/Remote, On/Off.									
OUTPUT PROTECTIONS		- Over Voltage, Over Temperature, Foldback.										
INPUT	INPUT VOLTAGE (*11)		- 85-265Vac Continuous, 47-63Hz									
	INPUT CURRENT (*12)		A	3.0/1.5	5.6/2.7	11.2/5.4	2.9/1.4	5.6/2.7	11.2/5.4	2.9/1.4		
	INRUSH CURRENT ( 100/200Vac )		A	15/30 (*7)	15	30	15/30 (*7)	15	30	15/30 (*7)		
	EFFICIENCY (*12)		%	69/72	74/77	74/77	73/77	79/82	77/81	74/78		
	INPUT CURRENT HARMONICS		- Complies with EN61000-3-2, Class A									
	POWER FACTOR (TYP)		- 0.99 at 100/200Vac, 100% load.									
ENVIRONMENT	OPERATING TEMPERATURE		- 0 to 50 °C ; 100% Load.									
	OPERATING HUMIDITY		- 30-90% RH ( No dewdrop ).									
	STORAGE TEMPERATURE		- -20 to 70 °C									
	STORAGE HUMIDITY		- 10 - 95% RH (No dewdrop).									
MECHANICAL	VIBRATION		- 10-55Hz, Amplitude (sweep 1 min ) 2G, X, Y, Z, When mounted with mounting screws.									
	SHOCK		- Less than 20G									
	WEIGHT		Kg	2.9	3.2	5.8	2.9	3.2	5.8	2.9		
	SIZE (WxHxD)		mm	200W and 400W units: 70 x 124 x 350. 800W units: 140 x 124 x 350 (Refer to outline drawing)								
EXTERNAL CONTROL FUNCTIONS	OUTPUT ON/OFF		- By TTL Signal or Dry Contact (Refer to instruction manual).									
	OUTPUT GOOD		- Open collector (Refer to instruction manual).									
	OUTPUT VOLTAGE PROGRAMMING		- By Voltage ( 0-4V ) or by Resistance ( 0-4K ) (Refer to instruction manual).									
	OUTPUT CURRENT PROGRAMMING		- By Voltage ( 0-4V ) or by Resistance ( 0-4K ) (Refer to instruction manual).									
	REMOTE SENSING		- Maximum 0.5V drop on each load wire for model up to 60V and 2V for the 80V, 120V models									
	COMMUNICATION INTERFACE		- RS-232 and RS-485 Built-in, IEEE488 Optional.									
APPROVALS	SAFETY STANDARDS		- UL3111-1, EN61010-1									
	EMC STANDARDS		- EN61326-1, IEC 61326-1, FCC part 15 (class A).									
CONDUCTED EMI		- EN55022-B, FCC-B, VCCI-B										
RADIATED EMI		- EN55022-A, FCC-A, VCCI-A										
SERIES OPERATION		- Up to 2 units (Refer to instruction manual).										
PARALLEL OPERATION		- Master - Slave method; up to 5 units (Refer to instruction manual).										
COOLING		- Forced air by blower fan (Blower fan is mounted within unit).										
WITHSTAND VOLTAGE		- Input - Chassis...2.0kVAC 1 min, Input - Output...3.0kVAC 1 min, Output - GND...500VAC 1 min.										
ISOLATION RESISTANCE		- More than 100MOhm at 25 °C and 70% R.H.										

### NOTES:

- \*1. Minimum voltage is guaranteed to maximum 0.2% of the rated output voltage.
- \*2. Minimum current is guaranteed to maximum 0.4% of the rated output current.
- \*3. Time for recovery to within +/-50mV against current change of 50% to 100%.

- \*4. From zero volts to full scale , resistive load and current setting at maximum.
- \*5. From no load to full load , constant input voltage.
- \*6. From 85~132Vac or 170~265Vac constant load.
- \*7. At cold start Ta=25 °C.



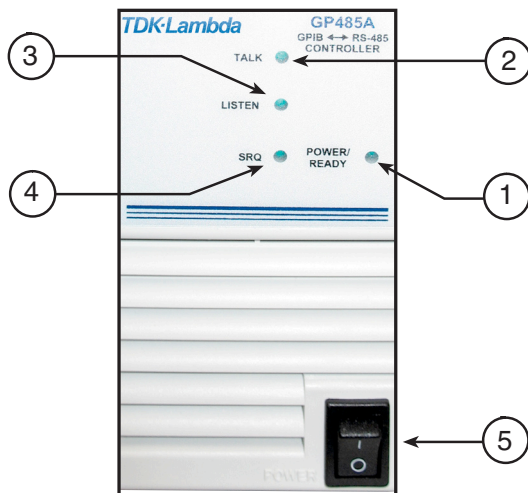


## GP485A SPECIFICATIONS

The GP485A has all the software and logic required to implement the physical and electrical Specifications of the IEEE488 and RS-485 standards

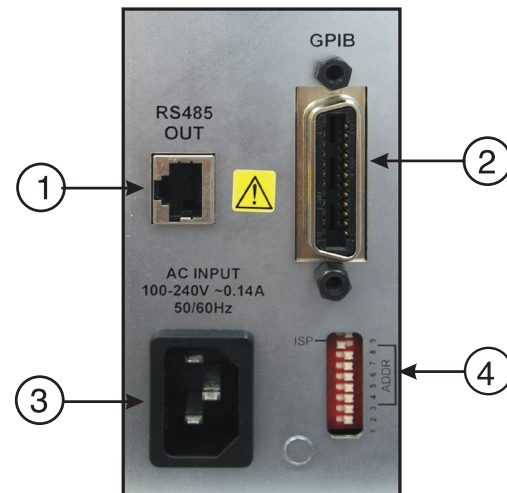
Input Voltage /freq	Vac	85 ~ 265Vac continuous 47 ~ 63 Hz
Input consumption	W	5W
IEEE 488 Capability		SH1,AH1,T6,TE0,L4,LE0,SR1,RL0,PP1,DC1,DT0,C0,E1,E2
Indication LED's		Power /Ready ,Talk ,Listen ,SRQ
Baud rate	bps	Optional 300 , 600 ,1200 , 2400 , 4800 , 9600     Default :9600
Address		1 up to 30 can be set using an address switch
Operating temp	°C	0~ 50
Storage temp	°C	-20 ~ 70
Conducted emission		EN5022B,FCC-B
Radiated emission		EN5022A,FCC-A
Safety standards		UL3111-1 , EN61010-1
EMC standards		EN61326-1, IEC 61326-1, FCC part 15 (class A).
Withstand voltage		Input - Chassis...2.0kVAC 1min, Input - Output...3.0kVac 1 min, Output - Chassis...500VAC 1 min.
Vibration	G	10-55Hz, Amplitude (sweep 1 min ) 2G, X, Y, Z, When mounted with mounting screws.
Size (WxHxD)	mm	70x124x350 (GP 485A has all the mechanical specifications & mounting hole as ZUP200W/400W units)
Weight	Kg	1.95

**Front Panel**



1. Power/Ready: Indicates that the power is "ON" and the self-test has passed successfully. The unit is ready to operate once the LED illuminates.
2. Talk: Indicates that the GP485A is addressed as a GPIB Talker.
3. Listen: Indicates that the GP485A is addressed as a GPIB Listener.
4. SRQ: Indicates that the GP485A signal line SRQ is asserted.
5. AC ON/OFF: Turns AC power On and Off.

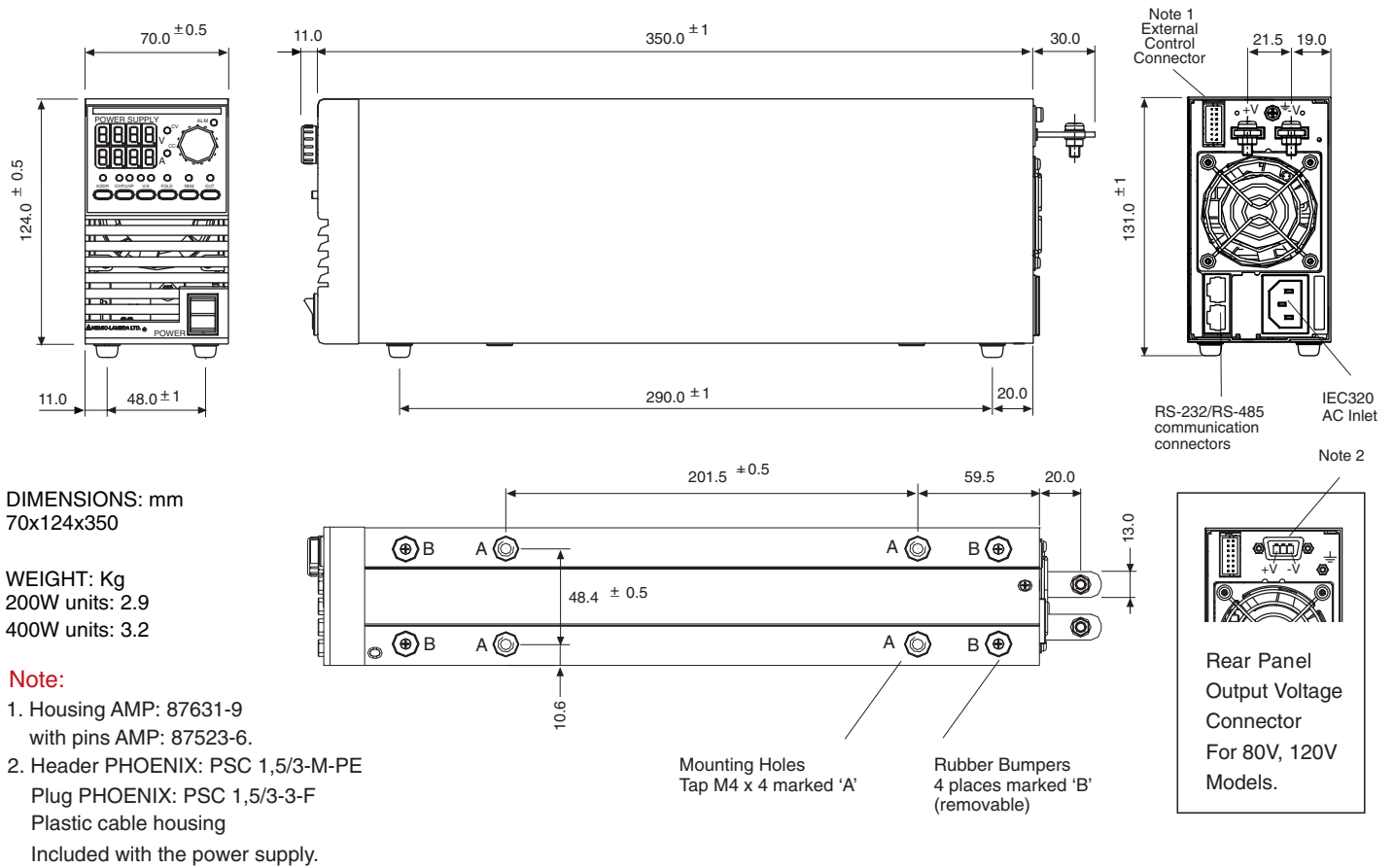
**Rear Panel**



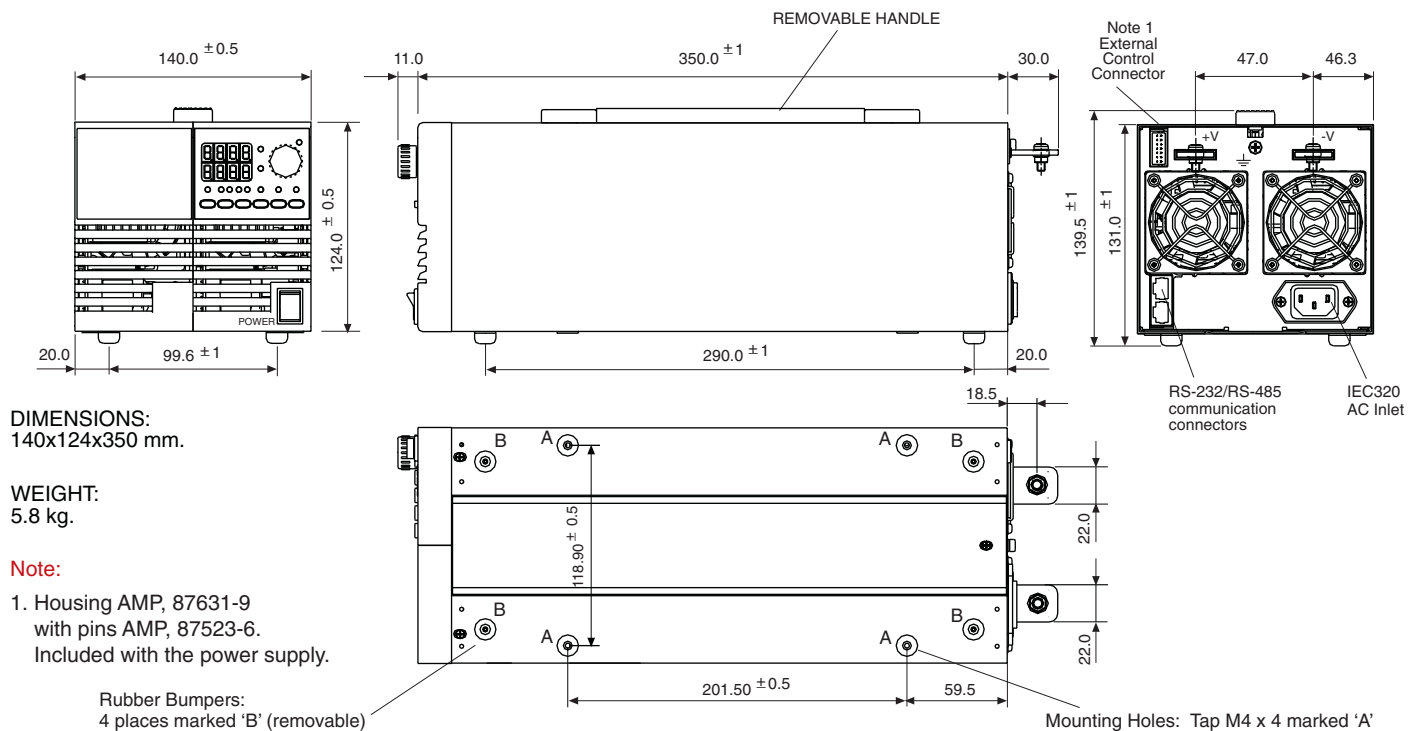
1. RS-485 OUT: EIA-568A shielded type connector, used for RS-485 communication with ZUP power supplies.
2. GPIB: Shielded 24-pin Champ female connector, with metric screwlock. Used for GPIB communication with the GPIB controller.
3. AC Input: IEC type appliance inlet.
4. Address setting Dip switch.



### Outline Drawings ZUP 200W/400W Units



### Outline Drawings ZUP 800W Unit



## Accessories

### 1. AC Cord Sets

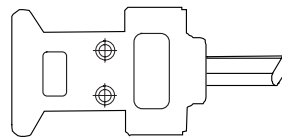
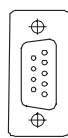
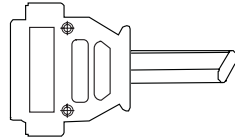
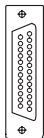
Five optional cords are possible according to order:

Region	Europe	United Kingdom	Japan	Middle East	North America
Output Power	850W	850W	850W	850W	850W
AC Cords	10A/250Vac L=2m	10A/250Vac L=2m	13A/125Vac L=2m	10A/250Vac L=2m	13A/125Vac L=2m
Wall Plug	INT'L 7/VII	BS1363		SI-32	NEMA 5-15P
Power Supply Connector	IEC320-C13	IEC320-C13	IEC320-C13	IEC320-C13	IEC320-C13
Part Number	P/N: ZUP/E	P/N: ZUP/GB	P/N: ZUP/J	P/N: ZUP/I	P/N : ZUP/U

### 2. Communication Cable

RS-232/RS-485 cable is used to connect the power supply to the PC controller

Mode	RS-232	RS-485	RS-232	RS-485
PC Connector	DB-9F	DB-9F	DB-25F	DB-25F
Communication Cable	Shield Ground L=1m	Shield Ground L=1m	Shield Ground L=1m	Shield Ground L=1m
Power Supply Connector	EIA/TIA-568A (RJ-45)	EIA/TIA-568A (RJ-45)	EIA/TIA-568A (RJ-45)	EIA/TIA-568A (RJ-45)
P/N	ZUP/NC401	ZUP/NC402	ZUP/NC403	ZUP/NC404



DB-25F (female connector)

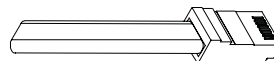
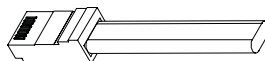
DB-9F (female connector)

EIA/TIA (RJ-45)

### 3. ZUP serial link cable

Used to chain Power Supply to Power Supply from a serial communication bus

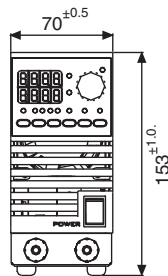
Mode	Communication cable	Power Supply Connector Remote IN /OUT	P/N
RS 485	Shield Ground , L=50cm	EIA /TIA -568 A (RJ-45)	ZUP/ W



### Options ( 200W, 400W, 800W Models )

#### 1. FRONT PANEL OUTPUT JACKS

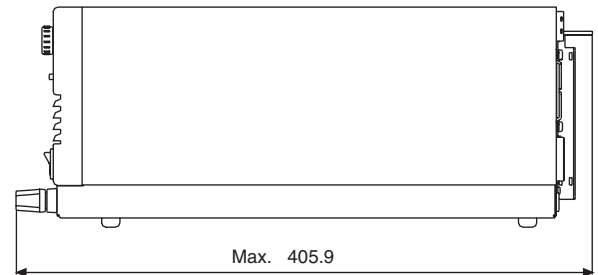
Up to 60V output models  
P/N: ZUP / L



Outline Drawing: Physical Dimensions in mm.

ZUP 200W/400W Units: 70x153x405.9

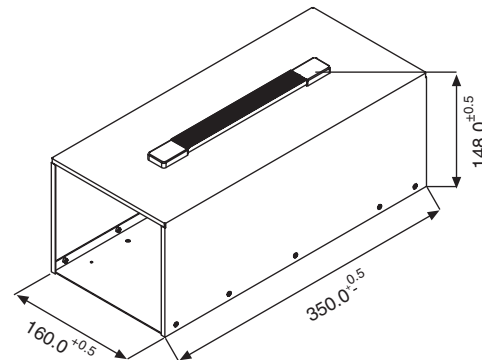
ZUP 800W Units: 140x153x405.9



Up to 20A output current via front panel jacks.

#### 2. ZUP ASSEMBLIES

Dual Output Packing 200W/400W models  
P/N: NL200

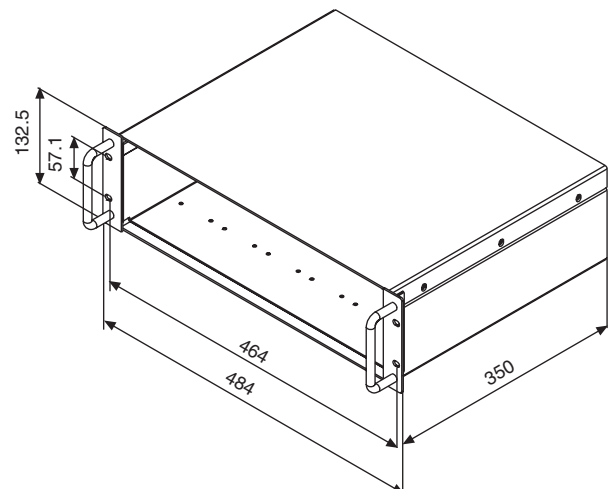


#### 3. 19" RACK MOUNTED ATE AND OEM UP TO 2.4 KW

Up to six power units can be assembled into a 19", 3U rack, kit P/N: NL100.

In cases where the entire rack is not occupied with power units, P/N: NL101 blank panels can be installed.

P/N: NL100



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