



## A0800 AC-DC POWER MODULE 800W

Universal AC Input: 85V to 264V, Single DC Output: 48 - 56.2VDC

### FEATURES

- High power density, 8.2W / in<sup>3</sup>
- Net Weight: 2.2 KG typ.
- Low profile : 40.8mm  
(fit 1U shelf – R2400 series)
- Universal AC input
- Efficiency: 84% ~ 88 % typical
- Power factor correction  
(meet IEC1000-3-2 requirements)
- Overvoltage & overcurrent protection
- Over-temperature warning & protection
- Redundant parallel operation up to 12 units
- Remote On/Off and remote sense
- Active load sharing
- Hot insertion / removal (Hot Swap)
- Power fail warning and fault alarm
- 400Hz input available
- I<sup>2</sup>C for voltage, current, temperature report & Power Supply ID.
- Front panel LED indicator
- Low Start-Up Temp: -30°C

The Powerstax A0800 series of front-ends power modules is specifically designed to operate as an integral part of a complete distributed power system, with or without battery backup.

A full complement of protection, alarm and control features has been incorporated into the power unit to provide the versatility of applications.

The flexible feature set makes this front-end power module an excellent choice for applications requiring modular AC-to-DC power systems such as distributed power and DC UPS.

### Applications

- ✓ Advanced workstations
- ✓ Telecom / Datacom equipment
- ✓ Midrange computers
- ✓ Mainframes
- ✓ File servers
- ✓ LAN/WAN applications
- ✓ Mass storage

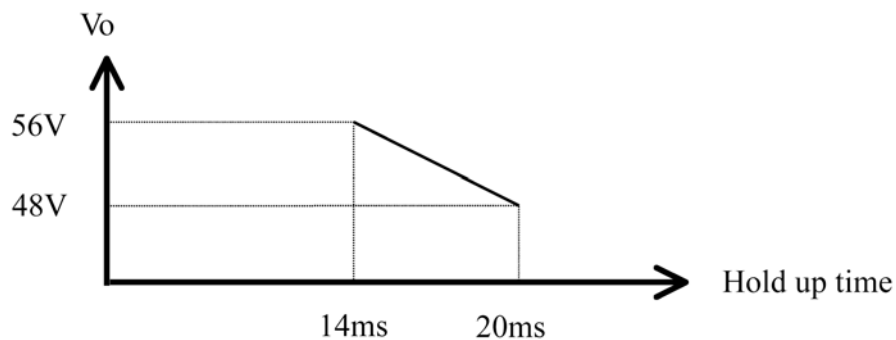




**Input Specification**

Parameter	Min	Typ	Max	Unit	Condition
Input voltage	85	-	264	Vac	750W max for under 90V AC input
Input Frequency	47	-	63	Hz	400Hz available with safety approvals. Consult APC for details
Inrush Current (peak)	-	-	50	A	
Power Factor	0.95	0.99*	-	-	≥ 50% of full load
Input Leakage Current	-	-	1.7	mA	264Vac, 50Hz
Line Harmonics	-	-	-	-	Meet IEC1000-3-2
Lighting Surge & Transients (damage free operation)	-	-	-	-	1) IEC1000-4-5 Level 3 2) IEC1000-4-4 Level 3
Hold Up Time	20	-	-	mS	Please see curve below
EMC (conducted)	-	-	-	-	CISPR22 Class B, EN55022 Class B, with 3dB margin

**Hold Up Time**



**Efficiency and Power Factor vs. Input Voltage at full load**

Input voltage	Efficiency (Typical)	Power Factor (Typical)
90Vac	83%	0.99
100Vac	84%	0.99
120Vac	85%	0.99
160Vac	85%	0.98
190Vac	86%	0.98
220Vac	86%	0.98
240Vac	87%	0.98
264Vac	88%	0.98

**Notes:**

When using this table to calculate line cord requirements, allow, at a minimum, an extra 3% for variations between units. Actual measured results will depend upon the harmonic content of the input voltage waveform.



**Output Specification**

Parameter	Min	Typ	Max	Unit	Note
Vo set point:					
APC-A0800-085-480	-	48.0	-		
APC-A0800-085-545	-	54.5	-	Vdc	
APC-A0800-085-562	-	56.2	-		
Regulation (line, load, temperature & set point)	-2.0	-	2.0	%	Measured at remote sense
Remote-sense Drop	-	-	0.5	Vdc	
Io (rated)					
APC-A0800-085-480	0	-	16.6		800W maximum
APC-A0800-085-545	0	-	14.7	Adc	800W maximum
APC-A0800-085-562	0	-	14.2		800W maximum
Capacitive Load			10,000	uF	
Ripple & Noise (50MHz bandwidth)			300	mVp-p	Under any load conditions
Transmission Noise (C message)	-	-	45	dBmc	
Output Rise Time	20	40	100	mS	Rise from 10% to 90% of final output level (resistive load)
Overvoltage Protection	62.0	-	64.0	Vdc	Reset by cycling ac input, pressing RESET, or reinsertion
Output Current Limit (Steady state)	-	-	23	Adc	See Fig. 1
Transient Response					25% step load transient with slew rate 0.1A/us within range from 25% to 75% of full load
Voltage Range	-1.0	-	1.0	%	
Active Current Sharing Differential	-	-	±1.7	A	Single-wire current share at full load
Efficiency	83	85	-	%	At full load, 120 Vac with Oring diode
	87	88	-	%	At full load, 264 Vac with Oring diode
Reserve Output Current Protection	-	-	-	-	ORing diode
Start-Up delay	-	1.3	2	s	Measured from application of valid ac voltage
Turn On delay			200	mS	Measured from DC on/off

**Characteristic Curves**

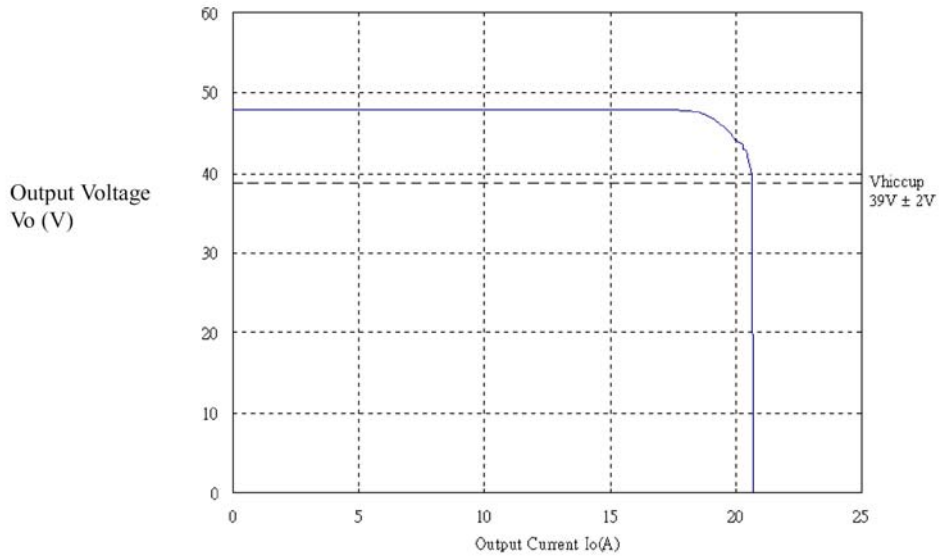


Figure 1. Output voltage vs. output Current

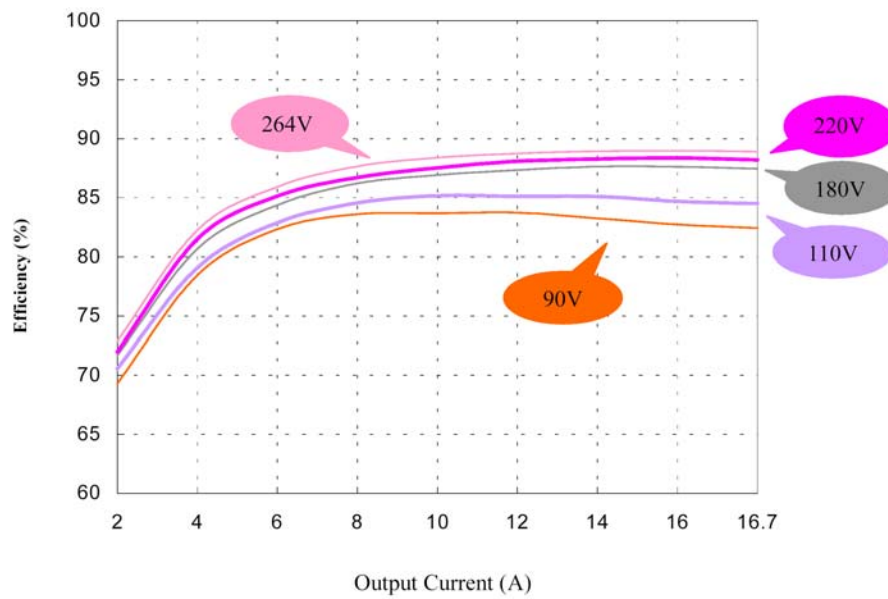
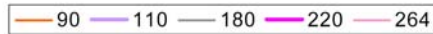


Figure 2. Efficiency vs. output current at different input voltage.



**Characteristic Curves**

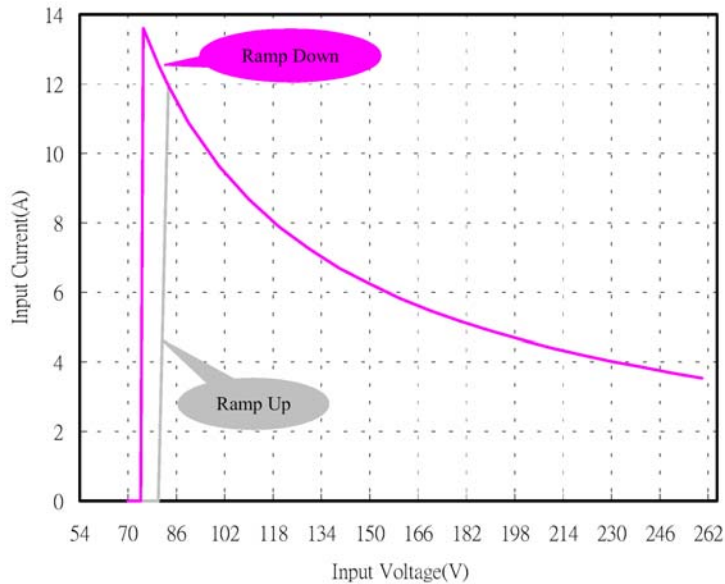


Figure3 Typical Input Current vs. Input Voltage at full load.

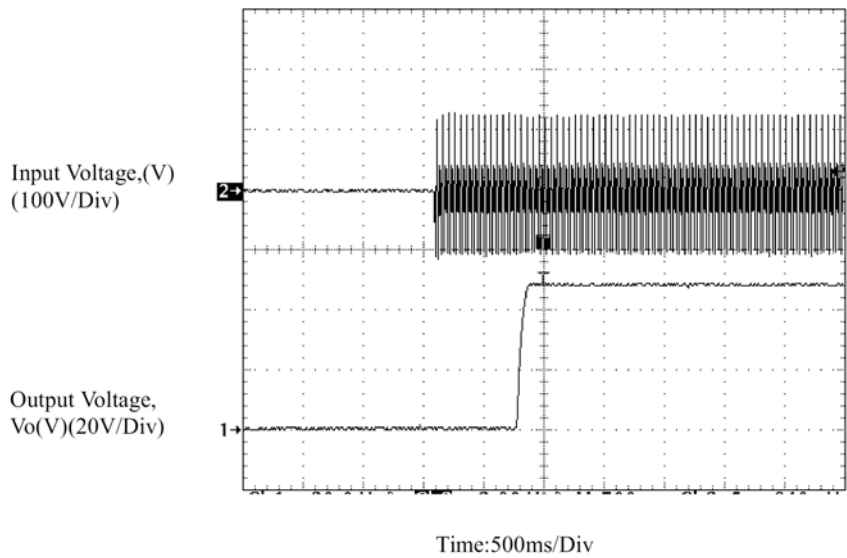


Figure 4 Typical Start-up transient at room temperature, When 90Vac Input voltage is applied.



**Characteristic Curves**

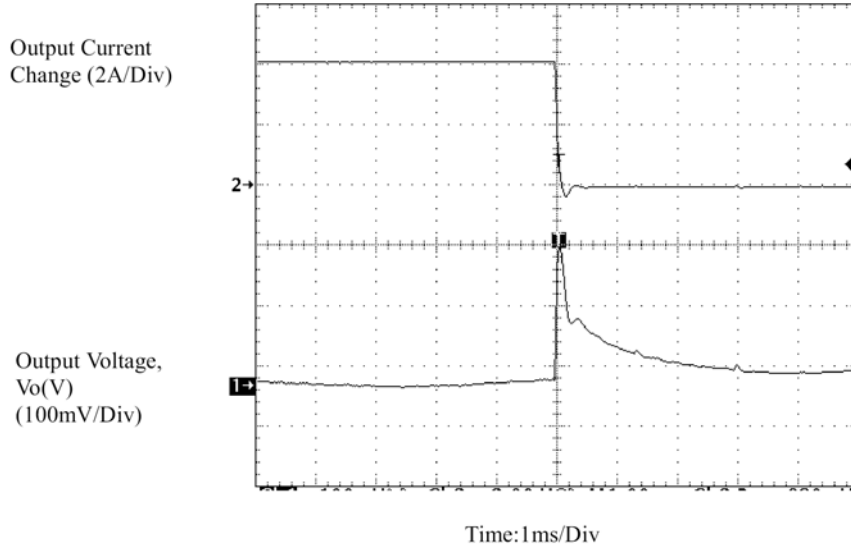


Figure 5. Typical transient: load changes from 12.45A to 8.3A @ 25°C and 90Vac input.

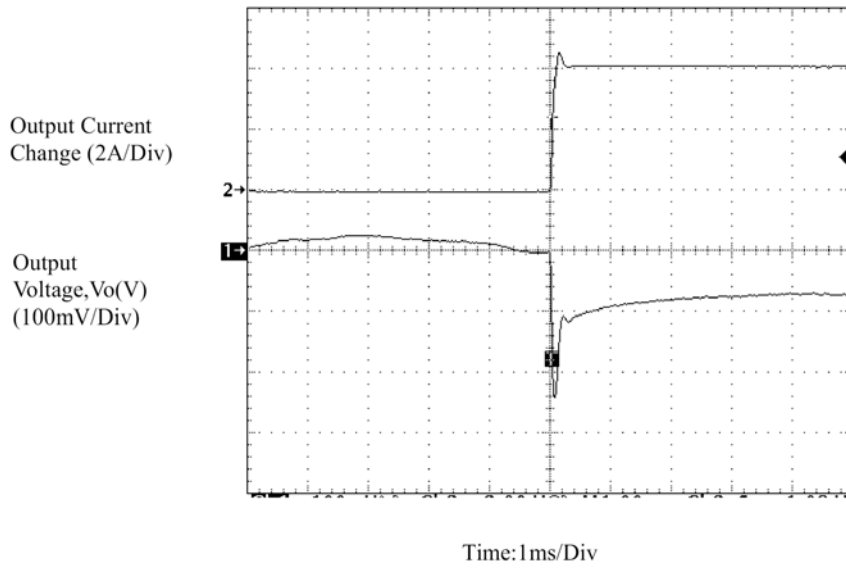


Figure 6. Typical transient: load changes from 8.3A to 12.45A @ 25°C and 90Vac input.



**Characteristic Curves**

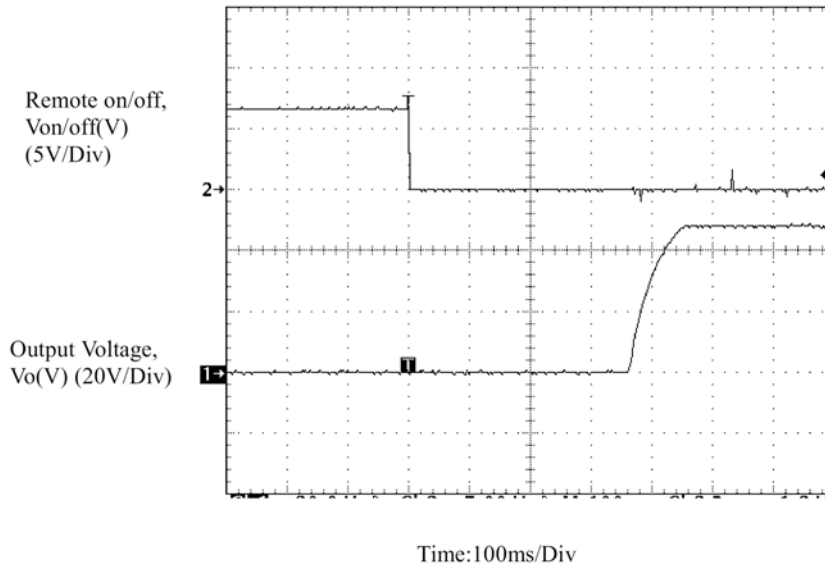


Figure 7. Typical turn-on timing at 25°C , 90Vac input when signal is applied to remote On/Off pin.

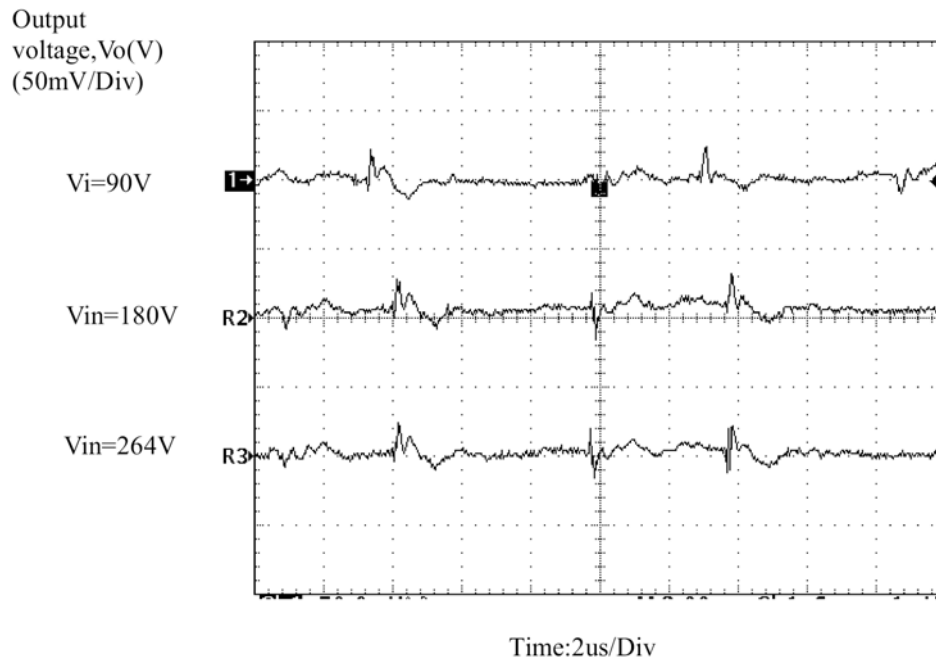


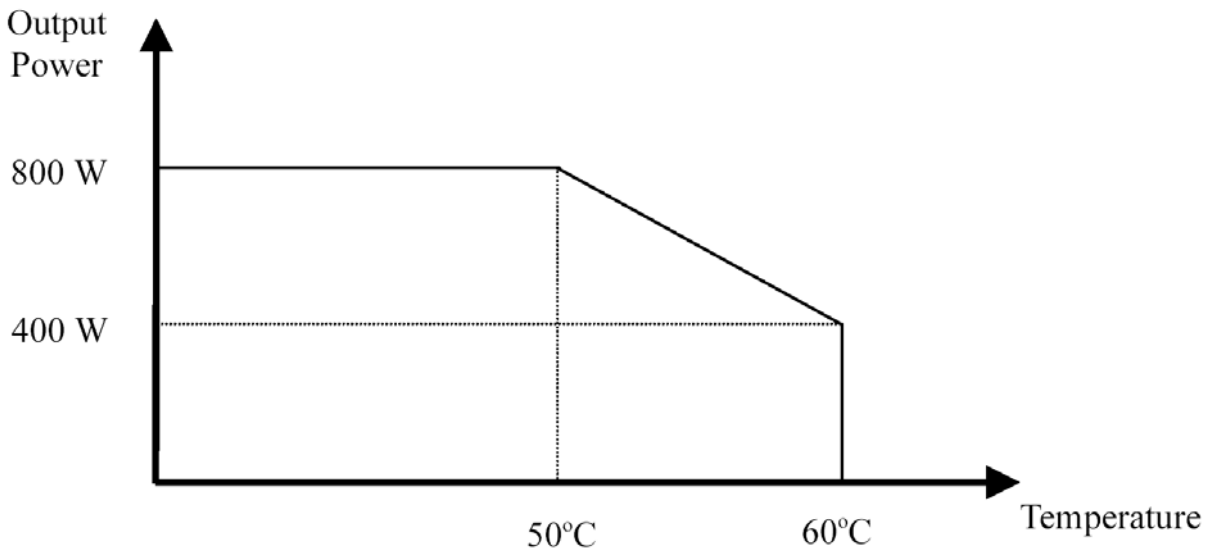
Figure 8. Typical output ripple voltage at 25°C ; 15.6A output current.



**Environmental Characteristics**

Parameter	Min	Typ	Max	Unit	Note
Storage Temperature	-40	-	85	°C	
Operating Temperature (note 1)	0	-	60	°C	Derating 5% / °C, 50°C to 60°C. (see curve below)
Acoustics	-	47	52	dBa	ISO 7779 SPL
Humidity (non-condensing)	5	-	95	%	
Altitude	-200	-	13,000	Feet	Derated at 2°C/1000 ft. above 8000 ft.
ESD	-	-	-	-	meet IEC1000-4-2 Level 3 stand-alone
Electromagnetic Immunity (error free)	-	-	-	-	meet IEC1000-4-2 Level 2 stand-alone
Isolation	3,000VAC				Primary to Secondary
	1,500VAC				Primary to chassis GND
	500VAC				Secondary to chassis GND
MTBF	$4 \times 10^5$	-	-	hours	@110V Input 80% load, T <sub>A</sub> = 30°C
Vibration					Meet IEC68-2-6
Shock					Meet IEC68-2-36
Weight	-	2.2	-	Kg	

**Thermal Derating Curve**





**Power Module Interfaces**

**Input Voltage**

The product can be used with any standard global line voltage; consult Powerstax for any particular regional application concerns.

**Input / Output Connector**

The input / output connector is PCB24W9M400A1 / Postronic, with 9 power pins and 15 signal pins. 3 out of the 9 power pins are for the AC input.

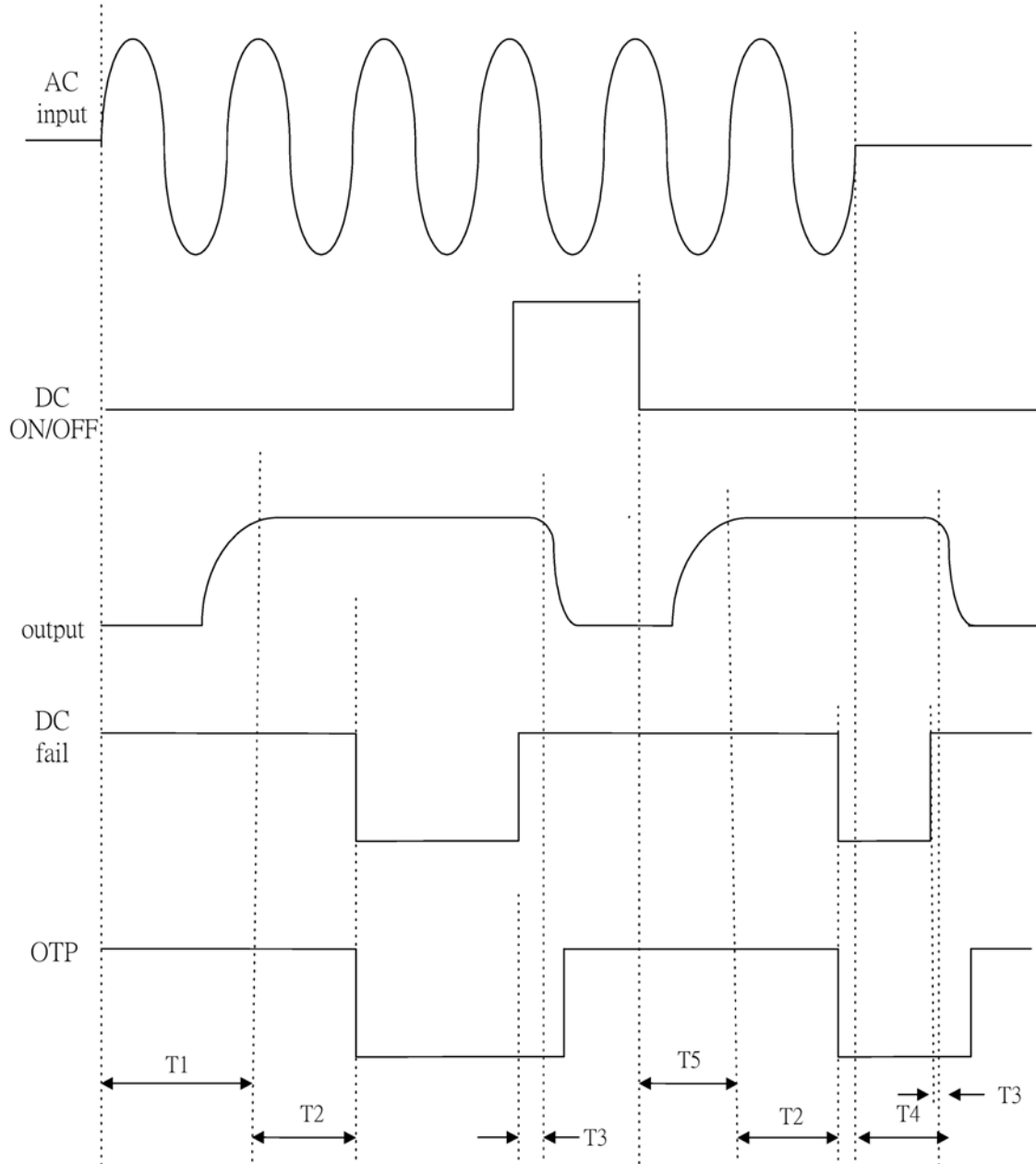
**Connector Pin Assignment - view into rear of power unit**

Please refer to “ Definition of Terms “ for detailed description for each pin

1	3	5	7	10	13	16	19	23
V+	V+	V+	ON/OFF	RS-	CS	OTP	DC FAIL	LINE
2	4	6	8	11	14	17	20	22
V-	V-	V-	N.C.	SDA	Signal RTN	A2	A1	24
			9	12	15	18	21	FG
			RS+	SCL	A3	A0	INT. BUS	Neutral



**Timing Chart**



	T1	T2	T3	T4	T5
	Start up delay			Hold up time	Turn on delay
Min.		200	1	14~20*	
Typ.	1300	270			
Max.	2000	600	4		200
Units	mS	mS	mS	mS	mS

\* Depend on output voltage



**SMBus Function**

Function	Command Code	Protocol*1			Unit
Temperature	0x08	Read	Word	No PEC	° K
Voltage	0x09	Read	Word	No PEC	mV
Current	0x0A	Read	Word	No PEC	mA
Manufacture Date*2	0x1B	Read	Word	No PEC	
Serial number	0x22	Read	Word	No PEC	
Manufacturer Name	0x20	Read	Block*3	No PEC	
Device Name	0x21	Read	Block*3	No PEC	
Manufacture Data (Version)	0x23	Read	Block*3	No PEC	

1. Reference: System management bus specification v1.1

2.The date is packed in the following fashion:

(Year - 1980) \* 512 + Month \* 32 + Day = data byte high: data byte low

Field	Data byte	Allow value
Day	Bit 0~4	1 - 31 (corresponds to date)
Month	Bit 5~8	1 - 12 (corresponds to month number)
Year	Bit 9~15	0 - 127 (corresponds to year biased by 1980)

Example: 2001/11/29 = 10101101111101 (bin) = 2B7D (hex)  
 Where 2B(hex) is data byte high, 7D(hex) is data byte low.

3.Read block data byte 1~N is in ASCII code, where N is the value of byte count.

**Address Definition**

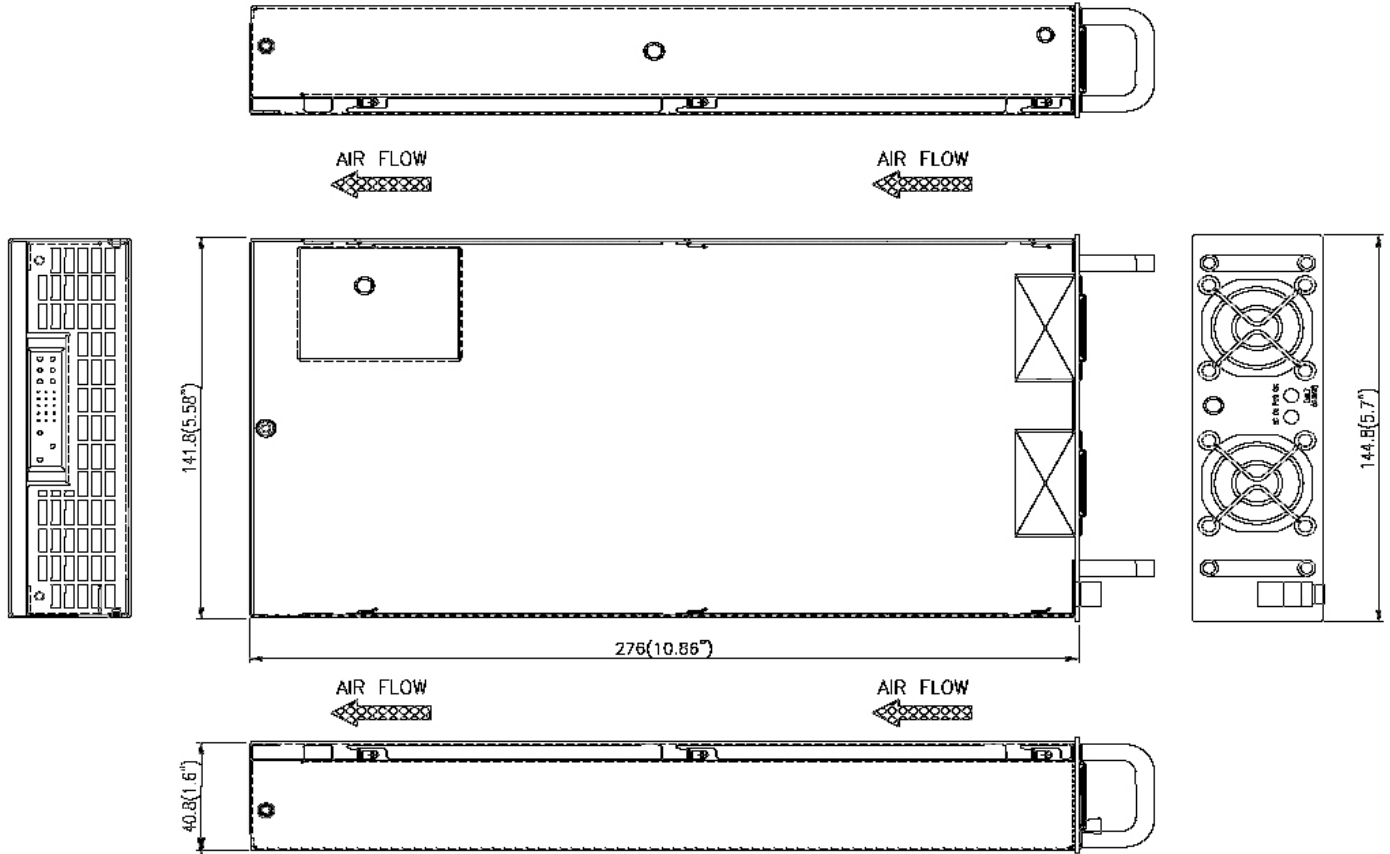
RACK	Shelf	P.S. No.	Address	A3	A2	A1	A0
	1	1	0x00	0	0	0	0
		2	0x02	0	0	0	1
		3	0x04	0	0	1	0
	2	4	0x20	0	1	0	0
		5	0x22	0	1	0	1
		6	0x24	0	1	1	0
	3	7	0x40	1	0	0	0
		8	0x42	1	0	0	1
		9	0x44	1	0	1	0
	4	10	0x10	1	1	0	0
		11	0x12	1	1	0	1
		12	0x14	1	1	1	0

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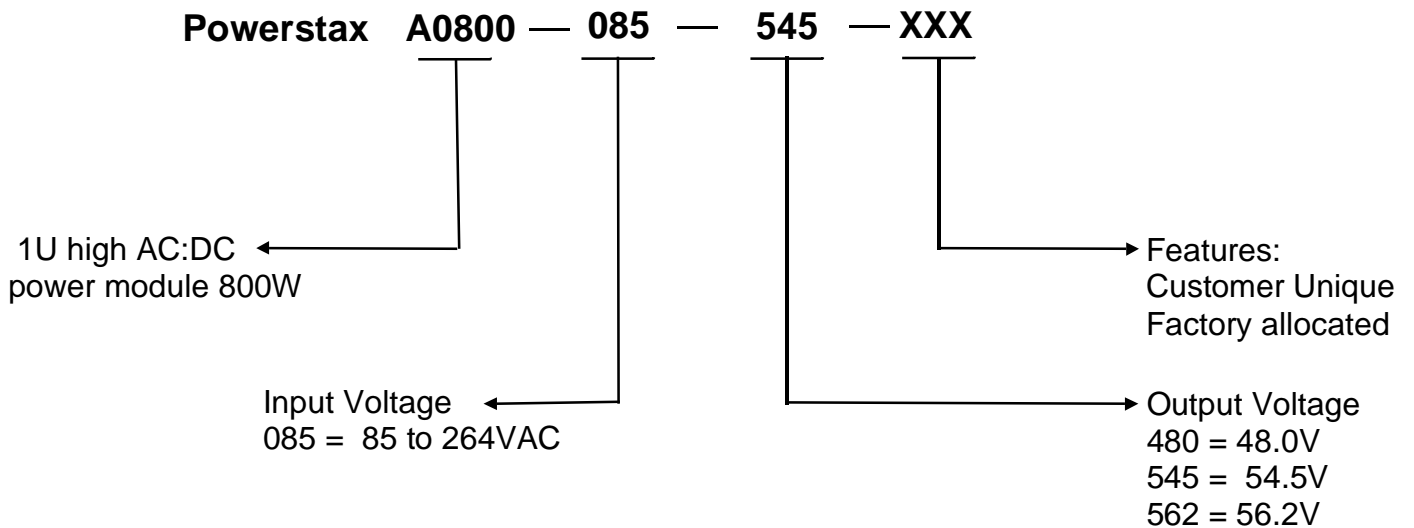
**Product Specification**



**Mechanical Outline**



**Model Reference Guide**





## Definition of Terms

### AC Line Discrimination

The unit senses the input line range at power up and shuts the unit down if the input drops below the line range for a specified period of time.

### Current Monitor

The output current could be reported through the I2C bus.

### Front Panel LEDs

**LED 1** -- AC OK (green): Input voltage OK

**LED 2** -- Output OK (green): The unit is powered up and operating normally

or

Output fail (amber): The unit has detected an internal fault.

### Input Overcurrent Protection

An internal fuse is provided for input protection in compliance with safety agency requirements.

### Current Share Bus (CS)

A single-wire interface between each of the power units forces them to share the load current equally.

### Overcurrent Protection

In the event of an overload condition, the power supply limits the output current.

### Overvoltage Protection

The power unit turns itself off before the output voltage reaches the OVP threshold.

### I<sup>2</sup>C Serial Bus Interface support

The power unit provides I<sup>2</sup>C serial bus interface to receive/transmit data

**SCL:** Clock signal input for I<sup>2</sup>C functionality.

**SDA:** Data signal I/O for I<sup>2</sup>C functionality.

**A0~A3:** Address pin for I<sup>2</sup>C address Bit 0~3.

### ORing Diode

A diode at the output of the power unit protects the DC bus during a power supply failure or hot plugging of the power unit.

### Overtemperature Protection

In the event of an overtemperature condition, the power unit protects itself by shutting off, restarts automatically after cooling down.

### Remote Sense ( RS+, RS-)

These signals permit the power units to compensate for a voltage drop across the output distribution.

### On/Off

This is an input signal referenced to the negative output. Shorting this signal to the negative output will turn on the power unit.

### Status Signals

The following are the optically isolated open-collector signals:

**DC FAIL:** This signal indicates the output fail. It becomes low with a turn on delay of 100 to 500mS after the output voltage reaches in the regulation window. It will go to a high level at least 1mS before output voltage runs out of regulation window.

**OTP:** This signal indicates fan fail or over temperature. It becomes low with a turn on delay of 100 to 500mS after the output voltage reaches in the regulation window. It will go to a high level 200mS before the unit shuts down if a fan fail or over temperature is sensed.

The logic low level is lower than 0.6V with the sink current of the photo-transistor less than 1mA.

### INT. bus

Intermediate DC bus. It is a DC output from the power module for shelf internal usage. There is a reserved slot for a DC/DC converter on the back plane of the power shelf. The DC/DC may transfer DC bus voltage to a standby DC output that may be customized upon request.