

PLUTO

Fits Mission-Critical Application

PLUTO, your best choice, Portwell provides to you

Portwell Inc. who has already set up for 20 years is dedicated to Industrial PC for designing and manufacturing industrial boards with various form factors, Box PC and Panel PC to meet diversified applications. Certainly, suitable combinations of chassis and power supply are included.

Since Box PC and Panel PC are system-oriented design, therefore, we know what quality the PSU is required. PSU to system is like the blood to body; hence, the crucial importance of PSU can't be over-emphasized.

In an attempt to provide stable output and high reliability for different applications such as communications, networks and servers, Portwell Inc. has done research on systems equipped with quality PSU. According to industrial experience, components from Japanese manufacturers are always earning high reputation of quality assurance. Thus, capacitors from Japanese brands like NCC and RUBYCON are introduced into PLUTO series to meet demanding requirements under harsh environment, remaining 80% de-rating output at 50°C which allows the complete system to work stable at high temperature environment.

Not only the thermal resistant components inside the PSU but also the enclosure material with high thermal conductive properties providing higher capability of heat dissipation are taken into account.

To assure customers' systems to work steadily, dual forward converter is design and reliability test under Burn-in condition at 0°C and 50°C for 12 hours at 100% full load is performed in order to keep stable and efficient to meet environment standards.

Besides safety concern, 100% HI-POT Test, Over Temperature Protection, Short Circuit Protection, Over Voltage Protection and Over Current Protection are considered; PLUTO with 80PLUS efficiency level is certified and compliance of green energy is well followed. That's the corporate social responsibility Portwell Inc. takes.

PLUTO Series Can Meet Your Demand and Product Range

PLUTO product range covering from 150W up to as high as 500W is sufficient to support most industrial applications. Why not much higher than 500W? The higher the wattage is, the hotter the system is. The power range listed above is the reasonable wattage we study and come out proper solutions to meet rack-mount server's demand with most off-the-shelf chassis (ordering guide of one stop shopping idea below may give reference to you).

Furthermore, besides specification and quality components which are stated, the basic form factors, both Flex ATX and ATX, serve different purpose also under Portwell's thoughtfulness.

Flex ATX PSU is suitable for application of smaller size but higher efficient system. Such as in POS, Node Chassis or Network Systems, Flex ATX PSU not only can save space but also meet those applications demanded.

PS/2 ATX PSU provides higher output of wattage, e.g. 350W and 500W, and various connectors (20+4 pin ATX main power cable, floppy drive power cable, 4 pin peripheral power cable, SATA power cable, 4 pin ATX +12 volt power cable, 6+2 pin PCI Express power cable) to meet customers' different requirement. For instance, PS/2 ATX PSU is mostly appropriate for the use of communication systems, servers, workstations and data storage.

In addition, to think over various demands, PLUTO-D3501PJ also provides dual +12V output for different devices.

All in all, Portwell Inc. does not provide a simple power supply to customers. The comprehensive thought in technology and considerate idea in specification will let you more understand what Portwell Inc. is to regard its products and to treat its partners.

Thinking Highly of Cost Performance and TCO

Imagining the electrolyte oozes out of the capacitors then you will realize how much crucial role such smaller parts really play in PSU. Introducing quality capacitors from Japanese manufacturers to PLUTO series may increase cost a little bit, however, judging from the following characteristics; customers will comprehend why designing in Japanese capacitors in PLUTO series is so significant. The reasons are:

- Higher ripple current capability (better characteristic of Irac).
- Lower DF (dissipation factor) value which has better tolerance to the influence from temperature, voltage capacitance, and frequency.
- Lower ESR (Equivalent Series Resistance). The lower the value, the longer life time.
- Lower leakage current
- Better life span, suitable for long-operating industrial machinery , much better quality, not easy to give rise to weeping of electrolyte and to short circuit compared with others.
- Smaller in size

In addition, PLUTO has stable characteristics at wider temperature range from -25°C to 105°C (partly -40°C), making it suitable for applications used at low temperatures.

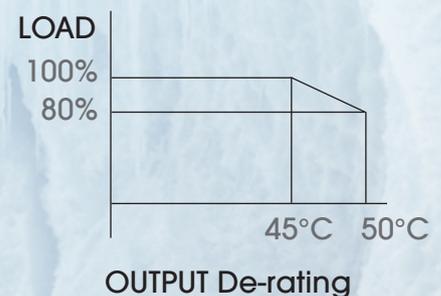
All of these characteristics mentioned above ensure quality, reliability and power stability to apply for industrial applications under harsh environment.

Let's take on example of capacitor specification for reference shown in following table. The quality requirement of some factors such as ripple current, leakage current and dissipation factor are seldom paid attention in the past from most PSU vendors. All of these parameters mentioned above are to stress why a quality PSU like PLUTO can have longer life expectancy to secure your systems.

Rated Voltage (V.DC)	Surge Voltage (V.DC)	Nominal Capacitance (μF)	Cap. Tolerance (%)	tanδ MAX.	MAX. Leakage Current (μA)	Rated Ripple Current (A r.m.s.) 105deg.C/120Hz	Dimension (mm)	
							φD	L
420	470	180	±20	0.2	824	0.91	25	30

Let's further look at the performance of output de-rating. As you can see from the following chart, PLUTO still can tolerate 80% load under 50°C ambient temperature.

For most PS/2 ATX PSUs in IPC applications are for heavy-duty servers, work stations, communications system. Under those environments, heat is the major cause to influence output de-rating. For instance, PLUTO-D3501PJ still remains around 80% de-rating output at 50°C which allows the complete system to work well at high temperature environment.



PLUTO-A1801PJ

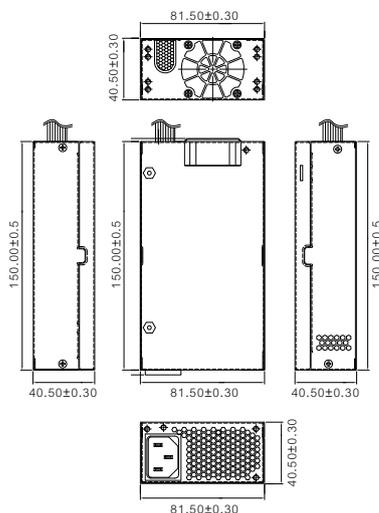
180W Flex form factor Power suppl with Active PFC
Japan made capacitor
80PLUS and OVP,OCP,SCP

180W
Flex ATX



For different industrial environment, like POS, small size server station or Mini-ITX system, PSU takes an important position. For those applications, PLUTO-A1801PJ not only can provide high efficiency but also high reliability. In PLUTO-A1801PJ, capacitors are provided by NCC (Nippon Chemi-Con Corporation), and its electrical characteristics is better than other capacitors. It tolerates as high temperature as 105°C, and low current leakage.

High reliability is also an important feature for PLUTO-A1801PJ, Burn-in test in 0°C and 50°C for 12 hours at 100% loading is performed. In such test, PLUTO-A1801PJ can meet various environment standards and keep stable and efficient. In order to protect customers' valuable data and machine, PLUTO-A1801PJ also comes with protective function such as 100% HI-POT Test, Short Circuit Protection, Over Voltage Protection and Over Current Protection.



FEATURES

- Power Efficiency (25°C can meet the minimum efficiency(80%) for all loading conditions (20%,50,100%))
- Made in Japan capacitor (NCC)
- Internal 4 cm double bearing fan
- Leakage current: Less 3.5 mA-rms at 264Vac, 50 Hz
- Low ripple & noise
- 100% Hi-pot tested
- Hold-up Time in 16ms
- Power Good signal : TTL compatible on delay 100ms to 500ms , off delay 1ms
- Short Circuit Protection
- Over Voltage Protection
- Over Current Protection

INPUT SPECIFICATION

Input Voltage	90V~264V
Input Frequency	47~63Hz
Input Current	3.0 A@ 115V, 1.5A at 230V

OUTPUT SPECIFICATION

Efficiency	>85%
Holdup Time	16ms, at full load
Over Voltage Protection	+5V:5.7V~7.0V,+12V:13.3V~16V.+3.3V:3.7V~4.8V
Over Current Protection	+3.3V:40A, +5V:40A, +12V:22A
EMI & Safety Approval	CE, CB, FCC, VCCI, UL, TUV,80PLUS

DC OUTPUT

	+5V	+3.3V	+12V	-12V	+5Vsb
Max.Load	14A	10.0A	10A	0.3A	2.5A
Min.Load	0.2A	0.1A	0.6A	0A	0A
Load Reg.	±5%	±5%	±5%	±10%	±5%
Ripple	50mV	50mV	120mV	120mV	50mV
Noise	50mV	50mV	120mV	120mV	50mV

GENERAL SPECIFICATION

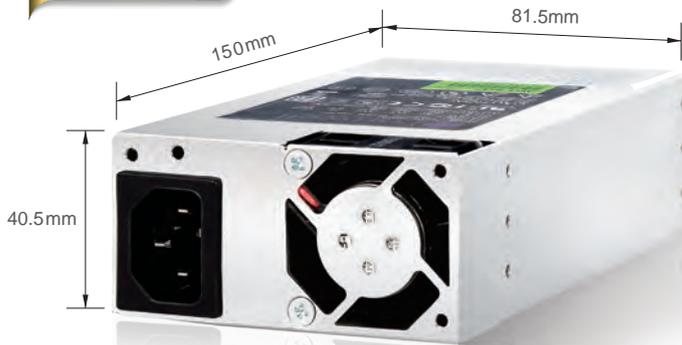
MTBF	10,000 Hours at 100% loading
Temperature/ Humidity	Storage: -20°C to +80°C, 5% to 95% (non-condensing) Operation: 0°C to +50°C, 5% to 85% (non-condensing)
Dimension (W x D x H)	81.5 x 150 x 40.5mm; 5.9" x 3.2" x 1.6"
Risetime	0.1 ms to 20 ms.



PLUTO-A2501PJ

250W Flex form factor Power suppl with Active PFC
Japan made capacitor
80PLUS and OVP,OCP,SCP

250W
Flex ATX



20/24 Pin

4Pin P4_12V

4 Pin

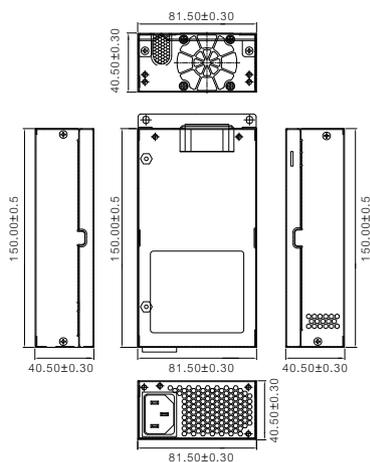
4Pin FDD

SATA

In an attempt to provide stable output and high reliability for different applications (communications, networks, servers and work stations), Portwell conducted a research to provide suitable PSU. In PLUTO series, only high quality components to meet those requirements are chosen.

The electrical characteristics of the PSU describe the quality of its outputs. In PLUTO-A2501PJ, all capacitors are from Japanese manufacturers: NCC and RUBYCON. The case material of PLUTO-A2501PJ is SECC that comes with high thermal conductive properties which helps to provide higher heat dissipating capacity.

High reliability is also an important feature for PLUTO-A2501PJ. Burn-in test in 0°C and 50°C for 12 hours at 100% loading is performed. In such test, PLUTO-A2501PJ can meet various environment standards and keep stable and efficient. For the benefit of valuable machine and data, PLUTP-A2501PJ provides full protection including Over Temperature Protection, Short Circuit Protection, Over Voltage Protection, and Over Current Protection.



FEATURES

- Power Efficiency (25°C and 50°C can meet the minimum efficiency (80%) for all loading conditions (20%,50,100%))
- Made in Japan capacitor (NCC and RUBYCON)
- Support Intel Celeron series
- Fan Control (Internal 4 cm fan)
- Audible Noise (40 dB ± 4dB)
- Remote on/off Control
- Hold-up Time in 17ms
- Power Good signal : TTL compatible on delay 100ms to 500ms, off delay 1ms
- Over Temperature Protection
- Short Circuit Protection
- Over Voltage Protection
- Over Current Protection

INPUT SPECIFICATION

Input Voltage	90V~264V AC
Input Frequency	47Hz~63Hz
Input Current	4.0A@90V and 264V

OUTPUT SPECIFICATION

Efficiency	>=80%
Holdup Time	17ms, at full load
Over Voltage Protection	+5V:5.5V~6.8V, +12V:13.2V~16.0V, +3.3V:3.7V~4.6V
Over Current Protection	+5V:20A, +12V:20A, +3.3V:18A
EMI & Safety Approval	CE, CB, FCC, VCCI, UL, TUV, 80PLUS

DC OUTPUT

	+5V	+3.3V	+12V	-12V	+5Vsb
Max.Load	12A	10A	16A	0.3A	2A
Min.Load	1.0A	0.5A	1.0A	0A	0A
Load Reg.	±5%	±5%	±5%	±5%	±5%
Ripple	100mV	100mV	20mV	200mV	200mV
Noise	100mV	100mV	20mV	200mV	200mV

GENERAL SPECIFICATION

MTBF	100,000 Hours at 100% loading
Temperature/ Humidity	Storage: -40°C to +70°C, 5% to 95% (non-condensing) Operation: 0°C to +50°C, 5% to 85% (non-condensing)
Dimension (W x D x H)	81.5 x 150 x 40.5mm; 5.9" x 3.2" x 1.6"
Storage altitude	-75.03~15250 meter
Operation altitude	-75.03~3000 meter
Risetime	0.1 ms to 20 ms.



PLUTO-D3501PJ

350W PS/2 ATX PSU with active PFC
Japan made capacitor
80 PLUS and SCP, OCP, OPP

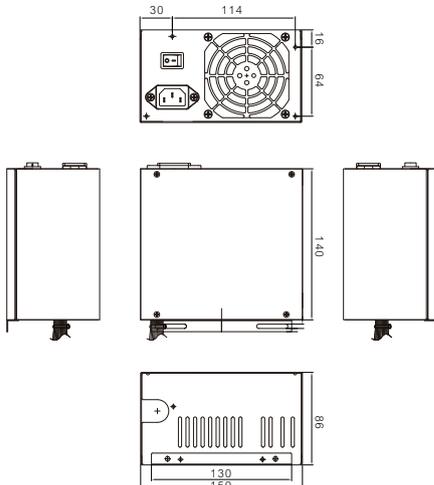
350W
PS/2 ATX



For most PS/2 ATX in IPC applications are for server station and communication system; In those environments, heat is the major cause of output de-rating. PLUTO-D3501PJ also remains 80% de-rating output at 50°C which allows the whole system to work in high temperature environment. In addition, for various demands, PLUTO-D3501PJ provides dual +12V output for different devices.

In order to ensure the output of PLUTO-D3501PJ is stable and reliable, it has dual forward converter design and RUBYCON high quality Japanese capacitor, thus it has shown high performance at 50°C, 12 hours at 100 % loading Burn-in test.

PLUTO-D3501PJ has 80PLUS certification which helps to reduce energy consumption, and hence to save cost of electricity.



FEATURES

- Meets ATX 12V V2.3 standard
- Dual forward converter design
- Active PFC (power factor correction) > 0.99
- Double independent +12V output
- Power Efficiency (25°C and 50°C can meet the minimum efficiency (80%) for all loading conditions (20%,50,100%))
- Leakage current: Less 3.5 mA-rms at 264Vac, 60 Hz
- Made in Japan capacitor (RUBYCON)
- Fan Control (Internal 80mm fan)
- Remote ON/OFF Control
- Hold-up Time in 16ms
- Power Good signal : TTL compatible on delay 100ms to 500ms
- Short Circuit Protection
- Over Voltage Protection
- Over Power Protection

INPUT SPECIFICATION

Input Voltage	90V~264V AC
Input Frequency	50-60Hz
Input Current	8A@115V,8A@230V

OUTPUT SPECIFICATION

Efficiency	>=80%
Holdup Time	16ms, at full load
Over Voltage Protection	3.3V@4.8V , 5V@7.0V, 12V@15.6V
EMI & Safety Approval	CE, CB, FCC, VCCI, UL, TUV, 80PLUS
Over Power/Load Protection	Output power over 120%~160%

DC OUTPUT

	+5V	+3.3V	+12V1	+12V2	-12V	+5Vsb
Max.Load	12A	18A	18A	18A	0.3A	2.5A
Mini.Load	1A	1A	1A	1A	0A	0A
Max.Watt	115W			302W		
Ripple	50mV	50mV	120mV	120mV	120mV	50mV
Noise	50mV	50mV	120mV	120mV	120mV	50mV

GENERAL SPECIFICATION

MTBF	100,000 Hours at 100% loading
Temperature/ Humidity	Storage: -40°C to +70°C, 10% to 95% (non-condensing) Operation: 5°C to +50°C, 20% to 85% (non-condensing)
Dimension (W x D x H)	150 x 140 x 85mm; 5.9" x 7.2" x 3.4"
Risetime	10 ms.



PLUTO-D5001PJ

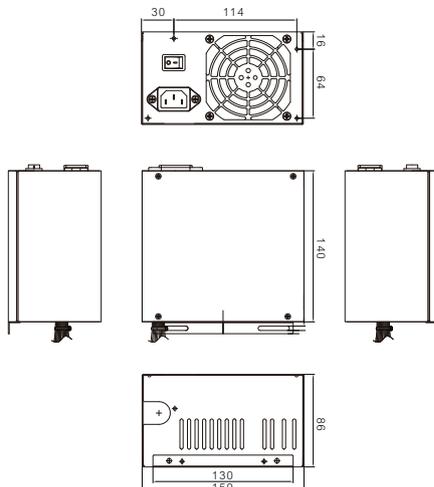
500W PS/2 ATX Power Supply with active PFC
Japan made capacitor
80 PLUS and SCP, OCP, OPP

500W
PS/2 ATX



To ensure PSU has well-appointed output for various devices in industrial environment, PLUTO-D5001PJ provides powerful output with dual +12V for different IPC applications. For quality output in PLUTO-D5001PJ, RUBYCON Japanese capacitors are used to reduce current leakage and lower ESR. It helps PLUTO-D5001PJ to maintain high level of stability and reliability output for various valuable machine. PLUTO-D5001PJ also passed 50°C, 12hours at 100% loading Burn-in test which shows its high reliability. In addition, PLUTO-D5001PJ remains 80% de-rating output at 50°C which allows the whole system to work in high temperature environment.

80PLUS certification can reduce energy consumption and hence to save cost of electricity, therefore, PLUTO-D5001PJ can be high efficient and keep green at the same time.



FEATURES

- Meets ATX 12V V2.3 standard
- Dual forward converter design
- Support Intel Core i series and Xeon Series CPU
- Active PFC (power factor correction) > 0.99
- Double independent +12V output
- Power Efficiency (25°C and 50°C can meet the minimum efficiency(80%) for all loading conditions (20%,50,100%))
- Leakage current: Less 3.5 mA-rms at 264Vac, 60 Hz
- Made in Japan capacitor (RUBYCON)
- Fan Control (Internal 80mm fan)
- Remote ON/OFF Control
- Hold-up Time in 16ms
- Power Good signal : TTL compatible on delay 100ms to 500ms
- Short Circuit Protection
- Over Voltage Protection
- Over Power Protection

INPUT SPECIFICATION

Input Voltage	90V~264V AC
Input Frequency	50-60Hz
Input Current	10A@115V,8A@230V

OUTPUT SPECIFICATION

Efficiency	>=80%
Holdup Time	16ms, at full load
Over Voltage Protection	3.3V@4.8V, 5V@7.0V, 12V@15.6V
EMI & Safety Approval	CE, CB, FCC, VCCI, UL, TUV, 80PLUS
Over Power/Load Protection	Output power over 120%~160%

DC OUTPUT

	+5V	+3.3V	+12V1	+12V2	-12V	+5Vsb
Max.Load	22A	24A	28A	20A	0.3A	2.5A
Mini.Load	1A	1A	1A	1A	0A	0A
Max.Watt	130W			456W		
Ripple	50mV	50mV	120mV	120mV	120mV	50mV
Noise	50mV	50mV	120mV	120mV	120mV	50mV

GENERAL SPECIFICATION

MTBF	100,000 Hours at 100% loading
Temperature/ Humidity	Storage: -40°C to +70°C, 10% to 95% (non-condensing) Operation: 5°C to +50°C, 20% to 85% (non-condensing)
Dimension (W x D x H)	150 x 140 x 85mm; 5.9" x 7.2" x 3.4"
Risetime	10 ms.



PLUTO

MODEL	PLUTO A1501PJ	PLUTO A1801PJ	PLUTO A2501PJ	PLUTO D3501PJ	PLUTO D5001PJ
TYPE	Single	Single	Single	Single	Single
FORM FACTOR	Flex	Flex	Flex	PS/2	PS/2
DIMENSION	81.5 x 150 x 40.5mm	81.5 x 150 x 40.5mm	81.5 x 150 x 40.5mm	150 x 140 x 86 mm	150 x 140 x 86 mm
WATTAGE	150W	180W	250W	350W	500W
INPUT	PFC	PFC	PFC	PFC	PFC
80 PLUS					
PSU with Chassis	Mini-ITX Bare Bone Chassis	Mini-ITX Bare Bone Chassis	Mini-ITX Bare Bone Chassis	2U/3U/4U/Node Chassis	2U/3U/4U/Node Chassis
Ordering Guide	WADE-2231Q WADE-2232Q	WADE-2231Q WADE-2232Q	WADE-2231Q WADE-2232Q	AREMO-2173P/AREMO-2173MX(2U) AREMO-3194(3U) AREMO-4196(4U) RPC-500NC(4U)	AREMO-2173P/AREMO-2173MX(2U) AREMO-3194(3U) AREMO-4196(4U) RPC-500NC(4U)



Portwell, Inc. Headquarters

No. 242, Bo'ai St., Shulin Dist.,
New Taipei City 238, Taiwan
Tel: +886-2-77318888
Fax: +886-2-77319888
E-mail: info@portwell.com.tw
<http://www.portwell.com.tw>

American Portwell (Fremont, California)

44200 Christy St.
Fremont, CA 94538, USA
Tel: +1-510-403-3399
Fax: +1-510-403-3184
E-mail: info@portwell.com
<http://www.portwell.com>

Portwell Japan, Inc. (Tokyo)

〒101-0042 ShowaKanda Build 9F, 10-2
Kanda Higashi Matsushita-cho
Chiyoda-ku, Tokyo, Japan
Tel: +81-3-5298-8071
Fax: +81-3-5298-8072
E-mail: info@portwell.co.jp
<http://www.portwell.co.jp>

Portwell Japan, Inc. (Osaka)

〒532-0004 Ste. 501 Nippo Shin-osaka
Dai-2 Bldg, 1-8-33 Nishi-Miyahara,
Yodogawa-ku, Osaka, Japan
Tel: +81-6-4807-7721
Fax: +81-6-4807-7720
E-mail: info@portwell.co.jp
<http://www.portwell.co.jp>

Beijing Portwell

4F, Building 5, Qunying Zone,
Chuangye Rd. 8, Shangdi, Haidian
District, Beijing 100085, China
Tel: +86-10-8270-1616
Fax: +86-10-8270-0606
E-mail: info@portwell.com.cn
<http://www.portwell.com.cn>

Shanghai Portwell

Room 1908 Yin Fa Mansion,
No. 1068 West Beijing Road,
Shanghai 200041, P.R. China
Tel: +86-21-3222-0505
+86-21-3222-0606
Fax: +86-21-6256-8056
E-mail: info@portwell.com.cn
<http://www.portwell.com.cn>

Shenzhen Portwell

Hunting 4th Building 26F
#Modern City, Nanshan District
Shenzhen 518052, China
Tel: +86-755-8621-7695
+86-755-8622-6424
Fax: +86-755-8617-2084
E-mail: info@portwell.com.cn
<http://www.portwell.com.cn>

European Portwell

Haverstraat 10, Nieuw-Vennep,
2153 GB, Netherlands
Tel: +31-252-620730
Fax: +31-252-621325
E-mail: info@portwell.nl
<http://www.portwell.nl>

Portwell (UK) Ltd.

Unit 15, Moorbrook,
Southmead Industrial Estate,
Didcot OX11 7HP, UK
Tel: +44(0)1235-750760
Fax: +44(0)1235-750761
E-mail: info@portwell.co.uk
<http://www.portwell.co.uk>

Portwell-Laxsons India

Laxsons House, AA2, Walbhat Road,
Goregaon (E), Mumbai - 400 063,
Maharashtra, India
Tel: +91-22-2685-9911
Fax: +91-22-2685-9922
E-mail: info@portwellaxsons.com
<http://www.portwellaxsons.com>