

PowerWAVE 3000/P1

(10 & 20 kVA)
Parallelable up to 80 kVA/kW

Technical Specification

powerWAVE 3000/P1



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PowerWAVE 3000/P1 Description

DESCRIPTION

Compact and advanced, the PowerWAVE 3000/P1 is the most energy efficient single-phase UPS in its class. It solves the problem of providing economic-to-run, dependable critical power protection for higher load single phase applications.

Compact, easy to install and operate, with an advanced, intuitive touch screen display, the 10KVA or 20kVA double conversion is also the most energy efficient UPS in its class. For loads up to 80kVA, up to four units can be paralleled.

Model range

The PW3000/P1 range comprises 10kVA or 20kVA single and three phase input and single-phase output, true on-line double conversion UPS models which are contained in identically sized cabinets. Up to forty 12V batteries can be housed within the standard UPS cabinet but, where extended autonomy times are required, additional batteries can be installed in a battery cabinet which can be positioned adjacent to the UPS.

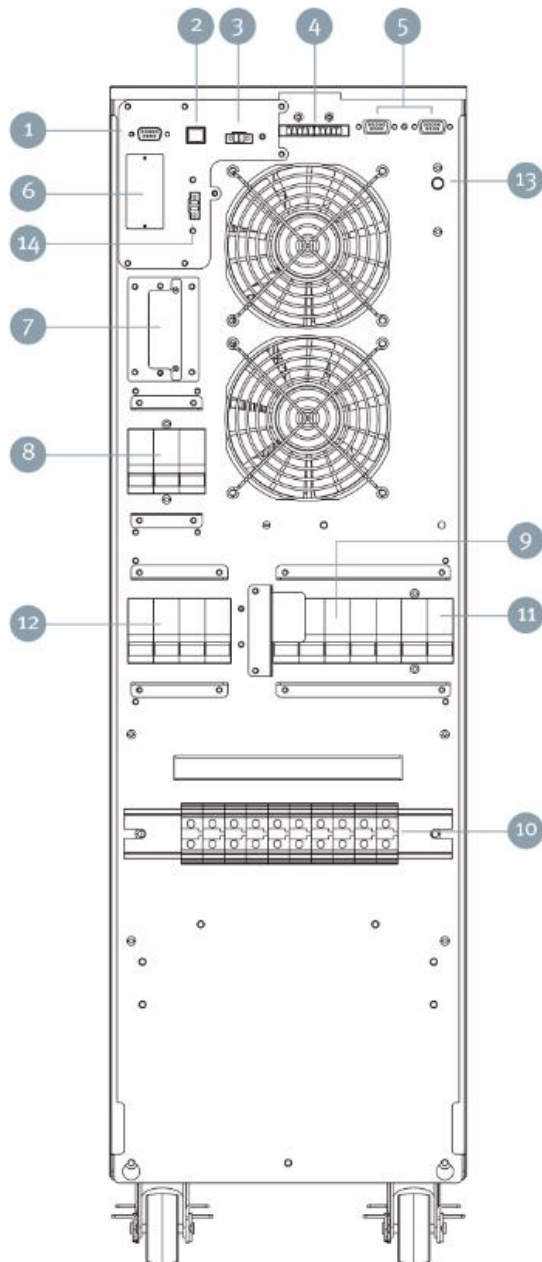
Up to four PW3000/P1 UPS cabinets can be connected in parallel to increase the UPS system's rated output, or introduce a level of module redundancy to further enhance the system availability

Key Features

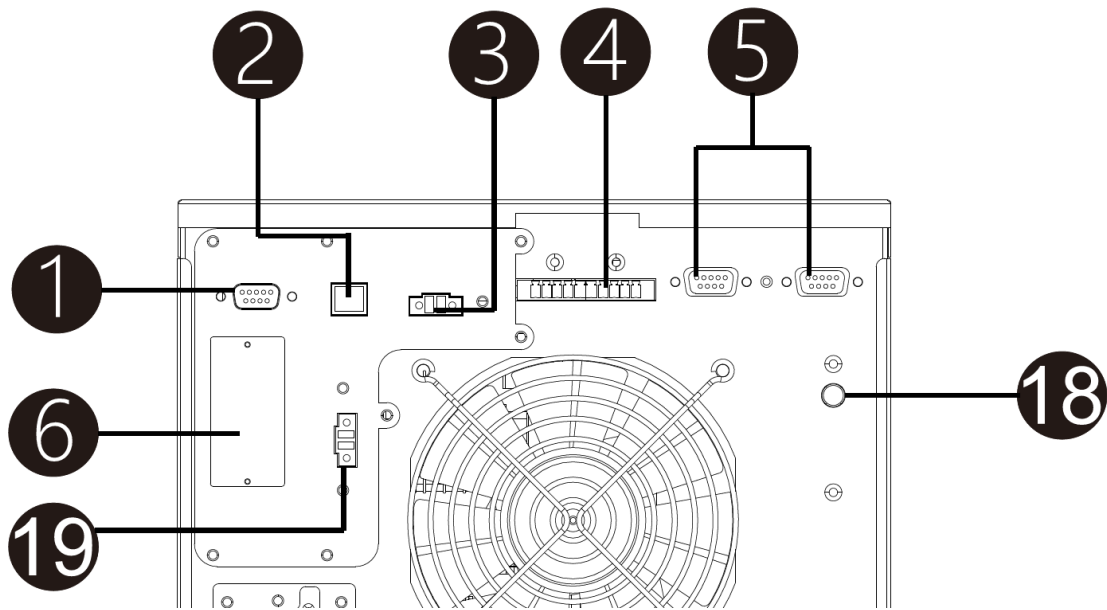
- True Online double conversion
- Single phase UPS output with either a single or three phase input mains supply
- Supports various input wiring schemes: with either a single input feed connected to both the UPS mains and internal bypass, or a dual input feed using a dedicated single-phase bypass supply
- Paralleling and redundancy capability up to 4 units in parallel increases system capacity and availability
- Energy savings thanks to 96.6% AC-AC efficiency, 99% efficiency in ECO mode
- Unity Power factor for single operation and 0.9 for parallel
- Small compact footprint
- Communications interface: Network interface SNMP card, dry-contact, Wi-Fi card
- External maintenance bypass switch connection
- 4.3" Graphical touch screen display – easy to use, advance interface
- Premium quality EnerSys brand batteries as standard
- Intelligent charging system able to support additional battery cabinets for extended autonomies
- Wide Input Voltage range (176V – 276V Ph-N)
- Larger internal charger for long runtimes
- Adjustable internal battery voltage (20kVA)
- Digital signal (DSP) technology



Rear System View



- 1 RS 232 communication port
- 2 USB communication port
- 3 Emergency power off connector (EPO connector)
- 4 Parallel Share current port
- 5 Parallel port
- 6 Intelligent slot SNMP or DRY Port
- 7 External battery connector
- 8 Line input circuit breaker
- 9 Maintenance bypass switch
- 10 Input/Output terminals
- 11 Bypass input circuit breaker
- 12 Output switch
- 13 Service start
- 14 External Maintenance Bypass Switch connector (EMBS)



1. **RS232 Port** – Port is used by Maintenance Service engineer to enable updates to internal firmware of the UPS System. Not for Customer Use
2. **USB Port** – Communication port for Customer to connect monitoring Software directly to local PC, provides Alarms and functional monitoring.
3. **EPO** – EPO port is NC in normal Operation. Breaking this NC loop forces the UPS Inverter to disconnect the output to the load.
4. **Parallel Share Current Port** – Used when multiple UPS systems are connected in Parallel
5. **Parallel Port** – Used when multiple UPS systems are connected in Parallel
6. **INTELLIGENT SLOT** – One Slot provided can hold either an SNMP card or Dry port card.
 - a. **SNMP CARD** – OPTIONAL (Further details in Section 7.1)
 - b. **DRY PORT RELAY CARD** – OPTIONAL (Further details in Section 7.3)
18. **SERVICE START** – Allows UPS to be started directly from the battery with no incoming mains supplied.
19. **EMBS** (External Maintenance Bypass Switch) – Port is NC in Normal Operation.

The EMBS port can be linked to an external Maintenance bypass switch to ensure an interlock is connected to the UPS internal static switch. When installed and the EMBS is closed the Inverter is shutdown and the static transfer switch connects the load directly to the incoming mains supply.

General specifications

UPS MODEL	PW3000/P1 10kVA		PW3000/P1 20kVA	
Output power factor at 100% Load	≥ 0.99			
Rated output power	10KVA / 10KW		20KVA / 20KW	
UPS MODULE /internal batteries	10kVA	14 mins at 10kVA 0.8 p.f Load	20kVA	4 mins at 20kVA 0.8 p.f Load
Weight [kg]	43	155	44	156
Dimensions DxWxH [mm]	710 x 250 x 827			
Colour	RAL 9005			
Topology	True on-line double conversion			
INPUT CHARACTERISTICS				
Input voltage	1ph + N: 220 / 230 / 240 VAC 3ph + N: 380 / 400 / 415 VAC			
Input voltage tolerance	110-300 VAC ± 3 % at 50% Load 176-276 VAC ± 3 % at 100% Load			
Frequency Range	46Hz ~ 54 Hz @ 50Hz system 56Hz ~ 64 Hz @ 60Hz system			
Phase	3 Phase with Neutral OR Single Phase with Neutral (Single or Dual Feed)			
1Ph Input, current at 230V Ph-N, 100% load, (no batt charging)	48 A		96 A	
1Ph Input current at 209V Ph-N, 130% load, 12A batt charging	67 A		132 A	
3Ph Input current at 360V Ph-Ph, 130% load, 12A batt charging	23 A		45 A	
Input current THDi	≤ 4% @ 100% linear load			
Power Factor	≥ 0.99 at 100% Load			
OUTPUT				
Output voltage	220/230/240VAC (Ph-N)			
Voltage tolerance	± 1%			
Frequency Range (Synchronized Range)	46Hz - 54 Hz @ 50Hz system 56Hz -64 Hz @ 60Hz system			
Frequency (Batt. Mode)	50 or 60 Hz ±0.1 Hz			
Overload capability	100% - 110%: 60min; 110% - 125%: 10min; 125% - 150%: 1min; >150% 1 second			

Crest factor		3:1	
Harmonic Distortion		$\leq 2\%$ @ 100% Linear Load; $\leq 5\%$ @ 100% Non-linear Load	
Transfer Time	Line ↔ Battery	0 ms	
	Inverter ↔ Bypass	0 ms (When phase lock fails, <4ms interruption occurs from inverter to bypass)	
	Inverter ↔ ECO	<10 ms	
EFFICIENCY			
AC mode		96.6%	
Battery Mode		95.5%	
BATTERY			
Number of 12v battery blocks	20 (10+10) Up to 2 strings Internal – 40pcs		32 – 40 (16+16 up to 20+20) Up to 1 String Internal – 40pcs
	Recharge Time		
		9 hours recover to 90% capacity	
Maximum battery charger current		12 A	
Battery type		VRLA	
ENVIRONMENT			
Protection rating		IP20	
Storage temperature		-15°C to +60°C for UPS; 0°C to +35°C for battery	
Operation Temperature		0 - 40°C (A temperature of 20°C is recommended to achieve a long battery life)	
Relative humidity		<95 % and non-condensing	
Altitude (above sea level)		1000m without de-rating	
Acoustic Noise Level		Less than 55dB @ 1 Metre	Less than 58dB @ 1 Metre
HEAT DISSIPATION			
Airflow		From front to back	
Heat dissipation with no load		165W	280W
Heat dissipation 100% Load, 12A Charger		900W	1500W
COMMUNICATIONS			
User interface		Menu-driven touch screen display, USB	
Communication card options		SNMP, RS485, AS400 Dry contact, Wi-Fi card	

STANDARDS	
Product certification	CE
Safety	IEC/EN 62040-1-1
EMI Conducted Emission	IEC/EN 62040-2 Category C3
EMI Radiated Emission	IEC/EN 62040-2 Category C3
EMS ESD	IEC/EN 61000-4-2 Level 4
EMS RS	IEC/EN 61000-4-3 Level 3
EMS EFT	IEC/EN 61000-4-4 Level 4
EMS SURGE	IEC/EN 61000-4-5 Level 4
EMS CS	IEC/EN 61000-4-6 Level 3
Power-frequency Magnetic field	IEC/EN 61000-4-8 Level 4
Low Frequency Signals	IEC/EN 61000-2-2
Leakage Current	IEC/EN 62040-1-1
Transportation	ETS 300019-2-2 class2.3
Warning: This is a product for commercial and industrial application in the second environment-installation restrictions or additional measures may be needed to prevent disturbances.	

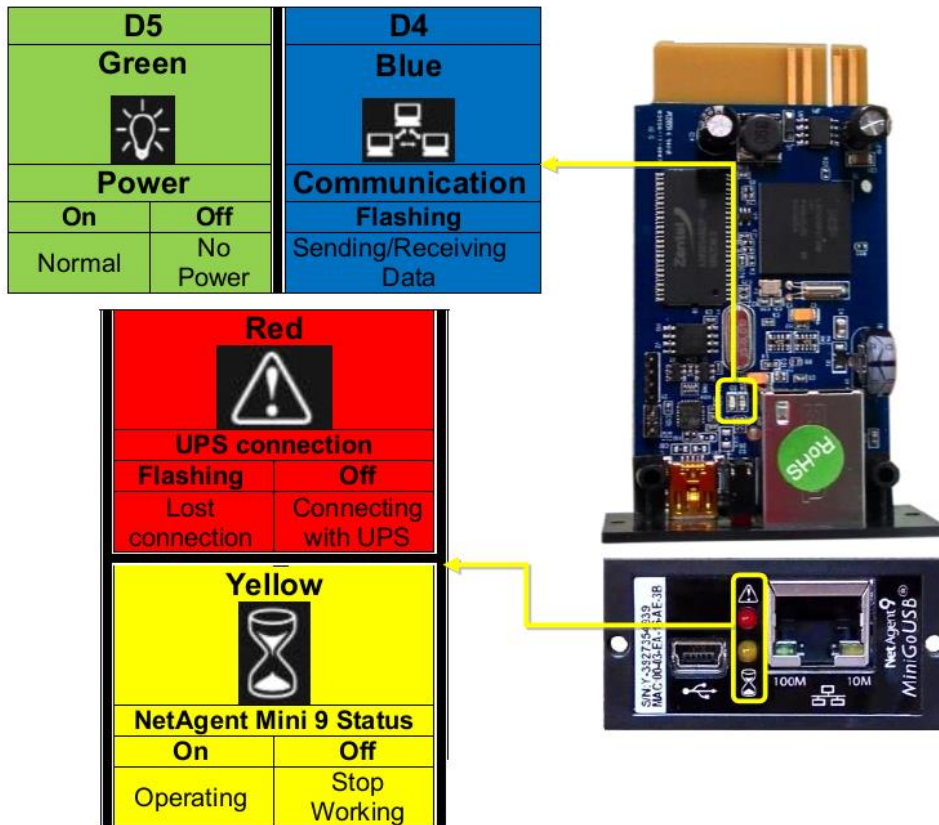
CUSTOMER INTERFACE OPTIONS

SNMP CARD

MEDA806 is an SNMP (Simple Network Management Protocol) card for monitoring the PowerWAVE UPS. The SNMP Card provides the ability to monitor the UPS remotely and provide some control.

Features:

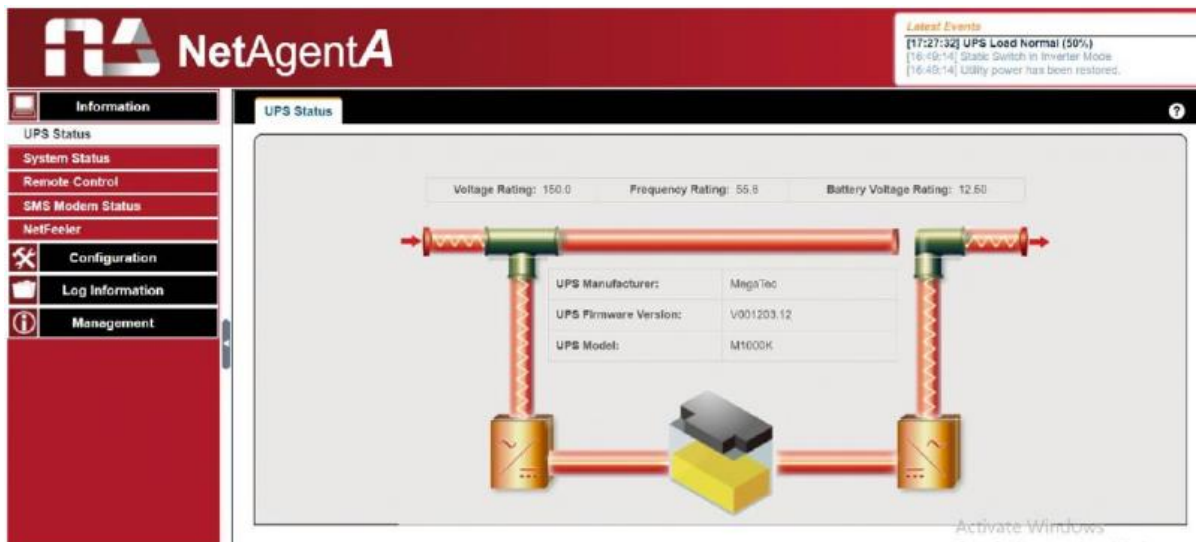
- Provide SNMP MIB to monitor & control UPS
- Auto-sense 10M /100M/1000M Fast Ethernet Manage and configure via Telnet, Web Browser or NMS
- Support TCP/IP, UDP, SNMP, Telnet, SNTP, PPP, HTTP, HTTPS, SMTP, FTP, Modbus, BACnet Protocols
- Support SSL/TLS, SSH Encryptions
- Providing easy setup and upgrade tools via our Netility software
- Send SNMP TRAP; E-mail and SMS for events notification.
- Auto email daily UPS history report
- Perform graceful shutdown with our ClientMate software
- Add-on optional NetFeeler for temperature, humidity, water, smoke and door sensor
- Add-on optional GPRS modem for SMS notification



Applications

Provides UPS monitoring via Network

When the UPS connects with SNMP, the user can check each UPS condition via a computer with an installed Browser. The user can monitor and control the UPS by entering the SNMP card IP address into the browser search. During an abnormal power condition, the SNMP can send the information directly to the user.



Provides Shutdown Utilities

The computer/server must install the provided shutdown software and the device must be connected to the same network as the SNMP. When the UPS goes into an AC failure condition or Battery Low condition, the software can close all running files of the operating system and shutdown gracefully. This avoids system corruption when a power disconnection happens.

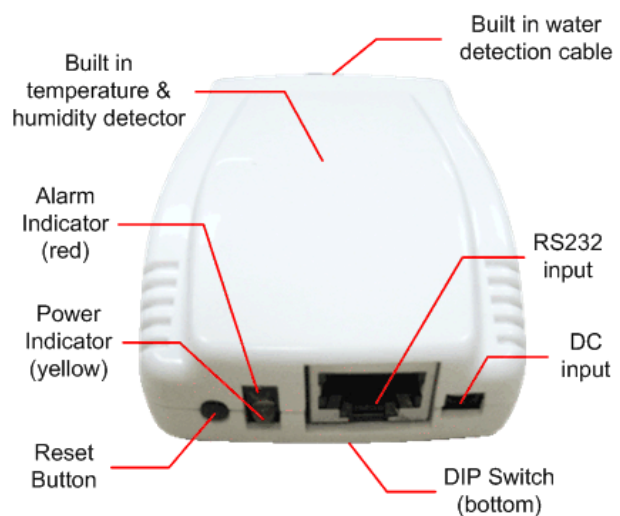
Provides Environmental Monitoring

The SNMP USB port can connect to optional sensor- USB NetFeeler to import the temperature/humidity/smoke/fire signals. Information is displayed on the SNMP Web page. If an abnormal condition happens a trap can be sent directly to the user.

NETFEELER ENVIRONMENT MONITORING CARD

NetFeeler can detect variation in temperature, humidity and presence of water. It can also be used to connect up to 7 wireless add-on devices;

- Wireless Smoke sensor
- Wireless Gas sensor
- Wireless Door/Window sensor
- Wireless Glass-Break sensor
- Wireless InfraRed Beam detector
- Wireless PIR sensor



The NetFeeler connects directly to the USB port of the SNMP card.

When an event occurs the NetFeeler alarm buzzer will activate, an email alert can also be sent via the SNMP card.

When connected to an SNMP Card it can provide environment status feedback (temperature, humidity and water presence) via the internet using a standard browser.

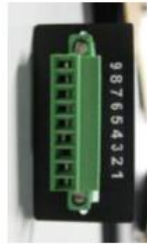
DRY PORT RELAY CARD

The dry port relay Card provides contact closures for remote monitoring your UPS. To meet different application requirement, the Relay card is capable of selection the status of the dry-contact signal (active close or active open) by setting jumper.

9-pin port



Top View



Side View

Pin Assignment

Pin Assignment	Function	I/O
Pin 1	UPS Failure	O/P
Pin 2	UPS Audible Alarm	O/P
Pin 3	GND (Common for Pin 4)	Power Ground
Pin 4	Remote Shutdown	I/P
Pin 5	Common for Relays	Power Supply
Pin 6	Bypass Active	O/P
Pin 7	Low Battery	O/P
Pin 8	UPS On	O/P
Pin 9	Utility Failure	O/P

NOTE1: To shutdown the UPS system a high level signal is required for 3-10s between Pin3 & Pin4, DC current should be less than 6mA

Note 2: The relays have a maximum voltage of 24Vdc and maximum 1A between the contacts

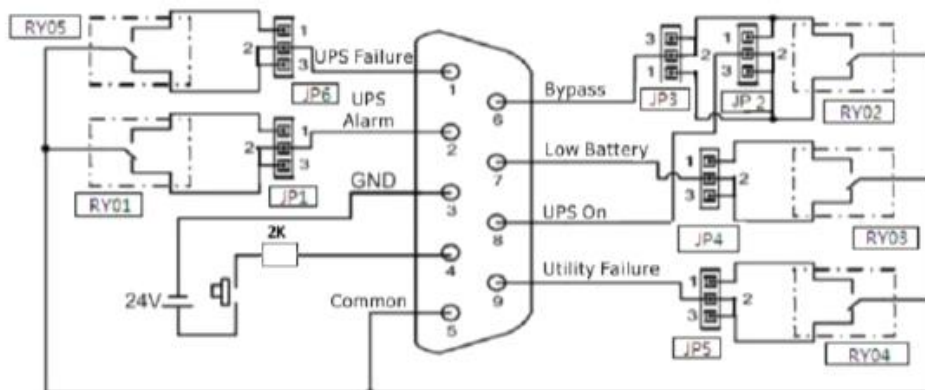
Note 3: Maximum 1.5mm² cable size for connection terminals

INTERNAL LOGIC CONNECTION

The Internal logic of the card can be changed across the 5 relays between NC and NO by moving the internal relays on the card.

If the Jumper is connected to PIN1 & PIN2 the relay is NC

If the Jumper is connected to PIN2 & PIN3 the relay is NO



There are 6 jumpers on the Card:

JP1 – UPS ALARM (PIN2)

JP2 – UPS ON (PIN8)

JP3 – BYPASS ACTIVE (PIN6)

JP4 – LOW BATTERY (PIN7)

JP5 – UTILITY FAILURE (PIN9)

JP6 – UPS FAILURE (PIN1)

PLANNING THE INSTALLATION

General guidelines

A certain amount of pre-planning will help ensure a smooth and trouble-free installation of the UPS system. The following guidelines should be taken into account when planning a suitable UPS location and operating environment.

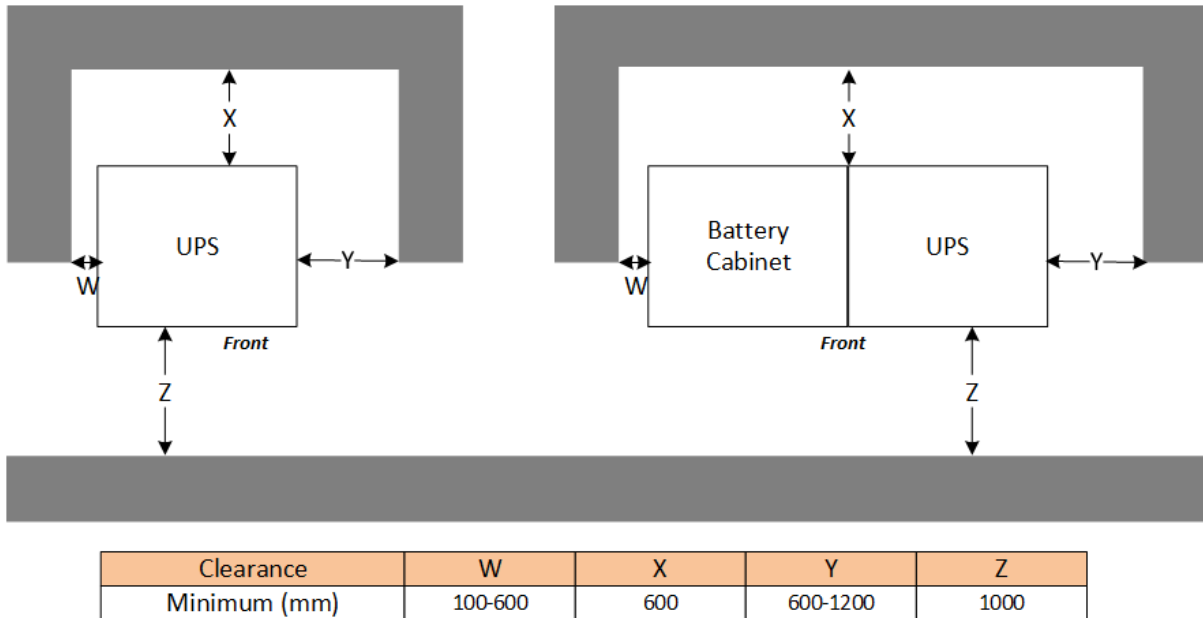
1. The UPS is designed for indoor installation only.
2. The route to the installation location must allow the equipment to be transported in an upright position.
3. The floor at the proposed installation site and en-route from the off-loading point must be able to safely take the weight of the UPS and battery equipment plus forklift during transit. The UPS system is on wheels and can be maneuvered on solid floor.
4. Locations with high ambient temperature, moisture or humidity must be avoided.
 - a) The installation site humidity should be <90% non-condensing.
 - b) The prescribed ambient temperature is 0°C to +40°C. A temperature of 20°C is recommended to achieve a long battery life.
 - c) Any requested cooling air flow must be available. The air entering the UPS must not exceed +40°C.
 - d) The air conditioning system must be able to provide a sufficient amount of cooling air to keep the room within the prescribed temperature range.
 - e) Do not install the UPS system near water.
 - f) Do not install the UPS system where it would be exposed to direct sunlight or nearby heat source.
 - g) Do not block ventilation holes on the UPS housing.
5. The following environmental conditions should also be considered:
 - a) Fire protection standards must be respected. The floor material should be non-flammable.
 - b) The location must be free of dust and corrosive/explosive gases.
 - c) The location must be vibration free.
 - d) A minimum clearance of 100mm is required on the sides of the equipment to allow the free passage of cooling air.

Clearances

The following notes are applicable to both the UPS and external battery cabinet.

The UPS cabinet is force ventilated with extractor fans mounted on the UPS back panel drawing cooling air through the inlet grills on the front of the unit. Sufficient space must be provided at the back and sides of the cabinet to permit adequate air-flow. Rear access is required for connecting the UPS power and control cables, and also to operate the UPS power switches. If direct rear access is not available, sufficient space must be provided at the side of the cabinet to allow the operator to reach around the cabinet to operate the power switches.

Full access is required to both sides of the cabinet (600mm) for maintenance. The UPS cabinet is mounted on wheels, so if the installation does not afford direct side access the UPS connecting cables should be of sufficient length to allow the cabinet to be moved forward to offer unhindered side access when required.



Positioning Diagram

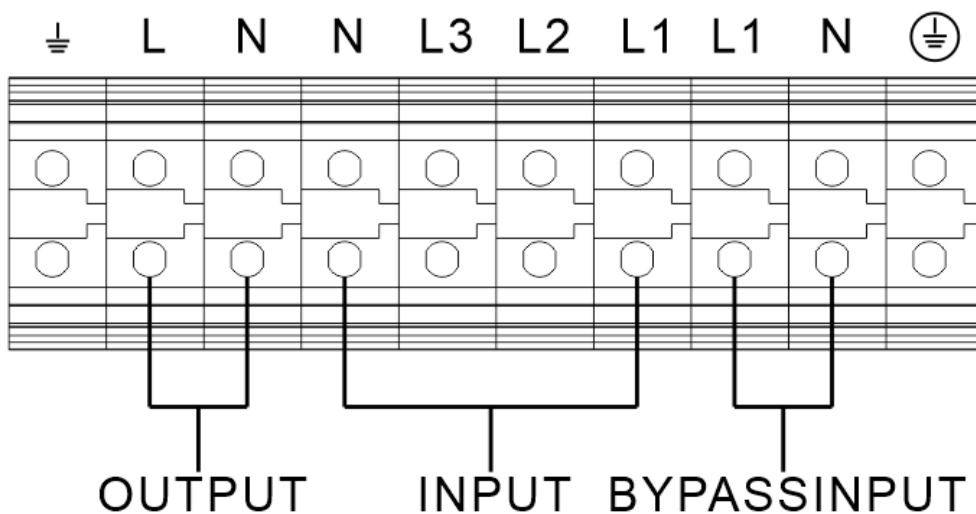
POWER CABLING

The input cables, output cables and external battery power cables are connected to a terminal block rail located on the back of the UPS cabinet, behind a removable cover. All power cables enter the bottom of the terminal box through cable glands which are installed as required.

Input supply configurations

The UPS input supply and bypass input supply can be connected to suit various supply configurations. These configurations can be described as:

- Three phase dual input – Three phase mains input (L1,L2,L3) and separate single phase bypass input
- Three phase single input – Three phase mains input (L1,L2,L3) with the bypass line linked to (L1)
- Single phase dual input – Single phase mains input (L1,L2,L3 linked) and separate single phase bypass line
- Single phase single input – Single phase mains input (L1,L2,L3 linked with the bypass input L1)



UPS Cable and fuse sizing

The UPS input mains and bypass supplies can be wired in one of four configurations:

- Three phase dual input – Three phase mains input and separate single phase bypass input
- Three phase single input – Three phase mains input with bypass input linked to the mains input L1
- Single phase dual input – Single phase mains input and separate single phase bypass input
- Single phase single input – Single phase mains input linked directly to the bypass input

Single UPS Installation

Condensation may form if the UPS system is moved instantly from a cold to warm environment. The UPS system must be dry before being installed. Please allow at least two hours for the UPS system to acclimatise to the environment.

Do not connect appliances or devices which would overload the UPS (e.g. big motor-type equipment) to the UPS output terminal.

Place cables in such a way that no one can step on or trip over them.

UPS chassis must both be connected to Site Potential Earth Terminals. Battery chassis must have a Potential Earth connection directly to UPS, or the battery chassis must be connected to site Potential Earth terminals directly.

Wiring must be carried out in accordance with the local installation regulations by trained professionals. The UPS must be installed only by a qualified engineer.

An appropriate disconnect device such as short-circuit backup protection should be incorporated during installation.

Secure the grounding/earthing wire to the terminal before connecting any live cable. **WARNING HIGH LEAKAGE CURRENT EARTH CONNECTION ESSENTIAL BEFORE CONNECTING SUPPLY**
This UPS should be connected with TN grounding/earthing system.

The power input for this unit must be 3pd/1ph rated in accordance with the equipment nameplate. It also must be suitably grounded.

- 1) Make sure that the mains cable and breakers of the building are rated for the capacity of the UPS to prevent electric shock or risk of fire.
- 2) Switch off the mains switch in the building before installation.
- 3) Turn off all the connected devices before connecting to the UPS.

4) Prepare cables based on the following table:

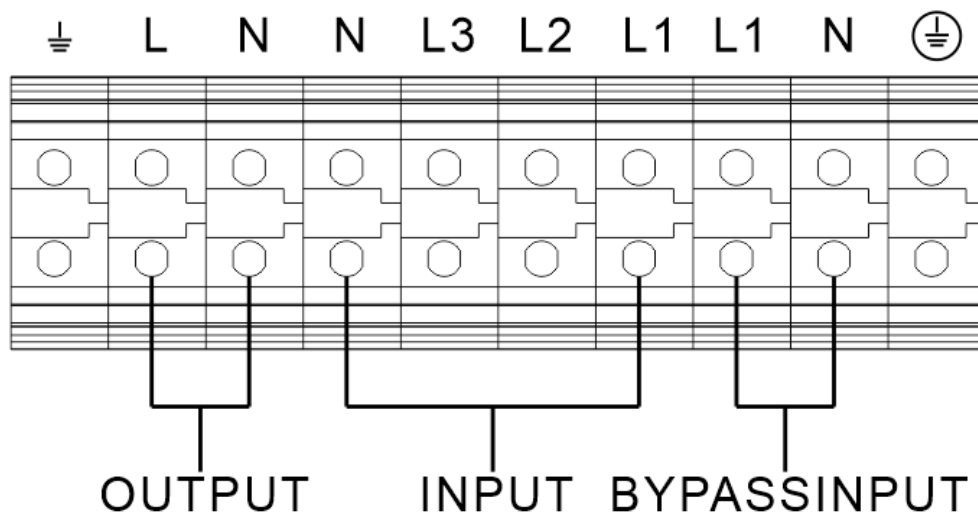
Model	Wiring spec (mm ² & Max A Per Phase)						
	Bypass Input (if used)	Input (1Ph)	Input (3Ph) SINGLE	Input (3Ph) DUAL	Output (Ph)	Neutral	Ground
PW3000/P1 10K	10mm (67A)	10mm (67A)	10mm (67A)	4mm (23A)	10mm (45A)	10mm	10mm
PW3000/P1 20K	25mm (132A)	25mm (132A)	25mm (132A)	10mm (45A)	25mm (86A)	25mm	25mm

NOTE 1: The selection for cable sizing should be based on the cable specification used and the type of cable installation. Local electrical standards and regulations should be followed.

NOTE 2: The selections for color of cables should be followed by the local electrical laws and regulations.

NOTE 3: Maximum current is based on Input Voltage of 209V, 130% load with 12A Charger fully operating.

5) Remove the terminal block cover at the rear panel of UPS. Then connect the wires according to the following terminal block diagrams: (Connect the grounding/earthing wire first when making wire connections. Disconnect the earth wire after you disconnect the power wire.)

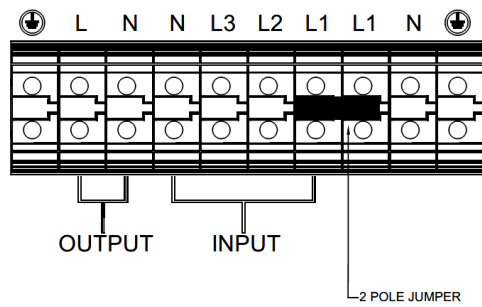


NOTE 1: Make sure that the wires are connected tightly with the terminals.

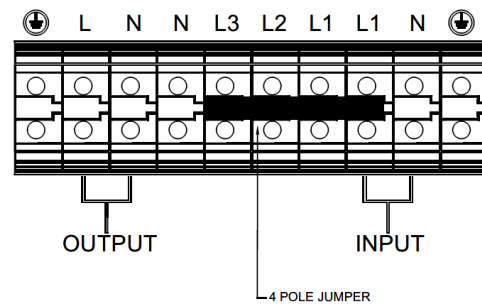
6) Put the terminal block cover back at the rear panel of the UPS.

The PowerWAVE 3000/P1 System Can be modified to operate at various configurations of inputs. To change the configuration, insert or remove the provided jumper bars on the terminal rail as detailed below:

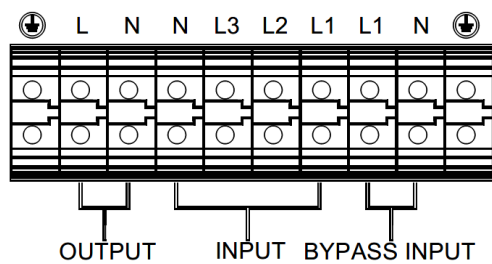
SINGLE FEED - 3 PHASE INPUT



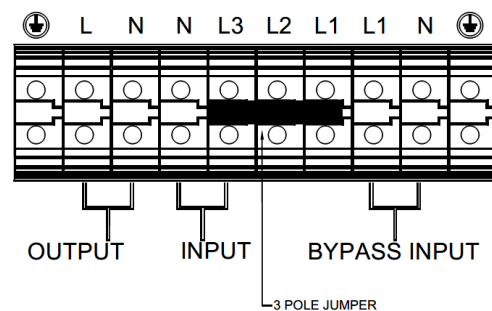
SINGLE FEED - 1 PHASE INPUT



DUAL FEED - 3 PHASE INPUT



DUAL FEED - 1 PHASE INPUT

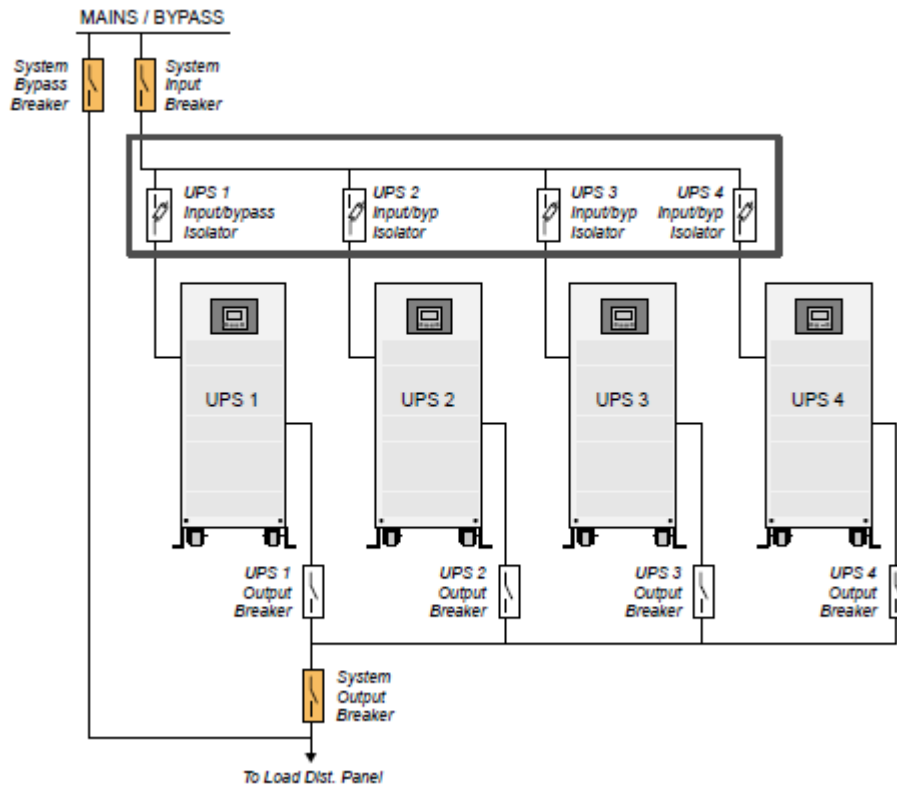


Terminal block wiring diagram

Power cabling for a parallel system

In a parallel UPS system, the length of the input cables from the input distribution board to each cabinet should be as equal as possible, with a maximum difference of 20%. This is necessary to obtain accurate load sharing between the cabinets. This also applies to the UPS output cables, where each module should be connected to an output circuit breaker located on a switch panel no further than 20 meters from the cabinets.

External maintenance bypass



An external maintenance bypass facility such as that shown above should be installed in conjunction with a parallel module system to increase the system flexibility. By opening its input fused isolator and output breaker, this circuit allows an individual module to be fully isolated from the system for repair or total replacement. It also allows the entire system to be bypassed by closing the System Bypass Breaker and opening the System Output Breaker; which in turn allows testing of the entire parallel system. To avoid the possibility of module damage, it is crucial that ALL the UPS modules are all operating on their internal bypass before the System Bypass Breaker is closed, and it is therefore usual to incorporate some form of safety interlocking mechanism between the UPS external breakers.

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