



PAC/PAP800 Datasheet & Manual

Features:

Switched mode power supply/charger
Wide output range 0...144 V_{DC} 0...50 A
Analog control by an external 0...5 V_{DC}
Power failure alarm output
Master-slave connection

Micropower PAP/PAC series is a high power, lightweight, advanced power supply series using modern switching technology. All units can be used as a power supply or constant voltage battery charger. The output voltage and output current can be adjusted from 0 to maximum value by a trimmer on the front panel, or by an optional 0-5V analog control.

Technical data

Variable		Unit	
INPUT DATA			
Input phase		-	1 Phase
Input voltage supply		V _{AC}	55...250 (55...200 reduced power)
Input current		A	4,5
Recommended input fuse		A	10
BATTERY CONNECTION			
Output connection		mm ²	6, terminal connector
Battery cable		mm ²	2x6
Battery cable length (standard)		m	2
ELECTRIC DATA			
Power factor		-	> 0,98
Efficiency (240Vac, 10%...100% load)		%	85...90 typical
Inrush current (Limited by an NTC resistor)		A	< 30
Line regulation		%	±0,1
Load regulation		%	±0,5
Output setting accuracy		%	±0,1
Output ripple (1 MHz bandwidth)		%rms	< 1 from maximum output voltage (< 1 MHz bandwidth). Resolution is defined by an 8-bit or 10-bit A/D converter of a microcontroller. Measured using nominal output voltage.
PROPERTIES			
Short circuit protection		-	Electrical current limiter
Wrong polarity protection		-	Electrical protection circuit
Isolation	input-chassis	V _{AC}	1500
	input-output	V _{AC}	3750
	output-chassis	V _{AC}	500
Standards	safety	-	IEC60335-2-29:2002 (Ed 4) + A1:2004 + A2:2009 IEC60335-1:2001 (Ed 4) + A1:2004 + A2:2006
	EMC	-	EN 55032
Protection class	mechanical	IP	IP20 metal enclosure
	electrical	-	Class 1
Mounting		-	DIN-rail, wall, bench
Cooling		-	Temperature controlled fan
Operating temperature range		°C	0...+45
Certifications		-	CE
HMI		-	LED
CHARGER DIMENSIONS			
Charger weight excl. cables		kg	1,55
Outer dimensions	W x H x D	mm	220 x 112 x 73

Power Supply Models

Trimmer adjustable power supplies							
Model	Input voltage range **)	Nominal output voltage	Voltage setting range	Nominal output current	Current setting range	Maximum output power	Installation/dimensions (width x height x depth)
800/12	55-250V _{ac}	12V _{dc}	0-18V _{dc}	50A	0-50A	700W	Wall /bench 220x112x73
800/24	55-250V _{ac}	24V _{dc}	0-36V _{dc}	30A	0-30A	800W	Wall /bench 220x112x73
800/36	55-250V _{ac}	36V _{dc}	0-54V _{dc}	20A	0-20A	800W	Wall /bench 220x112x73
800/48	55-250V _{ac}	48V _{dc}	0-72V _{dc}	15A	0-15A	800W	Wall /bench 220x112x73
800/72	55-250V _{ac}	72V _{dc}	0-108V _{dc}	10A	0-10A	800W	Wall /bench 220x112x73
800/96	55-250V _{ac}	96V _{dc}	0-144V _{dc}	7,5A	0-7,5A	800W	Wall /bench 220x112x73

0-5 V external control signal adjustable power supplies							
Model *)	Input voltage range **)	Nominal output voltage	Voltage setting range	Nominal output current	Current setting range	Maximum output power	Installation/dimensions (width x height x depth)
800/12AI	55-250V _{ac}	12V _{dc}	0-18V _{dc}	50A	0-50A	700W	Wall /bench 220x112x73
800/24AI	55-250V _{ac}	24V _{dc}	0-36V _{dc}	30A	0-30A	800W	Wall /bench 220x112x73
800/36AI	55-250V _{ac}	36V _{dc}	0-54V _{dc}	20A	0-20A	800W	Wall /bench 220x112x73
800/48AI	55-250V _{ac}	48V _{dc}	0-72V _{dc}	15A	0-15A	800W	Wall /bench 220x112x73
800/72AI	55-250V _{ac}	72V _{dc}	0-108V _{dc}	10A	0-10A	800W	Wall /bench 220x112x73
800/96AI	55-250V _{ac}	96V _{dc}	0-144V _{dc}	7,5A	0-7,5A	800W	Wall /bench 220x112x73

*) Cable sets with modular connectors are included: 1,5 m cable for analog control

**) Reduced power 55...200Vac, see curves; max 600W when used with DC input

Models with power failure output relay (24V models as type designation example)		
Model	Option description	Cable set, sold separately
800/24H	Trimmer adjustable model with power failure alarm relay	1,5 m, modular connector
800/24AIH	Analog controllable model with power failure alarm relay	Analog + relay cables
800/24TH	Temperature compensated model with power failure alarm relay	Temp. comp + relay cables

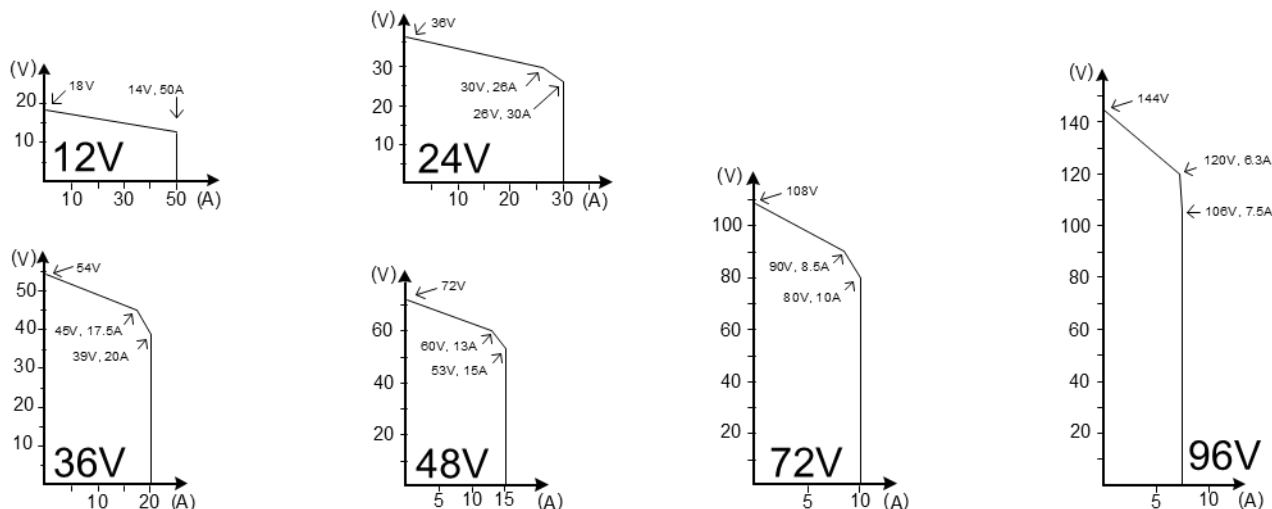
Master-slave connection (24V models as type designation example)	
Master units ***)	Slave units
PAP800/24, PAP800/24AI or PAP800/24T	PAP800/24S RS232 control bus in/out
Control to slave via RS232 bus	PAP800/24SH slave unit with relay, RS-232 bus in only
Cable set for master slave connection included in slave unit type number, 0,6 m modular connectors at both ends	

***) Master unit or slave with RS232 bus output cannot include the alarm relay

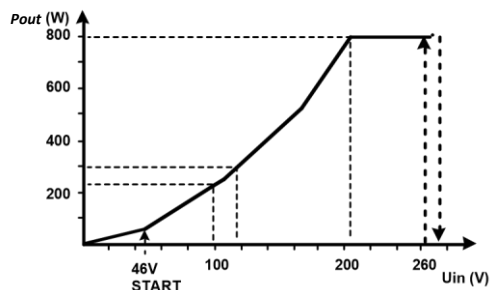
Customized versions on request

- Cyclic battery chargers or customized charging curves for all kind of batteries
- Sense models

Characteristics



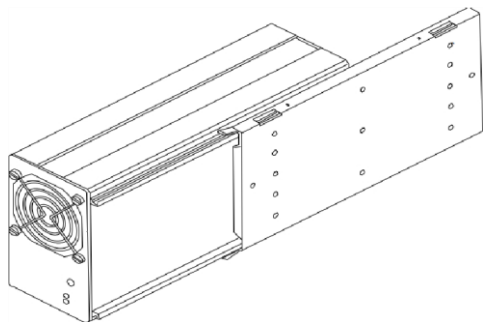
Typical output current/voltage characteristics



Output power / input voltage de-rating characteristic (see power limitation and start-up at DC-input).

Installation

1. The location must be dry, dust-free and indoor. The acceptable full power temperature range is 0°C...+45°C. Higher ambient temperature will limit the power. The power supply is not waterproof. Keep it dry and away from areas with high humidity to avoid the risk for electrical shock and damages to the charger.
2. Equipment must be connected to an earthed input socket-outlet.
3. The power supply can be installed horizontally or vertically. In case the power supply is mounted vertically with the cable plate downwards then installation area needs to be in a RESTRICTED ACCESS LOCATION and unit to be mounted on a concrete floor or other non-combustible surface. Vertical mounting is prohibited in case this condition cannot be met.
4. Leave at least 10 cm free space at both ends of the power supply to ensure sufficient ventilation.
5. When used as a charger, the charging process generates explosive hydrogen gas. Keep the area well ventilated. Never use an open flame or equipment that produce sparks close to the power supply and battery.



Wall mounting

Screw the assembly board to the wall using the mounting holes in the back of the board. Next, place the power supply to the assembly board and fasten it by using the small screws on the sides of the board.

Charging operation

1. Ensure that the power supply is switched off and that the environment meets the conditions as described in the previous section.
2. Connect the output cables to the load / battery terminals: + cable to the + terminal and – cable to the – terminal
3. Turn the power on by turning the switch to position 1.
4. During normal power supply operation / charging process, the STATUS LED will light continuous orange.
5. To avoid sparking, turn off the power supply before disconnecting the cables.

DC Input connection

The power supply input cable is connected as follows:

L	negative or positive DC supply input
N	positive or negative DC supply input
PE	protective earth (required)

The socket outlet shall be installed near the equipment and shall be easily accessible. Maximum 10 A maximum rating of protective device required in building installation. When having unearthed DC input, 2 fuses or 2 pole circuit breakers required in building installation.

Output voltage and current limit adjustment

Trimmer or analog control adjustable modules, type example PAP800/24 or PAP800/24AI:

The output voltage and output current limit of the power supply can be adjusted as follows:

- Trimmer adjustable models: with the multi-turn potentiometers accessible from the front panel.
- Analog controllable models by an external 0-5 V_{DC} voltage. See detailed description on page 7

Both voltage and current can be adjusted from zero to the maximum value. Maximum 800W output power is available within the adjustment range.

Temperature compensated models, type example PAP800/24T:

The power supply includes 16 pre-programmed output voltages that are set by the code switch. See the setting table for this unit. Any of these 16 different voltage settings can be taken in use and additionally be adjusted within ±5% using the trimmer on the front panel. See the instructions for choosing the programmed voltage and the fine-tune adjustment.

LED

An orange LED indicates a healthy power supply output voltage.

Overcurrent protection

The output of the power supply is protected against overcurrent and short circuit by an automatic, self-resetting electronic current limiter.

Series/parallel connection

Parallel operation: No restrictions, passive load sharing

Series operation: Up to 500 V total voltage

Warning

Dangerous voltages, capable of causing death are present in the power supply. Do not remove the cover. There are no operator serviceable parts inside the unit. Refer servicing to qualified service personnel only.

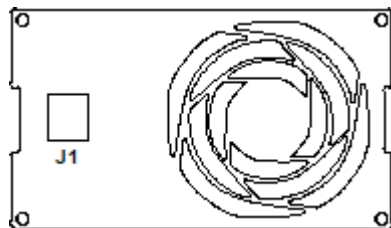
Charge lithium batteries only with appropriate BMS (Battery Management System).

Option selection table

Devices have output connectors J8, J5 and J6 for option purposes. Some of the options are alternative and cannot be assembled at the same time. Columns in following table show which options can be assembled same time.

	Code switch	Field presettable	Analog	Temperature measurement	Sense	LED	Bus OUT	Bus IN	Relay	Processor controlled relay
Code switch	•			•	•	•	•	•	•	•
Field Presettable		•			•	•	•		•	•
Analog control			•		•	•	•		•	•
Temperature measurement	•			•	•	•	•		•	•
Sense	•	•	•	•	•	•	•	•	•	•
External LED	•	•	•	•	•	•	•	•	•	•
Bus OUT	•		•	•	•	•	•	•		
Bus IN	•				•	•	•	•		
Relay	•	•	•	•	•	•			•	
Processor controlled relay	•	•	•	•	•	•				•

Modular connectors



Front panel

J1 Analog input 0...5 V_{DC}. Option: M



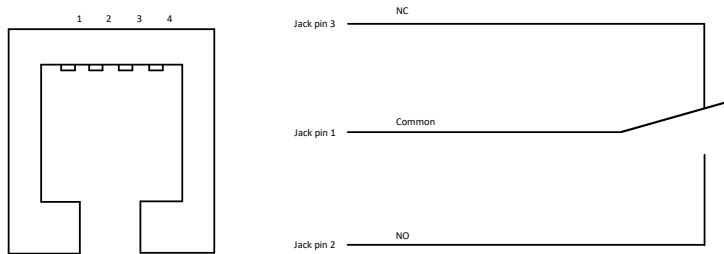
Rear panel

J8 Options: O, R, D, 6
J5 Options: T, S, I
J6 Options: L

Alarm relay models

On models with an alarm relay, the alarm relay output indicates whether the output voltage is healthy or not. The alarm signal is activated in case of an AC failure or charger failure. Both normally closed signals and normally open contacts are available.

Pin configuration, modular connector J8 with alarm relay option



Cable

Black = common
Red = NO
Green = NC

Relay

Isolation:
Output to case: 500 V
Output to GND: 120 V

Technical data:

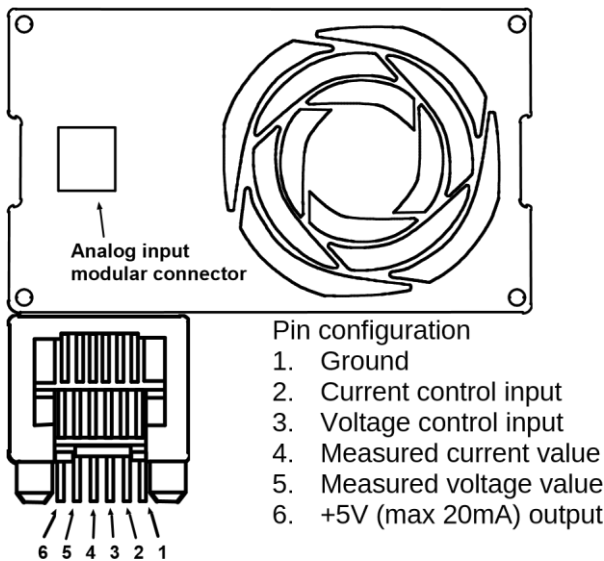
1 A@24 V_{DC}
0,5 A@120 V_{DC}

Common is connected to NC when the power is switched **off**.
Common is connected to NO when the power is switched **on**.

Analog control and master-slave connection

The optional analog control allows full control of the output current and voltages and it provides the measured values of both. A +5 V supply power is available for the supply of the control logic. The analog input has an isolation value of 500 V towards the input and output of the power supply.

The master-slave bus cables are connected from the master unit to the slave units as shown in the picture.

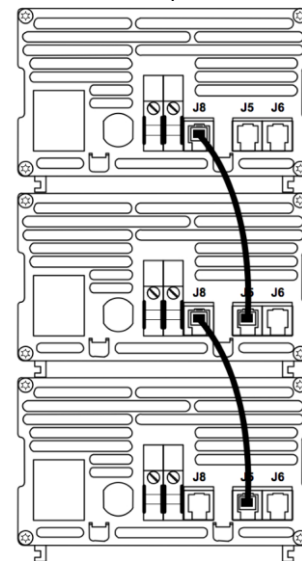


Master-slave connections. The first unit must be used as master unit. The number of slaves is unlimited.

Master

Slave

Slave



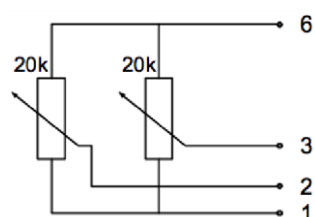
Pin configuration of the modular connector J1. The analog control card is connected via an AMP Modular 6 connector.

Controlling the analog card

All control voltages must be between 0 and +5 V, Higher voltages are not allowed. The control logic is positive, so that a +5 V control voltage gives a maximum value from the power supply, while 0V means minimum output. As soon the control connector is unplugged from the modular connector, the power supply is reset to the minimum output values.

The measured values can be read from the measurement signals. The measured values are scaled equal to the target values. If the power supply is set to the voltage reference, the measured value must be equal to the target. The same counts for the current control and its measured value. Measured signals (both together) can be loaded with max 20mA; otherwise proper operation cannot be guaranteed.

The modular connector is isolated from the input, output and enclosure of the power supply. This enables the possibility to parallel or series connect several power supplies maintaining equal voltages. The number of connected devices is not limited. The 500 V insulation voltage may, however, not be exceeded. This manual cannot be applied in case the connector of the analog card differs from a modular connector (9-pin D-connector). In that case it is an incompatible analog controlled power supply.



6 Connecting example using the internal +5 V_{DC} supply and external potentiometers.

The +5 V can be used as a supply for external circuits. The circuit given to the left, lets the power supply operate as a potentiometer-controlled device. It is important to keep in mind that the +5 V output may not be loaded more than 20 mA, otherwise proper operation cannot be guaranteed.