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 **ADVANCE  
POWER SUPPLIES**  
A Farnell Electronics Company



**Advance P1000  
5-output  
power supplies**

# Advance P1000 5-output power supplies

Advance P1000 products are modular multi-output power supplies that offer up to five fully regulated outputs delivering a total output power of 1000W when powered from either a nominal 220V ac or 110V ac. The main output of 5V at 150A is common to all models in the range. Auxiliary outputs may be selected from a menu to provide the other power requirements of a user's system.

Power trading (sharing) is a feature of P1000 units, and the well-proven technique of magnetic amplifiers to regulate outputs obviates the necessity for a minimum load to be applied to the main output. Their use also minimises interaction between outputs. A soft start circuit inhibits any major surge at switch-on thus leading to an enhanced and reliable service life in OEM equipment.

The units are fan-cooled (internally mounted producing a rear to front airflow\*) and housed in an industry standard 8"×5"×11" box. RFI filtering to VDE 0871 Curve A (BS 800) is standard, as are creepage and clearance distances to VDE 0806 and IEC 435.

This family of power supplies is ideally suited to medium and large system builders. A package of signals is available as an optional extra that enables the system designer to command a substantial degree of control within the system. The signals include:

- All outputs up
- Remote inhibit
- Remote margin switching on main output
- Power fail
- Early temperature rising warning

This set of signals and the current share option between units on the main output, coupled with the Advance history and reputation of dependable, reliable power supplies means that with the P1000 the system designer has at his disposal a valuable tool to ensure the integrity of his system power needs.

\*Front to rear airflow available to special order. Please consult technical sales.

## Specification (Typical at 25°C)

### Input Voltage

Dual input-user selectable  
88-132V ac (110V ac  $\pm 20\%$ )  
176-264V ac (220V ac  $\pm 20\%$ )  
selected by a link on the front panel.  
Will also operate between 250 and 370Vdc on 220V Tap.  
These units are internally fused.

### Input Frequency

45-440 Hz

### Input Current

At full output power of 1000W  
Input Volts      88V   132V   176V   264V  
rms                    20A   14A   10A   7A  
repetitive peak    50A   30A   25A   18A  
switch-on peak    <15A   <30A

### Output Power

1000W continuous at up to 50°C ambient

### Output Voltages

**Main Output**  
5V dc at 150A  
(Adjustable  $\pm 0.5V$ )

**Auxiliary Outputs**  
Up to four auxiliary outputs may be fitted, chosen from the following table.

Output Voltage	Output Current
5V (adjustable 4-6V)	15A
12V (adjustable 9-15V)	15A
24V (adjustable 18-26V)	8A
48V (adjustable 45-50V)	5A

### Operating Temperature

0°C-70°C. De-rating from 50°C to 70°C @ 2½%/°C

### Temperature Coefficient

Less than  $\pm 0.02\%/^{\circ}C$ .

### Efficiency

> 70% at full load

### Switch-on Surge

Electronic soft start circuit limits switch on surge to 30A peak max.

### Ripple & Noise

(Measured differentially with a 30 MHz band width)  
Main output: <1%  
Auxiliary outputs: <1.5% or 100mV whichever is greater

### Total Regulation

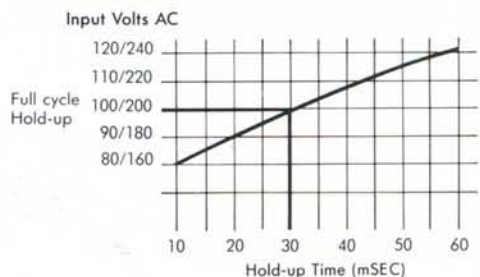
(Including line, load and cross-regulation)  
Main output: <0.5%  
Auxiliary outputs: <1.5%

### Dynamic Response

A step change of  $\pm 25\%$  in the band 10%-90% of rated load will produce a maximum deviation of less than 5% at the output terminals. Output will recover to within the regulation band in less than 400  $\mu$ S.

### Hold-up (at full load)

Hold-up time measured for outputs to remain within regulation limits, after last line voltage peak.



### Protection

#### (1) Current Limit

Constant current on all outputs, factory set 105% to 115%. Re-entrant, current trip options available.

#### (2) Overvoltage

Overvoltage protection is standard on all outputs. The inverter is shut down with latch. Recycle mains to reset.

### (3) Overtemperature

Units shut down when internal temperature exceeds maximum safe levels.

### Remote Sense

Front panel terminals are provided for all outputs, to permit sensing remotely at loads for outputs rated above 5A. Maximum total cable drop for each output is 0.5V.

### Remote Programming

The output voltage of all outputs rated above 5A may be programmed in one of two ways.

#### (1) Resistor Programming

A resistor connected between the voltage programming terminal and -Sense will programme the output voltage according to the relationship.

$$V_{\text{out}} = V_{\text{set}} \frac{R}{10,000}$$

where  $V_{\text{set}}$  = set output voltage  
 $R$  = programming resistor in ohms.

#### (2) Voltage Programming

A control voltage of 0-1V applied to the programming terminal and -Sense will control the output voltage from minimum output voltage to maximum set output voltage (100%). Output voltage will be directly proportional to input control voltage.

All outputs may be programmed down to 0.5V. Each output to be programmed will require a minimum load to guarantee regulation.

The main output requires 0.5A and the auxiliaries require 0.1A.

### RFI

Units meet the requirements of VDE 0871/78 Curve A, BS800/1977 and FCC document 20780 part 15J.

### Storage Temperature Range

-25°C to +85°C.

### Insulation

All units are tested at 2500V rms input to

output for one minute as per VDE 0806 (0730) (input to chassis 2000V rms and output to chassis 500V rms simultaneously).

### Safety Standards and Approvals

P1000 units are designed to comply with the requirements of UL 478, CSA 22.2-143, CSA 22.2-154, VDE-0806, IEC 380 and IEC 435. Formal approvals are presently in application.

### Weight

With full complement of Main output and four auxiliary modules 8.4kg (18.5lbs).

### Signals and facilities

The following package of signals and facilities is available as an optional extra. The connections are brought out to a 10-way and 6-way connector on the front panel of the unit.

#### (1) Signal Negative

The signals package is provided with its own negative connection. This must be joined to the negative terminal of the main output somewhere in the user's system providing an accurate remote signal and input system.

Logic level: logic 1 = 5V.

#### (2) 'Outputs Up' Signal

Goes from logic 1 to logic 0 if any of the outputs fall to below 90% of nominal or if the inverter fails. Since this signal also detects an inverter failure, it is suitable for use on units with their main outputs paralleled up (i.e. if any unit fails, the 'output up' signal will signal a fault although all output voltages will be correct due to the paralleling).

#### (3) 'System Inhibit' Input Low

Shuts down the inverter and all outputs if logic 0 is applied. Outputs return on applying logic 1, but a delay of approximately 1 second is incurred.

#### (4) 'System Inhibit' Input High

Shuts down the inverter and all outputs if

logic 1 is applied. Outputs return on applying logic 0, but a delay of approximately 1 second is incurred.

#### (5) Mains Low

This signal is logic 0 if the dc reservoir voltage falls below a predetermined level.

#### (6) Early temperature warning

Goes from logic 1 to logic 0 when the overtemperature is about to trip. Gives the user a chance to investigate the cause of overtemperature (such as a blocked fan intake).

#### (7) Margin Switching

Changes the main output by  $\pm 5\%$  of nominal. Three-wire system suitable for a simple changeover switch (centre-off for nominal). See also voltage programming.

#### (8) Current Share — Main Output

A direct connection from unit to unit to achieve current sharing between paralleled main outputs. The units can be made to current share by interconnecting all current share terminals with a single wire link. The units will automatically adjust their own output voltages to be equal to the unit with the highest output voltage. The current of each unit will be equal to

$$\frac{I_{\text{total}} \pm 10\%}{n}$$

where  $I_{\text{total}}$  = total output current  
 $n$  = total No. of units.

#### (9) Uncommitted Logic Inverter

For the customer to invert our signals or his commands as necessary. Permissible output load 4mA source or sink. See dimensional drawings for signal pin connections.

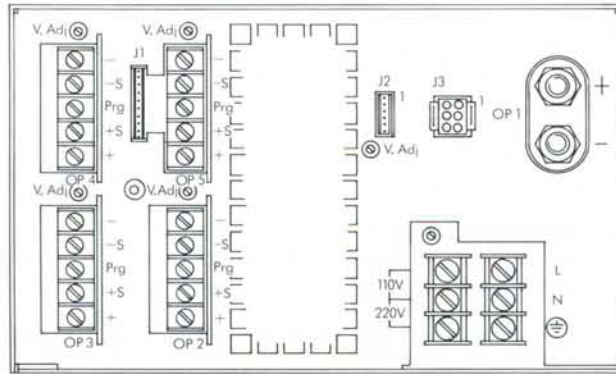
Advance Power Supplies Ltd. reserve the right to amend or alter specifications at any time and without notice.

### Dimensions

All dimensions in mm (inches in brackets).

J2 MAIN OUTPUT	
J2.1	+SENSE
J2.2	EXTERNAL PROGRAM
J2.3	CURRENT SHARE
J2.4	<del>-SENSE</del> I SHARE
J2.5	-SENSE
J2.6	-SENSE

J1 OPTIONAL SIGNALS CARD	
J1.1	LOGIC INVERTER INPUT
J1.2	LOGIC INVERTER OUTPUT
J1.3	MARGIN LOW
J1.4	MARGIN HIGH
J1.5	MAINS LOW
J1.6	EARLY TEMPERATURE WARNING
J1.7	SYSTEM INHIBIT INPUT LOW
J1.8	SYSTEM INHIBIT INPUT HIGH
J1.9	OUTPUTS UP
J1.10	SIGNAL NEGATIVE



J3 MAIN OUTPUT	
J3.1	+SENSE
J3.2	<del>-SENSE</del> I SHARE
J3.3	OUTPUTS UP
J3.4	-SENSE
J3.5	MAINS LOW
J3.6	SYSTEM INHIBIT-INPUT LOW

