

# Uninterrupted Power Supply (UPS)

PRODUCT CODE (ASICC)	: 77554
QUALITY AND STANDARDS	: As per customer's specification.
PRODUCTION CAPACITY	: Qty. : 900 Nos. (per annum) (600 Nos. 1KVA+300 Nos. 500VA) Value : Rs 42,30,000 (Rs. 36 lakhs and Rs. 6.3 lakhs)
YEAR OF PREPARATION	: 2002-2003
PREPARED AND UPDATED BY	: Small Industries Service Institute Bamunimaidan, Guwahati -781021 And Office of the Development Commissioner (Small Scale Industries), Electronics and Electrical Division, 7th floor, Nirman Bhavan, New Delhi-110011

## INTRODUCTION

The uninterrupted power supply (UPS) unit is used as stand by power supply during interruption of regular power supply due to load shedding, power failure, power fluctuations etc. The UPS provides a reliable and stable power to the equipments/systems sensitive to power variations and interruptions. It functions as voltage stabilizer and at the same time it isolates the equipment/systems from the power lines.

The UPS finds wide applications as a reliable power source to computer, telex and fax system and where continuous regular and stable power supplies are required. The major users of UPS are the industries, business houses/establishments, hospitals, banks, offices, cinema theatres, railway stations and hotels etc.

The UPS consists of a battery charger,

an inverter, output transformer, a set of batteries, control circuits and transient/EMI filters.

The on-line UPS provides a conditioned output voltage when the power is on and charges the battery through the battery charger. The control circuits of UPS automatically switch over to the inverter and supply power from the batteries during power interruption/failure. The change-over from mains to the battery and back to the mains supply is done automatically by the control circuits. The modern UPS employs MOSFET based inverter and pulse width modulators techniques and static switches.

## MARKET POTENTIAL

There is a huge market prevailing for UPS in both on-line and off-line categories in view of fast pace of the

industrialization together with the computerization . Hence, there is a large demand of UPS in the process industries, hospitals, banks, offices, cinema theatres, airports, railway stations, hotels and computer installations. The computerization in both the Government and private sector has lead to the growth of UPS market. Besides, UPS growth is also expected due to price reduction of UPS technological advancement, large replacement market, deteriorating power situation. Instrumentation which is generally computer based also need UPS to avoid complications arising due to power break-down.

There are about 200 units in small scale sector manufacturing UPS besides 10-15 units in the organized sector. The small scale units generally are concentrating on UPS below 50 KVA range. The UPS has a large Market Potential in the coming years.

### BASIS AND PRESUMPTIONS

- i) The basis for calculation of production capacity has been taken on single shift basis on 75% efficiency.
- ii) The maximum capacity utilization on single shift basis for 300 days a year. During first year and second year of operations the utilization is 60% and 80% respectively. The unit is expected to achieve full capacity utilization from the third year onwards.
- iii) The salaries and wages, cost of raw materials, utilities, rents, etc. are based on the prevailing rates in and around Guwahati. These cost factors are likely to vary with time and location.

- iv) Interest on term loan and working capital loan has been taken at the rate of 16% on an average. This rate may vary depending upon the policy of the financial institutions/agencies from time to time.
- v) The cost of machinery and equipments refer to a particular make/model and prices are approximate.
- vi) The break-even point percentage indicated is of full capacity utilization.
- vii) The project preparation cost etc. whenever required could be considered under pre-operative expenses.
- viii) The essential production machinery and test equipment required for the project have been indicated. The unit may also utilize common test facilities available at Electronics Test and Development Centres (ETDCs) and Electronic Regional Test Laboratories (ERTLs) set up by the State Governments and STQC Directorate of the Department of Information Technology, Ministry of Communication and Information Technology, to manufacture products conforming to Bureau of Indian Standards.

### IMPLEMENTATION SCHEDULE

The major activities in the implementation of the project has been listed and the average time for implementation of the project is estimated at 12 months:

Sl. No.	Name of Activity	Period in Months (Estimated)
1.	Preparation of project report	1
2.	Registration and other formalities	1
3.	Sanction of loan by financial institutions	3
4.	Plant and Machinery:	
	(a) Placement of orders	1
	(b) Procurement	2
	(c) Power connection/ Electrification	2
	(d) Installation/Erection of machinery/Test Equipment	2
5.	Procurement of raw materials	2
6.	Recruitment of Technical Personnel etc.	2
7.	Trial production	11
8.	Commercial production	12

#### Notes

1. Many of the above activities shall be initiated concurrently.
2. Procurement of raw materials commences from the 8th month onwards.
3. When imported plant and machinery are required, the implementation period of project may vary from 12 months to 15 months.

### TECHNICAL ASPECTS

#### Process of Manufacture

The incoming raw material and components are tested for required quality and specifications. The components are formed, shaped and soldered on pre-designed printed circuit boards. The assembled printed circuit boards are tested for desired performance. The PCB's and transformer and other electro-mechanical components are mounted

inside the enclosure, electrical wiring is made. Switches, knobs etc. are fixed to the enclosure. The UPS system is tested for required specification by using batteries.

#### Quality Control and Standards

	1KVA	500VA
Input	150-270	150-270
Output	190-255 V (mains/ battery mode)	190-255 V (mains/ battery mode)
Battery	External 2×12 V/65AH	Internal Built Up
Backup Time	2 to 3 Hours	15-20 Minutes
Overall Efficiency	> 80%	> 80%

#### Production Capacity (per annum)

Quantity :	900 Nos. (600nos. 1KVA + 300 nos. 500VA)
Value :	Rs. 42,30,000 (Rs. 36 lakhs and Rs. 6.3 lakhs)

Motive Power 10 KVA (Approx.)

#### Pollution Control

The Govt. accords utmost importance to control environmental pollution. The small-scale entrepreneurs should have an environmental friendly attitude and adopt pollution control measures by process modification and technology substitution.

India having acceded to the Montreal Protocol in Sept. 1992, the production and use of Ozone Depleting Substances (ODS) like Chlorofluoro Carbon (CFC), Carbon Tetrachloride, Halons and Methyl Chloroform etc. need to be phased out immediately with alternative chemicals/ solvents. A notification for detailed Rules to regulate ODS phase out under the Environment Protection Act, 1986 have

been put in place with effect from 19th July 2000.

The following steps are suggested which may help to control pollution in electronics industry wherever applicable:

- i) In electronic industry fumes and gases are released during hand soldering / wave soldering/Dip soldering, which are harmful to people as well as environment and the end products. Alternate technologies may be used to phase out the existing polluting technologies. Numerous new fluxes have been developed containing 2-10% solids as opposed to the traditional 15-35% solids.
- ii) Electronic industry uses CFC, Carbon Tetrachloride and Methyl Chloroform for cleaning of printed circuit boards after assembly to remove flux residues left after soldering, and various kinds of foams for packaging.

Many alternative solvents could replace CFC-113 and Methyl Chloroform in electronics cleaning. Other Chlorinated solvents such as Trichloroethylene, Perchloroethylene and Methylene Chloride have been used as effective cleaners in electronics industry for many years. Other organic solvents such as Ketones and Alcohols are effective in removing both solder fluxes and many polar contaminants.

### Energy Conservation

With the growing energy needs and shortage coupled with rising energy cost, a greater thrust in energy efficiency

in industrial sector has been given by the Govt. of India since 1980s. The Energy Conservation Act, 2001 has been enacted on 18th August 2001, which provides for efficient use of energy, its conservation and capacity building of Bureau of Energy Efficiency created under the Act.

The following steps may help for conservation of electrical energy:

- i) Adoption of energy conserving technologies, production aids and testing facilities.
- ii) Efficient management of process/manufacturing machineries and systems, QC and testing equipments for yielding maximum Energy Conservation.
- iii) Optimum use of electrical energy for heating during soldering process can be obtained by using efficient temperature controlled soldering and desoldering stations.
- iv) Periodical maintenance of motors, compressors etc.
- v) Use of power factor correction capacitors. Proper selection and layout of lighting system; timely switching on-off of the lights; use of compact fluorescent lamps wherever possible etc.

## FINANCIAL ASPECTS

### A. Fixed Cost

(i) Land and Building	
Built-up Area	300 Sq.Mts.
Assembly, testing and stores	250 Sq.Mts.
Office	50 Sq.Mts.
Rent payable per annum	Rs. 48,000

## (ii) Machinery and Testing Equipments

Sl. No.	Particulars	Qty. (Nos.)	Imp/Ind.	Total (Rs.)
1.	Oscilloscope (0 - 50 Mhz)	1	Ind.	50,000
2.	LCR-Q Meter	1	Ind.	13,000
3.	Power Supplies (0 - 30V, 3 Amp)	2	Ind.	20,000
4.	4½ Digit Digital Multimeter	2	Ind.	20,000
5.	Analog Multimeter	3	Ind.	18,000
6.	Auto Transformer	1	Ind.	4,000
7.	Rheostats	8	Ind.	15,000
8.	High Voltage Breakdown Tester	1	Ind.	35,000
9.	Testing Setup (consists of voltmeter, Ampmeter, Wattmeter and Lead Batteries)	1 Set	Ind.	15,000
10.	Insulation Tester	1	Ind.	5,000
11.	Electrification Charges @ 10% of Cost of Machinery and Equipment			19500
12.	Tools, Jigs, Fixtures		Ind.	20,000
13.	Office Equipment and Furniture			40,000
(iii) Pre-operative Expenses				10,000
Total Fixed Capital				2,84,500
or Say				2,85,000

## B. Working Capital (per month)

## (i) Staff and Labour

Sl. No.	Designation	Nos.	Salary (Rs.)	Total (Rs.)
1.	Manager	1	5,000	5,000
2.	Supervisor	1	3,500	3,500
3.	Clerk/Typist	1	2,500	2,500
4.	Peon	1	1,500	1,500
5.	Watchman	1	1,500	1,500
6.	Skilled Workers	3	2,000	6,000
7.	Semi-Skilled Workers	4	1,500	6,000
Total				26,000
Add Perquisites @ 15% of				3,900
Total				29,900
or Say				30,000

## (ii) Raw Material Requirements (per month)

Sl. No.	Particulars	Price/Unit (Rs.) 1 KVA—500VA
1.	Ics, Thyristor, Diodes, Displays, Mosfet etc.	650 — 300
2.	Resistors, Capacitors, Varister, Presets, Potentiometer etc.	300 — 100
3.	Transformers	1300 — 300
4.	Printed Circuit Boards	800 — 300
5.	Relays and Coils	175 — 75
6.	Electro-Mechanical Components like Connectors, Switches, Buttons/Knobs etc.,	300 — 50
7.	Cables and Wires	100 — 75
8.	Enclosure	200 — 125
9.	Consumables (Solder, Flux, Printing Material)	175 — 50
10.	Battery	No — 325
Total		4,000 — 1,700

Cost of Raw Materials Rs. 2,00,000–42,500 for 75 Nos.

Cost of Raw Materials for 75 Nos. Rs. 2,42,500

(50 nos. of 1KVA+25 nos. of 500VA) or Say Rs. 2,43,000

**Note:**The quality and quantity of raw material requirement vary with design and features of the UPS.

## (iii) Utilities (per month)

	(Rs.)
Power	2,500
Water	500
Total	3,000

## (iv) Other Contingent Expenses (per month)(Rs.)

Rent	4,000
Postage and Stationery	1,000
Repair and Maintenance	1,000
Telephone	1,000
Transport Charge	2,500
Advertisement/Publicity	3,000
Insurance	500
Miscellaneous Expenses	2,000
Total	15,000

(v) Total Recurring Expenditure Rs. 2,91,000  
(i + ii + iii + iv)

### C. Total Capital Investment

(a) Fixed Capital	Rs. 2,85,000
(b) Working Capital for 3 months	Rs. 8,73,000
<b>Total</b>	<b>Rs. 11,58,000</b>

### FINANCIAL ANALYSIS

#### (1) Cost of Production (per annum) (Rs.)

Total Recurring Expenditure	34,92,000
Depreciation on Plant/Machinery/ Equipment @ 10% p.a.	19,500
Depreciation on Office Equipment/ Furniture @ 20% p.a.	8,000
Depreciation on Jigs and Fixtures @ 25%	5,000
Interest on Total Capital Investment @16%	1,85,280
<b>Total</b>	<b>37,09,780</b>
<b>or Say</b>	<b>37,10,000</b>

#### (2) Sales Turnover (per annum) (Rs.)

Uninterrupted Power Supply ( 900Nos.)		
1. 600 nos. 1KVA @Rs. 36,00,000	6,000	each
2. 300 nos. 500VA @Rs. 6,30,000	2,100	each
<b>Total</b>	<b>42,30,000</b>	

(3) Profit (per annum) (Before Taxes) Rs. 5,20,000

$$\begin{aligned} \text{(4) Net Profit Ratio} &= \frac{\text{Profit (per annum)} \times 100}{\text{Sales (per annum)}} \\ &= \frac{520000 \times 100}{42,30,000} \\ &= 12.29\% \end{aligned}$$

$$\begin{aligned} \text{(5) Rate of Return} &= \frac{\text{Profit (per annum)} \times 100}{\text{Total capital investment}} \\ &= \frac{520000 \times 100}{1158000} \\ &= 44.90\% \end{aligned}$$

(6) Break-even Point

#### Fixed Cost (per annum) (Rs.)

Rent	48000
Depreciation on machinery and equipment @ 10 %	13900
Depreciation on tools, jigs and fixtures @ 25%	5000

<b>Fixed Cost (per annum)</b>	<b>(Rs.)</b>
Depreciation on office furniture @ 20%	5000
Interest on total capital investment @ 16%	185280
Insurance and Taxes	6000
40% Salaries and wages	144000
40% other contingent and utilities (excluding rent and insurance)	64800
<b>Total</b>	<b>480580</b>
<b>or Say</b>	<b>480500</b>

B.E.P.

$$\begin{aligned} &= \frac{\text{Fixed cost} \times 100}{\text{Fixed cost} + \text{Profit}} \\ &= \frac{480500 \times 100}{480500 + 520000} \\ &= 48.02\% \end{aligned}$$

### Additional Information

- The Project Profile may be modified/tailored to suit the individual entrepreneurship qualities/capacity, production programme and also to suit the locational characteristics, wherever applicable.
- The Electronics Technology is undergoing rapid strides of change and there is need for regular monitoring of the national and international technology scenario. The unit may, therefore, keep abreast with the new technologies in order to keep them in pace with the developments for global competition.
- Quality today is not only confined to the product or service alone. It also extends to the process and environment in which they are generated. The ISO 9000 defines standards for Quality Management Systems and ISO 14001 defines standards for Environmental Management

System for acceptability at international level. The unit may therefore adopt these standards for global competition.

- (d) The margin money recommended is 25% of the working capital and requirement at an average. However, the percentage of margin money may vary as per bank's discretion.

#### Addresses of Machinery and Equipment Suppliers

1. M/s. Phillips India  
No.7, Justice Chandra Madhab Road,  
Kolkata-700020  
*(Testing and Measuring instruments.)*
2. M/s. International Electronics  
202, Champakalal Industrial Estate,  
105, Sion East,  
Mumbai-400022  
*(Testing and Measuring instruments.)*
3. M/s. Advance Tech Services  
56, 2nd Floor,  
Rani Jhansi Road,  
New Delhi-110055  
*(Soldering Iron and Assembly Tools.)*

#### Addresses of Raw Material Suppliers

1. M/s. Continental Devices India Ltd.

C-120,  
Naraina Industrial Estate,  
New Delhi-110028  
*(Components.)*

2. M/s. Muktagiri Enterprises  
No.10, Manik Chambers,  
3rd Floor, 399-A,  
Lamington Road,  
Mumbai-400004  
*(Soldering Iron and Assembly Tools.)*
3. Elco Instruments Transformer and Coil.  
4/1, Madan Street,  
Kolkata-700072  
*(Transformer and Coil.)*
4. Avomech Commercial (I) Pvt. Ltd.  
2- A & B, Bright Apartments,  
7, Bright Street,  
Kolkata-700019  
*(Relays.)*
5. Golden Industrial Company  
74, Bentinck Street,  
1st Floor,  
Kolkata-700001  
*(Electro-mechanical Components)*
6. Calcutta PCB Printers  
51/3-A, Kalipara,  
Mukherjee Road,  
Kolkata-700008  
*(Printed Circuit Boards.)*