

Distribution Board

PRODUCT CODE (ASICC)	77308
QUALITY AND STANDARDS	IS 8623:1977 IS 2675:1983
PRODUCTION CAPACITY	Qty.: 600 Nos. (per annum) Value Rs. 75,00,000
YEAR OF PREPARATION PREPARED BY	2002- 2003 Small Industries Service Institute Vikas Sadan College Square Cuttack - 753003 and Office of the Development Commissioner Small Scale Industries Electrical and Electronics Division 7th Floor, Nirman Bhavan, New Delhi - 110 011.

Introduction

The Distribution Board, refers to an equipment which consists of bus bars, and possible switches, fuse links and Automatic protective equipment, bypass equipment, for connecting, controlling and protecting a number of branch circuits fed from one main circuit of a wiring installation in a building or premises for easy and safe handling of incoming power supply. These are, also used to protect the electrical distribution system in turn, connected electrical equipment from being damaged due to various faults like short circuit, over load, earth leakage, etc.

The Conductor system by means of which electrical energy is conveyed from bulk power source or sources to the consumers is known as distribution system, which may be divided into two systems known as high voltage (primary) distribution and low voltage (secondary distribution). From generating stations the Electrical Power is usually transmitted to various Sub- stations, through extra high tension transmission lines at voltages from 33 to 220 kV and at these Sub-stations this voltage is stepped down to 11 or 6.6 or 3.3 kV and power at this voltage is conveyed to different sub-stations for distribution and to the bulk supply consumer.

Similarly at distribution Sub-stations the voltage is stepped down to 400 volts. From these Sub-stations various low voltage (400 volts between phases and

230 volt between phase and neutral) distributed and radiated out to feed the consumer. This system of distribution of power is known as low voltage or secondary distribution system.

The distribution system is classified in many ways i.e. according to current A. C. or D. C. distribution, or according to the character of service i.e. it may be: (i) General light and power, (ii) Industrial Power, (iii) Railway (iv) Street lights etc. and according to number of wire, i.e.: (i) two wire, (ii) three wire and (iii) four wire etc. But now a days AC distribution system almost universally employed.

The choice of the system of power distribution is determined by the type of power that is available and by the nature of the load required for particular user i.e.:

1) Distribution Board 2-Way 15 A,

250 V

2) Distribution Board 2-Way 15 A,

250 V

3) Distribution Board 4-Way 50 A,

440 V etc.

Market Potential

The Distribution Boards, by virtue of being a functionally integral part of any distribution system have vast opportunities of demand. India is a developing country with a fast growing population and the economic growth of the country and the demand for any essential item grows as a function of population. Electrical power demand also grows as a function of population and commensurately the infrastructural requirement in the power sector grows. Our present generation capacity is about 1,05,000 MW but projected demand by 2012 is 2,05,000

MW that means an extra 1,00,000 MW has to be produced to meet the demand. This phased increase in the power generation and transmission and distribution has by itself, necessitated increased production of electrical equipment, thereby creating a good scope for the electrical equipment and distribution boards.

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 capacity 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 Cuttack. 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 14% 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) and Regional Testing Centres (RTCs).

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:

<i>Sl. No.</i>	<i>Activity</i>	<i>Period (In Months)</i>
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 distribution boards are sheet metal fabricated enclosures open, semi-closed or totally enclosed type which provide and control, electric power to distribution systems. Provision for indicating the parameters like voltage, current frequency per unit will be reflected on the face of the board. Regulation of the power supply is available through switches and MCB's and fault protection through the use of different relays.

The sheet metal enclosure for the control panel is designed and fabricated in the unit. The components and accessories are bought out from the market and fitted as designed in the board. The circuit as per the design is laid out and the board is tested for proper functioning as per relevant standards.

In brief the manufacturing process consists of:

- i) Establishing the requirement and accordingly designing circuit diagram.
- ii) Marking
- ii) Fabricating the Distribution Board - Marking, cutting, and bending of sheet, welding and Grinding and holing.
- iv) Fixing the joint clips
- v) Fixing the frame of battons
- vi) Wiring according to circuit diagram
- vii) Fitting and connecting components/ accessories
- viii) Testing as per relevant specifications/ standards.

Note: In house, wiring meter, fuse and link board should be installed by the Electricity Board.

Quality Control and Standards

The distribution boards are manufactured as per IS 2675:1983 and IS 8623 : 1977 referred for Control Panels, regarding technical aspects and testing requirements. The components and accessories are incorporated confirming to customer's requirement and demand. However, the standard of workmanship and quality of the raw material to be used are the basic needs of quality control. Obtaining ISO Certification can further boost the credibility of the unit concerned.

Production Capacity (per annum)

Qty. Value	(Rs.)
Distribution Boards 600 nos.	75,00,000

of different sizes and types for L.T. Voltage

Motive Power 10 kW.

Pollution Control

The Government 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 September, 1992, the production and use of Ozone Depleting Substances (ODS) like Chlorofluore Carbon (CFCs), 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.

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 Government 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 de-soldering 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 Capital

(i) Land and Building (Rs.)

Land - 5000 sq.ft. with a built up area of 3000 sq.ft. for office and workshop shed- Rented @ Rs. 10,000 month

(ii) Machinery and Equipments

Sl.	Description	Ind./	Qty.	Value
No.		Imp.		(Rs.)

1.	Guillotine shearing machine 1200 mm	Ind.	2	30,000
2.	Sheet Bending Machine	-do-	2	36,000
3.	Bench Drilling Machine 1/2" dia	-do-	1	10,000
4.	Portable Grinding Machine	-do-	1	3,500
5.	Gun drilling machine	-do-	1	3,000
6.	Arc welding Transformer with accessories	-do-	1	12,000
7.	Gas Welding set	-do-	1	5,000
8.	Bench Grinder 200 mm dia	-do-	2	5,000
9.	Hand Shearing Machine	-do-	1	3,000
10.	Air compressor with spray paint equipment	-do-	1	12,000
11	. Fly Press No. 8	-do-	1	6,000

12.	Vice	-do-	3	18,000
13.	Coil winding machine (hand operated)	Ind.	1	4,000
14.	Hand Tools and Measuring instruments	-do-	LS	10,000

Total 1,57,500

Testing Equipments

Sl. No.	Description	Ind./ Imp.	Qty.	Value (Rs.)
1.	HV Tester 5 kV	Ind.	1	6,000
2.	Megger 500/1000 V, DC	-do-	1	2,000
3.	Multimeter	-do-	2	4,000
4.	Voltmeter (0-1000 VDC)	-do-	1	1,500
5.	Ammeter (0-25 Amp) range	-do-	1	1,500
6.	Loading Rheostat (0-25 Amrs)	-do-	3	4,500
7.	L.C.R. Bridge	-do-	1	8,000
Total				27,500

Furniture

Sl. Description No.	Qty.	Value (Rs.)
1. Working Tables	3 sets	9,000
2. Office furniture and equipment	L.S.	15,000
Total		24,000
<i>Electrification and Installation Charges @ 10% of Cost of Machinery and Equipment</i>		15,750
(iii) Pre-Operative Expenses		Rs. 5,000
Total Fixed Capital		Rs. 2,29,750
Say		2,30,000
B. Working Capital (per month)		

(i) Personnel

Sl. Designation No.	No.	Salary (Rs.)	Total (Rs.)
1. Manager/Engineer	1	5,000	5,000
2. Supervisor	1	3,000	3,000
3. Skilled Worker	3	2,500	7,500
4. Un-skilled worker	4	2,200	8,800
5. Welder	1	2,500	2,500
6. Store keeper/ Office Accountant	2	2,500	5,000
7. Peon/Watchman/ Helper	4	2,000	8,000
Total			39,500
<i>Perquisite @ 15% of salaries</i>			5,925
Total			45,425

(ii) Raw Material (per month) (for 50 Sets)

Sl. Description No.	Qty	Price (Rs.)	Total (Rs.)
1. M.S. Sheet	3.5 MT	@20,000	70,000
2. M.S. Angles flats channels	1.5 MT	@ 14909	22,363
3. Instruments and Accessories per set	50 sets	5,000	2,50,000
4. Terminal strips, bus bar strips, fuse units	LS	-	50,000

(kit-kat), MCB's cut outs, Relays			
5. Hard ware item like bolts, nuts, nails, hinges, springs, circle sockets, screws, round blocks, etc.	LS	-	10,000
6. Consumable i.e. welding rods, paints etc.	LS	-	10,000
7. Wiring materials, insulating materials	LS	-	10,000
Total			4,22,363

(iii) Utilities (per month) (Rs.)

1) Power	8,400
2) Water	500
Total	8,900

(iv) Other Contigent Expenses (per month)

Sl. Item No.	Amount (Rs.)
1. Rent	10,000
2. Postage, stationery and telephone	2,000
3. Transportation	3,000
4. Insurance	2,000
5. Advertisement/publicity	2,000
6. Consumables	1,000
7. Miscellaneous Expenses	2,000
Total	22,000

(v) Total Recurring Expenditure (Rs.) 4,98,688

Say 5,00,000

(vi)

Working Capital (for 3 months)

5,00,000 x 3 = **15,00,000**

C. Total Capital Investment

a) Fixed Capital	2,30,000
b) Working Capital for 3 months	15,00,000
Total	17,30,000

Financial Analysis

(1) Total Cost of Production (per year)	(Rs.)
Total recurring expenditure	60,00,000
Depreciation/rent of building	1,20,000
Depreciation on machinery and equipment @ 10%	18,500
Depreciation on Tools and office equipment @ 20%	4,800
Interest on Capital Investment @ 14%	2,42,200
Total	63,85,500

(2) Turnover (per year) (Rs.)

600 Distribution Boards of different class and sizes @ Rs. 12,500 per board **75,00,000**

(3) Net Profit (per year) (Before Income Tax)

= Turnover- Total Cost of Production

= Rs. 75,00,000 - 63,85,500

= **Rs. 11,14,500**

(4) Net Profit Ratio

= $\frac{\text{Net Profit per year} \times 100}{\text{Turnover per annum}}$

= $\frac{11,14,500 \times 100}{75,00,000}$

= **14.86%**

(5) Rate of Return

= $\frac{\text{Net profit per year} \times 100}{\text{Total investment}}$

= $\frac{11,14,500 \times 100}{17,30,000}$

= **64.42%**

(6) Break-even Point (% of Total Production Envisaged)

Fixed Cost	(Rs.)
Depreciation on Machinery	23,300

and equipment, Tools, office equipment	
Rent/Depreciation on Building	1,20,000
Interest on total investment	2,42,200
40% of salary and wages	2,18,040
40% of other contingent expenses(Excluding Rent and Insurance)	48,000
Total	6,51,540
B.E.P.	

$$= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Profit}}$$

Fixed Cost + Profit

$$= \frac{6,51,540 \times 100}{6,51,540 + 11,14,500}$$

$$= \frac{6,51,54,000}{17,66,040}$$

$$= 36.89\%$$

17,66,040

$$= 36.89\%$$

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

Addresses of Machinery Equipment and Raw Material Suppliers

Machinery for Fabrication

1. M/s. HMT Ltd. 31, Chowranghee, Kolkata.
2. M/s. Manaklal and Sons 23 Ganesh Chandra Avenue, Kolkata-700013.
3. M/s. B.B. Engineering Works 166/22, B. T. Road, Ashok Garh (E), Kolkata-700035.
4. M/s. Atlas Works Pvt. Ltd. 119, Ribbons Street, Kolkata-16.
5. M/s. Nandy and Co. 125 Belidious Road, Howrah-1
6. M/s. Pipalia Engg. Works Premnagar, Pipala, Rajasthan.
7. M/s. NSIC Ltd. Link Road, Badambadi, Cuttack-753001.
8. M/s. Perfect Machine Tools Co. Pvt. Ltd. 17, Kharvela Nagar, Bhubaneswar.
9. M/s. Mohan Enterprises Mangalabag, Cuttack-753001.
10. M/s. Orissa Machine Tools Nuapatna, Cuttack-753001.
11. M/s. Patel and Co. Nuapatna, Cuttack-753001.
12. M/s. Engg. and Industrial Foundry Company Ramnagar, Coimbatore-9.

Test Equipments

1. M/s. Automatic Electric Ltd. Rectrifier House, 570, Nigaum Cross Road, Wadala, Mumbai-400071.
Tel-91-22-41467330
2. M/s. Associated Engineers and Co. Near HMT Beawar Road, Ajmer.
3. M/s. Batliboi and Co. Ltd. 26 R.N. Mukherjee Road, Kolkata.
4. M/s. Voltage Kiddepara Industrial Estate, Kshus Bridge-5, Hide Road, Kolkata.
5. M/s. BPL Pvt. Ltd. 14, Commander in Chief Road, Chennai-18.
6. M/s. Automatic Pvt. Ltd. 17/18 Broadway, Chennai-1.
7. M/s. Bluestar Ltd. 7 Hart Street, Kolkata, Tel-2480131.
8. M/s. Oriental Science, Apparatus Workshop, Jawaharlal Nehru Marg, Ambala Cant-133001.
9. M/s. Rishabh Instruments Pvt. Ltd., F-31 MIDC, Satpur, Nasik-422007.

Raw Material Suppliers

1. Steel Authority of India Ltd. (Marketing Divn.), Bhubaneswar.
2. M/s. Premji Electronic Industries 14, Errabalu Chetty Street, Chennai-1.
3. M/s. Puse Gear Industries, PH Road, Chennai-49.
4. M/s. Sahoo Traders, Cuttack.
5. M/s. Mutual Insulated Cables and Conductors Ltd., A-25 and 26, Phase-III, New Industrial Estate, Jagatpur, Cuttack-21.
6. M/s. Indian Oxygen Limited Chennai-21.
7. M/s. Single Window Switch Gear Solutions, The Central House, 222 Okhla Industrial Estate, New Delhi-110020.
Tel.-91-11-6848242-45. [E-mail-info@contralsindia.com](mailto:info@contralsindia.com)
8. M/s. Newtech Switch Gear, K-50, Udyog Nagar, Delhi-110041.
9. M/s. Minilec (India) Pvt. Ltd. S.No. 1073/1-2-3, Post- Pirangoat, Pune -412111(India) Tel-0213922162
10. M/s. Larsen and Toubro Ltd. Kolkata, Tel-033-2822301.
11. M/s. Udar Cable and Conductors (P) Ltd. 52/7, Plot No. 7 & 8, Athagarh I.E., Radhadamodarpur, Cuttack - 29
12. Local Market.