PROJECT PROFILE ON ELECTRIC MOTOR STARTERS

1. PRODUCT : **Electric Motors Starters**

2. **PRODUCTION CAPACITY** : Manufacturing of 24,000 Nos. Starters of 3 – Phase Induction Motors of upto 5 KW rating **(Value Rs.2,88,00,000/-)**

3. **MONTH & YEAR OF PREPARATION** : **March 2013.**

4. PREPARED BY : **ELECTRICAL DIVISION**

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Manufacturing of Electric Motor Starters

1. INTRODUCTION:

The Direct On Line (DOL) Starters are very important component for starting as well as protection of any 3 – Phase Squirrel Cage Induction Motors of upto 5 KW rating. The DOL Starter starts the motor in safe way and it also prevents the motor in case of single phasing, over current, short circuit, overloading or any other faults. A normal DOL Starter can be used in various ranges of motor only by replacing the bi-metallic over load relay only.

The manufacturing of a DOL Starter includes making of starter case, assembly of contactor, bi-metallic over load relay, actuator switches, wiring of starter, final testing of Starter and packing.

2. MARKET POTENTIAL:

With rapid industrialization in urban and semi urban areas as well as in agriculture heavy use of pumping sets the demand of Electric Motors starters is increasing very fast. It is being used in various machine tools, 3 phase Exhaust Fans, Air Circulating Fans, Pumps for starting of the induction motor used in that machine. Due to its variety of use in industry as well as in agriculture has got an immense market potential.

3. BASIS & 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 onward.

iii) The salaries and wages, cost of raw materials, utilities, rents etc. are based on the prevailing rates in and around Kanpur. 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 & Development Centres (ETDCs) and Electronic Regional Test Laboratories (ERTLs) and Regional Testing Centres (RTCs).

The following presumptions have been taken in to account –

i) Voltage Range – 3Ø , 380 – 450 Volts

ii) Capacity Range – 1 H.P. to 7.5 H.P.

iii) Basis of calculations – 3 H.P.

4. Implementation Schedule:

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

Sr. No.	Activity	Period (in months)
1.	Preparation of project report	1
2.	Registration and other formalities	1
3.	Sanction of loan by financial institutions	3
4.	Plant & 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

Note :

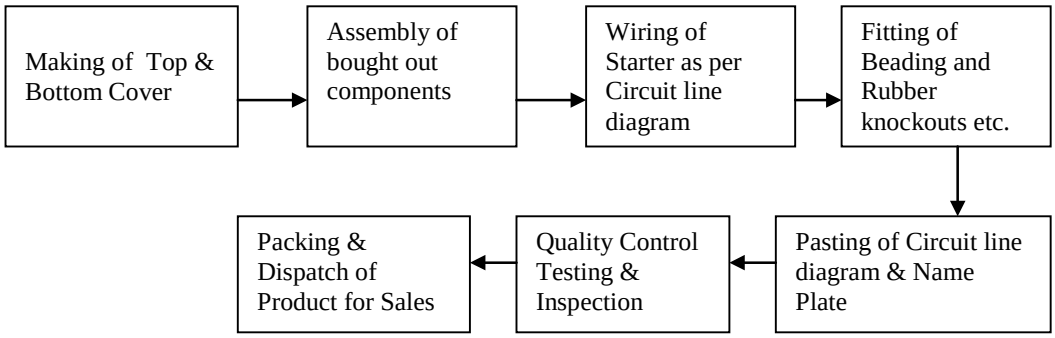
1. Many of the above activities shall be initiated concurrently.
2. Procurement of raw materials commences from the 8th month onwards.
3. When imported plant and machinery are required, the implementation period of project may vary from 12 months to 15 months.

5. TECHNICAL ASPECTS:

The manufacturing of Direct On Line Motor Starters can be sub-divided into following operations:

a) Cutting of CRCA Sheets into proper size on shearing machine.
b) Proper size sheets are pressed into deep drawing press for making of top & bottom covers.
c) Cover are drilled, cleaned in pickling plant and painted at painting booth .
d) Assembly of bought out components, in the bottom covers, viz. contactors, over load relay and actuator switches in top cover.
e) Wiring of Direct on line Starter with proper size & colour single core wires. Terminal Plate is provided at the cable entry.
f) Beading/ rubber gasket are provided between top and bottom cover and at the cable entry points to make it weather proof.
g) Pasting of circuit line wiring diagram & Name plate is riveted on the out side of top cover.
h) The starter inspected and tested as per IS 13947 (Part 1) : 1993 & IS 8544 (Part 1) : 1997.
i) The instruction and maintenance manual is packed along with the starter in printed corrugated box.

Process Flow Chart :



II. QUALITY CONTROL & STANDARDS :

The Bureau of Indian Standard has laid down specifications:

1. IS : 13947 (Part-I)-1993- Low Voltage Switchgear & Controlgear Part – 4, Contactors & Motor Starters
2. IS : 8544 (Part – I)- 1997 – Motor Starter for Voltage not exceeding 1000 V : Part 1 Direction Line Starters
3. IS : 1885 (Part XXXVIII) Electro- technical Vocabulary.

III. PRODUCTION CAPACITY PER ANNUM :

Quantity : 24000 Nos. per annum.
Value : Rs.2,88,00,000/-

IV. MOTIVE POWER : 20 KW (17KW for Plant & Machinery & 3 KW for Lighting etc.)

Water : 5 K.L./monthly.

V. 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 substitutions.

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, Halson 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 CFCs, 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, per chloroethylene and methylene chloride have been used an effective cleaner 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.

VI. 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 & 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.

6. FINANCIAL ASPECTS:

(A) Fixed Capital :

(i) **Land and Building**

Built up Area - 300 Sq.mtrs.
Rent (per month) @ Rs.45/- per sq.mtr.

Office & Testing Area	- 75 Sq. mtrs.	Rs. 3,375/-
Manufacturing Area	- 150 Sq. mtrs.	Rs. 6,750/-
Stock Area	- 75 Sq. mtrs.	Rs. 3,375/-
Rent payable/month		Rs. 13,500/-

(ii) **Machinery & Equipments:**

Sl. No.	Particulars	Ind./Imp.	Qty. (Nos.)	Value (Rs.)
(a)	**Production Unit :**			
1.	16/18 SWG x1200 mm type heavy duty Manually operated Shearing M/c with HCHC blades	Ind.	1	40,000
2.	20 Ton Deep Drawing Press M/c with 2 HP, 440 Volts Motor & all standard accessories	Ind.	1	70,000
3.	3.0 KVA Spot Welding M/c	Ind.	1	25,000
4.	½ Inch Double Bench Drilling M/c with ½ HP, 440 V motor complete with drill chuck & arbor	Ind.	1	15,000

5.	Double ended 200 mm Wheel Bench Grinder with 1.5 HP 440 V motor. With one fine & one course grinding wheel	Ind.	1	7,000
6.	Pneumatic Riveting M/c with 2 HP, 440 V motor and compressor unit	Ind.	1	25,000
7.	500x500x750 mm Pickling Plant	Ind.	1	10,000
8.	Spray Painting Booth100 lbs. working pressure Air Compressor fitted with 1 HP, 440 V motor	Ind.	1	25,000
9.	3.0 KW Heating Chamber	Ind.	1	40,000
			Total :	**2,57,000**

(b) Testing Equipments :

1.	Megger Hand operated 500 V DC & Testing leads	Ind.	1	5,000
2.	Digital Multimeter	Ind.	1	3,000
3.	Wattmeter 3 Phase 4 wire	Ind.	1	5,000
4.	Auto Transformer 0.5 KVA	Ind.	1	5,000
5.	3 ½ Digit Digital Clamp Meter Range 0 – 100 A	Ind.	1	8,500
6.	Leakage Current Earth Tester	Ind.	1	5,000
7.	2.5 KV High Voltage Tester	Ind.	1	10,000
8.	Testing Bench with all Electrical fittings	Ind.	1	20,000
9.	Tools Complete Kit	Ind.	2	15,000
			Total :	**76,500**
Total Cost of Plant & Machinery and Testing Equipments				**3,33,500**

i)	Electrification and Installation at 10% of cost of above		33,350
ii)	Office Equipments and furniture		50,000
iii)	Cost of Dies & Fixture		35,000
		Total :	**1,18,350**
		Total (a)+(b)	**4,51,850**
(c)	**Pre-operative Expenses**		15,000
		Total (a)+(b)+(c)	**4,66,850**
		SAY	**4,67,000**

(B) Working capital (Per month)

(i) Staff & Labour (Per month)

Sl. No.	Particulars	No.	Salary/per month	Amount Rs.
a)	**Admn. & Supervising**			
i.	Work Manager	1	10000/per month	10,000
ii.	Accountant/Supervisor	1	5500/per month	5,500
iii.	Chowkidar/Peon	1	4500/per month	4,500
			Total :(a)	**20,000**
(b)	**Technical Skilled & unskilled**			
i	Supervisor (Technical)	1	8000/per month	8,000
ii.	Skilled worker	4	6000/per month	24,000
iii.	Semi Skilled	1	5300/per month	5,300
iv.	Unskilled	2	4500/per month	9,000
			Total :(b)	**46,300**
			Total :(a)+(b)	**66,300**
	Perquisites @15%			9,945
			Total :	**76,245**
			SAY Rs. :	**76,300**

ii. Raw Material : (Per month)

Sl. No.	Particulars	Qty.	Rate/per Rs.	Amount Rs.
1.	CRCA Sheet 18/20 SWG	800 Kg.	62.50/per	50,000
2.	Contactors (16 Amp)	2000 Nos.	550/per	11,00,000
3.	Bi-metallic Over Load Relay	2000 Nos.	250/per	5,00,000
4.	Terminal Blocks Bakelite	2000Nos.	10/per	20,000
5.	PVC Wires 1 Sq. mm	LS	--	5,000
6.	Push Button Actuators with Red & Green Colour	4000 Nos.	50/per	2,00,000
7.	Rubber Bead, Knock Out, Silver Rivets, Earth Terminals, Screws	LS	--	4,000
8.	Acid, Thinner & Paint	LS	--	10,000
9.	Packing Material Complete	2000 Nos.	10/per	20,000
10.	Name Plates	2000 Nos.	2/per	4,000
11.	Instruction Manual & Line diagram	2000 Nos.	3/per	6,000
12.	Other Misc. Items	LS	--	5,000
			Total :	**19,24,000**

(iii) Utilities Per month:

Power 2000 units @ Rs.5.50 per unit	Rs.11,000
Water	Rs. 500
	Rs.11,500

(iv) Other Contingent Expenses (per month) :

Sl. No.	Particulars	Amount Rs.
1.	Rent	13,500
2.	Postage & Stationery	1,000
3.	Telephone & Internet	1,000
4.	Transportation	5,000
5.	Consumable stores	1,000
6.	Insurance & Taxes	1,000

7.	Publicity & Advertisement		5,000
8.	Repair & Maintenance		2,500
		Total :	**30,000**

TOTAL RECURRING EXPENDITURE (Per month) :

Sl. No.	**Particulars**	**Amount Rs.**
i.	Personnel (Salary & Wages)	76,300
ii.	Raw material	19,24,000
iii.	Utilities	11,500
iv.	Other Contingent Expenses	30,000
	Total :	**20,41,800**

Working Capital for 3 months = 20,41,800X 3 = Rs. 61,25,400

TOTAL CAPITAL INVESTMENT :

i.	Fixed Capital	Rs. 4,67,000
ii.	Working capital for 3 months	Rs. 61,25,400
		Rs. 65,92,400

FINANCIAL ANALYSIS :

Sl. No.	**Particulars**	**Amount Rs.**
1.	Total recurring cost per year	2,45,01,600
2.	Depreciation on Machinery & Equipments & 10%	33,350
3.	Depreciation on office furniture @20%	17,000
4.	Interest on total capital investment @16%	10,54,784
	Total :	2,56,06,734

TURNOVER (PER ANNUM):

Item	**Qty.**	**Rate/unit Rs.**	**Total Sales Rs**
Production of Direct On Line Motor Starters	24000 Nos.	1,200/per	2,88,00,000

PROFIT PER ANNUM (Before taxes) :

Annual Sales	(-)	Cost of Production	=	Profit
= Rs.2,88,00,000	-	Rs.2,56,06,784	= Rs.31,93,266	
			SAY **Rs. 31,93,200**	

NET PROFIT RATIO :

$$\frac{\text{Net Profit X 100}}{\text{Turnover}} = \frac{31,93,200X100}{2,88,00,000} = 11.09\%$$

RATE OF RETURN :

$$\frac{\text{Net Profit X 100}}{\text{Total Investment}} = \frac{31,93,200X100}{65,92,400} = 48.43\%$$

BREAK EVEN POINT:

Fixed Cost (Annual) :

Sl. No.	**Particulars**	**Amount Rs.**
1.	Rent of the building	1,62,000
2.	Depreciation on machinery & equipments @10%	33,350
3.	Depreciation on Office Furniture @20%	17,000
4.	Interest on Total Capital Investment @16%	10,54,784
5.	40% of Salary & Wages	3,66,240
6.	40% of Other expenses	1,44,000
7.	Insurance	12,000
	Total :	17,89,374
	Or Say	17,89,400

$$\frac{\text{Fixed Cost x100}}{\text{Fixed Cost + Profit}} \quad \frac{17,89,400x100}{17,89,400+31,93,200} = 35.91\%$$

ADDRESS OF MACHINERY SUPPLIERS :

1. M/s Hindustan Machine Tools, Hyderabad.
2. M/s Bharat Firtz Werner (India). Bangaluru
3. M/s Jatindra Machine Tools, Batala, Punjab
4. M/s Techno Plastic & Engineering Works, Okhla, New Delhi
5. M/s Shree Enterprises, Swaroop Nagar, Kanpur

ADDRESS OF RAW MATRIAL SUPPLIERS :

1. M/s Choubey & Co.,Birhana Raod, Kanpur.
2. M/s G.K. Electricals, Mani Ram Bagia, Kanpur
3. M/s Balak Ram Banarsi Das, M.G. Marg, Kanpur.
4. M/s Ess Kay Electricals, G.G.B. Marg, Lucknow
5. M/s S.K. Electricals, Mani Ram Bagia, Kanpur
6. M/s Bansal Steels, Khyala Industrial Area, New Delhi
7. M/s Samrat Steel Corporation, B.S. Road, Ghaziabad
8. M/s Shivam Printers, Nehru Nagar, Kanpur

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