

# **MANUFACTURING OF ELECTRICAL AND PLC PANEL BOARD**

## **1. INTRODUCTION:**

Simplification of engineering and precise control of manufacturing process can result in significant cost savings. The most cost-effective way, which can pay big dividends in the long run is flexible automation; a planned approach towards integrated control systems. It requires a conscious effort on the part of plant managers to identify areas where automation can result in better deployment/utilization of human resources and savings in man-hours, down time. Automation need not be high ended and too sophisticated; it is the phased, step-by-step effort to automate, employing control systems tailored to one's specific requirements that achieves the most attractive results. That is where Industrial electronics has been a breakthrough in the field of automation and control techniques. It is required System design and specification, Electrical and mechanical design using industry standard CAD tools and E plan, PL software development Panel manufacture to highest quality Panels and systems can be tested to customer specification and test procedures On-site commissioning using equipments. Diagnostics and troubleshooting Control Panel as the name implies, are used to provide proper control of operations of any electrical equipments. These are also used to protect the electrical equipments from being damaged due to various faults like short circuit, overload and earth leakage etc.

## **2. PRODUCT & ITS APPLICATION:**

A Programmable controller is a solid state user programmable control system with functions to control logic, sequencing, timing, arithmetic data manipulation and counting capabilities. It can be viewed as an industrial computer that has a central processor unit, memory, input output interface and a programming device. The central processing unit provides the intelligence of the controller. It accepts data, status information from various sensing devices like limit switches, proximity switches, executes the user control program store in the

memory and gives appropriate output commands to devices like solenoid valves, switches etc. Input output interface is the communication link between field devices and the controllers; field devices are wired to the I/O interfaces. Through these interfaces the processor can sense and measure physical quantities regarding a machine or process, such as, proximity, position, motion, level, temperature, pressure, etc. Based on status sensed, the CPU issues command to output devices such as valves, motors, alarms, etc. Programmer unit provides the man machine interface. It is used to enter the application program, which often uses a simple user-friendly logic.

### **3. DESIRED QUALIFICATIONS FOR PROMOTER:**

Graduate in any discipline, preferably science.

### **4. INDUSTRY LOOK OUT AND TRENDS**

Electrical control panel is a flat, often vertical, area where control or monitoring instruments are displayed. Any complex piece of machinery requires a user interface to enable the user to monitor its operations, check for efficient functioning, and intervene when required. Machines overheat, slow down, speed up or generally vary in their performance based on numerous factors such as fatigue, weather conditions, and the wear and tear of components and parts. They are found in places such as nuclear power plants, ships, aircraft and mainframe computers. The range of electric panels is used for industrial purposes, generator panel building or apartment construction organization purpose and custom built designs. These control panels are designed for specific applications and are available in many different configurations. Like standard control panels, custom products are used to receive inputs, trigger outputs, and monitor systems and information. Examples include access control panels; electrical control panels, motor control panels, and pump control panels. Typically, these specialized control panels can be electronic, hydraulic, or pneumatic (air) with buttons, touch screen, knobs, or other analog or digital inputs. In electrical machines, example like generators, these varying changes constitute an electrical signal. These signals can be intelligently processed to control the performance of the machine. A lot of machines

in urban environments (such as signal lights and automatic doors) are completely self-managed due to such controllers. They have sensors that can detect changes in physical attributes like heat and speed and generate signals accordingly. Various equipments have similar sensors to detect changes in all kinds of various parameters. These can be used to control the equipment through a control panel.

## **5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:**

With the rapid electrification and industrialization and by virtue of being a functionally integral part of all electrical equipments like Motor, Generator, Transformer, Motor Control Centre, Incinerator etc. the control panel has got immense scope. The phased increase in power generation and transmission has by itself necessitated increased production of electrical equipments thereby creating a good scope for the control panel. In the present industrial world, a flexible system that can be controlled by user at site is preferred. Systems, whose logic can be modified but still, used without disturbing its connection to external world, is achieved by PLC. Utilizing the industrial sensors such as limit switches, ON-OFF switches, timer contact, counter contact etc., PLC controls the total system. The drive to the solenoid valves, motors, indicators, enunciators, etc. are controlled by the PLCs. The above said controlling elements (normally called as inputs of PLCs) and controlled elements (called as outputs of PLCs) exist abundantly in any industry. These inputs, outputs, timers, counters, auxiliary contacts are integral parts of all industries. As such, it is difficult to define where a PLC cannot be used. Proper application of a PLC begins with conversion of information into convenient parameters to save money, time and effort and hence easy operation in plants and laboratories.

## **6. RAW MATERIAL REQUIREMENTS:**

The major raw materials required are 5 way connectors (30 A Bakelite) , Am meter A Panel Mount, Capacitor, Capacitor, 36 Farade/440 V), CRC steel sheet, (18 gauge) . Fuse unit (15 A), Hinges, (1/2" x 1" size). Indication Lamp Set, Metal coating powder, Overload Relay unit,

Packing Material, Push Button Station (on-off), . Screws, Nut and Bolt, Bottom Bush and sticker, Voltmeter, (0 to 300 V Panel Mount), Wires (2.5 sq. mm copper of 5 different colors)

## **7. MANUFACTURING PROCESS:**

The Control Panel is sheet metal fabricated in closure open, semi-enclosed or totally enclosed type, which provide and control electric power to equipment and appliances. Provision for indicating electrical parameters like voltage, current, frequency, power factor etc. will be available on the face of the panel. Regulation of the power supply is also possible with the help of auto transformer switches and circuit breaker. The sheet metal enclosure for the Control Panel is designed and fabricated in the unit. The components are bought out from the reputed sources and fitted at appropriate places on the panel as per manufacturers design. The circuit as per the design is laid out and the control panel is tested for the proper functioning as per relevant specifications.

2. Quality Control: The LT Control Panel shall be tested as per IS: 8623-1977 regarding technical aspects.

3. Production Capacity (per annum): LT Control Panel of a short range - 300 Nos. per year.

4. Approximate Motive Power Requirement: 20 KVA

5. Pollution Control Requirement: No Objection Certificate to obtain from DIC level.

6. Energy Conservation Requirement: The product under question itself plays vital role in energy conservation. The suitable tripping devices in case of automatic tripping devices etc. is required to be provided to minimize the unwanted use of electricity.

## 8. MANPOWER REQUIREMENT:

The enterprise requires 16 employees as detailed below:

Sr. No.	Designation of Employees	Monthly Salary ₹	Number of employees required				
			Year-1	Year-2	Year-3	Year-4	Year-5
	<b>Variable Labour / Workers:</b>						
1	Chemist @ 12000	36000.00	3	3	3	3	3
2	Skilled workers @ 8000	80000.00	10	8	10	10	10
	<i>sub-total</i>	116000.00	13	11	13	13	13
	<b>Fixed Staff:</b>						
1	Manager @ 15000	15000.00	1	1	1	1	1
2	Accounts/Sales Asst @12500	12500.00	1	1	1	1	1
3	Office Boy @ 9000	9000.00	1	1	1	1	1
	<i>sub-total</i>	36500.00	3	3	3	3	3
	<b>Total</b>	152500.00	16	14	16	16	16

## 9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 3 months' time as detailed below:

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	1.00
2	Construction (if applicable)	1.00
3	Procurement & installation of Plant & Machinery	2.00
4	Arrangement of Finance	2.00
5	Recruitment of required manpower	1.00
	Total time required ( <i>some activities shall run concurrently</i> )	3.00

## 10. COST OF PROJECT:

The project shall cost ₹ 24.46lacs as detailed below:

Sr. No.	Particulars	₹ in Lacs
1	Land	0.00
2	Building	0.00
3	Plant & Machinery	4.96
4	Furniture, Electrical Installations	1.00
5	Other Assets including Preliminary / Pre-operative expenses	0.50
6	Working Capital	18.00
	<b>Total</b>	<b>24.46</b>

## 11. MEANS OF FINANCE

The proposed funding pattern is as under:

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	6.11
2	Bank Finance	18.34
	<b>Total</b>	<b>24.46</b>

## 12. WORKING CAPITAL CALCULATION:

The project requires working capital of ₹ 18.00 lacs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	9.00	0.25	2.25	6.75
2	Receivables	4.50	0.25	1.13	3.38
3	Overheads	4.50	100%	4.50	0.00
4	Creditors	-		0.00	0.00
	<b>Total</b>	18.00		7.88	10.13

### 13. LIST OF MACHINERY REQUIRED:

Sr. No.	Particulars	UOM	Qty	Rate (₹)	Value (₹ in Lacs)
	<b>Plant &amp; Machinery / equipments</b>				
<b>a)</b>	<b>Main Machinery</b>				
i.	shearing machine	NOS.	1	70000	0.70
ii.	Hand operated sheet bending m/c	Nos	1	25000	0.25
iii.	Drilling machine	Nos	2	18000	0.36
<b>IV</b>	Bench grinder, Arc welding transformer, gas welding hand shearing, Saw, Compressor, etc.	Nos	1	100000	2.60
V	Installation, erection electrification.			50,000	0.50
VI	taxes and transportation			50000	0.50
	<i>sub-total Plant &amp; Machinery</i>				<b>4.96</b>
	<b>Furniture / Electrical installations</b>				
a)	Office furniture	LS	1	50000	0.50
b)	Stores Almirah	LS	1	0	0.00
c)	Computer & Printer	L. S.	1	50000	0.50
	<i>sub total</i>				<b>1.00</b>
	<b>Other Assets</b>				
a)	preliminary and preoperative				0.50
	<i>sub-total Other Assets</i>				0.50
	<b>Total</b>				<b>6.46</b>

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Bhavya Machine Tools

A-601, 6th Floor, Sapath-4, Opp. Karnavati Club,  
S.G. Highway Road, Satellite, Ahmedabad-380051, Gujarat, India.  
Phone No: +91- 79 - 4024 2800, +91- 79- 4024 2880

2. Hifine Machine

5, New India Estate, Inside Relief Hotel,  
Sanand Char Rasta, Sarkhej, Ahmedabad-382210, Gujarat  
Phone: 079 26891274, 079 26890274

3. Sagar Engineering Works

A-129, Road No. 9 D,  
V. K. I. Area, Jaipur - 302013,  
Rajasthan, India  
Phone: +91-9829024358, +91-141-4064876

4. Pulsar Electronics Private Limited

No. 127/128, Sonal Link Industrial Estate, No. 2,  
Link Road Opposite Movie Time Cinema,  
Malad West, Mumbai - 400064, Maharashtra, India  
Phone: +91-7021000597, +91-9867024141

5. Cosmic Devices

No. 1702/307, Srinath Building, 3rd Floor Bhagirath Palace, Chandni Chowk, Delhi -  
110006, India  
Phone: +91-9810413218, +91-9313866166



#### 14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	54.00	63.00	72.00	81.00	90.00
3	Raw Materials & Other direct inputs	₹. In Lacs	44.35	51.74	59.14	66.53	73.92
4	Gross Margin	₹. In Lacs	9.65	11.26	12.86	14.47	16.08
5	Overheads except interest	₹. In Lacs	5.10	5.42	6.06	6.25	6.38
6	Interest@ 10 % on 2.20 lakhs	₹. In Lacs	1.83	1.83	1.22	0.92	0.73
7	Depreciation	₹. In Lacs	3.47	2.48	1.74	1.24	1.12
8	Net Profit before tax	₹. In Lacs	<b>-0.76</b>	<b>1.52</b>	<b>3.84</b>	<b>6.06</b>	<b>7.85</b>

The basis of profitability calculation:

The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study; it can be increased according to the selling strategy.)

Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per liter. The depreciation of plant is taken at 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

#### 15. BREAK-EVEN ANALYSIS:

The project shall reach cash break-even at 44.24 % of projected capacity as detailed below:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	90.00
2	Variable costs	₹. In Lacs	73.92
3	Fixed costs incl. interest	₹. In Lacs	7.11
4	BEP = $FC/(SR-VC) \times 100 =$	% of capacity	44.24%

## **16. STATUTORY / GOVERNMENT APPROVALS**

As per the allocation of business rules under the Constitution, labour is in the concurrent list of subjects. It is dealt with by the MOLE at the Central and Departments of Labour under State Governments in respective States / UTs. The MOLE has enacted workplace safety and health statutes concerning workers in the manufacturing sector, mines, ports and docks and in construction sectors.

Further, other Ministries of the Government of India have also enacted certain statutes relating to safety aspects of substances, equipment, operations etc. Some of the statutes applicable in the manufacturing sector are discussed below:

### **The Manufacture, Storage and Import of Hazardous Electronic Rules (MSIHC), 1989**

These MSIHC Rules are notified under the Environment (Protection) Act, 1986. These rules are aimed at regulating and handling of certain specified hazardous chemicals. The rules stipulate requirements regarding notification of site, identification of major hazards, taking necessary steps to control major accident, notification of major accident, preparation of safety report and on-site emergency plan; prevention and control of major accident, dissemination of information etc. These rules are notified by the Ministry of Environment and Forests (MOEF) but enforced by the Inspectorates of Factories of respective States / UTs in the manufacturing sector. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

## **17. BACKWARD AND FORWARD INTEGRATIONS**

Both forward and backward integration for any Electrical Industry are strategies to gain better control over the supply chain, reduce dependency on the suppliers and increase their competitiveness. The two strategies can help companies reduce their dependency on suppliers and increase their influence over the customers. The benefits of these strategies

can be big. Both impact the bottom line directly. Integration happens if a company moves upward or downward in its supply chain. Starting from the suppliers from whom the raw materials are obtained, the chain moves downstream towards the distributors and the retailers. If the suppliers' power is very high, it can create financial burdens for the company. Suppose the number of suppliers of a company is low, then the control in their hands would be low. The burden in that case will fall upon company's shoulders. Its expenditure on raw materials will be high.

## **18. TRAINING CENTERS AND COURSES**

There is no such training required to start this business but, basic Electrical or IC bachelor's degree is plus point for enterpriser. Promoter may train their employees in such specialized institutions to grow up the business. There are few specialized Institutes provide degree certification in chemical Technology, few most famous and authenticate Institutions are as follows:

1. Department of Electrical LD College of engineering  
No.120, Circular Road, University Area, Navrangpura,  
Opposite Gujarat University, Ahmedabad, Gujarat 380015
2. MIT College of Engineering, Pune  
Gate.No.140, Raj Baugh Educational Complex,  
Pune Solapur Highway,  
LoniKalbhor, Pune – 412201  
Maharashtra, India

Udyamimitraportal ( link : [www.udyamimitra.in](http://www.udyamimitra.in) ) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

**Disclaimer:**

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.