MANUFACTURING OF WATER LEVEL CONTROLLER FOR HOUSEHOLD TANKS

1. INTRODUCTION:

In many homes and other public places, ground water is used, which is pumped up to overhead tanks using water pumps which are controlled by electric motors. Controlling the pumps is often a necessity to avoid wastage of water.

The level controller is a system to sense water level. When water level in the overhead tankexceeds the required upper level, it helps in automatically turning off the pump motor thereby preventing the over flow of water. Similarly, it can also have lower water level sensor to automatically switch on pump motor. These systems are useful in reducing the water wastage and ensures un-interrupted water supply to consumers.

2. PRODUCT & ITS APPLICATION:

The level controller consists of water level sensors, and electric circuit system to control power supply to pump motor. It uses a relay to cut off the power supply to the water pump.

Level sensors are one of the very important sensors and play very important role in a variety of consumer/ industrial applications. As with other types of sensors, level sensors are available or can be designed using a variety of sensing principles. Selection of an appropriate type of sensor suiting to the application requirement is very important. A variety of sensors are available for point level detection of solids. These include vibrating, rotating paddle, and mechanicaldiaphragm, microwave, and capacitance, optical, pulsed-ultrasonic and ultrasonic level sensors. There are many physical and application variables that affect the selection of the optimal level monitoring method for industrial and commercial processes. Also important are the application constraints: price, accuracy, appearance, response rate, ease of calibration or

programming, physical size and mounting of the instrument, monitoring or control of continuous or discrete point levels.

Water level sensor and switch also called float switch is a device used to detect the level of liquid within a tank. The switch may be used to control a pump, as an indicator, an alarm, or to control other devices like pump motor. Common type is a float mounted in a tube that rises on a rod and actuates a micro switch. Another pattern of float, contains a magnet, surrounds the tube and is guided by it. Almost all systems use electronic systems are used to automatically control operations.

Now days preferred level sensor is ultrasonic systems due to non-contact – movement free operations that is reliable and almost maintenance free. The ultrasonic sensor senses the level of water in the tank by transmitting ultrasonic signals towards the tank. The water in the tank reflects back the ultrasonic signals, and received by the receiver. The signal received is converted to electric signal pulses that denote the level of water in the tank. The signals are fed to the Micro controller and compared to set levels. As the water level decreases or increases above or below certain level, the Micro controller causes the MOSFET to be switched on or off power supply to relay to operate the pump motor.

Any or all of the systems can be selected in the project for development and supply level controllers for domestic as well as industrial applications.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any ITI, Diploma or Graduate with some background in manufacturing or marketing.

4. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Potable clean Water is becoming scarce commodity and there is growing awareness for preservation will lead to steps to reduce wastage. One of the major wastage is tank overflow in residential overhead water storage systems. This is a strong demand driver for the water level controllers in huge quantity in coming years. The demand is likely to grow for long time due to population growth and ever growing construction sector.

Besides level controllers have many industrial chemical, pharma, dairy, beverages etc. processes and machinery sector, thereby having good potential for the entrepreneur to grow in this field.

5. RAW MATERIAL REQUIREMENTS:

Main components and raw materials are based on design of water level sensors. Most electronic components like sensors, micro – controller, etc. are procured from large suppliers. For Mechanical construction of floats and switch etc. steel/ PVC tubes and, molded plastic floats are procured or produced.

6. MANUFACTURING PROCESS:

The manufacturing process consists of procuring standard components like control circuit and sensors like mechanical floats, relays and switches. The control circuit is assembled and configured as per the requirements of installation and tested for correct operations. These per-configured sub-assemblies are assembled and mounted at the site with brackets, and mountings. The system undergoes for final testing at the as per specified configuration and connected with alarm, and motor controls.

7. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 10 employees initially and increase to 25 or more depending on business volume.

Sr No	Type of Employees	Monthly Salary	Number of employees required				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	18000	2	3	4	5	6
2	Semi-Skilled/ Helpers	8000	4	5	6	10	12
1	Supervisor/ Manager	25000	1	1	3	3	3
2	Accounts/ Marketing	16000	2	2	2	2	2
3	Other Staff	7000	1	2	2	2	2
	TOTAL		10	13	17	22	25

8. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 3 months from the serious initiation of project work.

Sr No	Activities	Time Required in Months
1	Acquisition of Premises	-
2	Construction (if Applicable)	-
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Activities run concurrently)	3

9. COST OF PROJECT:

The unit will require total project cost of Rs 31.85 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	0.00
2	Building	0.00
3	Plant and Machinery	8.22
4	Fixtures and Electrical Installation	1.60
5	Other Assets/ Preliminary and Preoperative Expenses	1.00
6	Margin for working Capital	21.03
	TOTAL PROJECT COST	31.85

10. MEANS OF FINANCE:

The project will require promoter to invest about Rs 23.73 lakhs and seek bank loans of Rs 8.12 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	23.73
2	Loan Finance	8.12
	TOTAL:	31.85

11. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	20.04	40	8.02	12.02
2	Receivables	14.65	40	5.86	8.79
3	Overheads	1.81	100	1.81	0.00
4	Creditors	13.36	40	5.34	8.02
	TOTAL	49.86		21.03	28.83

12. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Incoming Inspection unit	Nos	1	25000	25000
2	Coil winding machine	Nos	1	35000	35000
3	Component Assembly /soldering	Nos	1	60000	60000
4	PCB Test Station	Nos	1	30000	30000
5	Component Test station	Nos	1	30000	30000
6	Assembly line for PCB	Nos	1	35000	35000
7	Assembly inspection Station	Nos	1	20000	20000
8	PCB Testing Station	Nos	1	25000	25000
9	Assembly Line of Final product	Nos	1	15000	15000
10	Testing Micro-controllers	Nos	1	25000	25000
12	Packing Labeling Station	Nos	1	20000	20000
13	Oscilloscope single/ dual waves	Nos	1	130000	130000
14	Shear machines	Nos	1	12000	12000
15	DC power supply	LS	2	25000	50000
16	Welding machine	Nos	2	40000	80000
17	Final Product test set up	Nos	1	40000	40000
	subtotal:				632000
Sr No	**Particulars**	**UOM**	**Quantity**	**Rate**	**Total Value**

	Tools and Ancillaries				
1	Jigs Fixture Tools for Assly line etc.	LS	1	150000	150000
2	Hand Tools and gauges	LS	1	40000	40000
	subtotal:				190000
	Fixtures and Elect Installation				
	Storage and transport bins and trolleys	LS	1	60000	60000
	Office Furniture	LS	1	20000	20000
	Telephones/ Computer	LS	1	30000	30000
	Electrical Installation	LS	1	50000	50000
	subtotal:				160000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	100000	100000
	TOTAL PLANT MACHINERY COST				**1082000**

13. PROFITABILITY CALCULATIONS:

Sr No	**Particulars**	**UOM**	**Year Wise estimates**				
			Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1	Capacity Utilization	%	30	40	50	60	70
2	Sales	Rs. Lakhs	175.78	234.37	292.96	351.55	410.14
3	Raw Materials & Other Direct Inputs	Rs. Lakhs	160.33	213.77	267.22	320.66	374.10
4	Gross Margin	Rs. Lakhs	15.45	20.59	25.74	30.89	36.04
5	Overheads Except Interest	Rs. Lakhs	9.74	9.74	9.74	9.74	9.74
6	Interest	Rs. Lakhs	1.14	1.14	1.14	1.14	1.14
7	Depreciation	Rs. Lakhs	1.08	1.08	1.08	1.08	1.08
8	Net Profit Before Tax	Rs. Lakhs	3.49	8.64	13.79	18.94	24.08

14. BREAK EVEN ANALYSIS

The project is can reach breakeven capacity at 23.22% of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs. Lakhs	585.92
2	Variable Costs	Rs. Lakhs	534.43
3	Fixed Cost incl. Interest	Rs. Lakhs	11.96
4	Break Even Capacity	% of Inst Capacity	23.22