IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 7.047 ⁜ Vol. 10, Issue 4, April 2022

DOI: 10.17148/IJIREEICE.2022.10460

FABRICATION AND INSTALLATION OF COOLING TOWER FOR HEAVY INDUSTRIAL APPLICATIONS

Nelson.R[1], Vibin.S [2], Vishwakanth.P[3], Yuvan Shankar P.R[4]

[1]Associate Professor, Department of Mechanical Engineering, SNS College of Engineering, Coimbatore, Tamilnadu, India.

[2,3,4] Students, Department of Mechanical Engineering, SNS College of Engineering, Coimbatore, Tamilnadu, India.

Abstract: Here we have fabricated the cooling tower; the aim of this unit is to convert the hot water into cold water with help of fan arrangement. Cooling towers may either use the evaporation of water to remove process heat and cool the working fluid by using the air temperature. Common applications include cooling the circulating water used in oil refineries, chemical plants, power stations and building cooling.

Keywords: cooling tower, industrial, fan arrangement

INTRODUCTION

This project we are fabricate the temperature controller with cooling system. It is a new innovative concept. This concept is very helpful for so many areas.One of the attractive features of thermoelectric (TE) technology is that it offers an incredible degree of controllability. With a properly 'tuned' controller, it is possible to maintain systems well within 0.1° C of set point. Unfortunately, many off-the-shelf solutions for temperature control are not well suited to the thermoelectric world because they were designed for heating or cooling hardware that is very different—and often far less responsive—than TE devices. This leaves designers groping for alternatives. This guide is intended to offer designers some practical guidance in exploring the vast range of possibilities.

Mechanical Engineering without production and manufacturing is meaningless and inseparable. Production and manufacturing process deals with conversion of raw materials inputs to finished products as per required dimensions, specification and efficiently using recent technology. The new developments and requirements inspired us to think of new improvements in air conditioning Engineering field.

The fabrication of cooling tower is our project; it is very useful in medium scale industries by converting hot water into the cold water. The cooling tower consists of more amounts of coolant tube and fan.

LITERATURE SURVEY

1. Madhukar, Water is the ubiquitous chemical substance, composed of hydrogen and oxygen, that is essential for the survival of many known formsoflife.Intypicalusage,waterrefersonlytoitsliquidformorstate,but the substance also has a solid state, ice, and a gaseous state, water vapor orsteam. Water covers 71% of the Earth's surface. On Earth, it is found mostly in oceans and other large water bodies, with 1.6% of water below ground in aquifersand0.001%intheairasvapor,cloudsandprecipitation.Oceanshold 7% of surface water, glaciers and polar ice caps 2.4%, and other land surface water such as rivers, lakes and ponds 0.6%.

A very small amount of the Earth's water is contained within biological bodies and manufactured products. Water moves continually through a cycle of evaporation or transpiration precipitation, and runoff , usually reaching these. Overland, evaporation and transpiration contribute to the precipitation overland.

2. Aakanksha Pimpalgaonkar, Clean, fresh drinking water is essential to human and other life forms. Access to safe drinking water has improved steadily and substantially over the last decades in almost every part of the world. There is a clear correlation between access to safe water and GDP per capita. However, some observers have estimated that by 2025 more than half of the world population will be facing water-based vulnerability. Waterplays

DOI: 10.17148/IJIREEICE.2022.10460

animportantroleintheworldeconomy,asitfunctionsasasolventforawide variety of chemical substances and facilitates industrial cooling and transportation. Approximately 70 percent of freshwater is consumed by agriculture.
3.R. Suguna, the output from the controller may take one of several forms. The most common forms are time proportional and analog proportional. A time proportional output applies power to the load for a percentage of a fixed cycle time. For example, witha10 second cycle time, if the controller output were set for 60%, the relay would be energized for 6 seconds, and de-energized for 4 seconds.

Time proportional outputs are available in three different forms// electromechanical relay, triacor ac solid state relay, or a dc voltage pulse The electromechanical relay is generally the most economical type, and is usually chosen on systems with cycle times greater than 10 seconds, and relatively small loads. An ac solid state relay or dc voltage pulse are chosen for reliability, since they contain no moving parts. Recommended for processes requiring short cycle times, they need an additional relay, external to the controller, to handle the typical load required by a heating element.

These external solid-state relays are usually used with an ac control signal for ac solid state relay output controllers, or with a dc control signal for dc voltage pulse output controllers. An analog proportional outputisusuallyananalogvoltageorcurrenttheoutputlevelfromthisoutput type is also set by the controller; if the output were set at 60%, the output level would be 60% of 5V, or 3V. With a 4 to 20mA output, 60% is equal to or 13.6 mA. These controllers are usually used with proportioning valves or power controllers.

4.Tarun Kumar Das When you choose a controller, the main considerations include the precision of control that is necessary, and how difficult the process is to control. For easiest tuning and lowest initial cost, the simplest controller which will produce the desired results should be selected. Simple processes with a well matched heater and without rapid cycling can possibly use on-off controllers.

For those systems subject to cycling, or with an unmatched heater, a proportional controller is needed. There are also other features to consider when selecting a controller. These include auto- or self tuning, where the instrument will automatically calculate the proper proportional band, rate and reset values for precise control; serial communications, where the unit can “talk” to a host computer for data storage, analysis, and tuning; alarms, that can be latching non-latching set to trigger on high or low process temperatures or if a deviation from set point is observed; timer’s /event indicators which can mark elapsed time or the end/beginning of an event.

In addition, relay or triac output units can be used with external switches, such as SSR solid state relays or magnetic contactors, in order to switch large loads up to75.

5.B. Levarda, the third controller type provides proportional with integral and derivative control, or PID. This controller combines proportional control with two additional adjustments, which helps the unit automatically compensate for changes in the system. These adjustments, integral and derivative, are expressed in time-based units; they are also referred to by their reciprocals, RESET and RATE, respectively.

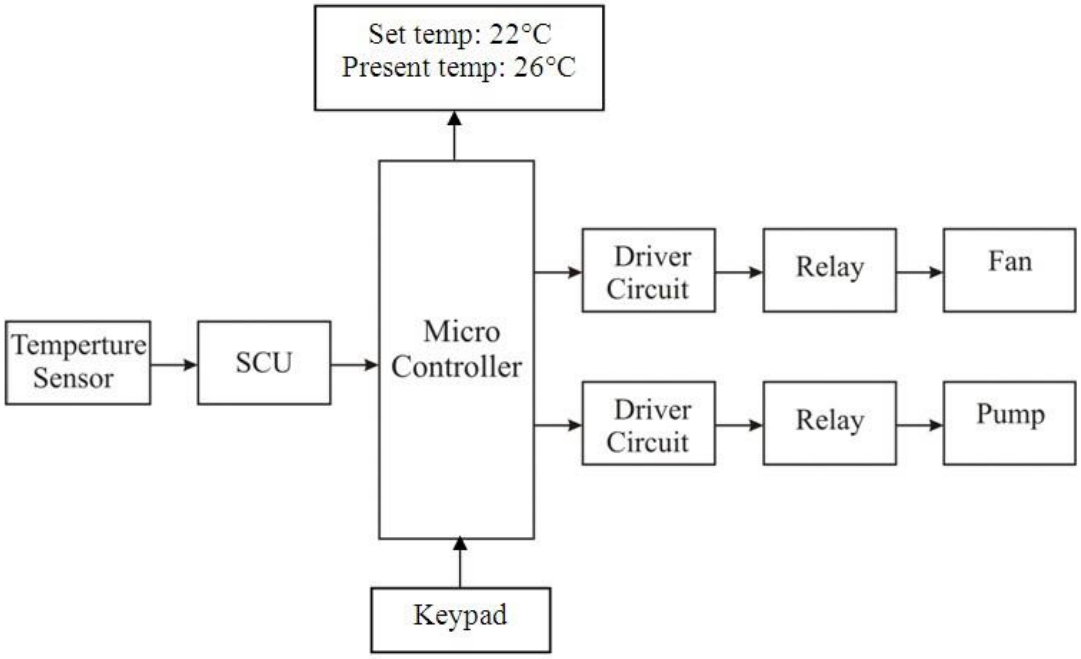
The proportional, integral and derivative terms must be individually adjusted or “tuned” to a particular system, using a “trial and error” method. It provides the most accurate and stable control of the three controller types, and is best used in systems which have a relatively small mass, those which react quickly to changes in energy added to the process. It is recommended in systems where the load changes often, and the controller is expected to compensate automatically due to frequent changes in set point, the amount of energy available, or the mass to be controlled. Rate and reset are methods used by controllers to compensate for offsets and shifts in temperature.

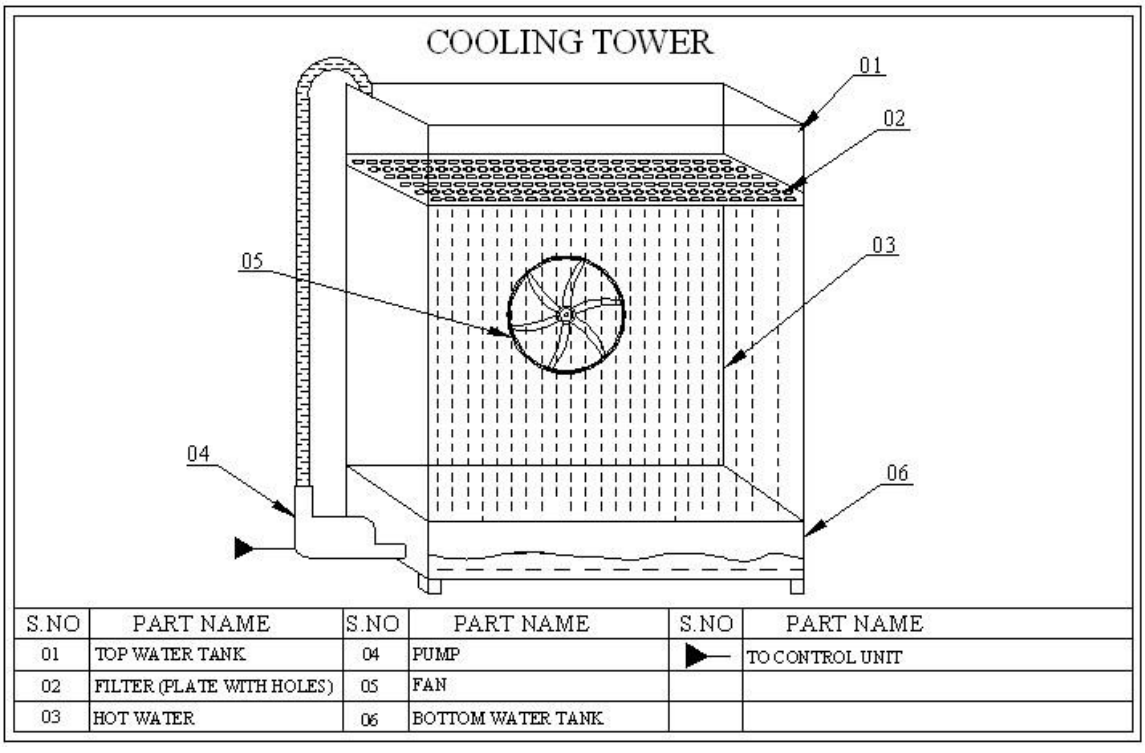
When using a proportional controller, it is very rare that the heat input to maintain the setpoint temperature will be 50%; the temperature will either increase or decrease from the setpoint, until a stable temperature is obtained. The difference between this stable temperature and the set point is called offset.

This offset can be compensated for manually or automatically. Using manual reset, the user will shift the proportional band so that the process will stabilize at the setpoint temperature. Automatic reset, also known as integral, will integrate the deviation signal with respect to time, and the integral is summed with the deviation signal to shift the proportional band. The output power is thus automatically increased or decreased to bring the Time Process with Temperature Offset PB SPTemp.

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526
International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering
Impact Factor 7.047 ⁜ Vol. 10, Issue 4, April 2022
DOI: 10.17148/IJIREEICE.2022.10460

BLOCK DIAGRAM





S.NO	PART NAME	S.NO	PART NAME	S.NO	PART NAME
01	TOP WATER TANK	04	PUMP	▶	TO CONTROL UNIT
02	FILTER (PLATE WITH HOLES)	05	FAN		
03	HOT WATER	06	BOTTOM WATER TANK		

DRAWING FOR TEMPERATURE CONTROLLER WITH COOLING SYSTEM

WORKING PRINCIPLE

The process of converting hot water into cold water is called cooling process. The main aim of the cooling tower is converting hot water input to the cold water outlet. The hot water tank is fixed on the top of the container. At the bottom of the tank a filter arrangement is placed which has number of holes in it through this the hot water is pure down and then it is cooled through the rotating fan. Then the hot water become cooled and settles down to the cold water tank. Here

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 7.047 ⁜ Vol. 10, Issue 4, April 2022

DOI: 10.17148/IJIREEICE.2022.10460

switch is used to on /off the fan motor. By the simple arrangement we can convert the hot water into cold water for different applications.

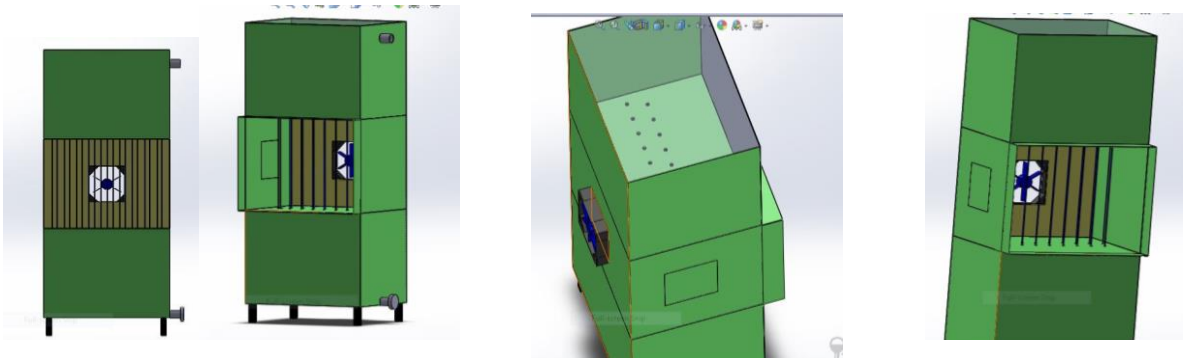
MERITS

- Simple in construction
- This system is noiseless in operation
- It is portable, so it can be transferred easily from one place to other place
- Maintenance cost is low
- Low cost and high performance

APPLICATIONS

- Common applications include cooling the circulating water used in oil refineries, chemical plants, power stations and building cooling.
- Industries Applications
- It is also used in a power plant
- Common applications include cooling the circulating water used in oil refineries, chemical plants, power stations and building cooling.

3D SETUP



CONCLUSION

The project carried out by us will make an impressing mark in the field of water boiling industries as well as home appliance. This project has also reduced the cost involved in the concern. The project has been designed to perform the required task taking minimum time. While TE technology is very controllable, there are a great many things to consider in arriving at the best solution. Every desire comes at a cost, so each must be contemplated thoroughly before proceeding. The more that cost is a constraining force in choosing a design path, the more diligent the designer must be in reigning in the 'wish list' to focus on what is absolutely necessary.

REFERENCES

[1] Madhukar S. Chavan, V.S.Suryavanshi & S.S.Sankpal, "AVR Microcontroller Based Temperature Control System, "IJARCSMS, ISSN2321- 7782,2014.
[2] Mansi Jha, "A Precision Temperature Controller Using Embedded System" IJSRPISSN 2250-3153,2013.
[3] R. Suguna, V. Usha, Mr. S. Chidambaram "A temperature control by using PID based SCR control system" ISSN: 2278- 8735,2014. [4] Tarun Kumar Das, Yudhajit Das, "Design of A room temperature and humidity controller using fuzzy logic" AJER ISSN 2320-0847, 2013.
[5] B. Levarda & C. Budaciu, "The Design of Temperature Control System Using PIC 18F46201," ICSTC, PP 282-286,2010.
[6] M. Suruthi, S. Suma, "Microcontroller Based Baby Incubator Using Sensors," IJIRSET, ISSN 2319-8753,2015.
[7] I.G. Saidu& M. Momoh& A.S. Mindaudu, "Temperature Monitoring& Logging System Suitable for Use in Hospitals, Incorporating GSM Text Messaging," IJIST,2013