International Research Journal of Education and Technology
Peer Reviewed Journal
ISSN 2581-7795

SCR Power Controller for Resistance Heating System

[1]P. Malini, [2]K. Priyadharshini, [3]R. Priyanka, [4]S. Swetha, [5]P.Yasmita

[1]Assistant Professor, [2,3,4,5]UG Students – Final Year, Department of Electronics and Communication Engineering, Vivekanandha College of Technology for Women, Namakkal, Tamilnadu, India.

Abstract

Contactor based control system having more break downs, and difficult for trouble shooting and also having more temperature variation. Thyristor based solid state heater control system will reduce breakdown and maintain the temperature accurately. The solid state thyristor controllers have been used in place of mechanical contactors. The thyristor controller reduces the system and temperature is maintains accurately.

Keywords: PID Controller, Silicon controlled rectifier, thermocouple, Temperature controller.

1. Introduction

The conductor-based ON/OFF control and using the PID controller for heating applications. In numerous utilities for many application as is needed by the business. They were earlier mistreatment contactor primarily based ON/OFF management for the heating applications that had the subsequent disadvantages.

- Repeating default
- The more power consumption
- Harm to supplies
- No rule of potential
- Manufacturing dropping monotonous breakdowns.

The use of mechanical contacts is eliminated by mistreatment Thyristorsand inflammatory disease controllers.

- Ensures an extended life amount for the instrumentation.
- It reduces the energy losses
- Lesser breakdowns and stoppages.

The PID controller is adequately massive then the contemporary transposition being sensed by the temperature observe component of the thermocouple, then the rotate ON time of light is noticeably lengthy then the rotate OFF time of the equal.

2. Related Works

If the environment transposition chose on the PID controller is adequately massive then the current transposition being control by the temperature sensing element of the thermocouple, then the rotate ON time of flash is noticeably massive then the rotate OFF time of the same. The highly complementary of the light is indicated warm, which is say that when the lamp is glowing, heating is done and when the lamp is not highly complementary warm is not need. Basically, the put off amount is that the non-heating amount and switch ON amount is that the heating amount. If the heater difference between the environment contemporary set on the PID and current transposition being observed is high, this means that warm is required to increase the transposition so on meet up with to the transposition at that is to be continue the fixed value. Therefore, the gas-discharge tube time or the activate time of the lamp is additional then the put off time as additional heat is needed to lift the temperature. As the transposition increasing nearer towards the close transposition, the rotate ON or glow time of the light lessen and rotate OFF time as the rotate OFF time expand. Because the warm required reaching the put transposition slowly becomes lesser as the temperature gradient make less.

3. Proposed System

The silicon controlled rectifier electrical converter based influence electronic surface for a directness. Standard magnet apparatus start a shifting velocity wind energy converting system is portrayed. The ac power electronic electrical converter consists important of a diode rectifier controller and a thyristor electrical converter. The electrical converter flaming angle can be adjusted endlessly to control rotor coil speed so that the best radiation interpret is achieved.

4. Block Diagram Inflammatory Disease Primarily Based Thyristor

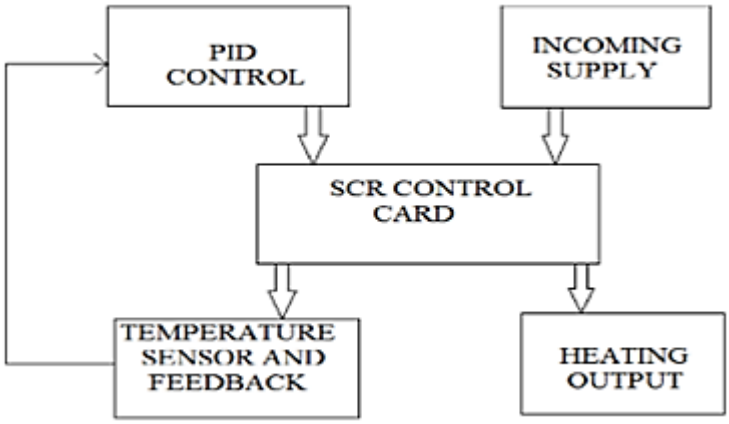

Figure1.Block Diagram of PID Based Thyristor

A proportional-integral-derivative managemental could be a generic management loop feedback mechanism wide utilized in industrial control systems .A PID controller calculates an error value.

International Research Journal of Education and Technology
Peer Reviewed Journal
ISSN 2581-7795

As the distinction between a measured method variable and a desired point. The managemental makes an attempt to attenuate the error by adjusting the method control inputs

5. Block Diagram of Thyristor

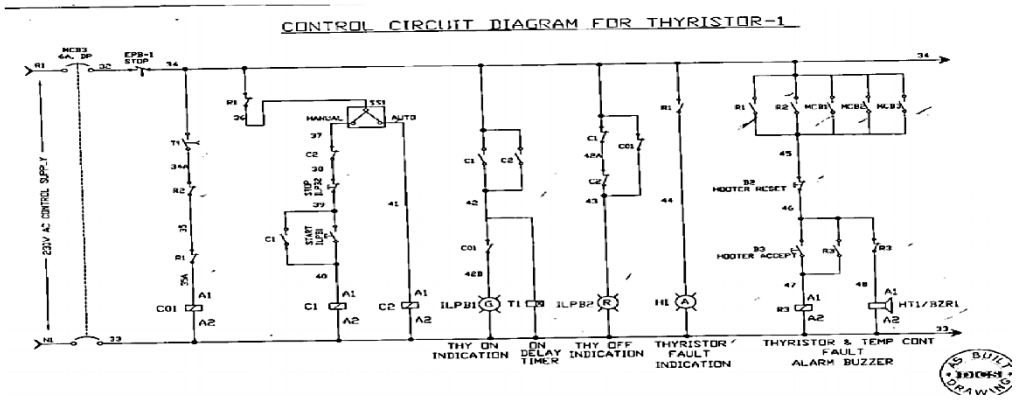

Figure 2.Circuit Diagram of Thyristors

A thyristor is also known as a SCR, is a good type of semiconductor that only allowing current to drip when a manage voltage is practical to its gate transportation system. although this applying to be nothing higher than a voltage managed switch the following should be noted in the being of forward actual .It will not turn of when the forrard actual drops to zero in a direct current circuit this makes the system about useless leave off in definite specially safety charge applications.

6. Thermocouple

A thermometer consists of two dissimilar conductors to bear, which produce a voltage when heated. The size of the voltage depends on the distinction of temperature of the junction to different elements of the circuit. Thermocouples are wide used sort of temperature device for measuring and management and may even be wont to convert a gradient into electricity. Mercenary thermocouples cut-price, not changeable, are allowing with touch stone connectors, and can determine a wide range of flash point. Thermocouples are deep employed in agrology and companies; applications typify fundamental measuring for kilns, gas vane weary, diesel engines, and another one industrial processing methods.

7. Experimental Results

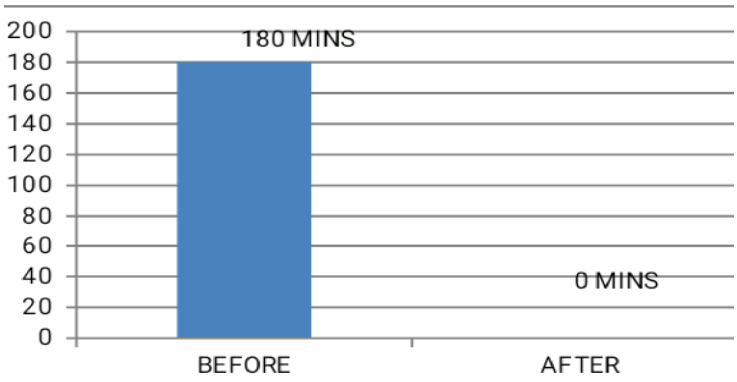

Figure 3.Proposed System Heater Failures

The above graph shows the data for the proposed system heater failures. As we have analyzed the process and the design of the heater structure in the existing method the heater failures where up to 180 minutes, so there was a loss in the production and the time to repair was also more and there is also more capital loss then these are used after the production is high.

8. Conclusion and Future Scope

Therefore, the disadvantages which were dominant with the earlier conductor supported ON\OFF security system. The current system that is used is nothing however a bigger scale execution of our model. The advantages of this method included: permits plasticity in use and fine temperature controls. Ensure a longer life period of the equipment. Reduces energy losses. Lesser disruption and energy losses ensure higher fruitfulness. PID primarily based SCR system used for many heating application. In here after, it can be utilized for the following: Reduces endless influence supply Reduces miscue actual in circuit moving ridge, avoiding breakdowns.

References

1. "PID control," in the control handbook, W. S. Levine, Ed. Piscataway, NJ: IEEE Press, 1996, PP.198_209.
2. "The future of PID Control," Eng. Pract., vol.9, no. 11, pp. 1163-1175, 2001.
3. A straightforward Event-based inflammatory disease Controller, Karl-Erik Arzen, Department of Automatic management, city Institute of Technology, Box 118, S-221 00 city, Sweden.
4. PID control system analysis, design and technology, Kiam Heong Ang, Gregory Chong, Student Member, IEEE, and Yun Li, Member, IEEE.
5. K.J.Astrom, T.Hagglund, C.C.Hang and W.K.Ho, Automatic tuning and adaptation for PID controllers-a survey.Control Eng. Pract, vol. 1, no. 4, pp. 699-714,1993.
6. "Getting the best out of PID in machine control," in proc. Dig. Inst.Elect. Eng. PG16 Colloquium (96/287), London, U.K., Oct. 24, 1996.
7. F.G.Shinskey, Feedback Controllers for the process Industries. New York: McGraw-Hill, 1994.