

TRANSPORTABLE STRESS RELIEVING PANEL.

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Abstract-

This paper presents review of transportable stress relieving panel. Traditional panels having some drawbacks such as fixed panel, heavy weight, slow response has been overcome in transportable stress relieving panel. Such a panels used for machining and cutting will cause a build up of stress in a material. Automatic stress relieving panel reduce the stress and dimensions changes of the components risk also minimized.

Key Words —Transportable, stress relieving, response, panels, machining.

INTRODUCTION

With increase in growth of industrialization such a panels plays very important role. For example, stress relieving is heat treatment process in which a metal is subjected to constant temperature that is below the metal critical temperature which can be followed by controlled cooling. Stress relieving is the process done after welding the job. When our metal is hot condition then we will apply this process. This process is manual or semi-automatic & it helps to improve the welding quality & relieve the stress of the job. It improves the quality of both welding metal as well as base of the metal. Stress means there is internal stress at the welding area. This is also known as post weld heat treatment. Many it is part of WPS (Welding Procedure Specification).

The main reason for metallurgical heat treatment process of stress relieving is tolerance residual induced stresses from the steel. This results will occur as a result of rolling, forging, machining, welding

However conventional stress relieving panels having some drawbacks such as maintenance issues operation is manually or remotely, big in size, having more weight, mechanical damage Furthermore to minimizing such a problem it is need to design a panels like movable having some benefits such as automatic operation, fault sensing relay, compact in size, light in weight.

This paper is consisting as follows. Section I explains the introduction, section II describes the objective of research, section III design of stress relieving panel, section IV and V consist with future scope and conclusion respectively.

MOTIVATION OF RESEARCH

- Reducing complexity of traditional stress relieving panels
- Automatic operation of panels using relay
- Reduce weight and size of the panels
- It can be transportable or movable.

METHODOLOGY

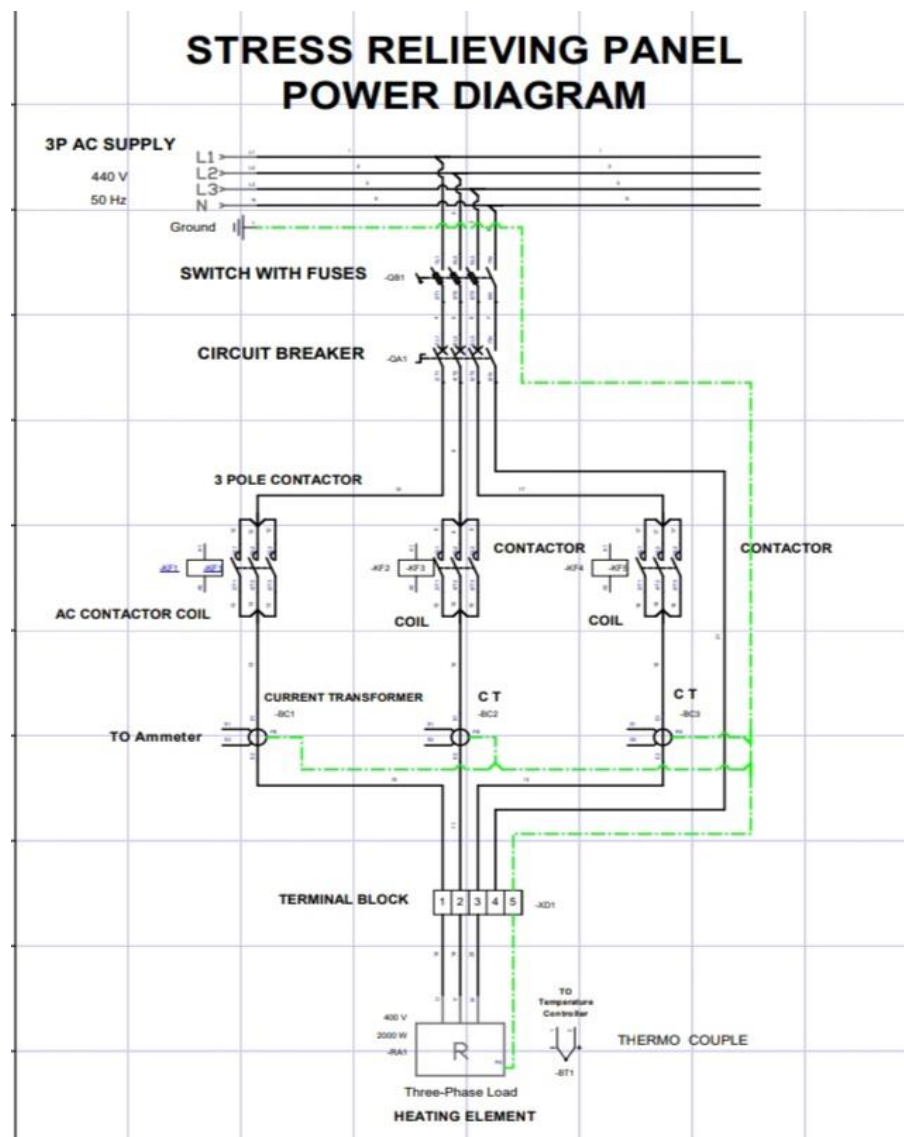


Figure 3.1

- L1, L2, L3 is main three phase, 440v, 50Hz supply goes to main switch with fuse. In that circuit breaker is also present for protection purpose.
- The output of that circuit breaker is gives to the contactors. There are three contactors of 45A.
- The output of that contactors is gives to load through CT Coil.
- At the load side we use kanthol as a heating element of 6 ohms.
- We connect the load in star connection as well as delta connection.

CONTROL DIAGRAM

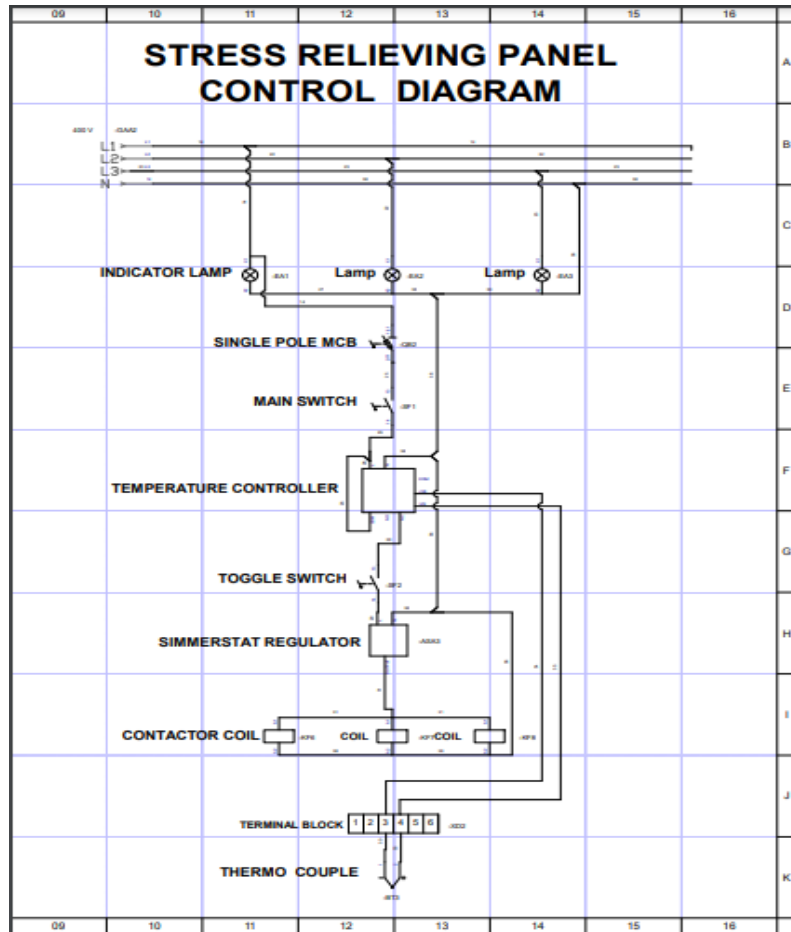


Figure 3.2

- In this we use 3 phase, 4 wire, 440v, 50Hz supply. From the above control diagram of transportable stress relieving panel consists of three indicative lamps.
- The output of these lamps gives to the MCB. Here we use 1 pole, 63A MCB for protection purpose.
- Output of these MCB is given to the main switch from the main switch we apply supply to the temperature controller. The main function of that controller is to measure the temperature on the thermocouple, compare it to the set point and to calculate the amount of time.
- The two outputs of temperature controller give to the terminal block and one is one output is gives to toggle switch. The main function of these switch is open or close the electrical circuit.
- The output of this switch is given to the simmer stat regulator. The main function of these simmer stat regulator is turning the heating element ON or OFF in hobs, grills.
- The output of simmer stat is gives to the three contactor coils. The main function of these contactor coils are provide driving force in contactor that closes the contactor.
- From above explanation we give the output of temperature controller to terminal block.
- At the last the output of terminal box is gives to the thermocouple and the process of stress relieving will be starts.

COMPONENTS OF STRESS RELIEVING PANEL

1.MCB



- **Function:**
MCB is an automatic switch that opens when excessive current flows through the circuit. MCB returns to normal automatically when the regular flow of current starts. It can be reclosed without any manual replacement.
- **Type:**
Single Pole
- **Rating:**
63Amp

2.Contactor:



- **Function:**
A contactor is a special type of relay used for switching an electrical circuit on or off. They are most commonly used with electric motors and lighting applications.
- **Type:**
3 Pole
- **Rating:**
40 MP

3.Current Transformer:



- **Function:**

A current transformer (CT) is a type of transformer that is used to reduce or multiply an alternating current (AC). (3)

- **Rating:**

1:5 Amp

4.Temperature Controller:



- **Function:**

A Temperature Controller is a device that is used to control a heater or other equipment by comparing a sensor signal with a set point and performing calculations according to the deviation between those values.

- **Rating:**

20 A

5.Switch:



- **Function:**
An electrical switch serves the purpose of controlling the flow of electrical current within a circuit.
- **Type:**
Regulator Type Switch
- **Rating:**
1A TO 100 A

6.Thermocouple:



- **Function:**
A thermocouple is a device made by two different wires joined at one end, called junction end or measuring end. The two wires are called thermos elements or legs of the thermocouple: the two thermos elements are distinguished as positive and negative ones.
- **Type:**
J Type, Pt100, K Type
- **Rating:**
J Type 0 to 750, K Type -200 to 1250

7. Indicative Lamp:



- **Function:**
Sense the phase R, Y, B
- **Type:**
LED Type
- **Rating:**
10 MP

8. Power Wire:



- **Function**
A power cable is an electrical cable, an assembly of one or more electrical conductors, usually held together with an overall sheath. The assembly is used for transmission of electrical power. Power cables may be installed as permanent wiring within buildings, buried in the ground, run overhead, or exposed. Power cables that are bundled inside thermoplastic sheathing and that are intended to be run inside a building are known as NM-B (nonmetallic sheathed building cable).

Rating:

36 Amp, 12 sq.mm

- **Type:**
Bundled Conductors

9.Control Wire:

- **Function:**
Many different techniques exist for connecting electrical conductors together: twisting, soldering, crimping (using compression connectors), and clamping (either by the tension of a spring or under the compression of a screw) are popular examples. Most industrial field wiring connections utilize a combination of compression-style crimp “lugs” (often referred to as ferrules or compression terminals) and screw clamps to attach wires to instruments and to other wires.

- **Rating:**
1 sq.mm

- **Type:**
Alpha Wire

10.Ammeter:

- **Function:**
Measure & Control value of current.
- **Rating:**
0Amp to 100 Amp, we are using 3 Amp

Type:

Analog panel ammeter.

11.Coil:



- **Function:**
This coil used as a heating element. (7)
- **Rating:**
Resistance: +/- 8, Temperature: 600 degree
- **Type:**
Kanthal Wire

12.Ceramic Beats:



- **Function:**
To insulate kanthal coil.

Type: Ceramic Insulation

- **Rating:**

Outside

Diameter: 0.200"

Inside

Diameter: 0.094"

Length: 0.210"

FUTURE SCOPE

Stress relieving is a form of post weld heat treatment. Rising demand from end user's industries is key factor driving the demand for metal heat treatment process. Manufacturing industries are integrating these processes with their existing production lines in order to enhance overall efficiency of final production

Metal heat treatment process used to improve electrical and magnetic properties. In future we can operate such a panels using computer programming.

CONCLUSION

Stress relieving is carried out on metal products in order to minimize residual stress in the structure thereby reducing the risk of dimensional changes during further manufacturing or final use of component.

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