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## **Automatic load sharing by parallel transformer using pic microcontroller**

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### **ABSTRACT**

1. Transformer is essentially a static gadget which moves the electrical power starting with one circuit then onto the next circuit with wanted change in voltage and flow at consistent recurrence. It is just a single gadget which works at most noteworthy productivity at full burden condition. Yet, strange condition happens at over-burdening condition which might bring about serious issue in future.

2. To keep away from such condition we are utilizing other reserve transformer which supplies the heap while over-burdening happens on fundamental transformer unit, which switch on consequently by Arduino. This will bring about effective stacking of the two transformers. Likewise when burden is ordinary the two transformers can be turned on to supply the heap on the other hand. This will keep away from the warm over-burdening of transformer. Additionally this plan will give legitimate support facility to the two transformers.

3. The transformer is massive hardware of force framework. It works for 24 hours of a day and feeds the heap. The transformer is abruptly expanded over its evaluated limit. When circumstance happens, the transformer will be over-burden and overheated and harm the protection of transformer bringing about of supply. The best answer for stay away from the over-burdening is to work the quantity of transformers in equal. It is same like equal activity of transformers where the quantity of transformers shares the framework load. In the recommended approach second transformer will share the heap when the heap on the principal transformer will transcend its limit. The primary point of the work is to give a continuous power supply to the energy purchasers. By execution of this plot the issue of interference of supply because of transformer over-burdening or overheating can be away from this.

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### **1. INTRODUCTION**

1. Is the in the electric power transmission. The issues of over-burdening, voltage variety and warming impacts are exceptionally normal. This drops and the optional winding gets overheated or it very well might be scorched. In this way, by lessening the additional heap, the transformer can be secured condition and the harm can be forestalled. In this work, the slave transformers share the heap of expert transformer on account of over load and over temperature conditions.

This should be possible by working one more transformer in corresponding with primary transformer through microcontroller and change over hand-off. The microcontroller thinks about the heap on the primary transformer with a reference esteem.

At the point when the heap surpasses the reference esteem, the slave transformer will naturally be associated in corresponding with first transformer and offer the additional heap. Subsequently, various transformers work proficiently under over-burden.

A sensor circuit containing microcontroller, current transformer to log the information from ace transformer and assuming that it is viewed as in over-burden condition, promptly the slave transformer will be associated in the corresponding to the expert transformer and the heap is shared. The microcontroller monitor's the heap current and temperature of transformer and presentations the qualities on LCD. Whenever loads are added to the auxiliary side of the transformer, the current at the optional side ascent.

As the heap current surpasses the evaluated current rating of the transformer, the temperature of the optional winding ascents, hence the microcontroller

will convey an outing message to the hand-off, consequently turning on the slave transformers.

, At first when we turned ON the heap that heap will be shared by the primary transformer. Whenever load has been expanded on first transformer over its appraised limit then the backup transformer (second) will share the heap naturally. In this project three modules are utilized to control the heap current.

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## 2. OBJECTIVES

The main aim of the project is to protect the Transformer under overload condition by sharing load with a Standby transformer and to provide uninterrupted power Supply to the consumers.

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## 3. LITERATURE REVIEW

Rekha.T, BinduPrakash, Asna.S, Dinesh.Sand Nandana. S.Prasad (2015), Distribution transformers are a significant piece of force framework which appropriates capacity to the low-voltage clients straightforwardly, and its activity condition is significant for the whole circulation network activity.

Be that as it may, their life is essentially decreased assuming they are exposed to over-burdening and over temperature bringing about startling disappointments and loss of supply to an enormous number of clients along these lines affecting framework unwavering quality.

\ Insurance against issue in power frameworks is exceptionally fundamental and essential for its solid exhibition. This task is an improved on way to deal with safeguard the transformers from uncommon circumstances.

For this reason two comparable sorts of appropriation transformers are utilized so that, in the event that any one transformer falls flat, promptly one more transformer is brought into the circuit during over stacking, over temperatures, input voltage varieties and gives traditional 230V stockpile to the purchasers without consuming of transformers.

The greater part of the heaps (for example Enlistment engines, bend lights) are inductive in nature and henceforth have low slacking power factor. The low power factor is exceptionally bothersome as it causes an expansion in

current, bringing about extra misfortunes of dynamic influence in every one of the components of influence framework from influence station generator down to the usage gadgets. So in this paper a programmed power factor rectification circuit is likewise consolidated with the heap sharing module.

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## 4. METHDOLOGY

In the square chart circuit breakers are utilized to make and break the associations with the transformers. A transfer is utilized to convey a stumbling message to the circuit breakers and they are stimulated on getting a sign from the microcontroller.

The current transformer is utilized for measurement reason. Three indistinguishable transformers are utilizing which are associated in equal through change over hand-off. Transformer-TF1 is a principle transformer, which is called ace transformer and transformer-TF2 is a helper transformers which is called as slave transformers.

Every transformer has its own heap taking care of limit. In the event of a typical activity the expert transformer shares the heap yet as the heap is past the appraised limit of fundamental transformer the slave transformer is associated in equal consequently and shares the heap.

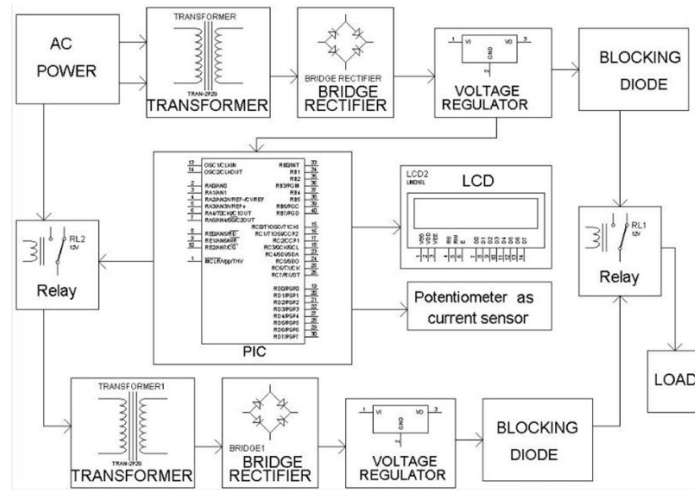
Load exchanging network is given to ON/OFF the heap on the transformers which is associated with load bank. Shunt is utilized to disseminate the current to every one of the segments of the circuit. Comparator is having two sources of info one is from shunt and the second is from the reference voltage.

Reference voltage is set by the client. Comparator (microcontroller) thinks about the reference voltage and system voltage persistently and the result signal is given to the transfer driver circuit. Hand-off driver circuit comprises of NPN semiconductor to drive the hand-off.

Hand-off driver makes a motion to the change over hand-off if there should arise an occurrence of over-burden conditions. Change over hand-off shuts its contact when load on the expert transformer is more than it's evaluated limit and the transformer-T2 for example

slave transformer is naturally associated in corresponding with the primary transformer and assuming the heap is expanded to such a sum that can't be taken care of with the two transformers then the third transformer T3 is consequently associated in corresponding with T1 and T2 and shares the heap.

Because of which the transformer-T1 isn't over-burden and the issue like overheating, consuming of twisting of transformer and uninterrupted of supply is gets disposed of by this course of action. The visual pointer contains the LED's which shows the ON/OFF status of the all transformers



### 5. HARDWARE REQUIREMENTS

1. PIC MICROCONTROLLER 16F 877A
2. LIQUID CRYSTAL DISPLAY (LCD)
3. RELAY

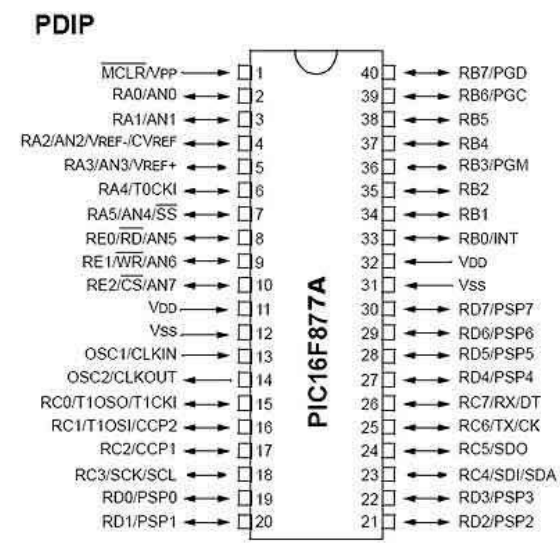
#### i. PIC MICROCONTROLLER 16F 877A

The PIC microcontroller PIC16f877a is one of the most eminent microcontrollers in the business. This is exceptionally to utilize, the coding or programming of this regulator is additionally more straightforward.

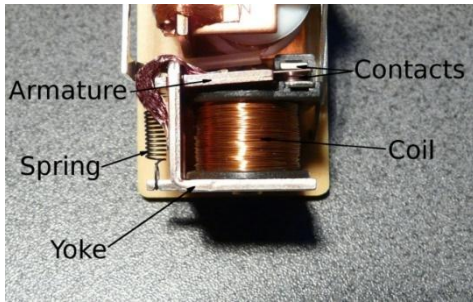
One of the primary benefits is that it very well may be compose delete however many times as could reasonably be expected on the grounds that it utilizes FLASH memory innovation. It has an all out number of 40 pins and there are 33 pins for information and result. PIC16F877A is utilized in numerous pic microcontroller projects. PIC16F877A additionally have a lot of utilization in advanced gadgets circuits.

PIC16f877a tracks down its applications in an immense number of gadgets. It is utilized in far off sensors, security and wellbeing gadgets, home robotization and numerous modern instruments. An EEPROM is likewise highlighted in it which makes it conceivable to store a portion of the data for all time like transmitter codes and recipient frequencies and another connected information. The expense of this regulator is low and its taking care of is likewise simple.

It is adaptable and can be utilized in regions where microcontrollers have never been utilized before as in microchip applications and clock capacities.



## ii. Fluid CRYSTAL DISPLAY (LCD)



LCD (Liquid Crystal Display) screen is an electronic presentation module and track down a wide scope of utilizations. A 16x2 LCD show is extremely essential module and is normally utilized in different gadgets and circuits. These modules are liked north of seven portions and other multi section LEDs. The reasons being: LCDs are efficient; effectively programmable; have no constraint of showing unique and even custom characters (not at all like in seven portions), movements, etc.

A 16x2 LCD implies it can show 16 characters for every line and there are 2 such lines. In this LCD each character is shown in 5x7 pixel grid. This LCD has two

registers, in particular, Command and Data.

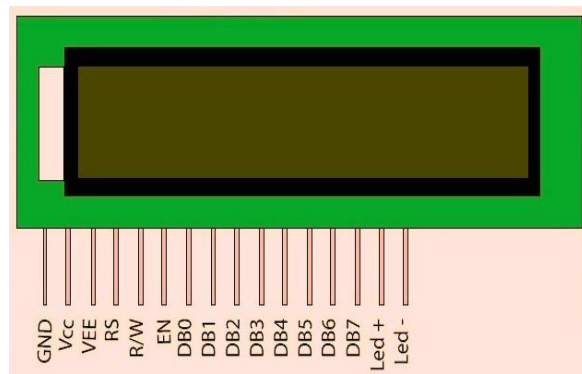
The order register stores the order directions given to the LCD. An order is a guidance given to LCD to do a predefined task like introducing it, clearing its screen, setting the cursor position, controlling showcase and so on

The information register stores the information to be shown on the LCD.

The information is the ASCII worth of the person to be shown on the LCD. Snap to dive deeper into inside design of a LCD.

## iii. RELAY

Profoundly, an iron burden which gives a low hesitance way to attractive motion, a mobile iron armature, and at least one arrangements of contacts (there are two in the hand-off imagined). The armature is pivoted to the burden and precisely connected to at least one arrangements of moving contacts. It is held set up by a spring with the goal that when the hand-off is de-empowered there is an air hole in the



attractive circuit. In this condition, one of the two arrangements of contacts in the transfer imagined is shut, and the other set is open. Different transfers might have more or less arrangements of contacts relying upon their capacity. The transfer in the image additionally has a wire associating the armature to the burden. This guarantees progression of the circuit between the moving contacts on the armature, and the circuit track on the printed circuit board (PCB) through the burden, which is fastened to the PCB.

## 6. Advantages:

1. The sharing of load in Transformer is automatically.
2. There are no manual error in operation.
3. It helps to be protected or be safe to the main transformer when load is high.
4. Continuously not disturbed supply is provided to the consumers.

## 7. APPLICATIONS

1. Generated power and system distribution.

2. Industry process.
3. Protection of transformer from high or overload condition.
4. Undisturb power supply.

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## 8. FUTURE SCOPE

1. The describes about how to use power force intelligently under peak loads. The design automatically connects and disconnects the motor therefore guarding motor from load. Seeing unit, i.e.
2. Current motor plays an important part by seeing the current through the cargo and transferring feedback signal to themicrocontroller
3. PIC Microcontroller is so programmed that as soon as the cargo exceeds a particular current limit it'll soon induce a control signal that would be amplified by the motorist unit and eventually control signal is fed to the relay.
4. The switching process occurs in the Relay which automatically connects the motor in parallel in agreement to the cargo tasted by the CT. The unborn compass of our design is particularly in Substation.
5. In substations particularly during the peak hours there's a need for the operation of fresh motor to supply the fresh cargo demand. Our design automatically connects the motor under critical loads.

Therefore there's no need to operate both mills under normal loads, particularly during off peak hours. Therefore power is participated intelligently with the mills in parallel.

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## 9. CONCLUSION

In this design we observed that if cargo on one motor is increases also the relay will smell the change in current & microcontroller operates & slave mills comes automatically in operation to partake the cargo.

The work on " Automatic cargo sharing of mills" is successfully designed, tested and a rally unit is fabricated for operating three mills in resemblant to partake the cargo automatically with the help of change over relay and relay motorist circuit and also to cover the mills from overfilling and therefore furnishing an continued power force to the guests.

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