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Smart Transformer using PLC and SCADA

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Abstract: *This article describes the ideas of education and upbringing in the period of the Khiva Khanate, as well as ideas on the issues of self-education in the lyrical works of Eastern thinkers.*

Keywords: Education, Upbringing, Historical Works, Literature, Socio-Spiritual Views.

I. INTRODUCTION

In this system, we can stop the illegal work also reduce the maintenance. We can stop the unwanted electricity wastage. Also this system provide the best service to consumer. We can modify the transformer means we provide its own brain (PLC) to take itself decision as per condition.

In this system we can monitoring transformer & also control by central office using SCADA. Also store transformer related data. We can reduce installation cost by modifying transformer infrastructure.

II. SCADA (SUPERVISORY CONTROL AND DATA ACQUISITION) & PLC

SCADA *(*supervisory control and data acquisition*)*

What is SCADA (supervisory control and data acquisition) and how does it work?

SCADA (supervisory control and data acquisition) is a category of software applications for controlling industrial processes, which is the gathering of data in real time from remote locations in order to control equipment and conditions. SCADA provides organizations with the tools needed to make and deploy data-driven decisions regarding their industrial processes.

One of the most commonly used types of industrial control system, SCADA can be used to manage almost any type of industrial process.

SCADA systems include hardware and software components. The hardware gathers and feeds data into field controller systems, which forward the data to other systems that process and present it to a human-machine interface (HMI) in a timely manner. SCADA systems also record and log all events for reporting process status and issues. SCADA applications warn when conditions become hazardous by sounding alarms.

Components of a SCADA system

SCADA systems include components deployed in the field to gather real-time data, as well as related systems to enable data collection and enhance industrial automation. SCADA components include the following:

Sensors and actuators. A sensor is a feature of a device or system that detects inputs from industrial processes. An actuator is a feature of the device or system that controls the mechanism of the process. In simple terms, a sensor functions like a gauge or meter, which displays the status of a machine; an actuator acts like a switch, dial or control valve that can be used to control a device. Both sensors and actuators are controlled and monitored by SCADA field controllers.

SCADA field controllers. These interface directly with sensors and actuators. There are two categories of field controllers:

Remote telemetry units, also called *remote terminal units* (RTUs), interface with sensors to collect telemetry data and forward it to a primary system for further action.

Programmable logic controllers (PLCs) interface with actuators to control industrial processes, usually based on current telemetry collected by RTUs and the standards set for the processes.

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SCADA supervisory computers. These control all SCADA processes and are used to gather data from field devices and to send commands to those devices to control industrial processes.

HMI software. This provides a system that consolidates and presents data from SCADA field devices and enables operators to understand and, if needed, modify the status of SCADA-controlled processes.

Communication infrastructure. This enables SCADA supervisory systems to communicate with field devices and field controllers. This infrastructure enables SCADA systems to collect data from field devices and to control those devices.

SCADA is sometimes compared with the industrial internet of things (IIoT), and while there is considerable overlap, the two terms are different. SCADA vendors tend to provide more complete, monolithic systems with tight integration across levels and devices, while IIoT vendors are likely to provide greater interoperability and more options for deploying systems and devices across an organization.

While SCADA and IIoT have significant overlap, there are differences.

Features of SCADA systems

Although SCADA systems may include special features for specific industries or applications, most systems support the following features:

SCADA vs. IIoT

	SCADA	IIoT
INTEROPERABILITY	Likely to use proprietary communication protocols for controlling components	Interoperability through standard internet protocols
SENSORS AND ACTUATORS	Usually wired connections, typically connected directly to field controllers	Wired or wireless, may not be directly connected to field controllers
DATA COLLECTION	Usually collected directly from controllers on premises	May be collected in cloud or on premises
INTEGRATION	Proprietary vendor lock-in may affect ability to integrate cross-vendor devices or software	Adherence to open standards enables integration of different devices, software

Data acquisition is a foundation of SCADA systems; sensors collect data and deliver it to field controllers, which, in turn, feed data to the SCADA computers.

Remote control is achieved through the control of field actuators, based on the data acquired from field sensors.

Networked data communication enables all SCADA functions. Data collected from sensors must be transmitted to SCADA field controllers, which, in turn, communicate with the SCADA supervisory computers; remote control commands are transmitted back to actuators from the SCADA supervisory computers.

Data presentation is achieved through HMIs, which represent current and historical data to the operators running the SCADA system.

Real-time and historical data are both important parts of the SCADA system, as they enable users to track current performance against historical trends.

Alarms alert SCADA operators to potentially significant conditions in the system. Alerts can be configured to notify operators when processes are blocked, when systems are failing, or when other aspects of SCADA processes need to be stopped, started or adjusted.

Reporting on SCADA system operations can include reports on system status, process performance and reports customized to specific uses.

SCADA architecture

SCADA systems operate at five of the six levels defined in the Purdue Enterprise Reference Architecture for enterprise integration:

Level 0. The field level includes field devices, such as sensors, used to forward data relating to field processes and actuators used to control processes.

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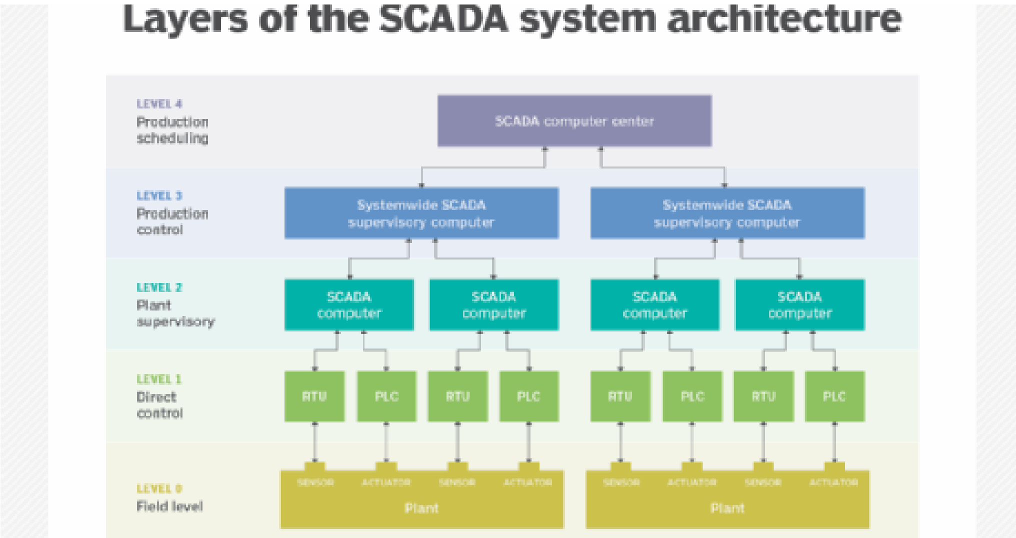
Level 1. The direct control level includes local controllers, such as PLCs and RTUs, that interface directly with field devices, including accepting data inputs from sensors and sending commands to field device actuators.
Level 2. The plant supervisory level includes local supervisory systems that aggregate data from level controllers and issue commands for those controllers to carry out.
Level 3. The production control level includes systemwide supervisory systems that aggregate data from Level 2 systems to produce ongoing reporting to the production scheduling level, as well as other site or regionwide functions, like alerts and reporting.
Level 4. The production scheduling level includes business systems used to manage ongoing processes.
SCADA system architecture spans from the shop floor to the enterprise network



SCADA use cases and industry examples
SCADA is used to assist in automating and managing industrial processes that have become too complex or cumbersome for human monitoring and control. SCADA is particularly useful for processes that can be monitored and controlled remotely, especially in cases where it is possible to reduce waste and improve efficiency.
Some common industry examples of SCADA industrial automation are the following:
electricity generation and distribution;
oil and gas refining operations;
telecommunications infrastructure;
transportation and shipping infrastructure;
fabrication and other industrial processing;
food and beverage processing;
chemical manufacturing; and
utilities infrastructure, including water and waste control.
With SCADA, these processes can be monitored closely and tweaked to improve performance over time.

Evolution of SCADA architecture
The history of SCADA parallels the history of enterprise computing. The earliest SCADA systems were implemented in large industrial enterprises, as they first started to integrate mainframe computing resources with industrial processes. As computing, networking, and process monitoring and control systems have improved, SCADA evolved through the following four stages:

First generation: Monolithic systems. SCADA systems implemented in the 1960s and 1970s usually incorporated RTUs at industrial sites connected directly to mainframe or minicomputer systems, usually also on-site or connected over wide area network

Second generation: Distributed systems. SCADA systems took advantage of wide availability of proprietary local area networks and smaller, more powerful computers during the 1980s to enable greater sharing of operational data at the plant level and beyond. However, the lack of open networking standards prevented interoperability across SCADA product vendors.

Third generation: Networked systems. SCADA systems depended on greater interoperability provided by industry acceptance and incorporation of standard network protocols during the 1990s. SCADA systems could be scaled more easily, as enterprises were able to integrate systems across their own industrial infrastructure, while using a wider variety of devices and systems.

Fourth generation: Web- or IIoT-based systems. SCADA systems began appearing in the early 2000s as SCADA vendors embraced web software development tools to enable transparent interoperability and access via universally available interfaces, like web browsers running on handheld devices, laptops and desktop computers.

As cloud computing increasingly dominates the enterprise computing world, it is also changing SCADA systems. SCADA systems can be scaled faster and more easily by allocating cloud computing resources as needed for surges and reducing those resources when demand drops.

Legacy vs. modern SCADA

Organizations still use legacy SCADA computing resources, like mainframes and old proprietary sensors and actuators. These systems may still be functional, in which case organizations can be reluctant to invest in more modern SCADA systems.

Modern SCADA systems that rely on network interoperability, distributed computing and modern communication infrastructures offer better returns on investment of time and resources

Benefits of modern SCADA

The benefits of updating legacy SCADA systems include the following:

Scalability. Modern SCADA systems are more scalable than legacy systems for several reasons, including better availability of supported hardware and software and use of cloud computing to meet workload demand.

Interoperability. Legacy SCADA systems rely on proprietary hardware and software, resulting in vendor lock-in.

Communications. Modern SCADA systems support more widely supported and modern communications protocols, which enable greater accessibility to SCADA data and controls.

Support. Legacy SCADA systems may have limited options for support, while modern systems are more likely to be well supported by vendors. Use of commercial off-the- shelf hardware, open networking standards and modern software development platforms makes third-party support more accessible as well

PLC (Programmable Logic Controllers)

PLC Basics

Programmable Logic Controllers (PLCs) are industrial computers, with various inputs and outputs, used to control and monitor industrial equipment based on custom programming.

PLCs come in many different sizes and form factors. Some are small enough to fit in your pocket, while others are large enough to require their own heavy-duty racks to mount. Some PLCs are more modular, with only basic I/O (Inputs and Outputs), but can be customized with additional back planes and functional modules (such as analog I/O, communications modules, or display modules) to fit different types of industrial applications.

PLC Programming

PLCs are widely used in a variety of industries because they are fast, easy to operate, and considered easy to program. There are five standard PLC programming languages. The most commonly used language is Ladder Logic, but it is also possible to use Function Block Diagrams, Sequential Function Charts, Structured Text, or Instruction Lists to achieve the same functionality.

PLCs and SCADA

SCADA and HMI systems enable users to view data from the manufacturing floor and provide user interfaces for control and monitoring — and PLCs are an essential hardware component element in these systems.

PLCs act as the physical interfaces between devices on the plant or manufacturing floor and a SCADA or HMI system. PLCs can communicate, monitor, and control complex automated processes such as conveyors, temperature control, robot cells, and many other industrial machines.

PLC Operation :

A PLC's operation is broken down into three stages: inputs, program execution, and outputs. PLCs capture data from the plant floor by monitoring inputs from any connected machines or devices. These inputs are checked against the program logic, which changes the outputs to any connected output devices. It is possible to have the same machine connected to both inputs and outputs on the same PLC, such as a valve position sensor connected to the inputs with the control of that valve position connected to the outputs. A program could read the current position of that valve, check to see if it needs to move, then move the valve position with the output.

PLCs often make a distinction between Digital (or Discrete) and Analog I/O. Digital I/O acts like a standard light switch where the state is either on or off, with no states between. Analog I/O acts like a dimmer switch, where the state can be anywhere between on and off.

It is easy to think of there being two sources of input data for PLCs: Device input data, automatically generated by a machine or sensor, or User input data, generated by a human operator using an HMI or SCADA system.

The Device input data comes from sensors and machines that send information to the PLC. This can include:

On/Off states for things like mechanical switches and buttons

Analog readings for things like speed, pressure, and temperature

Opened/Closed states for things like pumps and valves

Human-facilitated inputs can include button pushes, switches, sensors from devices like keyboards, touch screens, remotes, or card readers.

PLC outputs are very similar to inputs, but can also include audible or visual indicators for the user, such as turning on a warning light, or sounding an alarm beacon. Other outputs can include:

Opening or closing a valve

Adjusting the speed on a motor

Turning a heater On or Off

PLC programs operate in cycles. First, the PLC detects the state of all input devices that are connected to it. The PLC executes the user-created program, using the state of the inputs to determine the state that the outputs should be changed to. The PLC then changes the output signals to each corresponding device. After completing all these steps, the PLC then does a housekeeping step, which includes an internal diagnostic safety check to ensure that everything is within normal operating conditions. The PLC restarts the cycle each time the process is completed, starting again by checking inputs.

PLCs and Ignition

With a wide range of available Ignition device drivers, you can connect Ignition with just about any modern or legacy PLC. Once the device driver is installed, data can be viewed or sent to the PLC. With PLC data now available to Ignition's tag system, you can do so much more with Ignition's robust core modules.

With Ignition, it is possible to create a comprehensive SCADA and MES system, HMI system, Alarming and Reporting solution, or an enterprise-wide solution to view and control data on a PLC at any level of an organization.

PLC Communication

Traditionally, PLCs communicate using the poll-response method. In local plant and manufacturing environments, this type of communication method is usually fine, since the communication distances are short and predominantly hardwired. With poll-response, PLCs are constantly communicated with to check for any data changes.

As the Industrial Internet of Things (IIoT) becomes more popular, there is an increased need for data from remote locations. This translates to more PLCs and computing devices at the edge of the network. Cellular networks are frequently used in communications with edge devices that require data transmission across long distances. However, due to the high frequency of poll-response communication, cellular networks can incur an incredibly high cost when used this way.

To address this issue, solutions such as MQTT, in conjunction with the Sparkplug B Specification, employ a publish-subscribe protocol to streamline communications from the edge of the network. While modern PLCs employ modern communication protocols, legacy PLCs that are still at the edge of the network require additional hardware to deliver the same functionality. Edge gateways, such as Ignition Edge IIoT along with an MQTT broker, pull data from legacy PLCs using poll-response and then transmit the data using a publish-subscribe protocol.

This IIoT architecture allows industrial organizations to build IIoT solutions on top of brownfield systems, improving bandwidth usage and making data from edge-of-network PLCs widely available throughout the organization.

The Future of PLCs

The industry continues to see new products entering the market ranging from devices like Programmable Automation Controllers (PACs), which combine the functionality of PLCs with higher-level PC functionality, all the way to industrial embedded hardware.

Even with these new products, PLCs remain popular because of their simplicity, affordability, and usefulness. And software like Ignition will enable organizations to maximize their usefulness for many years to come

III. BLOCK DIAGRAM

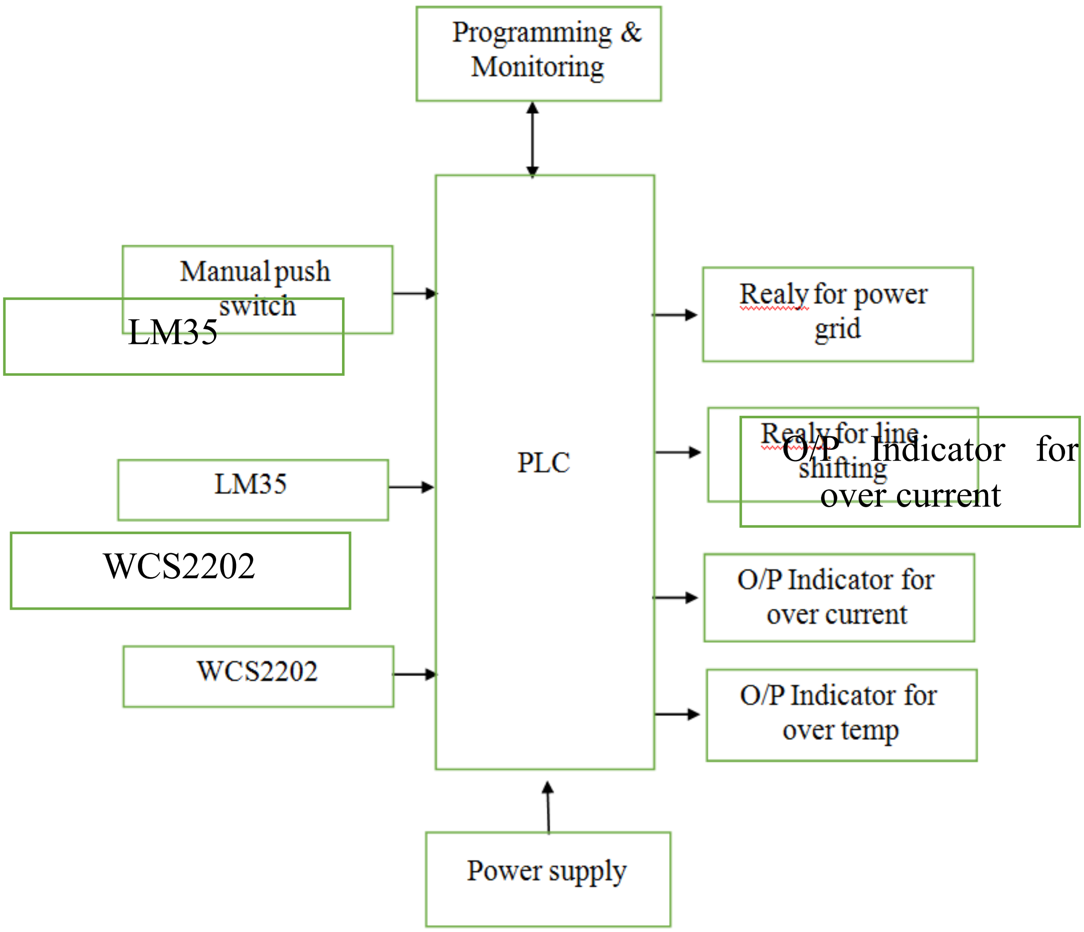


Fig 3.1 BLOCK DIAGRAM

The online monitoring of distribution transformer is required for automation as well as protection of transformer. The automation of distribution transformer has been done by using Programmable Logic Controller (PLC) based system. A Supervisory Control and Data Acquisition (SCADA) based system is also required for real time operation and online monitoring of transformer. The combination of PLC and SCADA is given the reliable real time operation and proper online monitoring of present state of distribution transformer.

WORKING PRINCIPLE OF PROJECT

PLC is the heart of the project. There are four basic steps in the operation of all PLCs; Input Scan, Program Scan, Output Scan, and Housekeeping. These steps continually take place in a repeating loop. Energizes or de-energize all output devices that are connected to the PLC.

SCADA systems acquire data from sensors and network devices connected to PLCs. They measure parameters such as speed, temperature, weight, flow rate, gaseous emissions and pressure. This raw data is then sent to a PLC to process, and then on to an HMI for a human operator to analyze and make decisions as required.

The LM35 temperature sensor uses the basic principle of a diode to measure known temperature value. As we all know from semiconductor physics, as the temperature increases the voltage across a diode increases at a known rate.

WCS2202 consists of a precise, low-temperature drift linear hall sensor IC with temperature compensation and AC to DC rectifier circuit and a current path .

The electromagnetic field that creates the temporary magnetic field is energised when the relay's circuit detects the fault current. This magnetic field moves the relay armature to open or close connections.

Technical Specification

1)Supply : 230V AC 50 Hz
5V DC
12V DC
24V DC
PLC : Delta DVP 14 SS
Language : Ladder Logic
Communication : Serial type

IV. SYSTEM DESIGN

PLC Delta

The Delta Compact Modular Mid-range PLC AS Series is a high performance multi-purpose controller designed for all kinds of automated equipment. It features Delta's self-developed 32- bit SoC CPUs for enhanced execution speed (40 k steps/ms) and supports up to 32 extension modules or up to 1,024 inputs/outputs

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Specifications

1. MPU points: 14 (8DI + 6DO) 2. Max. I/O points: 494 (14 + 480)

Program capacity: 8k steps

COM port: Built-in RS-232 & RS-485 ports, compatible with Modbus ASCII/RTU protocol. Can be master or slave.

High-Speed Pulse Output : Supports 4 points (Y0 ~ Y3) of independent high-speed (max. 10kHz) pulse output

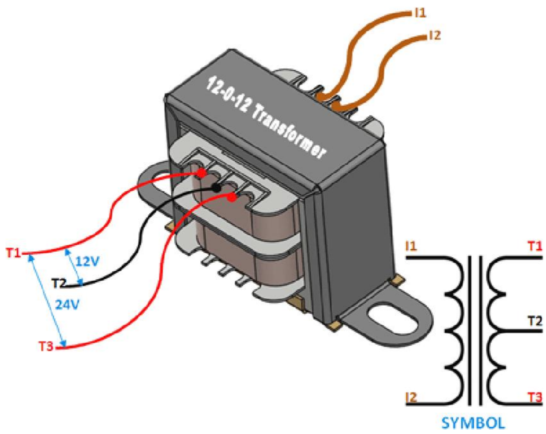
Supports PID Auto-tuning : DVP-SS2 saves parameters automatically after the PID auto temperature tuning is completed.

Built-in High-Speed Counters

1-phase 1		1-phase 2		2-phase 2	
Points	Bandwidth	Points	Bandwidth	Points	Bandwidth
4/4	20kHz/10kHz	2	20kHz	2/2	10kHz/5kHz

AS series standard CPU features Delta's self-developed 32-bit SoC CPUs for enhanced execution speed (40 k steps/ms) and supports up to 32 extension modules or up to 1,024 inputs/outputs. It provides accurate positioning control for up to 8 axes via CANopen motion network and max. 6 axes via pulse control (200 kHz)

Transformer (12-0-12v,5A)



Transformer Terminal Description

No:	Terminal Name	Description
1	I1 and I2	These are the input wires for the transformer, it is connected to the phase and neutral of AC mains
2	T1 and T3	There are the output terminals of the Transformer, the voltage across it will be 24V AC
3	T2	This is the centre tapped wire of the transformer; this wire can be combined with either T1 or T3 to get 12V AC across it. It's very useful for rectifier circuits

12-0-12 Centre Tapped Transformer Specifications

Step-down Centre tapped Transformer

Input Voltage: 220V AC at 50Hz

Output Voltage: 24V, 12V or 0V

Output Current: 5A

Vertical mount type

Low cost and small package

4.3. WCS 2202

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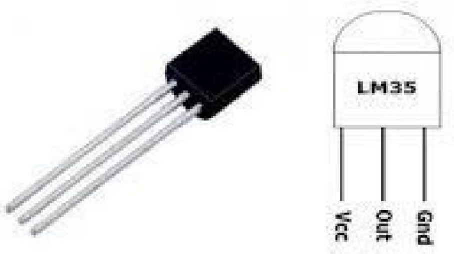
Features:
Output voltage proportional to AC and DC current
Built-in AC to DC rectifier circuit 8.3 mΩ internal conductor resistance
Wide sensing current range 0~2.5 A at 5V volt
High sensitive differential outputs Single Ended, Sensitivity: 560 mV/A Differential output, Sensitivity: 1120 mV/A
Wide operating voltage range 3.0~12 V
Low operating current 3 mA Nearly zero magnetic hysteresis
Ratiometric output from supply voltage
10 K Hz Bandwidth
Isolation voltage 1000V
"Output voltage" is 1/2 supply voltage at zero current Functional

Description :
The Winson WCS2202 current sensor provides economical and precise solution for both DC and AC current sensing in industrial, commercial and communications systems. The unique package provides easy implementation without breaking original system and make current sensing possible. Typical applications include motor control, load detection and management, overcurrent fault detection and any intelligent power management system etc… The WCS2202 consists of a precise, low-temperature drift linear hall sensor IC with temperature compensation and AC to DC rectifier circuit and a current path with 8.3 mΩ typical internal conductor resistance. This extremely low resistance can effectively reduce power loss, operating temperature and increase the reliability greatly. Applied current flowing through this conduction path generates a magnetic field which is sensed by the integrated Hall IC and converted into a proportional rectified DC voltage. The terminals of the conductive path are electrically isolated from the sensor leads. This allow the WCS2202 current sensor to be used in applications requiring electrical isolation without the use of opto-isolators or other costly isolation techniques and make system more competitive in cost.

LM35 Sensors



The LM35 is a precision integrated-circuit temperature sensor, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 has an advantage over the linear temperature sensor calibrated in ˚ Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4˚C at room temperature and ±3⁄4˚C over a full −55 to +150˚C temperature range. Low cost is assured by trimming and calibration at

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the wafer level. The LM35's low output impedance, a linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1˚C in still air. The LM35 is rated to operate over a −55˚ to +150˚C temperature range.

LM35 Features
Calibrated directly in ˚ Celsius (Centigrade)
Linear + 10.0 mV/˚C scale factor
0.5˚C accuracy guaranteeably (at +25˚C)
Rated for full −55˚ to +150˚C range

Power supply 24 ,12V & 5V

Specifications
General

Model Id	24V 1A Power Adapter, Power Supply Ac Input 100-240V Dc Output 24Volt 1Amps Worldwide Adapter (Black)
Model Name	24V-1AMP
Power Input	220
Output Current (A)	1
Cable Length (m)	1.5
Short Circuit Protection	Yes

Specifications
General

Model Id	12V 1A Power Adapter, Power Supply Ac Input 100-240V Dc Output 12Volt 1Amps Worldwide Adapter (Black)

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Model Name	12V-1AMP
Power Input	220
Output Current (A)	1
Cable Length (m)	1.5
Short Circuit Protection	Yes

Specifications

General

Model Id	5V 1A Power Adapter, Power Supply Ac Input 100-240V Dc Output 5Volt 1Amps Worldwide Adapter (Black)
Model Name	5V-1AMP
Power Input	220
Output Current (A)	1
Cable Length (m)	1.5
Short Circuit Protection	Yes

RELAY

24V DC 20 amp SPDT Relays are widely used in electrical applications where one circuit is to be energized or turned "on" by the presence of a voltage, provided by another circuit. An example of this is when a projector turns on it has a 24V signal to let different accessories know it's on. Anywhere a switch can go in a circuit, a relay can replace it, (as long as there is a triggering voltage available to activate it).

The "switch" in a relay is more often called a solenoid or coil. A solenoid is like a piston that pushes outward when energized with electricity. This push mechanically trips the switch in the relay, completing circuit and allowing the switched voltage output.

A relay can be triggered with an electrical pulse as small as 75 milliamps. The switched output can be as high as 20 amps or more. One very useful use of a relay is to control a high current device such as a linear actuator motor with a low current signal, such as a projector or home theater controller. Another common use for relays is to separate control voltage from motor voltage. This is useful when you've got a control voltage of 24V and you want to control a linear actuator running on 36V.

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Push & on-off switch 4.7.1Push switch

Modular Design
Quick, Easy Installation with Tool-less Mounting Latch
Plastic Operators: NEMA 4/4X/13 (IP66) Environmental Rating
Metal Operators: NEMA 4/13 (IP66) Environmental Rating
Heavy-Duty Current Ratings (10A continuous)

on-off switch

ROHS Compliant	Yes
Switch Type	Standard Rocker
Power/Voltage	0-220v
Usage/Application	MICRO CIRCUIT SWITCH
Material/Body	Plastic

Overall size: ~1. 5 x 1 x 1. 7cm / 0. 6" x 0. 4" x 0. 7"(l
-w*h). Terminals: 2 pin (on-off). 3a 250vacc, 6a 125vac. Black,

Indicator(PLC 24v)

RED Panel Indicator 24V
24 Volts LED Panel Mount RED Indicator
This type of Panel mount LED Indicator also called as Pilot Lights that is used in Industrial Panels for On, Off, Run, Trip, Start, Stop Indication. Red Panel Mount indicator light has long service life, lower power consumption and compact. With concealed terminal, it is both safe and creditable.
These indicators can be used directly with PLC's having 24 volt output or can also be interfaced to a Microcontroller through a Relay.

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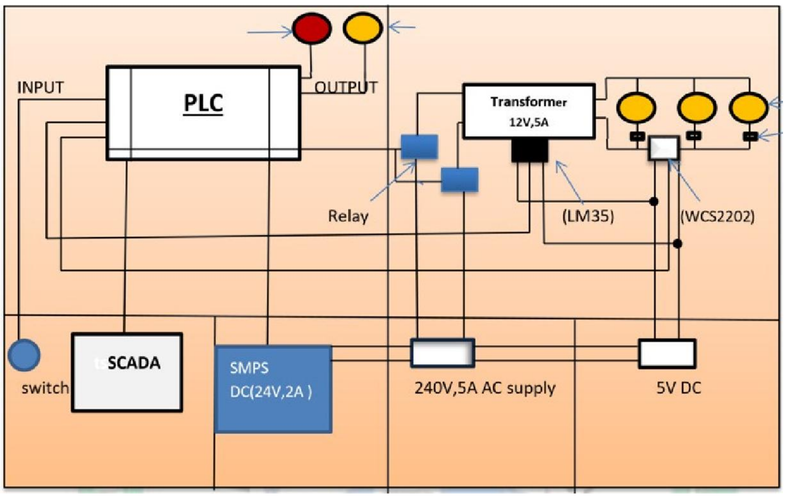
Features Of Red Panel Indicator
High-strength Polycarbonate lampshade material
Indicator Lamp is anti-interference signal Lamp Built-in screw wire is more safe and convenient
Colour : Red Green
Input Voltage : 24 Volts AC/DC
Mounting depth: Approx. 29mm/1.1".
Size : Fit for 22mm-25mm/0.86"-0.98" diameter mounting hole, Panel Mounted

Ac bulb (12v)

Specifications:
Volt: 12v AC/ DC 1-3 Amp Shape: round
Weight :25g

V. PROJECT CIRCUIT DIAGRAM



VI. TESTING AND TROUBLESHOOTING

Before soldering in components:
-check that component agree with the part list if in any doubt double check the polarized components
-If there is a significant time elapse between circuits, take trouble to read the article; the information is often given in a very condensed from.try to get most important point out of the description of the operation of the circuit, Even if you don't understand exactly what is supposed to happen.
- If there is any doubt that some component may not may be equivalent, check that they are compatible.
-Only use good quality IC socket.
-Make sure that all drilling, filling and other 'heavy' work is done mounting any component.
-If possible keep any heat sinks well isolated from other components.
-Make wiring diagram if the layout involves lots of wires spread out any all direction.
-check that the connectors used compatible and that they are mounted the right way round.

-Do not reuse wire unless it is of good quality. Cut off the ends and strip it a new.

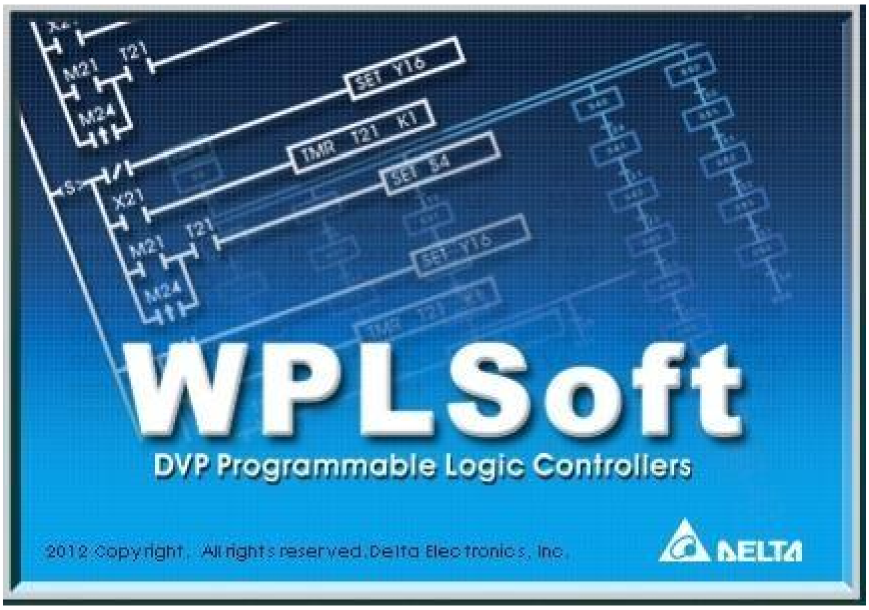
After mounting the component:-

-Inspect all the soldered joints by are using a magnifying glass the check them with a continuity tester. Make sure there are no dry joints and no tracks are short circuited by poor soldering.
-Ensure that the positions of all the component agree with mounting diagram.
-Check that any links needed are present and that they are in the right positions to give the desired configuration.
-Check all the polarized components are fitted correctly.
-check the wiring (watch for off cuts of components leads) at the same time ensure that there are not short-circuits between potentiometer, switches, etc. And there immediate surrounding (other components or the case).Do the same with mounting hardware such as spacers, nuts and bolts etc.
-Ensure that the supply transformer is located as closely as possible to the circuits (this could have significant improvement in the case of critical signal level).
-Check that the connections to the earth are there and that they are of good contact
-Make sure the circuit is working correctly before spending any time putting it into a case. And if it breaks down:
-Recheck everything suggested to far.
-Re-read the article carefully and carefully anything about which you are doubtful.
-Check the supply voltage or voltages carefully and make sure that they reach the appropriate components especially pins of the ICs (test the pins of ICs and not the soldered joints).
-Check currents (generally they are stated on the circuit diagram or in the text). Don't be too quick to suspect the ICs of overheating.
-If possible check the operation of the circuit in the separate stages as a general rule follow the course of the signal.
-While checking voltages, currents, frequencies or testing the circuits with an oscilloscope work systematically and takes notes.
-And don't forget to switch the power on and check the fuses

VII. SOFTWARE PART

WPL Software:

WPLSoft is **a program-editing software made for the Delta DVP-PLC series used under WINDOWS**. And this course is covering complete programming of PLC Model DVP-14SS2 of Delta PLC. After doing this course, you can easily program the other PLC series. This software is used for all the PLC series



How to Use Delta WPL Soft Simulator Software? (Beginners)

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International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
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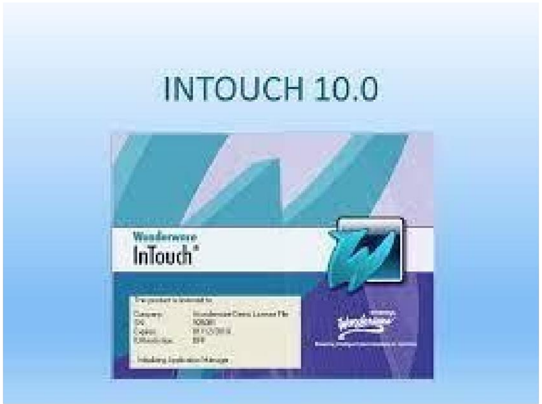
Volume 3, Issue 5, April 2023

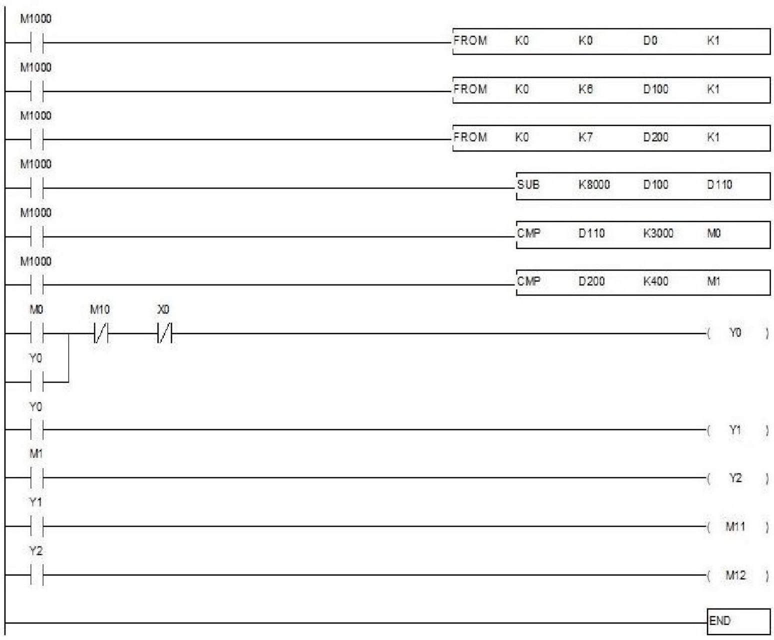
Step 1: Install WPLSoft Simulator Version 2.41. ...
Step 2: Make Project File. ...
Step 3: Start Your Project. ...
Step 4: Select NO (Normally Open Switch) ...
Step 5: Then Add NC (Normally Close) Switch. ...
Step 6: Add Output Coil (Y0) ...
Step 7: Now Add TMR (Timer)

WPL Software:
SCADA is a central control system that includes controller network interfaces, input / output, communication equipment and software. Wonderware "In Touch" provides a unified integrated view of all your controls and information resources.
Supervisory Control and Data Acquisition (SCADA) systems are used for **controlling, monitoring, and analyzing industrial devices and processes**. The system consists of both software and hardware components and enables remote and on-site gathering of data from the industrial equipment



VIII. PROGRAMMING PART

Ladder Diagram



SCADA Interface

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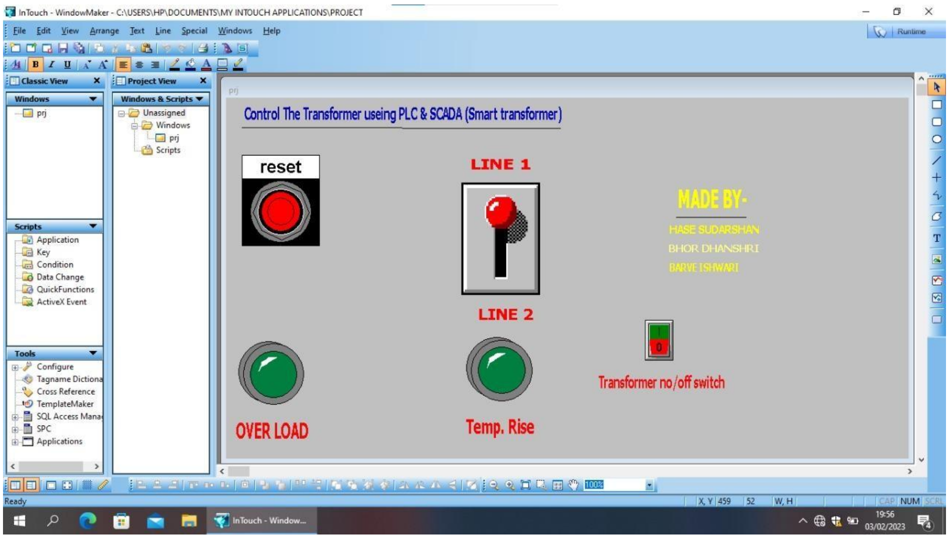

IX. SYSTEM OVERVIEW

ADVANTAGES OF PROJECT

Stop electricity robbery
Reduce maintenance
Reduce man power
Provide a consumer stable electricity

DISADVANTAGES OF PROJECT

Complex circuitries
Only expert can handle this circuitries

APPLICATION OF PROJECT

The presented system can be placed outside
public place such as a
Bus stop
Hospital
School
Colleges
Railway station
Shopping mall
Industries
Educational institute bank , hoste

X. CONCLUSION

We are able to use PLC & also understand PLC program Logic.
We are able to identify different types of sensors & its uses.
We are found a proper solution of our project related problems.

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