

LabVIEW Based Real Time Monitoring of HVAC System

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Abstract : This paper presents and discusses the real time monitoring of Heating Ventilation and Air- Conditioning (HVAC) system by using LabVIEW software. In this project we are measuring electrical as well as environmental parameters like current, voltage, power, power factor and temperature, humidity. The objective of this project work is to demonstrate the operation of real time monitoring of HVAC system.

Keywords: Heating Ventilation and Air- Conditioning (HVAC) system, electrical and environmental parameters effects, efficiency, monitoring of variables using LabVIEW

I. INTRODUCTION

Air conditioning system is playing very important role in our life. As per survey [1], around (55 to 65)% of the consumption of electrical energy in domestic buildings is utilized by air-conditioning systems. In this project we can monitor the different parameters such as temperature, humidity flow level, current, voltage, etc using LabVIEW[2]. The LabVIEW is used to interface different parameters and display this parameters. LabVIEW has two panels one is front panel and second is back panel. In front panel window shows output of this project continuously. The main objective of this is to observe the real time monitoring of the HVAC system. LabVIEW is graphical programming software and it helps us to visualize every aspect of your applications including hardware configuration measurement of data. This system support for research and education purpose.

II. LITERATURE SURVEY

Sr. No	Authors	Papers	Remarks
1.	Ramteen Sioshansi, Vincenzo Marano	Energy consumption of residential HVAC systems : a simple physically – based model	The model has been implemented In MATLAB and its flexibility allows different conditions to be easily simulated and impact of different technology adoptions to be assessed.
2.	Alessandra Parisio, Luca Febietti	Control of HVAC systems via Scenario- based Explicit MPC	The strategy has been implemented and tested on a real room of building.
3.	Myeong-in Choi, Keonhee Cho	Design and implementation of IoT-Based HVAC System for Future Zero Energy Building.	ZEB technologies are under investigation as a solution to problems of greenhouse gas emissions and energy depletion.
4.	Janani Rajaraman, K.Saraswathi	A Labview Based Monitoring and Controlling of Various Process Variables	The simple ON-OFF controller is designed in LabVIEW for Temperature Measurement. This is used in higher process stations in many industries using LabVIEW
5.	C. A. Belhadj, W. M. Hamanah, M. Kassas	LabVIEW Based Real time Monitoring of HVAC System for Residential Load	An experimental set up for HVAC System performance monitoring system was achieved using LabVIEW VI modules. The completely integrated system achieved real time measurements of HVAC System for Residential Load.

III. SYSTEM DEVELOPMENT

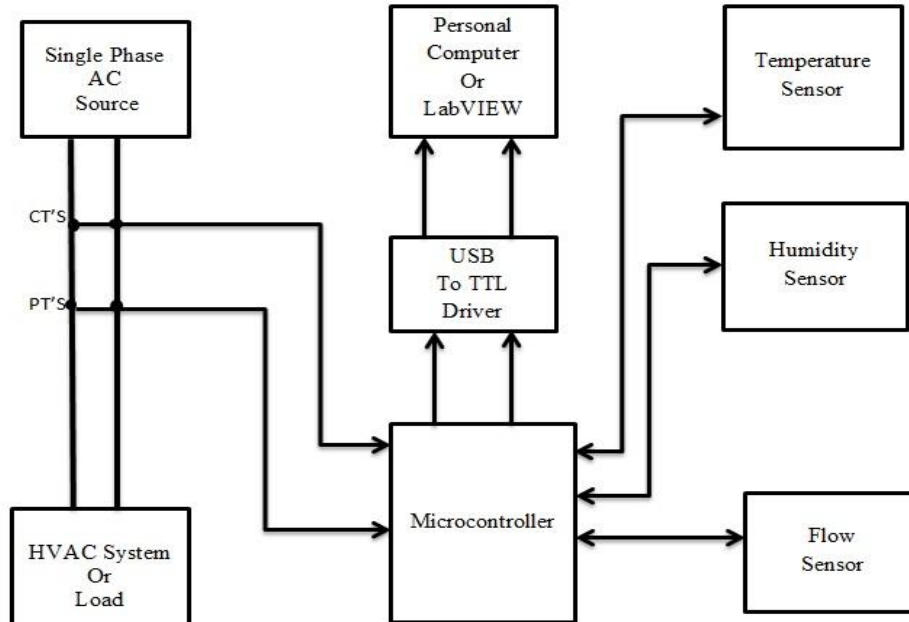


Figure1. Block diagram

This is the block diagram of a project. I am using here environmental as well as electrical parameters to measure temperature, humidity, flow of air from duct line, voltage and current respectively.

Current transformer: the current transformer is a type of instrument transformer that is designed to produce an AC current.

- It reduces high voltage current
- It reduces step down current flow.

Potential Transformer: Potential transformer is used to transmission of voltage from higher value to lower value. This transformer step down the voltage to a safe limit value which can be easily measured by ordinary low voltage instruments like a voltmeter and wattmeter.

Temperature and humidity sensor: this sensor is used to detect the changes in moisture and air temperature in environment.

Flow sensor: The flow sensor is used to provide output signals readily convertible to air from an HVAC system.

USB to TTL Adapter: A USB adapter is a type of converter which is used for converting USB data signals to other communications standards. USB adaptors are used to convert USB data signal to standard serial port data and standard port data to USB data signal.

HVAC system: In this project HVAC system play a main roll because by using this system we have to measure the temperature, humidity, current, voltage, power, power factor, and flow of air.

LabVIEW software: the full form of LABVIEW is Laboratory Virtual Engineering Workbench. It is used to display electrical parameter to environmental parameters in front panel of LabVIEW. It is graphical programming software. Program of LabVIEW is known as virtual instruments (VI).

IV. RESULTS

This model has been developed for real time monitoring of a HVAC system using different types of sensors. Displayed figure shows front panel of a LabVIEW.

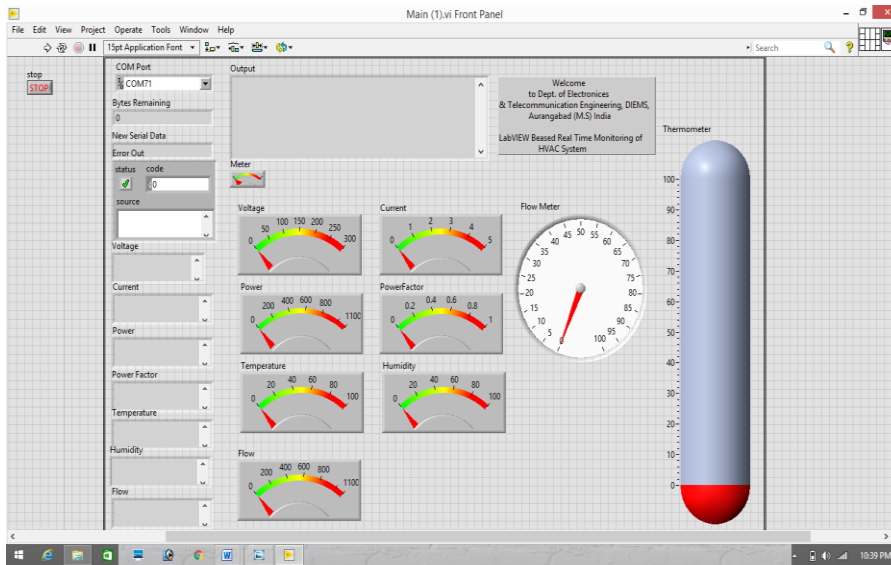


Figure2. Front Panel of Project

In this figure, by using LabVIEW we are calculating output of an HVAC system, like temperature, humidity, flow of air through HVAC system, voltage, current, power factor, power. This electrical as well as environmental parameters are checked by using different sensors and show in front panel of LabVIEW.

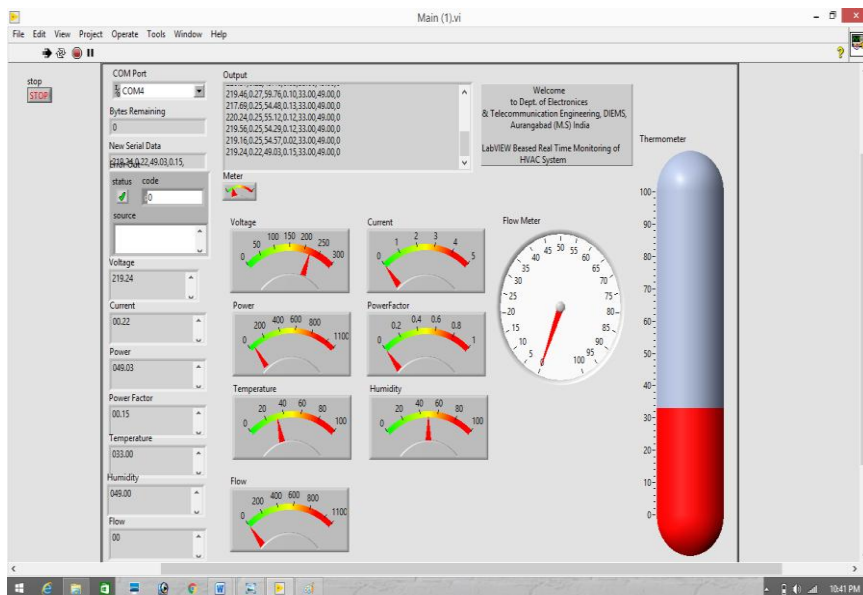


Figure 3. Output of a project

Figure show that output of an project voltage, current, power and power factor this are electrical parameters and temperature, humidity, and flow this are environmental parameters. As per circuit diagram the when you connect the power supply to your hvac system or project. The controller calculates the current, voltage, power and power factor using Emon Library of LabVIEW. As well as temperature, humidity is measured by DHT11 sensor and flow is measured by using flow sensor. Then using USB to TTL adapter system send data to your back panel of a LabVIEW and outputs are displayed in front panel of project on pc.

V. CONCLUSION

An experimental set up of an hvac system was achieved using LabVIEW vi modules. This system is completely integrated system achieved real time monitoring of a HVAC system, and displayed changes in environmental and electrical parameters using different sensors. This project is used in pharmaceutical companies to show temperature monitoring of their storage room.



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