Power Monitoring System

Introduction:-

The need of power monitoring system is aroused in order to obtain an efficient power management system.

Objective:-

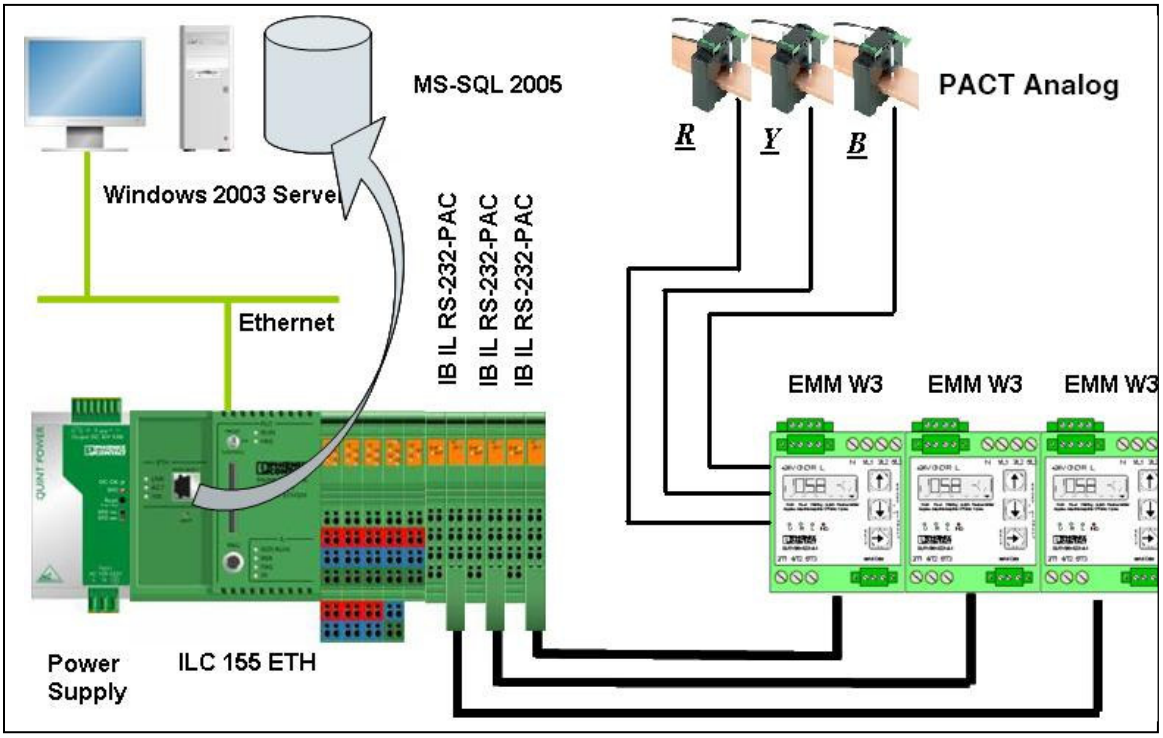
To give complete power data of each individual process segments by tapping the electrical power from the LT panels outgoing branch, supplying electrical power to each process segment.

Solution:-

Phoenix Contact propose to tap the current and voltage signals from the out going of LT panels and processing in our EMM module, providing current, voltage and Power monitoring.

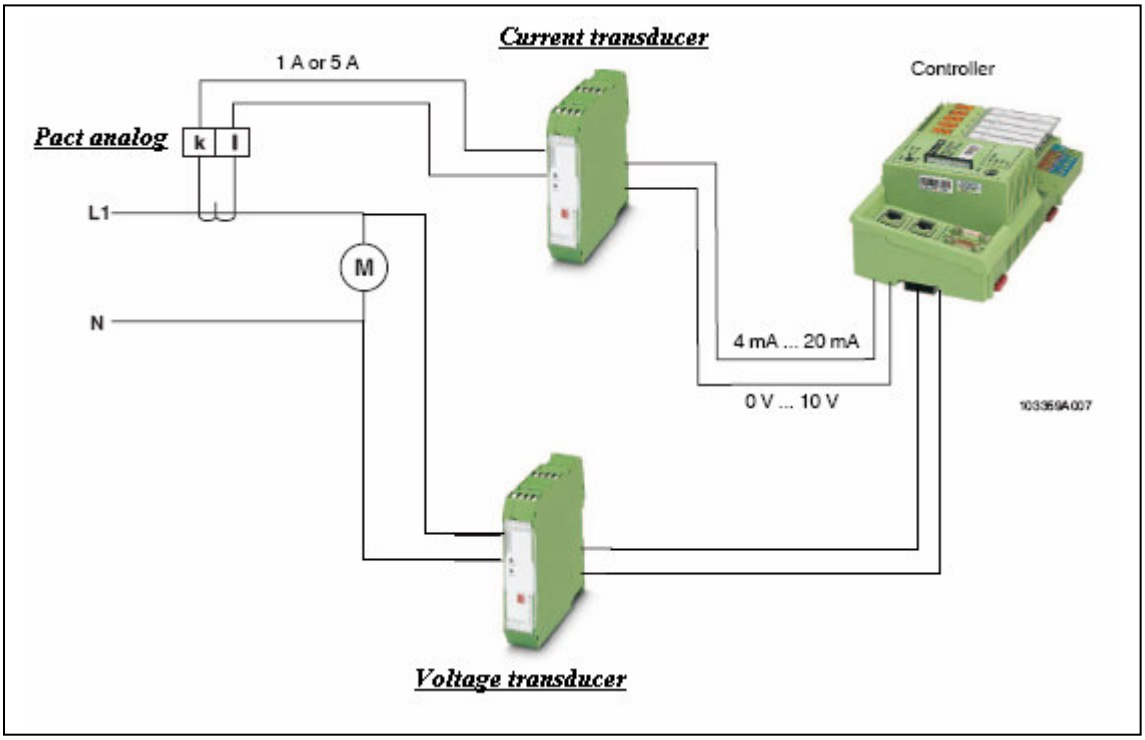
The EMM module communicated with ILC 1XX PLCs from Phoenix Contact over RS 232. ILC 1XX plc system in turn provides data to the data base over Ethernet.

Below figure provides the basic system architecture.

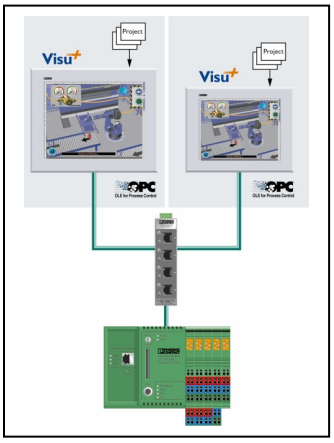


Why ILC 1XX?

One ILC 1XX can communicate with 8/16 EMM devices simultaneously, it can collect data from 8/16 points. Rest of the distribution data can be collected using the below shown system configuration from the LT panel. Also it can further expand using digital I/O modules, Analog I/Os, Functional I/Os from Inline series for either **Production performance monitoring or Quality monitoring** system.



Networking of various PLC is possible using existing Ethernet infrastructure or putting a new dedicated infrastructure of its own.

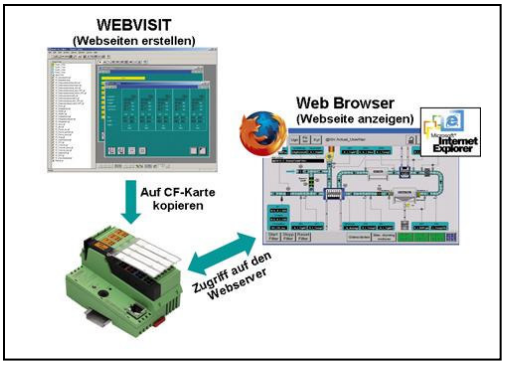


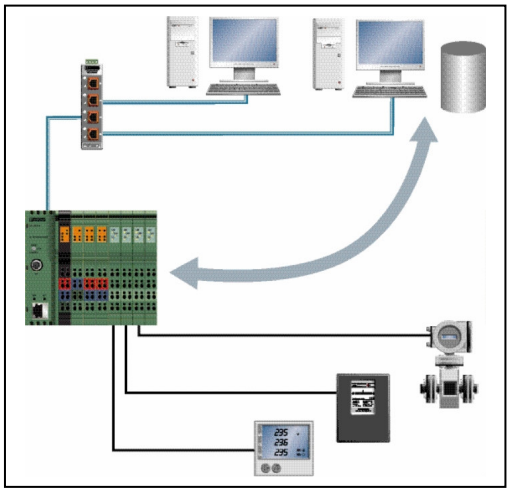
Also the IT Feature of ILC 1XX ETH from Phoenix Contact can provide the following advantages,

OPC: The OPC server provides data from the PLC program for visualization programs such as VISU+, or transports the data in the opposite direction. The OPC server runs in the control panel or on a PC.

WEB- SERVER: Provides a homepage on the ILC 155 ready. Its pages can be drawn using the WEBVISIT software and linked to the PLC program via data. Browsers can display these pages via HTTP access.

TCP/IP: Makes it possible to establish connections between the PLC program and programs on other Ethernet devices. PLC programming function modules, such as IP-Connect, IP-send, etc., are available for this.





UDP: Wireless messages (broadcasts) can be received from other Ethernet devices in the PLC program with UDP. This is done with the same function modules as with TCP/IP.

FTP: (File Transfer Protocol) The ILC 155 has an FTP server which can be used to store or upload any files in the Flash-File system of ILC 1XX ETH, e.g., for exchanging parameterization and log files or in order to store the current source code of the PLC program for servicing.

SNTP: To synchronize the real-time clock of ILC 1XX ETH with a time server.

SMTP: To send e-mails directly from the PLC program.

SQL: For data exchange between the PLC program and an MS-SQL/MySQL database.

SNMP: For file exchange with the network management software.

Specification (ILC 1XX):-

Data memory: -	512KB
Programming memory: -	512KB
Retentive data memory: -	48KB
Parameterization memory: -	4MB
I/O handling capacity: -	4096
Processing Speed: -	90 micro sec / 1K instructions.
It Features: -	All the above.
GSM Interface: -	ILC150GSM/GPRS
Field bus: -	Interbus Master integrated.

Compact controllers of the 100 class are equipped with the latest automation and IT technology:

• High flexibility thanks to the modular expandability with numerous standard and function terminals of the Inline I/O system

• Easy integration into existing networks based on international standards, such as Interbus, Ethernet and optionally GSM/GPRS

• Seamless data transfer by using IT standards such as HTTP, FTP, SNMP, SQL and OPC

• Intuitive programming as per IEC 61131 using automation software PC Worx or PC Worx Express

• Combination with operator terminals or touch panels for economical operation and monitoring of machines and systems

• Excellent price/performance ratio

Current transformer (PACT analog):-

Phoenix Contact offers a wide range of current transformer types. As a result, several types may meet the specified technical criteria. They will differ in terms of the size and shape of the transformer opening and in the external dimensions of the transformer housing. This enables you to select the ideal current transformer depending on the copper rail size and the space available in the control cabinet.

Due to the push-out primary rail bracket for PACT Analog current transformers, there is no raised edge on the housing and installation provides a flat surface. This is the basic requirement for installing and positioning the current transformers in parallel on the copper rail, and it enables the measurement of currents from loads, which are supplied via an electrical branch. To do this, a copper sleeve (available as an accessory) is led into the inner opening of the current transformer, which provides the conductive connection between the live copper rails and, for example, the fuse flag of a subsequent fuse. To increase air and creepage distances, an extended secondary terminal block cover (available as an accessory) is placed over the connections of the secondary terminal blocks of the horizontal current transformer.

EMM:-

EMM provides all the advantages of modern active power monitoring. The active-power input of a drive system or another 3-phase load is calculated every 6.6 ms from three currents, voltages, and the phase angle.

Currents greater than 5 A are led to the module via transformers. The load is switched by a separate switching element. In this way, the EMM reliably protects connected loads – regardless of their current consumption – against overload and under load and provides continuous status monitoring.

Switching thresholds, signaling thresholds, and four configurable confirmation outputs provide motor and system protection.

All relevant values can be viewed via the integrated display of the configuration software or a fieldbus interface:

– Apparent power, active power, and reactive power
– Currents and voltages
– Phase angle
– Operating cycle counter and elapsed-hour meter
– Power meter

The integrated memory can be used to record complete curves, which can be used, for example, in the system documentation.

Advantages of Phoenix Contact as a Solution Partner to your Automation needs:-

1. Single vendor solution

   All the component required in the system are manufactured by Phoenix Contact, including, current transformer, Power supply , PLC, Current and Voltage transducers, Power meter, Terminal bock (Bus bar terminal and Rail Terminals, I/O modules (digital, analog, temperature and functional modules), HMI, SCADA etc.

2. Proven technology

   Ethernet and Interbus technology from phoenix contact is well proven is in the market, with vast experience we provide the seamless flow of information from sensor level till the ERP system, hence called “IT Powered Automation”.

3. Flexibility

   The suggested system is highly flexible and modular in nature, you need to purchase only what’s required at present and future requirements can be accommodated in the present system time to time.

4. Future Proof

   Not only the future expansion but the future technology can also be integrated into the system thanks to the IT feature packed Ethernet interface available as an integral part on the control system.

5. No changes in the existing system required.

   To include a monitoring system into an existing plant normally requires lots of changes into the existing system, but this is not a case with Phoenix Contact. Thanks to the innovative products like Bus bar mountable compact current transformers, bus bar mountable terminal, wide range of terminal blocks for every application so that every signal from the field can be taken into our monitoring system without effecting the working or layout of the existing system.

6. Very short implementation time.

Working in a running plant always requires shorter implementation of a new system to minimize down time if possible it should be zero. Yes, with phoenix contact it is possible to achieve the zero stop time of a running plant, thanks to fast installation techniques implemented in our every product range.

7. Monitoring system – completely independent of manufacturing system.

   Monitoring system if completely independent of the manufacturing system provide the benefit of a smooth running of the plant as the problems in one system does not affect the working of another. This is a mandatory requirement to achieve high productivity with efficiency.

8. Compatible with WLAN and Bluetooth.

   The Ethernet interface with our control system is compatible with WLAN and Bluetooth solutions from Phoenix Contact making it even easier to implement the system as no more lying of long cables, which is a running plant, is always time consuming, costly and trouble some for maintenance especially during down time cases.

9. Open to third party database.

   In case customer has an already established database, then we can provide data over OPC, an international standard for data transfer.

10. Integration into ERP

    Thanks to OPC compatible control system, SCADA system and HMI system from Phoenix Contact, The data can be transferred to the ERP system existing in the plant over OPC.