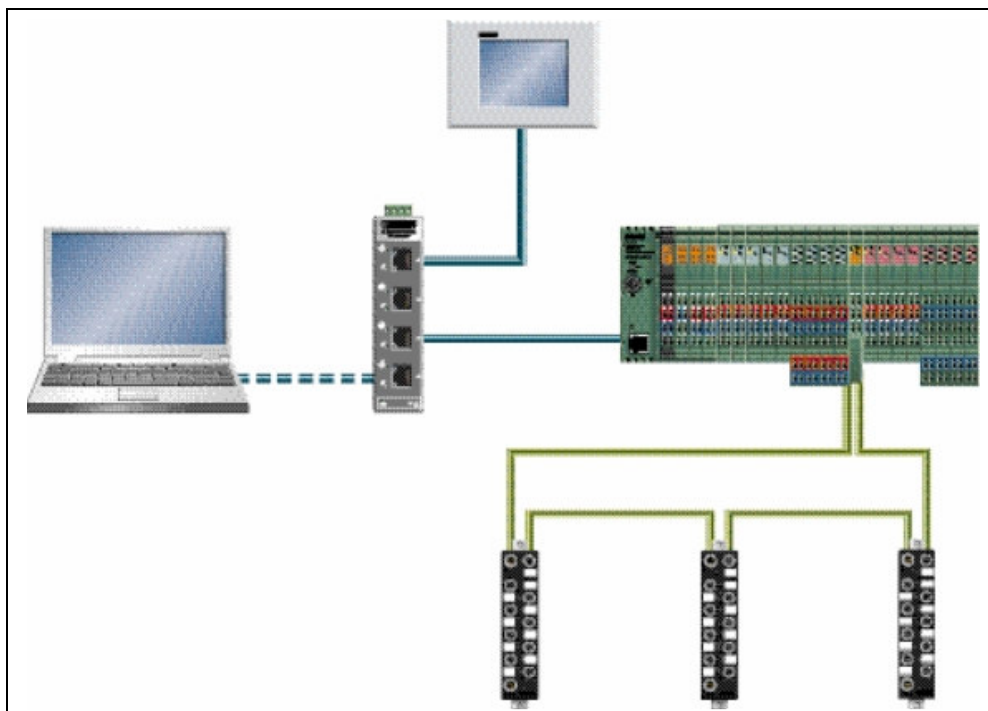**Smart Automation**

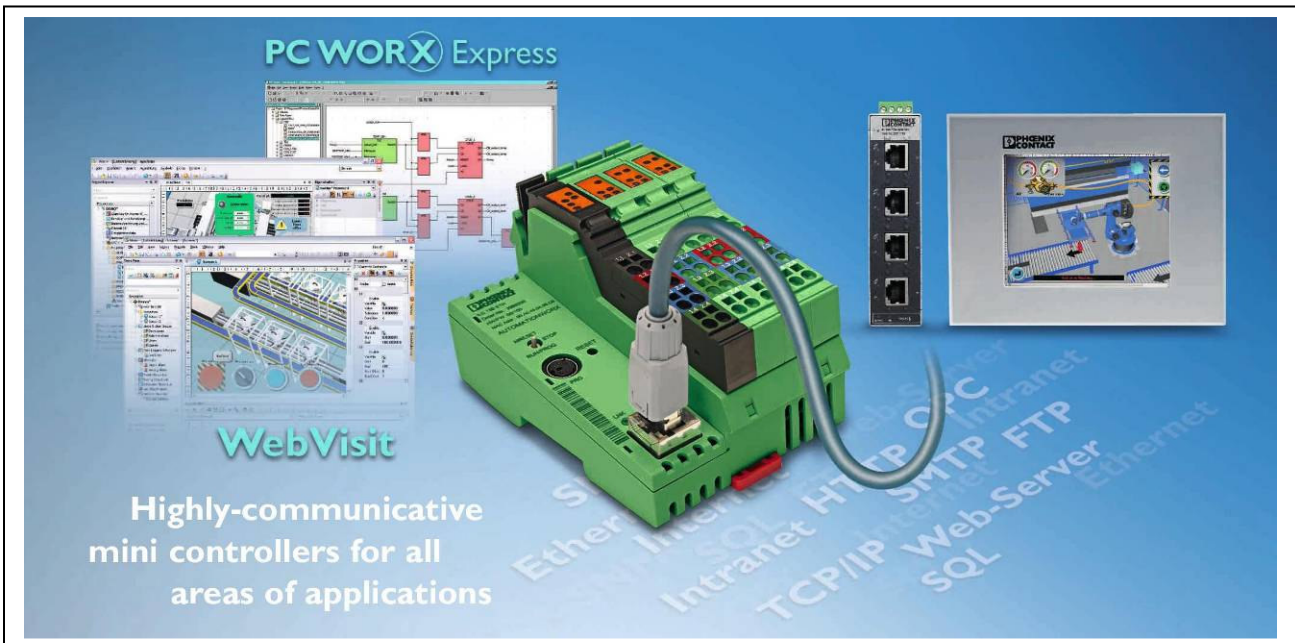**with Class 100 Compact Controllers**

INTRODUCTION

"**Knowledge is power**" --- the scientist Sir Francis Bacon first made this statement in the 16th century, but it remains true today: in fact, having the right knowledge is now more important than ever. If the relevant information is not available at the right place and the right time, a company can quickly lose its competitive edge. The fast, transparent, and specific transfer of all company data is therefore crucial. With this in mind, Phoenix Contact has integrated numerous IT technologies in its automation components. This ensures the truly seamless flow of information from the sensor to the company management level and therefore maintains the user's competitive edge.

The 100 performance class group has been newly added to the range of Inline controllers for the control of small to medium-sized applications. These compact controllers (ILC 130 ETH, ILC 150 ETH, ILC 155 ETH, ILC150 GSM/GPRS and ILC 170 ETH 2TX) are equipped with the latest automation and IT technology and can also be used in fields where economical aspects did not allow the use of programmable controllers in the past.

Although performance class 100 is the smallest range of controllers, even here all functions are still provided. Inline Controllers 1xx are the compact controller range in the Phoenix Contact product portfolio, which extend the possible field of application of controllers to include small-scale applications. With direct integration in the Inline automation system, the compact controller is highly modular and can be adapted to the relevant application requirements. Its integrated Ethernet interface enables parameterization and programming using PC Worx automation software according to IEC 61131, and it can also exchange data with OPC servers simultaneously and communicate with TCP/IP-compatible devices.

NOTE: - Automation isn't always expensive and complicated. On the contrary:

Get going in automation with the class 100 Compact Controllers from Phoenix Contact. The smallest members of controller family are true team players and work perfectly in a system with Inline I/O modules, web panels and network components. Create your own individual chosen solution.

Class 100 – simply smart!

Main features / unique selling points / customer benefits

Main features	Customer benefits
IEC 61131-3 compatible development environment (PC Worx Express)	✓ Standard programming language Ladder, Function Block or Structured text. ✓ Integrated bus configurator and diagnostic tool. ✓ Free development environment for controllers in performance class 100
Cost-effective controller with high density of functions	✓ Even small applications / systems can be automated and integrated with IT network. ✓ Networked applications (databases, remote control, etc.) can be implemented using performance class 100 ✓ Can be used for central and distributed applications
RJ45 Ethernet port onboard	✓ T CP/IP- or UDP-based communication possible from any application ✓ Networked applications possible without additional costs
Web server (http)	✓ The integrated web server together with WebVisit can be used to create visualizations quickly and cost-effectively. Runtime licenses are not required because the data can be displayed in any web browser.
File exchange (FTP)	✓ The integration of an FTP server means that data written via Ethernet can be read from the file system or new recipe data can be downloaded to the controller via FTP. Important documents or system instructions can also be stored in the internal Flash memory.
Time synchronization (SNTP)	✓ Synchronized times are increasingly required at control level, in order to provide recorded data with a correct time stamp. As a result, all Phoenix Contact controllers use the Simple Network Time Protocol (SNTP) to synchronize their internal real-time clocks (RTC) with a time server in the network.
Sending e-mails directly from the application (SMTP)	✓ The Simple Mail Transfer Protocol (SMTP) can be used to send e-mails directly via an SMTP server. This function is provided on all controllers by simply integrating a function block.
Network management (SNMP)	✓ The Simple Network Management Protocol is used to monitor and control network elements from a central station. The main functions are monitoring network components, remote control and remote configuration of network components, error detection, and error notification.
Address assignment (DHCP)	✓ Additionally available DHCP blocks can be used to obtain an IP address from the application via a DHCP server.
Database connection (SQL)	✓ The SQL library is another powerful extension of the scope of functions of performance class ILC 100. It enables simple communication with an SQL database, which can be used for example for production data acquisition.
Expandability (special function modules)	✓ As well as internal I/Os, the entire catalog of Inline modules is also available for expanding the 100 base stations.

Class 100 compact controllers enable customers to automate small applications, which in the past were not integrated into the automation system for reasons of cost or had to be operated with expensive controllers. The new range of compact controllers can be used to implement intelligent and smart solutions. The controllers are compact and cost-effective, and enable the creation of a simple yet flexible automation solution, even without in-depth programming knowledge. Since controller class 100 can be combined with the entire control technology system, there are countless applications in which these controllers can be used.

ILC 130 ETH (Article No. 2988803)

The youngest member of performance class 100 being highly modular in nature along with integrated IT features gives the flexibility to customer to be able to use same control platform for a wide range of applications.
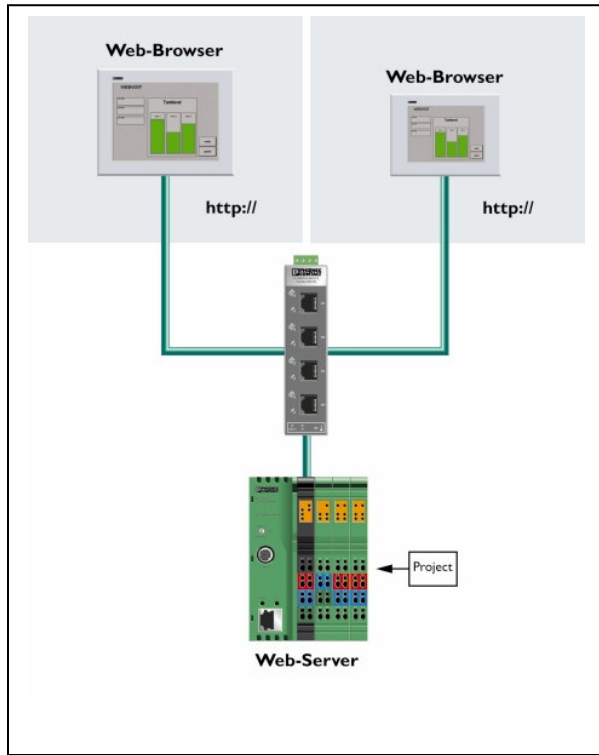
SPECIFICATION:-

Data Memory	192 kb
Program Memory	192 kb
Retentive Memory	8 kb
Flash Memory	4Mb integrated
Maximum I/O Points	2048
Processing Speed	90 micro sec / 1k instructions
Timer / Counter	Memory restricted
On board I/Os	8 DI / 4 DO
Communication	Ethernet (RJ45) + RS232
Real Time Clock	Yes
OPC functionality	Yes
Web Server	Yes
FTP Server	Yes
Field Bus Master	No
No. of devices	128

SELECTION CRITERIA
1. Applications involving only Local I/Os
2. Above given specification should fulfill the application requirements
3. Below given Approval list should fulfill the approval requirements of the applications.

APPLICATION / MARKET INFORMATION

The compact but powerful ILC 130 ETH is an ideal control system for a wide variety of Automation applications involving only local I/Os. As the complete range of inline I/Os can be used along with ILC 130ETH, Hence a variety of functions like, Temperature monitoring and control, Stepper motor control, Positioning applications using encoders, and many more can be economically handled along with normal DI, DO, AI and AO control applications.

Being flexible and modular in nature ILC 130ETH can be used either as a standalone system or in a distributed control network environment. And can be used for wide range of applications. Few of them are listed below.

Machine Automation, Building Automation, Utility Automation, Material handling, Traffic signaling, etc.

ACCESSORIES
1. Mandatory
   a. PC WORX EXPRESS
2. Optional
   a. WEB VISIT
   b. PRG CAB MINI DIN
   c. AX OPC SERVER

APPROVALS

Certifications applied for   -   UL / CUL

ILC 150 ETH (Article No. 2985330)

The versatile member of class 100 family along with its IT features also has integrated Fieldbus master on board, which gives the benefit of using remote I/Os (IP20 and IP 67) and devices to be handled even for smaller application.

SPECIFICATION:-

Data Memory	256 kb
Program Memory	256 kb
Retentive Memory	8 kb
Flash Memory	4Mb integrated
Maximum I/O Points	4096
Processing Speed	90 micro sec / 1k instructions
Timer / Counter	Memory restricted
On board I/Os	8 DI / 4 DO
Communication	Ethernet (RJ45) + RS232
Real Time Clock	Yes
OPC functionality	Yes
Web Server	Yes
FTP Server	Yes
Field Bus Master	Yes (Interbus)
Remote Station	32
No. of devices	128

SELECTION CRITERIA
1. Applications involving Local I/Os and Remote I/Os
2. Above given specification should fulfill the application requirements
3. Below given Approval list should fulfill the approval requirements of the applications.

APPLICATION / MARKET INFORMATION
The powerful compact controller ILC 150 ETH is an ideal control system for a wide variety of control system requirements. With complete range of inline I/Os at its disposal and special approvals for ship building and ATEX, This controller finds its application in virtually every industry. The field bus master on board gives the flexibility to the user of using remote I/O's even for smaller applications where till date it was not possible due to the high cost of a distributed control system.

Being scalable and modular in nature ILC 150ETH can be used either as a standalone system, Distributed control system or in a distributed control network environment. And can be used for wide range of applications. Few of them are listed below.

Machine Automation, Utility Automation, Material handling, Traffic signaling, Process, Shipbuilding, Water and waste water management, etc.
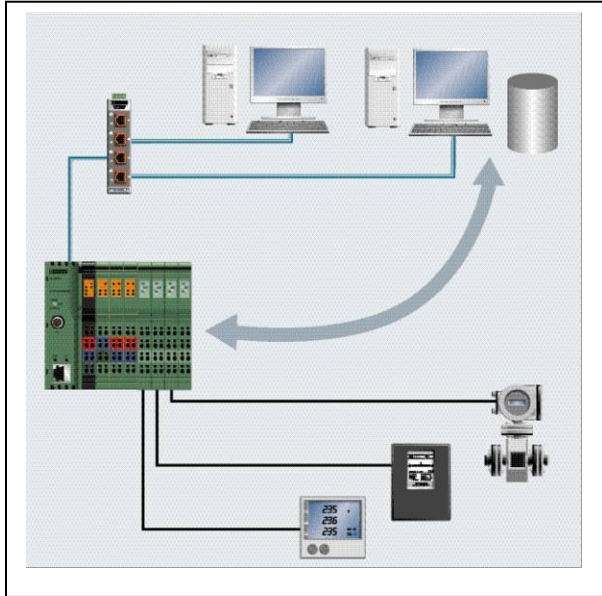
ACCESSORIES
1. Mandatory
   a. PC WORX EXPRESS
2. Optional
   a. WEB VISIT
   b. PRG CAB MINI DIN
   c. AX OPC SERVER

APPROVALS
Certification	-	ABS, BV, CUL, DNV, GL, LR, UL
Certifications applied for	-	UL-EX LIS / CUL-EX LIS

ILC 155 ETH (Article No. 2988803)

The highly commutative compact controller from Class 100 range comes with SQL license. The feature packed controller is meant to be used where real time data acquisition is required to the SQL data base which can be used further by either a visualization system or Manufacturing execution system or by an ERP system of the company.

SPECIFICATION:-	
Data Memory	512 kb
Program Memory	512 kb
Retentive Memory	48 kb
Flash Memory	4Mb integrated
Maximum I/O Points	4096
Processing Speed	90 micro sec / 1k instructions
Timer / Counter	Memory restricted
On board I/Os	8 DI / 4 DO
Communication	Ethernet (RJ45) + RS232
Real Time Clock	Yes
OPC functionality	Yes
Web Server	Yes
FTP Server	Yes
Field Bus Master	Yes (Interbus)
Remote Stations	32
No. of devices	128
SQL license	included

SELECTION CRITERIA
1. Applications involving Local I/Os and Remote I/Os.
2. Applications involving Data logging to SQL database.
3. Above given specification should fulfill the application requirements.
4. Below given Approval list should fulfill the approval requirements of the applications.

APPLICATION / MARKET INFORMATION
The capability of direct transfer of data to the SQL data base has made ILC 155 ETH as an ideal control system choice where field level information need to be transferred to the MES or ERP system. Having the extensive IT functionality in a compact and economical controller gives the opportunity to reduce or eliminate the cost of expensive data loggers in the industry.

With the usage of complete inline family each and every data from the field can be handled without the need of costly converters, This makes ILC 155 ETH flexible enough to be used in a wide variety of application specially as an integral part of the MES system. Few of them are listed below.

Production monitoring, testing systems, Power monitoring, utility automation, Building automation, Quality monitoring systems, etc.

ACCESSORIES
3. Mandatory
    a. PC WORX EXPRESS
4. Optional
    a. WEB VISIT
    b. PRG CAB MINI DIN
    c. AX OPC SERVER

APPROVALS
Certifications applied for   -   UL / CUL

ILC 150 GSM / GPRS (Article No. 2988803)

The Remote controller from class 100 family with its on board GSM/GPRS modem provides the easiest remote control options to the customer. With predefined function blocks for various functionalities offers an easy and fast commissioning and startup of the system.
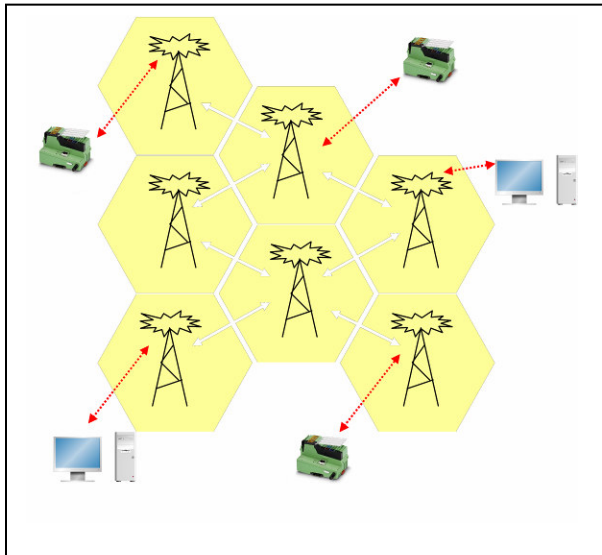
SPECIFICATION:-

Data Memory	512 kb
Program Memory	512 kb
Retentive Memory	48 kb
Flash Memory	4Mb integrated
Maximum I/O Points	4096
Processing Speed	90 micro sec / 1k instructions
Timer / Counter	Memory restricted
On board I/Os	16 DI / 4 DO
Communication	Ethernet (RJ45) + GSM/GPRS
Real Time Clock	Yes
OPC functionality	Yes
Web Server	Yes
FTP Server	Yes
Field Bus Master	Yes (Interbus)
Remote Stations	32
No. of Devices	128

SELECTION CRITERIA
1. Remote control application involving GSM/GPRS interface .
2. Above given specification should fulfill the application requirements.
3. Below given Approval list should fulfill the approval requirements of the applications.

GSM Functionalities
1. SMS (integrated FW components
2. Program download over GSM modem
3. Monitoring/Diagnostics over GSM modem
4. FTP and web server access over GSM modem
5. Resy:
   a. E-mail, Fax and voice output to landlines (as SMS service, provider-dependent), SMS
   b. CSD (Circuit Switched Data (data transfer by GSM dial-up connection))
   c. IEC 60870-5-104 remote protocol

GPRS Functionalities
1. GPRS services (ILS modem is configured by a program component which independently establishes a connection between the connected ILC and an OPC Server)

APPLICATION / MARKET INFORMATION

With the GSM / GPRS functionalities listed above the ILC 150 GSM / GPRS has made remote system application simple like never before.

Sending the Alarm message over GSM via SMS, Accessing the Webserver for system monitoring and diagnostics, Access to FTP server for remote data logging provides the power full means to the end-user to ensure the high system availability.

Programming the PLC over GSM network along with Monitoring and diagnostic functions provides the much needed support to system supplier or machine manufacturer for after sales support , while saving good amount of money.
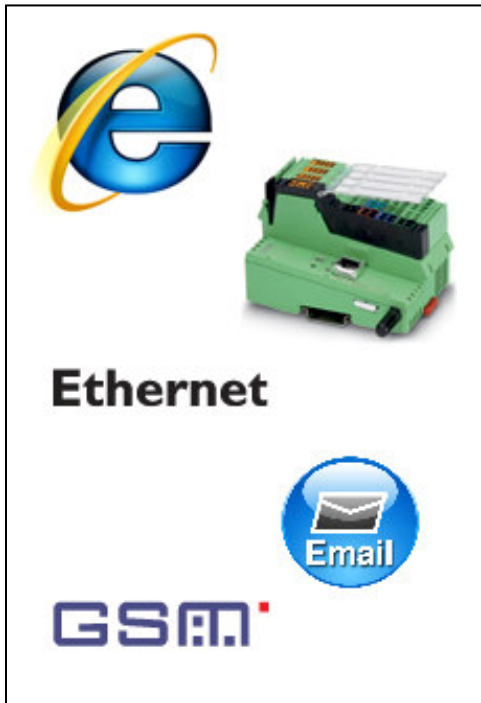
The ILC 150 GSM/GPRS proves to be an all in one controller with integrated field bus on board and all the IT features availability. As with all the other controllers of Class 100 the complete family of inline I/O module is available to be used.

The GPRS functionality can be switched on and off from outside the application and hence provides a great deal of flexibility to the online data monitoring application. Using the proven Resys+ technology and proven worldwide standard extends further functionality to the user to establish a dialup network with the control system remotely.

Having the numerous functions and features (few have been sited above), ILC 150 GSM/GPRS finds application where ever a remote access is required for the control system. Excellent control capabilities with packed IT features and on the top of it the remote access capabilities. ILC 150 GSM/GPRS is all set to start a new trend in the remote control applications.

Hence assured the wide range of application, which was not commercially feasible, can now be achieved with the best price to performance ratio. All Thanks to ILC 150 GSM/GPRS

Few of the application area are mentioned below.
1. **Pump house automation**
2. **Water supply**
3. **Pipe line automation**
4. **Petrol pump automation**
5. **Water and waste water treatment plant**
6. **Building automation**
7. **Telecom tower automation**
8. **Utility Automation**
9. **Machine manufacturing**
10. **Wind energy**
11. **Ware house automation**
12. **Logistics**

ACCESSORIES
1. **Mandatory**
   a. **PC WORX EXPRESS**
   b. **PSI-GSM-QB-ANT**

2. **Optional**
   a. **WEB VISIT**
   b. **AX OPC SERVER**
   c. **RESYS+**

APPROVALS
   Certifications applied for   -   UL / CUL

ILC 170 ETH 2 TX (Article No. 2988803)

The eldest member of performance class 100 is highly modular, flexible and scalable in nature along with integrated IT features gives the flexibility to customer to be able to use same control platform for even wider range of applications.

SPECIFICATION:-

Data Memory	512 kb
Program Memory	512 kb
Retentive Memory	48 kb
Flash Memory	4Mb + 256Mb SD Card
Maximum I/O Points	4096
Processing Speed	90 micro sec / 1k instructions
Timer / Counter	Memory restricted
On board I/Os	8 DI / 4 DO
Communication	2 Ethernet (RJ45) + RS232
Real Time Clock	Yes
OPC functionality	Yes
Web Server	Yes
FTP Server	Yes
Field Bus Master	Yes
Remote Stations	32
No. of Devices	128

SELECTION CRITERIA
1. Applications involving Remote I/Os.
2. Applications requiring expandable memory.
3. Application involving Data transfer to SQL database (Using SD FLASH 256MB APPLIC A).
4. Above given specification should fulfill the application requirements.
5. Below given Approval list should fulfill the approval requirements of the applications.

APPLICATION / MARKET INFORMATION
Normally used for mid size automation applications as a distributed control system. ILC 170 ETH 2TX having three port Ethernet switch on board along with expandable memory in form of 256 Mb SD card finds usage in applications where remote I/Os either in form of IP 20 or IP 67 modules. Both field line and Inline family of I/Os are compatible and ready to be used with ILC 170 ETH 2 TX giving opportunities to the customer to adapt to the most competitive system configuration.

Being highly scalable, flexible and modular ILC 170 ETH 2 TX can be used as a distributed control system while working in a distributed control network environment as well. Wide range of applications can be solved using this controller. Few of them are listed below.

Machine Automation, Material handling, Water and Waste Water management, Wind energy, Robotic applications, Ware house and logistic applications, etc.
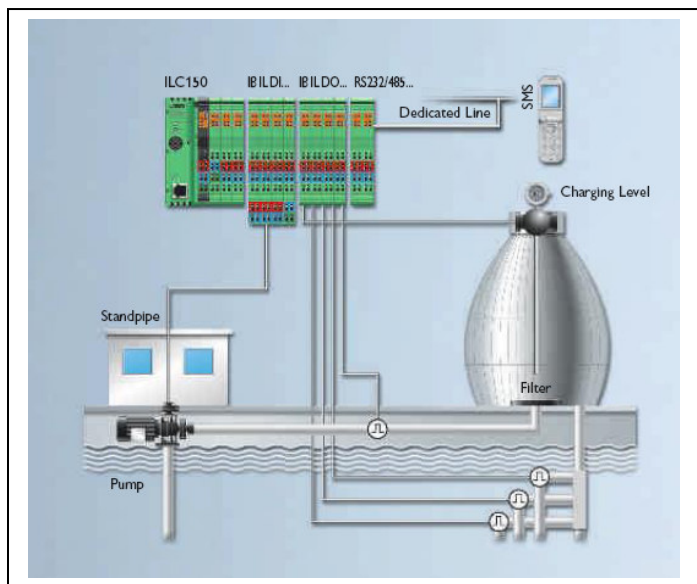
ACCESSORIES
3. Mandatory
    a. PC WORX EXPRESS
    b. SD FLASH 256MB
4. Optional
    a. WEB VISIT
    b. PRG CAB MINI DIN
    c. AX OPC SERVER
   d. SD FLASH 256MB APPLIC A

### APPROVALS
Certifications applied for   -   UL / CUL

SYSTEM SOLUTIONS AT A GLANCE

Small and medium sized Water and waste water treatment plant and can be automated efficiently and economically using the class 100 controllers. Along with remote I/O connectivity, these controllers can handle numerous signal directly form the field without the need of converters. Also With the IT features available the monitoring and control can be much more flexible and efficient. Even for small sized plants the remote data connectivity and alarm messaging can be achieved at virtually no additional cost. The numerous communication options provides the advantage of incorporating various utility parameters (e.g. power monitoring) which previously was not practically possible to be included with the main control system of the plant.
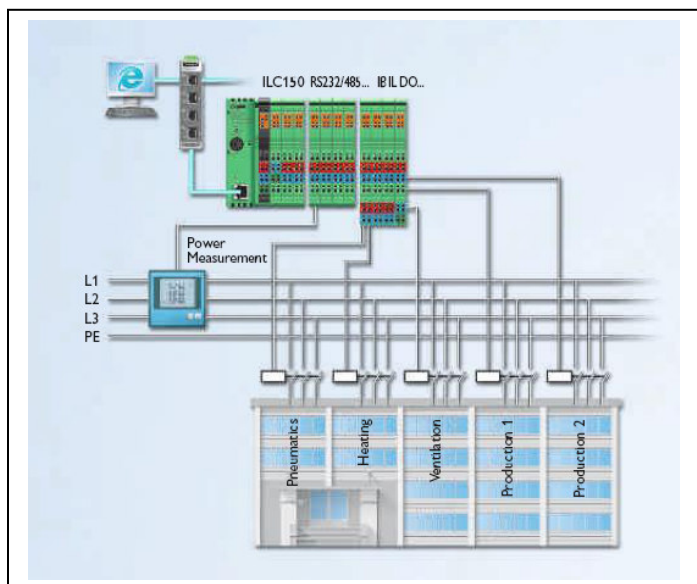
Building and Utility automation has unique requirements of mandatory system monitoring and data acquisition by the management, The class 100 controllers proves to be the most promising options for the same. While working on most widely used networking protocol (Ethernet), Class 100 controllers while executing its duty as a advanced, modular and expandable DDC controller, it can also handle the various functions like power management, security options and data acquisition simultaneously. System monitoring using webserver and alarm messaging using either SMTP or SMS gives the user a reliable control system to work with. The system availability is ensured using the SNMP while the real time data acquisition using the FTP and SNTP. With Class 100 customer is ensure of complete reliable, integrated and easy to use solution.
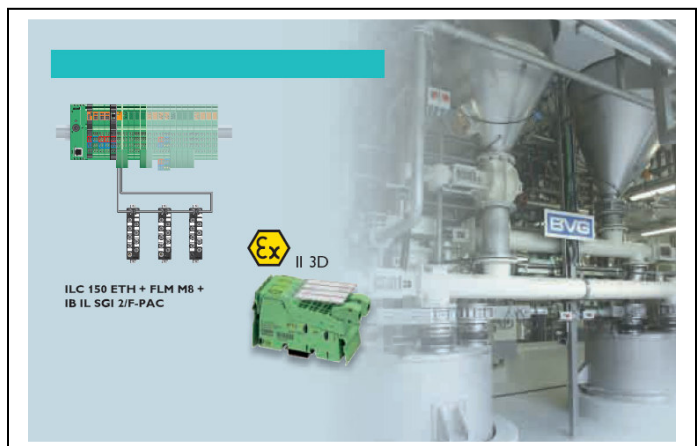

Class 100 controllers find its usage in process industry in a distributed control network environment, with its capability to handle a verity of signals (temperature, Strain gauge, encoder, etc) eliminates the requirement of various converters. Even for explosive environment (ILC 150ETH) Class 100 can take care of sub systems and utility automation with same efficiency and reliability in a process plant. Using the IT features of the Class 100 controllers, Maintenance team of the plant need not to dependent on the DCS system for the information required for complete system availability.
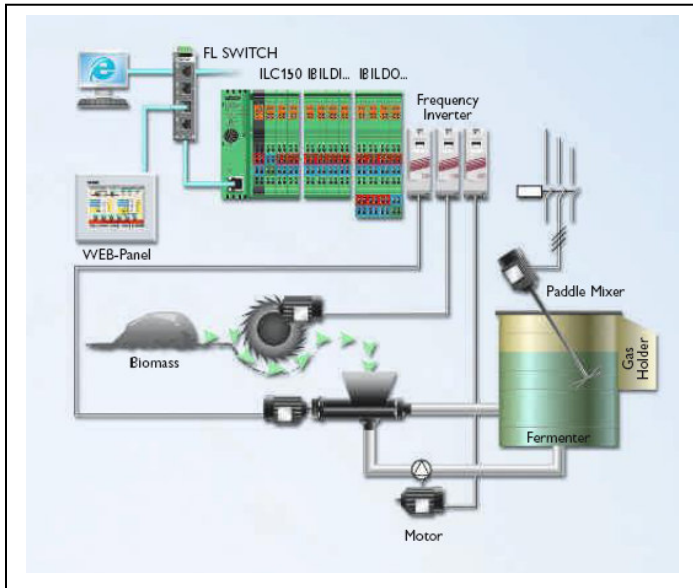
Regenerative energy is gaining popularity with every day so is the bio gas plants. Controls of a bio gas plants are normally are a few but scattered over the place based on the size of the plant. Hence the control system requirement becomes costly with the present technologies and time consuming installations and commissioning offers further challenge. Class 100 controller's offers cost effective and efficient system for such requirements. Having on board field bus master offers the possibility of using the remote I/Os economically and reducing the commissioning and maintenance cost considerably. An economic visualization option in form of web server makes the system further attractive for the user. For the advanced control, monitoring and data options can be achieved by simply using the IT features available with Class 100.
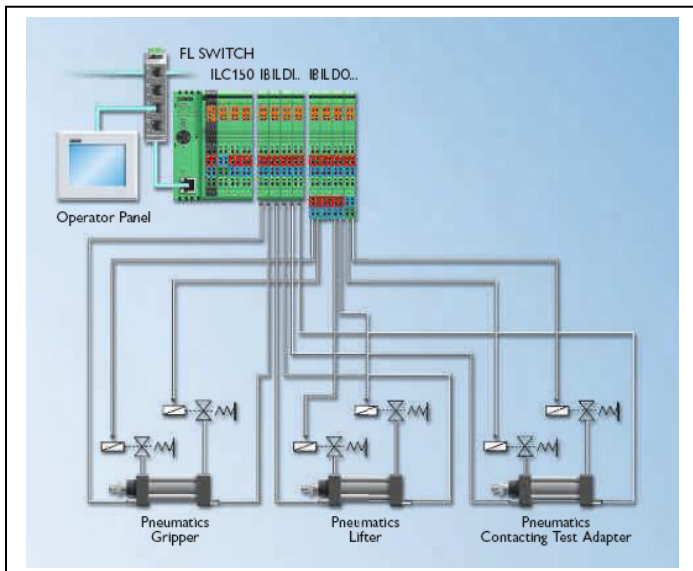

Mechanical engineering and Material handling though have less verity of signals but requires more challenges to the control system in form of positioning and time criticality. Hence low cost automation solutions till dates had tough task and often had to be implemented with lots of limitations and compromises on the performance of the system. The economical compact class 100 controllers equipped with high processing speed along with high efficiency INTERBUS as the fieldbus, overcomes these challenges effectively and economically. Production monitoring which had to be done with additional monitoring system with extra cost can also be taken care by these highly commutative, IT powered controllers from Class 100.
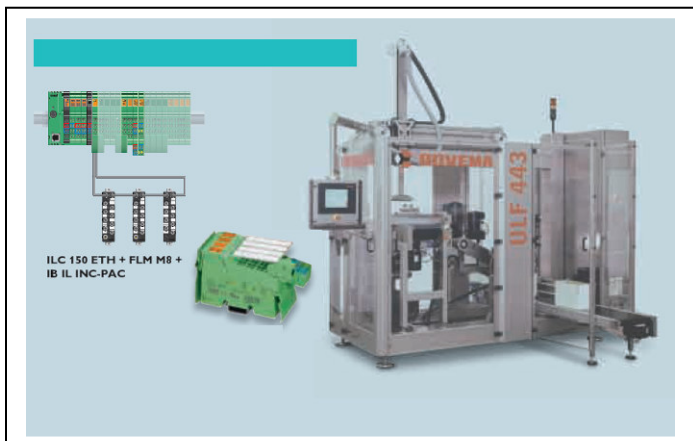

Component processing machines often requires high positioning accuracy along with harsh conditions with continuous flow of coolant. Class 100 controller's capability to include IP 67 I/Os with the local bus as well as the remote bus offers a unique but economical solution to these challenges of harsh operating conditions. With specialized position monitoring and control modules from the inline family provides efficient and high accuracy required for the machine too industry. Economic visualization along with production and quality monitoring can be achieved economically and efficiently.

ILC 150 ETH + FLM M8 +
IB IL TEMPCON

Shaping plastics definitely requires high efficiency of control system as the product quality depends on the processing same as on the raw material used. Class 100 controller range along with specialized temperature controller modules from the inline range offers the optimum solution at low cost with higher degree of accuracy. Further, capability of system to use IP 20 or IP 67 I/O's, with or without remote bus provides a highly flexible solution but cost effective solution. What more to say, IT features are always at your disposal.

ILC 150 ETH + FLM M8 +
IB IL AI 8/SF-PAC
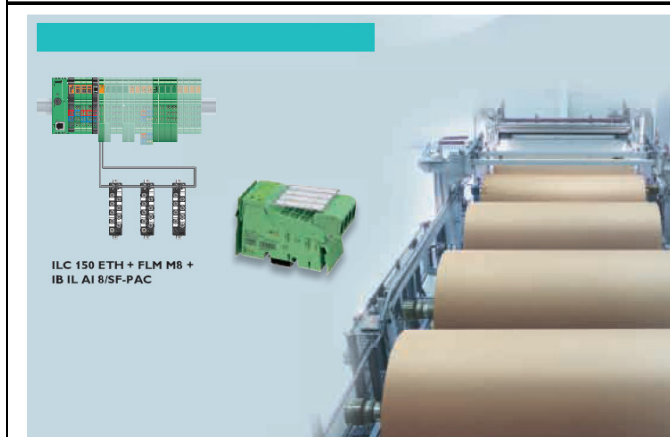
Paper and Board industry is very diversified. Starting with Paper and board machines, Packaging machines, printing machines (Both offset and Web printing) along with various paper processing machineries has numerous functions to be taken care off. Either its analog processing or precise positioning and synchronization application, Control system are all diversified for every application till date. Now, with Class 100 wide control and regulation capabilities same control platform can be used to achieve success at every application.

Master

Mögliche Roaming Pfade

Hauptkommunikationspfad
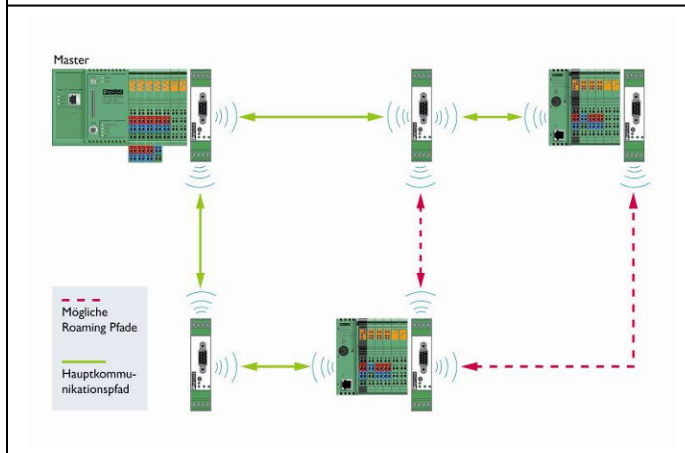
Either you have applications for remote control or for wireless data exchange, Class 100 controller with its extensive communication possibilities, offers wide verity of solutions, starting with on board GSM/GPRS modem, compatibility with Wireless LAN and Bluetooth along with trusted wireless for long distance communication with wide verity of signal option is now practical and economical to have the large volume of data to be transmitted without wires. Also all the IT features are definitely available for the customer even with your wire free system.

Zentraler Schaltschrank

Laser-Scanner Positioniersystem

SSI-Signale

IB IL SSI

Shuttle
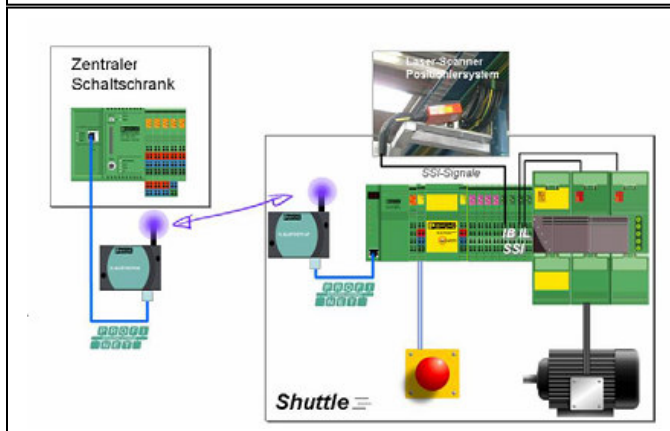
Rail systems either over head or grounded are popular means to material handling in the industry. Also called EMS (Electrified mono rail system) offers challenging requirements to the control system for exchanging data with the carrier to the control system and vice versa. The proven WLAN and Blue tooth solutions along with Class 100 controllers offer an economical solution much efficient and safe at your disposal. Either with local control or without local control Class 100 offers a reliable solution.
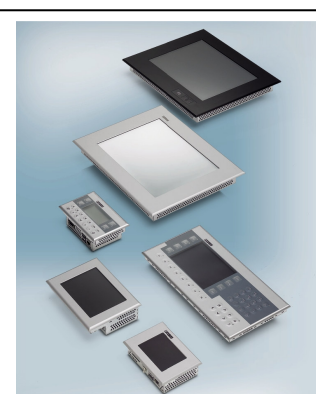
PRODUCT PORTFOLIO FOR COMPLETE SYSTEM SOLUTION

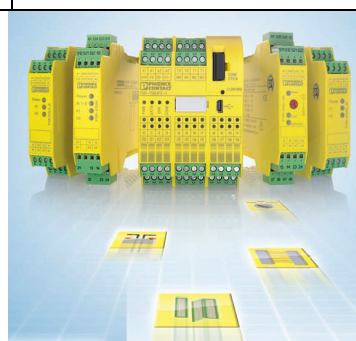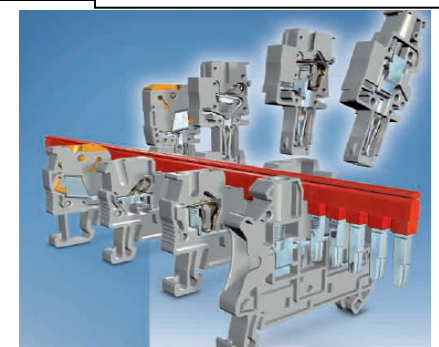|		
ETHERNET SWITCHES	WIRELESS	HMI
SIGNAL TOWER	SOLID STATE CONTACTOR	SAFETY
POWER SUPPLY	PLC RELAY	SURGE PROTECTION
SOFTWARE		TERMINAL
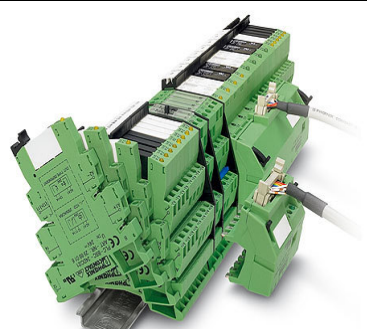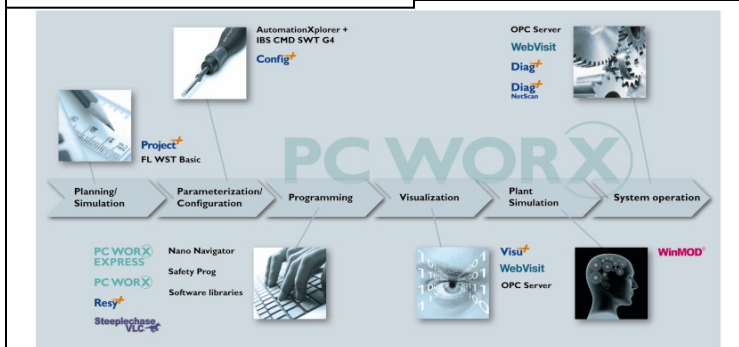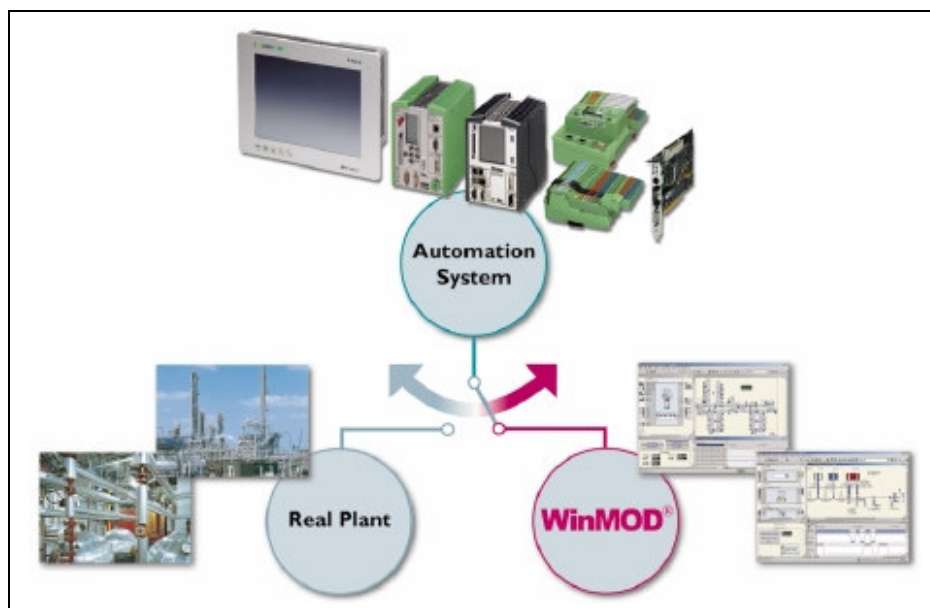
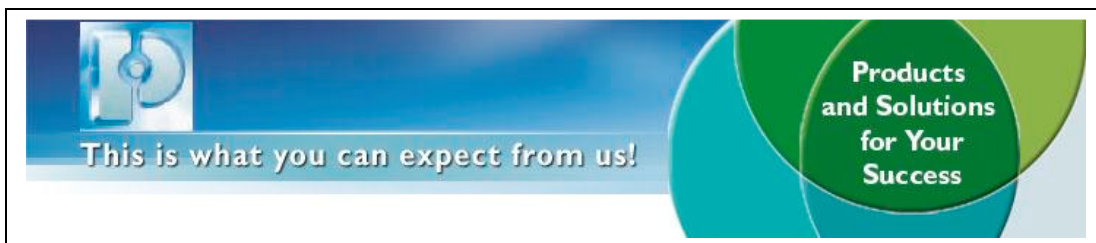**PHOENIX CONTACT ....**

......ALWAYS AND EVERYWHERE WITH CUSTOMER