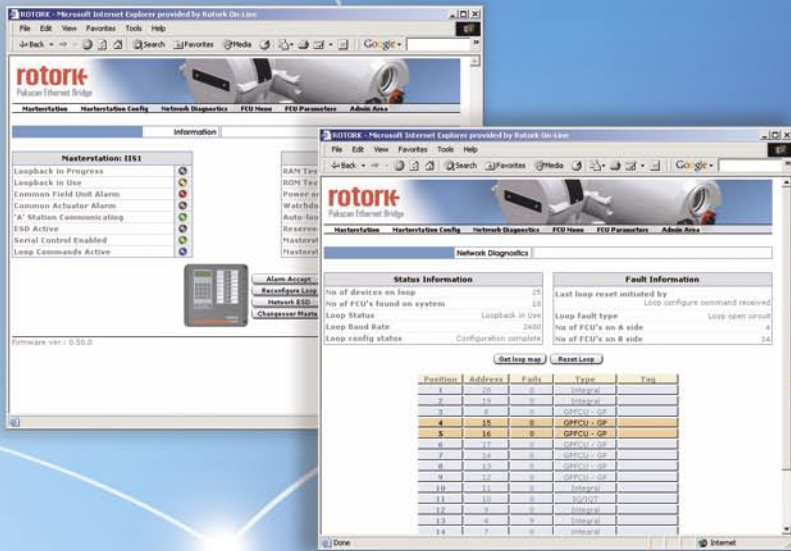


network remote operation

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in Actuation Technology



network remote operation



Pakscan Ethernet

network and internet
actuator control

Publication S118E issue 11/04

rotork®

Pakscan Ethernet

Network and Internet actuator control

Ethernet is the most popular network for communication of data in use in the world today. The staggering growth of this technology has now reached into the area of industrial controls and automation. Many DCS and PLC systems rely on an Ethernet connection between the gateways and controllers used in constructing the control system; Ethernet backbones to control systems are becoming commonplace.

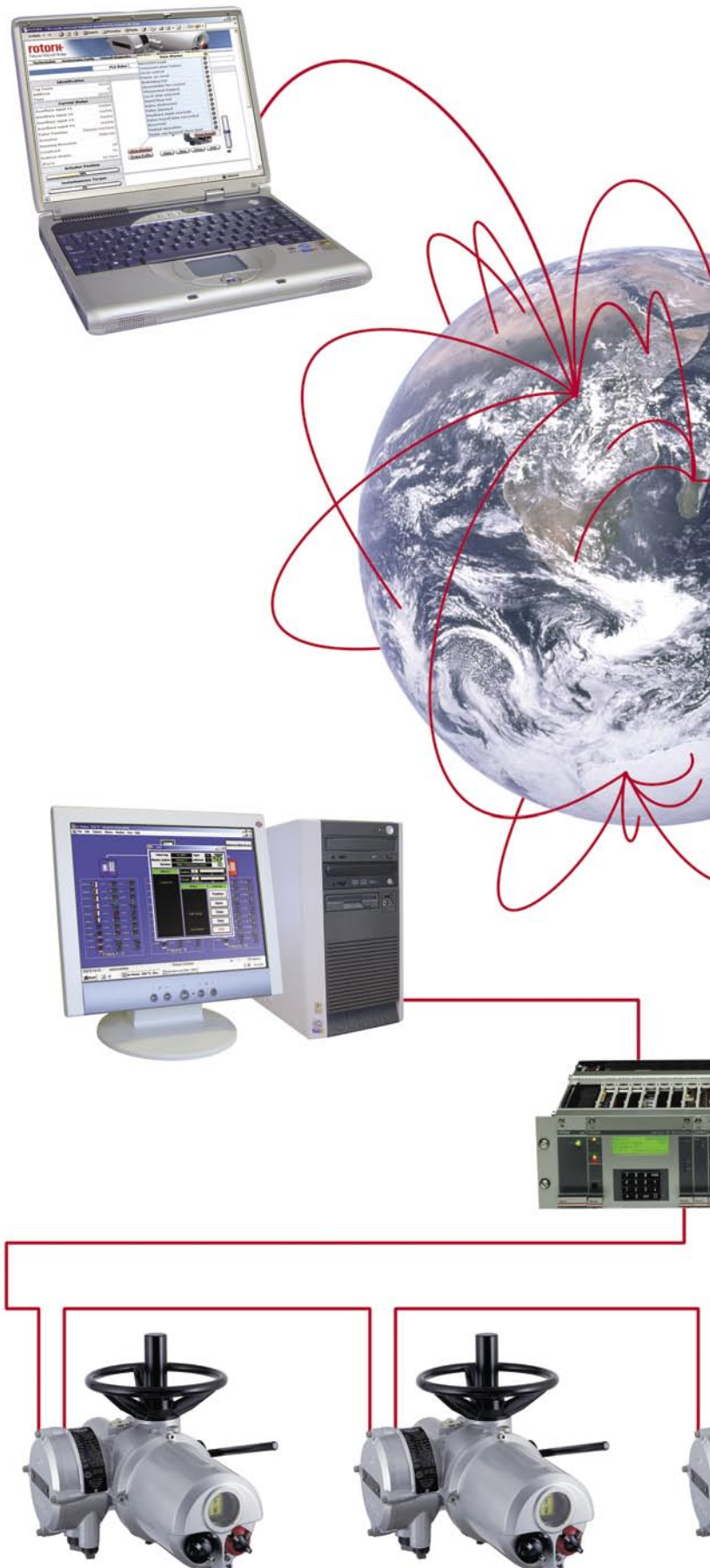
The Pakscan Ethernet connection lets this technology reach right down to the control of valves and actuators by linking the well established Pakscan system to a Local Area Network or the Internet. The Ethernet connection's high speed and wide bandwidth lets multiple users gain controlled access to the same actuator for control and diagnostic purposes at any time.

Pakscan Ethernet is pre-engineered to provide "Plug and Play" installation that automatically collects the status and alarm data about the connected actuators and field devices. This data is instantly available at the communications connection.

The embedded web server provides access to all the information available from the system, as well as configuration and diagnostic information via pre configured dynamic web pages.

Email notification is included to automatically notify appropriate personnel of selectable events indicating alarm conditions or maintenance is needed.

Security is ensured at all times by a fixed unique internet address and limiting access to password protected areas of the browser. Normal Modbus TCP communications is protected by standard firewall technology.





Pakscan Field Network

The actuators are connected together in the plant by a 2 wire twisted pair cable linking them in a series loop. The single fault tolerant 2 wire twisted pair digital network is the backbone of the Pakscan system.

- Plug and play installation
- Low cost of ownership
- Increased plant productivity
- 20 km distance capability
- Up to 240 field units
- No repeaters required

Fault Tolerant

All Pakscan systems are inherently fault tolerant. In the event of a single open, short or ground fault on the field cabling the unique Loopback facility automatically isolates the faulty cable segment. The system then continues to communicate with all the connected actuators. Inherent network diagnostics provide quick and easy identification of the location and type of network fault.

- Loopback mode
- High reliability field units
- Hot standby master stations
- Inclusive of lightning protection

Master Station Integrity

Modular design and pre-engineered functionality ensure the master station reliability. The inbuilt display and keypad allows simple on site diagnostics and set up alteration.

- Continuous monitoring of the 2 wire loop
- Monitors actuator availability
- Permits field unit parameterisation
- Alarms on loss of field device

Modbus TCP

Industry standard Ethernet protocol, Modbus TCP provides the ideal format for data exchange to and from the Pakscan system.

- Supported by all major PLC and DCS vendors
- Industry standard protocol
- Ideally suited to Ethernet

Multiple Data Format

Two data formats are available for transmission by Modbus TCP. The most popular formats previously supported on the Modbus RTU communication link are retained for Pakscan Ethernet comms.

Control and Data

Data requests are served from the system's internal data base ensuring minimal message turn round times. The data base is continuously updated with the status of the field equipment.

Commands are prioritised and pass directly to the actuators and valves.

- Transparent to commands
- Services data requests from internal data base
- Simple to configure

Ethernet LAN

Signals are transported over the LAN using standard Ethernet components. The LAN can include hubs, switches, routers and other users as well as the dedicated valve control system

- Industry standard LAN
- Standard components used

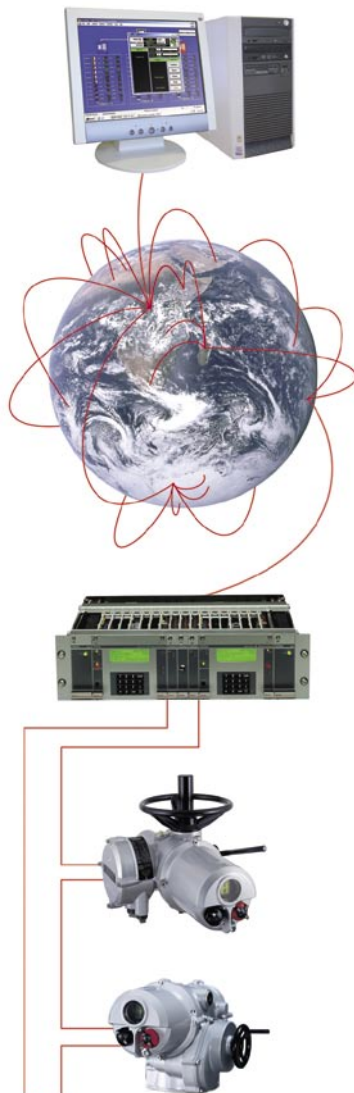
World Wide Web

The embedded web server allows information to be displayed over any LAN or the Web using TCP/IP and standard web browser technology.

- Embedded Web server
- Full actuator control and reporting

The embedded web server provides a graphical interface to the system through pages showing system status, user diagnostics, system configuration and field unit setup using any Web Browser software such as Microsoft Internet Explorer.

Control of field devices is also allowed to users with sufficient access rights. These pages run concurrently with the host Modbus TCP communications and use TCP/IP protocol.

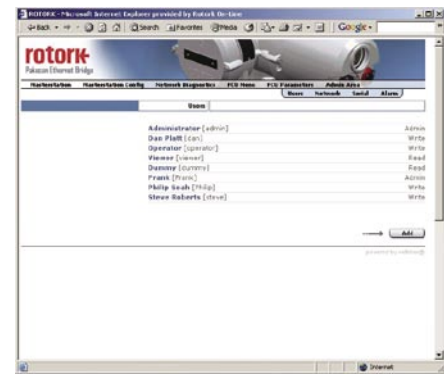


Security Access

The web server includes 3 levels of customer configured user name and passwords to restrict access to the system and user privileges.

- Administrator
- Operator
- Viewer

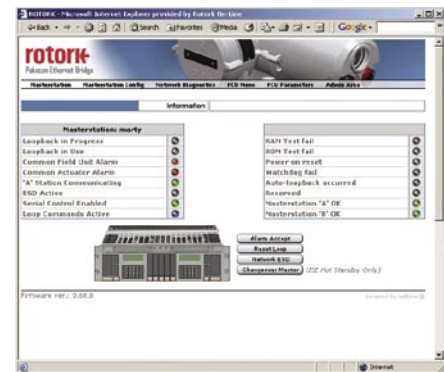
The lowest level (Viewer) can observe the system only, whilst an Operator can make changes to the actuator position and Pakscan system settings. Administrators can set up the whole system, including the email facility.



Master Station Status

The master station status page provides an overview of the status and health of the Pakscan system. Visual indications of the field network condition, master station health, internal processor integrity and presence of alarms are displayed.

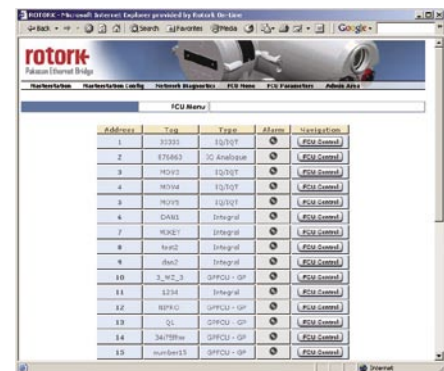
- System condition
- Reset loop



Field Unit Organisation

A dynamically constructed list shows all the connected field units together with their tag name and actuator type. Any alarm on any actuator is visible from this screen and it provides the route to the individual actuator status and control screens. The list automatically updates to reflect any changes to the system.

- Dynamically updated
- Complete Tag list of the connected valves
- Actuator type identified
- Pending alarm indication

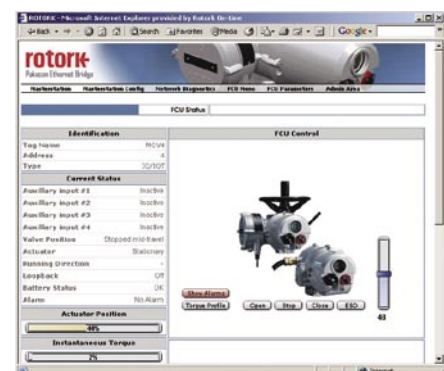


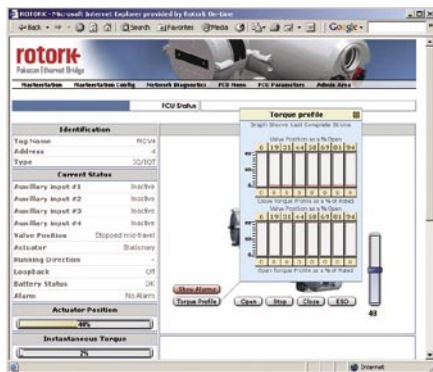
Actuator Status

Clicking on the 'FCU Control' button opens up a web page showing the current status of the actuator including any alarms that may be present.

The actuator may be opened or closed, or set to an intermediate position from this screen provided the user has suitable access rights.

- Current condition of the actuator
- Control the actuator position
- Select the alarm or torque (on IQ) screen



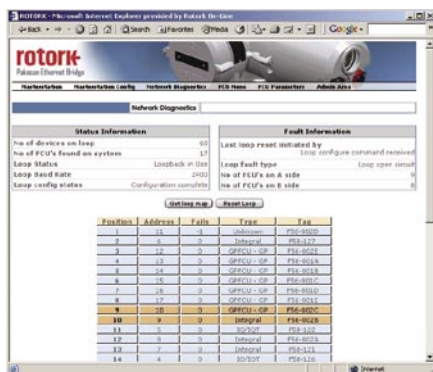


Actuator Alarms and Diagnostics

The Actuator Status screen includes additional pop up windows to show alarm and torque data. Alarms may be accepted by clicking the Alarm Accept button and the indication will return to normal if they are no longer present.

The actuator Torque profile can also be displayed from the status screen and this gives a chart showing torque versus position.

- Alarm latch and Accept facility
- Torque profile



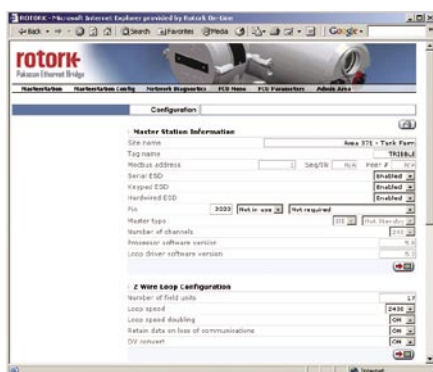
Network Diagnostics

The powerful Networks Diagnostic function automatically develops an 'as wired' field network map showing the physical connection order of all the field devices on the Pakscan loop. It also shows the current status of every actuator's communications and current performance of the system.

its position is shown by shading the two addresses in loopback. This provides a quick and efficient fault identification minimising repair down time.

- Full loop map
- Comms Failure counts for every actuator
- Position of any loopback faults

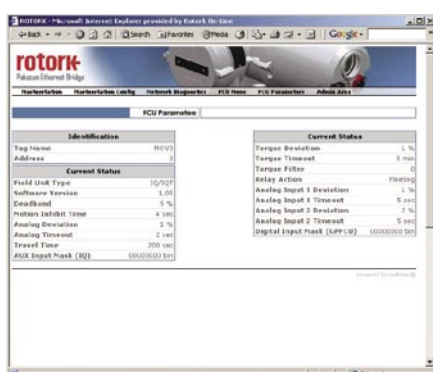
Should a field cable fault occur the nature of the fault is indicated and



Master Station Configuration

The settings for the master station, including the number of field units and loop speed, are editable from this screen. Only users with 'Administrator' access permission can make alterations. The tag name and communications settings can also be altered here. A print function is included to allow a permanent record of the settings to be kept.

- Port configuration
- Loop configuration
- PIN number
- Hot standby parameters



Field Unit Parameters and Settings

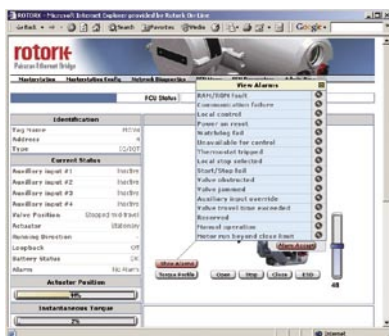
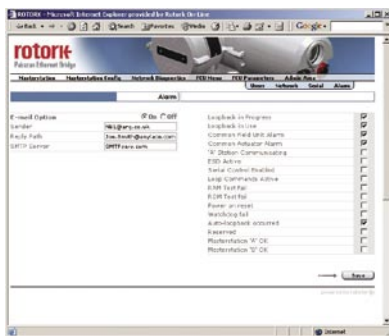
Every field unit has a number of parameter settings that determine its performance. If these are not correctly set then some features of the control system or the actuator will not be available for the end user. These screens allow the settings of all the field unit parameters to be examined.

- Actuator type
- Software version fitted
- Complete configuration details of actuator system related parameters

Automatic Email on Alarm

The system is able to automatically generate messages by email to specified recipients. These messages will send information relating to specific alarms generated on the system. For example the maintenance supervisor could be sent a message if the system develops a field network fault. The configuration of this feature requires Administrator access. Each user has their own set of email generation instructions lodged in the Pakscan system.

- Alarm event cause email generation
- Date and time stamped
- Destination of email programmable



Authorisation

The Pakscan Ethernet connects to an Ethernet Local Area Network. User security can be maintained on that connection in a number of ways. For absolute protection the Ethernet connection should be kept to a specific LAN for actuator control use on the installation.

LAN Connection

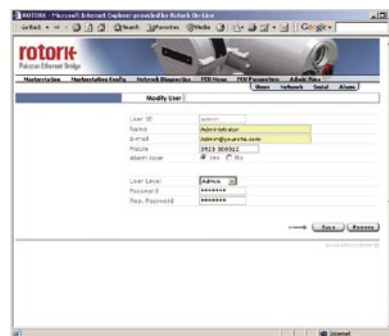
If the LAN is kept as an Intranet with no external connection then only authorised users of that Intranet will be able to view the Pakscan data. The Intranet firewall will prevent the Pakscan equipment from being accessed from outside the LAN.

Internet Connection

If the Pakscan Ethernet is connected to a LAN and suitable router with onward connection to the Internet or World Wide Web then the router must be set up with some protection against unwanted intrusion onto the LAN. The control data uses Modbus TCP that in itself provides security since most routers will not have their Modbus TCP port enabled.

Web Server

Access to the web server is protected by three levels of password. These must be securely kept and should periodically be changed to ensure against malpractice.



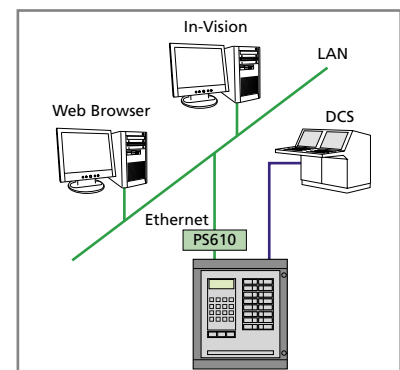
Pakscan IIS Ethernet Master Station Option

With a Pakscan IIS Ethernet master station a single Ethernet connection is provided for Modbus TCP to the host system over the LAN. The system is fully pre-configured for data collection and transmission and the engineering required to complete the settings for each system is minimal, comprising the IP address and simple data settings.

PS610 – A separate enclosure housing the additional components to give the Pakscan IIS Ethernet master station an Ethernet connection. The two configurable RS232/RS485 ports of the master station are also available.

Dedicated Interlocking

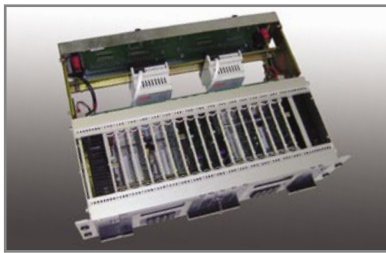
With Ethernet many potential points of control are possible. Interlocking or 'control permissive' can be difficult to implement. The Pakscan IIS master station includes a dedicated interlocking facility to ensure control conditions are satisfied for all potential points of control.



PS610 Option

Pakscan IIE Ethernet Master Station Options

In the case of a Pakscan IIE Ethernet master station, one or two Ethernet connections are available. For hot standby systems a common connection to both stations is provided. As with the IIS, the system is fully engineered connectivity and integrates seamlessly with PLC, DCS and Rotork's In-Vision.



Single Pakscan IIE Ethernet master station

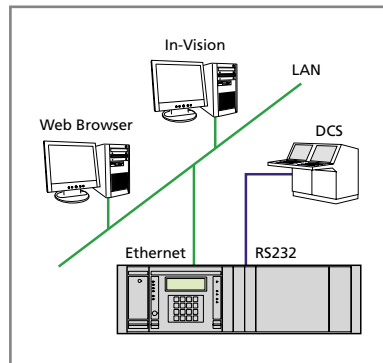
PS601 – Ideal for single master stations, this option includes an Ethernet output plus an RS232 port which can be used for serial communications.

PS602 – A second alternative for single master stations, in this option the Ethernet output is supplemented by an RS485 port. The RS485 port allows a conventional serial highway to be used in addition to the Ethernet highway.

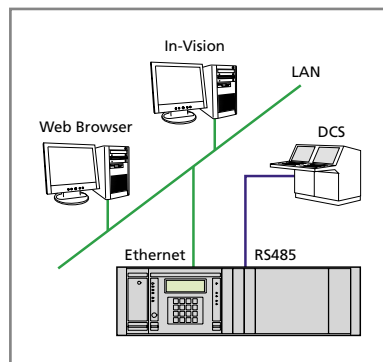
PS603 – When dual Ethernet communications are required from a single master station, this is the option to choose. Two Ethernet ports are included.

Hot Standby Pakscan IIE Ethernet master station

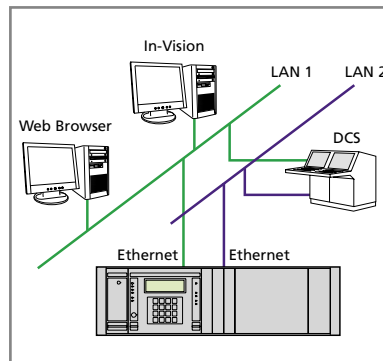
PS604 – For Hot Standby Pakscan IIE Ethernet master stations this is the option to choose. Either one or two Pakscan Ethernet ports are provided. When PS410 converters are fitted there can be both RS485 and Ethernet connections, or two Ethernet connections for dual host communication.



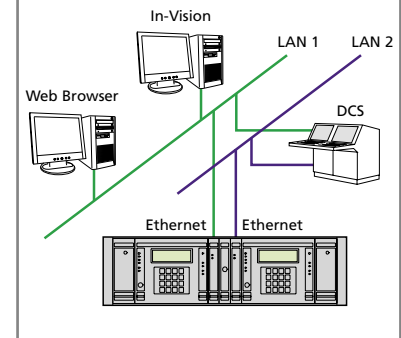
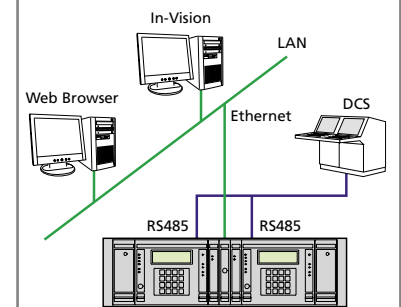
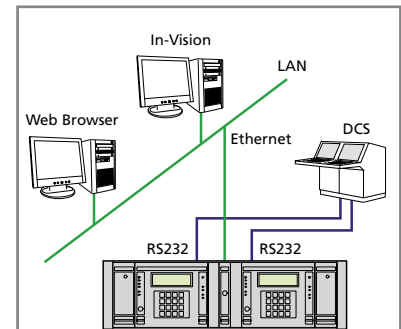
PS601



PS602



PS603



PS604

Pakscan IIE and IIS upgrades

Rotork has developed a field upgrade modification kit to enable customers with existing Pakscan systems to incorporate the Ethernet technology and web server.

The Pakscan master station software must be compatible with the upgrade kit. In the case of Pakscan IIE units the version of software must be V5.8/V5.2 or

higher and for Pakscan IIS units the software must be V3.1/V5.2 or higher to maintain full functionality.

The upgrade kit can comprise PS610 assemblies for external connection or new master station hardware for integral assembly.

Pakscan Ethernet Option

Common:

Ethernet Port: RJ45, 10Base-T or 100Base-Tx (IEEE 802.3)

IP address: user set during configuration

Protocols: Supports Modbus TCP for data exchange and TCP/IP for Web Server

Comms Connections:
Max of 10 simultaneous Ethernet connections

Email: Supports email generation on alarm detection. (Requires SMTP server).

Environmental: Operating temp 0 to 50°C
Storage temp -10 to +70°C
Humidity 5% to 95% RH, non-condensing

Password Protection:
3 levels *Read Only* – read data from the plant and bridge
Read/Write – read data and control outputs
Administrator – read, control outputs and set configuration parameters

Web Server: Requires system to use Generic Data base setting

Module Options:

For Pakscan IIE Systems -

PS601

A single Ethernet connection from each PS100 module, with an additional RS232 port

PS602

A single Ethernet connection from each PS100 module, with an additional RS485 port

PS603

Two Ethernet connections from each PS100 module

PS604

A single Ethernet connection common to both PS100's in a hot standby system. A second port (RS232 or RS485) is also available. (For RS485 two PS410 converters must be fitted).

For Pakscan IIS Systems -

PS610

A stand alone assembly with an RS232 port for connection to the Pakscan IIS master station

Connections: Screw clamp terminals for the RS232 connection, RJ45 for the Ethernet connection. Lever clamp terminals for the power supply (0.5mm max)

Power supply: 100 to 260V, 50/60 Hz, fuse 1 amp

Dimensions: 278(w) x 188(d) x 130(h) mm

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