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Controls

Pakscan P3 System

Network Control

Redefining Flow Control

Contents

Rotork is the global market leader in valve automation and flow control. Our products and services are helping organisations around the world to improve efficiency, assure safety and protect the environment.

We strive always for technical excellence, innovation and the highest quality standards in everything we do. As a result, our people and products remain at the forefront of flow control technology.

Uncompromising reliability is a feature of our entire product range, from our flagship electric actuator range through to our pneumatic, hydraulic and electro-hydraulic actuators, as well as instruments, gear boxes and valve accessories.

Rotork is committed to providing first class support to each client throughout the whole life of their plant, from initial site surveys to installation, maintenance, audits and repair. From our network of national and international offices, our engineers work around the clock to maintain our position of trust.

Rotork. Redefining flow control.

Pakscan Overview

The Rotork Pakscan system is a world leader in actuation control automation. First launched in 1986, Pakscan has been at the forefront of network technology since its inception, helping to control over 100,000 Field units.
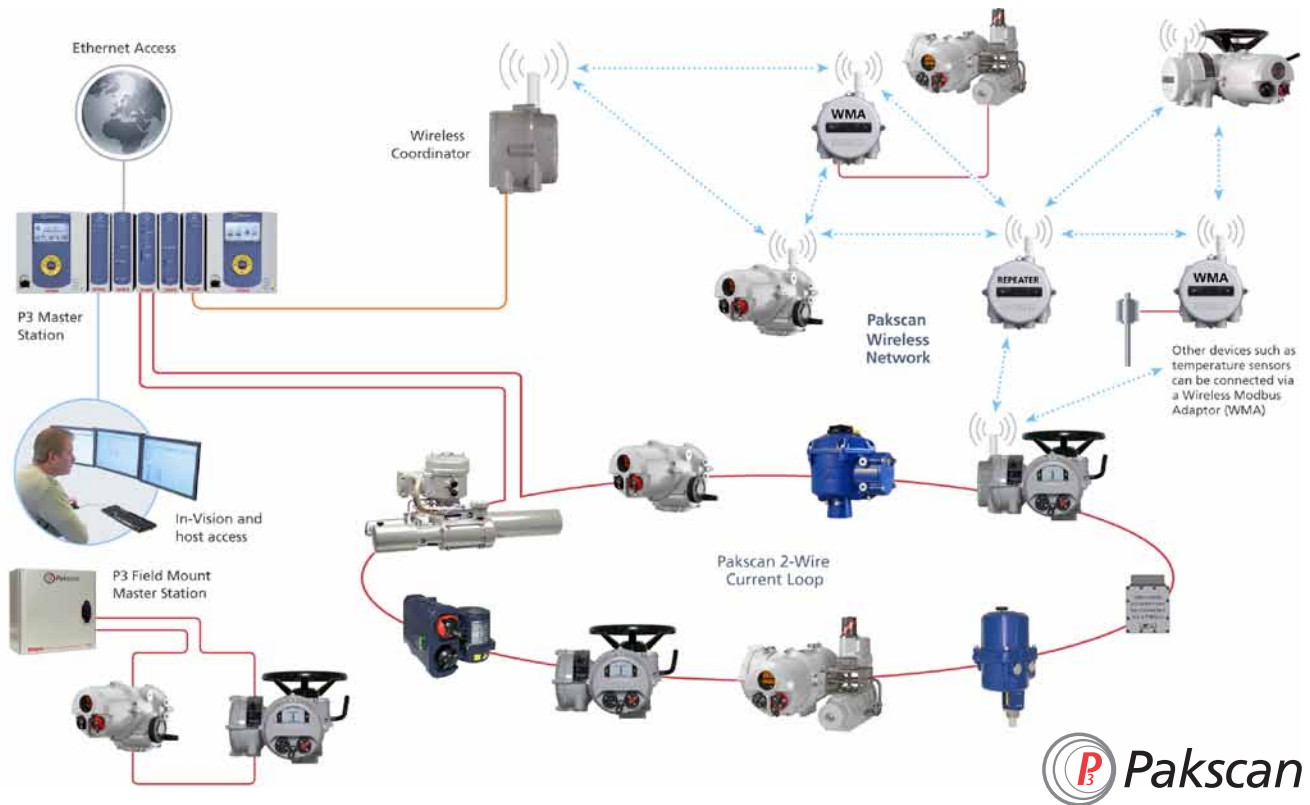
Pakscan network systems offer the customer unrivalled control, reliability and customer support. This is backed-up by a worldwide service and support network to keep your plant running 24 hours a day, 7 days a week.

Modern facilities require up to date communications right down to plant level. Plant managers demand more information quicker than ever before. Process operators need full control facilities at all times of the day and night. Maintenance managers want information so that their services can be scheduled economically.

To meet these requirements, design engineers include field communications networks to allow every piece of critical plant to be controlled and monitored by computer. These computers are assigned to management, operations and maintenance tasks within their own network, exchanging data about the equipment and process under their control.

The Pakscan system provides the vital link between valve actuator and supervisory control. It is an intelligent, reliable, high integrity, fast and easy to install network between field equipment and the control room. It is specially designed for use with Rotork products.

With their high reliability and efficiency, coupled with low maintenance costs, Pakscan networks have proved to be the unrivalled leader in valve actuator communications.

Completely Engineered Package

- Automatic network monitoring and fault management.
- Field network fault tolerant and redundant connection to host.
- Fully pre-configured master station.
- HMI screen and keypad built-in.
- Simple Modbus RTU / TCP host communications.
- Field network wired and/or wireless.
- Defined 2-wire transaction times and network distance.
- Field and host communication diagnostics.

- Easily expandable.
- Hot standby capability.
- Commission without the need for a host DCS or PLC.
- Proven track record.
- Over 100,000 installed Field units.
- Built-in web server for full systems diagnostics.
- Pakscan is compatible with existing and legacy Rotork actuators.

System Advantages at a Glance

Installed Cost Savings

- Direct cost reduction by using a single twisted pair or wireless network instead of expensive multicore cable.
- Direct reduction in engineering effort and associated costs due to simple network design.
- Direct reduction in commissioning time and associated cost due to faster and easier installation.
- Reduced down time losses leads to increased plant productivity.

Minimum Cost of Ownership

- Increased information flow permits optimised and correctly scheduled maintenance of the valves and actuators.
- Inbuilt system fault tolerance allows for continuing operation of the plant even when a fault exists within the system.
- Minimal downtime in the unlikely event of a component failure as Pakscan is simple to repair.
- Large number of in-built diagnostic features with automatic fault location indication and communication performance data.

Easy Integration

- Master station supplied fully pre-configured.
- Proven communications to all major DCS and PLC suppliers.
- Industry standard Modbus RTU / TCP protocol to DCS, PLC or In-Vision.
- Multiple host communications capability.
- Multiple database organisation for maximum data transfer efficiency.
- Mountable in the field (P3F).

Easy Configuration

- Built-in web pages.
- Graphic Human Machine Interface (HMI) on P3 master station units.

High Plant Capacity

- Network with the capacity for up to 240 field units on a single 20 km 2-wire loop.
- Wireless network addition increases master station capacity to 300 field units.
- Capable of controlling various field devices including actuators, mixers and pumps.
- Wired network allows for no restriction on inter-node distances within overall loop limit.

High Performance

- Commands to the actuators have priority over data collection.
- Full monitoring and control of every field unit and actuator connected.
- Wired network compatible with all current Rotork actuators. Wireless network compatible with all IQ range actuators.
- Master station monitors the full network at all times, reducing the host system burden.
- Field unit parameters may be altered from the master station.

Maximum Reliability

- Field units are integral to the actuator and have the same environmental specification.
- High levels of surge protection for wired and/or use of wireless to overcome noisy field environments.
- All parameters are set non-intrusively.
- Full isolation maintained between the network and the connected actuator or master station.
- Secure network communication protocol.
- Complete network fault protection with redundant field and host communication paths.
- Includes options for redundant master station (P3).
- No repeaters necessary on the 2-wire field cables.

Applications

Since its inception Pakscan has found acceptance in all industry sectors and many diverse applications. Wherever Rotork actuators are to be found there will be a Pakscan system to operate them:

- Oil and Gas Storage.
- Tank Farms.
- Refinery plant.
- Water Filtration plant.
- Potable Water Treatment and Storage.
- Waste Water Treatment plant.
- Flood control.
- Off-shore platforms.
- Gas production wells.
- Power station boilers and turbines.
- Metering skids.
- Tunnels and Pipelines.

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Pakscan In-Depth

Each Pakscan system has three primary elements - field units, the field network, P3 master station and a host connection. Together they provide the core around which the overall control strategy may be built. Additional facilities may be added to the systems to give control of other manufacturers' products, to provide specialist operator interface facilities, or to combine with our own In-Vision dedicated SCADA package.

The following sections explain the main aspects of the Pakscan control system in-depth:

p6   Field Units

Rotork IQ range, Q, SI *Pro*, EH *Pro*, ROMpak, CVA and CMA range actuators are all available with Pakscan wired field units. Rotork IQ range actuators are available with Pakscan wireless field units. General Purpose field units (wired and wireless) connect to other plant equipment, pumps solenoids, etc.

p9   The Field Network

Actuators are connected together either into a 2-wire loop using standard single twisted pair cable or into a wireless network with P3 Wireless. Network integrity is continually checked and a fault in the network can be detected and maintenance staff alerted.

p16   P3 Master Station and Host Connection

The Pakscan P3 is capable of controlling up to 300 actuators, split between a wired current loop option card and a wireless option card. The P3 includes a fully redundant Hot Standby master station as an option. The P3F is capable of being mounted close to the process and can operate a maximum of 32 field units.
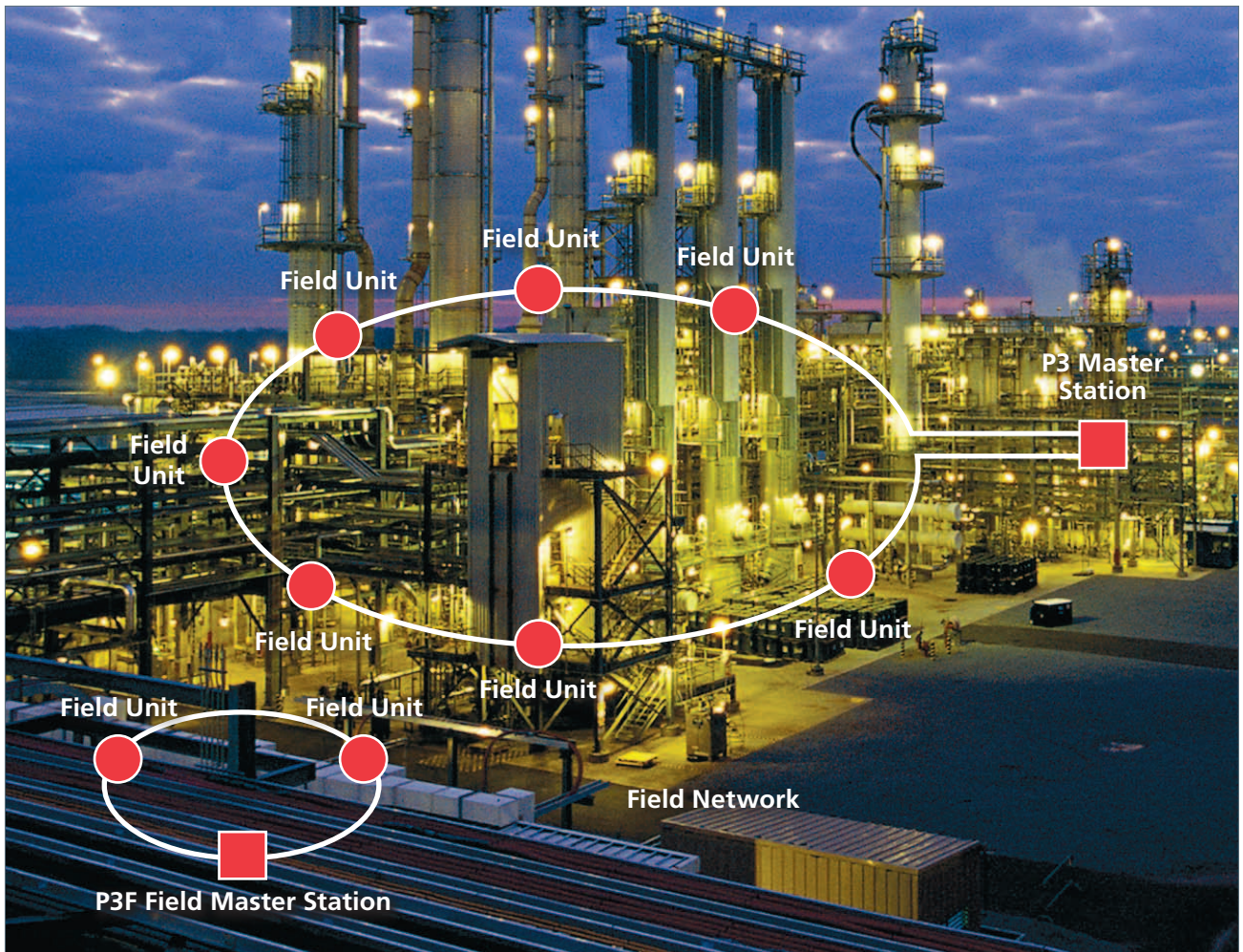

Fig. 2. Example Pakscan installation.

Pakscan Field Units

Wired Field Units

Actuator Wired Field Control Units

Pakscan wired field units meet the same environmental requirements as the actuator in which they are located. Each unit is integrally mounted within the actuator's double-sealed electrical housing and requires no access once fitted.

Variable parameters such as the address and baud rate are set non-intrusively over the two-wire loop using a Paktester (see page 31) or via the Rotork Setting Tool Pro on the IQ range, SI Pro and EH Pro actuators. Once installed and operating on the loop, changes to the parameters can be made from the master station for all settings except the field unit address. Each field unit has its own unique address to enable the master station to contact a specific actuator on the loop, regardless of its hard-wired position. All the field unit settings are retained in EEPROM ensuring they will remain unaltered even if the power is switched off.

Wired field unit positions on the loop do not have to follow a strict order and the set address may be in any order. If an actuator is switched off for any reason, this will not interrupt the communication with the remaining actuators and the system will identify any unit that is no longer present on the network.

The master station is able to identify the unit that is missing and report the fact to the host system. Data relating to the missing address can either be returned to zero (as it is unknown) or left in the last known state.

Each type of wired field unit is able to identify itself to the master station and, when it has done so, the displays used for the information retrieved are tailored to the particular device. With most Rotork actuators, the degree of valve opening is reported automatically without the need for additional components in the actuator.

Actuator local controls and remote, hard-wired, control inputs may be used in addition to the Pakscan system controls. These facilities remain operable even in the unlikely event of a field unit failure.

Fig. 3. An example FCU printed circuit board which are mounted within the main actuator housings

General Purpose Field Unit

The application of 2-wire control around a process plant often results in a need to include transmitters, solenoids, or other sensors into the system.

The General Purpose Field Control Unit (GPFCU) is specifically designed for digital and analogue inputs and outputs. It is available in 19" rack mounting form for use in an equipment room, or for field mounting in either a watertight IP65 enclosure or fully certified enclosure for use in hazardous areas.

The variable parameters are set in the same way as an actuator field unit using the non-intrusive Paktester.

Fig. 4. Rotork IQ3, IQ Pro, IQT Pro, Q, SI Pro, EH Pro, ROMpak, CVA and CMA range actuators range actuators are all available with Pakscan wired field units.

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Pakscan Field Units

Wireless Field Units

Actuator Wireless Field Control Units

Pakscan wireless field units meet the same environmental requirements as the actuator to which they are attached, only the IQ range of actuators can be fitted with the wireless module. The module is fitted in place of the terminal cover of the actuator and connects to the main CPU card of the actuator using a proprietary network connection. The unit is powered from the actuator and requires no access once fitted to the actuator.

For actuators that are fitted in wireless black spots, such as pits, the wireless module itself can be mounted remotely, where it is connected to the actuator using standard network cable.

Variable parameters such as the address and network parameters like the Personal Area Network (PAN) ID, can be set up non-intrusively using the infra-red link. Once installed and operating on the wireless network, changes to the parameters can be made from the master station for all parameters except the field unit address.

Each field unit has its own unique address to enable the master station to contact a specific actuator on the network. Once given a unique address and the correct wireless parameters the field unit will register with the master station. Monitoring and control can then commence. All field unit settings are retained in EEPROM ensuring they will remain unaltered even on removal of power from the actuator.

Actuator local controls and remote, hardwired, control inputs may be used in addition to the wireless field unit. This means that it is possible to have a monitoring only wireless network with control via a hardwired method - that method of hardwired control could even be the Pakscan 2-wire loop.

Wireless Modbus Adaptor

There may be a requirement to interface to other manufacturers' equipment or other non- IQ range Rotork equipment. This can be achieved using a Wireless Modbus Adaptor (WMA). The adaptor connects to the equipment via its Modbus interface. A special range of Modbus addresses can be allocated to these devices. Any messages received by the master station to these addresses will result in the Modbus message being passed transparently to the Modbus device attached to the adaptor. The adaptor requires a power supply from the device to which it is connected and can be mounted away from the device at a distance dependent on the Modbus baud rate utilised.

Wireless and Modbus parameters for this device are set up using the Modbus interface.

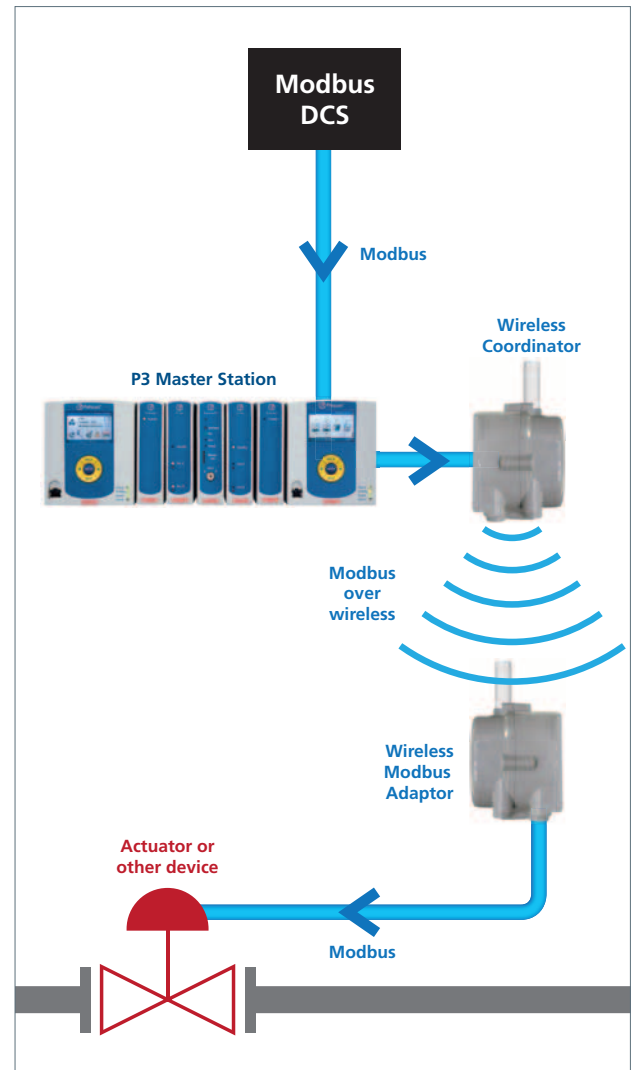*Fig. 5.   P3 Wireless actuator module within a Rotork 'IQT Pro' actuator.*

Fig. 6. Wireless control of actuators and other devices via P3 Wireless Modbus Adaptor (WMA).

Pakscan Field Units

The data reported by the system includes but is not limited to the following:

Pakscan Field Unit Data

Data and Control for Field Control Unit in IQ range
Control Outputs -
Open/Stop/Close/ESD digital control
Set Position 0-100% analogue control
Position and Torque Feedback -
Actuator current torque value 0-120%
Valve position analogue status (0-100% position feedback)
Actuator Status Feedback
Valve position digital status (open/closed)
Actuator alarm status
Remote control availability
Local stop selected
Valve opening and closing digital status
Actuator torque tripped at end of travel
Actuator torque tripped in mid stroke
Battery condition low
Motor thermostat status
Valve manual movement
Contactor failure to energise
Excessive valve travel time
Motor still energised at end of travel
Communication failure
Field Control Unit failure
Valve Signature Data
Torque profile in opening direction
Torque profile in closing direction

Pakscan System Data

Data and Control available with a P3 Master Station
System Control Commands
Reset system (Reconfigure loop)
Change station to standby mode (Hot standby systems only)
Alarm accept
Global ESD function
System Condition Feedback
Network condition register
Network status
Main station status
Standby station status (Hot standby systems only)
Map of field unit locations
Cable fault type (open or short circuit)
Configuration progress
Actuator alarm present
Field control unit alarm present

System Performance
DCS or PLC communications
Modbus RTU Serial communications, monitor and control
Modbus TCP Ethernet communications, monitor and control
Field Network communications
Relative geographic position of each field unit address
Communications failure count for each field unit address
Location of any field cable fault by adjacent address
Test communication performance at various data speeds
Address range to be scanned
Field Unit Settings
Block and parameter settings for each address
Actuator type at each address

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Pakscan Field Network
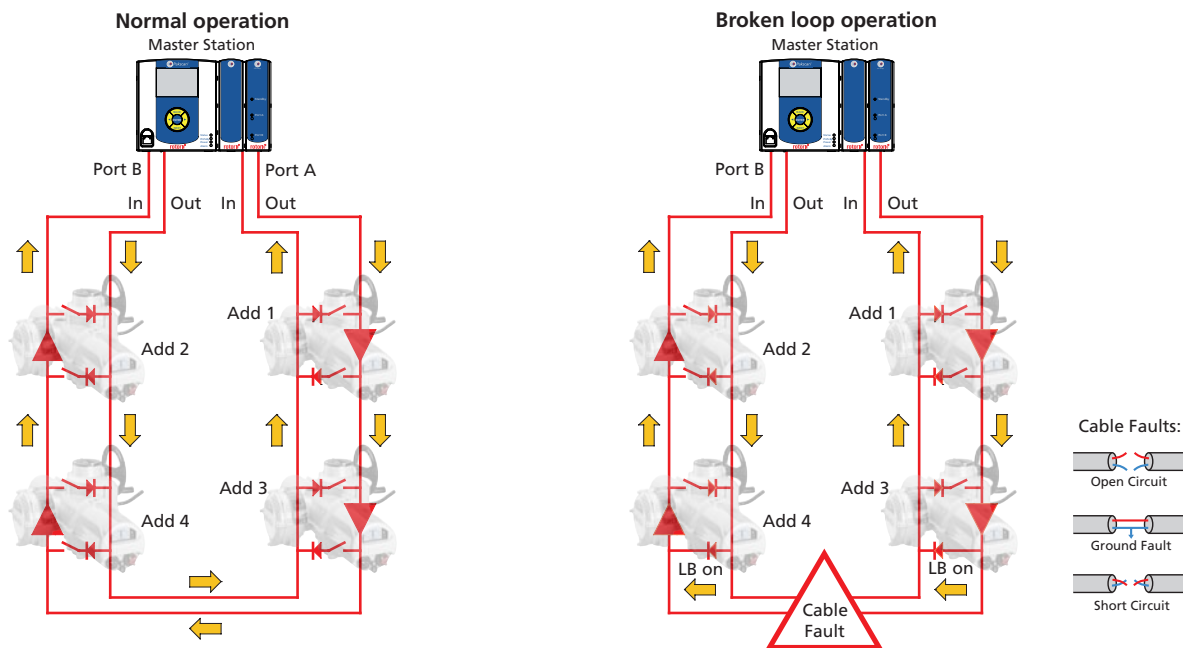
The 2-wire Loop – System Fault Tolerance

Fig. 7. System fault tolerance - 2-wire loop integrity.

The Loop System

The two wires are connected to, and taken from, each field control unit in turn. They originate from and return to the master station to create a single twisted pair 2-wire loop. As each device may now be accessed from either direction, a redundant communication path is available. Pakscan fully utilises this fact in the event of a cable fault.

Cable Fault Tolerance

The integrity of the 2-wire cable is continuously checked whilst the system is running. In normal operation port A is a transceiver and port B a receiver only. The 20 mA loop current passes from master station port A 'out' to port B 'in' and back from port B 'out' to port A 'in'. Port B is able to monitor communications from port A through the cable.

Should this communication fail for any reason, the master station ceases transmission and every field unit asserts its 'loopback' circuit. This closes all the 'switches' on the diagram above. After a short period, the master station then begins communication from port A to each field unit in turn, removing its loopback circuit. Progressively, the current loop is extended until the fault location is revealed.

Port B reconfigures as a transceiver and the procedure is repeated. Once the process is complete, the system will have located the position and precise nature of the fault and maintained communication with all the field units on each side of the fault.

The loopback feature allows the system to have two communication routes without the need for two cable runs. It also allows the system to cope with cable breaks, short circuits or ground faults.

High Integrity Data Transmission

All messages passed over the network are totally under the control of the master station. A field unit may not transmit any data unless it receives a request from the master station. All data messages and commands are verified by framing and CRC checks.

Non-catastrophic failures due to noise are handled by the master station on a repeat as necessary basis. All messages require a response within the timeout period. If the timeout period expires, the master station will repeat the message up to three times before indicating that the field unit is out of communication.

Fault Indication

If a cable fault occurs, Pakscan is able to inform the maintenance staff of the location of the problem and the nature of the fault. The master station includes diagnostic screens that show which actuators have instigated their loopback circuits and also the order of the addresses used on the loop. The position of the actuators in loopback will be adjacent to the cable fault.

Should two actuators inadvertently be programmed with the same address (which is not allowed), then the system can also tolerate this commissioning fault. The duplicated address will not be used for any command or data reporting and the field unit screen will indicate that a duplicate is present on the network.

Pakscan Field Network

The 2-wire Loop – System Isolation

Master Station

The master station is equipped with two processors. One controls the loop data and the other handles the host communications, web pages and Human Machine Interface (HMI) for P3. All the set up data for the master station is held in non-volatile FRAM.

Full galvanic isolation is maintained between the 2-wire loop connections and the processors in the master station.

Field Control Unit

Each field control unit is fitted with a micro-processor, an EEPROM to hold the address and communication speed data, and a detector to sense the loop current.

As with the master station, the field control unit maintains full galvanic isolation between the loop signal detection circuits and the actuator electronics. In addition, the field control unit does not interfere with the actuator local controls, which remain operable even in the event of a field unit malfunction.

Noise Protection

The Pakscan system protects against electrical interference by using a current loop and surge arresters. The use of a 20 mA current loop automatically ensures that the system offers a low impedance to any noise currents and prevents these currents from generating significant voltage spikes. Any voltage spikes that do result are swiftly clamped to acceptable levels by the high speed surge arresters fitted at each field unit and the master station.

The 2-wire Loop – High Efficiency

Simple Configuration

Each system is supplied entirely pre-configured with a full database and Modbus protocol configuration when it is delivered. To complete the plant specific settings, the number of field units and the loop communication speed, together with the host communication parameters are entered through the keypad.

It takes only a few moments to tailor the system to the actual plant and it is easy to reconfigure the settings if the design changes.

Cable Savings

The use of the 2-wire system greatly reduces the number of cable cores required to transfer signals from the actuator to the control centre.

Comprehensive Data Reporting

Two wires carry the data previously requiring 22 conductors. No additional actuator hardware is needed for position or torque data reporting from IQ range actuators.
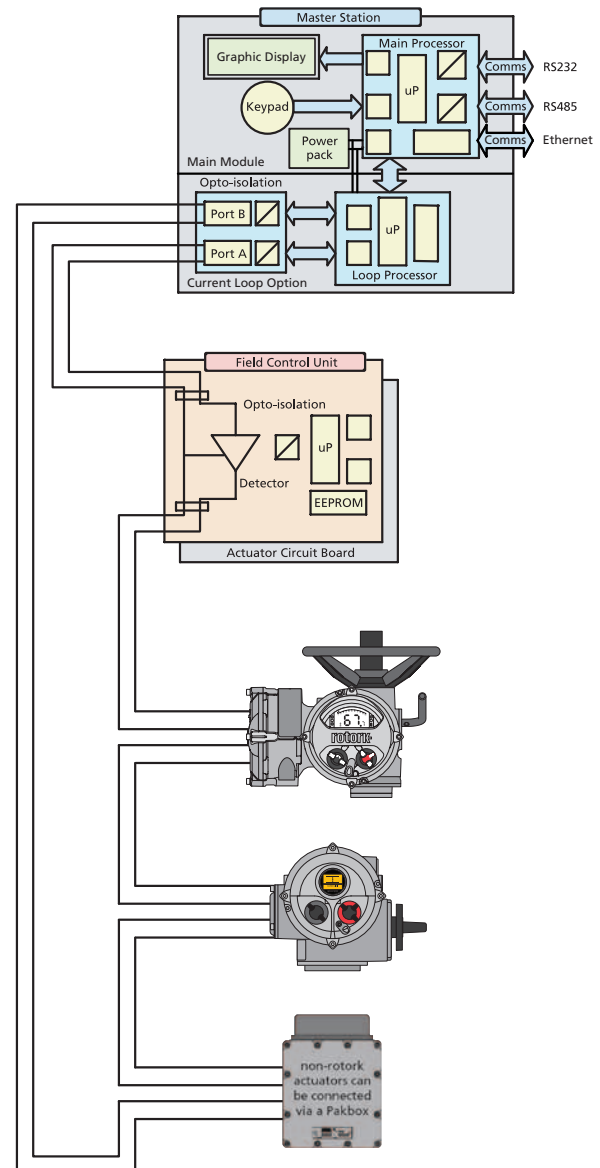

Fig. 8. Pakscan master station and 2-wire loop showing system isolation

Design, Construction and Commissioning Savings

The system is fully pre-engineered, obviating the need for costly wiring diagrams and reducing construction errors.

With up to 240 field units on one 2-wire loop, the total cost reduction is extremely significant.

Automatic Expansion

When additional actuators are fitted to the Pakscan network the system locates them, identifies them and includes them in the data reporting automatically. There is no need to reconfigure the system or modify the internal database; simply change the setting for the number of field units by using the in-built keypad and screen.

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Pakscan Field Network

The 2-wire Loop – Defined Transaction Times & Network Distances

Pakscan networks use a unique proprietary protocol that achieves very fast update times whilst using relatively low data transmission rates. Compressing the data field to a minimum length allows more data to pass over the network in a given time at each data rate. The result is a system that can handle long transmission distances and a large number of units, without repeaters, whilst still maintaining a quick and efficient communication.

Field units are scanned in turn by the master station and report their current status back in compressed code messages, shortening the transaction period to a minimum.

The field cable used for the Pakscan network is typical instrumentation cable. A simple twisted pair with overall screen using polyethylene insulation will suffice.
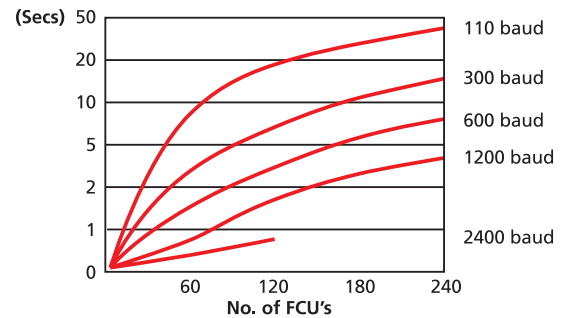
The use of low transmission speeds allows the current loop to achieve long distance communication with field devices without the need for repeaters. Where the loop distance is shorter then higher speeds can be used.

The communication protocol gives priority to instructions sent from the master station to the field units.
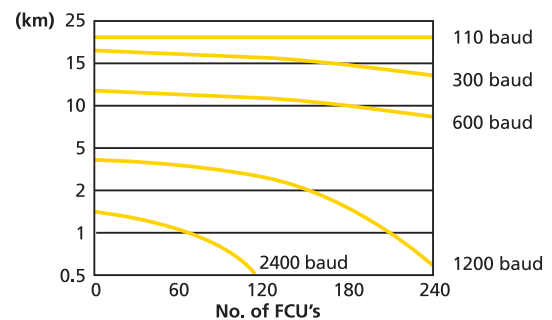
Commands are considered more important than reports so the routine polling of the field units is momentarily suspended when a command needs to be issued. Because command instructions occur infrequently there is a negligible effect on the scan time for the system.

The scan time in the table shown below assumes that only one actuator has new data or a new event to report during each scan cycle. The loop protocol uses a 'report by exception' technique to minimise the message lengths. The field unit does not repeat the data sent once it receives confirmation of receipt by the master station. If the scan time is short then the probability of more than one actuator with a new event to report is very small and the figures given will be accurate.
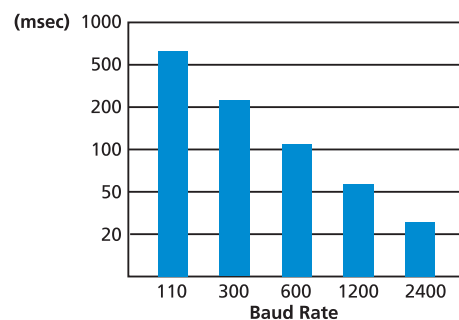
Scan Time (seconds)*

Baud Rate	Number of field units			
	60	120	180	240
110	8.4	19.3	31.1	42.9
300	3.1	7.1	11.4	15.8
600	1.6	3.6	5.7	7.9
1200	0.8	1.8	2.9	3.9
2400	0.4	0.9	N/A	N/A

Loop Distance (km) with 1.5 mm² cable

Baud Rate	Number of FCU		
	60	120	240
110	20.3	20.3	20.3
300	17.1	15.9	13.7
600	12.2	11.1	8.8
1200	4.1	2.9	0.6
2400	1.5	0.3	N/A

Time to issue a command (msec)*

Baud Rate	Time
110	614
300	230
600	110
1200	60
2400	30

* These figures are with 'doubling' enabled. See manual PUB059-002-00 for details.

Pakscan Field Network

Wireless Network – Components

P3 Wireless network consists of a number of essential modules:

- Option module for the standard P3 master station.

- Wireless coordinator – the base station for the mesh network.

- Wireless actuator module (see page 7).

Option module for P3 master station

All P3 master stations are modular and easily extended. The P3 Wireless option module can be added to single channel and hot standby systems. In all cases it is fully integrated, in terms of both its functionality and the interfaces through which the system is controlled.

There is a single Modbus master station database for all wireless actuators. This database has been designed to provide data in a number of different formats.

The P3 Wireless coordinator

This unit is the central hub for all wireless communications to and from the P3 master station. It can be mounted up to 200 m away from the P3 master station, either indoors or outdoors.

Up to 60 wireless actuators can mesh with a wireless coordinator. The addition of P3 Wireless to the P3 master station does not affect the number of wired actuators that it can handle; the wireless upgrade effectively provides additional capacity, up to a maximum of 300 devices.

Wireless repeaters

Although all P3 Wireless actuators work together as a mesh, relaying signals between one another, it is sometimes necessary to bridge gaps in your wireless network with stand-alone repeaters. Apart from the fact that these devices are not attached to actuators, they are otherwise identical in their performance. The repeater requires an external power supply.

Wireless Network – Applications

P3 Wireless for New Control Networks

For new actuation control networks, the Rotork Pakscan P3 wired system is a trusted solution. Now, with P3 Wireless, you can add the flexibility and infrastructure-savings of a wireless network.

In addition to controlling actuators, P3 Wireless can also gather actuator diagnostic and asset management information centrally, allowing you to optimise operations and keep on top of preventative maintenance.

Implementing a control network with P3 Wireless means no network cabling to lay and no cable trays to install. This keeps project times short and reduces both hardware and site installation costs.

There is minimal configuration involved with a P3 Wireless network. Individual actuators mesh automatically to form a self-managing, redundant network which routes data around any problem areas.

Every P3 Wireless network is designed to be secure and highly resilient. To be sure that your site is fully suitable, we will carry out a detailed site survey before work commences.

P3 Wireless for Network Upgrades

P3 Wireless can be utilised to expand an existing P3 wired system with new actuators without the cost of new network cables and without impacting on the existing working wired system.

It can also be added to existing actuators to improve asset management by adding the ability to collect actuator diagnostic logs. Once you have upgraded an actuator for wireless, it can be controlled wirelessly or it can still be controlled by your existing hardwired or P3 wired network control system.

This makes P3 Wireless perfect for a complete or partial upgrade of your control network, or to simply add a layer of enhanced diagnostic and monitoring capabilities.

Flexible

Suitable for internal or outdoor applications, P3 Wireless can adapt to meet most industrial environments:

- A single base station can serve the entire mesh.

- Outdoors, actuators can be up to 100 m apart.

- Indoors, actuators can be up to 30 m apart.

- The data is re-transmitted through actuator modules or repeaters, up to a maximum of 7 times, giving wide area coverage.

- Cable runs can connect actuators in pits and black-spots.

Secure

Robust security is a key feature of P3 Wireless. Rotork have designed in strong measures to safeguard your network:

- Strong encryption hides commands from external analysis.

- Anti-spoofing prevents malicious take-over.

- Private protocol obscures monitoring data.

Resilient

P3 Wireless has one of the most resilient network architectures available:

- Built-in redundancy safeguards.

- Mesh network dynamically reroutes around faults.

- Large frequency and channel options to avoid interference.

- International frequency band usage is respected.
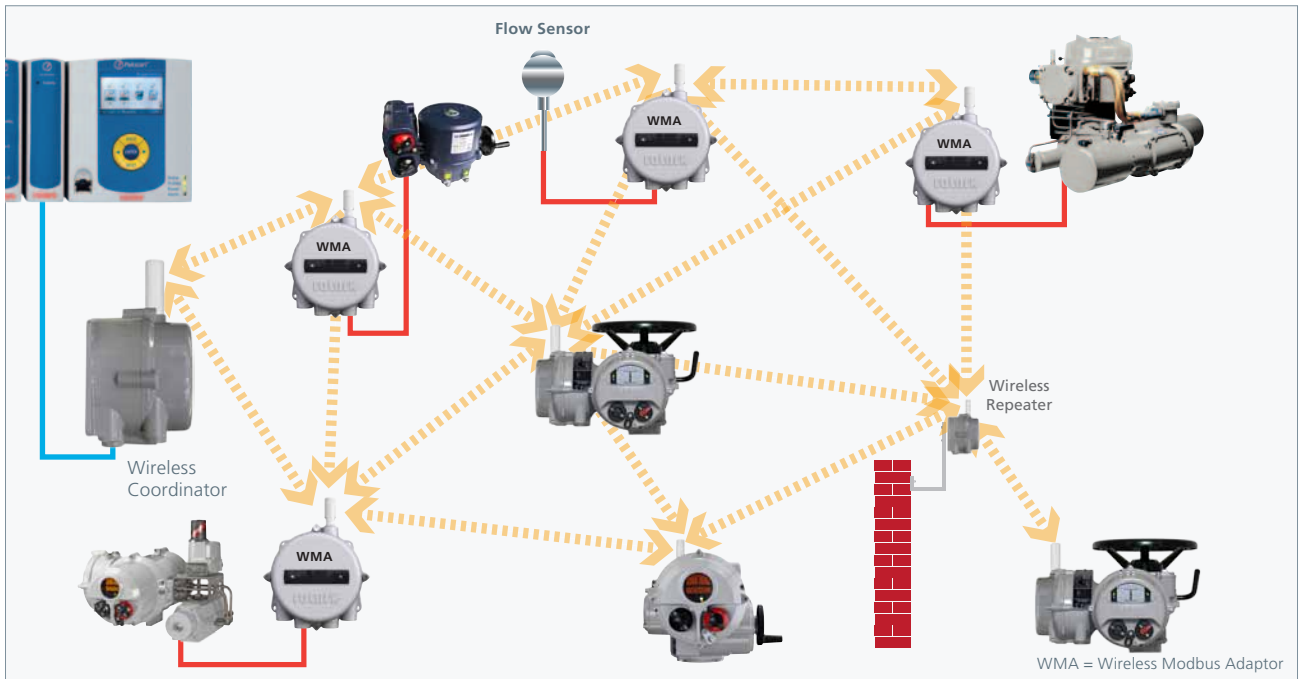
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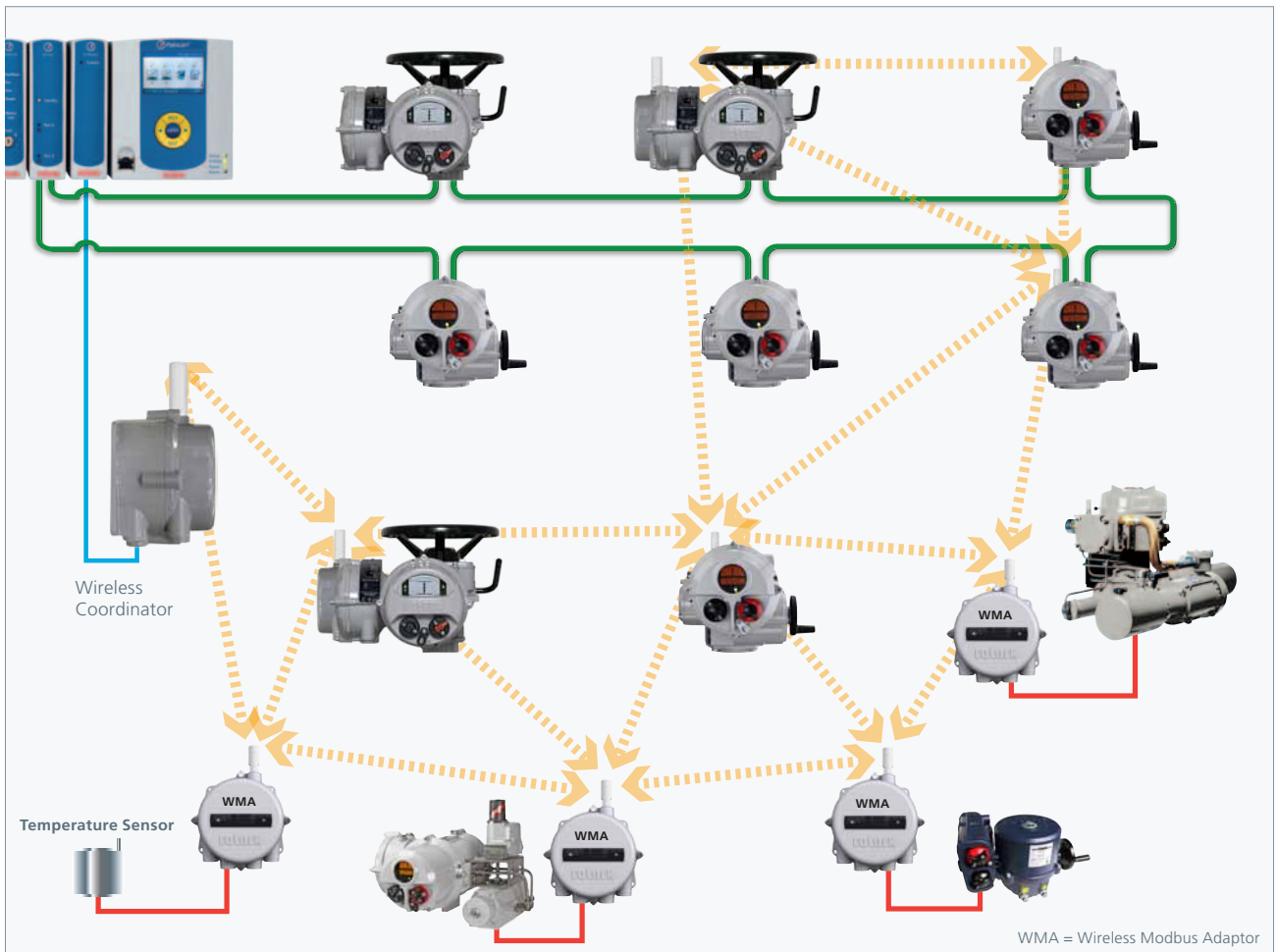*Fig. 9. Pakscan P3 Wireless only network.*

Fig. 10. Combined Pakscan P3 2-wire (green) and P3 Wireless network including wireless monitoring of wired actuators.

Pakscan Field Network

Wireless Network – Technical

Pakscan P3 Wireless uses a mesh network, operating in the internationally-recognised 2.4 GHz band. It adheres to IEEE 802.15.4 for its wireless interface and takes advantage of Direct Sequence Spread Spectrum (DSSS) which inherently provides resistance to interference.

Operating frequencies

P3 Wireless operates in the 2.4 GHz band – part of the internationally recognised ISM frequencies (Industrial, Scientific and Medical) that require no operating license. Within this band there are up to 16 available channels, although in some countries one or more of these are not available. Rotork has configured the various national restrictions into the system, so each installation works within the permitted range.

The system is able to transmit at relatively high power levels (up to 100 mW) if the operating environment requires it. However, because this is restricted in some countries, the default setting is 10 mW.

Operating range

The maximum size of a P3 Wireless network is affected to a large extent by the physical obstructions around the operating environment and any sources of radio interference, such as intruder detectors, cordless phones and other wireless networks. In a typical site environment a practical estimate of signal range between devices is 30 m indoors and 100 m outside.

The mesh network can pass a signal through up to 7 devices on the way to its destination. A device may be an actuator, a Wireless Modbus Adaptor (WMA) or a dedicated repeater.

Mesh networking

The network used by P3 Wireless is known as a mesh. In this type of network, every node – in this case each one of your wireless actuators – can act as an independent router to help signals get to their intended destination.

One of the most important advantages of a mesh network is its ability to self-heal: Provided it has been designed with two or more paths between each actuator and the wireless coordinator, almost any hardware or communications failure can be overcome, as the nodes dynamically determine an alternative route for the data.
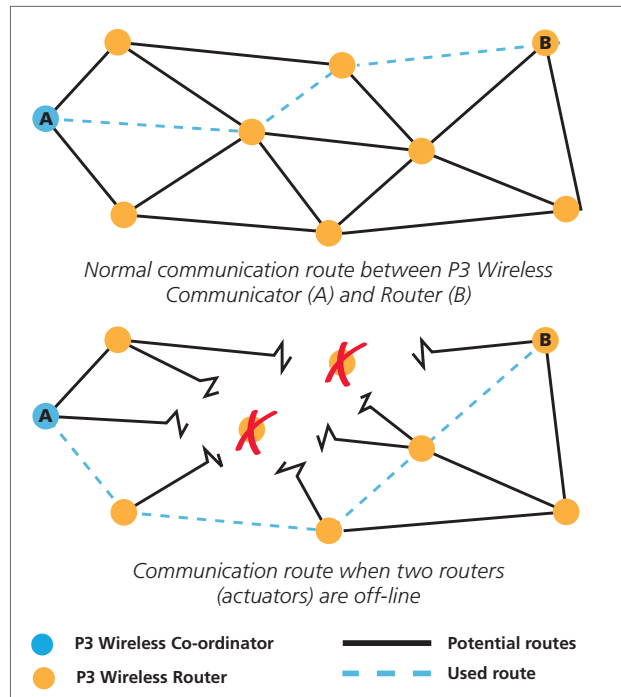

Normal communication route between P3 Wireless Communicator (A) and Router (B)

Communication route when two routers (actuators) are off-line

| ● P3 Wireless Co-ordinator | ──── Potential routes |
| ● P3 Wireless Router | - - - Used route |

Fig. 12. Explanation of mesh network redundancy paths.

Fig. 11. P3 Wireless mesh network technology is suitable for nearly any site industry or location.

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Pakscan Field Network

Wireless Network – Security

To keep Pakscan P3 Wireless networks private and secure, Rotork has applied strong security measures.

Encryption

To prevent unauthorised commands being sent to devices over the wireless network, all control data is strongly encrypted. AES – the Advanced Encryption Standard – was first developed by the US Government in the 1990s and since its approval (FIPS 197) in 2001, has become the recognised way of securing critical data.

The wireless controller and each actuator is programmed with your unique key. The AES algorithm is used to encrypt each command before it enters the network and then to decrypt it at the actuator. The 128-bit keys used by P3 Wireless result in an extremely high degree of encryption.

Anti-spoofing

To prevent a would-be attacker causing damage by intercepting and replaying genuine control instructions, the P3 Wireless system employs two anti-spoofing mechanisms.

Firstly, before a device can join the network it has to be manually authenticated through the P3 master station. Signals sent from unauthenticated devices are universally rejected. Secondly, every transmission over the network includes a counter – in encrypted form. If a command is maliciously replayed, the counter will clearly show it up as not original and cause it to be rejected.

Wireless Network – Site Survey

To be sure that we can provide a reliable, resilient wireless control network at your site, Rotork carries out a detailed survey to examine physical features and existing use of the local radio spectrum.

Before our survey team comes on site, we ask your engineers to provide site plans, information about existing wireless usage and the layout of your plant. We will also need details of on-site environmental conditions such as watertight and hazardous classification areas. We can provide a full list of questions to your nominated contact on request.
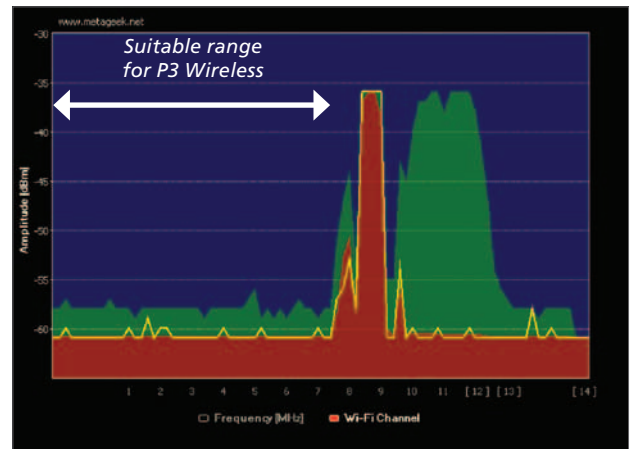

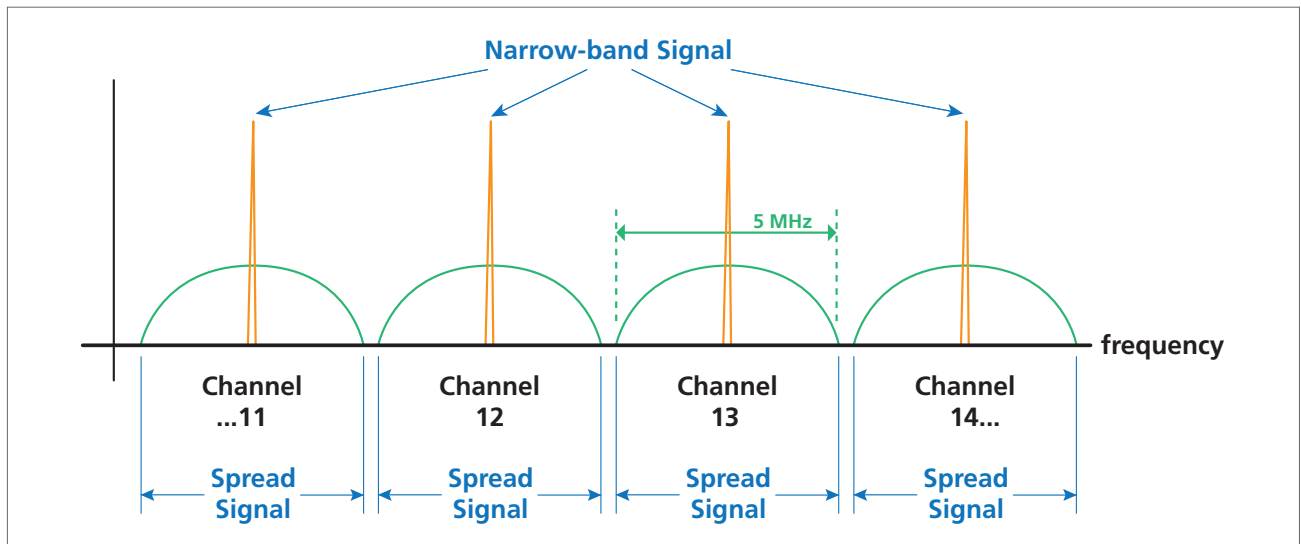*Fig. 14. Wireless survey showing existing signals present on site.*

Fig. 13. Diagram explaining Direct Sequence Spread Spectrum (DSSS) over P3 channels 11 through 14 in the 2.4 GHz ISM spectrum.

Direct Sequence Spread Spectrum (DSSS)

P3 Wireless communicates using DSSS – Direct Sequence Spread Spectrum. The name 'spread spectrum' comes from the fact that the carrier signals occur over the full bandwidth (spectrum) of a device's transmitting channel.

This means that when you have chosen the channel over which you are going to communicate, rather than transmitting at one central frequency, communications are spread over the 5 MHz bandwidth, centred around the channel frequency. Spread-spectrum radio is rarely affected by interference from conventional narrow-band sources.

Pakscan P3 Master Station

Pakscan P3 Master Station

The Rotork P3 Master Station provides the high integrity link from the DCS to the valves in the field. It comes complete with keypad and display screen to allow operators and engineers to see exactly what is happening with the system and the valve actuators at any time.

By adding a completely independent standby P3 Master Station, the availability of the Pakscan system in the event of a component failure is guaranteed. Multiple host ports allow connection to multiple host systems at the same time, or dual redundant comms links where necessary. The field network is fault tolerant, allowing the system to ride through any type of fault without losing actuator control. Further, if subsequent faults occur before the initial failure is repaired, the system will continue to operate as much of the plant as possible.

Key benefits:

- Single, dual and hot standby master station options.
- A reduced specification field mounted Master Station (P3F) is available. See page 28.
- Ethernet connectivity.
- Built-in secure web server.
- Logging of host messages, Field unit commands and status changes.
- E-mail notification of alarm conditions.
- Multiple host port connectivity.
- Modbus RTU and TCP protocols supported.
- On-line actuator parameterisation.
- Time synchronisation capability.
- Improved asset management.
- Intuitive colour graphical Human Machine Interface (HMI) (P3 only).
- Multiple language support.
- Front access to all terminals.
- Panel and 19" rack mounting options.
- Support for up to 300 nodes with the addition of wireless.
- Pakscan is compatible with existing and legacy Rotork actuators.

Ethernet Connectivity

Every system comes complete with multiple RJ45 Ethernet connections. The master station can be connected directly to a PC, laptop or Local Area Network (LAN) due to its auto sensing of the highway baud rate and Rx/Tx lines.

Using the Ethernet ports, the host is able to communicate to the master station using the widely accepted Modbus TCP protocol.

Built-in Secure Web Server

All field unit and network data available at the host is also presented to the web browser function, accessible via the Ethernet ports. This allows simple and easy control over a local intranet, or the Internet. Standard user name and password security is enhanced by cryptographic protection achieved by using HTTPS server support.

Additional Host Security

Further host security measures include password protection, IP address filtering to allow Modbus TCP access by designated addresses only; and the configurable ability to enable/disable control from certain ports.

Host Message / Field Unit Logging

Every host Modbus message is automatically monitored and logged, including the full data field within the Modbus telegram. All connected field units are constantly monitored. Changes of field status feedback are logged along with all digital and analogue commands to the actuators.

Logged data is viewable via the HMI or web pages. Data viewed via the web pages can also be stored for future reference.

Independent logging is also available using the Long term datalogger. See page 19.

Time Synchronisation Capability

The P3 has a real time clock that can be used to synchronise the master station with all on-site equipment via a Network Time Protocol (NTP) server.

rotork Controls

Pakscan P3 Master Station

Intuitive Colour Graphical HMI

The CPU module HMI can be used for both configuring the master station as well as providing local control station capability for monitoring and controlling loop connected devices.
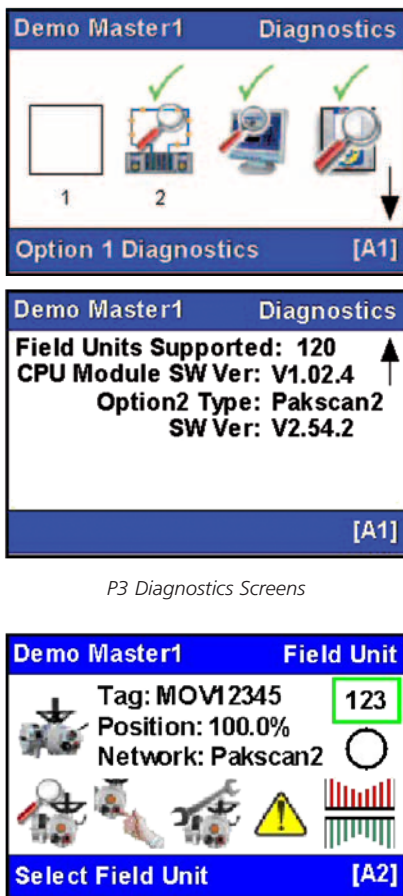
An icon and text based menu system is used to show the dynamic system status and facilitates the setting of any parameter. Extensive diagnostics ensure that engineers are given the maximum assistance in monitoring performance and identifying any system faults. Navigation through the icon and text menus and modifications to settings are made using the five-button keypad.

E-mail Notification of Alarm Conditions

There is a configurable option to permit automatic e-mail generation upon detection of an alarm condition. The e-mail will contain details of the master station alarm condition or the last event log of the field unit in alarm. Date, time, and site identifier will also be transmitted.

Multiple Language Support

Both the HMI and web pages can be configured to display in a variety of languages including; English, French, German, Italian, Hungarian and Spanish.

P3 Diagnostics Screens

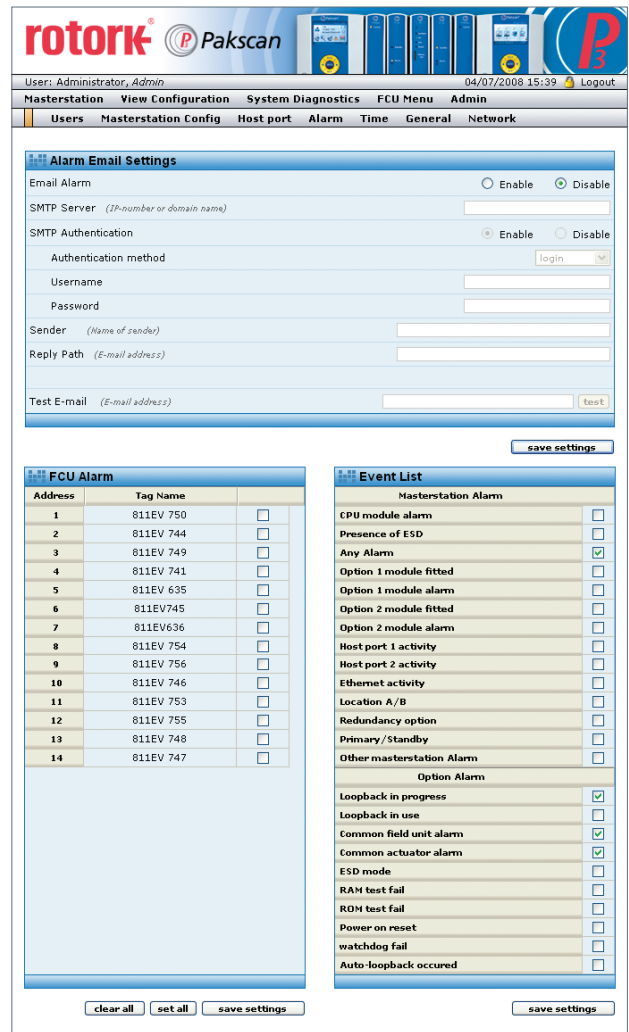*Fig. 15. HMI - MOV control & monitoring*

Fig. 16. E-mail notification of alarm conditions

Fig. 17. Multiple language support

Redefining Flow Control

17

Pakscan P3 Master Station

Front Access to All Terminals

Years of experience gained in supplying cabinet mounted equipment has enabled Rotork to simplify the connections to field devices, host equipment and the mains power supply. All are now accessible from the front, making installation simpler and quicker. The mains input is via an IEC connector, the Ethernet via RJ45 sockets, serial comms via 9-way D-type sockets, the 2-wire loop and wireless coordinator connections via screw terminals.

Multiple Host Port Connectivity

Every system comes complete with dual Host Ethernet connections and one configuration port Ethernet connection. Using Modbus TCP via the Ethernet ports, up to 10 hosts can access the master station concurrently. Legacy dual serial ports (switch selectable RS232 or RS485) are also included as standard, offering Modbus RTU support with proven interface compatibility to all major DCS and PLC vendors.

All host interface ports have LED status indicators to act as a simple visual aid for host communications status and fault diagnosis. Communications parameters are easily configurable via screens on either the HMI or web pages.

Fig. 20. Ports on CPU module

Fig. 21. Ports on backplane

Database Support for up to 300 Nodes

Every P3 has a database capacity for up to 300 nodes. The P3 master station has been designed with the future in mind. Its modular design ensures that future options for host and field networks can be easily included.

Compatible with all Pakscan Equipment

The P3 has 5 in-built databases, 4 are for the wired network actuators, allowing seamless integration of P3 onto any existing Pakscan site. There is complete backwards compatibility with all actuators previously controlled by Pakscan IIE master stations. It is fully compatible with Rotork's In-Vision SCADA system. The 5th database is for the wireless network only.

Fig. 18. Web browser - MOV control & monitoring

Full MOV Control and Monitoring

Every Pakscan actuator can be fully monitored and/or controlled via host ports (Modbus), the web server and the HMI screen on the P3 master station.

On-line Actuator Parameterisation

Remote parameterisation of all field unit variables (except for the address), is achieved from the master station, via the HMI or web browser on a local or remote PC. Parameters can be changed on-line with no system interruption and without the need to visit the actuator.

Fig. 19. Web browser opening screen

rotork
Controls

Pakscan P3 Master Station

Status and Alarm Indication

Current status and alarm indication, updated on a per-scan basis provide a current indication of the field device. Torque profiling provides an accurate indicator of valve performance.

Event Logging

The event logger captures and saves every major change of field unit device status as well as recording both digital and analogue commands. Logged data is viewable via the HMI or web pages. Data viewed via the web pages can also to be stored for future reference.
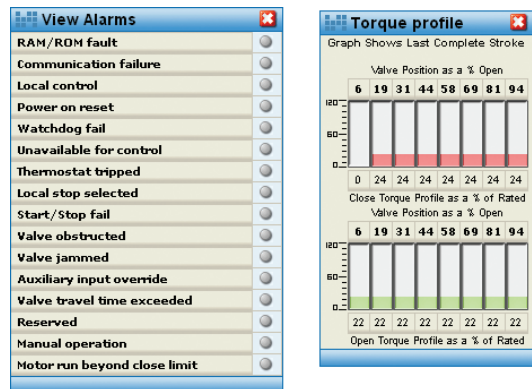

Fig. 22. Event logging

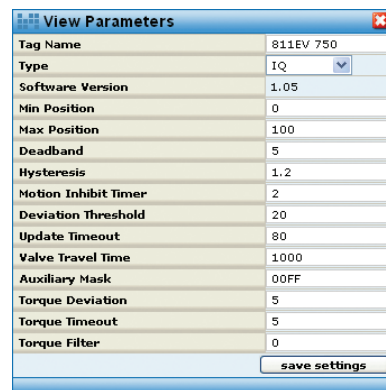*Fig. 23. Alarm and valve torque profile indication*

Fig. 24. On-line actuator parameterisation

Long Term Datalogger

A recent addition to the Pakscan system is the Long Term Datalogger, further extending the datalogging and diagnostics capabilities of the system. From the switch slot location on the hot standby and the spare slot on the single channel and P3F units, the LTD card is able to independently capture and store all messages transferred onto the back plane of the Master station. This includes all Modbus commands and all the FCU status information.

Data is stored on a MicroSDHC (Secure Data High capacity) card, which can be removed from the front of the module and fitted into a card reader attached to a PC. The data from the card is then viewed on an application called LTD Viewer, which is downloadable from the Rotork web site.

Files are created on the memory card for each day at a maximum of 30 Mb, size of the files depends on the traffic on the network. Typically files are approximately 1 Mb a day – for a 4 Gb card it could be possible to record 4,000 days of 1 Mb files – over 10 years worth of data. Should the memory card become full, the LTD will start by overwriting the oldest files.

Fig. 25. Long term datalogger

- Independently captures and stores all Modbus command messages from any port to the master station.
- Stores all the FCU change of status and alarm information.
- Stores data on removable storage: MicroSDHC.
- Creates multiple files, 1 file per day.
- Has capacity to store multiple years worth of data.
- Data is viewed using free PC software: LTD Viewer.

Pakscan Host Connectivity

Host Connectivity

Ethernet Connections

The Pakscan P3 and P3F master stations include the ability to connect to the host system using a Local Area Network and Ethernet communications.

The Pakscan master stations includes two integral Ethernet 10 Base-T/100 Base-Tx ports in each CPU module. The Ethernet ports use Modbus TCP protocol for communication to the host system.

Pakscan master stations give access to the plant data directly from their database communications to the host.

Modbus TCP

The protocol used for data exchange and control is Modbus TCP. This widely used protocol allows for the data to be broken into packets for Ethernet transmission over the LAN.

Local Area Network (LAN) Connection

Up to 10 simultaneous connections are allowed for the Ethernet connection. Several host systems can access data at the same time at speeds of 10 Base-T or 100 Base-Tx.

The LAN can be extended to a wide area network or even include a router onto the World Wide Web. Enabling the correct router port for Modbus TCP comms increases the security of the system when used over the internet.

The Ethernet ports on Hot Standby Pakscan P3 systems can be interconnected using managed switches so that transparent change-over occurs in the event of a main unit failure.

Embedded Web Server

The embedded web server allows the system performance, diagnostics and set-up to be viewed at any time by connecting a PC to the Ethernet LAN and browsing to the master station using standard Internet Browser software, such as Internet Explorer.

With the correct passwords entered, parameters can be altered and outputs changed allowing rapid corrective maintenance in the event of a field fault.

The server can even be configured to send e-mail messages to specified recipients should a system fault develop.

Security

The Modbus TCP communication protocol and the inherent protection of a router provide a high degree of security for the system. In addition, the ability to alter the system or issue commands to the actuators is under password protection.
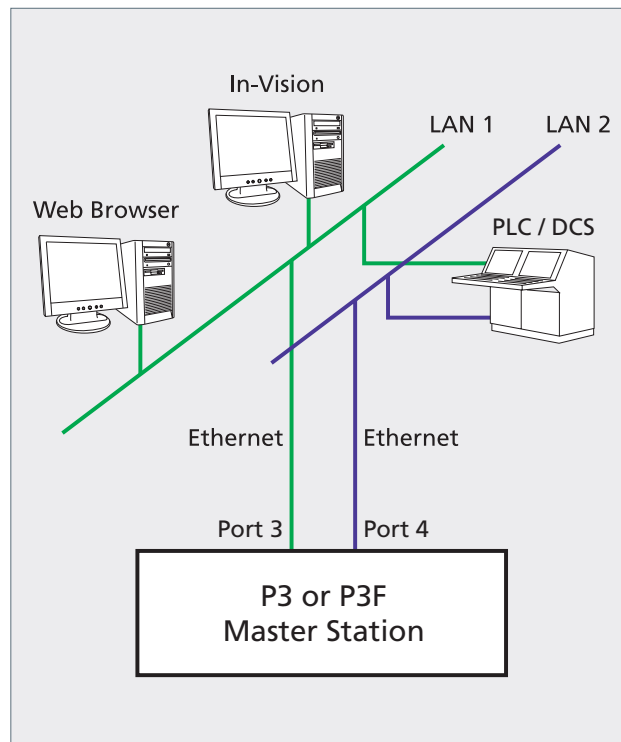

Fig. 26. Example web pages

Fig. 27. Multiple ethernet LAN connections

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Pakscan Host Connectivity

Host Connectivity

Serial Connections

Master Station to Host System

The Pakscan system acts as a slave to a host. The host system may be a DCS, PLC or SCADA system such as Rotork In-Vision. It can communicate with the Pakscan equipment by either RS232 or RS485, half duplex, at data rates up to 115 k baud. The information is passed using the universally accepted Modbus RTU protocol.

Information is continuously gathered by the master station from the field units, ensuring that information requests by the host system are serviced with an immediate reply from the internal database. This permits fully asynchronous data transfer between the field equipment and the host system.

Command instructions from the host have priority and are processed immediately by passing the message to the field unit concerned.
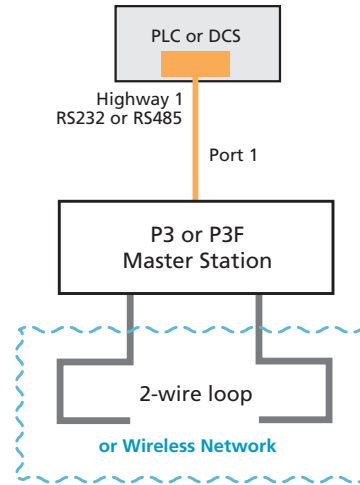
Fig. 28.

Dual Communication Paths

All Pakscan master stations are fitted with two serial communication ports and each is served by its own internal database. This provides the ability to communicate between the master station and two independent host systems, or to use a redundant communication path between the host and the Pakscan system.

For those applications where high integrity of the control system is required, the use of dual communications paths protects against failure in one part of the communications system, preventing the whole system from failing.
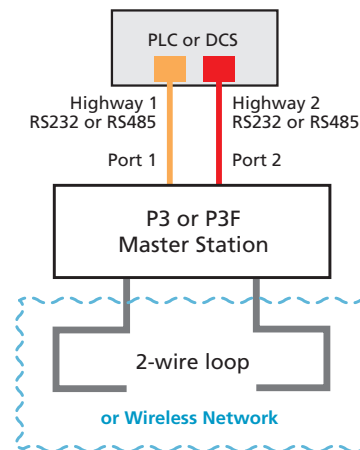
Fig. 29.

Multi-drop Capability

Every Pakscan master station is fitted with two half duplex Modbus communication ports that can be set to RS485, 2-wire. When the host system is controlling more than one Pakscan master station, an RS485 multi-drop highway may be used to minimise the host system hardware and cabling. If the host system is unable to support RS485, then Rotork has a stand alone RS232/RS485 converter that may be used (see page 31).

Multi-drop is especially useful in systems where full redundancy is being used. The hot standby master stations are connected together on a multi-drop highway and the internal setting for port activity is set to 'standby passive' on both the A and B sides. The resulting communication will have transparent changeover from A to B when the master changes sides.
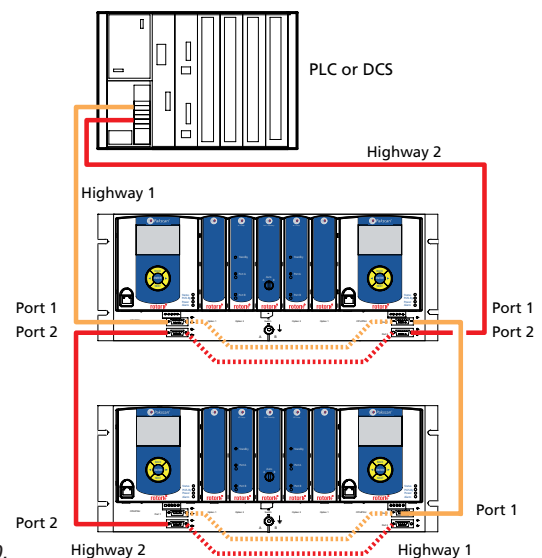
Fig. 30.

Hot Standby Master Station

Hot Standby Master Station

Some systems will require a higher degree of availability than others, though all systems should be able to tolerate simple component failures. All Pakscan systems include fault tolerance throughout to provide immunity against internal failures. This ensures actuator availability is maintained at all times.

The master station protects against communication failures with the supervisory system. Host communications to the DCS/PLC may be duplicated and either link can be used for data collection and control.

In the case of the Pakscan P3 master station the complete master station may be duplicated, with the second unit providing an on-line hot standby to the first. The system will then give totally automatic change-over from the primary unit to the secondary in the event of a component failure. The change is made without interruption to the field network or host communication and is completely transparent to the host system. Indeed, the only indication of a failure will be the alarm that is raised.

Indication of the status of the primary and standby master station is provided over the host communication link.

The field unit fitted within the actuator does not interfere with the actuator local controls, so ensuring that even if there is a failure of the device, the actuator may still be used to operate the valve.

Each side of the Hot Standby Master Station includes a separate power module. To enable full MOV monitoring and control each side can be powered from a separate supply or a UPS (Uninterruptible Power Supply).
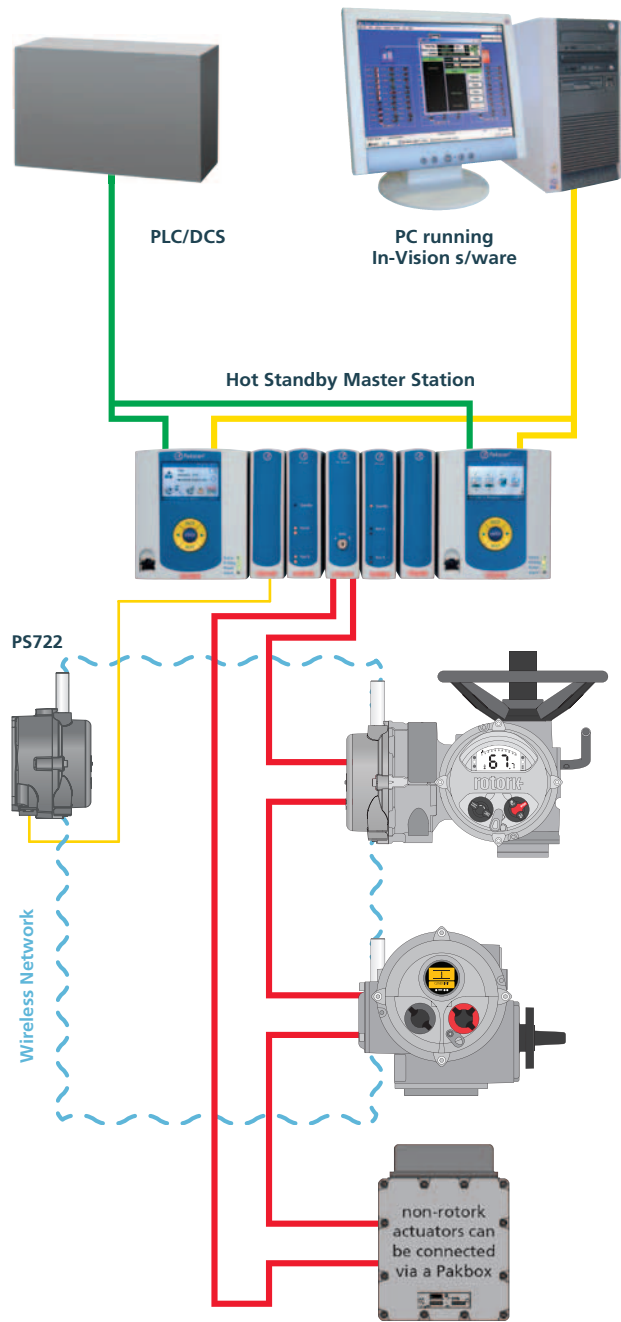
PLC/DCS

**PC running
In-Vision s/ware**

Hot Standby Master Station

PS722

Wireless Network

non-rotork actuators can be connected via a Pakbox

Fig. 31. Hot standby master station

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Pakscan Product Range

The field units are detailed in technical manuals available on our web site www.rotork.com. For example:

Pakscan IQ FCU (Field Control Unit) Technical Manual - PUB059-019.

General Purpose Field Control Units (GPFCU) documents which detail control of other manufacturers' products within the Pakscan system - Publication numbers PUB059-015, PUB059-016 and PUB059-017.

Additionally, details of cabling considerations can be found in document PUB059-011 and loop isolators for the Pakscan products can be found in document PUB059-014.

The IQ range PUB059-018 details an additional analogue input card available for reporting analogue data.

Further details of the master station hardware, P3 wireless, the In-Vision supervisory control software and accessories available for Pakscan are shown in the following pages.

Bespoke Systems

Rotork offers bespoke systems to suit your plant requirements. These include customised control cabinets and all-in-one touch screen computer interfaces.

Most P3 master stations are delivered as individual units along with a mounting kit to enable either panel or 19" rack mounting options. However, Rotork can also supply the P3 master stations included in fully engineered control cabinets built to the end user's specifications.

Rotork can design, build and test control cabinets, fitted with up to four P3 master stations along with all the ancillary equipment such as Ethernet switches, fans, mains distribution units, etc. This ensures a much quicker commissioning period, as all of the internal links within the cabinets would have been independently tested and verified prior to despatch from Rotork.

Contact Rotork for more information on bespoke systems.

Pakscan Product Range

Hardware

P3 Master station

Control room or equipment room mounting, this master station is capable of controlling up to 240 field units on the current loop option card and 60 field units on P3 wireless network. The surface or rack mounting unit has all the connections on the front and rear access is not required. The Pakscan P3 is complete with two serial ports, two ethernet ports and a system configuration ethernet port. The integral display screen and keypad provide a full colour graphical interface for setting, diagnostic and control of the system.

P3 Hot Standby Master Station

The Hot Standby version of the P3 features two identical sets of modules in one chassis. Either may be the primary unit and transfer between the two is transparent and automatic on component failure. Control room or equipment room mounting, this master station is capable of controlling up to 240 field units on the current loop option cards and 60 field units on P3 wireless.

Performance Data

Supply voltage	85 to 265 VAC, 47 to 63 Hz, or 24 VDC.
Power consumption	50 VA per single master station / 100 VA per hot standby master station.

Environmental Specification

Operating temp	0 to +50 °C.
Storage temp	–10 to +70 °C.
Humidity	5% to 95% RH, non-condensing.
Vibration Resistance	5 to 22.3 Hz 1 mm pk-pk, 22.3 to 100 Hz 1 gn.
Shock Resistance	5 gn 11 ms.
EMC	BS EN 61326 1997 + Amendment A1 1998 Immunity levels for Industrial Environment. Emission limits, Class B.

Host Communications - Ethernet

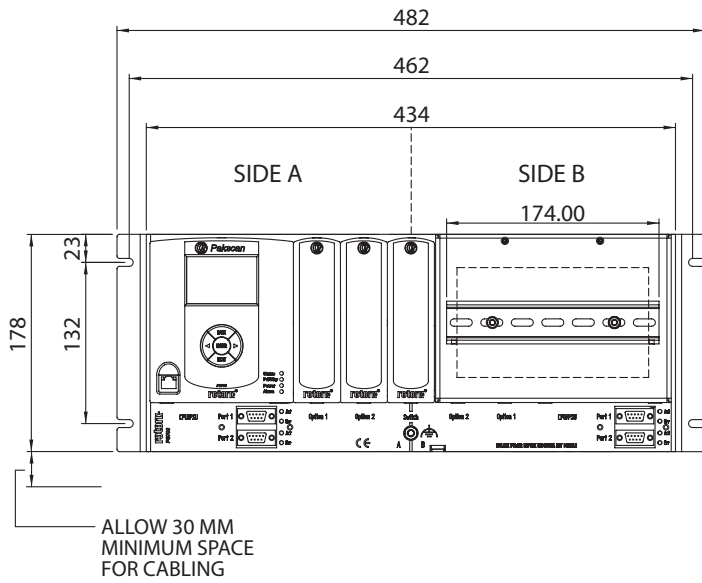|	
Connector	3 x RJ45, 10 Base-T or 100 Base-Tx (IEEE 802.3).
Protocol	Modbus TCP for data exchange and TCP/IP for Web Server.
IP address	User set during configuration.
Connections	Max of 10 simultaneous Modbus ethernet connections.
Email	Supports e-mail generation on alarm detection. (Requires SMTP server).

Host Communications - Serial

Connector	2 x 9-way D-type, female, RS232 or RS485 (switch selectable).
Protocol	Modbus RTU.
Address	User set during configuration (1 to 247).
Baud rate	2.4 kB, to 115 kB.
Parity	Odd, even or none.

Mounting

Mounting	Panel mounting or optional 19" rack mounting.

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Controls

Dimensions

482
462
434

SIDE A   SIDE B
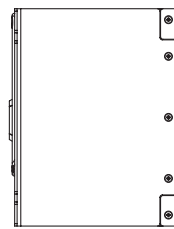
174.00

23
178
132

ALLOW 30 MM
MINIMUM SPACE
FOR CABLING

Pakscan P3 master station.

Above: Master station rack mounted.
Below: Hot Standby system, back panel mounted.

SIDE A   SIDE B

26
127
178

19
140

428
438
482

SIDE VIEW WITH 19" RACK
MOUNT BRACKET

SIDE VIEW WITH WALL
MOUNT BRACKET

140

Weights

Hot Standby Master Station: 3,750 g
Dual Master Station: 3,600 g
Single Master Station: 2,500 g
(not including blanking plate and DIN rail)
Measurements in mm

Pakscan Product Range

Hardware

2 -Wire Loop Components

To include the 2-wire loop network in a single channel P3 Master Station requires 1 option module, mounted to the Master Station back plane. A Hot Standby Master Station requires 2 of these option modules, one for each Master Station side. The 2-wire loop field unit module is located within the main actuator housing.

Wireless Network Components

To include the P3 wireless network option in the P3 Master Station requires 2 components, a back plane mounted module which connects to a wall mounted coordinator. The P3 wireless field unit module is located in the terminal housing. A Hot Standby Master Station requires 2 sets of these modules.

P3 Wireless actuator module

2 -Wire Loop Module

Connection	Screw terminals suitable for 1.5 mm^2 cables.
Current loop	20 mA, 15 V max Pakscan protocol.
Loop cable	Single twisted pair, 500 Ohm max resistance.
Field Units	240 max actuator and general purpose field units.

P3 Wireless Option Module and Wireless Coordinator

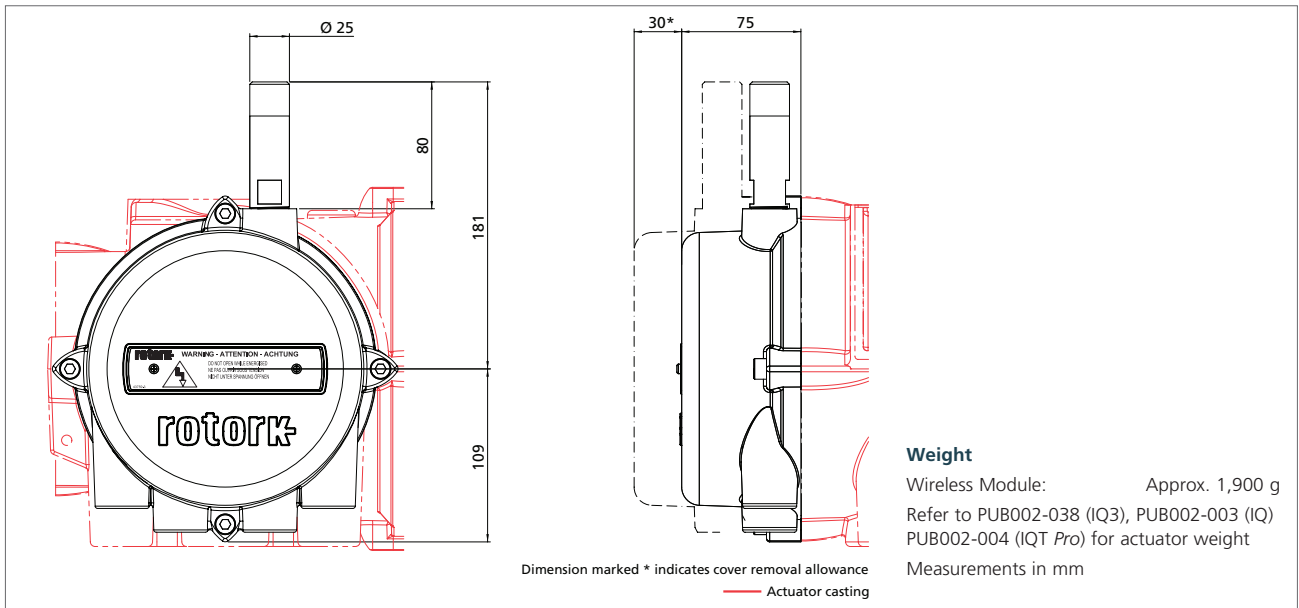|	
Connection	Screw terminals suitable for 1.5 mm^2 diameter cables
Cable	Shielded twisted pair cable (3 pair), connected to the P3 master station
Length	Maximum of 200 m from the P3 master station option module.
Power supply	Taken from P3 master station
Wireless Coordinator Enclosure	Rated IP68 - 7 metres for 72 hours, NEMA 4/4X/6, ATEX Exd IIB T4 and Exd IIC T4.
Conduit entries	1

P3 Wireless Actuator Module

Compatible Actuators	IQ3, IQ *Pro*, IQT *Pro*.
Connection	Normally connected directly to the actuator via factory supplied cables. Where remote mounting is required, ring terminals are used at the actuator and screw terminals suitable for 1.5 mm^2 diameter cables are used in the module.
Cable	Shielded twisted pair cable (2 pair) where mounted away from the actuator.
Length	Where mounted away from actuator maximum of 50 m from the actuator.
Enclosure	Rated IP68 - 7 metres for 72 hours, NEMA 4/4X/6, ATEX Exd IIB T4 and Exd IIC T4.
Power supply	Taken from the actuator

Wireless Specifications

Based on	IEEE 802.15.4, DSSS
Maximum wireless devices	60
Frequency	2.4 GHz band
Operating range	30 m indoor, 100 m outside
Network structure	Mesh
Channels available	16
Security	AES and anti-spoofing
Power	10 mW default. Potential for 100 mW if location allows.

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Dimensions

Dimension marked * indicates cover removal allowance
— Actuator casting

Weight

Wireless Module: Approx. 1,900 g

Refer to PUB002-038 (IQ3), PUB002-003 (IQ)
PUB002-004 (IQT *Pro*) for actuator weight

Measurements in mm

Dimensions of P3 Wireless actuator module.

VIEW WITHOUT DEEP COVER FITTED

Dimension marked * indicates cover removal allowance

Weight

Wireless Coordinator
repeater module and
Wireless Modbus Adaptor: Approx. 4,400 g

Measurements in mm

Dimensions of P3 Wireless Coordinator, repeater module and Wireless Modbus Adaptor (WMA).

Other Wireless Hardware

■ P3 Wireless Repeater

Enclosure	Rated IP68 - 7 metres for 72 hours, NEMA 4/4X/6, ATEX Exd IIB T4 and Exd IIC T4.
Conduit entries	2
Power supply	To be provided by customer

■ Wireless Modbus Adaptor (WMA)

Connection	Screw terminals suitable for 1.5 mm^2 diameter cables are used in the module.
Cable	Shielded twisted pair cable (2 pair).
Length	Where mounted away from device maximum of 50 m from the device.
Enclosure	Rated IP68 - 7 metres for 72 hours, NEMA 4/4X/6, ATEX Exd IIB T4 and Exd IIC T4.
Conduit entries	2
Power supply	To be provided by customer.

Pakscan Product Range

Hardware

P3F Field Master Station

This master station is field mountable in an IP65 enclosure, capable of being mounted close to the process and is able to control up to 32 field units. It has all the features of a single channel P3 master station without the integrated HMI. Connections to the P3F are made through a removable gland plate that can be drilled to accept the cables required for the individual application. Internally the connections are made using standard RJ45 ethernet connections and plug and sockets with screw terminals. The P3F has two serial ports, two ethernet ports and a system configuration ethernet port. The built-in web pages provide an intuitive interface for setting up the master station and field units; also providing diagnostics and control of the system. Wireless also available, apply to Rotork.

Performance Data

Supply voltage	85 to 265 VAC, 47 to 63 Hz.
Power consumption	50 VA per single master station.

Environmental Specification

Operating temp	0 to +50 °C.
Storage temp	–20 to +70 °C.
Humidity	5% to 95% RH, non-condensing.
Vibration Resistance	5 to 22.3 Hz 1 mm pk-pk, 22.3 to 100 Hz 1 gn.
Shock Resistance	5 gn 11 ms.
EMC	BS EN 61326 1997 + Amendment A1 1998 Immunity levels for Industrial Environment. Emission limits, Class B.

Host Communications - Ethernet

Connector	3 x RJ45, 10 Base-T or 100 Base-Tx (IEEE 802.3).
Protocol	Modbus TCP for data exchange and TCP/IP for Web Server.
IP address	User set during configuration.
Connections	Max of 10 simultaneous Modbus Ethernet connections.
Email	Supports e-mail generation on alarm detection. (Requires SMTP server).

Host Communications - Serial

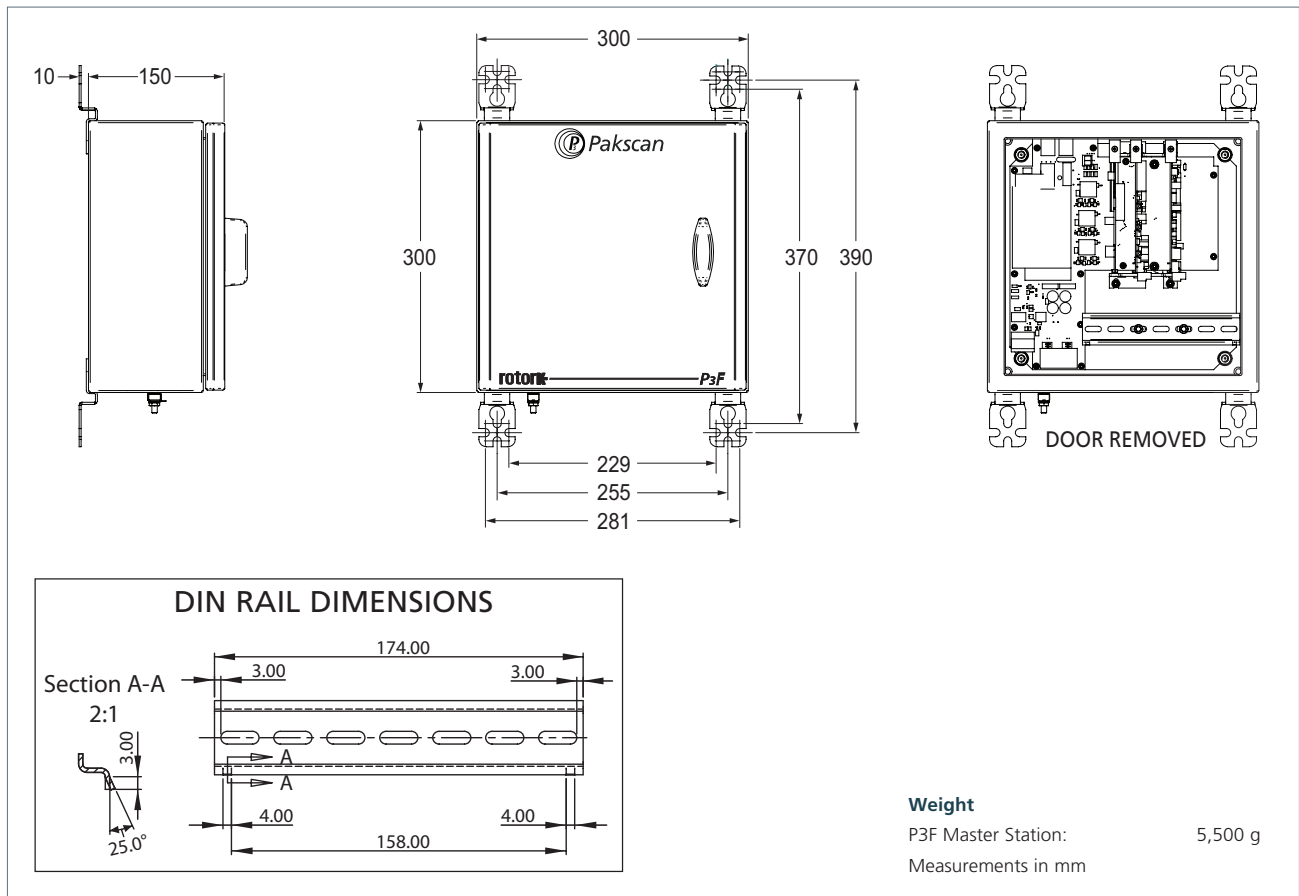|	
Connector	1x 2 port screw terminals for 1.5 mm^2 cables, RS232 or RS485 (switch selectable).
Protocol	Modbus RTU.
Address	User set during configuration (1 to 247).
Baud rate	2.4 kB, to 115 kB.
Parity	Odd, even or none.

Loop

Connection	Screw terminals suitable for 1.5 mm^2 cables.
Current loop	20 mA, 15 V max Pakscan protocol.
Loop cable	Single twisted pair, 500 Ohm max resistance, 3.9 µF max capacitance.
Field Units	32 actuator and general purpose field units.

Enclosure

Enclosure	IP65 weatherproof wall mounting.

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Controls

Pakscan Product Range

DIN RAIL DIMENSIONS

Section A-A
2:1

174.00
3.00
3.00
3.00
4.00
4.00
158.00
25.0°

A
A

300
10
150
300
370
390
229
255
281

DOOR REMOVED

Weight

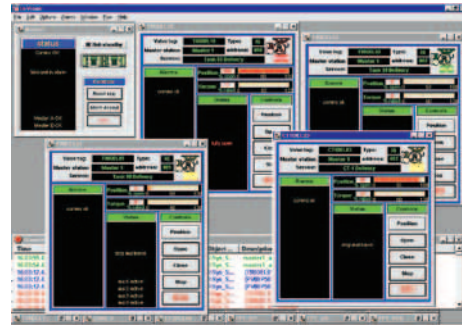P3F Master Station: 5,500 g

Measurements in mm

Pakscan Product Range

Software

In-Vision PC Based Supervisory Control

In-Vision is a user friendly PC based control and data acquisition software package that perfectly complements Rotork's Pakscan 2-wire control systems.

In-Vision brings the computer animation and plant visualisation capabilities right to the fingertips of the plant operator. It requires as a minimum a Pentium processor and SVGA colour screen to show the condition of the process and will run on a variety of Microsoft operating systems.

In-Vision system capability:

- Run time only system.

- Unlimited tag capability.

- Up to 480 valves or other devices per system (240 with torque displays).

- Full animation of valve status, text and graphic.

- Comprehensive event and alarm Log.

- Up to 100 mimic diagram graphics.

- Up to 500 pop-up graphic windows.

- Optional sounds for specific event reporting.

- Password security with 10 levels.

- Ability to include plant photographs.

- Dedicated Rotork Pakscan driver.

Computer requirements:

- Pentium personal computer, at least 1.3 GHz.

- 1024 MB RAM.

- Allow for 2 GByte free hard drive space.

- CD ROM disk drive.

- Sound card and speakers.

- RS232 serial port.

- Mouse (PS2 compatible).

- Minimum screen resolution SVGA. (800 x 600 pixel) 16 bit colour, recommended resolution XGA (1024 x 768 pixel) with 16 bit or 32 bit colour.

- Microsoft Windows XP or Windows 7.

- Optionally, use the Rotork TSI (Touch Screen Interface).

See PUB059-024 for further details.

In-Vision MD PC Based Maintenance and Diagnostic System

In-Vision MD is an optimised version of the standard In-Vision package specifically designed to bring the economic benefits of a tailored maintenance and diagnostics utility to the Pakscan system.

In-Vision MD includes:

- Status screens showing the current actuator condition, alarms present and allowing control of all the actuators and master station.

- Alarm and event logs.

- Customer defined tag names and service descriptions.

- Torque profiles for IQ range actuators.

- Standard screen layouts.

See PUB059-024 for further details.

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Controls

Pakscan Product Range

Accessories

Paktester

The Paktester allows the variable parameters of all the different types of field unit available on the Pakscan system to be set. It connects directly to the actuator or field unit and allows the user to interrogate and control the field unit. It also performs diagnostic functions when fault finding on a system or actuator.

Converter PS412

The PS412 converter is a stand alone RS232/RS485 converter that includes smart intelligence. Many PLC and DCS systems do not have a true RS485 communication port and this converter is exactly matched to the Pakscan system. The unit is supplied with a universal power pack for 90 - 264 VAC.

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