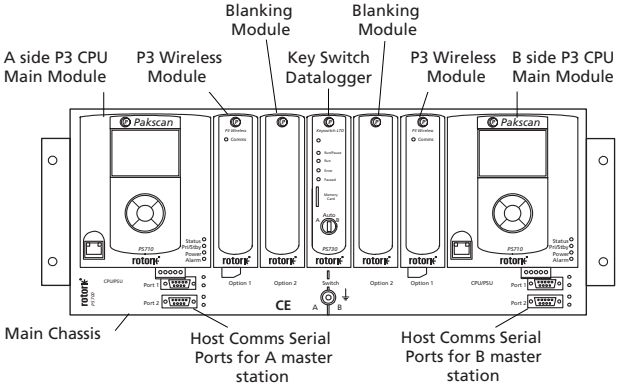
rotork®
Controls

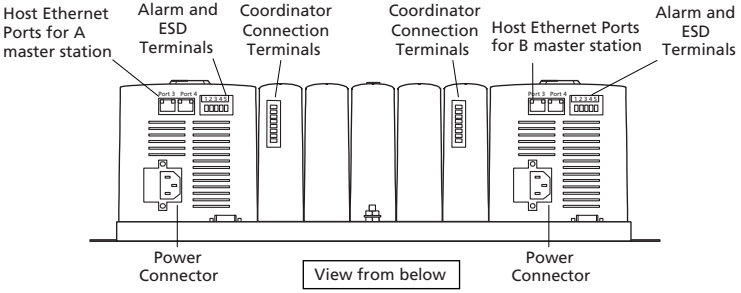
Pakscan P3 Wireless Quick Start Guide

Redefining Flow Control

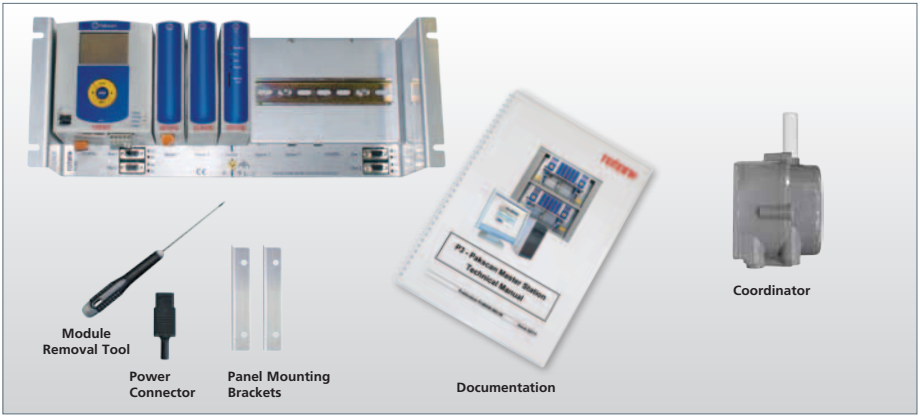
1. Identification of major components

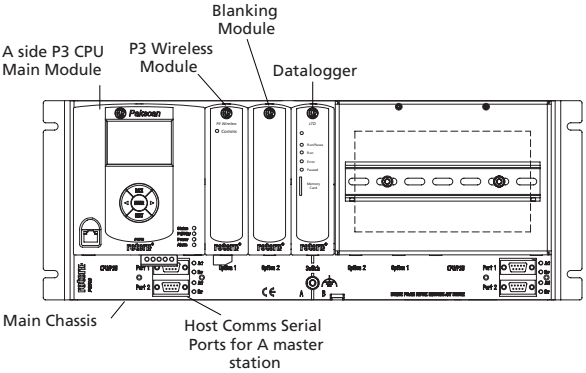
1.1 Included in the box: P3 Hot Standby Wireless System



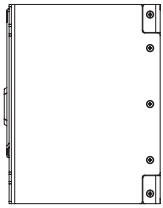


1.2 Included in the box: P3 Single Channel Wireless System

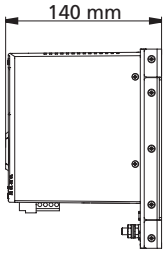




SIDE VIEW WITH 19" RACK MOUNT BRACKET



SIDE VIEW WITH PANEL MOUNT BRACKET



Hot Standby and Single Channel system:

- To make the master station panel mounting, change the brackets.
- All connections and adjustments are accessible from the front.
- 24 VDC units have screw connections for the power.

Also required for Hot Standby and Single Channel system:

- Cable for connecting coordinator to Master Station.
- Mounting hardware for coordinator.
- Appropriate cable glands.

Note: Other items may be required

2. Mounting Options

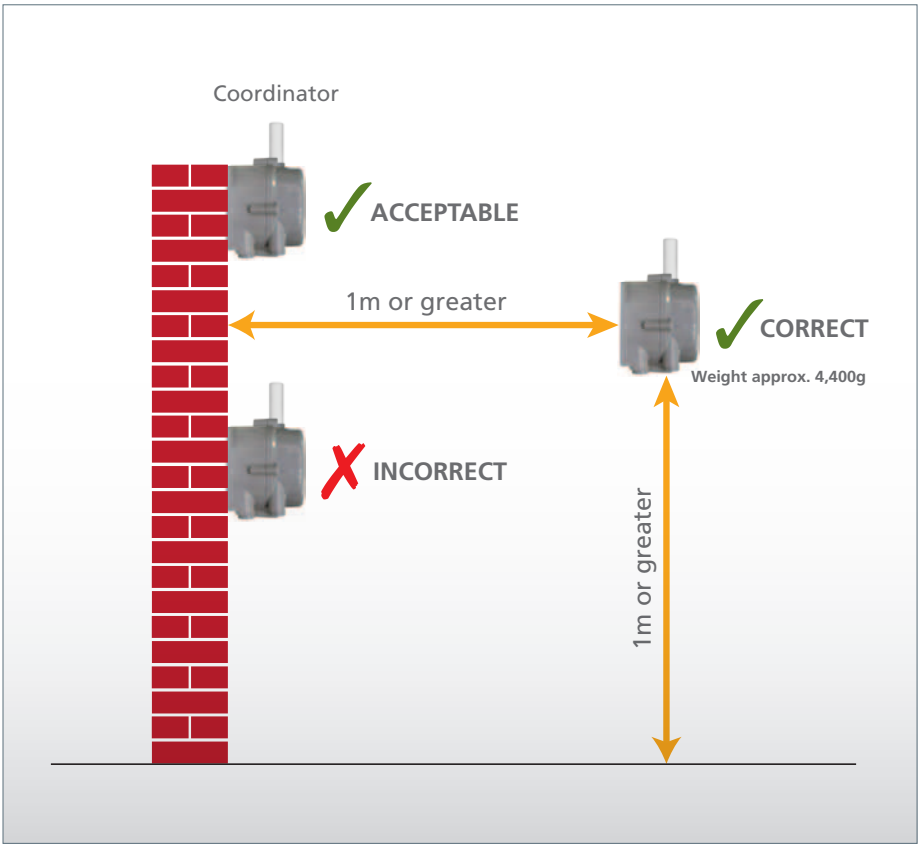
2.1 Coordinator Mounting guidelines

Correct mounting

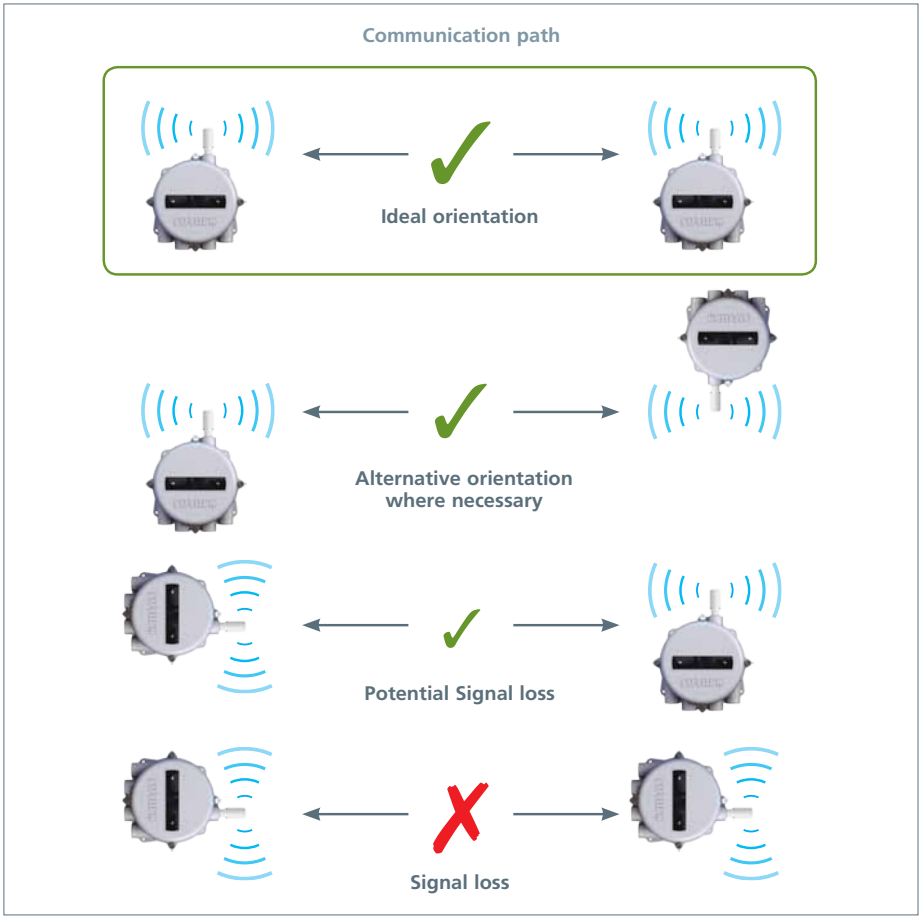
Before installation a complete site survey should be completed to indicate the best coordinator mounting positions.

General guidelines:

- It is best to mount the Coordinator at least 1 m up and 1 m away from wall surfaces to ensure a clear antenna signal.
- The Coordinator should be sited free of obstructions and ideally be in line of sight to the first group of actuators. The cable run between the Master Station and coordinator must be less than 200 m.
- The Coordinator should be sited clear of metalwork and any other antenna cables.
- The Coordinator must be connected with screened 3 pair cable.



2.2 Antenna Orientation guidelines

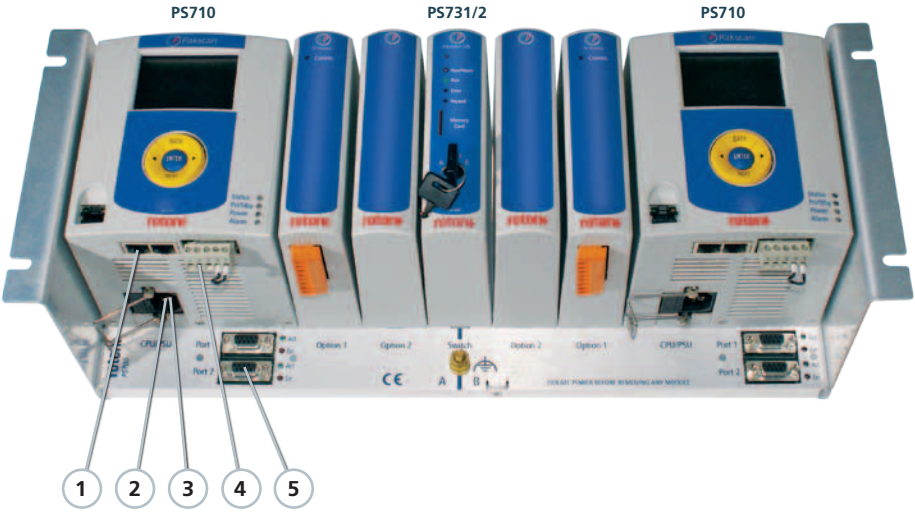


Correct Antenna Orientation

Correct antenna orientation is important to ensure effective operation of the system. The guidelines above show a range of orientation combinations from 'Ideal' to 'Signal Loss'. In general it is best to have all the antennas in the same orientation. A completed site survey will indicate the correct orientation required for all modules required in the system – the Coordinator, the actuator modules and repeaters (if required). Each device antenna radiates its signal outwards in a ring. If the antenna of the next device is inside the ring then communication can occur. A site survey is the best tool to assess location suitability and should be performed by Rotork personnel.

3. Connecting Up

3.1 Connecting - P3 Master Station



1 For Ethernet
Connect a cable to Port 3 on CPU A and another to Port 3 on CPU B. For redundancy replicate the connections using Port 4 (managed switch required that supports rapid spanning tree protocol).

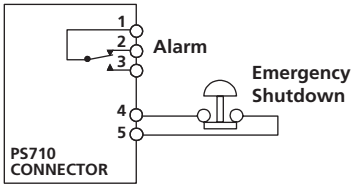
2 Mains Power Connectors
CPU A and B. Mains power 85-263 VAC.

3 24 VDC Power Connectors
CPU A and B. Optional power 24 VDC (PS711 module).

4 Emergency Shut Down

If Emergency Shut Down is required, place the ESD button between pins 4 & 5.

If Emergency Shut Down is not required, link pins 4 and 5 together.

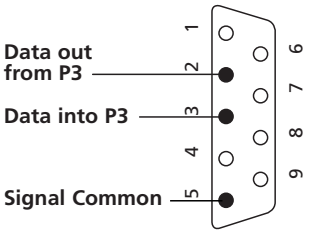


5 For RS232 Serial Data

Connect a cable to CPU A port 2 (and another to CPU B port 2 on hot standby systems).

9 way Female D Type

RS232 Connections

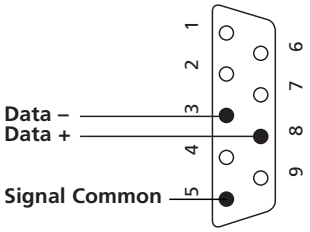


5 For RS485 Serial Data

Connect a cable to CPU A port 1. (The system automatically links the connection to port 1 on CPU B).

9 way Female D Type

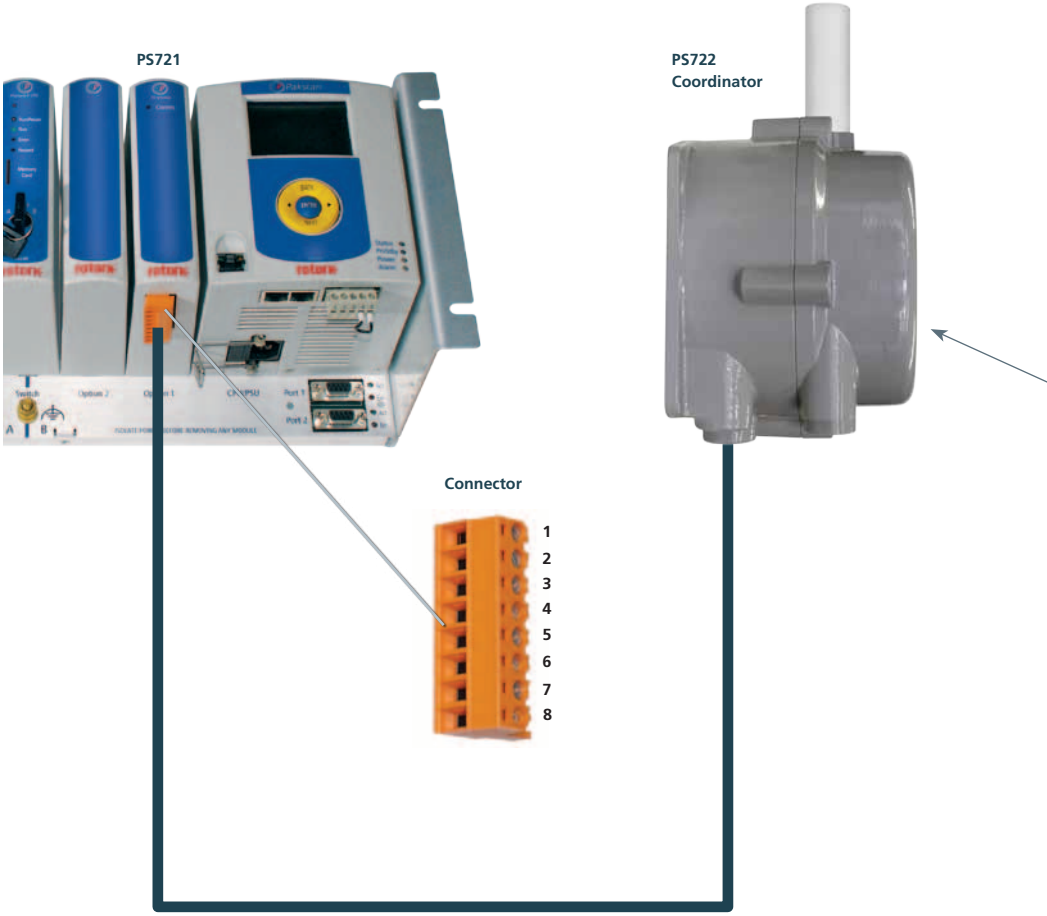
RS485 Connections



Note: See page 13 for port defaults.

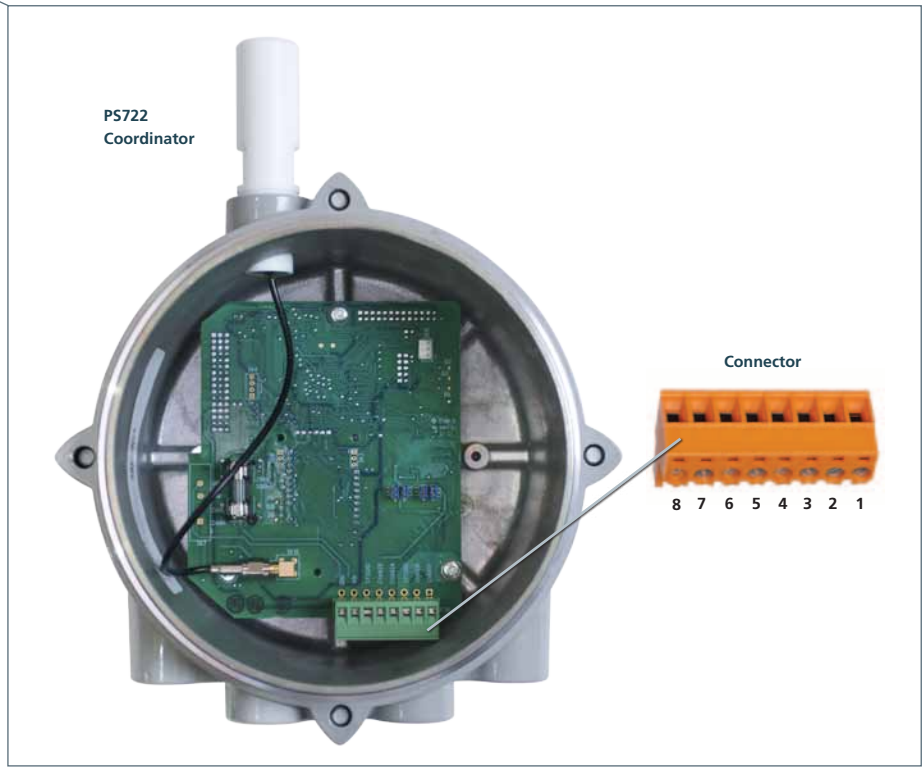
3. Connecting Up

3.2 Connecting - P3 Master Station to Coordinator



The PS721 - P3 Master station option module connects to the PS722 - P3 Master station wall mount module (coordinator) as per the table below:

Master Station	Coordinator	Function	PCB Reference
PIN1	PIN4	RS422 Rx +ve	CHAN 2A
PIN2	PIN5	RS422 Rx -ve	CHAN 2B
PIN3	PIN6	Shield	SYSGND
PIN4	PIN1	RS422 Tx +ve	CHAN 1A
PIN5	PIN2	RS422 Tx -ve	CHAN 1B
PIN6	PIN3	Shield	SYSGND
PIN7	PIN7	Module +ve supply (24 VDC)	VIN
PIN8	PIN8	Module -ve supply	GND

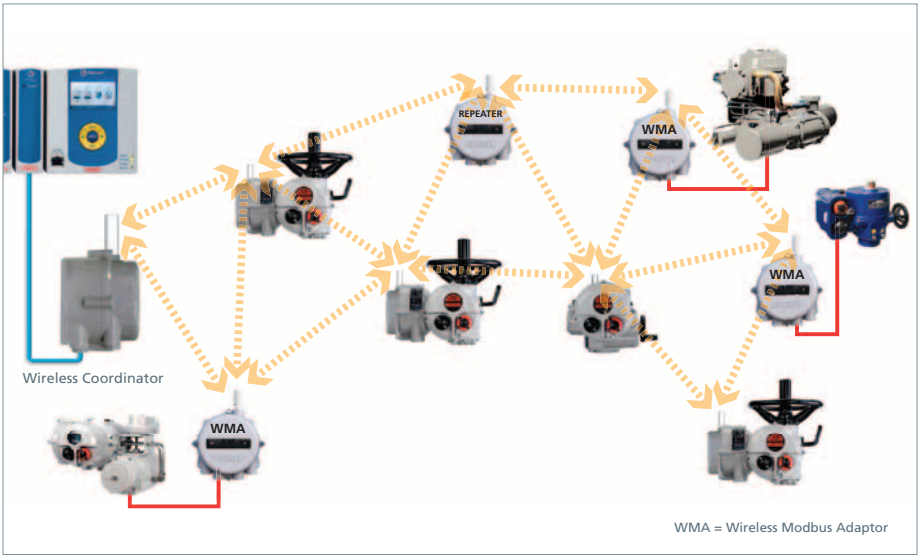


4. Specifications

4.1 Pakscan P3 specifications

Wireless Specifications

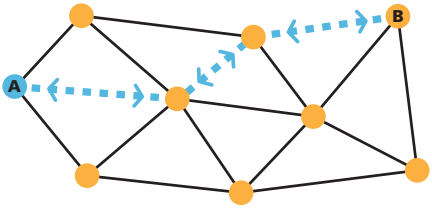
Based on	IEEE 802.15.4, DSSS
Maximum wireless devices	60
Frequency	2.4 GHz band
Operating range	30 m indoor, 100 m outside (distance between individual wireless modules). Larger network distances are covered as each device acts as a repeater, passing signals onwards to other devices.
Network structure	Mesh
Channels available	16
Security	AES Encryption and anti-spoofing
Power	10 mW default. Potential for 100 mW if location allows.



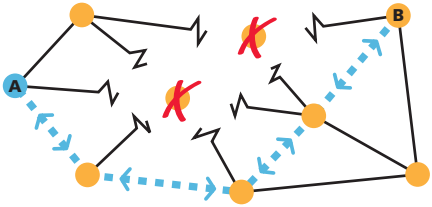
Pakscan P3 Wireless only network

5. Mesh Network

5.1 Explanation of mesh networks

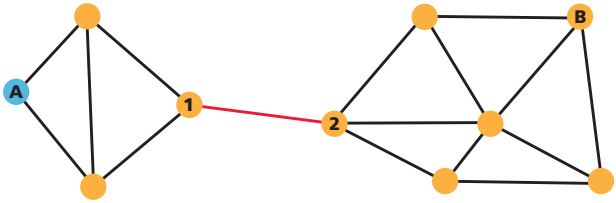


Normal communication route between P3 Wireless coordinator (A) and actuator wireless module (B)

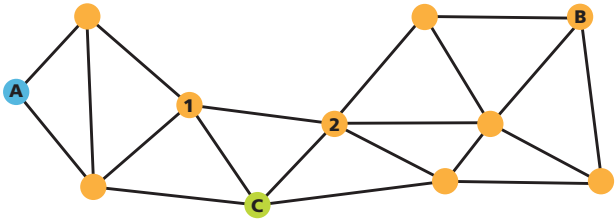


Communication route when two wireless devices (actuators) are off-line

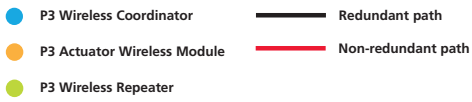
5.2 Explanation of mesh network redundancy paths



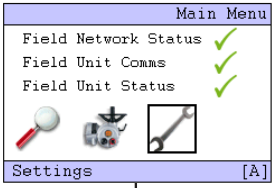
The red path between node 1 and node 2 has no redundancy. If the path fails there is no way for for node 1 and 2 to communicate and the P3 Wireless coordinator (A) can not communicate with any nodes on the right of the diagram.

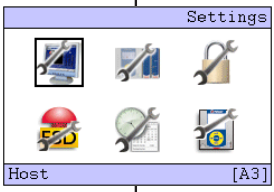


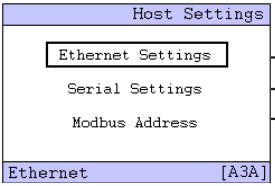
Adding a repeater module (C) changes the red non-reduntant path into a black redundant path and also creates other redundant paths. The P3 Wireless coordinator can now communicate with all nodes in the diagram even if the original red path fails.

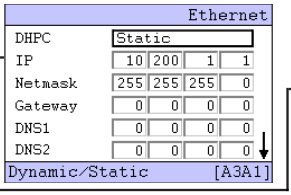


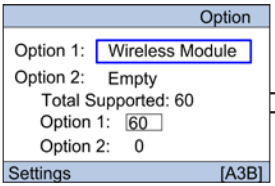
6. Setting Up using local HMI

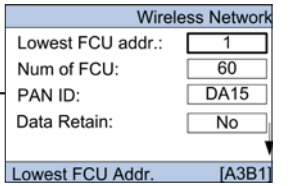


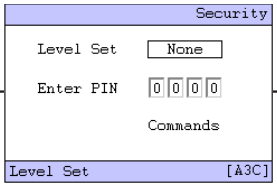


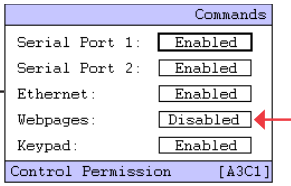


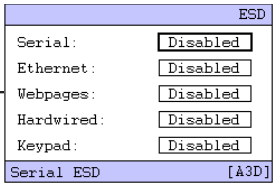


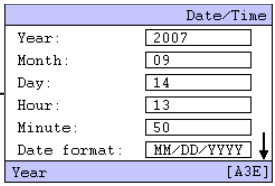


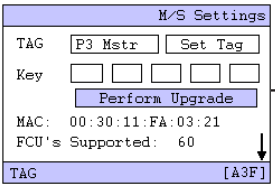


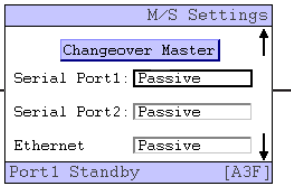












Navigation:

ENTER Selects a highlighted element on the screen or completes the entry of information.

BACK moves up one level in the menu of the displays, returning to the previous screen viewed.

NEXT only functions if there is more data to show than fits on the screen as depicted by the small arrows on the right side of the screen.

◄ ► **Arrow keys** allow active items within a page display to be highlighted and change a numeric value.

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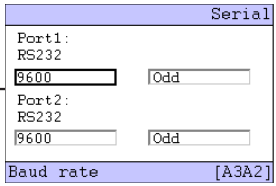
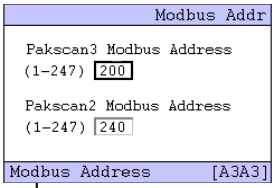
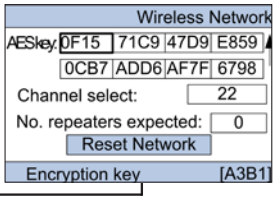


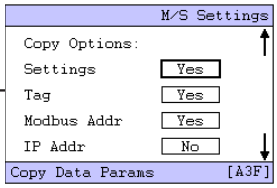




If control via webpages is required during commissioning (section 8), this function should be ENABLED.

In most cases the default settings for the master station will be suitable to get started.

- Host Port Settings **must be adjusted** to match the host system parameters



Default Settings

Host Settings

IP Address	10.200.1.1
Netmask	255.255.255.0
Port 1 (RS485)	
Baud Rate	9600 Baud
Parity	Odd
Port 2 (RS232)	
Baud Rate	9600 Baud
Parity	Odd
P2 Modbus Address (Wired)	240
P3 Modbus Address (Wireless)	200

Wireless Option Settings

Channel	22
PAN ID (Personal Area Network)	DA 15
AES Key: 0F 15 71 C9 47 D9 E8 59 0C B7 AD D6 AF 7F 67 98	
Actuator Wireless Module Address	300

Security

PIN	PIN disabled

Control Permit

Serial Port 1	Enabled
Serial Port 2	Enabled
Ethernet	Enabled
Webpage	Disabled
Keypad	Enabled

ESD

Serial ESD	Disabled
Ethernet ESD	Disabled
Webpage ESD	Disabled
Hardwired ESD	Disabled
Keypad	Disabled

M/S Settings

Port 1 Standby Mode	Passive
Port 2 Standby Mode	Passive
Ethernet Standby Mode	Passive

Copy Options

Settings (H/S)	Yes
Settings (Single)	No
Tag (H/S)	Yes
Tag (Single)	No
Modbus Address (H/S)	Yes
Modbus Address (Single)	No
IP Address (H/S)	Yes
IP Address (Single)	No

7. Setting Up Using a Laptop

The master station includes a set of Web pages for setting up and controlling the system. These are accessed by connecting a laptop/PC to the master station Ethernet port on the front of the CPU.

Adjusting the Network Settings of the laptop/PC (requires PC admin rights)

- To change the IP settings of a laptop/ PC, it is necessary to access the Protocol TCP/IP' settings (version 4 if referenced). This setting would be found in the properties section of the 'Local Area Connection' panel - found through the control panel network settings section.
- Select 'Use the following IP address' to make the laptop/PC adopt a fixed IP address and enter an address of 10.200.1.3 and a subnet mask of 255.255.255.0, click on the OK button and the window will close.
- Click OK on the 'Local Area Connection Properties' window and then Close the status window, the Network Connections window and the Control Panel. Reboot the laptop/PC to ensure that the new settings take effect. Connect the cable between the laptop/ PC and the master station front connector.

When you reconnect your laptop/PC to a LAN you must restore your original network settings.

Accessing the Pakscan P3 Internal Web Pages

- Start Internet Explorer and browse to IP address 10.200.1.1, (http://10.200.1.1).
- The browser will then access the master station and bring up the opening page of the master station.
- Log in with a user name of admin and a password of admin.
- Select and edit the configuration pages.
- Most pages are intuitive. For more details see PUB059-002.

8. Commissioning for IQ and IQT actuators

When a wireless IQ or IQT actuator is shipped from the factory, it will be set with default values for its PAN ID (Private Area Network Identifier), Channel number, AES (Advanced Encryption Standard) Key and Address. These settings can be changed at the actuator using the infra-red header or, when communication has been established with the master station, using the master station web pages / HMI. The actuator's wireless address cannot be set using the master station and must be set using the infra red setting tool, each actuator must have a unique address.

It is best practice to setup the network such that the lower numbered devices are closest to the coordinator. This is because the reset of the network has been set up to be staggered, allowing those devices nearest the coordinator to join first, and more remote to join later.

At the start of commissioning the wireless network, leave all the wireless actuator modules powered down, power up the master station and set up the desired PAN ID and AES key, this is to be decided by the customer. Set the channel number to the one determined during the wireless survey. It is recommended that at least the PAN ID is modified from the default setting. This will simplify commissioning by ensuring that actuator modules only appear on the network when the correct PAN ID has been set locally in them.

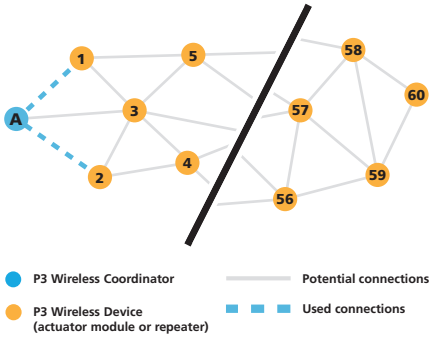
Default values are shown on page 13.

The PAN ID, AES key and Channel number of the master station can be set using the HMI screens on the master station, or using the in-built web pages.

Once the master station has been set up, the wireless actuator modules can be powered up and set up with the infra red setting tool. If the master station settings are different from the default (as recommended) none of the modules will appear at the master station. The actuator address should be set first, then the PAN ID, Channel and AES key.

When these have been set correctly, the new device will appear on the master station FCU menu page. It is useful at this stage to have one person setting up the FCUs in radio contact with someone monitoring the master station, confirming that each newly commissioned FCU is appearing on the master station FCU list.

The actuators should be powered up one at a time, starting with those devices closest to the co-ordinator and working outwards to the unit furthest away.



If the wireless network is to control the actuators as well as monitor, it is necessary to ensure this setting is enabled in the actuator. All wireless settings are found in the secondary settings menu in the actuator see document PUB002-008 for details of the menus for wireless.

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Redefining Flow Control

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Rotork plc
Brassmill Lane, Bath, UK

tel +44 (0)1225 733200
fax +44 (0)1225 333467
email mail@rotork.com

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Issue 09/12