Case Study

NetMan Works for WPD

Western Power Distribution and Netcontrol prove a winning formula in power distribution

Western Power Distribution Limited (WPD) with the assistance of Netcontrol have secured the number one position as the leading power distribution company in the UK. Over the past few years Netcontrol has automated around 6500 control points on the WPD network with their NetMan family of products. WPD is now the UK Market leader, according to the regulator for quality and supply.

High voltage NetMan

WPD have installed and operated Netcontrol NetMan systems for network automation since 1998. Netcontrol has been working directly with WPD with integrating and maintaining the NetMan data radio telemetry equipment which is used to monitor and control High Voltage equipment across its vast network. The NetMan data radio telemetry system integrates directly in to the main WPD SCADA systems providing seamless control of all their secondary distribution equipment. To date WPD have automated approximately 6,500 remote secondary switchgear locations, from ground mounted Ring Main Units (RMUs), to pole mounted reclosers and air-break disconnectors.

NME 200 Installation

WPD have installed a large number of Central Control Units, or system NetMan gateways at nearly all of their 33/11kV Primary Substations. Here the NetMan gateway unit communicates with the remote sites using a UHF frequency. The remote sites or outstations report to this gateway using the NetMan report-by-exception system, thus increasing the available communication bandwidth. The gateway then communicates with the WPD SCADA system suing DNP3 via the existing Primary substation RTU. The system NetMan uses a compressed method of communicating over-the-air, to reduce the normal transmit time a pure SCADA telegram would take.

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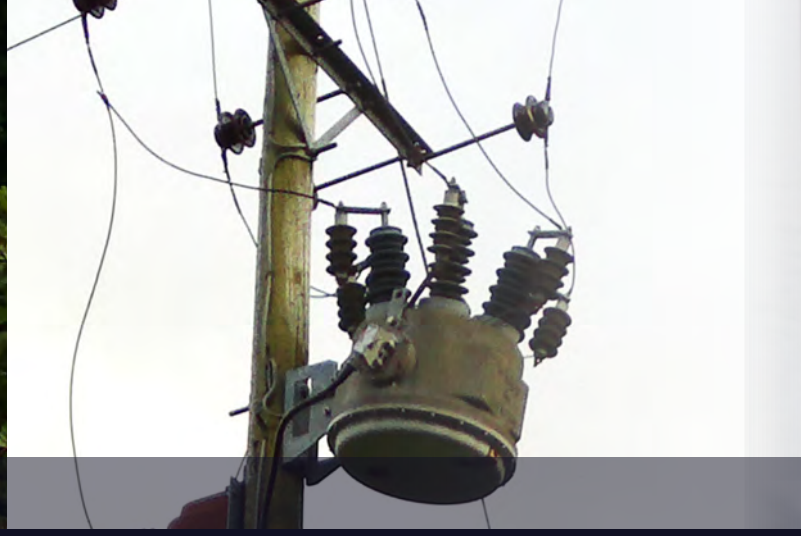

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Long Range Data Radio

The heart of the System NetMan is the Netcontrol data radio. This powers the functionality of the system being allowing for long range communication from the gateway to the remote locations. Since it is not common that all outstation locations can communicate directly with the gateway, Netcontrol have developed a sophisticated communication algorithm that allows for each outstation device to pass a data telegram on to another outstation in order to increase the potential communication path. As a message leaves the master gateway unit is contains information on how it is to arrive at the outstation device. In fact a message can travel through 6 other slave devices before arriving at the destination device.

In order to assist the client, the menu within the radio, allows the installer to measure the best signal to and from neighbouring devices and this is used then to set up a main and standby communication path. Should a message not get through on the main route a standby route is used.

GVR Recloser

NMS 100 Switch Control Panel

This methodology was critical in WPD deploying such a large number of remote sites in such a short period of time. Since no costly and complex communication infrastructure is required to achieve the wide areas of coverage, it was very easy for WPD to embark on such an ambitious project.

Where an Intelligent switchgear device is installed, such as a 'Smart Recloser', the data radio is connected to the device directly using a serial cable.

The slave radio then acts as a DNP3 master and continually communicates with the slave recloser.

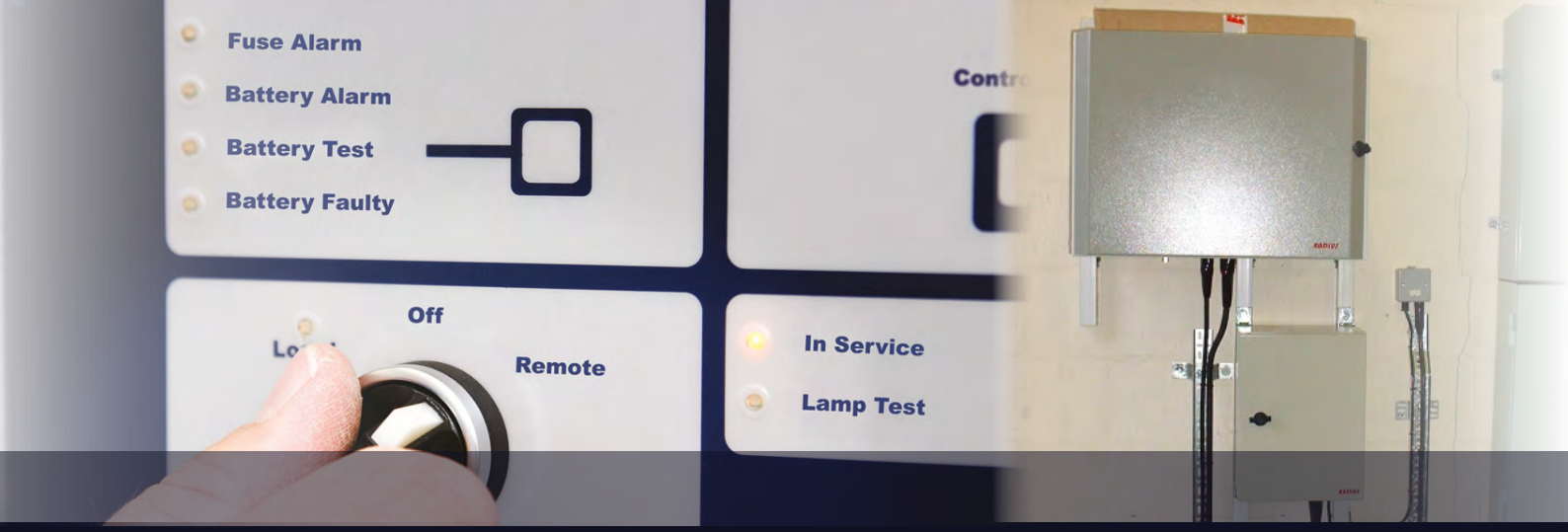
G&W Pole Switch

The installation engineer, via a menu on the radio, can select the data points that they wish to bring back to SCADA and the radio will transfer these back to the gateway. This map can be saved and built in to the radio menu so that should another similar device be installed the data points can be set directly by the pre-set menu, reducing the installation time and the potential for an incorrect mapping to be configured.

Reliability in the field

"One reason for this long standing relationship is that Netcontrol equipment is very reliable, particularly considering the environment that it operates in. What is impressive is the continual development of the NetMan systems hardware and software platforms in relation to system integration and radio networking functionality and the customer focus applied to the development of the equipment." One of the newer units deployed by WPD is the NMS 100 which offers an intelligent

Ringmain Unit (RMU)



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remote control system that not only monitors but can also control up to three motor operated High Voltage switches/disconnectors. The NMS 100 actuator has advances features which enable the users to have peace of mind since the system automatically sectionalises the HV network under fault conditions. This is an important aspect since all faults on the network must be reported to the UK governing regulator OFGEM. So every second counts. The NMS 100 is designed for Ring Main Units (RMUs) and incorporates motor control circuits that power the motor actuators fitted to the switches and circuit breakers on the RMUs.

Typical basestation antenna installation

A variant of the NMS 100 is the remote control, pole mounted air-breaks switch controller, the NME 200. This is designed to allow for high-speed operation of installed pole mounted air-break switches and disconnectors through the inclusion of a compact, rare earth magnetic motor that provides very high torque levels. The NME 200 replaces the manual operating handle on air-break switches and allows the unit to be easily converted to remote operation.

Versatility in Control

The NMS 100 is designed to control a range of motor or magnetic actuator controlled switchgear and has been used extensively with the WPD network on both ground mounted and pole mounted applications.

Hit & Run Function

WPD have been impressed with many of the functions the NMS 100 and the NME 200 has to offer but pay particular credit to its `Hit and Run` function. This allows the user to select a local switching operation, which can then be delayed by a configurable time, to allow the operator to move safely away from the equipment. This reduces the risk from standing beneath a pole mounted switch when it operates, and also the risk involved in operating a ground mounted switch, especially within the close confines of a GRP housed packet substation.

A spokesperson for WPD states; "Netcontrol develop highly robust packages that not only communicate with its own system, but can be adapted to run with numerous other communication packages".

The NetMan group of products also offers a monitoring system for the entire network, which relays information continuality back to WPD control centres. The NetMan and SCADA systems incorporated into the WPD network allow operators to seamlessly remote control and operate the network, from central points reducing the cost of additional support teams out in the field.

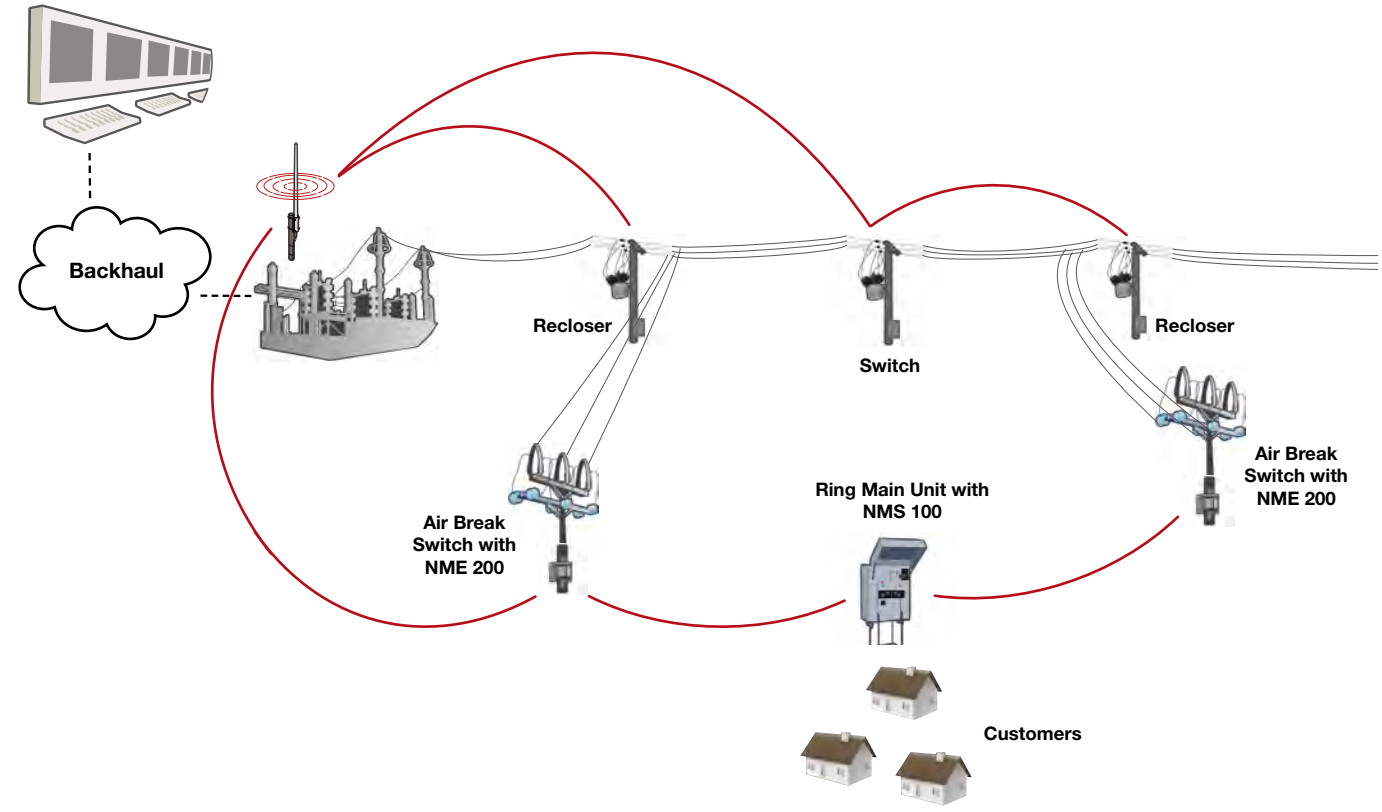
Battery Management Crucial

WPD have also commented on the benefit of the sophisticated battery managaement on both the NME 200 and the NMS 100. The temperature compensated integrated charger, not only ensures the batteries are charged in the correct way, but battery life is enhanced by ensuring that batteries are disconnected before being deeply discharged after periods of power loss. The charging circuits also allow 'test' the batteries by placing a very high current load across them periodically, to ensure that none of the cells have malfunctioned. This battery test can be programmed to take place at specific intervals, but can also be performed local or remotely prior to a switching operation to give additional confidence to the operator that a potential battery failure will not affect the manoeuvre.

Benefits

- Wide Area Coverage
- Low cost of instalment
- Integration of existing switchgear
- Ease of deployment
- Intelligent Motor Control Protection
- Ability to integrate earth fault indicators
- Event Triggered Communication
- Battery Deep Discharge Protection
- Battery Conditioning and Monitoring
- Operator Safety ensured

System Overview



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