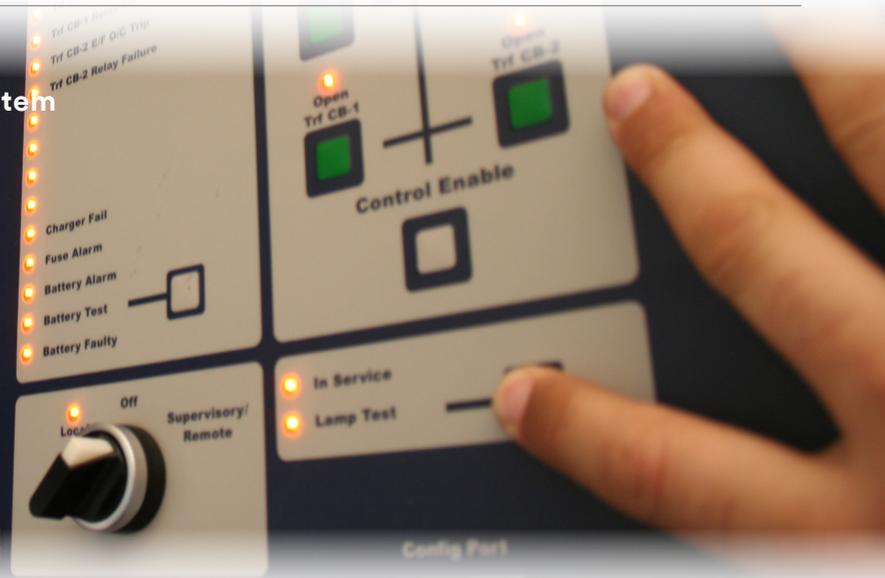


CASE STUDY

Abu Dhabi Emirate Automation Solution

Netcontrol & Autochim Systems provide a turnkey retrofit distribution automation system for 11kV ground mounted substations



AN ADDC OVERVIEW

The Abu Dhabi Distribution Company (ADDC) was formed in late 1998 with the responsibility of distributing high quality water and electricity services to all in the emirate of Abu Dhabi.

ADDC distribute electricity at the 33 kV and 11 kV levels to three regions Mussafah and Baniyans in the eastern region, Liwa and Silla in the west and Abu Dhabi island itself.

ADDC is regulated by the Regulation & Supervision Bureau (RSB) who being customer focused, limit the amount of revenue ADDC can earn in any particular year by the application of price control and incentives for ADDC to improve the quality of service to customers while reducing cost.

PILOT STAGE

To achieve the required improvements ADDC turned to Netcontrol, having already seen the improvements to the quality of supply Netcontrol had achieved from world class companies, such as Scottish Power, and Western Powwer Distribution. Through is local partner Autochim Systems a pilot program with Netcontrol was conducted as a proof

of concept in order to address such issues as the communication options, switchgear interfaces and SCADA / DMS integrations. After the success of the trial, ADDC moved to a full implementation stage, with Netcontrol supplying 500 units for the first phase.

SUBSTATION DESIGN TYPES

The 11 kV / 415 V substations were made up of 3 main types of design. The first type were TRM stations, comprising of a standard Ring Main Unit and a single transformer, the second was a QRM, consisting of an extensible ring main unit and 2 transformers. The third type known as panel type are typical indoor, metal clad, extensible breakers and switches, with associated transformers in arrangements with as few as 4 panels (2 feeder switches and 2 transformer circuit breakers) up to as many as 16 switches/breakers per substation.

COMPETITIVE EDGE

For some locations where the switchgear was nearing the end of its asset life, new switchgear was installed, such as the Lucy RMU. These units have been fitted with new motor actuator



packs supplied by the switchgear manufacturer. However for the most part, the switchgear is older and the manufacturer has not designed them, to be anything other than manually operated. For most of ADDC's switchgear a retrofit solution had to be found, especially since it made no economical sense to replace the units as they have several decades of asset life left.

RETRO-FIT SOLUTION

There are around 2500 secondary substations within ADDC jurisdiction. These switchgear have been installed historically as part of a complete 'package substations' and complete substation tenders. Over the years this has resulted in a large number of different manufactures and equipment types appearing on the ADDC network. Netcontrol are a global specialist in Distribution Automation, and familiar with switchgear retro-solutions, designed for this project a range of retro-fit actuators for a large number of switchgear for ADDC. Including Tamco GR1, Tamco panel type, Hawker Siddeley Falcon Beta, Seimens, Hitachi, and Mitsubishi

HOW IT WORKS

Each of these units is connected to a FastNet RTU and a NMS control unit. The NMS controller allows for local and remote operation of the TRM and QRM stations via the easy to use operators panels. These also give an indication of the health of the 24V batteries and charging capacity. A daily battery health test is automatically conducted and any issues highlighted locally on the panel, and remotely to the SCADA system. The NMS plus FastNet RTU communicates to the DMS using IEC60870-5-104. As well as the status of the switchgear, charging circuits and battery, load currents are also monitored at each site.

POWER WITHOUT MAINS

When supplying automation equipment its essential to have battery backup to ensure continued operational performance beyond the loss of supplied power. Netcontrol provided ADDC not

only with battery back-up but the assurance that the backup would work when required. This is achieved through stored energy/battery management. Battery performance and battery life are very critical elements to the long term effectiveness of any remote device. To that end, Netcontrol has designed a sophisticated solution to maximise battery life. This is achieved through a variety of different measures, from thermostatic control, calibrated load testing to deep discharge protection to ensure maximum battery life and performance.

OPERATOR SAFETY

As part of any of Netcontrol automation products we apply an extended level of operator safety. Normally this is taken care of through remote control via SCADA activation. At times local operations are required. This is where Netcontrol's "Hit & Run" function takes effect. The NMS's in ADDC's case have been programmed to allow local operation with "Hit & Run" which allows operators to move to a safe distance away from the switch after pressing the local manoeuvre control. An audible bleep alerts the operator that the "Hit & Run" function is armed, after a configurable waiting period the NMS 100 will operate.

COMMUNICATION OPTIONS

The NMS with the FastNet RTU communicates to ADDC's DMS system using a Wi-Max network, operated by ADDC. Although the initial installations utilised a Radius Data Radio network (PDR). It's likely that the PDR data radio will be utilised across the entire ADDC region as the Wi-Max coverage is limited to the main city.

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