

DATA CENTRES: Keeping Data Safe



Diesel generating sets worldwide

**ENGINEERING EXCELLENCE
BUILT ON EXPERIENCE**



12 UNITS ARE SUPPLIED FOR SCANDINAVIAN ICT CENTRE PROJECT

AJ Power delivered and installed 12 x 2.25MW DCC rated generators to 2 separate sites in Sweden to provide backup power to 2 separate large data centres. The specification of the generators, created by a large international consultancy firm, was very detailed calling for a large 30,000litre bundled 'belly' fuel tank, very strict noise levels (65dBA at 3m) and numerous safety systems in the generator container, including automatic water mist fire protection. The generators were installed on an N+1 basis and included dual redundancy for the generator control system.

For the generators, the engines used are MTU 20V4000 units coupled to Stamford Frame 8 medium voltage alternators, generating voltage at 10kV/11kV depending on the site. AJ Power designed the generators and the control and synchronising system and were heavily involved in the container design with the supplier.

The specification called for the generators to be fully witness tested at the AJ Power factory at 10kV/11kV at 0.8pf in their final built-up configuration. All 12 sets required witness testing and this was completed successfully.

System installation at each site was then carried out which included connecting all control cabling, and attaching fuel lines and other mechanical items. Once fully installed each generator underwent a site acceptance test witnessed by the customer. Finally an Integrated Systems Test was performed at each site, which ensured that all critical systems for the building were fully operational and communicating properly and that the generators performed correctly against given scenarios.

AJ Power project managed the complete project for the generators from order to IST sign-off and had staff on site to supervise installation work, perform SAT testing and assist with IST testing.

Several months after successful commissioning both sites requested a 'forward synch' solution which allowed the generators to be tested monthly using the mains as load. The generator control system was re-programmed to allow this feature and safeguards were put in place to ensure that the emergency backup function of the generators remained in place during these monthly tests.



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Generator Control System

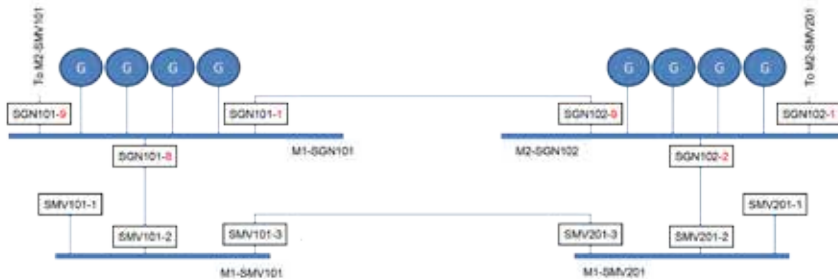
AJ Power supplied a dual redundant Master Control system to integrate with the Site wide PMS system (Power Management System). The Master Control system managed control of all critical circuit breakers (CBs) within the Generator MV Switchgear suites including all Bus tie CBs and Neutral Earthing contactors.

On receipt of a 'call for diesel generation' signal from PMS system, the master control system signalled all available Diesel Generators to perform a run-up synchronising procedure (also known as dead-bus paralleling). The PMS system could also signal the Master control system to switch the generators between N/N+1 power management modes.

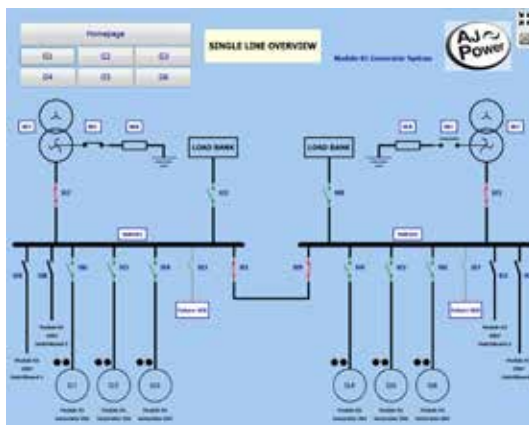
On Mains Return on request from the PMS system the Master control system managed the reverse synchronisation of the generators to mains including phase matching and check synch interface signals to the PMS System.

The Master control system also managed generator test sequences on request from the PMS system.

Site Single Line Diagram:



In addition each Genset was fitted with individual synchronising and load sharing control panels and a full HMI suite was provided in each control room.



SWING SET SOLUTION

A new Data Centre has recently opened in the Atlantic Link Enterprise Campus in Coleraine, Northern Ireland. The Data Centre is a 4,500 m² world-class facility providing highly efficient and exceptionally secure data storage. It is the first commercial carrier-neutral data center and the first Tier III data center to be built in Northern Ireland. AJ Power were specified from the beginning of the project to provide the standby power requirements. The detailed specification called for an N+1 generator setup with a 'swing' generator used as backup to all other generators on site.

The generator specification called for 2 x 1250kVA Data Centre Continuous (DCC) rated sets in low noise containers (70dBA@1m) with an automatic water mist fire suppression system, mounted on 18,000L (72hr) 'belly' fuel tanks.



AJ Power provided a complete solution for the control philosophy on the site, comprising of a Generator Control System (GCS) made up a network of ComAp IntelliGen, IntelliMains controllers and an IV17T2 HMI connected via Redundant CAN network and Ethernet.

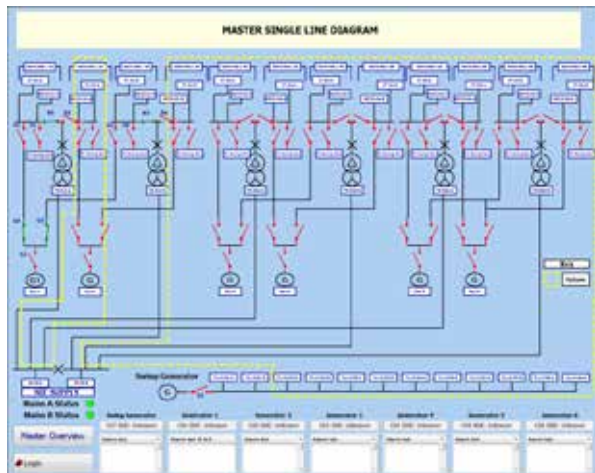
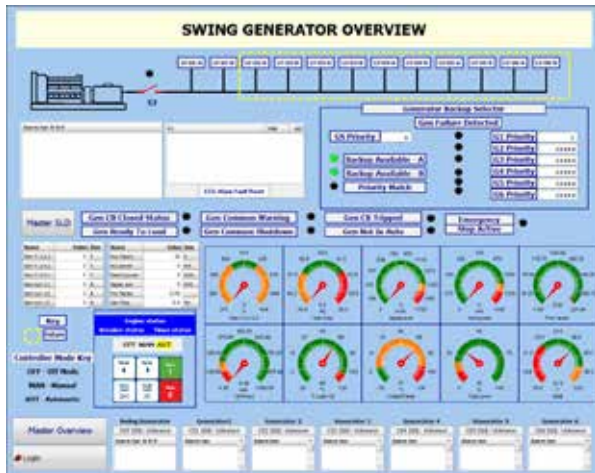
The key Generating Control System features are:

- Automatic Mains Failure (AMF) functionality with a manual to return to mains. IntelliMains provides AMF sensing and controls the generators' request to start.
- Building UPS covers transfers between Mains and Generator supplies. Neutral Earthing Contactor (NEC) controlled to supply a neutral reference on the switchboard for the UPS.
- In the event of a mains failure, the system detects this and signals for the backup generators to supply data hall load. Due to the critical load of the data center the generators will supply the data hall load until a "Manual Return to Mains" command is issued by Facility Management.
- In the event of backup generator failure to start, the swing generator assesses the situation and backs up the generator load with the highest priority. This process occurs every time the status of a generator change (online or offline for backup) to ensure that the highest priority of load is always met. This occurs until the mains supply is healthy and the manual return to mains command is issued.
- All control communications operate over a redundant CAN network with an Ethernet connection also available. Both options allow for minimum downtime.

SWING SET SOLUTION

The system HMI Overview includes easily understood screens of each generator, a Complete System overview and an overview of alarms for each genset. Manual Return to Mains signal is possible via the touchscreen HMI and also by a physical key switch. All of the above are displayed on easy to navigate screens.

A Generator priority selection feature is also available – this selects which data hall load to backup if multiple backup generator failure occurs i.e. the most critical data hall to be powered. This feature is fully configurable meaning that the BMS can configure the priority sequence of generators to backup.



DEPENDABLE POWER

LONDON DATA CENTRE

AJ Power supplied, installed and commissioned 3 x AJ2525 standby generators and associated control gear to a flagship Tier 3 Data Centre in London, United Kingdom.

The data centre facility, designed to deliver high quality customer solutions, has six data halls, all capable of being subdivided to allow clients to have anything from a cabinet in a shared space, to their own suite or data hall with dedicated power and cooling.

The three AJ Power generating sets supplied are each rated at 2525kVA, 11kV, 50 Hz and operate in N+1 Standby mode with a fuel system designed for 72hrs continuous operation at full load. The generating sets are powered by Mitsubishi S16R2-PTAW engines driving Newage Stamford 11kV alternators.

Each genset is supplied with a complex synchronising and load sharing system including Multiple HMI panels for operator interface and an internet gateway for client SCADA. Dual-redundant genset controllers and Master PLC panels are also supplied to solve the complex nature of the clients HV System and to fulfil the needs of meeting the Uptime Institute's requirements for a Tier 3 certified Data Centre.

The genset control system also allows the facility to synchronise with the utility supply during a no-break return from mains failure or a 'forward synch' for generator testing.

The control system is designed to be expandable, giving the facility to add future gensets as the Data Centre utilisation and power demand increases.



TELECOMMUNICATIONS

IRELAND

AJ Power engineering team recently completed the commissioning of a 3 x 2.5MW generating sets for a major telecommunications provider in Ireland.

The 9 Series DC3-AJ3125S-5M1 sets are powered by a MTU 20 cylinder 4000 Series engine and are designed to operate in synchronisation with the mains utility as well as to provide standby power. The power is distributed through a specially manufactured circuit breaker with integrated solid Busbar connection point to the main facility switchgear.

The units have a noise level of 65dBA at one metre as they are positioned very close to working offices.

AJ Power was responsible for the complete design, manufacture, witness testing, delivery, installation and commissioning of the generators for the project.



CONTACT US:



Founded in 2003, AJ Power is based in a modern facility in Craigavon, Northern Ireland, UK. The company specialises in the volume manufacture and design of diesel generating sets with a management team who have over 40 years' experience in the industry.

All AJ Power generating sets provide reliable power, innovative design and peace of mind. The market for generating sets is growing rapidly, keeping pace with the rising demand for electricity and AJ Power are at the forefront with technology to meet this demand.

UK Sales Office

Will Mason UK Sales Manager

Unit 21 Eventus
Sunderland Road
Northfields Industrial Estate
Market Deeping
Peterborough
PE6 8FD

Tel: + 44 (0) 1778 382709
Mob: + 44 (0) 7557 365436
Email: wmason@ajpower.net

Head Office:

Andy Mackey Director of Sales

Tel: + 44 (0) 28 3836 1000
Email: amackey@ajpower.net

David Shepherd European Sales Manager

Tel: + 44 (0) 28 3836 1000
Email: dshepherd@ajpower.net

Ciaran Corry Chief Electrical Engineer

Tel: + 44 (0) 28 3836 1000
Email: ccorry@ajpower.net

Graeme Purdy Project Sales Manager

Tel: + 44 (0) 28 3836 1000
Mob: + 44 (0) 7952 408017
Email: gpurdy@ajpower.net

AJ Power Limited

1 Charlestown Drive, Carn Industrial Area, Craigavon, BT63 5GA, Northern Ireland, UK
Tel: +44 (0)28 3836 1000 **Fax:** +44 (0) 28 3836 1010 **Email:** info@ajpower.net
Company Registration No: NI 45303 VAT Registration No: GB 815 2976 14