

POWER ENGINEERING SERVICES

CAPABILITY STATEMENT



SAFETY - QUALITY - RESPONSIBILITY - VALUE

INTRODUCTION AND COMPANY OVERVIEW

Established in 2015, **POWER ENGINEERING SERVICES** is an Australian owned and operated company based in Perth, Western Australia.

Our core expertise is the engineering design, commissioning, testing, maintenance, and repairs of high voltage (HV) and low voltage (LV) electrical systems and their associated equipment.

The company employs a team of electrical engineers, technicians, electricians, trade assistants and electrical apprentices all with one goal in mind – to **safely** and **effectively** deliver the solutions our clients expect, to do this on time and within budget.

Another of our key goals is providing an after-hours service and giving value-added service to our clients.

Work undertaken by us covers most sectors within the electrical industry including mining, oil and gas, utilities, heavy/light industry, manufacturing, construction and commercial.

We travel to all parts of Australia and the wider area to locations where our services are required.

CERTIFICATION

Our HSEQ Management System has been developed by JS ISO Services and is certified by GRS Certification. The system meets the requirements of the following Standards:

- ISO 9001:2015 (Quality),
- ISO 14001:2015 (Environment) and
- ISO 45001:2018 (Safety).

CORE COMPETENCIES

Testing & Commissioning

We provide our clients with a comprehensive testing and commissioning service on a wide range of HV & LV power system assets including power transformers, current & voltage transformers, circuit breakers, switchgear, protection relays, revenue meters, earthing systems, cables etc.

We are able to perform all stages of the commissioning process from the document preparation stages, where we develop commissioning plans, inspection, and test plans (ITP), and verification documents (ITR) for projects to Factory Acceptance Testing (FAT), Site Acceptance Testing (SAT) through to the No load and Load Commissioning stages.

In providing this service, we use trained testing personnel (Field Engineers, Testing Technicians, Testing Assistants, etc.), some of which are licensed electricians, who are familiar with the testing philosophies, test equipment and the equipment under test (Power Transformers, Protection Relays, Circuit Breakers, Current Transformers, Voltage Transformers, etc). Our commissioning staff are able to offer on-site practical solutions to issues noted during the commissioning process.

We own and use testing equipment supplied by reputable manufactures such as Omicron, Megger, b2 electronics GmbH (HVA range), Baur, etc. The test equipment is modern and regularly calibrated by NATA certified laboratories.

Asset Condition Monitoring

Condition monitoring of power system assets is a very effective strategy used by many successful asset owners. For our clients to maximise the use of their assets, we provide a service to effectively maintain and monitor them. We also develop asset maintenance strategies and plans and work in conjunction with our clients to implement these strategies.

To assist with this, we provide online & offline thermographic, corona discharge & partial discharge surveys. We also provide transformer oil analysis and other services.

Construction/Installation

We can perform limited installations of both HV & LV plant and equipment. This is usually in the form of changing out equipment that is found to be faulty or requiring replacement.

Maintenance & Repairs

Maintain and repair a wide range of HV and LV electrical equipment. This includes power transformers, current transformers (CTs) & voltage transformers (VTs), HV & LV circuit breakers, switchgear and switchboards, protection relays, revenue meters, electrical earthing, and lightning protection systems, HV cables and other electrical assets.

DETAILS OF SERVICES PROVIDED

○ Power System Scheme Tests

- Examples of equipment used – Omicron CPC 100, Omicron CMC 256 & 356, 3 Phase Variac, Omicron CMGPS, etc.
- Transformer through tests to check transformer protection stability.
- Bus Zone primary injection to check stability.
- Protection Relay blocking logic tests.

○ Protection Relays

- Examples of equipment used – Omicron CPC 100, Omicron CMC 256 & 356, Omicron CMGPS, etc.
- Set up and configure settings files.
- Testing of trip pickup and time tests by Secondary and/or Primary injection.
- Logic tests (cause and effect logic).
- Assist with SCADA tests.
- Functional tests.
- Testing using the IEC 61850 protocols.

○ High Voltage & Low Voltage Switchboards

- Examples of equipment used – Omicron CPC 100, Omicron CT Analyser, Omicron CP CB2, Omicron CP TD12, Megger

MIT1025, UltraTEV Plus2, Omicron MPD800, Phenix BK130, etc.

- Commissioning, Testing and Maintenance.
- Insulation Diagnostic tests.
- Circuit Breaker time travel tests.
- CT and VT tests.
- Protection Relay injection tests.
- Assist with SCADA tests.
- Functional tests, Interlocks etc.
- Online and Offline Partial Discharge testing.

○ Earth systems

- Examples of equipment used – Omicron CPC 100, Omicron CU1, Omicron HGT1, Megger DLRO10, etc.
- Soil Resistivity.
- Inspections.
- EPR tests.
- Earth Grid Impedance.
- Step & Touch Potential Tests.

○ DC Power Systems

- Examples of equipment used – Megger Torkel.
- Commission Battery systems.
- Battery Capacity Testing.

- **Current transformers (HV & LV)**
 - Examples of equipment used – Omicron CPC 100, , Omicron CT Analyser, Omicron CP CB2, Omicron CP TD12, Megger MIT1025, UltraTEV Plus2, etc.
 - Ratios, Polarity, Magnetisation Curves, Winding Resistance, IR & PI.
 - Dielectric Loss Angle.
 - Partial Discharge (Online & Offline).
- **Voltage Transformers (HV & LV)**
 - Examples of equipment used – Omicron CPC 100, Omicron CP TD12, Megger MIT1025, UltraTEV Plus2, etc.
 - Ratios, Polarity, Winding Resistance, Insulation Resistance & Polarisisation Index.
 - Dielectric Loss Angle.
 - Partial Discharge (Online & Offline).
- **Power Transformers**
 - Examples of equipment used – Omicron CPC 100, Omicron CP TD12, Omicron Dirana, Omicron Franeo, Omicron CP SB1, Omicron MPD 800, Megger MIT1025, UltraTEV Plus2, etc.
 - Insulation (Oil & Paper) Analysis.
 - Oil Quality, Dissolved Gas Analysis.
 - Paper Insulation moisture content.
 - Oil filtration.
 - Regeneration of oil.
 - Transformer Devices.
 - Surge Devices.
 - Temperature Devices.
 - Oil.
 - Winding.
 - Buchholz Relay.
 - Oil Level.
 - Transformer Tests.
 - Insulation Resistance.
 - Ratio.
 - Winding Resistance, Dynamic Resistance.
 - Vector group & Polarity.
 - Short Circuit tests.
 - Excitation Current.
 - Sweep Frequency Response Analysis tests.
 - Leakage Reactance & Impedance.
 - Dielectric Loss Angle.
 - Partial Discharge (Online & Offline).
- Transformer Tap Changers:
 - Operation checks & Maintenance.
 - Dynamic resistance tests.
 - Leaking Bushings & Tap Changers.
 - Radiators.
- Maintenance and repairs of Transformers:
 - Oil streamlining and regeneration.
 - Replacement of bushings and radiators.
- **High Voltage & Low Voltage Circuit Breakers**
 - Examples of equipment used – Omicron CPC 100, Omicron CP CB2, Omicron CP TD12, Omicron Cibano, Omicron CB MC2, Megger MIT1025, Various OEM OCR checkers, RH973-SF6 Analyzer, UltraTEV Plus2, Phenix BK130, etc.
 - All types of Circuit breakers – Air, Oil, Vacuum, SF6
 - SF6 Gas Circuit Breakers
 - Charge with SF6
 - SF6 Leak detection
 - SF6 Gas analysis
 - SF6 Dew Point tests
 - Safety function tests (low gas lockout)
 - Electrical tests including
 - Insulation Resistance Power Withstand
 - Contact Travel and Timing Minimum operating voltages (Open/Close)
 - Spring Charge Motor
 - Charge time
 - Charge current/load.
 - Contact Resistance
 - Static & Dynamic
 - Dielectric Loss Angle
 - Partial Discharge
 - Online & Offline
 - On-board Protection Relays (LV)
 - Set up and configure relays.
 - Primary & Secondary injection
 - Maintenance
 - Contact wear
 - Mechanical
 - Oil change
 - SF6 and Oil Analysis
 - Mechanical

- **Cable Jointing and Terminations up to 33kV**
 - LV and HV Cables.
 - XLPE Cables.
 - PILC Cables.
 - Transition Joints.
- **HV Switching up to 33kV**
 - Develop switching programs.
 - Carry out switching.
- **High Voltage Cables**
 - Examples of equipment used – HVA60 & HVA90, HVA45TD, HVA TD60, HVA PD60,
 - Omicron MPD 800, UltraTEV Plus2, Megger MIT1025, Megger DLRO10, etc.
 - Commissioning tests including
 - Insulation Resistance (IR).
 - Polarisation Index (PI).
 - Very Low Frequency (VLF).
 - Tan Delta (DLA).
 - Partial Discharge (Online & Offline).
- **Dry Ice Cleaning**
 - Electric Motors.
 - HV & LV Stators.
 - HV & LV Rotors.
- **Power Lines**
 - Examples of equipment used - FLIR E54 24, Megger MIT1025, Megger DLRO10, UltraTEV Plus2, etc.
 - Pole Inspections.
 - Corona Discharge surveys.
 - Thermographic surveys.
 - Live line insulator washing.
 - Maintenance of pole top hardware (Disconnectors, Isolators etc.).
- **Workshop Facilities**
 - Repairs, maintenance & testing are carried out on most pieces of High Voltage equipment within our workshop.
 - Programming, Configuring, setting up and testing protection relays.
 - Electrical testing of mobile elevated work platforms on and off-site.
 - Testing of:
 - HV Gloves & Hot Sticks.
 - HV Portable Earths.

CLIENTS & PROJECTS

Detailed below is a summarised list our clients and projects: -

- **APT Management Services (APA)**
 - Gruyere Power Station – Testing of Protection Relays.
- **Co-operative Bulk Handling (CBH)**
 - Various Sites – Maintenance of HV Switchboards, Transformers, HV Cables, Earthing Systems, Protection relays etc.
- **CIVMEC**
 - FMG Iron Bridge – Commission Transformers, HV Cables, Earthing System.
 - Gruyere Mine – Commissioning Transformers, HV Cables, Earthing Systems, Protection Relays.
 - Gruyere Mine – Perform HV Switching & energisation of equipment.
- **EDL Energy**
 - 10 x Kimberly Power Stations – Maintenance of HV & LV Switchgear, Testing of Transformers, HV Cables, Protection Relays and Alternators.
- **Fremantle Ports**
 - Inner and Outer Harbours – Commissioning of new HV Substations, Earthing System, Transformers, Cables, Protection relays etc.
 - Inner and Outer Harbours – Maintenance of Ship Loaders, HV Switchboards, Transformers, HV Cables, Earthing Systems, Protection Relays etc.
 - HV Cable Diagnostic & Condition Tests & Assessments.
 - Perform HV Switching as required.
- **Fredon WA Electrical**
 - Garden Island – Commission 27 x Kiosk Substations (HV Switchgear, Protection Relays, HV Cables, Transformers, Earthing Systems).
 - Campbell Barracks – Commission new HV Kiosks (HV Switchgear, Protection Relays, HV Cables, Transformers, Earthing Systems) and locate faults on HV Cables.
- **Genus**
 - Covalent Kwinana – Commissioning of MRN & KBP 132kV/22kV Switchyard.
 - Neerabup GWTP Commissioning – Commissioning of new HV Motor Feeder, Earthing Systems, Transformers, HV Cables, Protection relays etc.
- **IPSA Australia**
 - RAAF Learmonth – Supply and Commission (Factory & Site Acceptance Testing) on 11 x 11kV/415V Ring Main units, 2 x 11kV/415V Cyclone Kiosks and associated LV Switchboards & Panels. Supply and Commission 4 x 11kV/415V Transformers.
 - Test Earthing Systems and HV Cables.
 - Locate faults on HV Cables.

- **Metrowest**
 - Western Power Depot – Commission new HV Substations (HV Switchgear, Protection Relays, HV Cables, Transformers, Earthing Systems).
 - Fujitsu Data Centre – HV & LV Circuit Breaker maintenance and Relay Protection testing.
 - Perform HV Switching/Energisation of equipment.
- **Monadelphous**
 - Yandi – Commissioning of HV and LV electrical equipment.
- **Newmont Boddington Gold Mine**
 - Shutdown maintenance on HV & LV electrical equipment.
 - Testing of HV & LV Cables and Protection Relays.
 - Testing of HV Gloves and Hot Sticks.
- **UON**
 - Maintenance and testing of various Containerised Switchrooms.
 - Includes HV & LV Switchgear, Protection Relays, HV Cables and Transformers.
- **Ventia Australia**
 - RAAF Learmonth – Maintenance of Power Station Equipment (HV Switchgear, Protection Relays and Scheme Checks and HV Cable Diagnostic & Condition Tests).

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