



Powell IEC Product Portfolio

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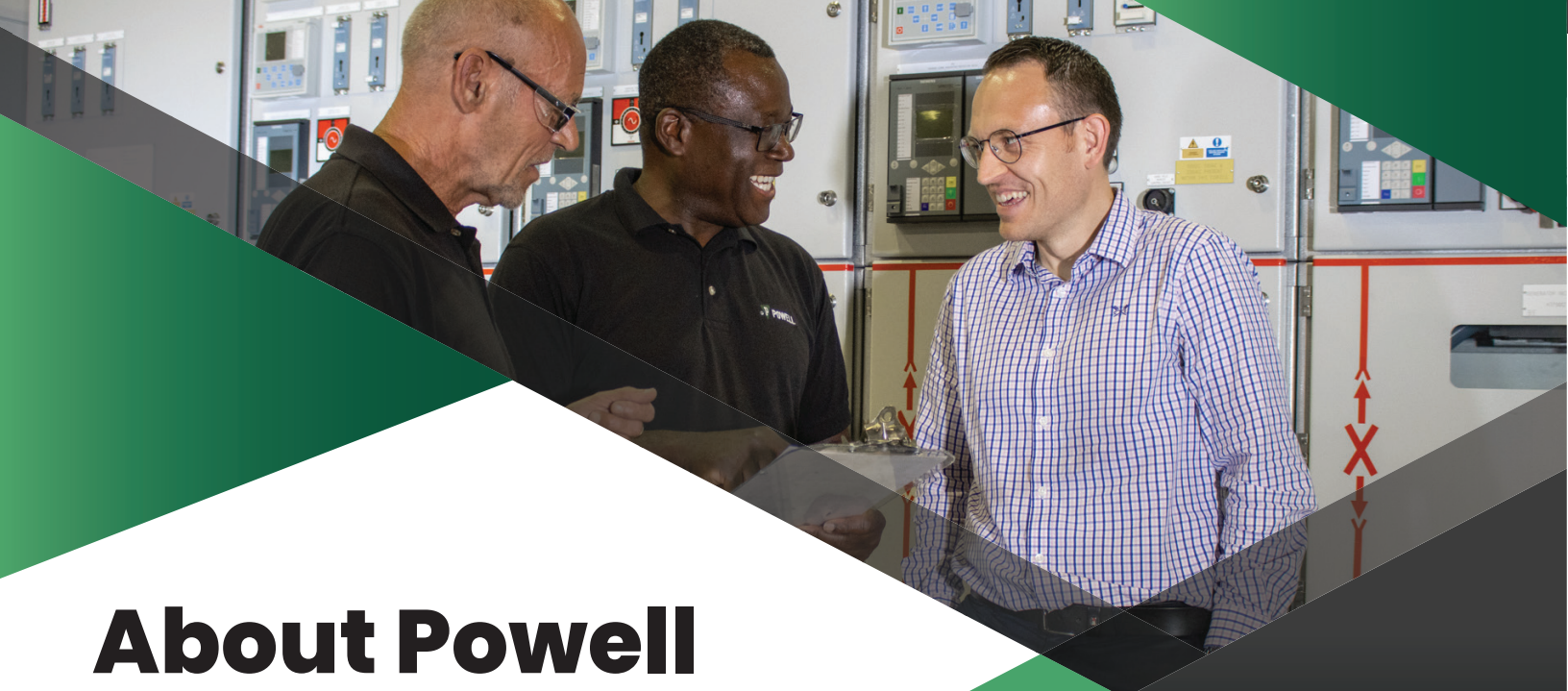
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Table of Contents

About Powell	3
Medium, Voltage Switchgear	
Type 298 Medium Voltage IEC Switchgear	4
Low Voltage Switchgear	
Type 439 PowlCentre - LV Switchgear & Motor Control	5
Type 439FP PowlPillar™ - Feeder Pillar	6
Type 439CAB - PowlCAB™ - Distribution Cabinet	7
Packaged Substations	
Power Distribution Substations	8
PowlSkid™ Equipment Integration	9
Mobile Substation Solutions	10
Spares, Retrofits, & Upgrades	
Spare & Replacement Parts	11
Tailored Upgrade Solutions	12
Air Circuit Breaker Retrofit Solution	13
Remote & Condition Based Monitoring	
Thermal Monitoring	14
Equipment Health Monitoring	14
Circuit Breaker Monitor	
EcoVisor: Temperature, Humidity, and Dust	
PinPoint™ Partial Discharge Monitor	
Intelligent Motor Management	15
Communications Management & Control	15
Powell Global Services	16
Custom Engineering Solutions	17





About Powell

Powell (UK) Ltd is a major LV and MV switchgear, motor control, and integrated systems solutions provider based in Bradford, West Yorkshire, United Kingdom serving, Power Generation, Water & Waste Water, Oil & Gas, Mining & Mineral, Food and Beverage, Pulp & Paper, Pharmaceutical, Chemical and Nuclear industries for over 75 years.

We are part of Powell Industries, Inc, a publicly held company with headquarters in Houston, Texas USA, registered on Nasdaq stock exchange under stock symbol POWL.

Our 15,000 square meter facility in Bradford is equipped with full in-house engineering and manufacturing processes which include: laser cutting, robotic welding, sheet metal fabrication, press brakes, powder-coating paint line, copper punching, insulation coating, switchgear and mcc

manufacturing, packaged substation assembly, and fully integrated equipment inspection and factory testing services prior to shipment to the jobsite. Our in-house manufacturing contributes significantly in carbon foot print reduction, resulting in reduced emissions while boosting the local economy and creating skill sets needed for a sustainable future and increased growth for years to come.

With cutting edge technological low & medium voltage switchgear, equipment integration, automation, and monitoring & control solutions, Powell (UK) Ltd products serve a wide variety of industrial and commercial markets worldwide where IEC products are required.

All our IEC products are fully type tested at KEMA, ASTA and other independent European test labs to confirm compliance to applicable design criteria.

Powell Industries, Inc. has been designing, manufacturing and packaging equipment and systems for the distribution and control of electrical energy for over seven decades. Headquartered in Houston, Texas, Powell is a customer- focused, technology-driven, and solutions-oriented company offering single point sourcing to our customers, no matter how diverse the project.



Type 298 Medium Voltage IEC Switchgear

Powell Type 298 MV switchgear and motor control is designed and manufactured to applicable IEC standards to provide the highest level of operational safety and reliability.

All Type 298 switchgear designs are type tested and certified by independent, international test and certification agencies ASTA and KEMA.

- 15kV with up to 4000A ratings
- Modular LSC2B-PM Switchgear to IEC 62271-200
- AFLR internal arc protection
- Suitable for indoor application up to IP42 applications
- Various widths from 640mm to 1000mm
- Front and rear (top and bottom) cable entry / exit
- Cable and bus duct connections
- Fully interlocked closed-door operation
- Cable/Circuit and Busbar Earthing options
- Environment Testing – Seismic & Sinusoidal Vibration
- Wide range of protection relays, automation and condition monitoring options
- Fully with-drawable VCB, contractors, and VTs



Rated Voltage	kV	15
Rated Current	A	630/1250/2000/ 3150/4000
Impulse Withstand Voltage	kV	75/95
Power Frequency Withstand Voltage	kV	28/36
Short Circuit Making Current	kA	100/125/158
Short Circuit Breaking Current	kA	25/31.5/40/ 50/63
Internal Arc Ratings	kA 1s	25/31.5/50/63

Type 439 PowlCentre - LV Switchgear & Motor Control

Type 439 is designed to fulfill the requirements of all applicable IEC standards, draws upon the latest technology and materials to provide the user with the highest level of operational safety and reliability.

- 690V with up to 6300A ratings
- Modular Switchgear Design to IEC 61439-2
- IEC/TR 61641 relating to internal arc faults (criteria 1 to 7)
- Suitable for indoor application up to IP42 applications
- Various widths from 600mm to 1000mm
- Top and bottom cable entry / exit
- Form 4 Type 2 to Type 7
- Cable and bus duct connections
- Withdrawable or fixed compartments with Fully interlocked closed-door operation
- Environment Testing – Seismic & Sinusoidal Vibration
- Wide range of protection relays, automation and condition monitoring options
- Fully insulated main and fully segregated riser busbar systems reducing the remote possibility of busbar faults



Rated Voltage	V	1000
Rated Current	A	630/800/1000/ 1250/1600/2000/ 2500/3200/4000/ 5000/6300
Impulse Withstand Voltage	kV	12
Power Frequency Withstand Voltage	kV	8
Short Circuit Making Current	kA	100/125/158/ 176/220
Short Circuit Breaking Current	kA	25/31.5/50/ 85/100
Form of Separation	Form 4	Type2/Type5/ Type6/Type7

Type 439FP PowlPillar™

Powell's Type 439FP product line is a compact, modular design that can provide multiple arrangements of outgoing ways for EV Charging applications.

Units are shipped fully assembled from our factory and can be installed with minimal downtime resulting in significant cost savings.

- 690V with up to 5000A ratings
- Modular Switchgear Design to IEC 61439-2 & IEC 61439-7
- Suitable for outdoor application up to IP44 applications
- Various widths from 900mm to 2700mm
- Free standing or Transformer mounted design
- Cable and bus duct connections
- Wide range of protection relays, automation and condition monitoring options
- Compact, fully assembled factory construction for ease of installation
- Extensible Feeder Pillar allows easy installation of further outgoing ways after installation
- Seamless integration with existing distribution systems



Rated Voltage	V	1000
Rated Current	A	630/800/1000/ 1250/1600/2000/ 2500/3200/4000/ 5000
Impulse Withstand Voltage	kV	12
Power Frequency Withstand Voltage	kV	8
Short Circuit Making Current	kA	100/125/158/ 176/220
Short Circuit Breaking Current	kA	100/125/158/ 176/220
Short Circuit Breaking Current	kA	25/31.5/50/ 85/100



Type 439CAB - PowlCAB™

Powell's Type 439 - PowlCAB Power Distribution Cabinet is a compact, modular design that can provide multiple cable arrangements of outgoing ways. Units are shipped fully assembled from our factory resulting in significant cost savings.

- Suitable for Indoor or Outdoor (IP44) applications
- Corrosion resistance Category C4, coating as per BS EN ISO 12944
- Various cubicle widths
- Cable and bus duct connections available
- Provision for close-coupling to fit any transformer design
- Wide range of protection relays, automation and condition based monitoring options
- Seamless integration with your existing power distribution systems



Rated Voltage	V	690
Rated Current	A	Up to 5000
Impulse Withstand Voltage	kV	12
Power Frequency Withstand Voltage	kV	2.2
Design Standard	-	BS EN 61939.5 (read in conjunction with BS EN 61439-1)

Product Applications

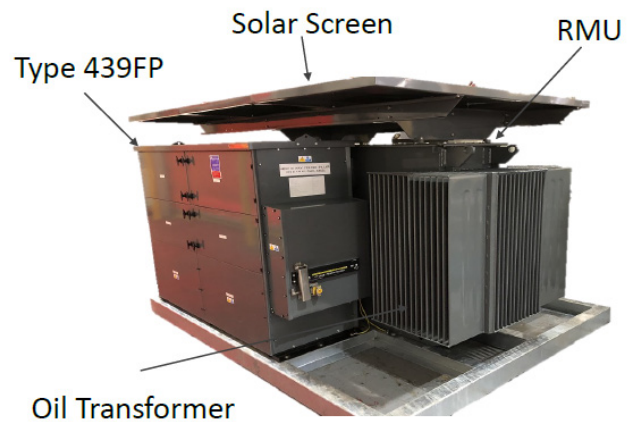
- Defence Estates MoD
- Utilities: Power Distribution
- Commercial buildings
- Airports
- Hospitals
- Retail parks
- Educational establishments
- Sports facilities
- Data Centers

Power Distribution Substations

Powell's factory assembled package substation consists of RMU, Transformer and LV Feeder Pillar designed for outdoor/ indoor applications.

RMU: 630A 12kV UK Supplier Liquid Filled
Transformer 315KVA – 2500KVA Feeder Pillar:
MCCB/ ACB 400V, 400A - 4000A

- Factory preassembled reducing installation, assembly time
- Maximum flexibility with various manufacturer RMU and Transformers, improving choice and availability.
- UK made products reducing lead time and carbon foot prints.
- One point of contact for complete end to end solution
- Complete solution support from specification, engineering, assembly, on-site delivery, installation and commissioning
- ESI type (MV and LV on same side) or BEBS type MV and LV on opposite side of Transformer options



Product Applications

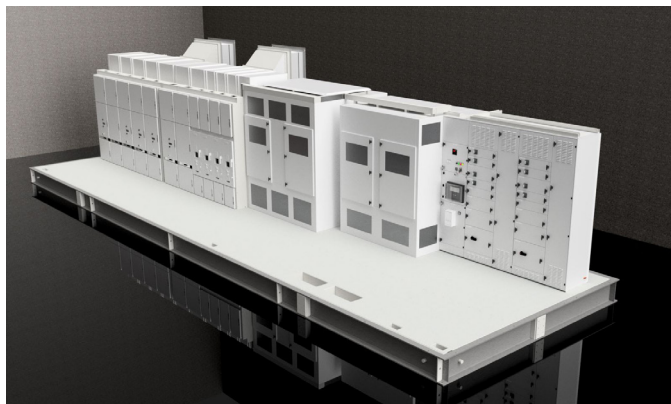
- DNO & IDNO
- ICP (Independent Connection Provider)
- Solar Photo Voltaic Farms
- On-Shore Wind Farms
- Energy Storage
- Electric Vehicle Charging
- Data Centre and Commercial Buildings
- Water and Waste Water Facilities
- Airports, Ports, and Railway Infrastructure

PowlSkid™ Equipment Integration

Designed and Manufactured in the UK.
Equipment is skid mounted and ready for final integration, assembly and wiring.

Equipment Includes

- 12kV and 33kV Switchgear
- Oil filled and dry type transformers
- LV Switchgear ACB/ MCCB and Motor Control Centres
- DC Battery Chargers, DCS equipment and other ancillary panels



Product Applications

- UK base designed, manufactured and factory preassembled reducing installation, assembly and commissioning time
 - Locally made products reduce lead-time and carbon foot print
 - One point of contact for complete end to end solution from specification, engineering, assembly, installation, on-site delivery and commissioning
 - Option for oil-filled or dry-type transformers complying with latest EU (Eco Loss) standards and recommendations
 - A wide range of Low voltage switchgear including MCCB, ACB, Motor Control Centre or combinations fully assembled for on-site delivery
- Energy Power Generation
 - Electric Vehicle Charging
 - Data Centre and Commercial Buildings
 - Water and Waste Water Facilities
 - Airports, Ports and Railway Infrastructure
 - Oil & Gas Processes
 - Pulp & Paper
 - Pharma and Chemicals
 - Food and Beverage Industry
 - Automotive Factories
 - Nuclear Power Plants
 - Renewable energy
 - Solar PV Plants
 - Wind Energy
 - Bio-energy
 - Hydrogen production
 - Sustainable Aviation Fuel
 - Carbon Capture and Storage
 - Energy storage

Mobile Substation Solutions

A perfect solution for temporary power distribution, Powell's mobile substation solutions offer a versatile way to quickly deploy and distribute power. Applicable to a wide range of industrial applications, our mobile substation designs can be used in the utility market for emergency power or in conjunction with mobile turbine power generation systems.

- Portable electrical distribution system designed for easy deployment and set-up
- Reliable power distribution when and where you need it
- Equipment enclosures utilizes Powell PCR interlocking panel construction mounted on a flat-bed trailer
- Reduce Down time: Rapid deployment and commissioning for emergency situations.
- Cost Savings: Eliminate the need for building permanent infrastructure, resulting in reduced capital costs and installation time
- Modularity: The substation components could be easily replaced individually , improving adaptability for varied power requirements
- Temporary solution: Ideal for large events, construction sites and remote locations



Product Applications

- Temporary Emergency Power Distribution
- Temporary Turnaround Power Distribution
- Portable Power Generation
- Mobile Traction Power Substations
- Energy Power Generation
- Ready for quick installation and connection to provide emergency power distribution
- Highway Compatible design
- Trailer title directly transfers to the customer
- Weatherproof equipment front and rear access doors built-in to the trailer design
- May be exempt Building or Energy code re-quirements based on the installation location

Spare & Replacement Parts

The Right Parts, Right on Time

At Powell, we provide an array of spare and replacement parts for maintenance, startup, commissioning, and emergencies. We are here to help you maintain your equipment throughout its entire lifecycle. To minimize downtime and productivity, it is important to keep your processes up and running.

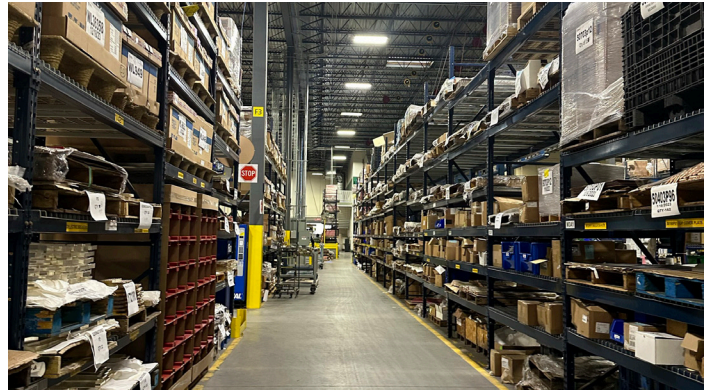
We Are Your Partner

Our team is here to support you from start to finish. We work closely with you to identify equipment that is damaged, aging, or out of date. Based on our assessment, we provide customized solutions guaranteed to reduce risk and help keep your critical processes running. Many of our manufacturing facilities have stock on hand, to help minimize downtime caused by unexpected failures.

Our parts are manufactured with the same specifications as your original equipment regardless of manufacturer, meeting all safety and reliability standards with a valid warranty.

Our team is also capable in providing:

- Bespoke SPIR/SPILs records
- Customised spares agreements
- Specialised packing and bespoke labelling
- Pre-programming of intelligent relays
- Repairs and warranty service



Parts Offerings

We offer parts for a number of electrical solutions, regardless of manufacturer:

- ANSI Metal Clad Switchgear
- ANSI Metal Enclosed Switchgear
- LV & MV Motor Control
- IEC Switchgear
- Bus Duct
- Circuit Breakers
- Switches
- Power Control Rooms



Tailored Upgrade Solutions

As a leading-edge global power control & automation solutions provider, our team of highly skilled engineering professionals have the application expertise and industry knowledge to tackle your specific upgrade requirements, regardless of the original manufacturer. We have a variety of type tested solutions for both IEC & ANSI switchgear, ready to be implemented. You can trust our team to develop a custom solution that will optimize your current equipment to meet your needs. Our vendor-neutral positioning requires our engineers to be cross-trained on both the legacy and current electrical control & automation equipment in the market.

Along with upgrades to your equipment, we have a number of relay solutions that can be incorporated into your existing equipment, such as our Powell Motor Manager 6, the Siemens Simocode Pro V or Pro S, and GE Multilin MM300.

Before you decide to replace your legacy equipment give us a call, we will be available to offer you a site survey to work through an upgrade solution that will help support your operation.

Upgrade Benefits

- Optimizes the usage of your switchgear with intelligent devices
- Extends the life of your equipment
- Efficiently utilizes the latest technology
- Provides you the ability to monitor and collect data accurately, in real time.
- Improves your overall equipment performance and reliability

Case Study: Laurence Scott "Centaur" - Low Voltage Switchgear

11kW DOL Starter

Rated Voltage - 415V AC 3 Phase
IP Rating Internal - IP2X Minimum

Dielectric Properties - IEC 61439-2
Clause 10.6

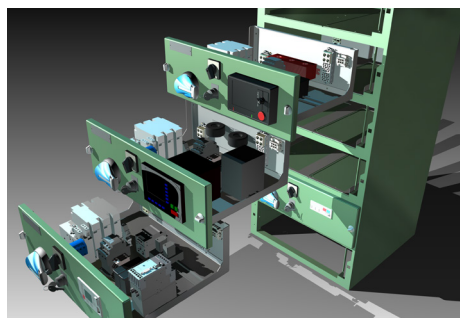
6kV Impulse Withsatnd Voltage to
IEC 64139-2 Clause 10.9.3

2.2kV (Ui 690V) Power Frequency
Withstand to IEC 61439-2 Clause
10.9.2

Thermal performance tested in accordance with IEC 61439-2 Clause 10.10.2.3.7 parts C and D



Before Upgrade



Detailed Design



After Upgrade

Air Circuit Breaker Retrofit Solutions (Teraski AT, AH)

Increase your Low Voltage Switchgear life and performance with a “Safe and Certified” ACB retrofit solution.

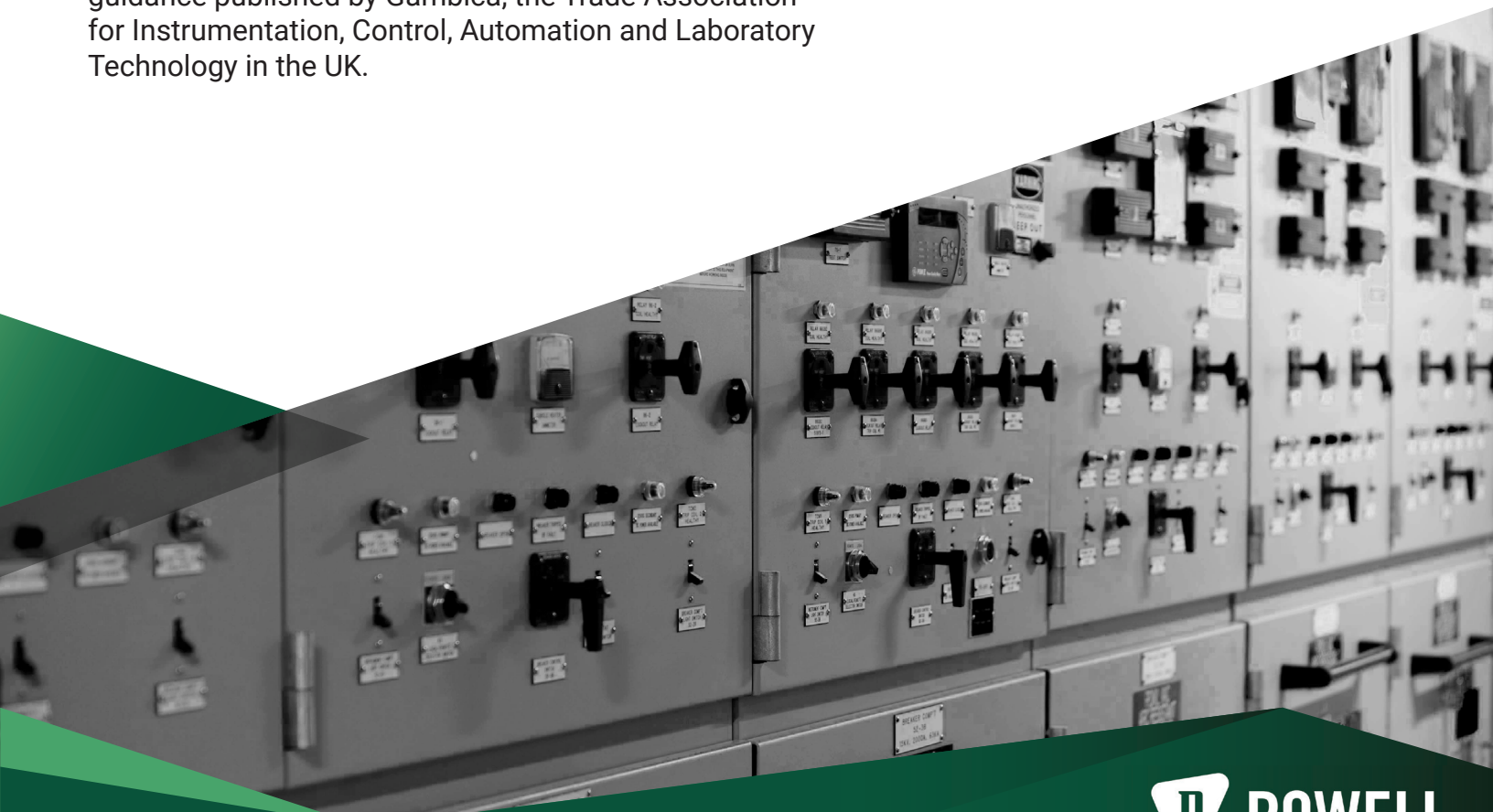
As a leading Global L.V. / M.V. Switchboard and MCC manufacturer and Power Control & Automation solutions provider, our team of highly skilled engineering professionals have the application expertise and industry knowledge to tackle your specific ACB Retrofit requirements. With vast experience on the design and application of Terasaki ACB Retrofit solutions, Powell is committed to extending the viability of customer assets in the field and in the event of a lifecycle extension requirement Powell is ready to offer an ACB Retrofit upgrade programme.

As production or process requirements change and as safety codes (EAWR/PUWER) guidance (Gambica) and standards (BS EN 61439 & BS EN 60947) become more stringent, it is important to ensure coordination and protection within the system.

The Powell (UK) approach to guaranteed safe and certified retrofit Air Circuit Breakers is entirely consistent with the guidance published by Gambica, the Trade Association for Instrumentation, Control, Automation and Laboratory Technology in the UK.

Benefits

- Increased Switchboard lifespan
- Maintains the original switchboard configuration and equipment installed
- Improve safety and reliability to personnel and surrounding equipment
- Low investment costs compared to replacing the complete switchboard in its entirety
- Reduced costs for maintenance and repairs for the foreseeable future
- Seamless integration with the existing distribution systems
- Latest technology in electronic protection – Future proofing
- Customized tailored solutions based on specific customer needs



Remote & Condition Based Monitoring

Thermal Monitoring



G3 Module

Powell's **BriteSpot®** thermal monitoring technology provides continuous thermal monitoring of switchgear components without compromising standard ANSI and IEC switchgear construction practices.

- 24/7 continuous thermal monitoring
- Direct connect installation
- Utilizes optical fiber to monitor temperature



BriteSpot Plus

BriteSpot® Plus is a door-mounted version of our G3 thermal networking module. The panel mount display is considered the at-a-glance version for thermal monitoring providing local visibility.

- Door-mounted display
- Historical logging and trending
- Full networking communications

Equipment Health Monitoring



Circuit Breaker Monitor (CBM®)

Powell's **Circuit Breaker Monitor (CBM®)** device is an easy-to-use, reliable method to monitor the health of your circuit breaker. The CBM device helps you shift to a predictive maintenance approach while improving your asset availability.

- Proactively monitors breaker health
- Simple green-yellow-red alert system
- Reduces unexpected downtime



EcoVisor™

Temperature and contamination are the principal environmental factors associated with dielectric system breakdown. Powell's **EcoVisor** aids in the assurance of safe switchgear operation by monitoring critical environmental elements that could cause equipment failures.

- Temperature monitoring
- Relative humidity monitoring
- Settled dust monitoring

Remote & Condition Based Monitoring

Equipment Health Monitoring



PinPoint™ Partial Discharge Monitor

Powell's **PinPoint™** allows you to shift toward predictive maintenance and improve asset availability by continuously monitoring for partial discharge activity within medium voltage switchgear or bus duct. Our non-contact detection method utilizes compact antennas to measure partial discharge (PD) levels within your energized equipment.

- 24/7 partial discharge detection and monitoring
- Non-contact detector
- PD fault detection and localization

Intelligent Motor Management



Motor Manager 6 (MM6)

Powell's intelligent **Motor Manager 6** features the most advanced microprocessor technology and a truly modular philosophy to provide the most flexible, technically advanced, and cost-effective protection, control, and monitoring functionality available.

- For LV/MV motor applications
- Diagnostic data for preventive maintenance
- Large screen with intuitive menu

Communications Management & Control



CMAC

Our **Communications Management and Control (CMAC®)** computer is a dedicated front-end communications processor for serially connected devices. It provides dual-redundant interfaces between the host control system and the slave devices while supporting connections from other third-party interfaces, such as IED interrogation and configuration software tools.

- Multi-protocol, multi-master information routing interface for the integration of process and electrical control system
- RS232 and RS485 serial ports
- Versa Module Europe (VME) backplane interface
- Enables interfaces to the IMS SCADA, engineering workstation, and power management system

Powell Global Services

Thanks to a team of experienced, highly skilled service technicians and first-class equipment, Powell's testing and commissioning services ensure electrical safety and reliability.

Powell has a world-wide network of service locations and factory trained personnel to meet all of your service needs.

- On-site Installation, assembly, commissioning and testing of MV, LV switchgear and automation systems
- Switchgear and systems modifications, upgrades and life extensions
- Planned preventive maintenance, hot spares, and service level agreements
- 24/7 emergency telephone assistance and tailored emergency call out service agreements
- Specialist support includes on-site partial discharge analysis, 3rd party equipment modification, protection schemes verification and laboratory analysis
- LV Motor Manager relay training courses
- Protective relay, commissioning and testing services
- LV and MV Switchgear Operation and Maintenance



Service Offerings:

- Life-Extension Services
- Equipment and Breaker Repair
- Retrofit/Retrofill Designs
- Equipment and Breaker Upgrades
- Equipment Replacement
- Rebuild & Maintenance Services
- Equipment & Site Testing
- Troubleshooting
- Warranty Startup Services
- Installation and Commissioning

Other Powell Locations



Corporate Headquarters – Electrical Division Houston

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Phone: +1 713.944.6900 | Fax: +1 713.947.4453

United States

Electrical Division Airport / Global Services /
Automation Division - Houston, TX
Electrical Division Houston Fabrication
Yard - Houston, TX
Electrical Division North Canton, OH
Electrical Division Northlake, IL

Canada

Powell Canada Inc. - Acheson, Alberta

Middle East

Powell (Middle East) B.V. Bahrain - Al Seef, Bahrain

Asia

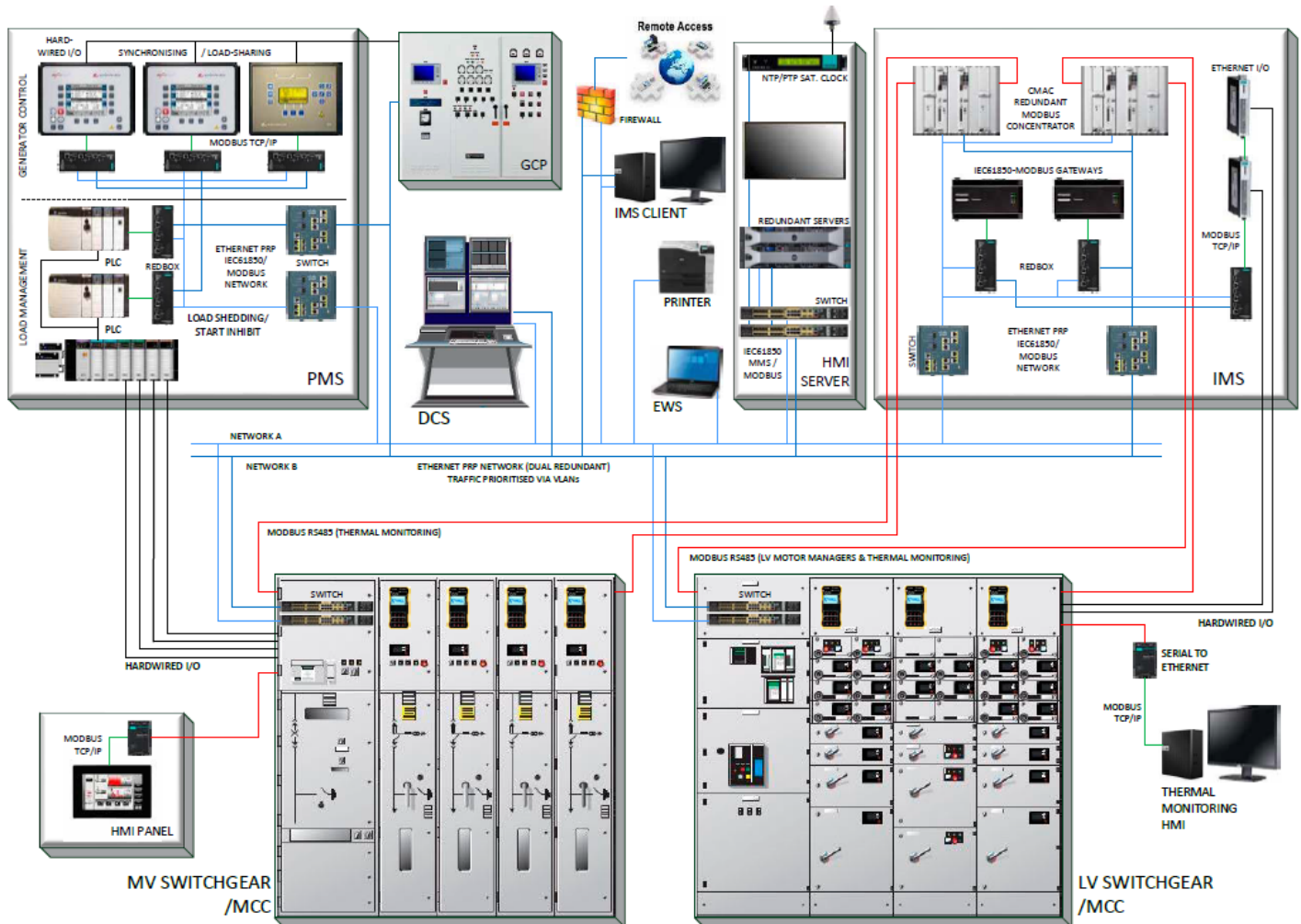
Powell Industries Asia Pte. Ltd. - Asia, Singapore

Custom Engineering Solution


With an enduring commitment to the principle of identifying, anticipating and satisfying the requirements of our customers, and unsurpassed strength in engineering design, manufacture and multi-discipline project management, Powell is the natural choice of customers worldwide as providers of associated ancillary equipment to either house, or interface with, the core switchgear; where there is a requirement for Packaged Modular Substations, Transformers or UPS.

The Powell advantage is our ability, when given project management responsibility for the electrical system package, to provide best of breed technical and commercial solutions to fit specific requirements, at the same time reducing the client's engineering and expediting time.

At the time of contract award, a dedicated, experienced, project manager is appointed as the single point of contact, with full responsibility for all technical and commercial interfaces with the customer, colleagues and throughout the supply chain.



Low Voltage IEC Switchgear and Motor Control Centres



Custom Engineered Solutions



Powell's Overall Product Overview

- ANSI MV and LV Switchgear, Motor Control
 - Underground Distribution Switches
- IEC MV and LV Controlgear
- DC Switchgear and Rectifiers
- Iso-Phase, Non-Segregated Phase and Cable Bus Systems
 - Segregated Phase Bus and DC Bus
- Power Control Rooms, E-Houses, Offshore Modules
- Digital Solutions and Power Automation Services
- Product Life Extensions, Maintenance and Support



Core Competencies

Meeting electrical energy distribution and control needs with multifaceted resources in engineering, project management, manufacturing, field services, technical support, and product development.



Markets & Industries

- | | | |
|---------------------|------------------------------|-------------------|
| • Data Centers | • Pulp & Paper | • LNG Facilities |
| • Utilities | • Petrochemical Plants | • Mining & Metals |
| • Renewables | • EV Charging Infrastructure | • Oil & Gas |
| • Commuter Railways | | |

