



YOUR STRATEGIC PARTNER
FOR THE ENERGY & WATER SECTOR

Contents

About Us

Our Values and Commitment

A. Our Products

A.1 Electrical Compact Substations

A.1.1 Packaged Substation Buildings

A.1.2 Mobile Substations

A.1.3 Kiosk Substations

A.1.4 Skid Mounted Substations

A.2 Medium Voltage Switchgear

A.2.1 Fixed Pattern Indoor Metal- Clad Vacuum Switchgear - Eclipse

A.2.2 Withdrawable Indoor Metal Enclosed Type Switchgear

A.2.3 Withdrawable Indoor Metal Clad Switchgear

A.2.4 Reclosers & Sectionalisers-GVR- OutdoorUnits

A.2.5 Horizon Compact

A.2.6 Horizon

A.2.7 Fault Thrower - Single phase to earth fault making switch

A.3 DC Chargers and UPS systems

A.4 Power Transformers

A.5 Distribution Transformers

A.6 Low Voltage Equipment

A.7 Cables and Cable Accessories

A.7.1 Cables and Conductors

A.7.2 Cable Terminations and Cable Jointing Systems

A.8 Other Products

B. After Market Spares and Services

C. Our Clients

TSI Offices and Associated Offices



■ Our Head Office: United Arab Emirates

● Our Offices: Iraq, Qatar, Libya, Ghana, UK, India

■ Our Market: Middle East , North Africa and India (MENAI) Region

About Us

Technical Solutions to Industry (TSI) was established over a decade ago in the United Kingdom with offices across the Middle East, North Africa & India (MENA) Region.

TSI is a specialist supplier of electrical & mechanical equipment, packages and complete solution providers to the energy and water sector; with a network of local offices serving the Oil & Gas, Water, Waste Water and the Electrical Generation, Transmission & Distribution sectors.

TSI is an ISO 9001, OHSAS 18001 certified company and regards the promotion of health & safety measures as a mutual objective of management and employees at all levels.

www.tsilimited.com



Our Values and Commitment

We are committed to deliver and service our client with unrivaled quality products and technical solutions competitively, efficiently, exceeding client expectation time and time again.

A. Our Products

A.1 Electrical Compact Substations

TSI is a specialist supplier of Electrical Compact Substation Units, providing a complete line of packaged substations, mobile substations, kiosk substations and skid mounted substations, meeting the relevant international standards such as IEC/ANSI and other applicable standards, custom built to suit client requirements and applications.

These compact substations are designed to withstand the environmental conditions and operational needs of the MENAI Region.

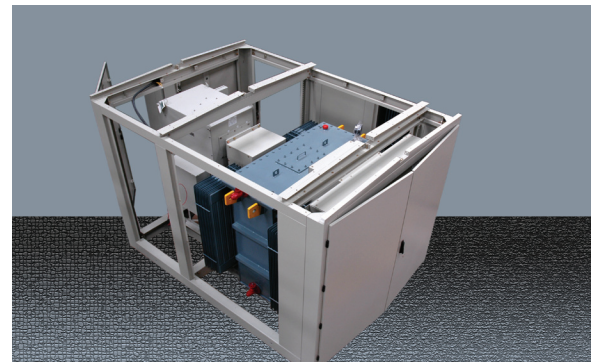


Benefits

- Cost effective
- Short delivery
- Space saving
- Minimise installation time required on site
- Rapid startup and commissioning
- Mobility

Types

1. Packaged Substation Buildings
2. Mobile Substations
3. Kiosk Substations
4. Skid Mounted Substations



A.1.1 Packaged Substation Buildings

TSI offers a variety of packaged substations meeting client requirements by using purpose built steel housing, sandwich panel housing or a standard container.

Housings

1. Steel housing
2. Pre fabricated type modular - sandwich panels housing
3. Blast / Proof resistant housing

Features

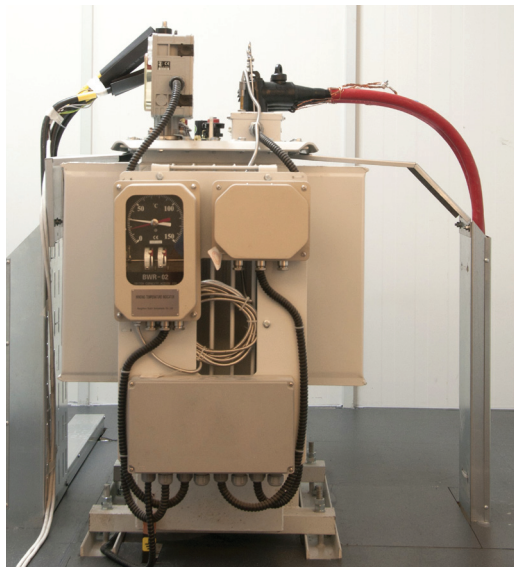
- Can accommodate all the electrical equipment to match client specifications including HVAC systems, fire detection, firefighting systems and lighting control systems
- Internal housing layout is designed to suit the application
- Can accommodate medium voltages up to 36kV, transformers and low voltage switchgear, as per client needs
- For rated voltages beyond 36kV, a skid mounted transformer can be installed adjacent to the packaged substation
- Dimensions are designed in accordance to end user's requirements
- Incoming & outgoing cable connectors suitable for different types of switchgear
- Heat insulated by applying relevant insulation materials, used in substation's ceiling and walls
- Protection degree up to IP 56
- Equipped with doors and locking systems
- Metal clad, metal enclosed air insulated & gas insulated switchgear can be accommodated
- Oil type or dry type transformers can be used
- SCADA systems
- Measuring and monitoring systems



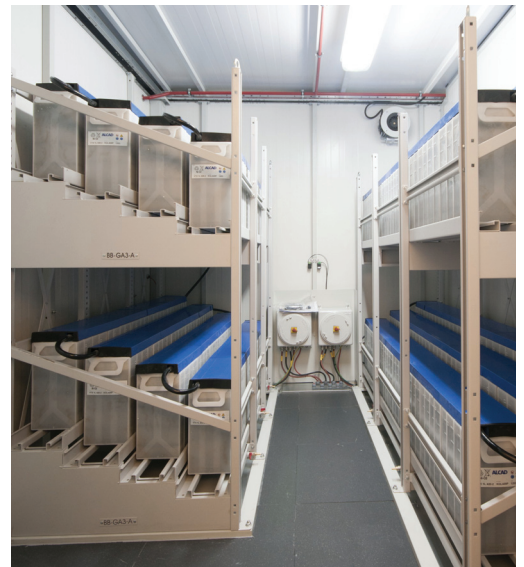
Packaged Substation Building



MV Room



Transformer Room



Battery Room



Control Room with LV & UPS



Design Criteria

- Altitude
- Ambient temperature
- Site and climatic conditions
- Environmental pollution
- Solar radiations
- Seismic requirements
- Design life
- Blast proof requirements
- Transportation
- Regulatory and statutory requirements

Standards

- IEC 62271-202 : Prefabricated transformer centers
- IEC 60076 : Transformers
- IEC 62271-200 : MV Switchgear
- IEC 60529 : IP protection classes
- IEC 60694 : Common properties in MV Switchgear
- IEC 60721-1 : Outer environment Classification and other applicable standards

Advantages

- Suitable for any type of medium voltage, low voltage switchgear and panels
- Can be used in special project applications
- HVAC pressurization solutions
- Safety solutions with fire & gas detection and firefighting systems
- Easy Transport and start-up facility
- Modular design
- Easy and Safe operation
- Long operational life
- Space saving

A.1.2 Mobile Substations

TSI offers a variety of Mobile Substations, which can be fully integrated into existing networks and reused afterwards at other locations.

Our highly experienced engineers are capable of analyzing the necessary requirements and site conditions, to design & manufacture the most suitable Mobile Substation according to client requirement.

Main Application Areas

- Emergency services
- New services
- Temporary services
- Substitute for AIS/GIS substations



Types

Our Mobile Substations are built in two main types, depending on the voltage level requirements, designed according to international standards.

1. Medium Voltage/Low Voltage Mobile Substations

- MV/LV Mobile Substations are used in power generation or distribution at medium and low voltage levels
- Manufactured to withstand primary voltages up to 36 kV with a power up to 31.5 MVA

2. High Voltage/Medium Voltage Mobile Substations

- HV/MV Mobile Substations are used in high transmission lines and medium voltage distribution network
- Manufactured to primary voltages up to 245 kV and secondary voltages up to 52 kV





Major Components

- Medium Voltage Switchgear
- Control and Protection Panels
- HV Switching Equipment and HV Disconnector Switches
- Current and Voltage Transformers
- Power Transformers
- AC and DC Distribution Panels
- Battery and Charger Auxiliary Transformers
- Cable Drum
- Sheets Steel Kiosk
- Trailer



A.1.3 Kiosk Substations

Our Kiosk substations are designed up to 36kV and up to and including 3150kVA, using different type of housings depending on client's requirements

Housings

1. Metallic Housing Units
2. GRP Housing
3. Concrete Housing

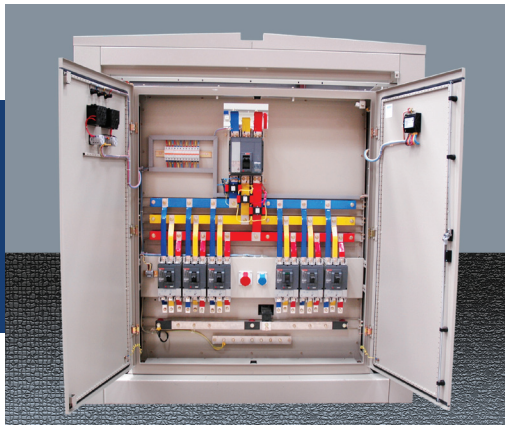


Features

- Outdoor application designed for the MENA environment and climatic conditions
- Designed to international standards such as IEC/ANSI
- Functional segregated compartments
- LV contents are designed to meet client requirements
- Powder coated finish
- Aluzinc sheet steel housing with 2 mm thickness of mild steel for structural members bolt on assembly which creates the option to ship in kit form for local assembly
- Double skin roof to minimize solar heating radiation
- Double leaf doors for MV and LV compartments
- The base structure is designed to carry the complete load

A.1.4 Skid Mounted Substations

Substations on a common skid with different combinations are designed and supplied according to client needs.



A.2 Medium Voltage Switchgear

TSI is a leading supplier of Medium Voltage switchgear suitable for indoor & outdoor applications, fixed & withdrawable types ranging up to 36kV.

A.2.1 Fixed Pattern Indoor Metal- Clad Vacuum Switchgear - Eclipse

A market leader in 12kV fixed pattern Indoor Metal-Clad Vacuum Switchgear type, is the Eclipse type, designed and manufactured by Hawker Siddeley Switchgear Ltd. & HS Switchgear LLC , bringing together one of the most advanced operating mechanisms available on the market today with vacuum interruption and the simplicity of air insulation in a compact, fixed pattern design.

The Eclipse is also available as a pre-engineered solution in ratings up to 25kA, 2000A. Alternatively, it can be fully engineered to meet exact customer's needs.



Features

- Superior, proven Fit & Forget technology with minimal maintenance
- Endurance Tested to 10,000 operations
- Magnetic Actuator powered from substation battery
- Trip circuit supervision, self-diagnostics & position indication contacts included as standard.
- The fixed pattern design had the simplicity of air insulation and, with the low parts count (the total parts count has been reduced by a factor of x20 and the number of moving parts by a factor of x50), is more compact (500mm wide) than equivalent rated GIS equipment
- Environmentally friendly vacuum interrupters
- Internal Arc containment
- Superior operator safety with a fully interlocked design, animated front panel mimic and a front access cable test facility, ensuring secure but simple operation
- Voltage Presence Indication System (VPIS) is fitted as standard to all panels (circuit)
- Reliable control – supplied with an integral control module, providing indication, trip circuit supervision and self-diagnostics
- Customers choice of protection
- Unique front access cable testing options



A.2.2 Withdrawable Indoor Metal Enclosed Type Switchgear

Our metal enclosed switchgear are designed, manufactured and assembled in ratings up to 36kV with Fault levels up to 50 kA, meeting the relevant international standards such as IEC 62271-200, tailored design and construction to suit client requirements.

Features

- Type-tested using globally approved components inside the panels
- Draw-out type
- Service continuity As per IEC Standards
- Inter Arc classifications
- High operating safety owing to complete mechanical interlocking systems. All electrical and mechanical operating procedures take place when the enclosure is closed
- These type of switchgear can be manufactured as a single bus system or as a duplex system
- Comes with optional motor-operated withdrawable units and earthing switches
- Grounded metal separation between compartments
- Modular design which allows extensibility
- SCADA connection systems
- Low maintenance cost
- After sales service and spare parts availability
- Compact panels for contractor feeders (500mm wide)



A.2.3 Withdrawable Indoor Metal Clad Switchgear

Our Withdrawable Metal Clad Switchgear are available in ratings up to 36kV, meeting the relevant international standards such as IEC 62271-200, tailored design and construction to suit client requirements.

Features

- Type-tested using globally approved components inside the panels
- Air Insulated
- Service continuity as per IEC Standards
- Inter Arc classifications
- High operating safety owing to complete mechanical interlocking systems
- All electrical and mechanical operating procedures take place when the enclosure is closed
- Can be manufactured as a single bus system or as a double busbar system
- Comes with optional motor-operated withdrawable units and earthing switches
- Grounded metal separation between compartments
- Modular design which allows extensibility
- SCADA connection systems
- Long operational life – 10,000 switching
- Low maintenance cost
- After sales service and spare parts availability
- Compact panels for Contractor feeders (500mm wide)



A.2.4 Reclosers & Sectionalisers - GVR - Outdoor Units

We supply world renowned GVR Auto reclosers , providing 'intelligent control' and protection on power distribution networks, whilst offering a lifetime of trouble-free service with ratings up to 38kV, 630A.

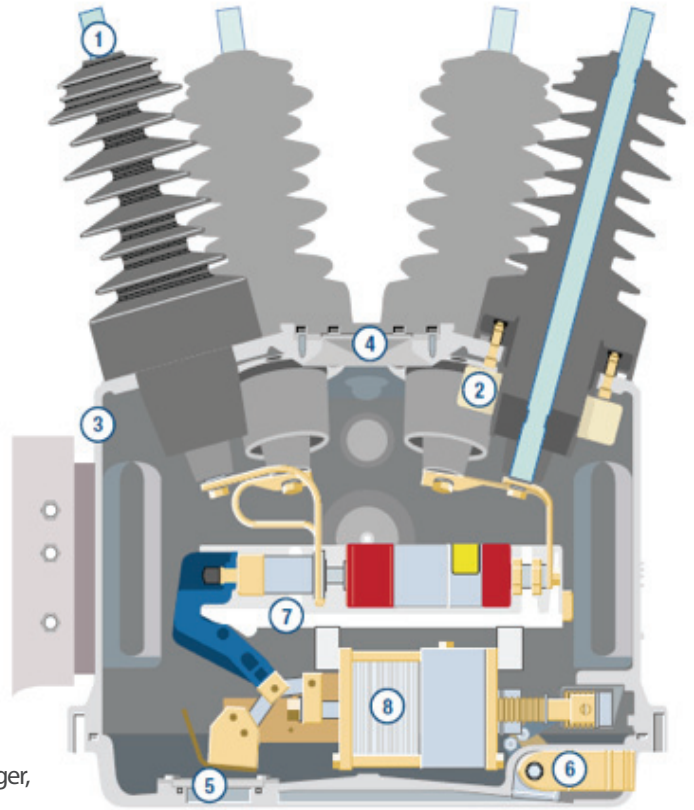
The first in a range of equipment utilizing one of the most advanced operating mechanism available on the market today – Hawker Siddeley Switchgear Ltd's Fit and Forget Technology.

Features

- A new, patented, single coil magnetic actuator mechanism which allows the GVR to operate independently of the HV supply and to be tested in an ordinary workshop; by extensive use of insulated mouldings, in particular the bushings, the total number of parts has been reduced by a factor of x 20 and the number of moving parts by x 50
- Superior, proven Fit & Forget technology with minimal maintenance
- The Hawker Siddeley Switchgear Ltd patented, single coil magnetic actuator mechanism allows the GVR to operate independently of the MV supply
- Environmentally friendly vacuum interruption produces no by-products
- The lightweight, corrosion resistant, aluminum tank makes the GVR easier to transport and install
- The EPDM or silicone bushings are tested for tracking and erosion to IEC 61109 and are resistant to damage from vandalism or mishandling
- Endurance tested to 10,000 operations
- Pole mounted or substation mounted, the GVR can be integrated into the most advanced distribution automation schemes, or can operate as a stand-alone recloser
- By using the advanced control and protection functions of the Panacea, the GVR can also be used in applications where reclosers have not traditionally been used such as closed rings and under frequency load shedding schemes
- The 3-in-1 Recloser – the GVR can be configured to function as a Switch, Sectionaliser or Recloser by using one of the specially pre-engineered protection and control cubicles
- The GVR automatic recloser is now available as a tank only option for those customers who wish to connect their own protection and control cubicles. Alternatively, customers looking for a ground-mounted solution can select our epoxy separable bushings for cable connected networks

GVR Engineering Detail

- ① Single Piece, aluminium or copper-cored EPDM or silicon rubber bushings, with grooves to take optional wildlife gaurds/MV boots. Epoxy separable bushings also available
- ② Current transformers are mounted within the tank's controlled environment, while optional capacitive voltage dividers provide voltage signals for use by the Panacea or an RTU
- ③ Aluminium housing with lightweight, moulded baseplate, secured by stainless steel bolts and incorporating rubber 'O' ring seals
- ④ Pressure-relief disc, to comply with IEC 60296, offering the highest levels of safety
- ⑤ Mechanical ON/OFF position indication visible through clear viewing window from ground level
- ⑥ Hook stick-operated manual trip and lockout control
- ⑦ A single moulding supports the three phase vacuum interrupter assembly, magnetic actuator mechanism and one-piece drive beam
- ⑧ The patented, single coil magnetic actuator is based on a solenoid plunger, held in the tripped or closed position by a permanent magnet



Applications

The GVR has a wide range of applications:

- Pole mounted applications
- Substation applications
- Wind Farm applications
- Switch applications (Auto-reclosing)
- Sectionaliser applications

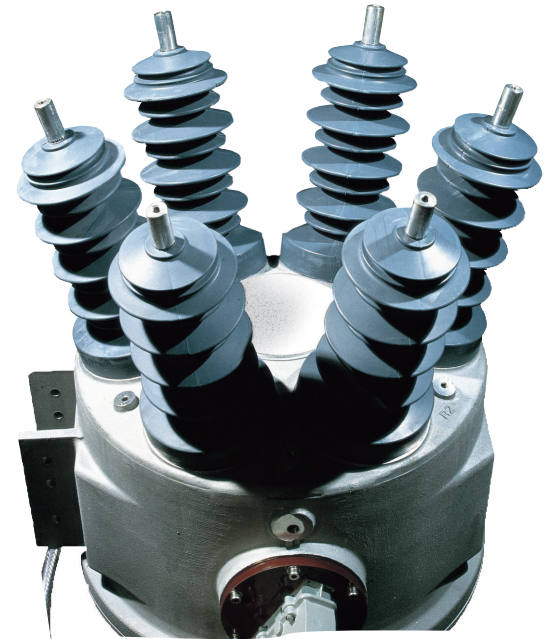
Protection Options Available

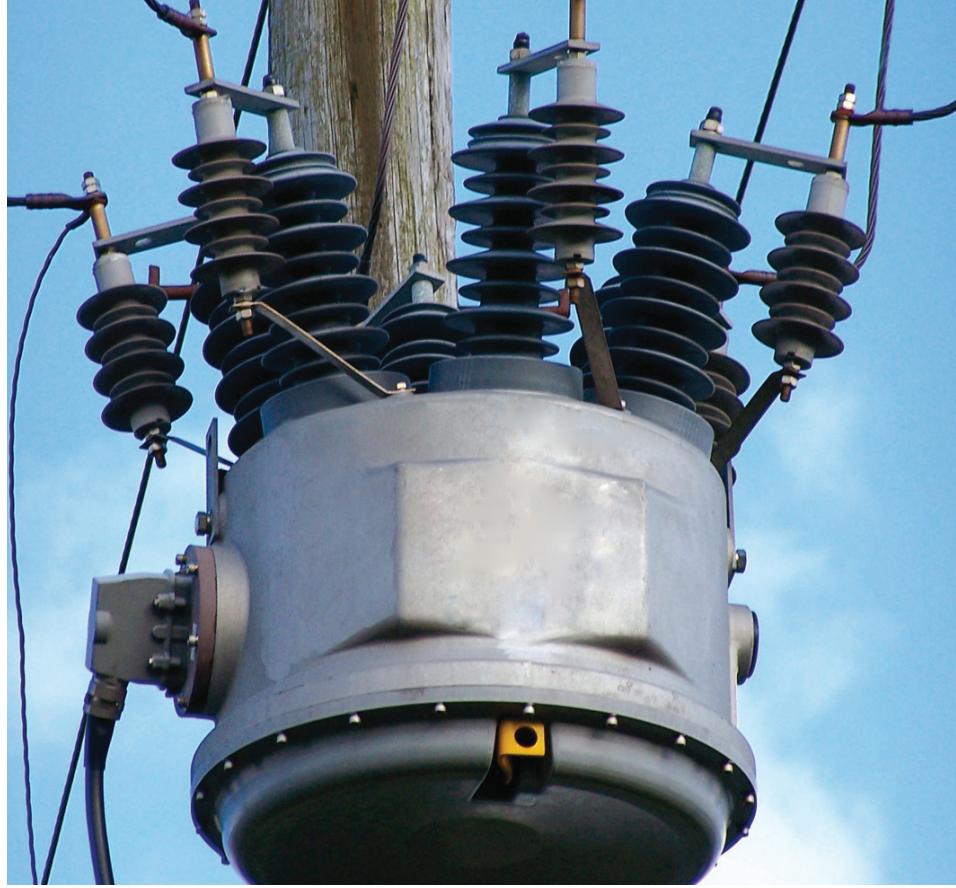
1. Polarr: The Polarr is the standard relay package for the GVR, offering full auto-reclose protection and control functionality.

The low power, microprocessor architecture of the Polarr is unique to the power industry. Its design has been perfected over several years and offers the user significant benefits:

- The long life lithium batteries eliminate the need for an auxiliary supply
- Offers several advanced auto-reclosing functions in a comprehensive but cost effective package
- Housed in an IP56 sealed control box, the Polarr is protected against the harshest of environments and kept condensation-free in an even internal temperature

2. Panacea: Based on the SEL 351R Relay, the Panacea offers the optimum levels of advanced control and protection for distribution networks. Functions include directional protection, voltage synchronisation, load encroachment logic and under frequency load shedding.



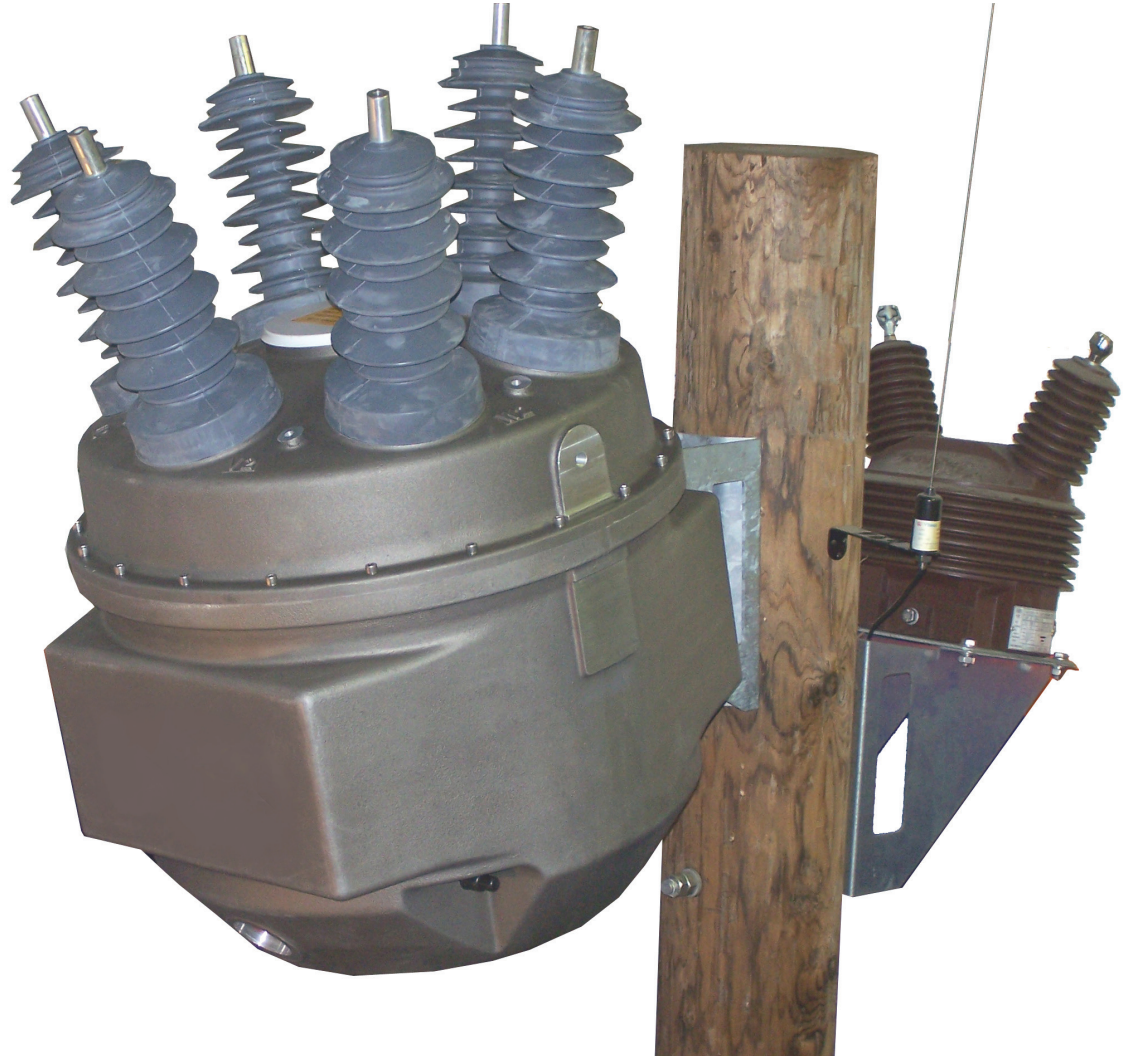


A.2.5 Horizon Compact

Designed for a 15kV or 27kV application, the Horizon Compact can be used with other products from Hawker Siddeley Switchgear Ltd to provide cost effective and compact substations or breathe new life into existing substations by replacing old and obsolete equipment.

Features

- Superior, proven Fit & Forget technology with minimal maintenance
- Uses a magnetic actuator driven vacuum circuit breaker without the need for electronic control
- EPDM Bushings
- Corrosion resistant, light weight Aluminium tank and cover
- Dead tank construction suitable for live or dead tank applications
- Internal Arc certified
- Cubicle with space for ancillary equipment and option for integrated control and customer specified protection relay
- Substation frame, stand or pole-mounted, the Horizon Compact can be integrated into the most advanced distribution schemes or operate as a stand alone breaker
- Variety of mounting options provide compact solution where space is at premium





A.2.6 Horizon

One of our Fit & Forget family of products, featuring one of the most advanced operating mechanism available on the market today – the award winning magnetic actuator technology, the Horizon fills the need for outdoor, ground-mounted or pole-mounted circuit breakers.

Designed for a 15kV or 38kV application, the Horizon can be used with other products from Hawker Siddeley Switchgear Ltd to provide cost – effective and compact substations or breathe new life into existing substations by replacing old and obsolete equipment.

Features

- Superior, proven Fit & Forget technology with minimal maintenance
- Vacuum interruption in an SF6 filled, controlled environment (1.5 bar absolute)
- Dead tank construction suitable for both live or dead tank applications
- Internal arc containment
- Generous CT accommodation
- The lightweight aluminium tank makes the Horizon easier to transport and install
- The silicone rubber bushings are resistant to damage from vandalism or mishandling and have an extended creepage of 1500mm
- Cubicle with space for ancillary equipment an option for integrated control and protection relay
- Optional Adjustable Legs version





A.2.7 Fault Thrower – Single phase to earth fault making switch

The fault thrower provides a means of deliberately introducing a phase to earth fault in order to ensure remote end tripping of a circuit breaker, assuming pilot wires are not available for inter-tripping.

The need to operate the remote circuit breaker can be due to equipment faults, such as thermal protection or low level fault currents that cannot be detected by the remote protection.

A typical application is with transformer feeders to enable the remote feeder breaker to respond to the transformer local fault detecting relays, such as Buchholz protection, local earth fault protection, etc.

The unit is based on the design of the Horizon circuit breaker and uses a single phase vacuum interrupter driven by a magnetic actuator for fault initiation. The switch is housed in an aluminium tank, dielectric insulation is provided by SF6 gas. Connection to the system is achieved by either a separable connector or open terminal bushing. Manual release of the switch is available within the control cubicle housed under the tank.

The fault is 'thrown' through the aluminium tank, two earth points are provided for safely earthing of the equipment steel work and to provide a fault path.



Fault Thrower

A.3 DC Chargers and UPS systems

TSI Offers a wide range of range of standard or custom DC products which include Battery Chargers, Distribution, UPS, Emergency lighting and Batteries, all of which are supported as required during installation, commissioning and maintenance.

Our DC chargers have been used extensively on major projects for the last 20 years and has proved to be both extremely reliable and very rugged in hostile environments.

They can be customized to suit a customer's particular specification.

Features

- Digital metering
- Modular alarm system
- Micro processor computerised alarm and cells monitor modules

Products Include

- Single & Three phase battery chargers
- Switch Tripping and closing chargers
- Switchmode 19" rack systems
- Portable Chargers
- PADS approved chargers



A.4 Power Transformers

TSI supplies a wide range of Power Transformers which are globally renowned for its high quality, innovation and service.

These power transformers can be supplied with a highest system voltage up to 400kV.

These power transformers are designed , manufactured according to British, European and International Standards using first class and ISO Certified testing facilities.



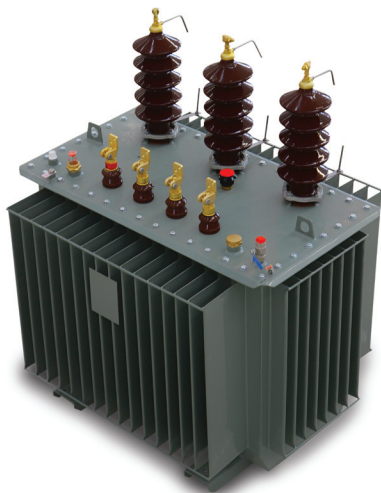
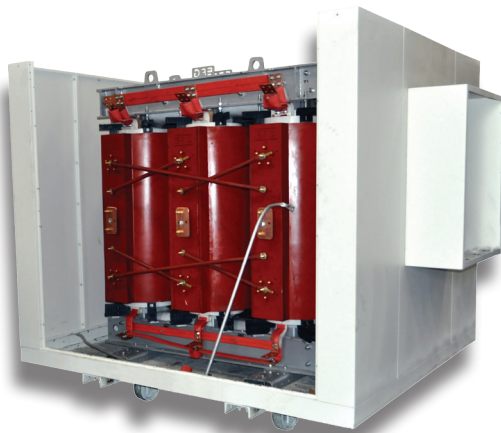
A.5 Distribution Transformers

TSI supplies wide range of distribution transformers with voltages up to 36kV, designed and manufactured in ISO certified facilities and can be customized to suit client's requirements.

Our types of distribution transformers

- PAD Mounted Transformers
- Pole Mounted Transformers
- Ground Mounted Distribution transformers
- Flame Proof Transformers
- Special Transformers

Both oil filled and cast resin type transformers can be supplied .



A.6 Low Voltage Equipment

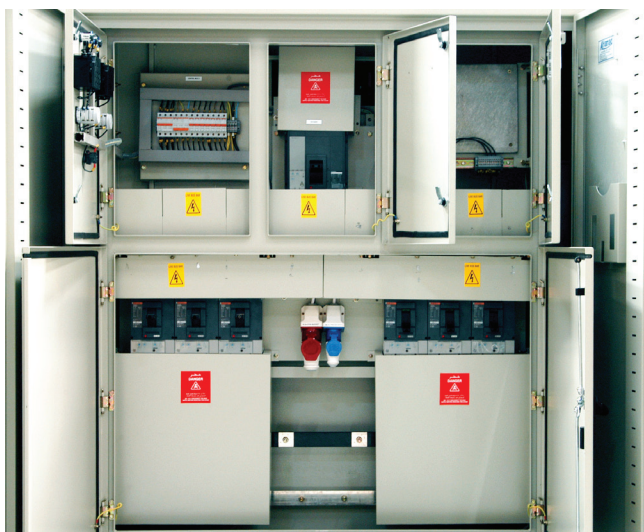
TSI is a leading supplier for Low Voltage equipment, Motor Control Centers (MCCs) and Automatic Transfer switch panels, which are widely used in the low voltage electrical distribution applications.

We offer design-tested and type-tested switchgear system with utmost personal and operational safety.

Panels are equipped with electrical mains, feeding into numerous circuits via fuses or circuit breakers which can be equipped with residual current devices, for over current protection and tailored made to suit requirements.

Features

- Draw-out type or Fix type switchgear system with high-rated currents and short-circuit currents for safe power distribution in industrial plants, power plants, cogeneration plants, refineries, chemical works, water management, cement industry, glass production, etc
- Easy to maintain
- Equipped with main switch
- Branch Circuit breakers or fuses based on client's requirements
- Over-current protection
- Can be equipped with an Automatic Transfer Scheme



A.7 Cables and Cable Accessories

A.7.1 Cables and Conductors

TSI Supplies a wide range of High Voltage , Medium and Low voltage Cables and conductors such as :

- Insulated wires and Power Cables
- Afumex LSOH Cables
- Airbag Cables
- Protodur and Protothen X Insulated Cables
- Ship Cables
- Rubber (EPR) Insulated Cables
- Cable Accessories
- Elevator Cables
- Aluminium Conductors
- Aluminium Conductors Steel
- Reinforced ACSR
- Aluminium Alloy Conductors AAAC



A.7.2 Cable Terminations and Cable Jointing Systems

TSI is also a lead supplier of Cable Jointing and cable terminations systems for Power Cables upto 66 kV, Polymeric Insulators upto 400 kV, Elbow Connectors up to 24kV, manufactured with advanced engineering concepts and developed in compliance with global quality standards such as IS, VDE and IEC.



A.8 Other Products

TSI can serve you with many more products and equipment.

Distribution and Transmission

- DC Switchgear for light railway systems
- Surge and Lightning Arrestors
- Insulators and end fittings
- Fittings for OPGW , OPPC and ADSS as well as for high temperature conductors
- Joints and terminations for underground distribution systems
- String fittings sets
- Medium voltage dropout fuses
- High voltage and medium voltage shunt reactors
- Wave Traps
- Static Compensators
- Conductor Accessories



Water and Waste Water Treatment Plants

- Pumps
- Pipes and fittings
- Chlorination equipment
- Chemical dosing equipment
- Screens
- Electrical and control systems

Oil & Gas Products

- Pipes flanges and fittings
- Valves
- Cathodic protection rectifiers and transformers
- Instrumentations
- Dual Plate Check Valves
- Drilling chemicals
- Engineering
- Separators

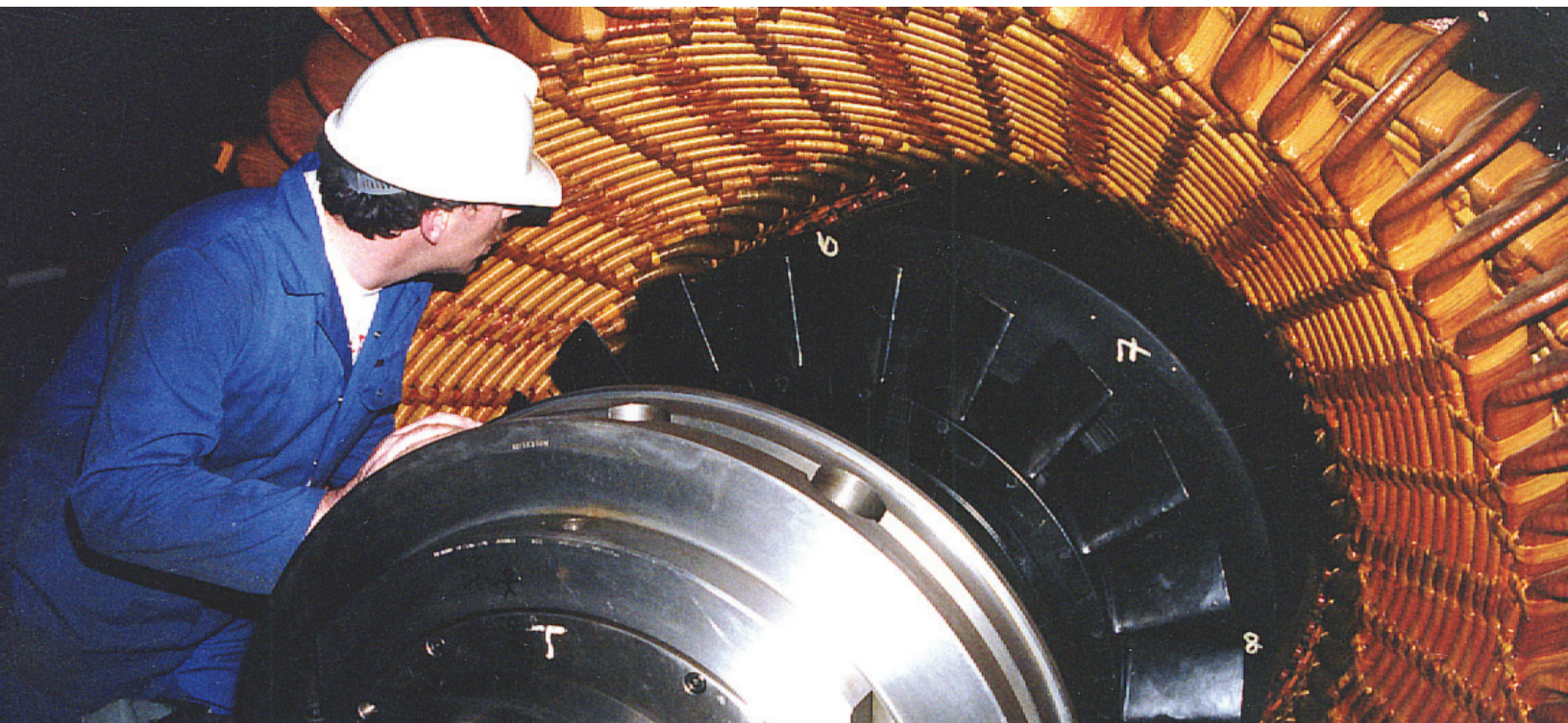




B. After Market Spares and Services

TSI is an exclusive distributor in the MENA region for aftermarket spares and services for many renowned manufacturers such as Brush Electrical Machines*, Hawker Siddeley Switchgear, South Wales Switchgear, Brush Switchgear and Natus GmbH.

TSI extends its support for installation, commissioning, training retrofitting for all products and equipment supplied.



* Exclusive distributor for Brush Electrical Machines in Iraq

C. Our Clients



And many more...

YOUR STRATEGIC PARTNER
FOR THE ENERGY & WATER SECTOR



TSI/006/20/R0

Technical Solutions to Industry FZE
P.O.Box:56525 Dubai - UAE
Tel:+971 (0)4 8857151
Fax:+971 (0)4 8857152
E-mail: info@tsilimited.com
www.tsilimited.com