

Modular substations, ehouses and kiosks

Catalogue

2027

TGOOD

tgood.com





Modular substations, ehouses and kiosks

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TGOOD introduction

TGOOD
Energy, Fast!

Founded by a forward-thinking team of electrical engineers TGOOD Global is a world leader in substations, including ehouses, electrical kiosks, switchgear and other industrial power equipment. Our slogan is Energy, Fast! for a reason. We delight our customers with much faster delivery and better build quality than our competitors. You do not have to choose between speed and reliability!

We measure switchroom delivery and installation time in weeks, not months

Faster assembly
Many substation solutions ready to depart the factory in as little as six weeks.

Faster construction
Minimised civil works on electrical enclosures vastly reduces building effort.

Faster installation
Electrical kiosks and modular substations considerably reduce onsite construction times.

Faster commissioning
Rigorous factory testing of power equipment reduces commissioning times by an average of 50%.

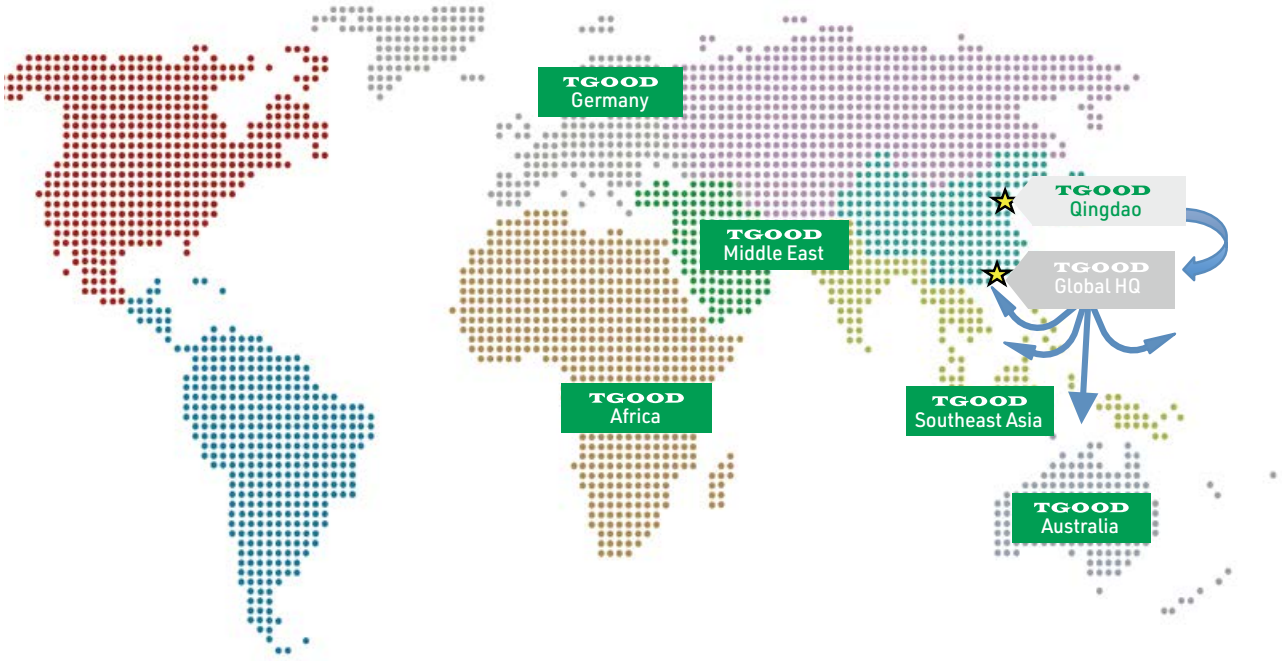
Find out more about the TGOOD Global group on

www.tgood.com/about-tgood



TGOOD introduction

Companies in the TGOOD Global group



TGOOD Global has its headquarters in Hong Kong and our group includes companies in Africa, Australia, Europe, the Middle East and South East Asia. We offer the best of both worlds–local service and compliance combined with the scale and speed of large factories.



Features

TGOOD have a proven modular design philosophy that has been standardised to achieve exceptional project outcomes that are focused on meeting specifications, commercial competitiveness and lightning fast lead times. Your local TGOOD Global team can also facilitate specific parameters for your modular substation, ehouse or kiosk.















Modular substation design

Typical specifications

- Switchgear cabinets are welded to the cabin floor for structural integrity.
- Wall construction: 2.5 mm cold-rolled steel plate.
- Roof panel construction: 2 mm cold-rolled steel plate.
- Mechanical impact protection rating: 1K10.
- Seismic intensity rating: horizontal and vertical acceleration of 0.5 g.

Dual layer panels

- Insulated panels are at least 50 mm thick to effectively maintain internal temperatures in all seasons and environmental conditions.

Thermal insulation

- Foam insulation is injected between panels to prevent heat conduction and eliminate condensation.

Sealed seams

- Rubber seals around doors are IP33D rated, and panel seams are not rated less than IP54.

Fire rating

- Optional three-hour fire rated designs available.

Windproof door

- Windproof door remains open at an angle of 90° to ensure personnel safety in high wind areas.

Anti-corrosion technology

- Layered anti-corrosion technology ensures thirty years of corrosion resistance before refinishing is required, and an overall lifespan of 30 years.
- Coating and spraying production lines developed by the Nordson company in the United States.
- Hammertone finish incorporates an anti-UV coating that provides at least a decade of fade and oxidation resistance.

Fully integrated prefabricated substation and modular substation system

- Modular design for different functions such as housings for HV, MV, LV & control, transformer and compensation.
- Integration of multi-systems including air conditioning, ventilation, sealing, lighting, earthing, communications system and the alarm network.

Best-in-class lead time measured in weeks, not months

- Expertise of modular substation design
- Advanced and automatic production line
- Efficiency as prefabricated substation industrial base

Flexible design

- Layout design according to land available to customers
- Customised design, optional
- A range of solutions are available

Overleaf: Modular substations for the Fleurhof residential project in South Africa

Presentation





Features

Exceptional weatherproofing

- Constant temperature and humidity, with an internal air pressure greater than outside to avoid contamination (optional).
- Sealed design provides outstanding performance in harsh environments like: high altitude; heavy pollution; coastal, remote, outback, desert and arctic sites.

High voltage gas insulated switchgear available

- Mature technology and abundant references
- Compact to save space and reduce transport costs
- Flexible to meet customer needs

Substation expansions

- Capacity within existing footprint in crowded cities or congested industrial zones
- Compact and flexible solution
- Low audible noise (<45 dB) and electromagnetic shielding make the solution wonderfully quiet for densely populated urban areas

Standard design complies with international building and specific regional codes

- TGOOD's steel building system for prefabricated substations and ehouses is certified according to CSA A660-10 and EN 1090-1:2009+A1:2011.
- Our key switchgear, such as HV GIS, MV GIS, and power AIS, are type tested in STL laboratories.



Benefits to customers





Impulse Generator 1800 kV



Temperature rise test facility up to 7000 A

Fast

- Some of our substations can leave the factory in as little as six weeks after design approval.
- Rigorous factory testing reduces commissioning times by an average of 50%.
- For many applications, cast-in-place concrete is not needed.
- Construction time is reduced to between 3 and 6 months compared to traditional (bricks and mortar) substations.

Quality and safety

- Innovative designs protected by over 200 patents on modular substations, substation products, and TGOOD's production process
- Design life up to 30 years
- High quality and reliable components manufactured in ISO 9001 certified facilities
- High quality design of modular substation enclosures are safe to touch, and provide protection against vandalism

Benefits

- Compact substation modules reduce shipping and transportation costs
- There are over 7000 prefabricated substations produced annually at TGOOD factories. This enables TGOOD Global to pass significant economies of scale on to customers.
- Pre-assembled and pre-commissioned substations reduce on-site construction time and workload.
- Working with TGOOD helps to reduce project management time.
- Compact substations reduce the land space required, which conserves valuable land, especially in congested urban and industrial areas.
- Our MV switchgear kiosks, metering kiosks and transformer kiosks simplify renewable energy site commissioning and give your project Energy, Fast!

Service

- Complete engineering, procurement and construction (EPC) services are available with some of our subsidiaries (enquire for details).
- Customised layout to meet customer specifications and requirements
- Many of our local subsidiaries, or TGOOD regional businesses, are companies that can service installed plant throughout the lifecycle of your investment

Quality assurance


DNV

MANAGEMENT SYSTEM CERTIFICATE

Qingdao TGOOD Electric Co., Ltd.

GB/T 19001-2016/ISO 9001:2015

Design, Production and Service of T&D Equipment of 500kV & Below

IAF

Quality assurance certified quality: ISO 9001

TGOOD ensures that its products meet local standards and requirements around the world, including in Africa and Australia. TGOOD Global's manufacturing partner facilities and regional subsidiaries are certified to ISO 9001:2015 quality management.

Strict and systematic checks

During manufacture, each modular substation is subject to systematic routine testing with the purpose of checking the quality and conformity to all of the relevant regional legislative standards both in electrical and structural adherence.

Test results are recorded against defined acceptance criteria in each routine test report, which is signed by the tester and witness and reviewed and approved under document control. Reports reference project, panel and serial numbers along with test instrument calibration status, ensuring full product traceability.


CERTIFICATE OF CONFORMITY

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATION

QINGDAO TGOOD ELECTRIC CO.,LTD.

GB/T 24001-2016/ISO 14001:2015

IAF CNAS

Environmental protection

As part of the group's environmental policy, TGOOD encourages the recycling of high voltage switchgear in an attempt to reduce the environmental impact of disposal.

- All materials used, insulators and conductors for example, are identifiable, and easily dismantled and recycled.
- SF_6 usage is reduced in GIS, and SF_6 can be recovered at the end of the equipment's life, and reused after treatment.
- SF_6 free GIS are available through the Brunstock brand, which TGOOD Global also represents in its markets
- TGOOD Global's manufacturing partners are certified to ISO 14001 as are many of the regional subsidiaries.


CERTIFICATE OF CONFORMITY

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATION

QINGDAO TGOOD ELECTRIC CO.,LTD.

GB/T 45001-2020/ISO 45001:2018

IAF CNAS

Occupational health and safety

Health and safety bears the highest importance at TGOOD. Commitment towards control of the risks and improvement in performance of health and safety is demonstrated by the compliance of TGOOD manufacturing facilities with ISO 45001. Our management believes in a proactive approach to health and safety. The policies of companies in the TGOOD group are based on the PDCA (plan do check act) methodology, which focuses on elimination or minimising risks to personnel and other interested parties who could be exposed to hazards associated with its activities.

Strong mechanisms are in place to ensure that TGOOD's performance on health and safety meet legal and policy requirements, now, and will also do so in the future.

To read the specific health and safety policies and procedures of your local TGOOD business, please contact them.

Structure

TGOOD offers flexible substation solutions throughout the whole voltage range from low voltage up to 252 kV.



1. GIS module
2. MV module
3. Transformer module
4. Control module
5. Compensation module



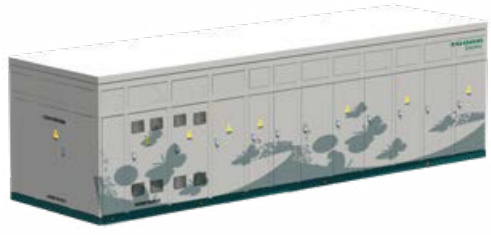
Key components

- Incoming and outgoing cable connections
- Air to overhead GIS bushings also available
- Lightning surge arrestors
- Site perimeter protection and video surveillance systems
- Internal, external lighting and emergency lighting
- Positive pressure environmental control system (optional)
- Smoke detection and SF_6 monitoring system with alarms
- Balconies, stairways and escape doors with push bars

Advantages of the structured modules

- Layout adaptable to space and topography requirements
- Electrical equipment kept at a constant temperature and humidity in a dust-free operation environment
- Largely maintenance-free and remotely operated
- Custom painting to improve appearance is available
- Advanced construction methods deliver an exceptional lifespan of 30 years

Structure



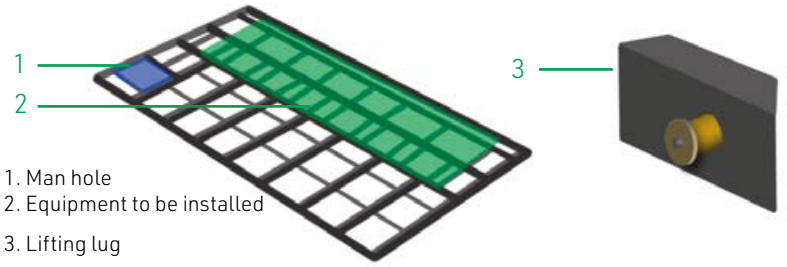
Key parts design

Walls and doors

- Doors and walls are a double-layer structure, plug welded with galvanised 1.2 mm inner sheet and 2.0 mm outer sheet, sandwiching 44.8 mm thick. This design features a validated structural integrity fire rating of 180 min. Total thickness for both doors and walls are 48 mm and both use the thermal bridge design which enhances thermal insulation performance.
- Doors can be equipped with appropriate locks, door closers or push bars depending on a TGOOD customer's request.
- Doors are pre-assembled into a welded steel frame. Hinges are stainless steel, and the door is positioned in the frame with a gasket to provide an effective seal against wind-driven rain when closed.
- All doors swing a maximum of 100°, and open outward.

Base

The base of a TGOOD modular substation is welded with profile steel, in which components such as I-beams are arranged and analysed to ensure adequate equipment support.



1. Man hole
2. Equipment to be installed
3. Lifting lug

Columns

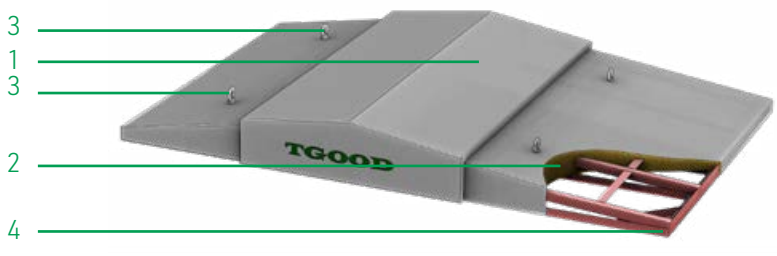
Columns are bent with Q235 2.5 mm galvanised steel sheets and welded onto the base. The same solution is used for the lintels between columns. Stiffening columns are plug welded together with columns.

Roof

The roof is framed and welded by angle steel:

- Top sheet: 2.0 mm galvanised steel
- Base sheet: 0.5 mm PPGI sheet
- Sandwiching nonflammable foam in the middle.

Another feature for the roof is the removability; its eyebolts connect the top sheet and structure together, which enables equipment to be lifted in or out of the modular substation with relative ease after the roof is removed.

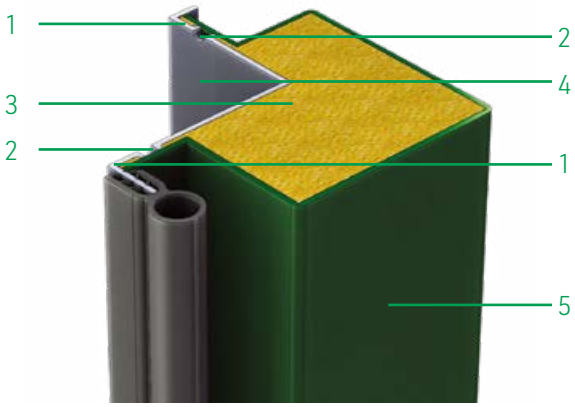


1. Water shedding, 3° slanted roof
2. Injected foam Insulation
3. Lifting rings
4. Steel frame

Proven performance

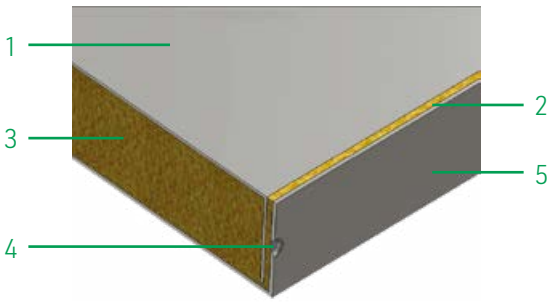
Thermal performance

Our insulation methods effectively eliminate thermal bridging across steel parts, providing the best overall thermal insulation performance in the modular substation industry



Insulation detail: corner column

1. Thermal barrier
2. Spot weld
3. Injected foam insulation
4. Internal metal surface
5. External metal surface



Insulation detail: panel

1. Internal metal surface
2. Thermal barrier
3. Injected foam insulation
4. Spot weld
5. External metal surface

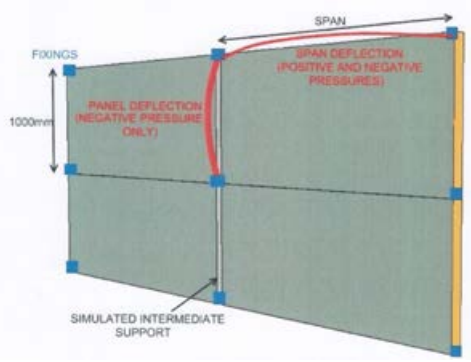
Proven performance

Mechanical strength performance

Plain panel mechanical strength tests are performed according to Australian National Construction Code 2012 (NCC 2012)

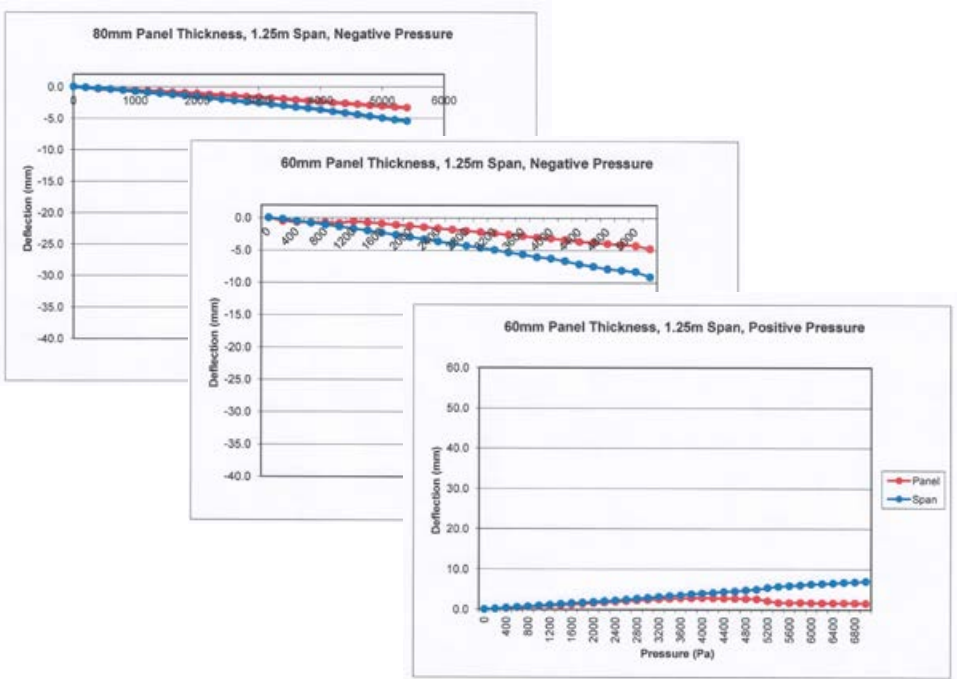
Wind pressure simulations are performed on different panel sizes.





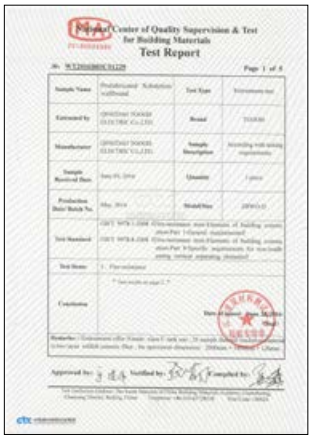
Evaluation of strength under test

Strength limit static pressure ± 4000 Pa



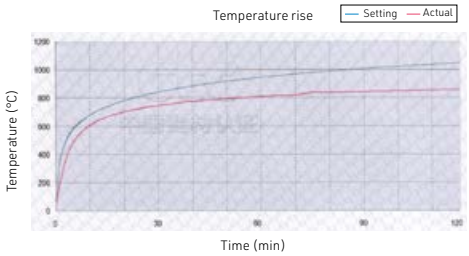


Proven performance

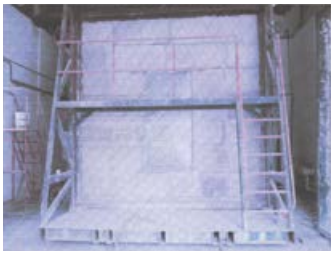


Fire resistance performance

Fire resistance is designed and tested according to GB 9978, BS 476, AS 1350, and EN 13501. Test report 20131C02391, issued by National Research Centre for Test Techniques for Building Materials.



Temperature inside the test room and wall temperature



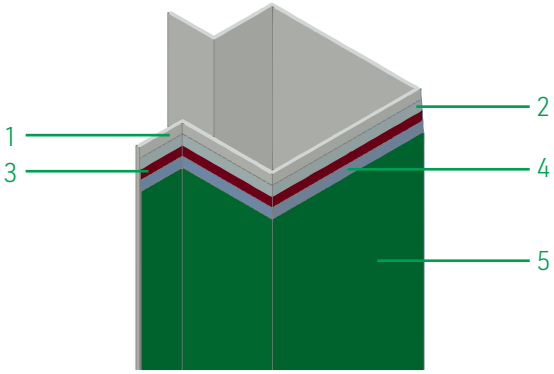
Object before test



Object after test

Corrosion protection performance

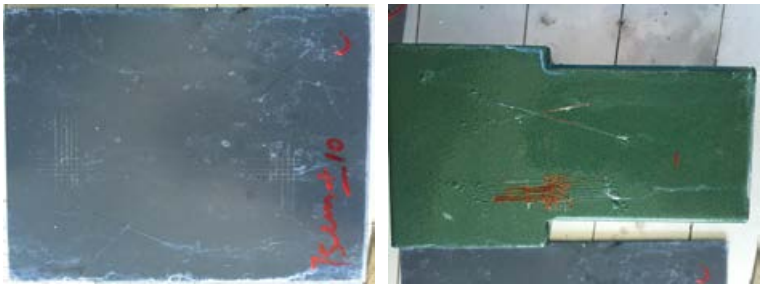
Layered anti-corrosion technology



1. Sandblasted steel frame
2. Hot zinc sprayed layer
3. Zinc + paint layer
4. Epoxy coating
5. Hammertone finish

Corrosion protection test

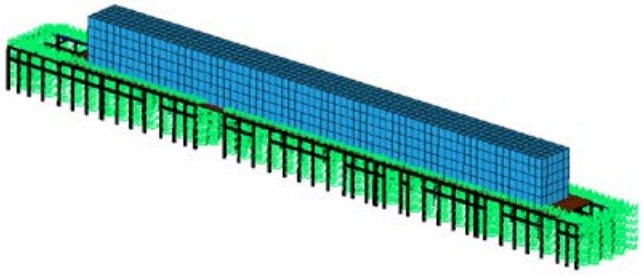
Performed according to ISO 9227, neutral salt spray, 5% NaCl



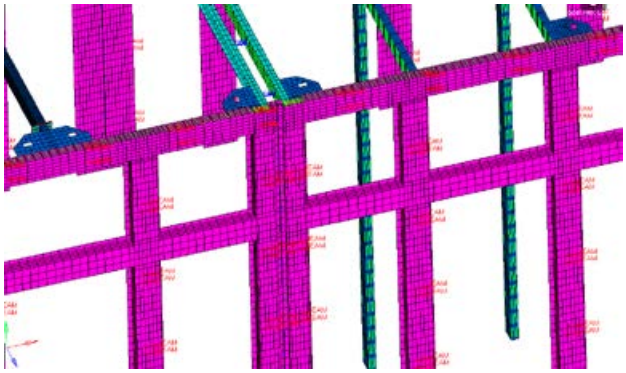
Zinc paint layer after 750 hrs salt fog test

Proven performance

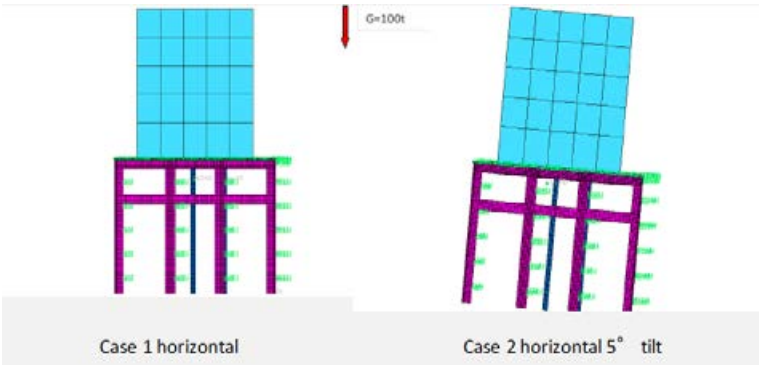
Seismic performance



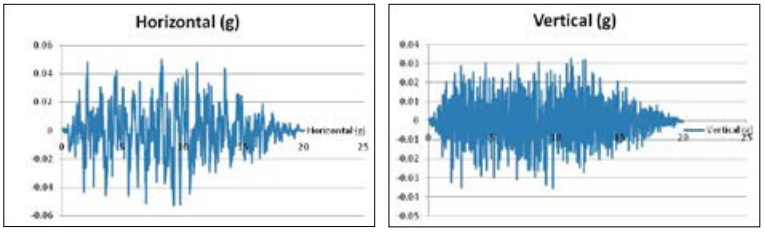
Numerical simulation of a support structure with a GIS module on the top



Transfer of the 3D data into a finite element mesh



Load assumption

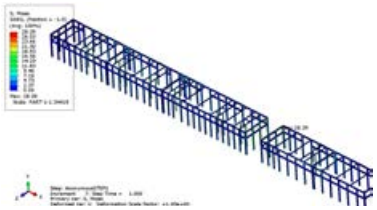


Load spectrum for magnitude 6 earthquake

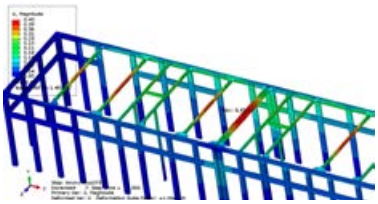
Proven performance

Results - static loads

	Case 1	Case 2
Maximum pressure	28.39 Mpa	92.49 Mpa
Maximum displacement	0.43 mm	6.71 mm
Safety factor	8.3	2.5

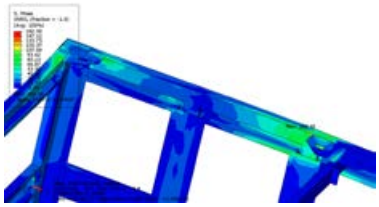


Case 1

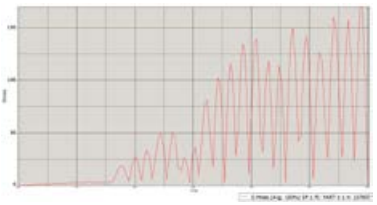


Case 2

Results - seismic (step 1, critical time)

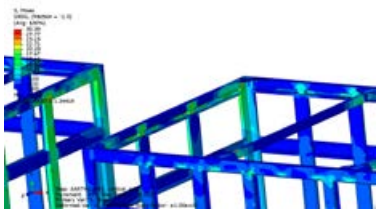


Corners and junctions at horizontal load



tcrit = 4.4 s

Results - seismic (step 2, simulation up to 5 s)



Corners and junctions at vertical load



Overall result: Maximum stress is under horizontal load (160.5 MPa) with a safety factor of 1.5

Substation description

Environment conditions

Variable		Unit	Description
Ambient air temperature	Maximum temperature	°C	≤45*
	Minimum temperature	°C	≥-35**
	Daily average temperature	°C	≤+35
Ambient humidity	Daily mean relative humidity		95% and below
	Monthly mean relative humidity		90% and below
Altitude of the installation site		m	1,000 and below (please specifically state if exceeding 1,000)
Wind pressure		Pa	≤700 (equivalent to a wind speed of 34 m/s)
Seismic intensity			Not exceeding magnitude 8
	Horizontal acceleration	g	0.5
	Vertical acceleration	g	0.5
	Safety factor		≥1.67 (simultaneous action)

Note: * more than 45°C is optional
**lower than -35°C is optional

Typical specification

Item	Unit	Description
Protection level		IP54 min.
Impact resistance	J	20 min.
Standard 3° sloped roof	N/m^2 load	2500 min.
Thermal conductivity	W/m °C	0.03 min.
Anti-corrosion Zinc protection		30 years (stainless steel optional)
Sound absorption technology	dB	<55 (day); <45 (night)

Standard compliance

IEC 62271-202	High-voltage/low-voltage prefabricated substation
ISO12944	Corrosion protection of steel structures by protective paint systems
IEC 60529-2004	Degrees of protection provided by enclosures (IP code)
IEC364-4-41	Protection of grounding, lightning protection and grounding standards
DIN EN ISO 3834-2	Quality requirements for fusion welding of metallic materials - Part 2: Comprehensive quality requirements
EN 1090-2:2008+A1:2011	Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures
ISO2768-1:1989	General tolerances for linear and angular dimensions without individual tolerance indications
GB/T 1231	Specification of high strength bolts with large hexagon head, large hexagon nuts, and plain washers for steel structures.
ISO 898-1:1999	Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs
AS 4115-1993	Hand torque tools - general requirements.
CSA A660-10	Manufacturers certification of steel building systems
EN 1090	Assembly of steel structures
CWB 47.1	Canadian welding standards
ISO 3834	Welding fabrication certification

Please consult us concerning the standards applied for monitoring systems,
UPS systems, automatic fire alarm system, and the design basis of the cabin auxiliary system.

Modules of modular substation

HV GIS module

GIS module features

- Incoming and outgoing 145 kV lines: overhead line or cable
- Low maintenance GIS modules
- Compact inline arrangement
- Operating voltage up to 145 kV, short time withstand current of 40 kA, and breaker rated current of 3150 A
- Busbar rated current of 4000 A
- Arc-quenching breaker design has a lifespan of 10,000 mechanical endurance and 22 times electrical endurance
- Three-position switch integrates disconnector and earthing switches into a single module, with viewing ports as option
- Each three-phase GIS module is only 0.8 m wide
- Aluminium alloy tanks provide corrosion resistance and eliminate eddy current losses

Structural arrangement

- Standard, configurable prefabricated modules for fast assembly
- Modules for fast transport
- Inline layout with fixed maintenance corridor
- SF_6 monitoring system with alarm and automatic ventilation system
- Utilises damping technology to reduce effects of seismic activity on GIS (optional)

TGP 145 integrated

The TGP 145 is compact, metal encapsulated, set of switchgear consisting of high voltage components such as circuit breakers and disconnectors.

TGP 145 GIS complies with the international standard IEC 62271-203; all elements mounted inside the GIS conform to international standards as certified by STL laboratories.

Main technical parameters of TGP 145

SN	Technical requirements		Unit	Data
1	Rated voltage		kV	145
2	Rated frequency		Hz	50/60
3	Rated current		A	2000, 2500, 3150
4	Rated short-time withstand current / time		kA/s	40/3
5	Rated peak withstand current		kA	104
6	Insulation level	Rated short-time power frequency withstand current (1 minute)	kV	275(to earth, between phases)
				315(across the isolating distance)
		Withstand voltage with zero-gauge pressure (5 minutes)	kV	109
		Rated lightning impulse withstand voltage (peak value)	kV	650(to earth, between phases)
				750(across the isolating distance)
7	Rated SF_6 gas pressure / min. functional pressure (20°C)		mPa	VT / lightning arrester gas chamber 0.5/0.45
8	Water content in SF_6		μL/L	CB chamber ≤150 (during handover)
				Other gas chambers ≤250 (during handover)
9	Partial discharge		pC	≤5
10	Annual leakage ratio of SF_6		%/ year	≤0.1
11	Level of radio interference		μV	≤500
12	Bay width		m	0.8

Modules of modular substation



3D view of HV GIS module

Typical Configuration of TGP 145

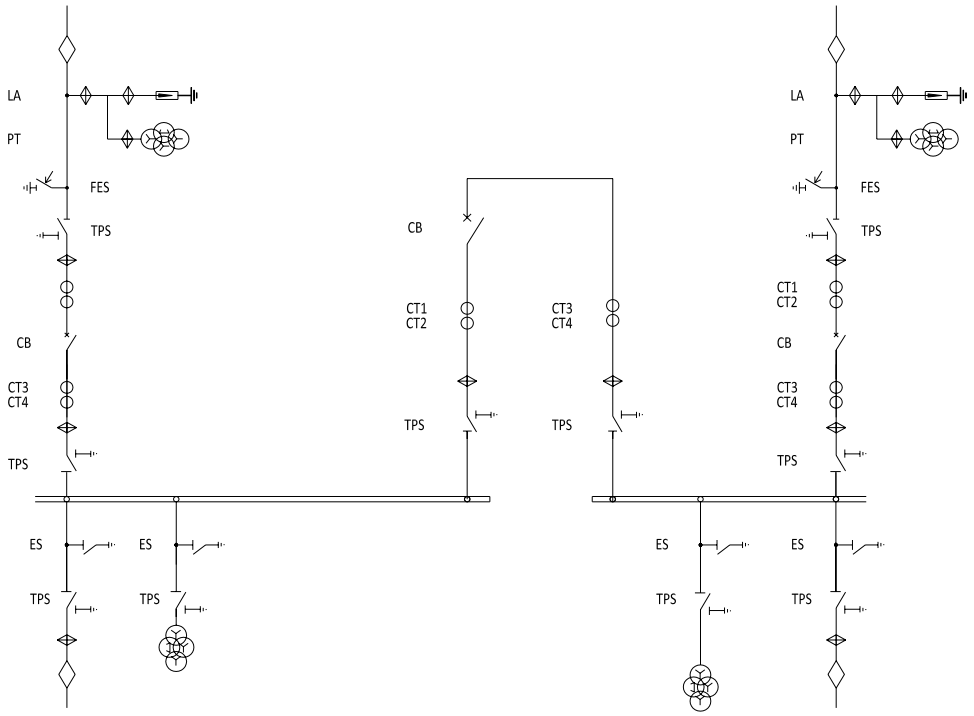
The modules of the TGP145 are integrated together into a sealed and grounded metal enclosure that, depending on requirements, can be set into various configurations to create bays that are then connected together via the busbar.

It is comprised of various partitions called bays that serve different functions, including:

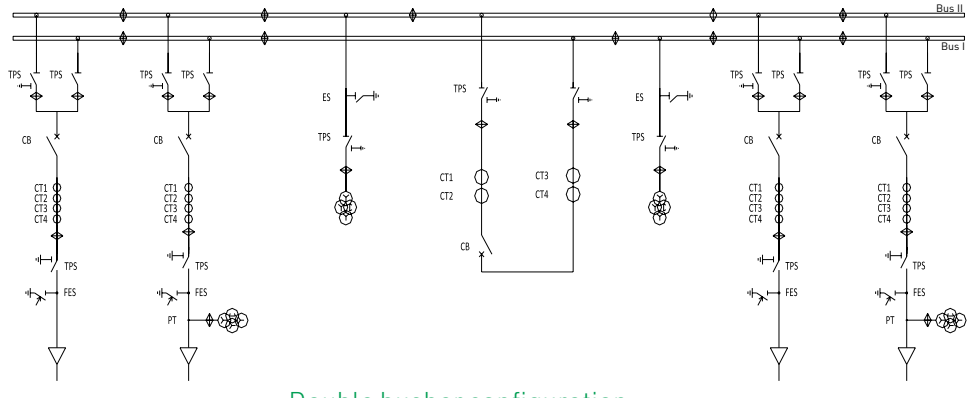
- Incomer (feeder) bay
- Single-bus main transformer bay
- Single-bus line bay
- Busbar coupler bay
- Measurement and protection bay

Single line diagram of HV GIS module

Single busbar configuration



Single line of Bus-tie configuration



Double busbar configuration

Modules of modular substation







MV GIS modules (substation kiosks)

Features and structural arrangement

17.5 kV AIS module features

- Incoming and outgoing 17.5 kV lines: outdoor busbar, cable
- Maintenance-free vacuum circuit breakers

36 kV GIS module features

- Incoming and outgoing 36 kV lines
- Fully insulated and sealed gas insulated switchgear eliminates maintenance and ensures safe and reliable operation
- Maintenance-free vacuum circuit breakers
- Reduced footprint

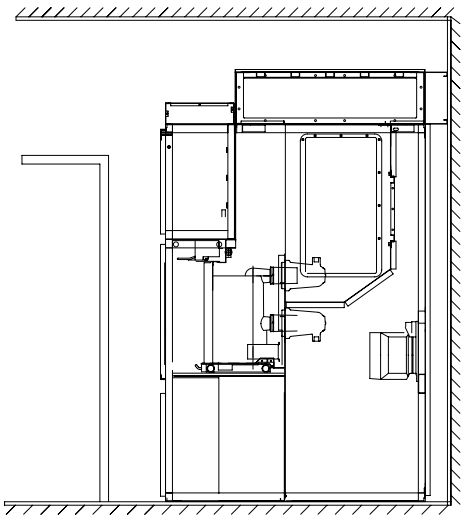
Structural arrangement

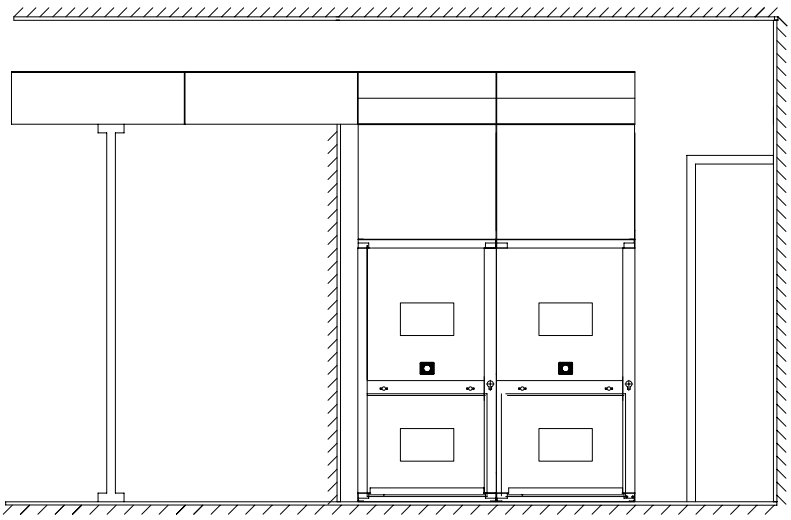
- Standard, configurable prefabricated modules for fast assembly
- German-engineered arc-resistant switchgear design enhances highest level of personnel safety.
- Arc-resistant switchgear doors incorporate mechanical interlock labyrinth seals.
- Integrated switchgear allows for compact and transportable modules.
- Single-row layouts simplify maintenance access.

Arc fault consideration and TGOOD solution

IEC 62271-200 aims to have standard test conditions mainly to make the results comparable; at the end, the user is responsible for health and safety. The arc fault test considers most effects of the arc fault, but not any indirect damage to personnel (eg. toxic gases). Minimising the hazards to personnel is a priority.

TGOOD tests are carried out under realistic conditions, to minimise the disturbances inside the room, all hot gases are vented out of the room, and cables are accessed from outside.





Modules of modular substation







AIS TAP 17

TAP17 is a primary air insulated switchgear of the LSC2B (loss of service continuity) category, as defined by IEC standard 62271-200. The medium voltage parts are compartmented using metallic partitions and shutters which are connected to earth and which separate:

- The busbars
- The withdrawable parts (circuit breakers, disconnector trucks or earthing trucks)
- MV connections, earthing switches, current sensors and voltage transformers, as required

Technical datasheet

Rated voltage (kV)				
			12	17.5
Rated frequency (HZ)				
			50	60
Rated insulation level				
Power frequency withstand voltage 50/60 Hz - 1 min	(rms kV)		28	38
Lightning impulse withstand voltage 1.2/50µs	(rms kV)		75	95
Nominal current and maximum short time withstand current				
Functionnal unit with circuit breaker				
Short-time withstand current	Ith. max	(kA/3 s)	25	25
			31.5	31.5
Rated current	In max busbars	(A)	3150	3150
	In CB	(A)	630	630
			1250	1250
			2000	2000
			2500	2500
			3150	3150
Internal arc withstand				
IAC-AFLR	(kA/1 s)		31.5	31.5

Six typical cubicles are offered:

- Incomer or feeder
- Incomer direct to busbar
- Bus coupler
- Bus riser
- Bus riser with withdrawable parts
- Busbar voltage transformer

Modules of modular substation

Application examples

12 kV modular substation used for open pit coal mine



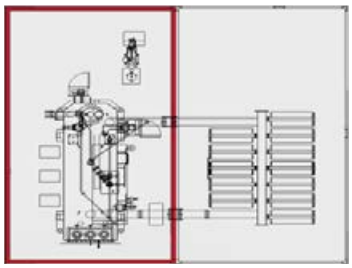
Another example of substation layout:



Project	Final Stage	Current Phases	Remarks
Primary transformer	2X50MVA	2X50MVA	
145 kV outgoing line	2-outlet	2-outlet	1 backup 1-outlet
12 kV outgoing line	8-outlet	8-outlet	

Modules of modular substation









Transformer layout

Prefabricated transformer module

Compartment design and characteristics

The transformer is enclosed in a cabinet, which adopts sound reducing and fire resistance technology to meet the requirements of noise reduction and fire protection. The radiator is separated from the body and placed in a protective box, which is self-ventilated to ensure normal transformer operations. The transformer has low power consumption, low noise, low partial discharge and low temperature rise. It is leakage free and does not require a support structure.

Split type transformer chamber

The chamber of the split type transformer consists of a transformer body cabinet and a radiator cabinet. The body cabinet adopts sound reduction and fire resistance technology. The radiator cabinet is made of an aluminium alloy and has natural and forced air cooling. The structure not only meets the requirements of ventilation and heat dissipation, but also of dust proofing.

Maintenance to main transformer

There is a 1800 mm wide walkway in the structure, which is for convenient daily maintenance. The top parts of the transformer can be removed for core repair.

Sound barrier technology

TGOOD applies a noise reducing treatment to the main transformer while noise killing shutters are used in ventilation outlets, which, in combination, meet the environmental noise control requirements.

Main transformer features

- Capacity range of 20 MVA ~ 60 MVA without ventilation, depending on power load density
- Main transformer windings may be two or three winds
- On-load tap changers available
- Transformer body is completely enclosed while radiator cabinet is perforated to facilitate cooling
- Online analyser of dissolved gas in oil
- Insulated cable bushings at 145 kV primary and 36/15 kV secondary
- Standard, configurable prefabricated modules for fast assembly
- Fire resistance technology: double steel casing allows the inner wall of the module to completely replace a traditional fire barrier
- Electromagnetic shielding technology: full metal shielding reduces electromagnetic radiation

Modules of modular substation



Protection and control module

Protection systems

- State-of-the-art protective relay systems designed to meet the highest of utility standards

Automation and control

- Remotely accessible control systems allow for real-time operation of the substation with a wide range of SCADA systems for metering and data collection

Station service power

- Highly reliable DC charger and battery systems provide uninterruptible power to all circuit breakers and control devices
- Absorbent glass mat battery technology eliminates the need for a separate, ventilated battery room

Utility System

- Fire alarm systems, security systems, video surveillance, and environmental monitoring available

Maintenance access

- Rear access doors allow for easy removal of secondary equipment modules

Modules of modular substation



Auxiliary systems (optional)

Reactive power compensation system (module)

- Substation power correction and/or harmonic filtering may be included as a module
- Capacitor banks may be adjusted as required for the application
- Fixed or variable stages of compensation available

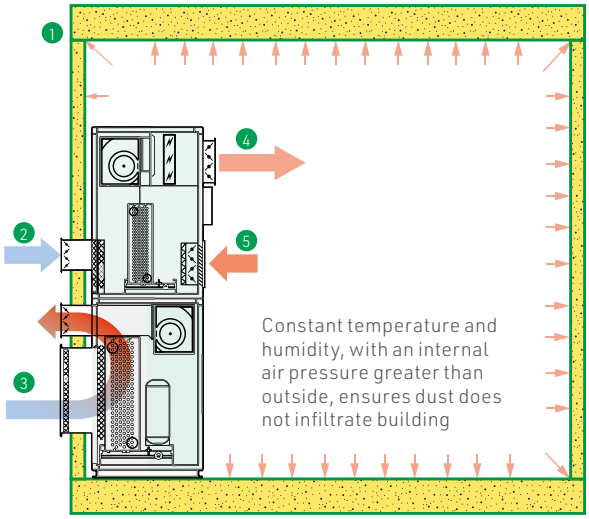
Neutral grounding system (module)

- Customers may choose between solid grounding, resistive grounding, reactor grounding, or resonant (Peterson coil) grounding
- Zigzag transformer grounding also available

Climate control and alarm systems

- System guarantees ideal environment for reliable operation and long lifespan of electrical components
- Patented positive-pressure and air conditioning system provide a constant temperature and humidity in a dust free operating environment
- Positive pressure environmental control system ensures that internal cabin pressure is always greater than external atmospheric pressure to repel dust. This technology has been tested and proven in the world's harshest operating environments, including the world's highest railway in Tibet
- Alarm system detects deviations from standard operating tolerances to ensure safe and reliable operation
- Early warning fire alarm is calibrated to detect a fire hours before visible smoke is produced, without the risk of false positives
- Climate control system utilise a heat pump to precisely control the cabin temperature and humidity at all times

Positive pressure environmental control system



1. Foam-Insulated panels (with optional bridge insulation technology)
2. Fresh air from outside
3. Outer recycling system
4. Return air (inside air combined with fresh air to maintain positive pressure environment)
5. Inside air

Utilities

Some of TGOOD's utility project references

Customer	Country	In Operation
EDM	Mozambique	2013
Aleminsa S.A	Latin America	2018
AGL	Australia	2022 to 2026
CS Energy	Australia	2024
K-Electric	Pakistan	2024
CityPower	South Africa	2024
Neoen, Synergy	Australia	2025
Intium, Essential Energy	Australia	2025 to 2026

Please request a recent project reference list from your TGOOD rep for more details.

Specific references

Fleurhof 11 kV switching station, South Africa, 2024

Project scope

- HV gas insulated switchgear 7 x 145 kV
- MV switchgear panels 40 x 11 kV
- Ehouses to contain all switchgear and protection equipment

Value for the customer

- Speedy delivery
- Controlled and minised space requirements
- Prefabricated to simplify on-site construction



Forest Glen switchrooms, Australia, 2026

Project scope

- 1 control building and 2 switchrooms (solar farm and BESS)
- MV switchgear panels 18 x 33 kV

Value for the customer

- Turnkey integrated ehouses by the local TGOOD Australia team, easy and cost effective
- Simplified remote site delivery
- Complete with stairs and landings



Overleaf: Modular ehouse for the Chinchilla BESS in Queensland, Australia - CS Energy 2024


FIRE

Renewable energy

Typical references

Customer [location]	Country	Operation time
Pakistan PV	Pakistan	2014
[Longreach]	Australia	2017
[Haughton]	Australia	2018
Cypark	Malaysia	2019, 2021
[Warwick]	Australia	2020
Voltalia	Zimbabwe	2022
Rosh Pinah	Namibia	2022
Scatec	South Africa	2024
Exxaro	South Africa	2024
Conpower	Australia	2024
UGL & Yurika	Australia	2025, 2026

Please request a recent project reference list from your TGOOD rep for more details.

Specific references

Australia 33 kV substation kiosks for an energy storage system



Malaysia 8 MW solar farm 33 kV substation



Renewable energy

Some of TGOOD Australia's completed solar farm ehouse projects















Mining

Typical references

Customer	Country	Operation time
Martabe Gold Mine	Indonesia	2017
Iron Mine	Peru	2018
Copper Mine	Australia	2019
Coal Mine	Pakistan	2019
Kamoa-Kakula Copper Mine	DROC	2024

Please request a recent project reference list from your TGOOD rep for more details.

Specific references

Kyrgyzstan Copper Mine 110 kV Substation



Indonesia gold mining 110 kV substation



Overleaf: Modular kiosk substations for Western Downs BESS in Queensland, Australia

Mining

Australia copper mining 33 kV substation



Peru iron mining 110 kV substation



Pakistan coal mining substation



Special applications

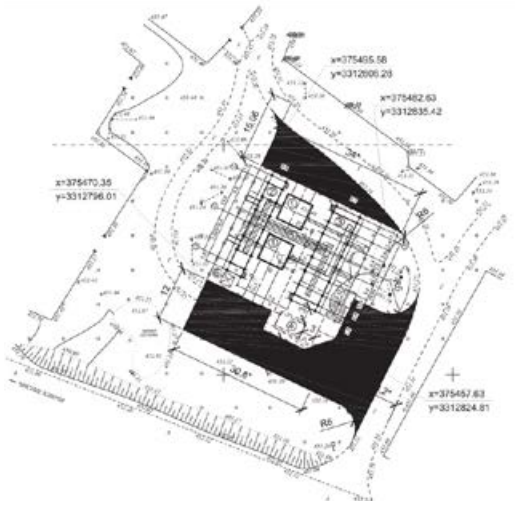


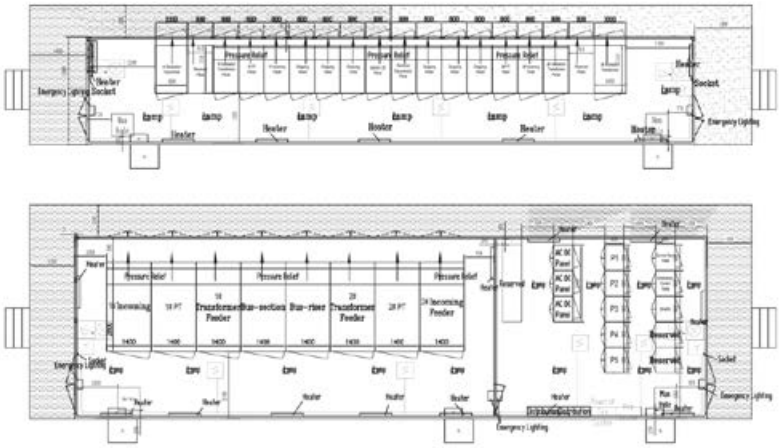
Extremely cold temperature: -50 °C

TGOOD provides modular substation solutions for extremely cold region applications, available down to the lowest temperature of minus 50 degrees (-50 °C).

In order to deliver a safe and reliable modular substation to our arctic customers, TGOOD tailors the design to meet the conditions:

- All materials that operate directly in extreme cold are carefully selected and tested
- All components and switchgear are validated for the temperature
- Sub-systems, such as heating, monitoring & control, and fire warnings are tested under real operating environments
- The installation and commissioning process is re-defined compared to the conventional one







High ambient temperature: 55 °C

TGOOD can also build modular substations for environments where the temperature rises up to 55 °C without current derating. The thermal isolation technology of TGOOD enables the modular substation design to meet the special requirements.

Fire rating solution

In order to enhance the operator's safety in case of a fire, the TGOOD modular substation design considers different situations:

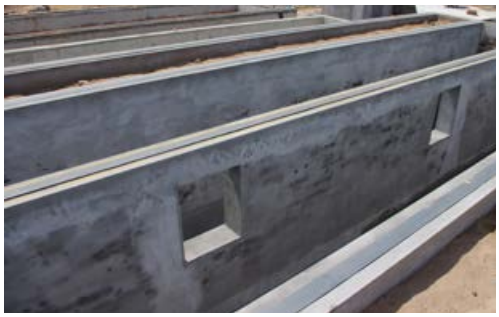
- Operator inside modular substation with double layers
- Operator inside modular substation with single layer
- Operator outside modular substation

For any of the above mentioned cases, a TGOOD modular substation can achieve:

- The wall, door and roof must keep integrity for three hours
- No poisonous gas accumulated to a degree which would endanger an operator's life, for three hours

Foundation options



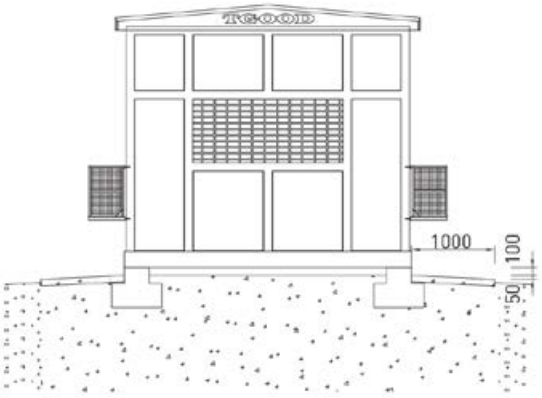


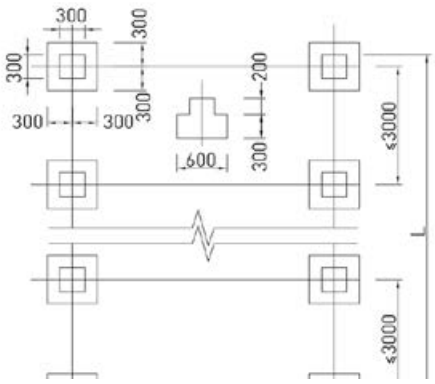
Some of the enclosures used in a modular substation are heavy. Through proper planning and construction of the foundation, according to soil conditions on sites, TGOOD supports your site design and execution. Below are three options for reference.

- On solid sandy soil, gravel is usually enough
- On normal soil (solid, non-sandy), construct two concrete support beams
- On difficult soil (non-sandy, non-solid), construct a concrete support raft under the substation

Foundation option 1: Supporting the substation with gravel

Support the substation with a gravel foundation when placing it on a solid and sandy type of soil. Build the foundation and cast isolated foundation on the long side of the substation, max spacing of 3 m. The size of an isolated foundation is shown below. If the width of the substation is more than 3500 mm, please add a list of isolated foundation. The top of the foundation is higher than the surroundings by 100 mm.





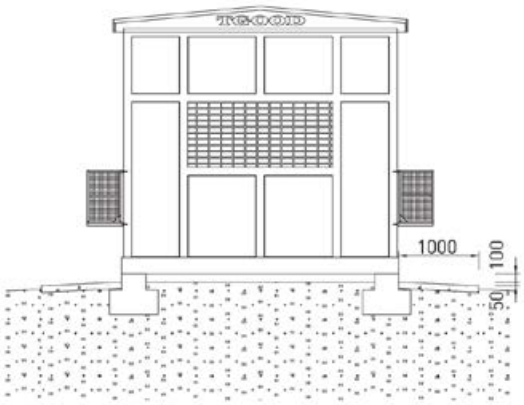
Note:

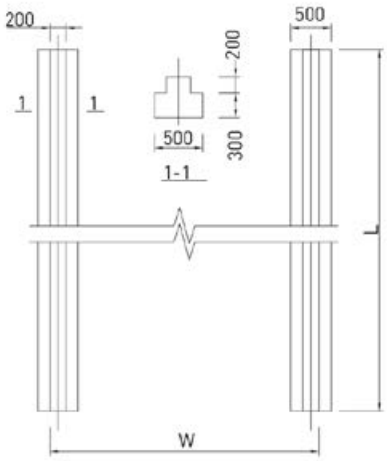
- Tilt the surface of the surrounding ground min. 50 mm per meter.
- Leave the concrete base 100 mm visible.
- Consider the local conditions such as frost, rain (humidity) and drought.
- W–width of substation, L–length of substation. Unit: mm.

Foundation options

Foundation option 2: Supporting the substation with concrete beams

Support the substation with concrete beams when placing it on a normal soil (solid, no sandy) as follows: Build the foundation and cast two concrete support beams under the long sides of the substation with width of min. 200 mm and depth of min. 500 mm or into frost free depth. If the width of substation is more than 3500 mm, please add a beam at the middle. The top of the foundation is higher than the surrounding by 100 mm.





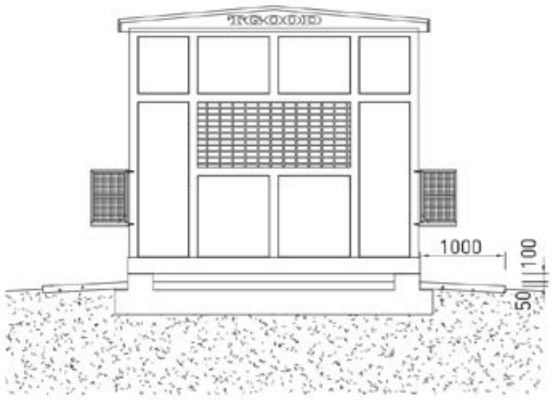
Note:

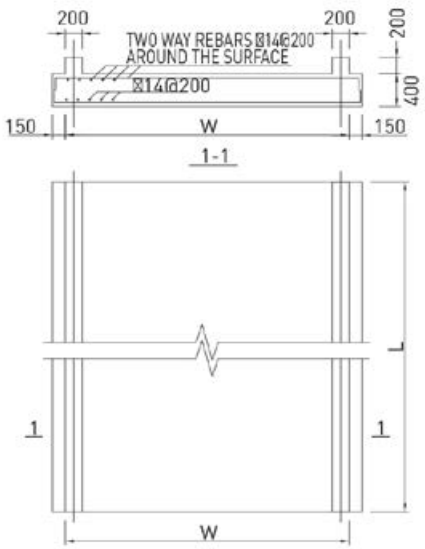
- Tilt the surface of the surrounding ground min. 50 mm per meter.
- Leave the concrete base 100 mm visible.
- Consider the local conditions such as frost, rain (humidity) and drought.
- W–width of substation, L–length of substation. Unit: mm.

Foundation options

Foundation option 3: Supporting the substation with a concrete raft foundation

Support the substation with a concrete raft foundation when placing it on difficult soil (non-sandy, non-solid). Build the foundation and cast one concrete raft foundation at the bottom, then cast two concrete support beams under the long sides of the substation. (Width min. 200 mm, depth min. 500 mm or into frost free depth.) If the width of substation is more than 3500 mm, please add a beam at the middle. The top of the foundation is higher than the surrounding by 100mm.





Note:

- Tilt the surface of the surrounding ground min. 50 mm per meter.
- Leave the concrete base 100 mm visible.
- Consider the local conditions such as frost, rain (humidity) and drought.
- All two-layer substations need to adopt the raft foundation.
- W–width of substation, L–length of substation. Unit: mm.
- For more foundation options consult with your local TGOOD.

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