



PARSIAN TABLO CO.



2019 General Catalog

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Capable Of Making , Dependable In Quality

Company Resume



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Founder of PTC
Mr. Gholam Reza Salajegheh

Message from the company founder

It has been over 15 years from the beginning of our journey with the mission of design and manufacture of electrical switch boards. we began our work with limited resources aimed toward providing our customers in oil, gas, petrochemical, food, steel and energy industries with total solutions of highest quality. to reach this great purpose, we rely on our valuable personnel and their growing knowledge and knowhow in different fields. having to deal with professional customers with high expectations, we are constantly working on providing the best quality products and services at the lowest price. our ultimate aim is to provide people with the highest quality solutions in order to deliver reliable services for wellbeing of society.

We would like Thank you for your continued support of the PTC and our services.

Mr. Gholam Reza Salajegheh

1-COMPANY RESUME

1-A) HISTORY

- Parsian tablo switch Board Company was founded in 2003 as the designer and manufacturer of electrical switch board for LV & MV application and also central control system for industries industrial zone khazra kermam .
- As result with years of experience and cooperation in different projects and also targeting continuous innovation, committed to an expansion project in 2009 - 2010 to improve its quality and increase its capacity.
- At the moment the production space is about 8000(m2) including engineering and design office, electrostatic powder coating system and related laboratory,metal sheet manufacturing with CNC machines an electrical assembling and test.
- PTC has continues presence in infrastructure market and industries such:oil,gas & petrochemicals, marine industries, steel and alloys, Food and Beverages,Research and Development centers, Production – transmission and distribution of electricity and.....
- Following to its objectives for improvement of quality assurance, in 2010 PTC has been certified by Moody international for quality management system ISO 9001:2008 .



1-B) VISIONS

SERVICE:

- To Provide a full range of services in switchgear manufacturing to support national industry operations in delivering quality, innovation, customer satisfaction and company profitability.

SAFETY :

- We are proud of our safety performance at switchgear & Instrumentation , both in the factory at and the same time Performing site work.
- We practice zero tolerance: reporting of incidents is mandatory to allow investigation and full analysis of trends.

1-C) QUALITY POLICY

After establishment of quality control system in our company we decided to continue within the trend of quality assurance and quality improvement. For this purpose we have defined an objective for our Company in the area of implementation of quality management system in accordance with ISO 9001:2008. This project was started in sep.2009 and successfully audited by moody international in Aug.2010 . Hopefully this will be the smooth path for total quality management in our company to bring more value for our customer's satisfaction. We, as one of the fast growing electrical switch board manufacturer in the country are obliged to achieve appropriate quality and present desirable services to get more market share in today competitive market.



1-D) PERSONNEL PROFILE

Expert and experienced manpower has a large portion in both qualitative and quantitative growth of PTC. More than 20% of personnel are university graduated with BS & MS degree .

- Sales team:	6%
- Design & Engineering team:	3%
- Test & Quality Control team:	5%
- Production Team:	84%
- Administrative & services Team:	2%

1-E) RANGE OF PRODUCTS

Distribution & control switchgears:

- Medium voltage switchgear from 3.3kV to 36kV /circuit breaker compartment / withdrawable or fixed
- Low voltage motor control switchgear Up to 6300
- Low voltage switchgear for different applications/Fixed, modular & withdrawable type up to 6300A

power compensation:

- Capacitor banks with automatic for reactive power compensation.

Process Control panel:

- central control and navigation console.
- process control panel using programmable(PLC) or conventional relay based.



1-F) AFTER SALES SERVICES SECTION

Customer satisfaction is the first priority of PTC goals, after sales Service section has been established on 2005 in order to provide as much Service as possible to the customer. the activity of this part is related to Sales section based on customer request for site services and modification Or spare part request.

1-G) MANUFACTURING MACHINERY & EQUIPMENTS

- ✓ CNC Punching Machine, 9 Head
- ✓ Electrostatic Powder Coating System
- ✓ NC Cutting Machine
- ✓ Foam Injection Machine
- ✓ Fiber Laser Cutting Machine (Coming Soon)
- ✓ Plaque Engraving Machine

1-H) RESEARCH AND DEVELOPMENT

In today world, the most important factor for competition is quality . so in order to be along with modern technology, PTC has established her R&D center in factory site close to production facilities. Following are number of projects implemented by R&D section recently.



2-GENERAL PRODUCTION INFORMATION

2-A)METAL SHEET MANUFACTURING PROCEDURE

There are 2 types of metal sheets used for cubicle manufacturing by PTC Company :

- » Carbon steel in accordance with St12 DIN1623-83 standard for covers and doors of both LV and MV cubicles .
- » Galvanized steel in accordance with SGCC JISG 3302/94 standard, Zinc coated 220g m(2), for structure, supports and internal part of both Mv metal clad and fix LV cubicles .
- » Aluzinc steel coated with 55% Aluminum & 43.4% zinc & 1.6% silicon in accordance with DS 412+DS/R 454 standard for LV MCC cubicles (Tabula). Steel provides strength,Aluminum gives protection from corrosion & Zinc safeguards the steel at edged and scratches by virtue of its cathodic action, which will be used for Enclosure sections.

2-B) BUSBAR MANUFACTURING SECTION

The main and internal distribution Busbar is manufactured from High Conductive Electrolytic copper(99.9%) . According to the requirement it Can be coated with heat shrinkable cover or to be painted in order to increase its current capacity & isolation level. Joints could be silver plated by the request .

Forming & bending are performed by special CNC machined in order to avoid any surface Crack. Also all cutting & punching are performed by special instrument to avoid any edge distortion .

2-C) COATING & PAINTING PROCEDURE

» Daily Laboratory Examinations:

Before starting the cleaning process all the chemical component will be controlled by every standard chemical solver. Any defect in points has to be charge. And then starting permission will be send .

controlling options :

- 1) Alkalinity of degreasing component.
- 2) Accelerator point and acidity degree of phosphating
- 3) Bath temperature.

All steel sheets will be fully cleaned, phosphatized, dried, coated and heated in order to be protected against corrosion from inside and outside. All these procedure will be performed in fully automatic system as follows:

» Cleaning & Phosphatation section:

All metal sheets degreased by using special chemical solutions and Washed with warm water to be cleaned from Alkaline. Then enter to another bath to get phosphatized with zinc phosphate and washed again at 70°C to be cleaned completely. After that they hung on conveyor with speed of 1.5 meter/minute to be dried in 90°C . This is the start of Automatic system.

» Coating Section:

Dried sheets which are hung on the conveyor in the last step, coated With thermosetting electrostatic powder spray in special cabinets. Thanks To electrostatic technology, all the corners & unachievable parts of steel Sheets will be coated by powder. the paint thickness varies from 60 to 120 micron according to the requirement.

» Heating section:

After coating with electrostatic technology for curing, hung sheets on the moving conveyor to pass the heating tunnel . paint thickness , heater temperature and required are declared paint (Electro static powder) supplier .

2-D) QUALITY CONTROL PROCEDURE

Throughout the manufacturing process starting from the raw material up to the final Product , the QC inspection is the main issue in Parsian tablo switchboard Company.if There were any problem in quality in each section the material will not pass to the next stage & will be returned to be checked & fixed. there are QC inspection forms for each Production stage which has to be completed by the QC Engineers in charge in differernt Stages:

- ✓ Metal sheet manufacturing.
- ✓ coating and painting section .
- ✓ Assembling part including components , wiring and BusBar forming .

All the QC forms will be part of the project final documentation .

2-E) TEST PROCEDURE

In addition to quality control system forced by production stages, authorized representative of client is welcome to carry out necessary inspection and test at any stage of production .

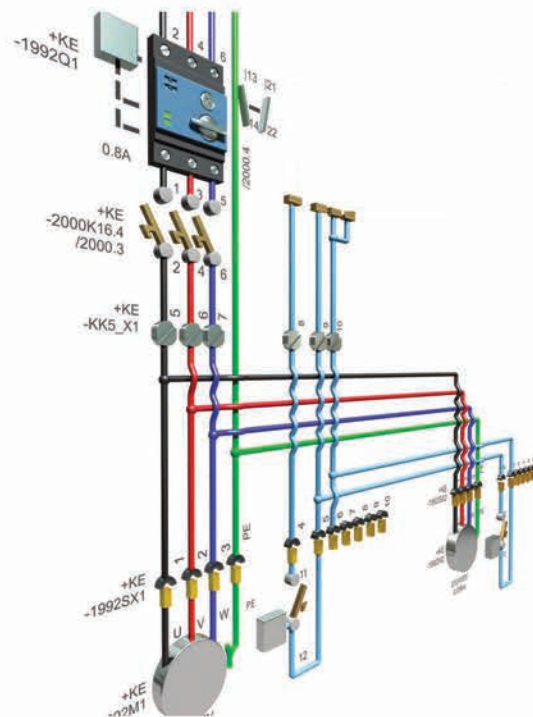
Routine tests will be done on all switchboards according to IEC standards and following steps will be held on factory for :

- ✓ conformity of delivered equipments with drawings and specifications.
- ✓ Mechanical operations and interlocking .
- ✓ functioning test for incoming and outgoing feeders .

2-F) DRAWING AND DOCUMENTATION

After manufacturing of cubicles, following are Built drawings prepared for each cubicle :

- ✓ Front view and dimension.
- ✓ Top view.
- ✓ Single Line diagram .
- ✓ Power & Control Wiring diagram.
- ✓ Terminal diagram .



2-G) PACKING PROCEDURE

There will be different packing types based on clients request as following :

- Wooden palette for base, special bulb nylon and carton all around the cubicle and some special pieces to prevent impacts to the instruments.
 - In addition to the above mentioned packing , woden cage could be added for more trength on long destinations according to the request of client .
 - If the client declared that packages will be remained unpack for more than 3 weeks , there will be some silica Jell available inside of each cubicle to reduce humidity inside cubicle space.
- The related packing list will be attached to each package ready to be transformed .

3-Quality & ISO:

All electrical components assembling / wiring and busbar selection are in accordance with latest IEC standards.

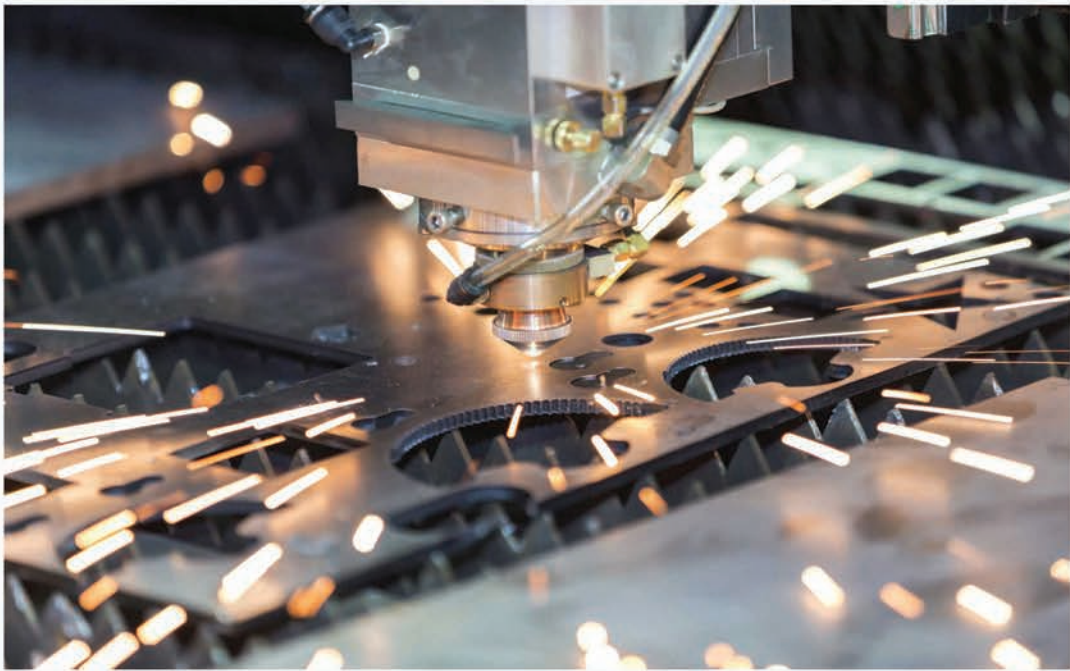
The electrical test department of PTC is equipped with high accurate and calibrated equipments together with qualified technicians to fulfill the necessary major routine tests such as:

- power frequency test up to 100KV AC/DC
- Impulse test up to 125KV
- Insulation test up to 5000V AC/DC
- Current injection up to 3500A

Quality and speed of production is guaranteed by performance of modern CNC machines in cutting, Bending, punching of steel sheets and Busbars forming.



Some Factory Equipment



Fiber Laser Cutting Machine (Coming Soon)

PARSIAN TABLO CO.



UNISWITCH

Uniswitch Medium Voltage Switchgear

1. Uniswitch Design Philosophy

Uniswitch, the light flexible switchgear developed as a modular, simple to apply design, with fewer components, providing a high reliable, quality and safe product for you, our Customer.



By reducing the number of components, utilising modern materials correctly, we have developed an environmentally and user friendly product. The simple design and construction of Uniswitch will stand the test of time for generations to come.

Uniswitch is an air insulated (AIS), metal enclosed, switchgear cubicle design of the next generation developed through continuous innovation and vision to meet the changing market needs. The standard cubicle is powder pointed light gray (RAL 7035) on visible parts.

Uniswitch provides long-term technical solutions for various applications. Safety, user friendliness and environmental concerns have been the driving force in the development of the switchgear.

Uniswitch switchgear is a compact solution for a fully automated power distribution network. Supported by sensor technology and the latest in protection relays, it meets even the most demanding requirements in hospitals and airports.

Uniswitch market segment



Uniswitch

Switchgear for electricity
distribution application such as:

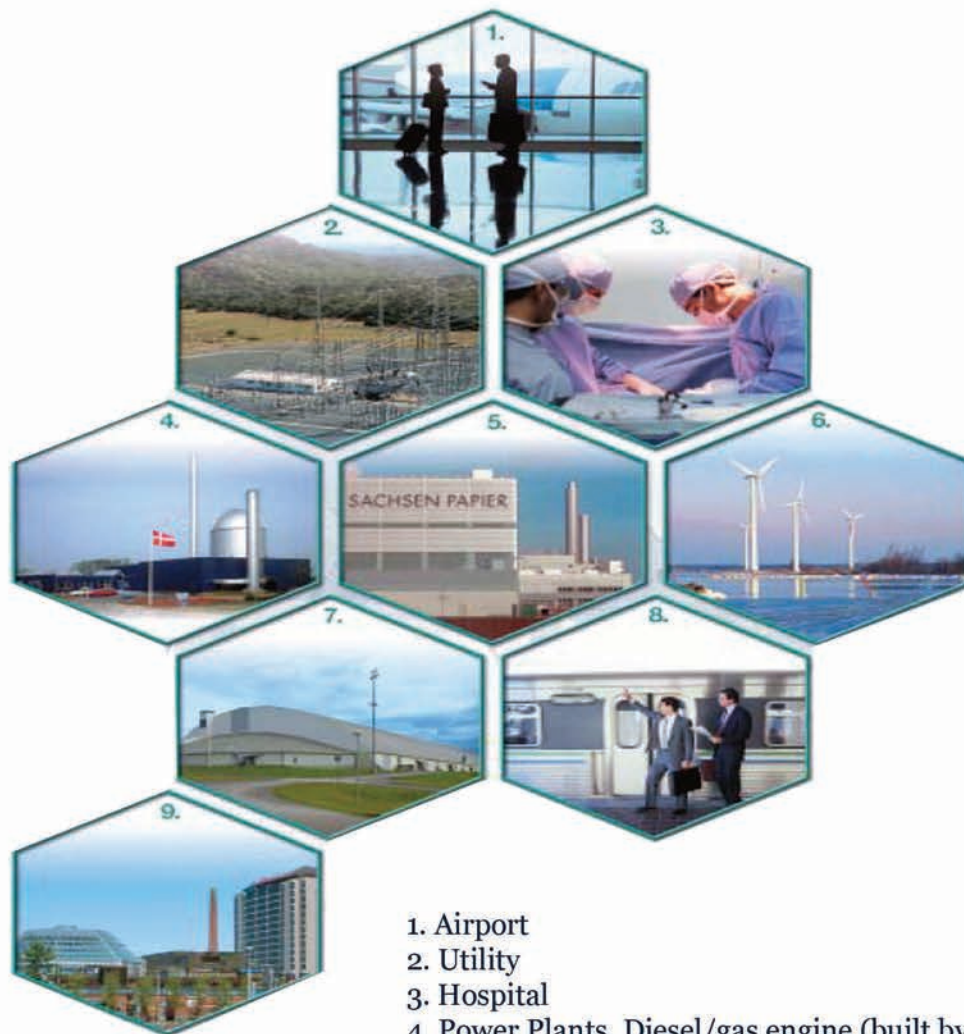
Secondary substations
Manufacturing industry
Shopping centres
Airports
Metro
Windmills
Small/medium size
power plants
Hospitals
Sportcenters
Marine

Uniswitch product provides our Medium Voltage Customer with the best solution for heavy duty switchgear in a size only a little than a single tank Ring Main Unit while including:

- the flexibility in meeting our Customers specification and accomodating on future change & upgrading
- the options include complete control, measuring and protection systems

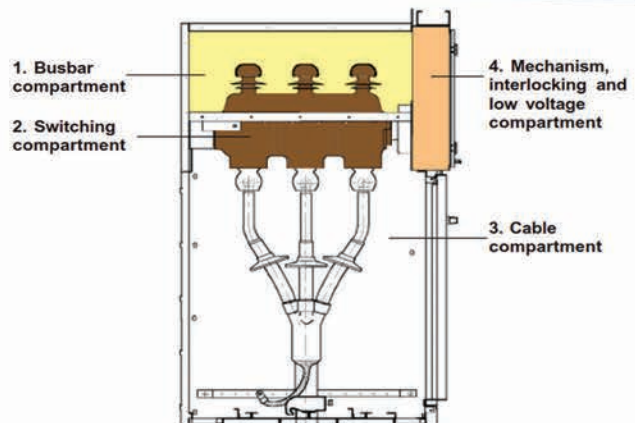
2. Uniswitch

Applications



1. Airport
2. Utility
3. Hospital
4. Power Plants, Diesel/gas engine (built by Wartsila)
5. Industry
6. Windmills
7. Sports center (Botnia Hall, Vaasa)
8. Metro
9. Shopping center

3. Uniswitch Switchgear Construction



Metal enclosed switchgear :

1. Busbar compartment

The busbar compartment is located on the top of the cubicle. This compartment contains the main busbars that interconnect between switchgear cubicles.

2. Switching compartment

A 3-position SF6 switch disconnecter with epoxy cast resin housing is provided with inspection windows and available also with gas density indicator.

3. Cable compartment

75 % of the space in the switch disconnector cubicle is reserved for power cable connection making it possible to use both 1- and 3-phase cables with most simple unscreened terminations.

Space is also adequate for cubicle accessories such as surge arresters, current transformers, second earthing switch etc. The door has an inspection window and safety interlocking as standard.

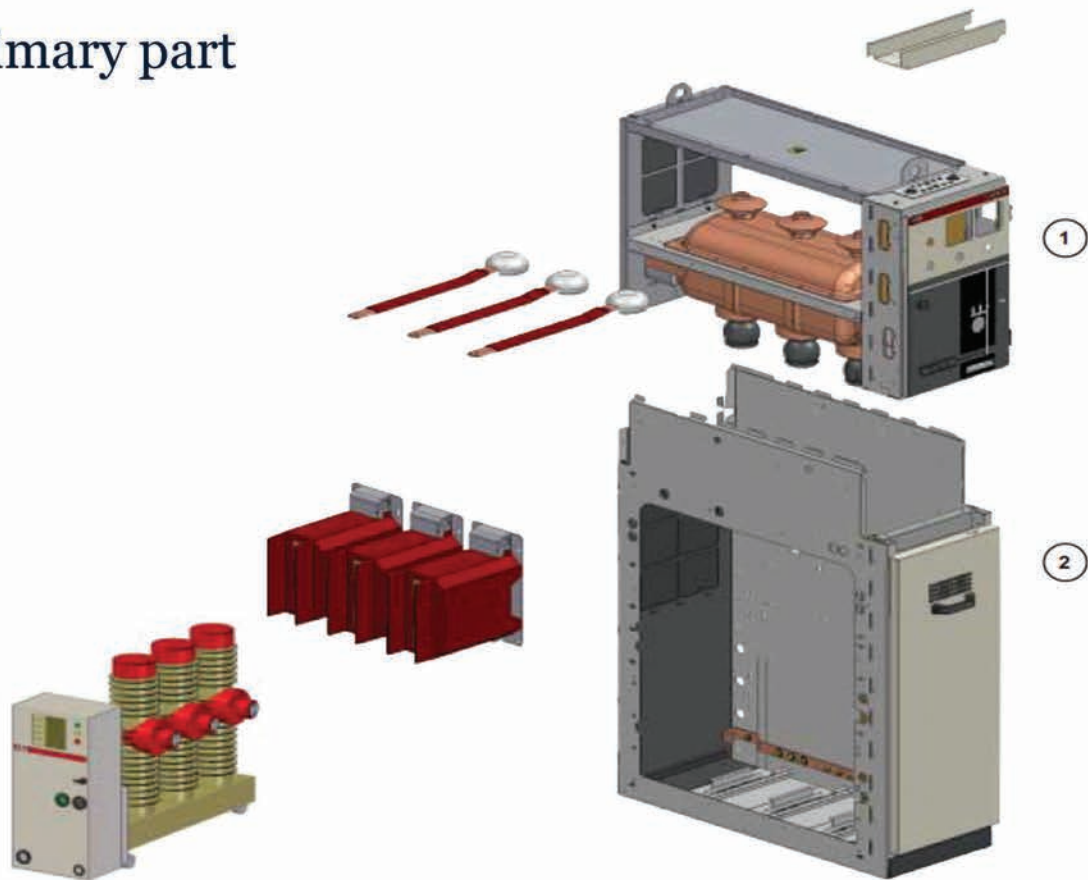
For cable entry there are 3 individual cable gland plates in the bottom with support for a suitable dimensioned cable clamp. The bottom and the threshold of the cubicle can be removed for ease of cable installation.

4. Mechanism, interlocking and low voltage compartment

Behind a hinged door (which serves as control panel) are located the spring operating mechanism with position indicator and the mechanical interlocking unit. There are also facilities for cubicle accessories such as: auxiliary contacts, tripping coil, emergency tripping mechanism, capacitive voltage presence indicating system, key interlocks and motor operating device. Space is also provided for control circuits and measuring instruments as well as a protection relay. In the 750 wide cubicles there is also a second identical compartment for further accessories.

The upper part of the cubicle, including the busbar compartment, the switch disconnector and the mechanism and low voltage compartment is separated from the lower part and the cable compartment. Because of this it is possible to carry out maintenance, repair and upgrading of the unit in the lower module while the switchgear is in service.

Primary part



1) Top unit

- 3-position switch disconnecter SFG
- Operating mechanism with mechanical position indication
- Enclosure of busbar compartment
- Integrated low voltage compartment for secondary components
- Interlocking unit
- Busbars
- Control cable ducts

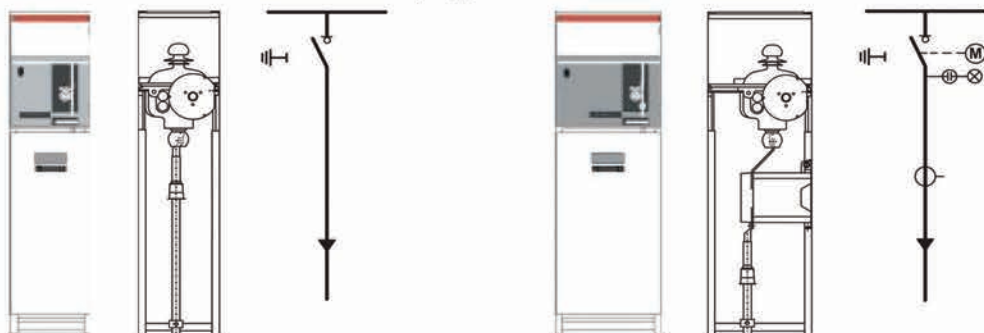
2) Bottom unit

- Enclosure
- Circuit breaker (fixed version)
- Current transformers
- Earthing switches
- Voltage transformers
- Cable entry with cable support

4. Uniswitch

Cubicle Types / Cubicle Program

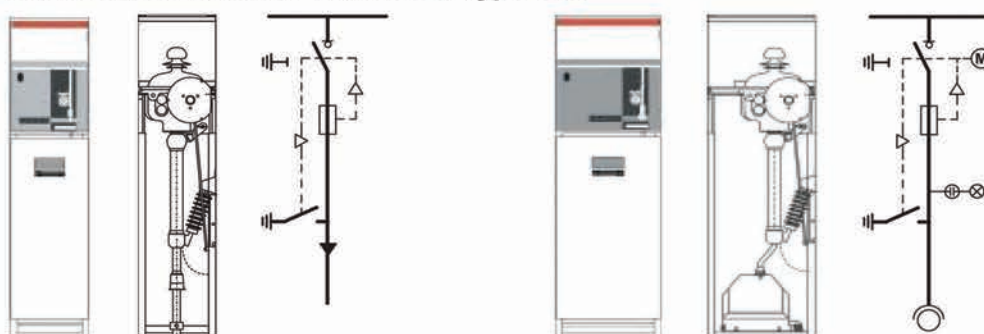
Switch Disconnector Cubicle, type SDC



Width: 375 or 500 mm
Height: 1635 or 1885 mm

Example: equipped with motor, current transformer, voltage indication

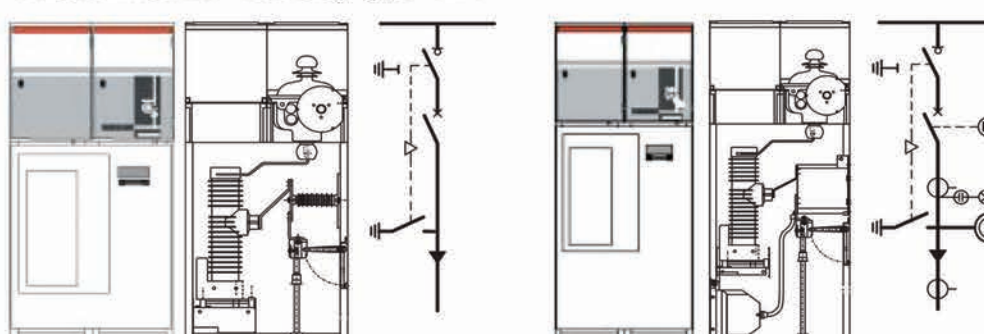
Switch Disconnector with Fuse, type SDF



Width: 375 or 500 mm
Height: 1635 or 1885 mm

Example: equipped with motor, voltage metering and indication

Circuit Breaker Cubicle, type CBC

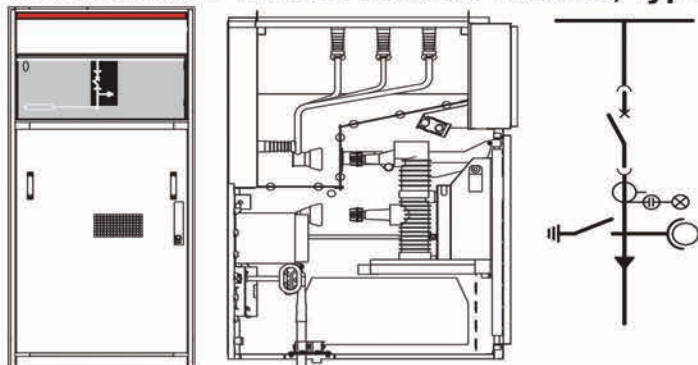


Width: 750 mm
Height: 1635 or 1885 mm

Example: equipped with motor, current and voltage transformers, voltage indication

Uniswitch Cubicle Types / Cubicle Program

Withdrawable Circuit Breaker cubicle, type CBW



Width: 800 mm
Height: 1885 mm

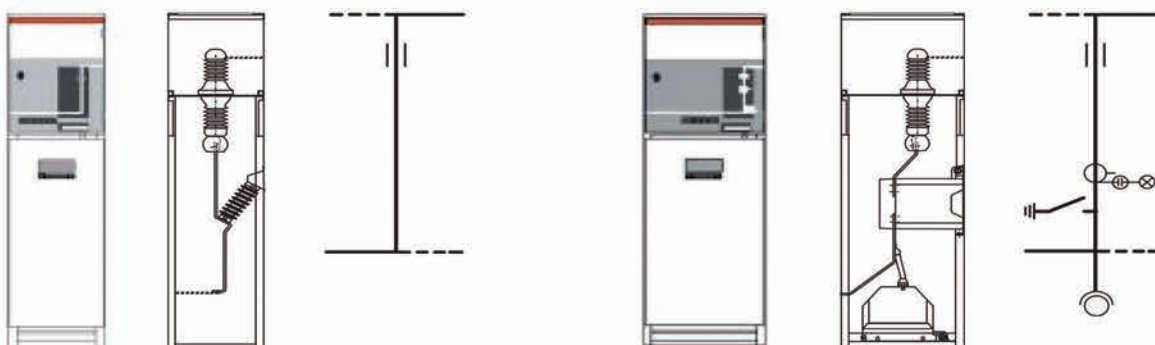
Direct Busbar connection Cubicle, type DBC



Width: 375 or 500 mm
Height: 1635 or 1885 mm

Example: equipped with earthing switch, current transformers and voltage indication

Bus Riser Cubicle, type BRC



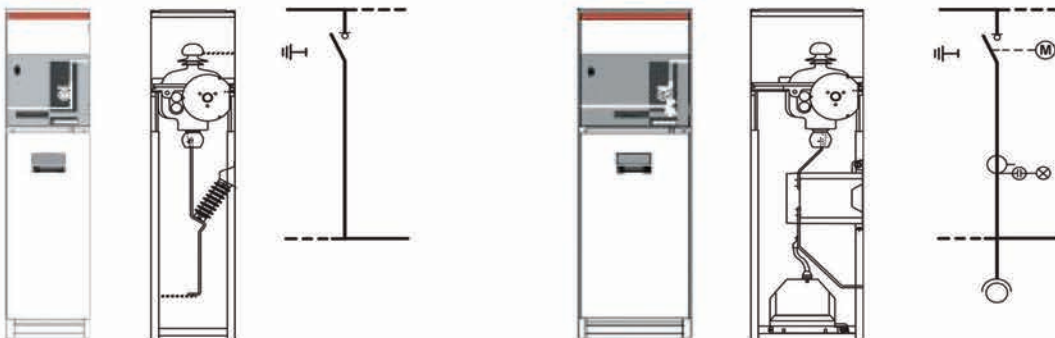
Width: 375 or 500 mm
Height: 1635 or 1885 mm

Example: equipped with earthing switch, current and voltage transformers, voltage indication

Uniswitch

Cubicle Types / Cubicle Program

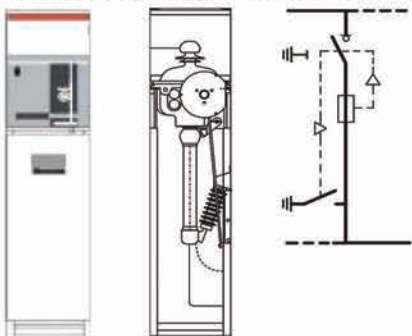
Sectionalising Cubicle, type SEC



Width: 375, 500 or 750 mm
Height: 1635 or 1885 mm

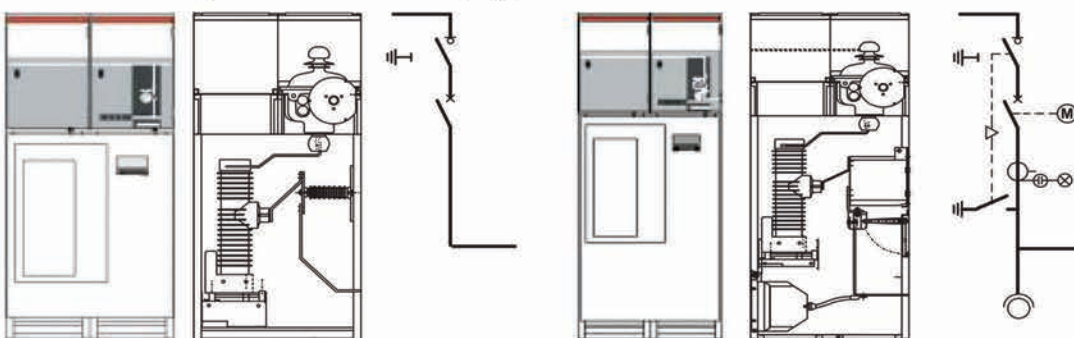
Example: equipped with motor operation, current and voltage transformers, voltage indication

Sectionalising cubicle with Fuse, type SEF



Width: 375 or 500 mm
Height: 1635 or 1885 mm

Sectionalising Breaker Cubicle, type SBC

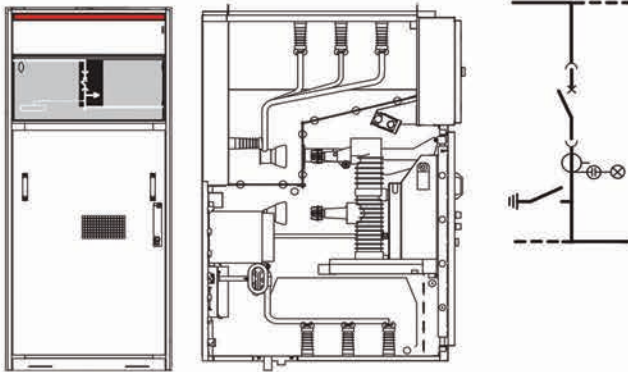


Width: 750 mm
Height: 1635 or 1885 mm

Example: equipped with motor operated CB, current and voltage transformers, second earthing switch, voltage metering

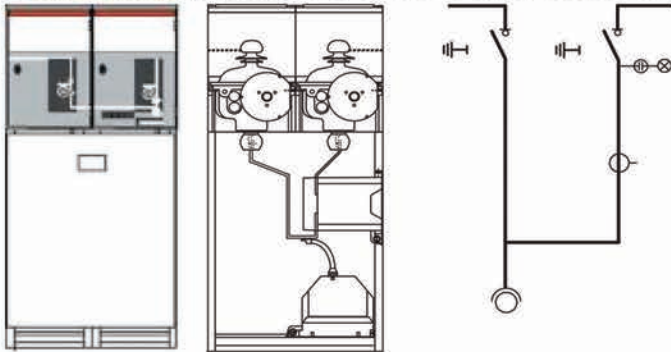
Uniswitch Cubicle Types / Cubicle Program

Sectionalising Withdrawable Breaker cubicle, type SBW



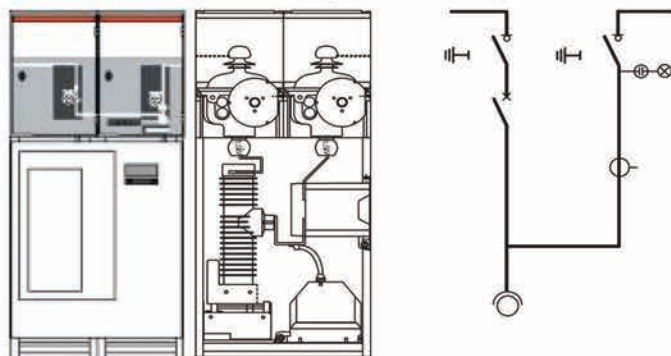
Width: 800 mm
Height: 1885 mm

Sectionalising Metering cubicle with Disconnecter, type SMD



Width: 750 mm
Height: 1635 or 1885 mm

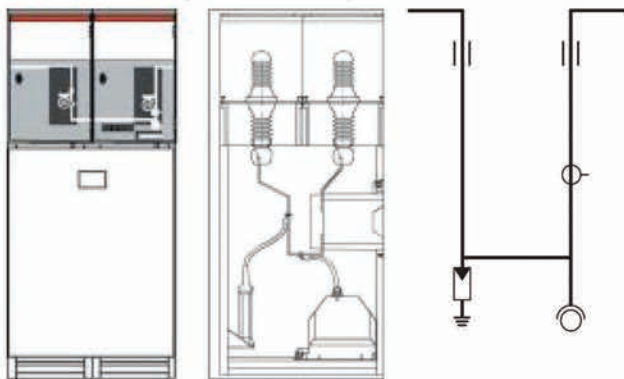
Sectionalising Metering Cubicle, type SMC



Width: 750 mm
Height: 1635 or 1885 mm

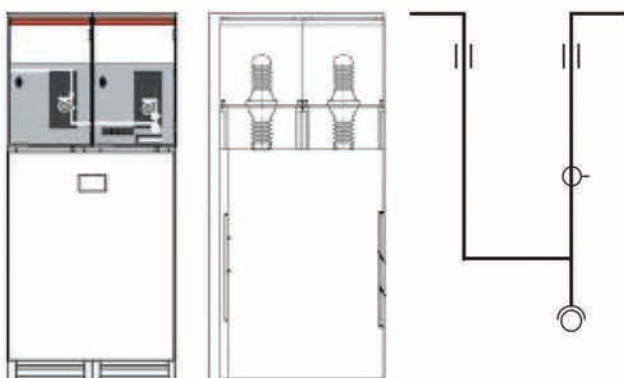
Uniswitch Cubicle Types / Cubicle Program

Bus Metering Cubicle, type BMC



Width: 750 mm
Height: 1635 or 1885 mm

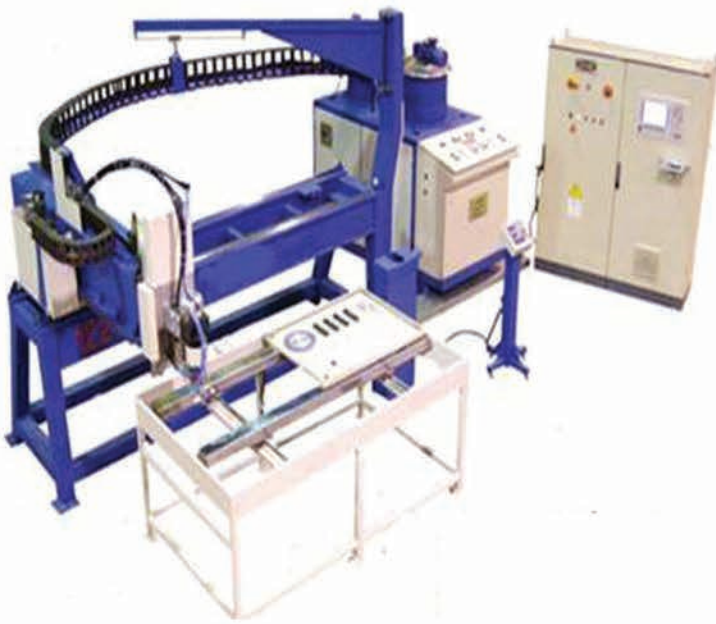
Universal Metering Cubicle, type UMC



Width: 750 mm
Height: 1635 or 1885 mm

Prepared for mounting of universal instrument transformers,
busbars on request

Some Factory Equipment



Foam Injection Machine

PARSIAN TABLO CO.



MNS

Low-voltage switchgear

Features & Applications

Notable system advantages with regard to design aspects:

- Optimum protection for personnel and plant
- Fully type-tested including internal arc fault containment
- High operational reliability and availability
- Maintenance-free busbar and frame construction
- Simple retrofitting procedures
- Compact, space-saving design

Thus MNS proves to have the approved solution for the following industries:

- Oil & Gas
- Chemical/Petrochemical
- Pharmaceutical
- Power Stations
- Paper
- Water treatment
- Mining
- Steel
- Food
- Marine

As well as for infrastructure requirements:

- Data centers
- Airports
- Office buildings
- Shopping centers
- Hospitals
- Rail





Horizontal busbar system, IP 31

1500 A
2100 A
3000 A
3400 A

Transformer cubicle

800 – 2500 kVA
50 – 75 kA

2327 mm

1452 mm

2000 – 2800 mm



Circuit-breaker cubicle, ACB Incoming, sectioning, distribution

Circuit breaker size

1250 A
1600 A
2000 A
2500 A
3200 A
4000 A

2263 mm



600 – 1000 mm

Disconnecter cubicle Incoming, sectioning, distribution

Disconnecter size

1250 A
1600 A
2500 A
3150 A

2263 mm



600 – 800 mm

Apparatus cubicle W/R For withdrawable and removable units

Metal enclosed vertical busbars

1175 A
1700 A

Isolated vertical busbars

750 A

2263 mm



1000 – 1200 mm

Non-equipped cubicle

2263 mm



400 – 800 mm

Switchgear Design

Functional Compartments and Segregation

The assembly is divided into compartments thus separating different functional areas.

Incoming circuit breaker solution:

1- Equipment compartment The equipment compartment is divided into 3 sub sections, each sub section having its own door.

The center sub section accommodates the circuit breaker and associated equipment infixed or withdrawable design.

Depending upon the option for cable entry, for example with top entry solution access to incoming connections is via the door in the upper sub section, the auxiliary compartment.

2- is then located behind the door in the lower sub section. For bottom entry the configuration is vice versa.

3- Busbar compartment Contains

The MNS main busbar system. Connection to the main bus is via a 'Partition Plate' with gas sealed connections.



Outgoing solution

1- Equipment compartment

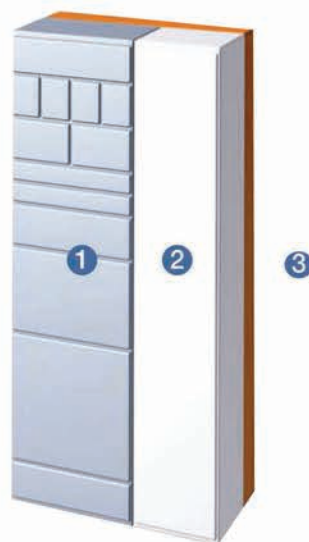
All equipment, including the motor starter modules in withdrawable design, is situated therein. The compartment can be divided into horizontal and vertical* sub compartments.

2- Cable compartment

Contains control cables and terminals, as well as power cables and connection units. Cable entry may be top or bottom.

3- Busbar compartment

Contains the MNS main busbar system. The distribution bars are embedded in the multifunction wall (MFW) which is located between the equipment compartment and the busbar compartment.



Switchboard Arrangements

MNS cubicles can be arranged as follows: free standing, back-to-back or duplex.



Enclosure

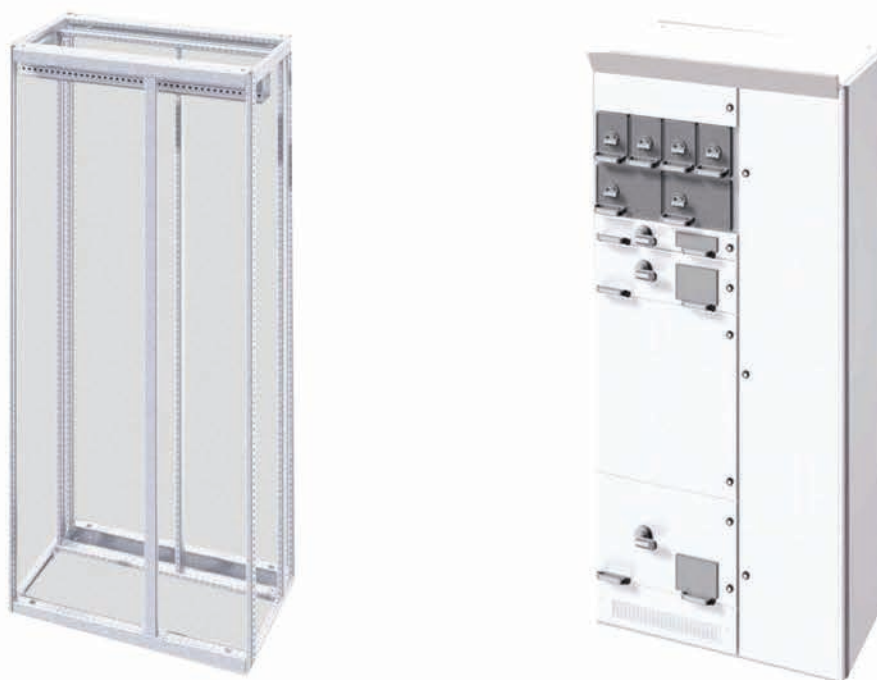
MNS switchboard enclosure is made of sheet steel protected by galvanic coating and powder coating for maximum durability.

The fixing of the enclosure with respect to doors, roof plates, rear and side walls is achieved with thread forming screws. Final construction varies depending upon the required degree of protection.

Frame construction

The basic elements of the MNS frame construction are "C" shaped steel profiles with a 25 mm hole pitch according to DIN 43660. This 25 mm equals the dimension of 1E used in LMS to define the area usage within the switchgear.

Each cubicle is precision constructed by bolting horizontal and vertical profiles together, to form a rigid modular structure.



Some Factory Equipment



CNC Punching Machine

PARSIAN TABLO CO.



LV

Low Voltage draw-out switch boards

Low Voltage draw - out switch boards

The low voltage draw – out switch gears equipped with the best brands of air circuit breakers, contactors and controls.

Rated current up to 5000A manufacture in Parsian tablo Co . with the latest technology innovations and complete computerized manufacturing process and necessary test equipments to ensure customers about safety, quality and durability of products.

Features of draw- out switch boards:

- . Busbar location on the top of the cubicle.
- . Each compartment suit to universal installation.
- . Rated peak withstand current IPK up to 375KA.
- . 3 - and - 4 pole busbar system up to 5000 A.
- . Modular structure of device Compartments.
- . Cable entry from the front and rear.
- . Rapid replacement without interrupting the operation.
- . Optimum protection for personnel And plant
- . High operational reliability and availability
- . Maintenance – free busbar and frame construction
- . Simple retrofitting procedures
- . Compact, space – saving design



Technical specifications:

Rated Operational Voltage U_e	V	690
Rated Insulation Voltage U_i	V	1000
Rated Impulse withstand Voltage U_i	kv	8
Rated Current Main Horizontal Busbar	A	UP TO 5000A
Rated Current Vertical Busbar For Withdraw Able- Unit Design	A	UP TO 1200
Rated Peak Withstand Current I_{peak} Main Horizontal Busbar	KA	UP TO 375
Rated Current Vertical Busbar For Circuit Breakers	A	UP TO 4000A
Rated Peak Withstand Current I_{peak} Vertical Bus bar For Circuit Breakers	KA	UP TO 250
Switchgear Rated Current Circuit Breakers	A	UP TO 4000A
Switchgear Rated Current Circuit Outgoing Feeders	A	UP TO 630
Internal Separation	FOR1 TO FORM 4	IEC 60439-1, SECTION7,7, DIN EN 60439-1
Surface Treatment Frame Parts/Enclosure/Doors		Galvanized powder Coated
Degree Of Protection To IEC 60529 , EN60523		IP30 TO IP54
Dimensions Of Basic Cubicle	H(mm)	2200/2600
	W(mm)	600/800/1000/1200
	D(mm)	600/800/1000/1200



Some Factory Equipment



Cutting Machine

PARSIAN TABLO CO.



MV

Medium Voltage metal clad switchboards

Medium Voltage metal clad switchboards

The medium voltage metal clad switch gears equipped with the best brands of air circuit breakers.

Rated voltage from 3.3 Kv to 24 Kv and respective Busbar current from 4000A to 2500A manufacture in Parsian tablo Co. with the latest Technology innovations and complete computerized manufacturing process and necessary test equipments to ensure customers about safety, quality and durability of products.

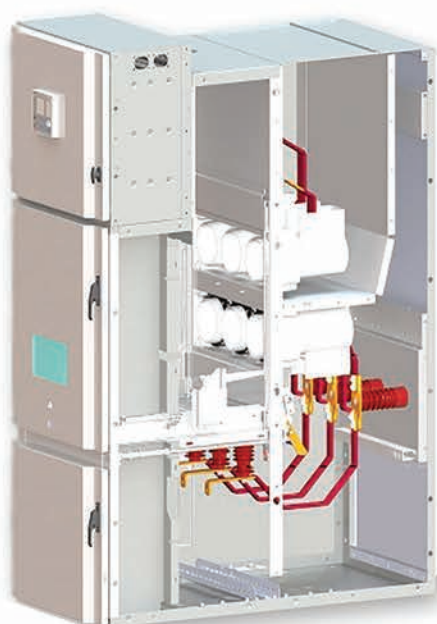
Features of metal clad switchgears:

- Air insulated.
- Arc proof.
- Main structure of the enclosure from deep galvanized steel sheet.
- Control measurement and protection LV compartment in fully segregated Compartment.
- Safety shutters and insulators on ACB, busbar, cable Compartment.
- Front access for operators, maintenance and service.
- Mechanical safety interlock.
- Factory ITP in accordance with IEC regulations and customer requirements.



Technical specifications:

Switchgear	Up to	12Kv	17.5Kv	24Kv
Type of construction		Metal - clad	Metal - clad	Metal - clad
Rated insulation voltage	Kv	12	17/5	24
Test voltage at power frequency	kv(1min)	28	38	50
Impulse withstand voltage	KV	75	95	125
Rated frequency	HZ	50-60	50-60	50-60
Rated short - time withstand current	KA 1s	...50	...50	...31.5
peak current	KA	...125	...125	...63
Rated short-time withstand current	KA 3s	...40	...40	...25
peak current	KA	...100	...100	...63
Internal arc withstand current	KA 1s	...40	...40	...25
	KA 0.5s	...50	...50	—
Main busbar rated current	A	...4000	...4000	...2500
Rated current of the branch connection	A	630	630	630
		1250	1250	1250
		1600	1600	1600
		2000	2000	2000
		2500	2500	—
		3150	3150	—
Rated current of the branch connection	A	3600	3600	2500
		4000	4000	—
Overall dimensions of basic cubicle	H(mm)	2160/2495	2160/2495	2160/2495
	W(mm)	600/750/1000	600/750/1000	750/1000
	D(mm)	1550/2000	1550/2000	1900/2300



Some Factory Equipment



**Electrostatic Powder Coating System
With ligament**

PARSIAN TABLO CO.



Low voltage Bus Duct systems

System Overview

Overview

Creating a concept design for a power supply system not only involves observing applicable standards and regulations, but also examining and clarifying economic and technical requirements. For electrical equipment selection should be based on whether the entire system can achieve the best configuration, but not limited to the integral features of equipments. For example, in choosing of connection between cabinets and transformers for the distribution, it should take into account the connections between devices as a whole. rather than individual choice Components should not only be appropriate for rated operation, but should also be suitably dimensioned to withstand faults situations. A power distribution concept should also take the following points into consideration.

- . Building type, use and form (for example, highrise building, flat buildings and number of floors)
- . Load centers and possible supply and location for transformers and main distribution boards.
- . Regulations and guidelines of building an authorities.
- . Power supply company guidelines.

There will always be more than one possible solution which will have to be assessed in terms of its technical and economic advantages and disadvantages. In making this assessment, the following requirements should be a priority.

- 1-Simple and transparent design.
- 2-Long service life
- 3-High availability
- 4-Low fire load
- 5-Flexible adaptation to building modifications.

The above problems are frequently encountered in projects. bus bar system are able to meet requirements above thanks to its features, therefore more and more engineers increase their favor of busway system over cable for power transmission, PTC provides bus bar system with current rating rating from 25A to 5000A

As a substitute for the cable distribution system, PTC Low-voltage bus bar system is an economic, ideal solution.

When install cables, the new load lines only in accordance with traditional connection methods to connect branch distribution board, costly and complicated to install.



Cable distribution is complicated with high fire load

The tap-off units of bus bar system are close to the loading equipment, enjoying clearer site layout, flexible, economical and practical features.



PTC Low Voltage bus bar system



As the power transmission system among transformer switchgear, and loading equipment, bus bar system is widely applied. Such system is safe, long life - spanreliable and convenient to operate over cable.

PTC bus bar system covers wide current range and variety and meet requires of different projects. All bus bar system complies with international IEC standard.



Bus bar System

As the big current power distribution and transmission bus bar, rated from 100A to 5000A, mainly used for connecting low-voltage switchgear and transformer or other heavy-load equipment. It shares fast installation convenient and safe performance, etc. which serves for automobile manufacturing generator manufacturing.



System Description

- 1- Straight units (With or without tap - of unit)
- 2- Tap - off unit
- 3- Joint unit
- 4- Flanged end unit
- 5- Junction Unit
- 6- Installation accessories for wall /ceiling mounting
- 7- Steel enclosure
- 8- Excellent earth device
- 9- Protection degree: IP54
- 10- Standard color: RAL 7000 RAL 7032 RAL7035
- 11- Easy installation

Some Factory Equipment



Plaque Engraving Machine

PARSIAN TABLO CO.



Steel Compact Substation

1. General Description

PCS is a series of outside-operated compact secondary substations for voltages up to 24kV. They have been designed and manufactured by PTC Electrical Industries Co. IRAN to withstand all operating needs and special environmental conditions in IRAN and other places with same environments.

The PCS series prove that compact secondary substations can be really compact while main training all required electrical parameters



Features

- Outside operated substations
- Specially designed sand traps
- Contains three compartments which are totally separated by galvanize sheets
- IP43 for the LV & MV compartments
- IP23 for transformer compartment
- Flexibility in selecting the required LV & MV equipment
- Double roof with air insulation
- Powder paint coated finish



2. Standards

The design of PCS substations and their components is based on the relevant IEC standards .

The relevant standards are:

IEC 61330	High-Voltage / Low-Voltage : Prefabricated Substations.
IEC 60298	: Metal-enclosed Switchgear.
IEC 60265-1	: High-Voltage Switches.
IEC 60420	: High-Voltage alternating current fuse-switch combinations.
IEC 60694	: Common clauses for high-voltage switchgear and controlgear standards.
IEC 60282-1	: HRC fuse links.
IEC 60076	: Power Transformers.
IEC 60947-1	: Low Voltage Switchgear.

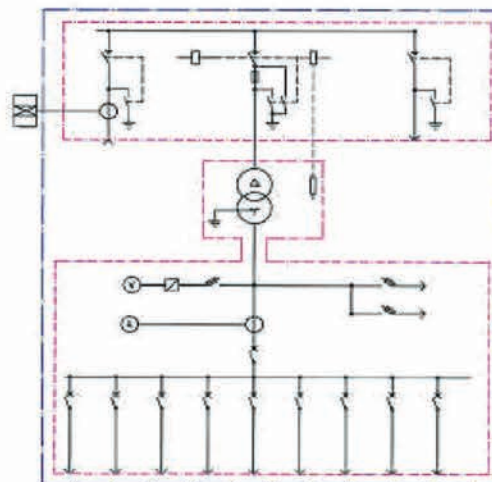


Fig. 1

3. Design

PCS substations are completely self-contained, factory assembled in a totally enclosed metal cladding, weatherproof housing ready for placing into position upon a concrete pad .

The housing of the kiosk is mainly made of 2mm galvanize steel sheets. In addition, 3mm galvanized steel sheets are used for stronger support in the base frame. Last finish coat is powder paint of polymer resin base color to RAL 7035 (or other colors).

Each substation contains three main equipment: transformer, MV switchgear and LV switchgear, each is contained in a separate compartment. The compartments are completely separated by galvanize steel sheets. Labyrinth louvers with sand traps at the bottom form the sidings of the transformer compartment to assure free entry and exhaust of air, as such the inside temperature is kept within limits. The substation is provided with a metallic ceiling as additional provision to diminish heating due to solar radiation (double roof system). Openings located at the lower and upper sides of the slanted roof allow air circulation as part of the ventilation design.

The outer doors of the kiosk are wide and provided with gas spring stoppers. They are provided with heavy-duty hinges to prevent distortion and mis-alignment. Locks are provided with door swing handles. When they are closed, they are firmly locked. The MV doors are provided with a drawing pocket.

Degree of Protection:

HV Compartment	: IP43 (IP54 on request)
Transformer Compartment	: IP23
LV Compartment	: IP43 (IP54 on request)

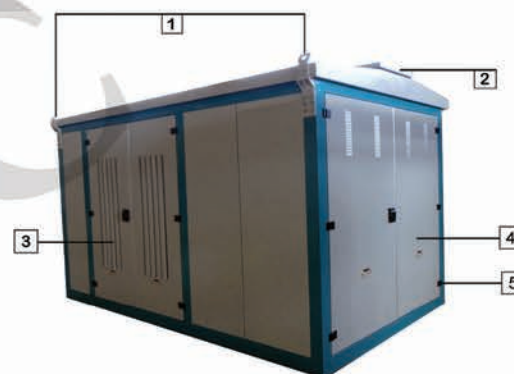


Fig. 2

1. Four roof mounted lifting eyes
2. Top external slanted roof with ventilation openings
3. Sand traps in both sides of transformer compartment
4. MV compartment door
5. Heavy-duty door hinges

4. MV Compartment

MV compartment can be equipped with varieties of MV switchgears. For voltages up to 24KV

Alternatively, air-insulated modular MV switchgear type UniSwitch 24KV - 36KV (see Fig. 3) or other SF6-insulated switchgear can be provided to protect the distribution transformer. Load break switches and circuit breakers modules can be combined together in different arrangements. as per the customer needs.

All options can be provided with distribution automation facilities.



Fig. 3 :

5. Transformer Compartment

The compartment is specially designed to provide the transformer with sufficient air volume and flow for cooling through adequately sized and professionally designed ventilation openings. These ventilation opening, located on both sides of the compartment, are uniquely designed to trap the sand from entering the compartment. Hence, they are called sand traps.

Transformer compartments can be equipped with either oil-immersed or dry type (as an option) transformers. In case of oil-immersed transformers, normally, three phase hermetically sealed (with corrugated sheet) steel tank transformers are used. All standard and optional accessories can be offered with the used transformers. (see Fig. 4)



Fig. 4: Transformer Compartment

6. LV Compartment

This compartment contains the Low Voltage Distribution Boards (LVDB-see Fig. 5), connected to the secondary side of the transformer. The LVDB can be designed in different arrangements and configurations in order to suit a specific application with certain required equipment such as :

- Air Circuit Breakers (ACB)
- Moulded Case Circuit Breakers (MCCB)
- LV Fuse Switches / Fuse ways
- Instrumentation & Metering
- Automatic Transfer Schemes (ATS)
- Street Lighting Systems



Fig.5: LV Compartment

7. Connection between Equipment

Equipment safety is our concern. Accordingly and in order to have full safety of equipment inside PTC CSS, especially the transformer bushings, the connection between the transformer and the RMU is made with XLPE insulated cables.

The customer has the option to choose either plug-in or heat-shrink type termination as connection to the transformer and the RMU sides.

The connection between the transformer and LVDB is made with flexible busbar. The flexible part is installed to absorb vibrations caused during transportation.

8. Grounding

Each PCS substation forms a complete metallic structure bolted together. In addition, the LV and MV compartments are provided with grounding busbars. Bonding and interconnection of the grounding buses are made of 70mm bare stranded copper conductors



Fig.7: Grounding connection between equipments

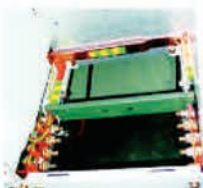


Fig.6: Connection between equipments

9. Double Roof

One of the remarkable advantages of the design of PCS Substations Series is the double roof system. Each substation is equipped with a top slanted roof under which an additional internal ceiling is fixed. The external roof and the internal ceiling are separated by a volume of air. This air plays a remarkable role in insulating the internal equipment of the substation from the external heating sources (mainly due to sun radiation). In addition, both roof and ceiling are specially designed with ventilation openings to facilitate the air circulation and hence to support the complete cooling system of the substation.

(see Fig. 8)

10. Ventilation and Sand Traps

Another remarkable feature of PCS substations design is the sand traps located at both sides of the transformer compartment. These sand traps are specially designed for harsh and sandy environments. While trapping the sand, these sand traps will allow the smooth circulation of the incoming and outgoing ventilation air. The natural flow of this ventilation air is due to the thermosiphon effect. Cool air enters from lower inlets. As it absorbs heat, it becomes lighter (less dense), so it rises upwards and then slowly expelled out of the substation from the outlets located on top. As a result, the temperature rise of the internal compartments of the substation can be kept within limits.

(see Fig. 9)

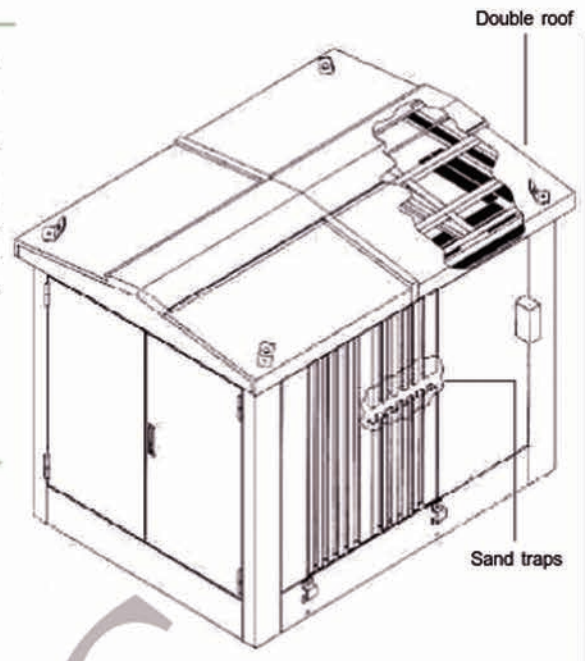
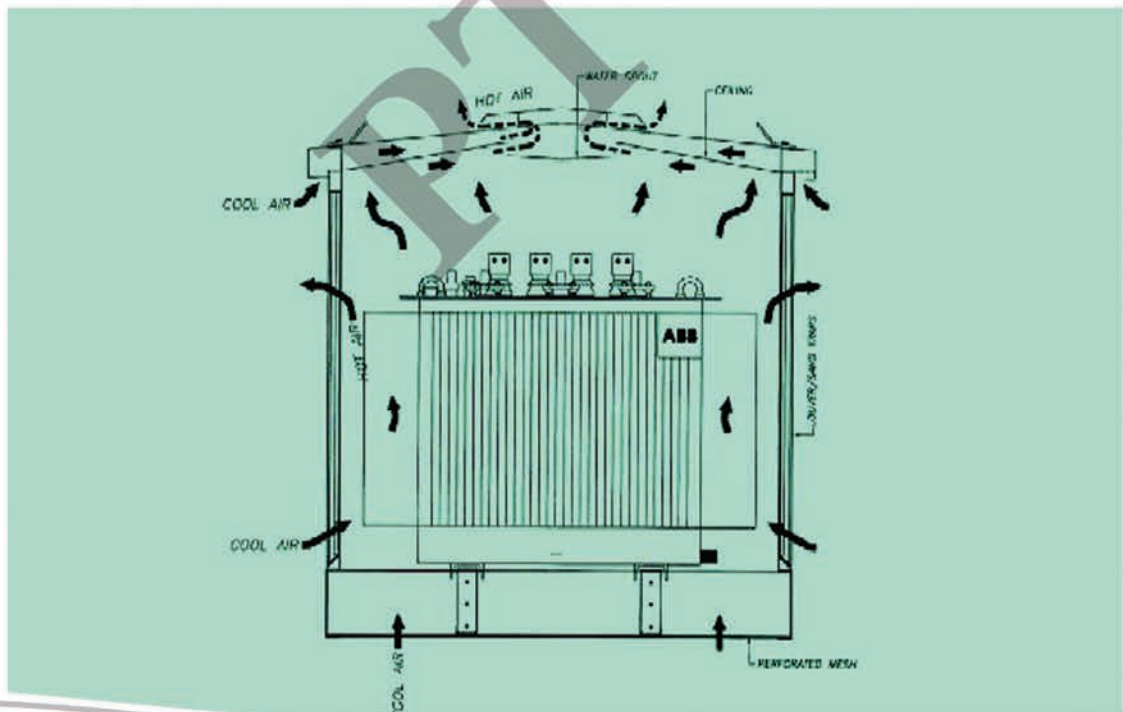


Fig. 8: Double roof & Sand traps



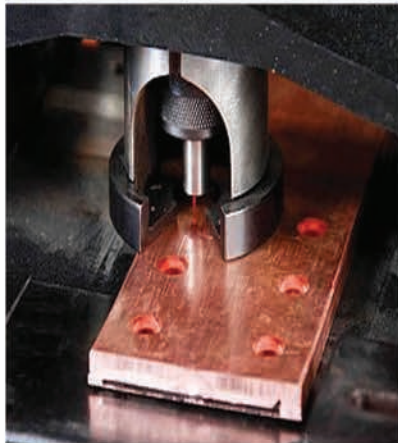
11. PCS Range

Maximum voltage rating (kV)	Substation Type	Transformer rating (kVA)	Arrangement H D W	Outer dimensions (HxWxD)
24	PCS 315	(Up to 315 Oil Type)		2000x3900x2300
24	PCS 400	(Up to 400 Oil Type)		2000x3900x2300
24	PCS 500	Up to 500 (Oil Type) Up to 1000 (Dry Type)		2000x4100x2300
24	PCS 630	630 (Oil Type) 630 (Dry Type)		2000x4100x2300
24	PCS 800	800 (Oil Type) 800 (Dry Type)		2200x4100x2400
24	PCS 1000	1000 (Oil Type) 1000 (Dry Type)		2400x4200x2400



Fig. 10: PCS 1000

Some Factory Equipment



Bullion Bending Machine

PARSIAN TABLO CO.



PMCS

Multipurpose Compact Substation

RE-POWERING & SERVICE INTEGRATION

PTC has a long experience in urban technological furniture. We offer integrated infrastructures taking care of environment and urban aesthetic.

Focusing our designs on sustainability mobility, we have developed a product range to meet the needs of the energy demand, telecommunication needs and electric mobility. The following diagram represents the products we offer:



PTC, as a designer, supplier and integrator of solutions, offers One product lines **PMCS**, to conceal Power PTC developed the **PMCS** enclosures with the following characteristics:

SOLID STRUCTURE - Composed of a levelling and adaptation to the terrain base made of Stainless Steel polygonal in shape with spikes made of the same material to be embedded in the cement.

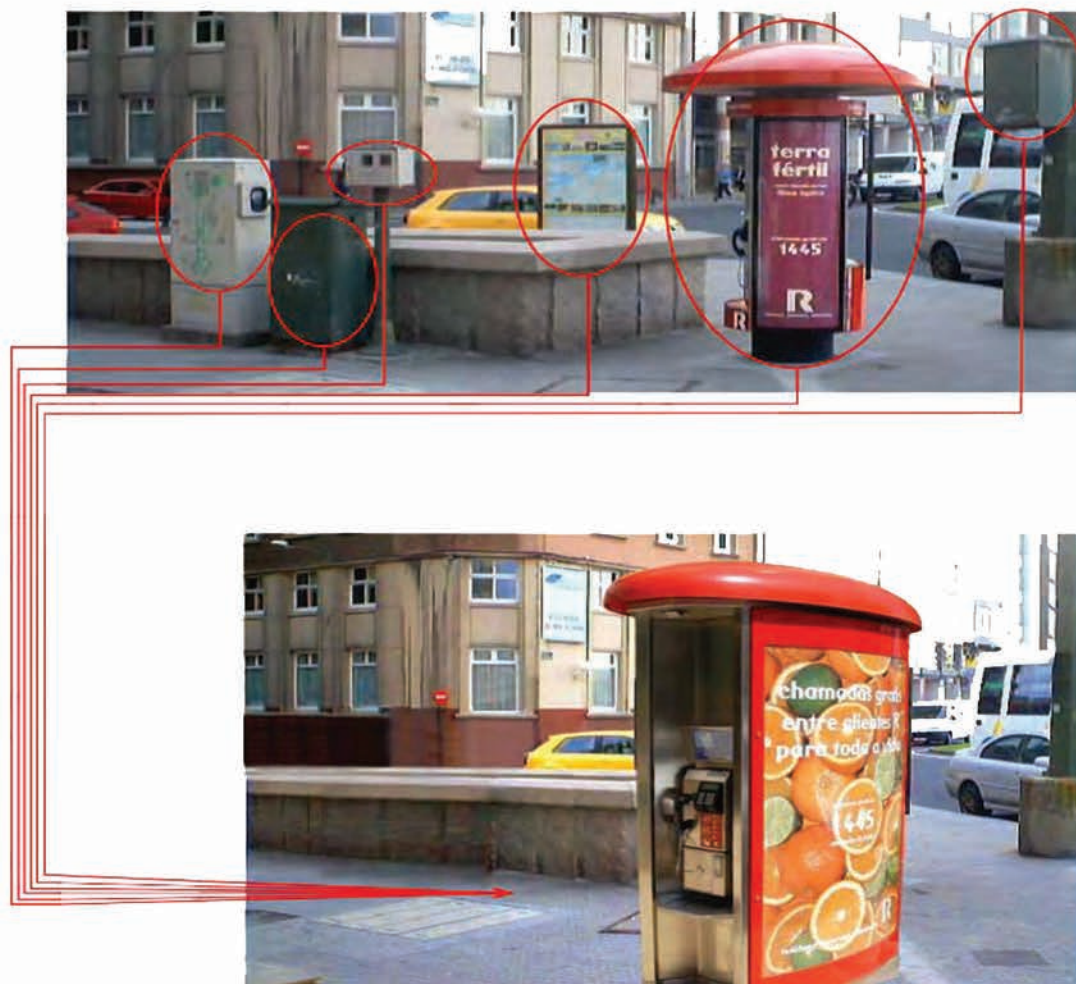
This is the starting point for the prismatic form of its internal/external skeleton reinforced with crossbeams, as well as the vents. Its roof is formed of a polyester hood reinforced with fibreglass and it has an elliptical shape.

On the East/West sides there are sliding doors with transparent polycarbonate windows of standard sizes for vertical urban publicity, which on opening gives access to the actual door of the internal enclosure located inside. Inside these doors there are the internal lighting and the access to change publicity.



LONG SERVICE LIFE - The quality of the materials used: Stainless steel, Lacquered aluminium, 4 mm Polycarbonate on the outside with sun filter and fibreglass reinforced polyester planned for a long service life of the equipment, even when located in areas or different and difficult climates.

MULTIFUNCTIONAL STRUCTURE - The cabins enable up to four standard advertising spaces. It can contain an internal cabinet of Stainless Steel getting a IK 10 protection with a power substation up to 630KVA concerning **PMCS**.





MULTIUSE STRUCTURE - PMCS can be used by the owner, by city councils, by the public and by advertising companies, which can only access this section.

BETTER INTEGRATION IN THE STREET FURNITURE - After an analysis of existing street furniture incities, PTC enclosures were designed with a slender look and modern design, to blend completely into the environment.



STANDARD PUBLICITY SPACES - All the MUPI of standard sizes 1,800 x 1,200 mm, are back-lighted with LED lamps. Everyone knows the interest that exists in strategic publicity spaces and the revenue generated by renting these locations. The owner will be able to use the spaces on the North/South sides, doorframes, for publicity.

CUSTOMISABLE - PMCS is designed and developed to use the colours and the image of the operator.

COMPATIBLE AND NOT AGGRESSIVE WITH THE ENVIRONMENT OF HISTORIC AREAS - Both cabins can also be customized to integrate historic areas, by giving the roof an antique copper or cast iron appearance, with the doors in ash grey and the rest in stainless steel. It can include a natural wood finish.





In this new technological world, it is a fact that the demand for electric energy in cities is constantly growing, which implies increasing the capacity of power substations (henceforth PS).

Due to the concern of electricity supply companies in bringing PS close to the points of consumption, to improve the quality of supply there are a series of problems that supply companies have to face:

- The Utility's PS are overloaded.
- The need to negotiate adequate locations on ground floors.
- The need to install Pad Mounted-type in the street.
- The need to look solutions on the facades of buildings.
- The need to bury the PS under ground.

All of these solutions have a important drawbacks:

- Acquisition: cost.
- In the streets: Town Council permissions.
- Urban aesthetics - degraded.
- The image of the Electric Company is degraded.
- Underground PS: elimination of heat and water.

PMCS (Special Centre for Urban Transformers), is an enclosure holding all the elements of a compact transformer substation composed of:

- Transformer.
- RMU.
- Low voltage Panel.
- Tele-control Panel.
- Aesthetic external enclosure.

The external enclosure presents 4 spaces standardized for publicity of 1800 x 1200 mm (MUPI), back-lighted with LED lamps. From this basic configuration, and always maintaining 4 MUPIS, the North/South sides can be used to conceal:

- Street electrical lighting cabinets.
- Traffic-lights cabinets.
- Smart Grid devices.



QUICK AND EASY INSTALLATION - To install PMCS, it takes about one day's work and the technical and human resources needed are:

- One lorry crane.
- Two operators.
- One supervisor.



Some Factory Equipment



Corner Notcher Machine

PARSIAN TABLO CO.



GRC

Prefabrication & Distribution A Global Solution

GRC

We create tailor-made solutions adapted to your needs Because the methods, regulations, and needs are different in each country, we provide the solutions which correspond with your applications and with your expectations, whatever your sector of activity:

- Utilities,
- Buildings,
- Industry,
- Wind farms,
- Mining applications.

ADAPTABLE TECHNOLOGY

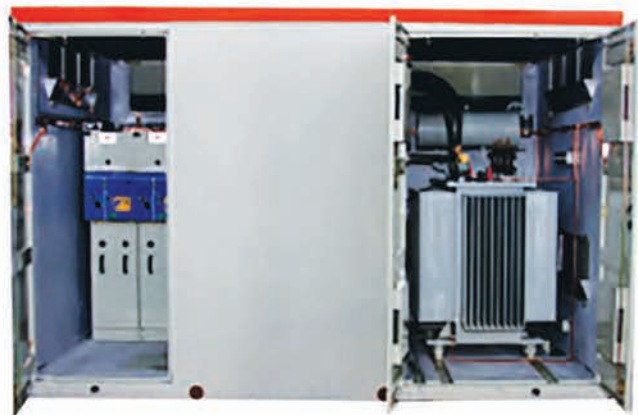
Our products are designed to answer the most varied applications, from the smallest to the largest project solution:

- Switching units and compact substations,
- Substations with corridor,
- Substations with modular dimensions,
- Substations connected together up to 210m2,
- Mobile or provisional power supply.

ADAPTABLE MATERIALS

Our 14 years of experience, has proven our expertise in selection of proper material dedicated to the application.

- Reinforced concrete,
- GRC, special light concrete,
- Steel enclosure.

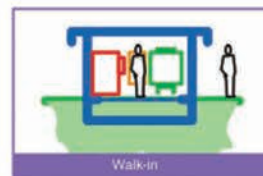


Design of a substation

The definition of a substation depends on a number of criteria

TYPE OF OPERATION

- Walk-in version



Corridor for easier operation, enabling protection of the operator from bad weather, compact surface.

DESIGN OF THE SUBSTATION ENCLOSURE

- Without plinth



Civil engineering work must be carried out on-site.

TYPE OF MATERIAL FOR THE ENCLOSURE

- Light concrete (G.R.C.)



- For compact substations
- Excellent resistance to thermal shocks and corrosion.
- Aesthetic design.
- Light-weight.

CONFORMITY WITH THE I.E.C. STANDARD



People and equipment safety
Retention tank, temperature rise test,
IP25D, mechanical withstand etc.



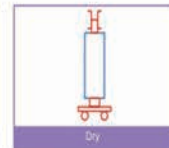
Choosing internal arc capability,
(Yes or No) is called (I.A.C.)
for public safety.

TYPE OF TRANSFORMER

- Oil immersed
- Dry



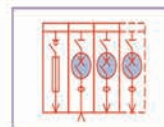
Oil immersed
Hermetically sealed transformer for more compact dimensions of the substation, with oil retention tank.



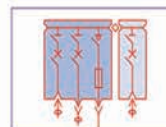
Dry
Cast resin transformer to reduce fire risk for strategic locations.

TYPE OF MV CUBICLE

- Air insulated switchgear
- Gas-insulated switchgear



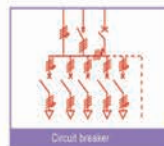
Air insulated Switchgear
Modular expandable design with SF6 switch in AIS cubicle



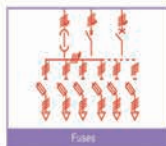
Gas-insulated Switchgear
Complete GIS expandable design

TYPE OF LOW VOLTAGE

- Circuit breaker
- Fuses
- Disconnecter



Circuit breaker
The circuit breaker solution is preferred for facilitating operation and maintenance work. Expensive, however.



Fuses
Fuses mean better protection of the installation. Cost effective.

Advantages of a prefabricated substation solution

Quick Delivery

The industrialization of the manufacture of our substations allows fast and secure delivery of a complete product ready to be connected to the network.

Easy & Quick Installation

The concept of the prefabricated substation allows delivery on site of a complete product preconnected and tested at the factory.

Only connection to the electrical network remains to be carried out.

Simplified transport on a standard truck or container.

Quality

Our manufacturing process is in conformity with the Quality standard ISO9001.

Security/Safety

Guaranteeing the safety of operators and of the public is our main concern.

Our prefabricated solutions are fully connected, factory tested and undergo controls before delivery.

Our standard substation equipment is approved and installed according to a strict and industrialized process.

Respecting Standards

All of our substation equipment is in conformity with the Standards.

Cost-Effective Solution

In terms of manufacturing, delivery and reduction of civil engineering work on-site.



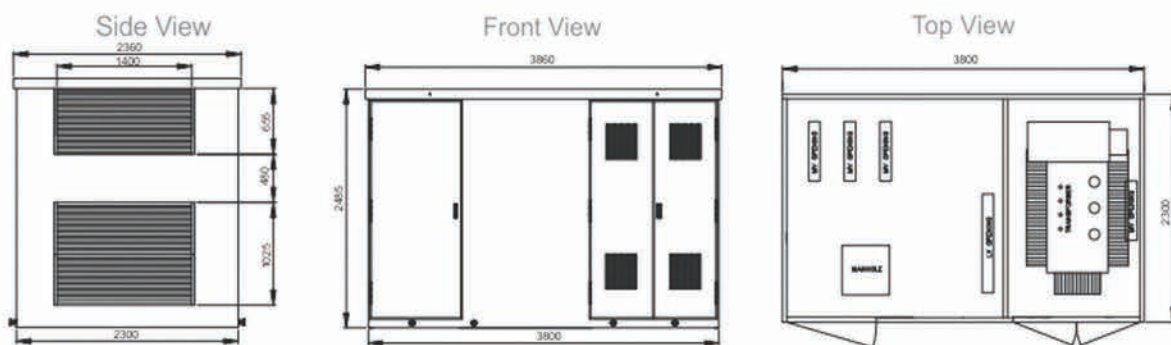
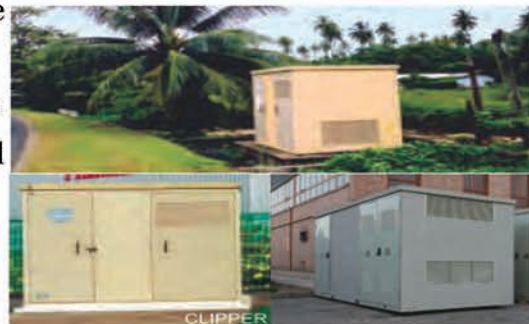
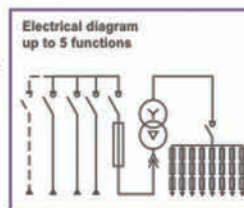
Walk-in substation

Indoor Operation

This range presents a real compactness arrangement, but as well an added feature: "indoor operation" often preferred by maintenance & operation team in terms of convenience and safety. The range exists with different widths in order to fit even higher electrical performance.

Entirely made in G.R.C. our range of CLIPPER Cmbines the robustness of concrete and lightness in weight.

It is easy to transport by truck or ship (container). This type of substation is preferred for tropical reas, because of the non-corrosive nature of the material, and reduced condensation. Futhermore, even under hot sunny conditions, the temperature effect is limited compared to a steel enclosure.





Some Factory Equipment



High Voltage Labrator



Some Quality Control Equipment

PARSIAN TABLO CO.



Pad - Mounted Transformer

A pad mount or pad-mounted transformer is a ground mounted electric power distribution transformer in a locked steel cabinet mounted on a concrete pad. It is used with underground electric power distribution lines at service drops, to step down the primary voltage on the line to the lower secondary voltage supplied to utility customers. pad-mounted transformers are usually low KVA transformers with self-protection and switching options in the form of elbow connectors and built in sectionalizing switches.

Advantages

- 1 Minimum area for installation
- 2 No civil work
- 3 Free maintenance
- 4 Easy transportation
- 5 Using transformer with low losses
- 6 Short time for installation and start up
- 7 Decreasing cost in comparison with old type sub-station
- 8 automation (Optional)

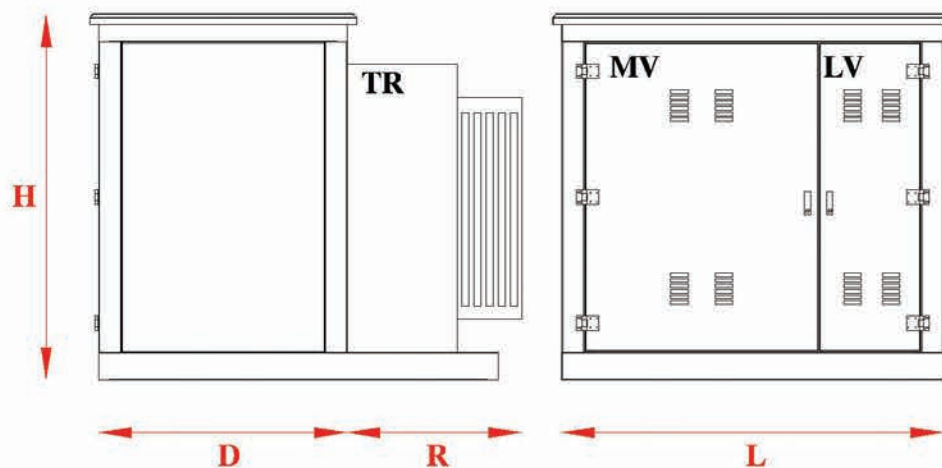


Construction standards:

The Construction of pad mounted transformer is designed based on ANSI C57

Service area	Outdoor
Phase	3
Rated Frequency	50 HZ
Capacity	100-1600 KVA
RATED Voltage	24 KV
Secondary voltage	400/230 Volt
Cooling method	ONAN-Liquid immersed
Temperature (MAX)	65 °C

Rating (KVA)	H.V (KV)	R (Radiator)	Dimension (L×D×H)	Weight (Kg)
100	20	***	150 × 95×125	1500
200	20	***	150 × 95×125	1860
160	20	***	150 × 95×125	1650
250	20	***	150 × 95×125	1950
315	20	25	150 × 95×125	2100
400	20	35	150 × 105×155	2900
500	20	35	150 × 105×155	3100
630	20	35	150 × 105×155	3400
800	20	35	160 × 110×165	4200
1000	20	35	180 × 130×185	5000
1250	20	45	180 × 150×185	5600
1600	20	55	190×150×195	5900





Capable Of Making , Dependable In Quality



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