AUGIER energy
a company of ARETÈ COCCHI TECHNOLOGY

PTC

PTM

PTS

STEP-UP & STEP-DOWN METALLIC SUBSTATIONS
950 V - 3200 V - 5500 V - 6600 V networks
Product leaflet

- Bring energy close to the site
- Financial benefits of shorter cables
- Easy installation and use
- Integrated electronic protections
- Security: secured with proper locks

6010552– 26/03/2024

Need to power a receiver far from the source?
Augier Energy offers step-up and step-down transformer substations.

CONTENTS

TRANFORMER SUBSTATIONS

Abbreviations

LV	Low voltage
BTM	Max. low voltage – 950 V
CIMALT	Isolation and earthing switch
MV	Medium voltage – 3200 V, 5500 V , 6600 V
PT	Transformer substation
PTC	Compact transformer substation
PTM	Modular transformer substation
PTS	Simplified transformer substation
TMAI	Dry type single-phase transformer
TTAI	Dry type three phase transformer

END-TO-END ENERGY TRANSPORT

- Power rating of 3 to 1250 kVA, a step-up substation supplies a step-down substation
- Bring energy closest to the receiver
- Fewer cables
- Easy installation

NETWORK CONTROL AND PROTECTION

- Autonomous, complete substation delivered pre-wired
- Electric protection of energy transport network
- Outdoor lighting network control with contactor
- Earthing switch for safety intervention

NETWORK MONITORING

- Integrated sensors show substation status
- Supervision with SMS delivery
- Event control and timestamping

applications

TRANSFORMER SUBSTATIONS

Roadway equiment

Supply to dynamic equipment (camera, variable messaging boards, radar, vehicle counting).

Lighting

Lighting supply for roads, bypasses, industrial zones, tunnels, bridges.

Airports

Supply to Navaids equipment (Glide, VOR, DME, Localizer) and lighting for airplane parking, access roads, fencing.

Military

Supply for surveillance devices, identified targets, gates.

Power plants

Supply for security lighting, remote buildings, motorized doors, pumps, measuring equipment.

Railways

Supply for GSM-R communications materials, instrumentation, and lighting of emergency outlets in tunnels.

Hydraulic - dams

Supply for valves, water intake.

Ski resorts

Supply for run lighting, remote restaurants, motors (Tyrolean).

FROM 3 TO 1250 kVA
950 V - 3200 V - 5500 V

TRANSFORMER SUBSTATIONS

AUGIER's transformer substations are modularly designed units that guarantee performance. They are available in step-up or step-down models for indoor or outdoor use**.**

Substation Construction

- The indoor models are made of either steel or aluminium sheet metal
- Substation closed by doors locked by a lock
- Substation with transformer and electrical protection

Models available

Choice of model will depend on use, voltage characteristics, power rating, and operation provided by the equipment type.

Model	***Installation***	***Max Voltage (kV)***	***Power rating in kVA***		**MV device associated with HRC protection**
			Single-phase	Three-phase	
PTS95 int	Indoor	0,95	50	63	Load break + earthing switch
PTS95 ext	Outdoor	0,95	32	100	
PTS32 int	Indoor	3,2	50	50	Isolating and earthing switch
PTS32 ext	Outdoor	3,2	32	32	
PT3I ext	Outdoor	3,2	32	160	Load break switch
PTM	Indoor	5,5	160	160	Isolating switch or contactor and earthing switch
PTMI	Indoor	5,5	160	160	Load break switch and earthing switch
PTC-R or S	Outdoor	10	100	1250	Load break switch and earthing switch

Standards

The transformer substations conform to the following standards:

Substation

- NFC 64 400 – CEI 6227 I-200: metal-encased high-voltage equipment
- NFC 20 010 – CEI 60529: degree of protection ensured by encasing

Transformer

- CEI 60076: power transformers
- NFC 52-410: high-voltage/ low-voltage transformers
- Ecodesign directive 548/2014/CE

SELECTED PROJECTS

TRANSFORMER SUBSTATIONS

Aire de la Clusaz, supply to rest area

Aéroport de Hong Kong, fence lighting

Aéroport de Malabo, ILS supply

LGV Rhin Rhône, instrument supply

Carole race track, lighting supply

Avord Air Base, building supply

Braus Tunnel, GSM-R communication

Borgo Bypass, lighting supply

INDOOR
PTS95 int - 950 V substation 3 to 63 kVA

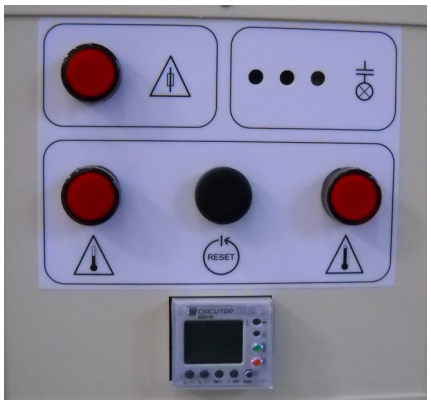
TRANSFORMER SUBSTATIONS

PTS95 int

General characteristics

- Made from sheets of painted aluminium, RAL 1015, IP21, bottom-less station, front closed by a door with a three-point handle
- Impregnated dry-type transformer, from 3 kVA to 63 kVA, delivery separately
- Adjustment taps +/- 5 %
- Equipped on the 950 V side with a three-position load break switch, allowing the mains to be disconnected and grounded
- For use with single-phase or three-phase networks
- Network fuse protection 950 V fuse merger device with signalling light, and transfer of information across terminals
- Thermal protection at one temperature threshold with LED signalling and contact output on terminals
- LED live voltage signal on 950 V side
- “In service” position for terminal output switch
- Unbalanced current protection achieved by differential torus and associated double-threshold relay (On step up PTS95 only)

Load break switch 950 V



Signalling and control panel

Optional features

Mechanical

- Substation with bottom
- Ronis lock to secure isolating switch

Protection

- Isolating controller, P1 card and Cardew (for neutral IT mode)
- Surge arrester on 950 V side but also, if applicable, on low-voltage side

Additional features

- Supplemental 950 V load break switch (S and XL versions only)
- Doubling of the 950 V terminals to allow passage through the artery
- Heat resistant Résistance

Standard characteristics

Power rating (kVA)	3 to 63 kVA (see selection table)		
Step-up transformer: Primary voltage No load secondary voltage	230 V or 400 V 970 V		
Step-down transformer: Primary voltage No load secondary voltage	950 V 235 V or 410 V		
Insulation class primary / secondary	1100 V		
Coupling	Single-phase or three-phase		
Transformer	Impregnated dry type		
Dimensions: Length (mm)) Depth (mm) Height (mm) Average weight without transformer (kg)	Small model XS 750 640 1004 65	Medium model S 1000 640 1230 80	Large model XL 1205 840 1520 110

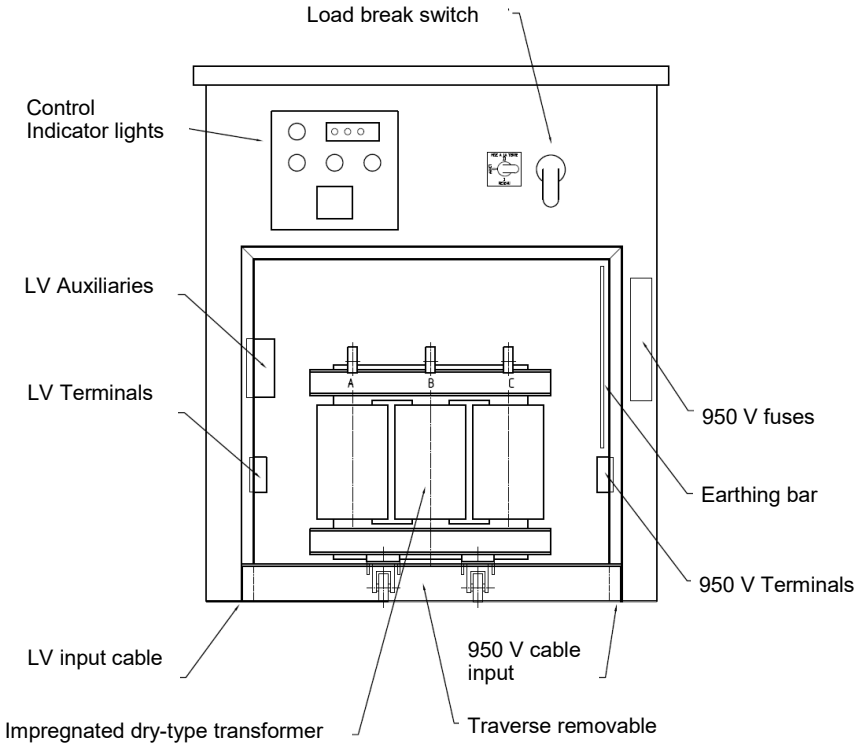
PTS95 int XS with 3 kVA single-phase dry transformer

SELECTION TABLE – POWER RATING LIMITS

Coupling \ Power rating (kVA)		3	5	10	16	25	32	50	63
950 V Single phase	1 load break switch	XS	XS	XS	XS	S	S	XL	-
	2 load break switch	S	S	S	S	S	S	XL	-
950 V Three phase	1 load break switch	-	-	XS	S	S	XL	XL	XL
	2 load break switch	-	-	S	S	S	XL	XL	XL

XS : Small model
S : Medium model
XL : Large model
- : Not available

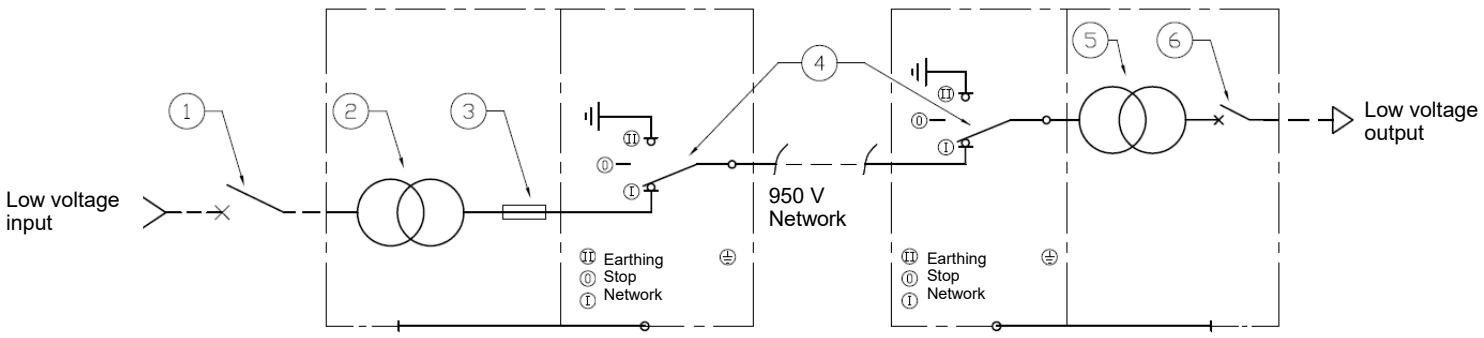
PTS95 int - FRONT PANEL REMOVED



Drawing 55 01756

STEP-UP / STEP-DOWN SUBSTATION – SINGLE-LINE DIAGRAM

STEP-UP SUBSTATION **STEP-DOWN SUBSTATION**



1- GENERAL CIRCUIT BREAKER (not supplied)
2- STEP-UP TRANSFORMER
3- 950 V FUSE
4- LOAD BREAK SWITCH
5- STEP-DOWN TRANSFORMER
6- LOW-VOLTAGE CIRCUIT BREAKER (optional)

Drawing 4505101

OUTDOOR
PTS95 ext - 950 V SUBSTATION 3 to 32 kVA

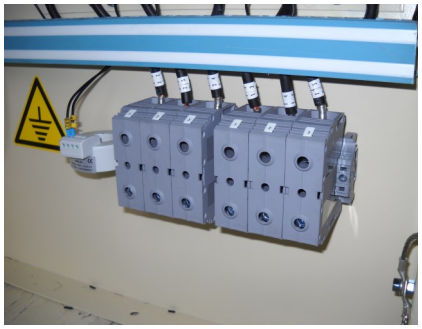
TRANSFORMER SUBSTATIONS

Photo : PTS95 ext XL

General characteristics

- Made from sheets of painted aluminium, RAL 1015, IP44, bottom-less station, front closed by a door with a three-point handle
- Waterproof transformer, IP68, from 3 kVA to 63 kVA
- Adjustment taps +/- 5 %
- Equipped on the 950 V side with a three-position load break switch, allowing the mains to be disconnected and grounded
- For use with single-phase or three-phase networks
- Network fuse protection 950 V, fuses incorporated in the transformer
- Thermal protection at one temperature threshold with LED signalling, contact output on terminals
- “In service” position for terminal output switch
- Unbalanced current protection achieved by differential torus and associated double-threshold relay (On step up PTS95 only)

950 V Load break switch



950 V connection terminals

Optional features

Mechanical

- Substation with bottom and anti-insect grill on the vents
- Ronis lock to secure isolating switch

Protection

- Isolating controller, P1 card and cardew (for neutral IT mode)
- Surge arrester on 950 V side but also, if applicable, on low-voltage side

Additional features

- Supplemental 950 V load break switch (S & XL version only)
- Doubling of the 950 V terminals to allow passage through the artery
- Heat resistant and thermostat

Standard characteristics

Power rating (kVA)	3 to 32 kVA (see selection table)		
Step-up transformer: Primary voltage No load secondary voltage	230 V or 400 V 970 V		
Step-down transformer: Primary voltage No load secondary voltage	950 V 235 V or 410 V		
Insulation class primary / secondary	1100 V		
Coupling	Single-phase or three-phase		
Transformer	Watertight IP 68		
Dimensions: Length (mm) Depth (mm) Height (mm) Average weight without transformer (kg)	Small model XS 750 640 1004 65	S Model 1000 640 1230 80	Large model XL 1205 840 1520 110

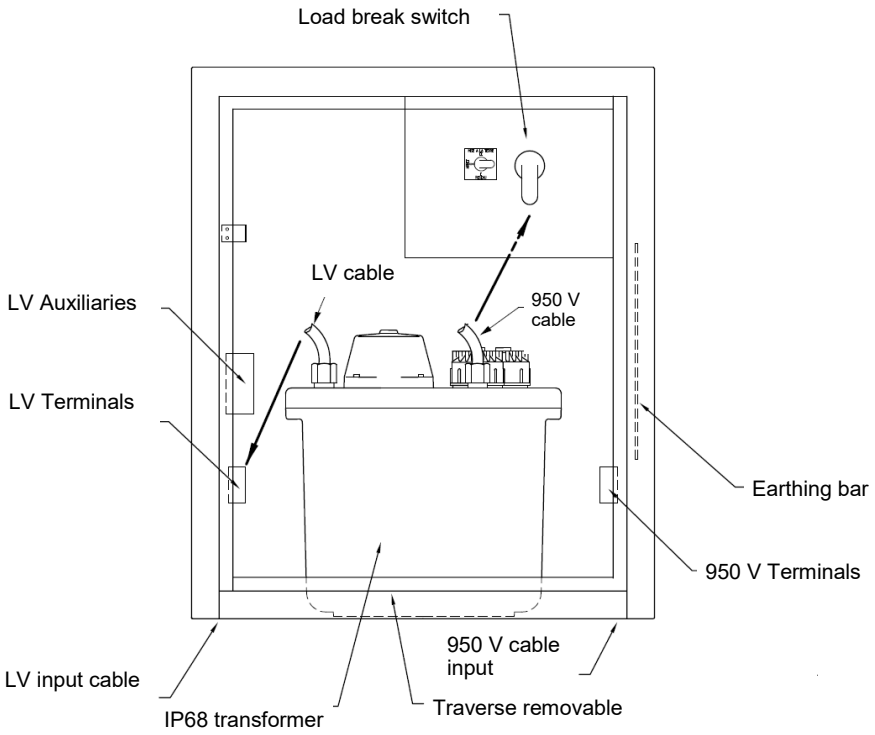
PTS95 ext XS
with 5 kVA transformer

SELECTION TABLE – POWER RATING LIMITS

Coupling \ Power rating (kVA)		3	5	8	10	16	25	32
950 V Single phase	1 Load break switch	XS	XS	XS	XS	XL	XL	XL
	2 Load break switch	S	S	S	S	XL	XL	XL
950 V Three phase	1 Load break switch	-	XL	-	XL	XL	XL	XL
	2 Load break switch	-	XL	-	XL	XL	XL	XL

XS : Small model
S : Medium model
XL : Large model
- : Not available

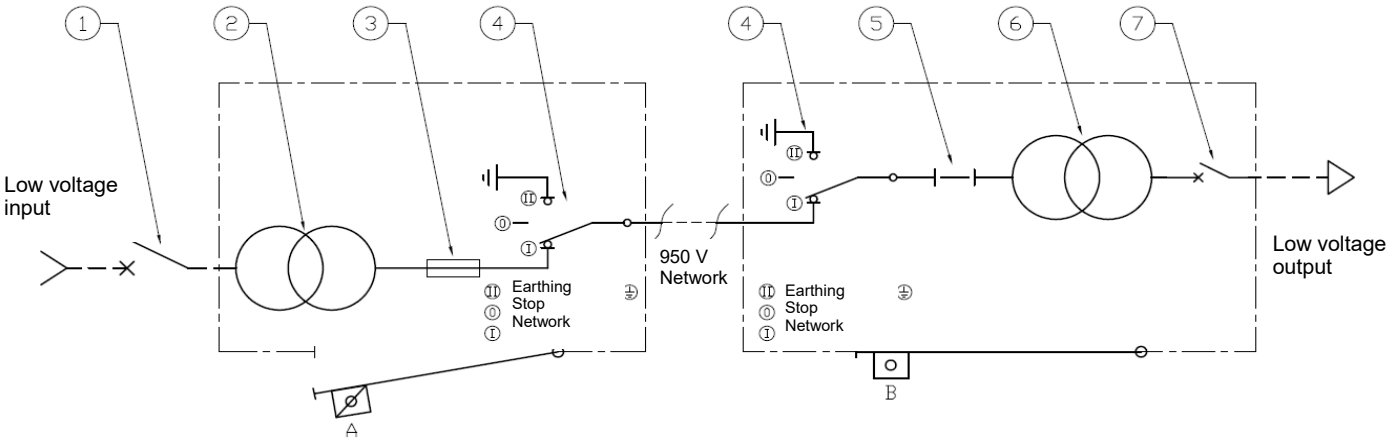
PTS95 ext — FRONT PANEL REMOVED



Drawing 55 01757

STEP-UP / STEP-DOWN SUBSTATION – SINGLE-LINE DIAGRAM

STEP-UP SUBSTATION **STEP-DOWN SUBSTATION**



1- GENERAL CIRCUIT BREAKER (not supplied)
2- STEP-UP TRANSFORMER
3- 950 V FUSE
4- Load break SWITCH
5- SHUNT
6- STEP-DOWN TRANSFORMER
7- LOW-VOLTAGE CIRCUIT BREAKER (optional)

Drawing 4505102

OUTDOOR
PTS95 ext - 950 V SUBSTATION
50 to 100 kVA

TRANSFORMER SUBSTATIONS

General characteristics

- Made from sheets of painted aluminium, RAL 1015, IP44, bottom-less station, front closed by a door with a three-point handle
- Waterproof transformer, IP68, from 32 kVA to 100 kVA
- Adjustment taps +/- 5 %
- Equipped on the 950 V side with a three-position load break switch, allowing the mains to be disconnected and grounded
- Low-voltage compartment is designed to receive the EDF counting table (list in blue or yellow)
- Network fuse protection 950 V, fuse merger device with signalling light, and transfer of information across terminals
- Thermal protection at one temperature threshold with LED signalling and contact output on terminals
- LED 950 V live signal voltage signal installed in the low-voltage compartment
- Unbalanced current protection achieved by differential torus and associated double-threshold relay (On step up PTS95 only)
- Substation interlocking and closing via three-point locks

950 V load break switch and lock

Advantages

- Low-voltage compartment integrated with independent access
- Removable lifting handles for easy installation

low-voltage compartment

Optional features

Protection

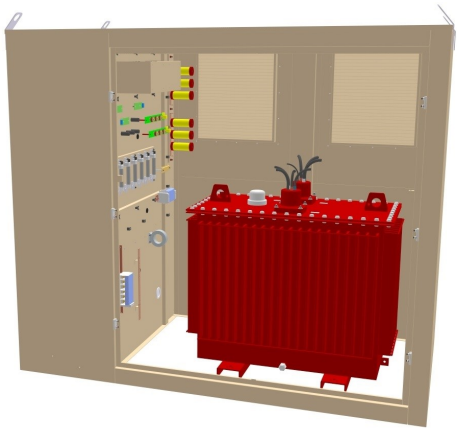
- Surge arrester on 950 V side but also, if applicable, on low-voltage side

Additional features

- Supplemental 950 V load break switch to create two three-phase outlets or four single-phase outlets
- Heat resistant and thermostat

Standard characteristics

Power rating (kVA)	32 to 100 kVA (see selection table)
Step-up transformer: Primary voltage No load secondary voltage	 230 V or 400 V 970 V
Step-down transformer: Primary voltage No load secondary voltage	 950 V 235 V or 410 V
Insulation class primary / secondary	1100 V
Coupling	Single-phase or three-phase
Transformer	Watertight IP 68
Dimensions: Length (mm) + LV compartment Depth (mm) Height (mm) Average weight without transformer (kg)	XXL model 2000 1100 1700 380

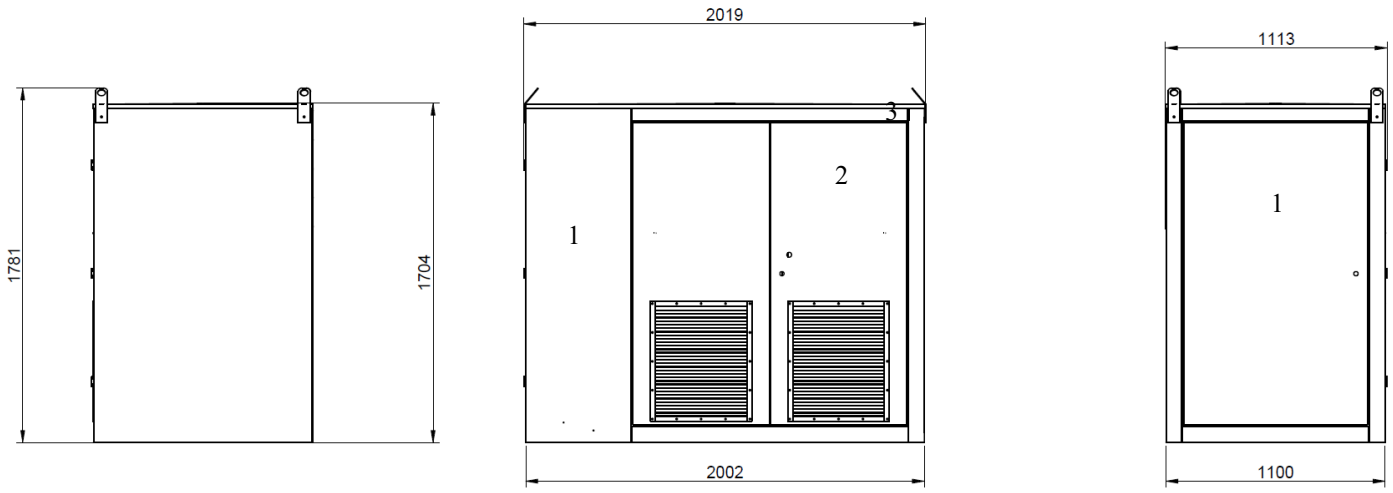


PTS95 with watertight transformer

SELECTION TABLE – POWER RATING LIMITS

Voltage Tens d \ Power rating (kVA)	50	63	80	100	125	160
950 V Three-phase	XXL	XXL	XXL	XXL	XXL	XXL

PTS95 ext - DOOR CLOSED - DIMENSION



1 - LV compartment and 950 V operation
2 - Transformer compartment and 950 V protection

Drawing 40 02503

PTS95 ext - SINGLE LINE DIAGRAM - Interlocking

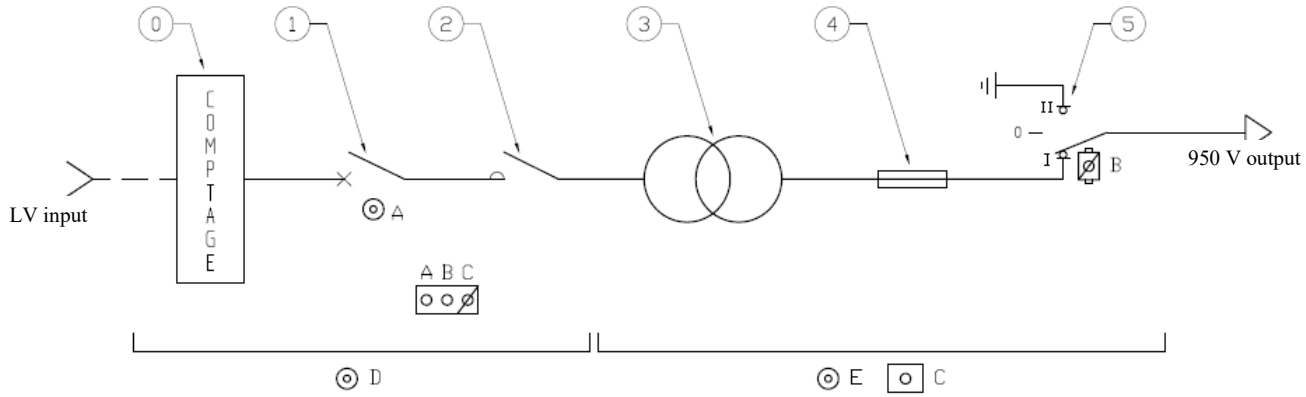


DIAGRAM FOR LOCKING SYSTEM

STATION POWERING OFF

- Access to LV compartment by the door and with the help of the D key.
- Open the LV circuit breaker, lock it opened with the A key, A key free.
- Position the switch / isolating switch on earthing position and lock it with the B key.
- Introduce A and B keys in the central lock «A,B,C». Lock A and B keys, the C key goes free and keys A and B are imprisoned.
- With C and E keys; possible access to the 950 V compartment by the door => access to the transformer, to the fuses and 950 V connection terminals.

0 - COUTING TABLE (not supplied)
1 - LV GENERAL CIRCUIT BREAKER
2 - LV CONTACTOR
3 - STEP UP TRANSFORMER
4 - 950 V FUSE
5 - LOAD BREAK SWITCH
NETWORK - POWER OFF - EARTHING

Drawing 45 04149

INDOOR
PTS32 int- 3200 V substation - 5 to 50 kVA

TRANSFORMER SUBSTATIONS

General characteristics

- Made from sheets of painted aluminium, RAL 1015, IP21C, bottom-less station, front closed by a door with a three-point handle and secure lock
- Impregnated dry type transformer, from 5 kVA to 50 kVA, Adjustment taps +/- 5 %
- Three-position CIMALT isolating switch (3200 V side), allowing the lines to be sectioned, earthed, and measured separately from the input.
- For use with single-phase or three-phase networks
- Network fuse protection 3200 V with fuse merger device with signalling light, and transfer of information across terminals
- Thermal protection at one temperature threshold with LED signalling, contact output on terminals
- LED live signal voltage signal on 3200 V side
- “In service” position for CIMALT isolating switch output on terminals
- Unbalanced current protection achieved by differential torus and associated double-threshold relay (On step up PTS32 only)

Security

- Ronis lock preventing access of the high-voltage parts

Isolating and earthing switches with lock

3200 V connection plate

Optional features

Mechanical

- Substation with bottom and anti-insect grill on the vents

Protection

- Surge arrester on 3200 V side but also, if applicable, on low-voltage side

Additional features

- Doubling of the 3200 V terminals to allow passage through the artery
- Heat resistant and thermostat

Standard characteristics

Power rating (kVA)	5 to 50 kVA (see selection table)	
Step-up transformer: Primary voltage No load secondary voltage	230 V or 400 V 3360 V	
Step-down transformer: Primary voltage No load secondary voltage	3200 V 235 V or 410 V	
Insulation class primary / secondary	1100 V or 3600 V	
Coupling	Single-phase or three-phase	
Transformer	Impregnated dry type	
Dimensions: Length (mm) Depth (mm) Height (mm) Average weight without transformer (kg)	Small model S 1000 640 1230 80	Large model XL 1205 840 1520 110

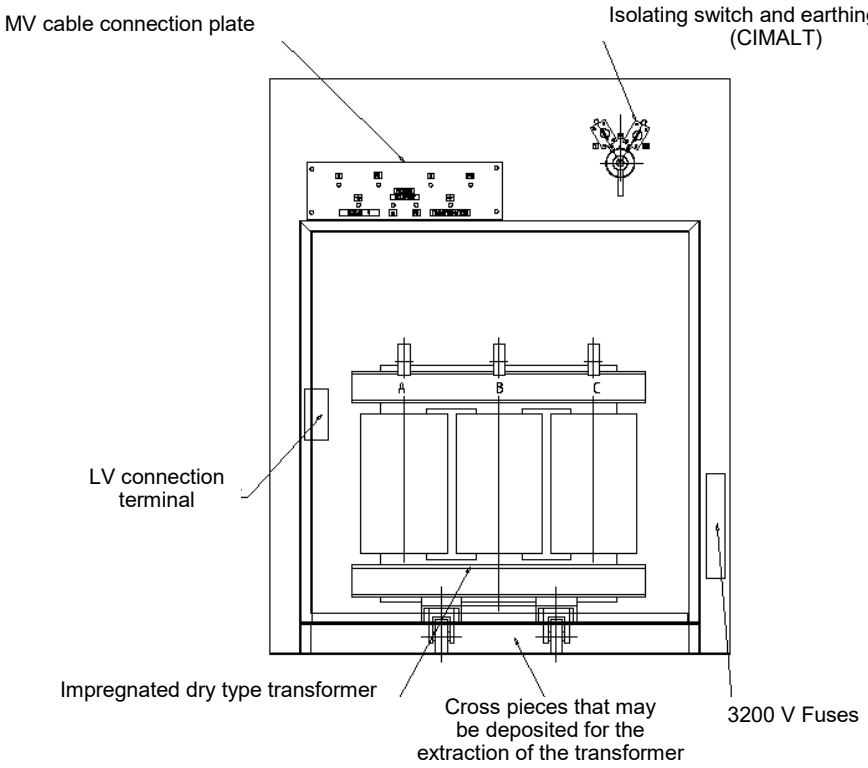
PTS32 int S swith dry type impregnated dry transformer 16 kVA

SELECTION TABLE – POWER RATING LIMITS

Coupling \ Power rating (kVA)	5	10	16	25	32	50
3200 V Single-phase	S	S	S	S	XL	XL
3200 V Three-phase	-	XL	XL	XL	XL	XL

S : Small model
XL : Large model
- : Not available

PTS32 int - DOOR OPEN



Drawing 55 01358

STEP-UP / STEP-DOWN SUBSTATION – SINGLE-LINE DIAGRAM - Interlocking

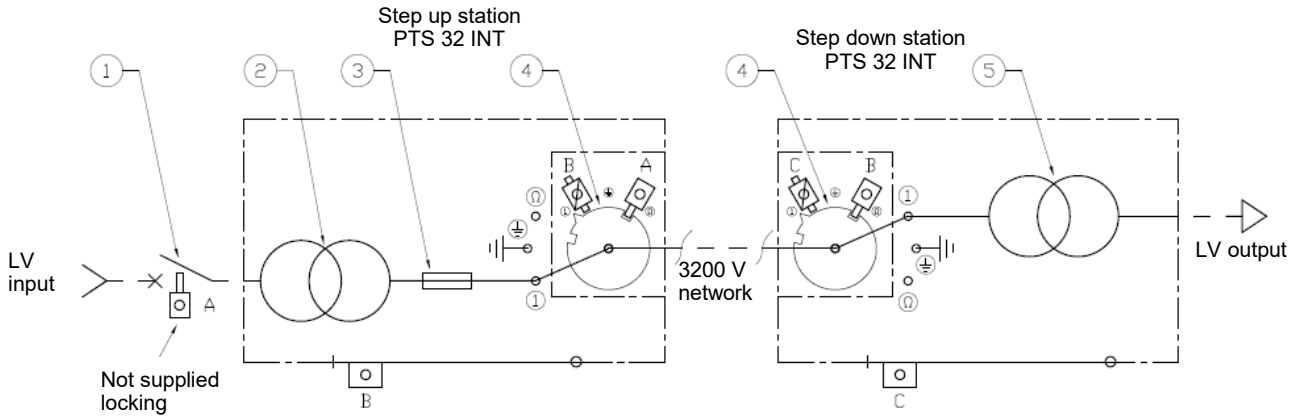


DIAGRAM FOR LOCKING SYSTEM

- Open the upstream LV circuit breaker and open it through A, key A becomes free. With key A unlock the step-up station's switch/ isolating switch, prisoner key A.
- Position the step-up station's switch / isolating switch in the earthing position and lock it with the help of key B, key B becomes free.
- With key B the possibility of access: to the transformer compartment, opened door, key B is imprisoned, or to the MV network.

1 - GENERAL CIRCUIT BREAKER (not supplied)
2 - STEP UP TRANSFORMER
3 - MV FUSES
4 - SWITCH / ISOLATING SWITCH (CIMALT)
5 - STEP DOWN TRANSFORMER

Drawing 4504135

OUTDOOR
PTS32 ext - 3200 V substation - 5 to 32 kVA

TRANSFORMER SUBSTATIONS

General characteristics

- Made from sheets of painted aluminium, RAL 1015, IP44, bottom-less station, front closed by a door with a three-point handle and secure lock
- Watertight transformer, IP68, from 5 kVA to 32 kVA, Adjustment taps +/- 5 %
- Three-position CIMALT isolating switch (3200 V side), allowing the lines to be sectioned, earthed, and measured separately from the input
- Network fuse protection 3200 V, fuse incorporated in the transformer
- Thermal protection at one temperature threshold, contact output on terminals
- “In service” position for CIMALT isolating switch output on terminals
- Unbalanced current protection achieved by differential torus and associated double-threshold relay (On step up PTS32 only)

Security

- Ronis lock prevents access to high-voltage parts

Isolating and earthing switch with lock

3200 V connection plate

Optional features

Mechanical

- Substation with bottom and anti-insect grill on the vents (IP44)

Protection

- Surge arrester on 3200 V side but also, if applicable, on low-voltage side

Additional features

- Doubling of the 3200 V terminals to allow passage through the artery
- Heat resistant and thermostat

Standard characteristics

Power rating (kVA)	5 to 32 kVA (see selection table)	
Step-up transformer: Primary voltage No load secondary voltage	230 V or 400 V 3360 V	
Step-down transformer: Primary voltage No load secondary voltage	3200 V 235 V or 410 V	
Insulation class primary / secondary	3600 V	
Coupling	Single-phase or three-phase	
Transformer	Watertight IP 68 TED-E type	
Dimensions: Length (mm) Depth (mm) Height (mm) Average weight without transformer (kg)	Small model S 1000 640 1230 80	Large model XL 1205 840 1520 110

PTS32 ext XL
with 16 kVA transformer

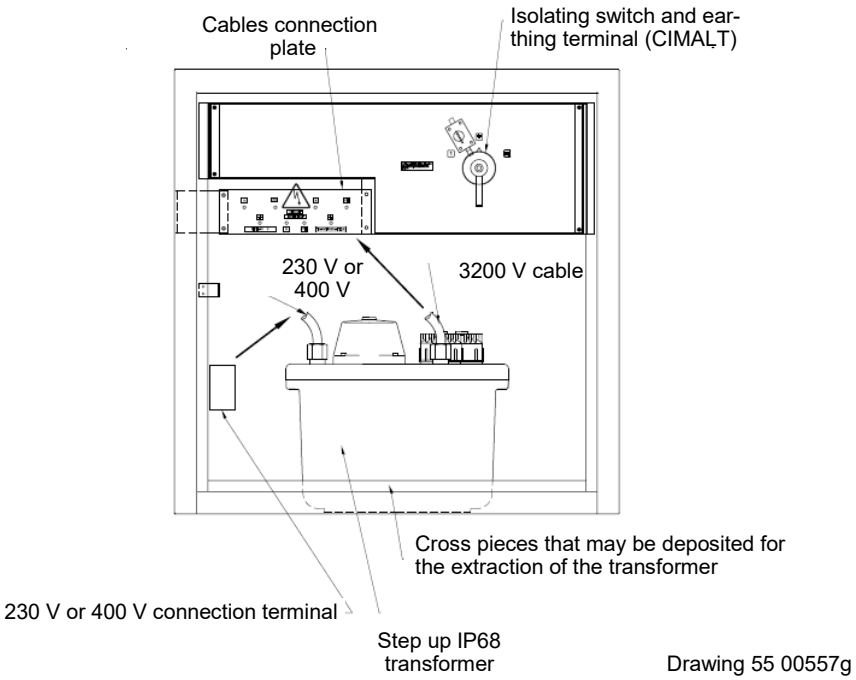
SELECTION TABLE – POWER RATING LIMITS

Coupling \ Power rating (kVA)	5	8	10	16	25	32
3200 V Single-phase	S	S	S	XL	XL	XL
3200 V three-phase	XL	-	XL	XL	XL	XL

S : Small model
XL : Large model
- : Not available

PTS32 ext - DOOR OPEN

PTS 32 ext XL



Drawing 55 00557g

STEP-UP / STEP-DOWN SUBSTATION – SINGLE-LINE DIAGRAM - Interlocking

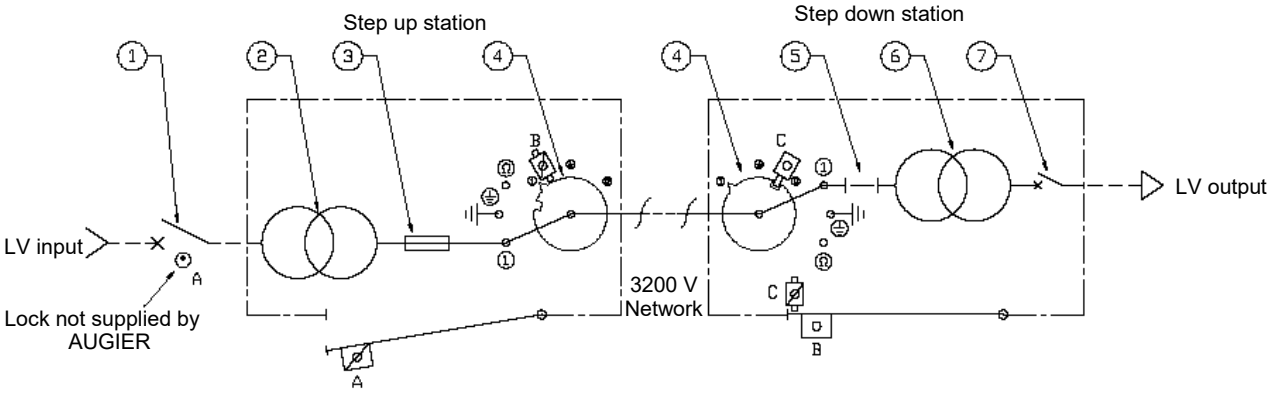


DIAGRAM FOR INTERLOCKING SYSTEM

- Step-up station: Open the upstream LV circuit breaker with key A, key A becomes free. With key A open the step-up stations door lock, when door opened, key A is imprisoned.
- Position the step-up stations switch/ isolating switch on the earthing position and lock it with the help of key B, key B becomes free.
- Step-down station:
- Using key B you can access MV network and step-down station, retrieve key C, the outside bolt prevents the closing of the door. Using key C, it is possible to unlock the switch/ isolating switch in order to put it on earthing or insulation measurement position.

1 - GENERAL CIRCUIT BREAKER(not supplied)
2 - STEP UP TRANSFORMER
3 - MV FUSES
4 - SWITCH / ISOLATING SWITCH
5 – SHUNT
6– STEP DOWN TRANSFORMER
7 - LV CIRCUIT BREAKER OF STEP DOWN SUBSTATION (optional)

Drawing 4504000

INDOOR
PTM - 950 V, 3200 v, 5500 v substation
25 to 160 kVA

TRANSFORMER SUBSTATIONS

PTM composed of a transformer and a network departure

General characteristics

- Made of painted steel, RAL 7035 and 7016, IP 21C, substation without bottom, composed of a transformer unit and CEP14-15 equipment unit.
- Characterized by its ability to customize
- Impregnated dry type transformer, from 25 kVA to 160 kVA
- Adjustment taps +/- 5 %
- Thermal protection through probes connected to the central part of the windings which respond to the low voltage circuit breaker
- For use with single-phase or three-phase networks
- Entirely accessible from front panel

PTM with two transformers, two incoming, one coupling and six network departure

Transformer unit comprised of:

- **Low-voltage compartment** containing, as needed, devices for sectioning, disconnection and protection; fuses; isolating switch; circuit breaker; and, where applicable, control device
- **Transformer compartment** composed of an impregnated dry-type transformer. Transformer delivered separately. The transformer cell can be positioned to the right or left of the switchboard, as specified in the order
- **MV switchboard** consisting of one or several feeder units with detachable carriages, allowing sectionalising and protection of network fuse, along with earthing and short circuiting of output cable by earthing switch. Circuit opening is ensured by the isolating switches or contactor

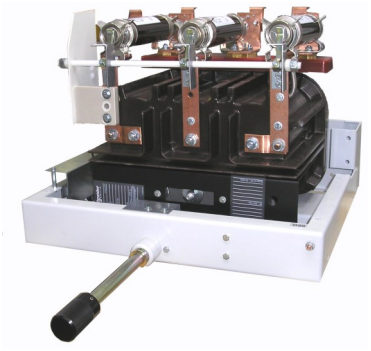
Optional features

- Diurnal insulation surveillance device - DFTEP
- Monitoring of network inputs

Photos : Transformer unit
Switchboard with two contactor feeders

Standard characteristics

Power rating (kVA)	25 to 160 kVA (see selection table)	
Step-up transformer: Primary voltage No load secondary voltage	400 V 970 V or 3360 V or 5750 V	
Step-down transformer: Primary voltage No load secondary voltage	950V or 3200 V or 5500 V 410 V	
Insulation class primary / secondary	1100 V or 7200 V	
Coupling	Three-phase or three-single phase	
Transformer	Impregnated dry type TTAI	
Dimensions with one switchboard Length (mm) Depth (mm) Height (mm) Average weight without transformer (kg)	Medium model L 1500 950 1600 120	Large model XL 1500 1200 1600 150



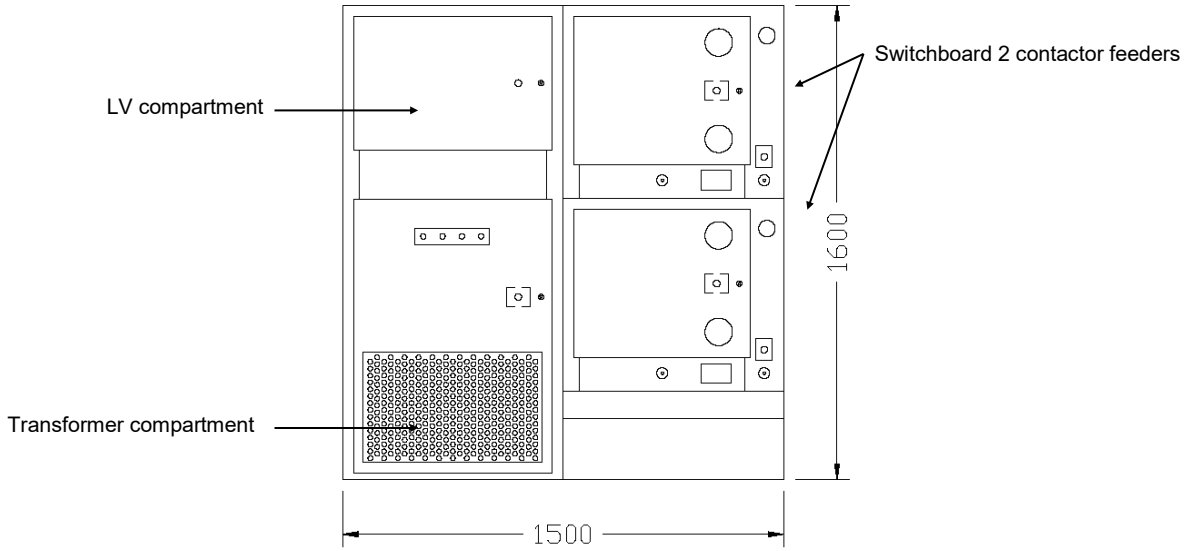
950 V Contactor carriage with protection fuse

SELECTION TABLE – POWER RATING LIMITS

Coupling \ Power rating (kVA)	25	32	50	63	80	100	125	160
Three-phase	L	L	L	L	L	XL	XL	XL
Three-single phase	L	L	L	L	XL	XL	XL	XL

L : Medium model
XL : Large model

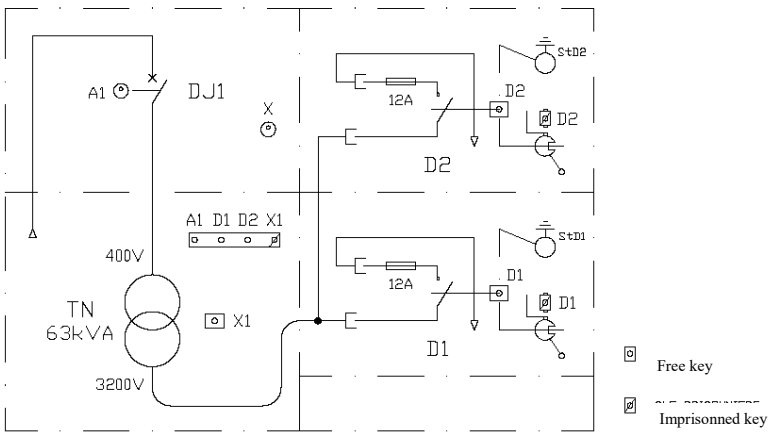
PTM - L DOOR CLOSED



Conforms to NFC 13200 et NFC 64400 standards; allocated current : 200 A; Acceptable short-circuit current : 2.5 kA eff. 1 s.

Drawing 8101677

PTM - LOCKING
With a two-contactor feeders switchboard



- When opening LV circuit breaker, key A becomes free.
- Open the contactor feeder D1, close the earthing isolating switch, close it, key D1 becomes free.
- Open the contactor feeder D2, close the earthing isolating switch, lock it and key D2 becomes free. Lock keys A1, D1, D2 in the central lock, key x1 becomes free.
- Using key x1 the transformer compartment can be accessed.

Drawing 8101676

INDOOR
PTMI - 950 V, 3200 v, 5500 v substation
25 to 160 kVA

TRANSFORMER SUBSTATIONS

General characteristics

- Made of painted steel, RAL 7035 and 7016, IP 21C, substation without bottom, composed of a transformer unit and CEP14-15 equipment unit.
- Impregnated dry type transformer, from 25 kVA to 160 kVA
- Adjustment taps +/- 5 %
- Thermal protection through probes connected to the central part of the windings which respond to the low voltage circuit breaker
- For use with single-phase or three-phase networks

Transformer unit comprised of:

- **Low-voltage compartment** containing, as needed, devices for sectioning, disconnection and protection; fuses; isolating switch; circuit breaker; and, where applicable, control device.

Transformer cell

- **Transformer compartment** composed of an impregnated dry-type transformer. Transformer delivered separately. The transformer cell can be positioned to the right or left of the switchboard, as specified in the order.

- **Medium voltage load break switch cell,** 375 mm long, which allows on-load cut-off of the feeder as well as protection through the fuses. The cell is equipped with an earthing disconnector and voltage lighting signals. A locking device allowing manoeuvring to be carried out safely
  - Signalling and triggering on fuse system with information carried on terminal
  - Load break switch position contact

Photo : Load break switch cell

Optional features

- Unbalanced current protection achieved by differential torus and associated double-threshold relay
- Communication card
- Surge arrester 950 V, 3200 V or 5500 V

Standard characteristics

Power rating (kVA)	25 to 160 kVA (see selection table)	
Step-up transformer: Primary voltage No load secondary voltage	 400 V 970 V or 3360 V or 5750 V	
Step-down transformer: Primary voltage No load secondary voltage	 950 V or 3200 V or 5500 V 410 V	
Insulation class primary / secondary	1100 V or 7200 V	
Coupling	Three-phase or Three-single phase	
Transformer	Impregnated dry type TTAI	
Dimensions with an isolating unit: Length (mm) Depth (mm) Height (mm) Average weight without transformer (kg)	Medium model L 1125 950 1600 120	Large model XL 1125 1200 1600 150

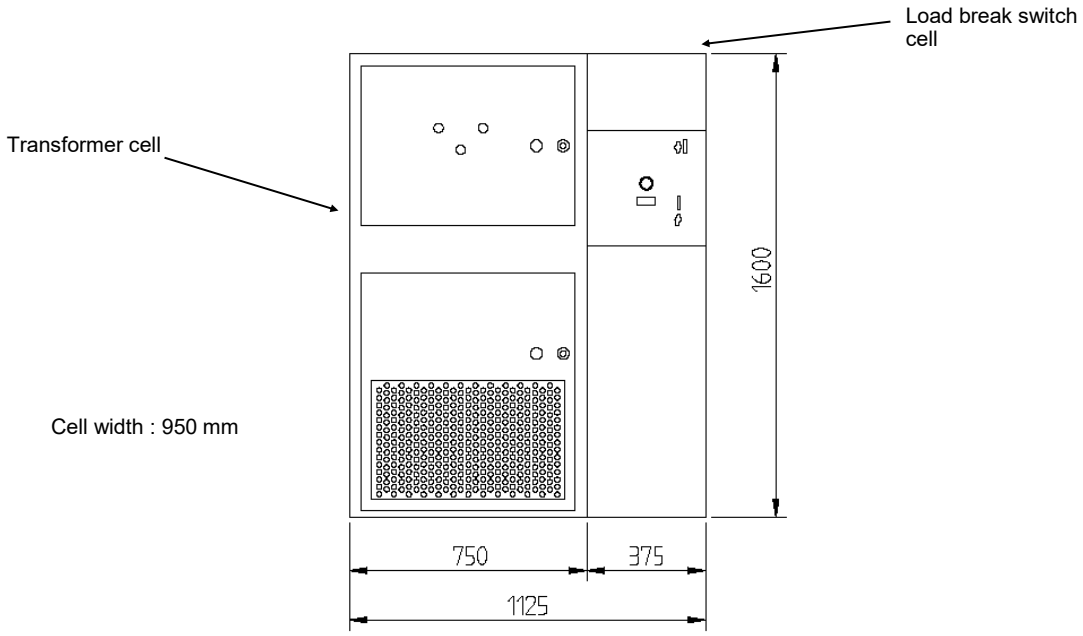
Low voltage compartment equipped with load break switch

SELECTION TABLE – POWER RATING LIMITS

Coupling \ Power rating (kVA)	25	32	50	63	80	100	125	160
Three-phase	L	L	L	L	L	XL	XL	XL
Three-single phase	L	L	L	L	XL	XL	XL	XL

L : Medium model
XL : Large model

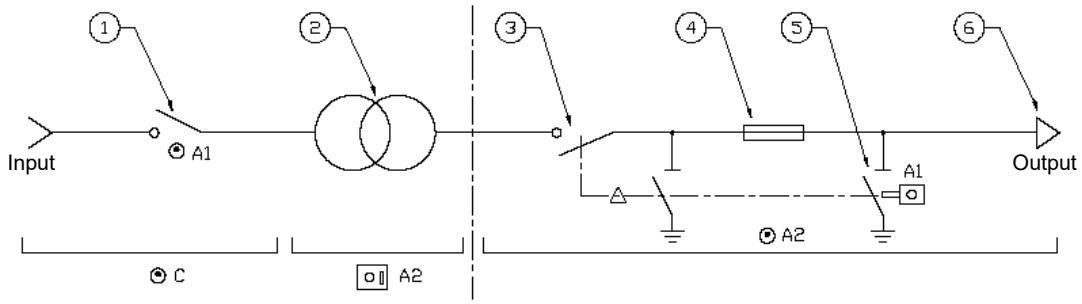
PTMI - DOOR CLOSED



Conforms to NFC 13200 and NFC 64400 standards; Allocated current : 200 A; Acceptable short circuit current : 2,5 kA eff. 1 s.

Drawing 4002473

PTMI - LOCKING



1– LV LOAD BREAK SWITCH (optional)
2 - IMPREGNATED DRY TYPE TRANSFORMER
3 - MV LOAD BREAK SWITCH
4- FUSES
5– EARTHING ISOLATING SWITCH
6– MV TERMINAL BARS

Drawing 4503189

INDOOR
3200 V, 5500 V - 250 à 1250 kVA

TRANSFORMER SUBSTATIONS

Step-up or step-down unit consisting of an oil transformer, a 3200 V / 5500 V cable connection and a load switch panel

Picture : On load switch panel

General characteristics

Oil transformer

- Oil transformer 250 kVA to 1250 kVA
- Eco Design, according to UE 548/2014 regulation
- Protected by DGPT2 or DMCR relay
- Tap changing +- 2.5% +-5%
- MV connection lockable by lock

Cable link between transformer and on-load switch panel

- 10 meters length , 25+25 mm² 3.6/6 kV cable with plug in terminal made at each side

On load switch panel 7.2 kV

- **Medium voltage on load switch cell,** 375 mm long, which allows on-load cut-off of the feeder as well as protection through the fuses. The cell is equipped with an earthing disconnector and voltage lighting signals. A locking device allowing manoeuvring to be carried out safely
  - Fuse merger device with signalling light, and transfer of information across terminals
  - “In service” position for the on load switch

Optional features

Oil transformer

- Oil retention pan for oil transformer

On load switch panel 7.2 kV

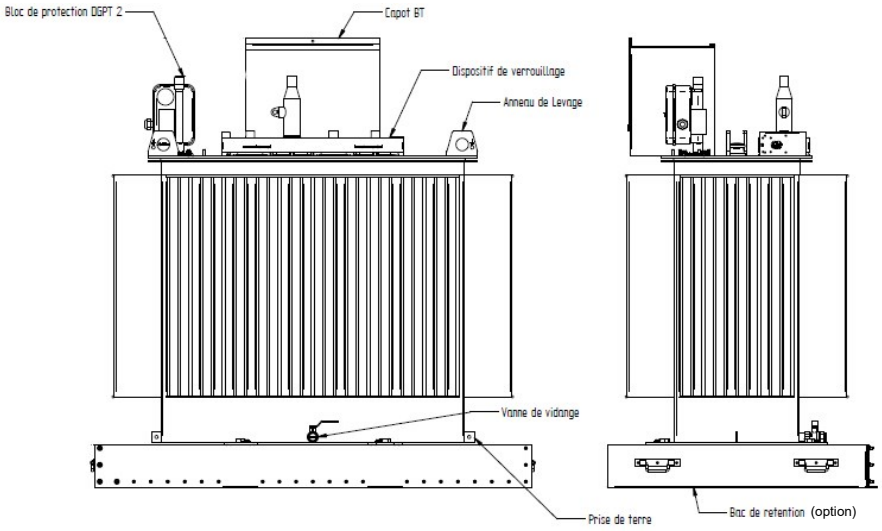
- Unbalanced current protection achieved by differential torus and associated double-threshold relay
- Communication cards
- Surge arrester on 3200 V / 5500 V side

Standard characteristics

Power rating (kVA)	250 kVA to 1250 kVA (see selection table)
Step-up transformer: Primary voltage No load secondary voltage	400 V 3360 V or 5750 V
Step-down transformer: Primary voltage No load secondary voltage	3200 V or 5500 V 410 V
Insulation class	7200 V
Coupling	Three phase
Transformer TTHI	Mineral oil

SELECTION TABLE - DIMMENSION

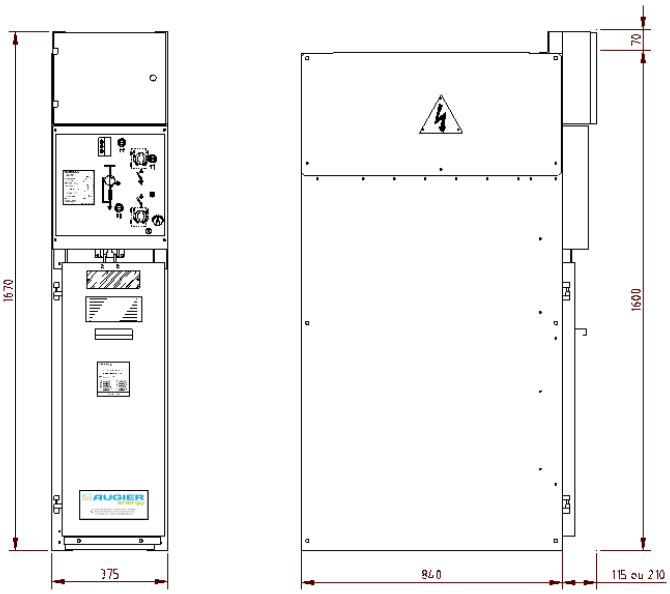
Power rating (kVA)	250	315	400	630	800	1000	1250
Length (mm)	1350	1500	1600	1750	1850	1950	2050
Depth (mm)	850	900	900	950	1000	1000	1000
Height (mm)	1400	1400	1600	1700	1700	1800	1700
Weigth (Kg)	1550	1850	2000	2650	3150	3300	3700



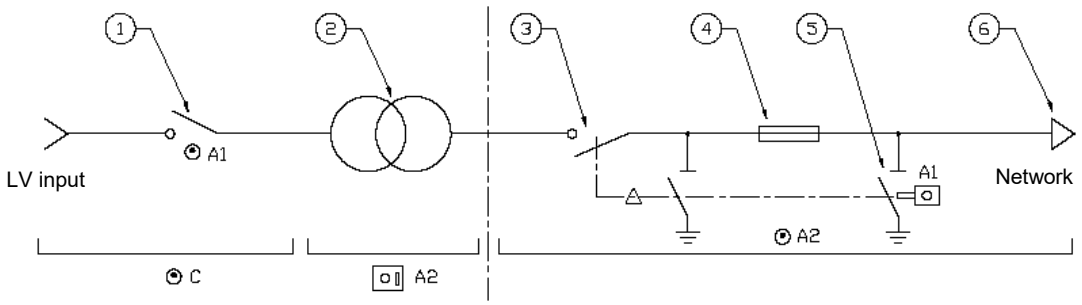
Conforms to IEC 76 standard,
Conforms to European regulation UE 548/2014.

On load switch panel	
Length (mm)	375
Depth (mm)	950
Height (mm)	1600
Weigth (Kg)	180

Conforms to NFC 13200 and NFC 64400 standards;
Allocated current : 200 A; Acceptable short circuit current : 2,5 kA eff. 1 s.



LOCKING



1– LV CIRCUIT BREAKER (not supplied)
2 - OIL TRANSFORMER
3 - MV ON LOAD SWITCH PANEL
4– FUSES
5– EARTH ING SWITCH
6– MV CABLE CONNECTIONS

4503189

OUTDOOR
PTC-R (S) (M) - 950 V, 3200 V, 5500 V substation
25 to 1250 kVA

TRANSFORMER SUBSTATIONS

General characteristics

- Made of painted sheet metal, RAL 1015, IP34, without bottom, forming separate compartments closed by doors with locking locks
- A transformer compartment that can receive an oil transformer from 25 to 1250 kVA, with oil retention tank non-fire
- An MV cell compartment that can receive from one to four switch cells depending on model
- A low voltage compartment, equipped according to the customer's needs, it also includes the auxiliaries of the substation, one socket
- Electricals protection
- Substation equipped with safety accessories

- **Shelter type substation delivered ready to used, turnkey solution, wired materials**
- **Reduced dimensions, equipment operated from outside, to be installed on a concrete base**
- **Very low weight, 4 to 5 times lighter than a concrete substation**

On load switch

Optional features

Mechanical

- Substation IP54 substation for high voltage and low voltage cells compartments
- Inox substation

Protection

- Unbalanced current protection achieved by differential torus and associated double-threshold relay
- Surge arrester on network side
- Low-voltage circuit breaker protection transformer
- Low-voltage contactor for lighting control

Monitoring

- Controller for remotely sending the functional information of the shelter, communication using the GSM network

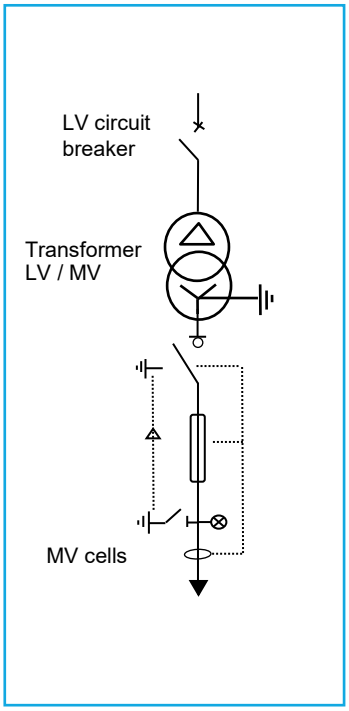
Standard characteristics

Power rating (kVA)	25 to 1250 kVA (see selection table)		
Step-up transformer: Primary voltage No load secondary voltage	400 V 3360 V or 5750 V or 10 kV		
Step-down transformer: Primary voltage No load secondary voltage	3200 V or 5500 V or 10 kV 410 V		
Insulation class primary / secondary	1100 V or 7200 V or 12 kV		
Coupling	Three-phase		
Transformer TTHI	Mineral oil		
Dimensions: Length (mm) Depth (mm) Height (mm)	**PTC-R** **25 to 250 kVA** 2850 2010 2200	**PTC-S** **100 to 630 kVA** 4600 2250 2300	**PTC-M** **800 to 1250 kVA** 4600 2250 2300

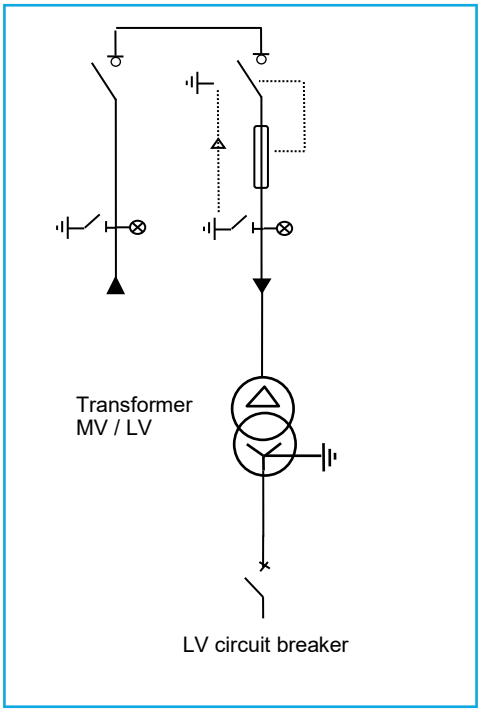
Oil transformer

PTC-R, S or M - Electrical diagram example

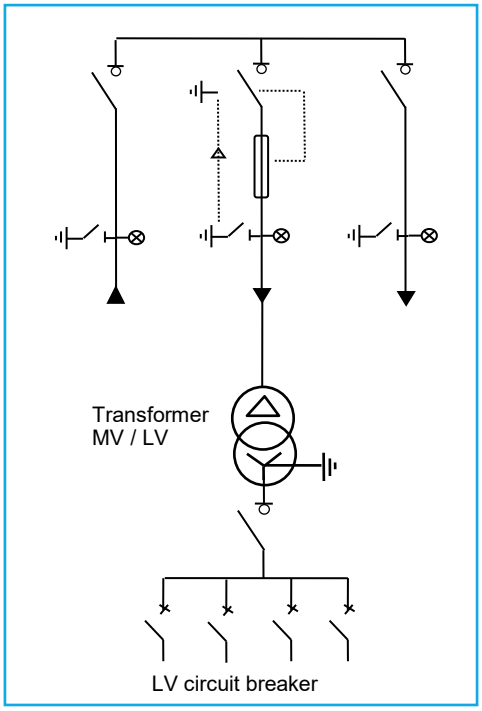
Step-up substation



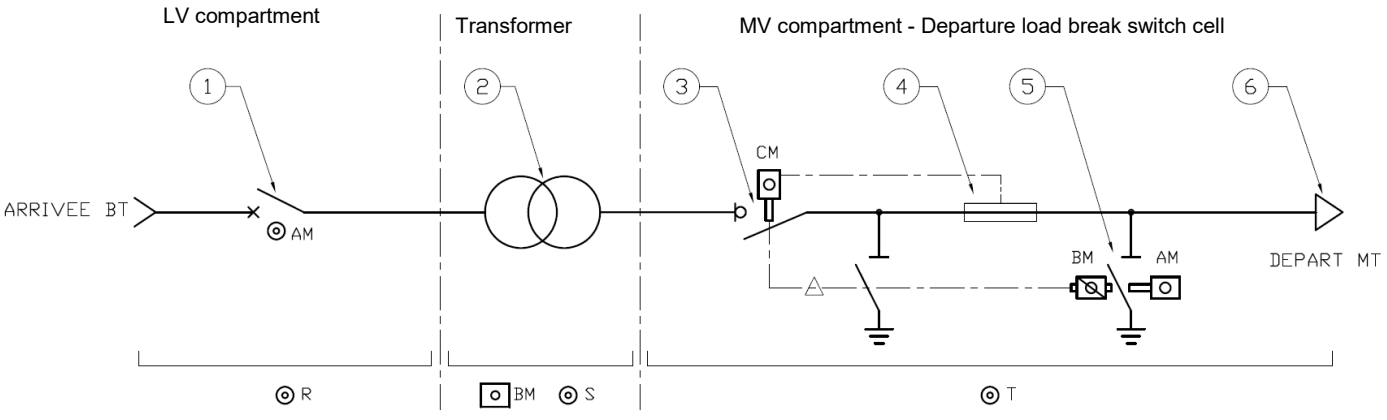
Step-down substation



Step-down substation



LOCKING - STEP UP PTC



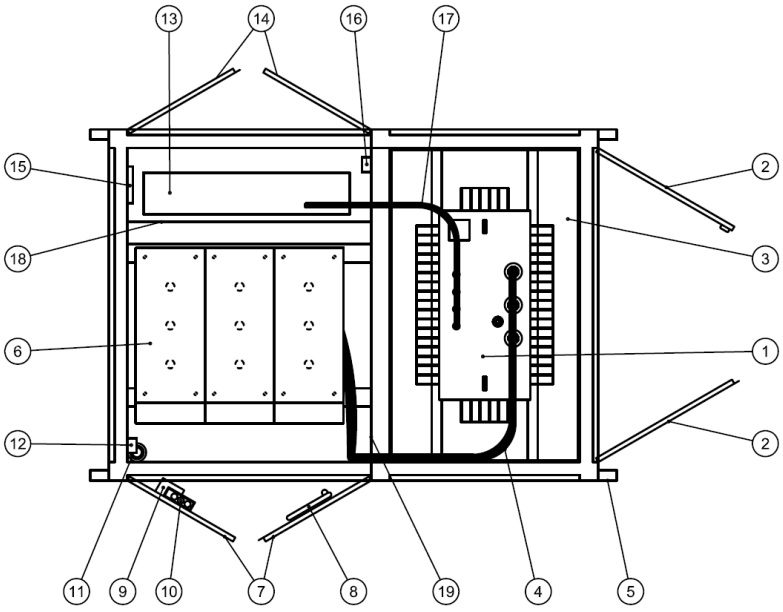
1– LV LOAD BREAK SWITCH
2 - Oil TRANSFORMER
3 - MV LOAD BREAK SWITCH
4- FUSES
5– EARTHING ISOLATING SWITCH
6– MV TERMINAL BARS

PTC-R WEIGHT

Power rating (kVA)	25	50	100	160	250
Weight (kg)	2000	2200	2400	2800	2990

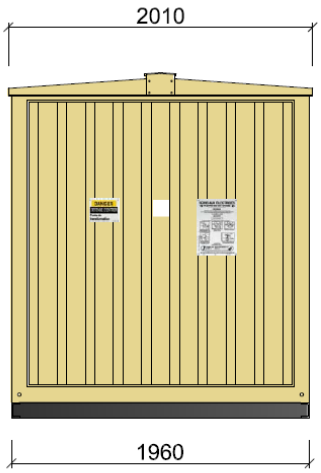
Approximate weights, with two switch cell

PTC-R DIMENSIONS

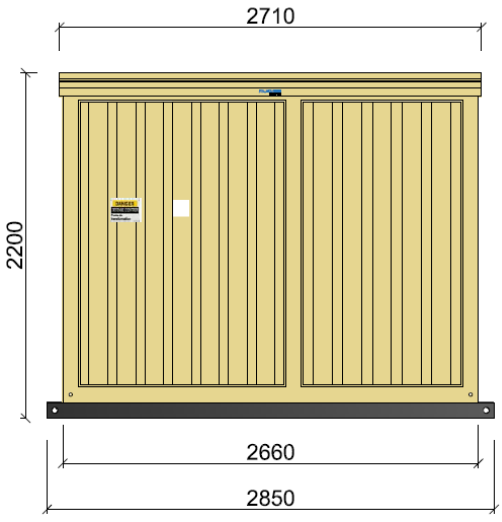


1	Oil transformer
2	Transformer access doors
3	Non-fire retention tank
5	Self-supporting chassis
6	MV Cells
7	MV cells access doors
8	Rescue pole
9	Insulating glove box
10	Spare MV fuses
11	Insulating mat
12	MV compartment lighting
13	LV equipment
14	LV access doors
15	Collector of land and earthing
16	MV compartment lighting
18	Partition wall TN / MV cells
19	Partition wall TN / LV equipment

Right view
Transformer side



Front view
MV Cells side

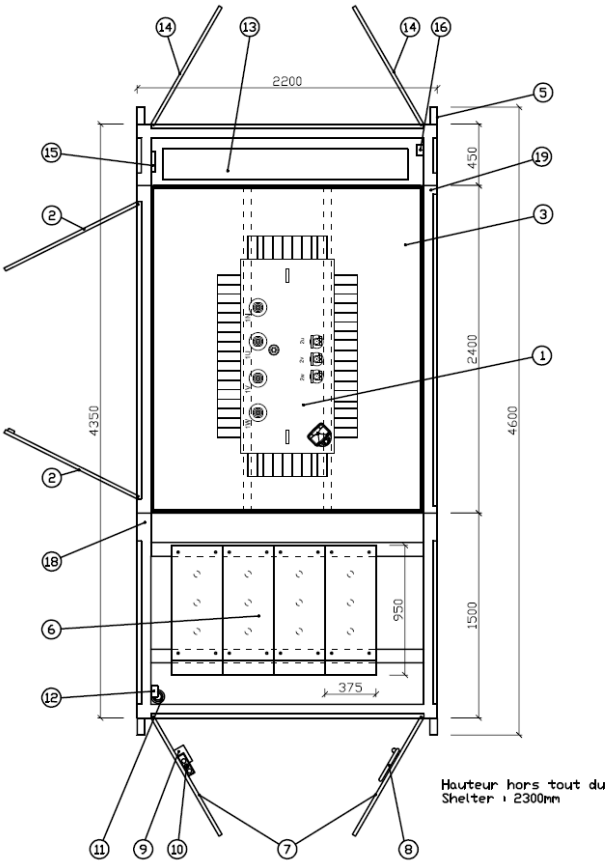


PTC-S or M WEIGHT

Power rating (kVA)	100	160	250	315	400	500	630	800	1000	1250
Weight (kg)	3000	3180	3750	3990	4200	4600	4850	5400	5600	5950

Approximate weights, with two switch cell

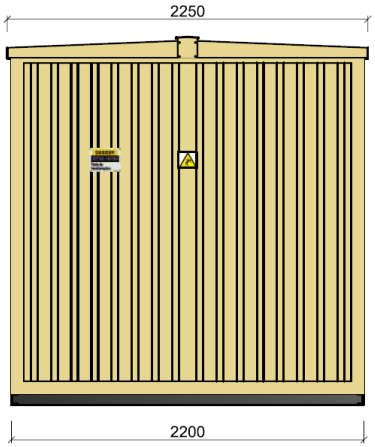
PTC-R or M DIMENSIONS



1	Oil transformer
2	Transformer access doors
3	Non-fire retention tank
5	Self-supporting chassis
6	MV Cells
7	MV cells access doors
8	Rescue pole
9	Insulating glove box
10	Spare MV fuses
11	Insulating mat
12	MV compartment lighting
13	LV equipment
14	MV access doors
15	Collector of land and earthing
16	MV compartment lighting
18	Partition wall TN / MV cells
19	Partition wall TN / LV equipment

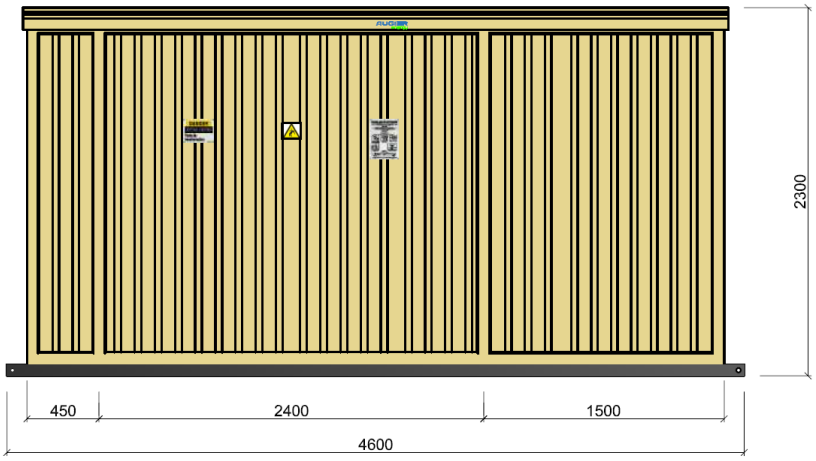
Right view

MV Cells side



Front view

Transformer side



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