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ELECTRICITE DU CAMBODGE

TECHNICAL SPECIFICATION

EDC-DTS-MV012

Compact Prefabricated MV/LV Substation and RMU Cabinets

May 2023

ELECTRICITE DU CAMBODGE

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Content

Compact Prefabricated MV/LV Substations (PTT) and RMU Cabinets

1 Scope

This document specifies the service conditions, rated characteristics, general structural requirements and test methods of medium voltage/low voltage prefabricated substations and RMU cabinets, that are cable-connected, to be operated from outside (non-walk-in type) for alternating current of rated voltages of 24 kV on the medium voltage side, and for one transformer for service frequency of 50 Hz for outdoor installation at locations with public accessibility and where protection of personnel is provided. This equipment is to be used on the underground MV network of Electricité du Cambodge.

This technical specification applies for ALL Prefabricated substation connected to EDC network either public distribution or private.

This document completes, details, reinforces and amends the articles of IEC 62271-202 (2014).

Prefabricated substations and RMU cabinets shall be installed at about 0.5 m or more in case of floodable above ground level and installed on a built (concrete/bricks) basement in any cases.

Prefabricated substation shall comprise an enclosure which will contain the following electrical components:

- Power transformers;
- Medium voltage RMU (switches and metering);
- Low voltage distribution boards, customer Moulded Case Circuit breaker or ACB;
- Medium voltage and low voltage interconnections;
- Auxiliary equipment and circuits (LV metering, lighting, RTU, etc....)

However, relevant provisions of this standard are applicable to designs where not all these electrical components exist (for example, an installation consisting of power transformer and low voltage switchgear or a RMU cabinet).

So RMU cabinets shall be conformed to the requirements of this technical specification and shall comprise:

- Compact RMU
- Auxiliary equipment and circuits (RTU, etc....)

Prefabricated substations and RMU cabinets can be ordered including the whole or part of equipment or can be ordered empty of any equipment.

2 Standards

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition mentioned applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC: International Electro technical Commission

IEC 60050-461 (all parts):	International Electro technical Vocabulary
IEC 60068-2-75:	Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests
IEC 60076-1:	Power transformers – Part 1: General
IEC 60076-2:	Power transformers – Part 2: Temperature rise for liquid-immersed transformers
IEC 60076-3:	Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air
IEC 60076-5:	Power transformers – Part 5: Ability to withstand short circuit
IEC 60076-7:	Power transformers – Part 7: Loading guide for oil-immersed power transformers
IEC 60076-10:	Power transformers – Part 10: Determination of sound levels
IEC 60364-4-41:	Low-voltage electrical installations – Part 4-41: Protection for safety –Protection against electric shock
IEC 60529:	Degrees of protection provided by enclosures (IP Code) Amendment 1:1999. Amendment 2:2013
IEC 60664-1:	Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests
IEC 60721-1:	Classification of environmental conditions – Part 1: environmental parameters and their severities Amendment 1:1992 Amendment 2:1995
IEC 60721-2-2:	Classification of environmental conditions – Part 2-2: Environmental conditions appearing in nature – Precipitation and wind
IEC 60721-2-4:	Classification of environmental conditions – Part 2: Environmental conditions appearing in nature – Solar radiation and temperature Amendment 1:1988
IEC/TS 60815-1:	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles
IEC 60947-1:	Low-voltage switchgear and controlgear – Part 1: General rules
IEC 61180-1:	High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements
IEC 61439-1:	Low-voltage switchgear and controlgear assemblies – Part 1: General rules

IEC 61439-2:	Low-voltage switchgear and controlgear assemblies – Part 2: Power switchgear and controlgear assemblies
IEC 62262:	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
IEC 62271-1:	High-voltage switchgear and controlgear – Part 1: Common specifications Amendment 1:2011
IEC 62271-200:	High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
IEC 62271-202 (2014)	High-voltage switchgear and controlgear –Part 202: High-voltage/low-voltage prefabricated substation
IEC 62271-201:	High-voltage switchgear and controlgear – Part 201: AC insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
IEC/TR 62271-208:	High-voltage switchgear and controlgear – Part 208: Methods to quantify the steady state, power-frequency electromagnetic fields generated by HV switchgear assemblies and HV/LV prefabricated substations
IEC/TR 62271-300:	High-voltage switchgear and controlgear – Part 300: Seismic qualification of alternating current circuit-breakers

ISO International Standard Organisation

ISO/IEC Guide 51:	Safety aspects – Guidelines for their inclusion in standards
ISO 1052:	Steels for general engineering purposes
ISO 1182:	Reaction to fire tests for products – non-combustibility tests
ISO 1716:	Reaction to fire tests for products – Determination of the gross heat of combustion (calorific value)
ISO 6508-1:	Metallic materials – Rockwell hardness test – Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)
ISO/IEC 17025:	General requirements for the competence of testing and calibration laboratories
ISO 9001:	Quality management systems – Requirements

EDC-DTS: Electricité du Cambodge Distribution Technical Specification

EDC-DTS-MV002:	22 and 35 kV Indoor transformers
EDC-DTS-MV003:	22 kV Ring main units
EDC-DTS-MV004:	22 kV cables and accessories
EDC-DTS-LV003:	LV Distribution board for indoor substations

EDC-DTS-LV005: LV Moulded Case Circuit Breakers

Unless a year is specified, the latest specification or standard applies.

The supplier may propose alternative standards, provided it **is demonstrated that they give an equivalent degree of quality as the referenced standard**. Acceptability of any alternative standard is at the discretion of the Purchaser.

3 Definitions

The definitions of the relevant IEC and ISO standards apply to this technical specification.

- **High voltage definition** in this document refer to **medium voltage**. This is necessary in order to apply the same wording in this document and the IEC 62271-202 standard.

4 Testing and inspection

4.1 General Notes for Test

Prefabricated substations may be inspected at the factory by EDC's representatives.

The inspection and routine tests shall be carried out in accordance with the provisions of the relevant IEC and ISO recommendations.

MV/LV prefabricated substations shall be subjected to tests as specified below.

4.2 Type Tests

All type tests required by the IEC 62271-202 standards shall be carried out with exception herein after.

Type tests shall be carried out by internationally recognized electrical testing laboratories.

Full copies of type test reports shall be submitted within the bid of the manufacturer/supplier.

If the manufacturer is certified by EDC, it is not necessary to submit type test reports for the considered equipment.

Nevertheless, in case the testing laboratory is not internationally recognized, the testing laboratory shall be mandatorily accredited ISO/IEC 17025 by an international or national accreditation body specialized in testing laboratories accreditation/acceptance. In that case, the testing laboratory shall prove mandatorily its capability/capacity to carry out all type tests mentioned in the type tests reports by suppling: Full description of all tests the laboratory can carry out, list of testing equipment with full characteristics, drawing of testing rooms with location of testing equipment, ...etc, supported by pictures and copy of the ISO/IEC 17025 accreditation certificate.

Acceptability of any accredited testing laboratory is at the discretion of the EDC.

The following reports of the type tests shall be submitted with the tender:

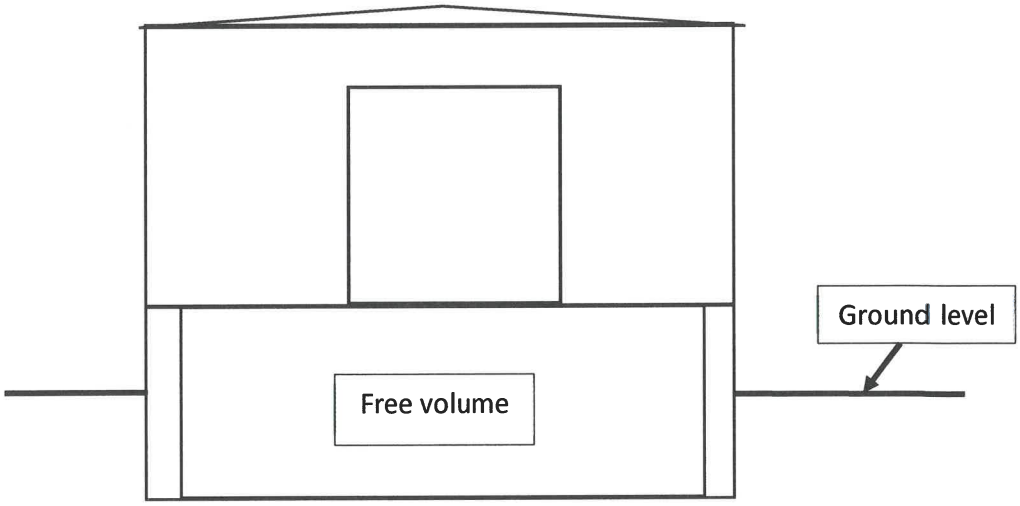
Type tests reports required by IEC 62271-202 shall be supplied within the bid except as her in after.

In case of **fully equipped or partially equipped** substation or RMU cabinet test reports required by EDC-DTS-MV002, EDC-DTS-MV003, EDC-DTS-MV004, EDC-DTS-LV003 and EDC-DTS-LV005 shall be supplied within the offer.

4.3 Specific requirement for Internal PTT/ RMU cabinet Internal Arc type test

4.3.1 Built basement with empty space beneath the enclosure

This case of installation is strongly recommended



When PTT and RMU enclosure are to be installed on bricks/concrete basement with free volume of about the floor surface of the enclosure and with a depth of more than 0.8 m, **it is allowed that the enclosure internal arc type test being not provided only if:**

- The RMU installed inside the enclosure (PTT or RMU cabinet) is designed to exhaust the internal arc (gas, etc...) in direction of the floor (ground direction) and on the rear side of the RMU. **This is to be proven in the offer**.
- The floor of the enclosure allows the free exhausting of RMU internal arc inside the free volume beneath the enclosure. **The cabinet floor is fully open at this location.**
- And other parts shall be fully closed.

4.3.2 Full concrete floor basement

This case is a very exceptional case allowed only if there is absolutely no possibility to install PTT or RMU cabinet with built basement with empty space beneath the enclosure.

For PTT/RMU installed on **full concrete floor** without any free volume beneath (without taking into account cable trenches or cable entries, this PTT/RMU internal arc type test shall be mandatorily supplied within the offer.

This internal arc type test shall be mandatorily carried out with the same RMU than offered. Transformer and LVDB can be similar than the equipment offered.

This internal arc type test is mandatorily supplied within the offer. If not, the offer shall be rejected.

Any PTT or RMU cabinet installed on concrete floor basement **without Internal Arc type test** shall be rejected or not connected to EDC network in case this equipment is installed by private customer.

It is of the responsibility of the equipment supplier and contractor to verify the PTT and RMU cabinets is to be installed on full concrete floor basement and supplied enclosure type tested for internal arc withstand.

4.4 Routine /Inspection tests

Routine tests shall be carried out in accordance with the requirements of IEC 62271-202 and in case of fully equipped substation or RMU cabinet, EDC-DTS-MV002, EDC-DTS-MV003, EDC-DTS-MV004, EDC-DTS-LV003 and EDC-DTS-LV005 standards. Those routine tests shall be shall be sent to EDC prior shipment for acceptance.

Nevertheless, the Supplier shall make necessary arrangements for inspection by an Engineer appointed by EDC to carry out in his presence necessary Routine/Inspection tests of the equipment (IEC 62271-only). Routine test shall be carried out by the supplier.

The supplier shall include details of all acceptance/routine tests to be carried out on prefabricated substations and the routine/inspection test report shall be made available to Employer's inspector at the end of inspection.

5 Local manufacturing

Prefabricated substations and RMU cabinets for which design, development is made jointly by foreign manufacturer and another local company for manufacturing are accepted provided the foreign manufacturer issue a letter or certificate certifying its agreement and acceptance.

This document shall be included within the offer.

In that case, the equipment must strictly similar to the foreign equipment and mandatorily be type tested according the requirements of this technical specification.

6 Quality Management

Design, development and production of the proposed equipment shall be ISO 9001 certified. The ISO 9001 certificate shall be submitted within the bid.

Total or part of the equipment can be assembled in Cambodia, in that case the assembling shall be done under quality supervision of the manufacturer and the assembly workshop shall mandatorily implement a quality process satisfactory to EDC and/or Local Authorities in order to obtain ISO 9001 in a near future.

7 Operating conditions

The prefabricated substations shall be suitable to operate in the ambient conditions described here after:

Altitude	Sea level to 1,000 meters
Climate	Tropical
Annual Rainfall	1,300 mm.140 days
Monsoon Period	June to November
Ambient Air Temperatures:	
Average	27.5°C
Minimum	13.3°C

Maximum	40.5°C
Relative Air Humidity	65-100%
Soil Thermal Resistivity, :	
Average	1.20c m/W
Maximum	3.00c m/W
Solar Emissivity	0.8
Solar absorption	0.8
Wind Velocity:	
Average	37 km/h (10.3 m/s)
Maximum	72 km/h (20 m/s)
Pollution level: II as per IEC 60815	

8 Technical requirements

This document completes, details, reinforces and amends the articles of IEC 62271-202 and shall be read in conjunction with this IEC standard.

8.1 General

The prefabricated Medium Voltage/ Low voltage substations shall be conveniently mounted (plug and play type) and will generally comprise at least the following components:

- Enclosure
- Compact Ring Main Unit switchboard
- Transformer
- Fault detector indicators
- Low voltage switchboard or Moulded case circuit breaker
- Metering
- MV and LV Connections

Normally, the components noted below are not to be supplied:

- Remote control system for SCADA.

Nevertheless, it shall be possible that the manufacturer supply and install more or less components and/or install parts of the components supplied by EDC as RMU, transformer or remote control system as example.

RMU cabinets shall be conform to the requirements of this technical specification and shall include:

- Compact RMU
- Remote control system for future SCADA and wiring

It is recalled that prefabricated substations and RMU cabinets can be ordered including the whole or part of equipment or can be ordered empty of any equipment.

The prefabricated substation and RMU cabinet shall be located at ground level or about 60 cm above the soil level in case of floodable area but in all case, both shall be installed on a suitable built base (not supplied). The base (floor) and the structure of the prefabricated substation or RMU cabinet shall take into account this particular installation.

Compact prefabricated substations and RMU cabinets shall be of **non-walk-in type.** All the equipment included shall be accessible and operated from outdoor. The substations and cabinets shall be located in sites accessible to people and the safety of people shall be assured in service conditions notified here after.

Service conditions are detailed in § 6 of this specification. IEC text fully applied except article 2.2.3 where the preferred ranges of temperature inside the substation is: **–5 °C and +50 °C for very hot climates.**

The enclosure of the prefabricated substation (PTT) or RMU cabinet shall be made of:

- Electrolytic galvanized steel
- Phosphated steel
- Stainless steel
- Aluminum

8.1.1 Compartments

The enclosure of the prefabricated substation shall be compartmented in order to include:

- One medium voltage switchgear and controlgear conform to IEC 62271-200 and EDC-DTS-MV003 with three or four electrical functions (three function plus MV metering for private substations)
- One transformers conform to IEC 60076-1 and EDC-DTS-MV002 (22kV only) with a maximal capacity depending of the type of PTT here in after,
- One low-voltage switchgear and controlgear according to IEC 60947-1 and IEC 60439-1 and EDC-DTS-LV003 or EDC-DTS-LV005. This compartment shall also include a complete metering system and a remote control system for the RMU. In case of private substation, this compartment shall include a MCCB or ACB as well as the energy meter and RTU cabinet.

The enclosure of the RMU cabinet includes:

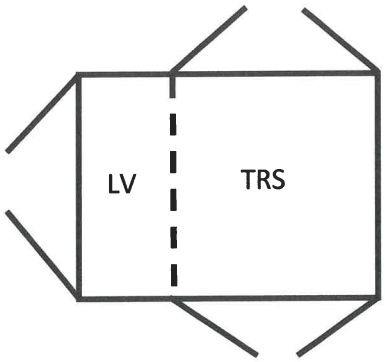
- One medium voltage switchgear and controlgear conform to IEC 62271-200 and EDC-DTS-MV003 with three or four electrical functions,
- One remote control system for the RMU (RTU cabinet)

8.2 Type of standard PTT and RMU cabinet

Several standard types of PTT and RMU cabinet are to be supplied:

8.2.1 Type 1 PTT

This PTT does not include MV compartment and shall be used as "**satellite substation**".



- The maximum transformer capacity to be installed shall be 800 kVA.
- LV compartment shall include one 8 feeders, 1200 Amp or 1800 Amp LVDB conform to EDC-DTS-LV003 technical specification as well as LV metering system.

The maximum dimensions of Type 1 PTT are:

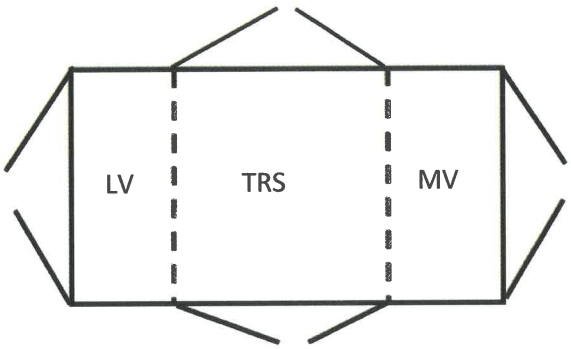
- Length (L) : 2200 mm
- Width (W) : 2000 mm
- Height (H) : 2500 mm

Type 1 substations are used only for public distribution.

8.2.2 Type 2 PTT

8.2.2.1 Type 2A PTT

This PTT includes three compartments



- The maximum transformer capacity to be installed shall be: 800 kVA
- The transformer compartment shall comprise doors on both side
- LV compartment shall include one 8 feeders, 1200 Amp or 1800 Amp LVDB conform to EDC-DTS-LV003 technical specification only as well as LV metering system and RTU cabinet.
- The MV compartment shall include a three electrical functions RMU conform to EDC-DTS-MV003 technical specification.

The maximum dimensions of Type 2A PTT are:

- Length (L) : 3300 mm
- Width (W) : 2000 mm
- Height (H) : 2500 mm

Type 2A substations are used only for public distribution.

8.2.2.2 Type 2B PTT

This type of substation is exclusively reserved for customer private substation.

It is identical to type 2A PTT in arrangement and dimensions.

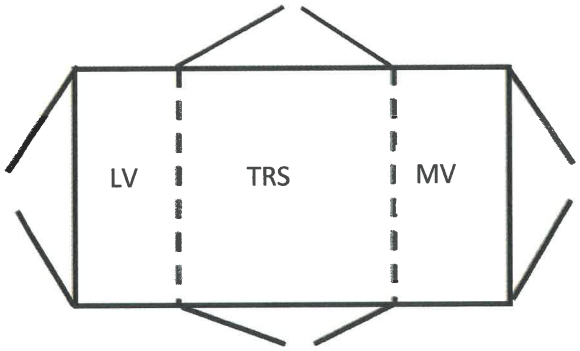
Nevertheless:

- The maximum transformer capacity to be installed shall be: 800 kVA.
- LV compartment shall include one main MCCB or ACB as well as meter and RTU cabinet.
- The MV compartment shall include a three electrical function RMU conform to EDC-DTS-MV003 technical specification plus one MV metering cubicle conform to EDC requirement.

8.2.3 Type 3 PTT

8.2.3.1 Type 3A PTT

Type 3 A PTT shall be used for public distribution substation. It includes 3 compartments as follow:



- The maximum transformer capacity to be installed shall be 1250 kVA.
- The transformer compartment shall comprise doors on both side
- LV compartment shall include one or two 8 feeders, 1800 Amp or 1200 Amp LVDB conform to EDC-DTS-LV003 technical specification as well as LV metering system and RTU cabinet.
- The MV compartment shall include an electrical three or four functions (transformer protection is 200 A circuit breaker function) RMU conform to EDC-DTS-MV003 technical specification.

The maximum dimensions of Type 3A PTT are:

- Length (L) : 4500 mm
- Width (W) : 2400 mm
- Height (H) : 3000 mm

8.2.3.2 Type 3B PTT

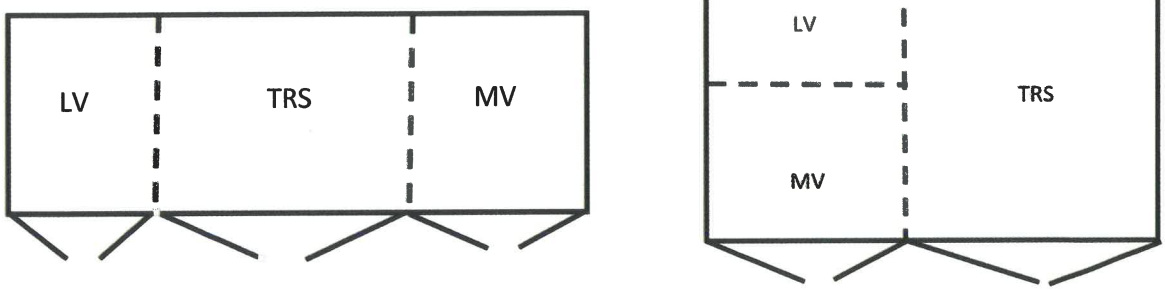
This type of substation is exclusively reserved for customer private substation.

It is identical to type 3A PTT in arrangement, dimensions and capacity. Nevertheless the:

- MV compartment shall include a RMU with 3 functions (transformer protection is 200 A circuit breaker function) conform to EDC-DTS-MV003 technical specification requirements plus a MV metering cubicle as per EDC requirements.
- LV compartment shall include MCCB or ACB plus the necessary busbars as well as a necessary metering cabinet.

8.2.4 Not standard PTT

Considering the lack of free spaces on pavement and private land, as well as specific requirements, it is allowed that customized PTT being supplied. In that case, the following arrangements shall be tolerated.



All these not standard PTT envelops shall be of public distribution or private customer versions but in all case, they shall be installed on concrete and bricks basement with free volume beneath.

8.2.5 Type 1 RMU Cabinets

This type 1 RMU cabinet shall include:

- one three electrical function RMU conform to the requirements of EDC-DTS-MV003 technical specification
- One RTU cabinet (LV supplied from LV network)

Internal dimensions shall allow the installation of any three electrical function RMU and RTU available on the market and accepted by EDC.

8.2.6 Type 2 RMU Cabinets

This type 2 RMU cabinet shall include:

- one four electrical function RMU conform to the requirements of EDC-DTS-MV003 technical specification. It shall be possible to install 630 Amp circuit breaker RMU function.
- One RTU cabinet (LV supplied from LV network)

Internal dimensions shall allow the installation of any four electrical functions (including circuit breaker function) RMU and RTU available on the market and accepted by EDC.

8.3 Ratings:

8.3.1 Rated Voltage

Subclause 4.1 of IEC 62271-1:2007 is not applicable for the prefabricated substation and RMU cabinet assembly.

Rated voltage of a prefabricated substation is defined by the rated voltages of its high voltage switchgear and controlgear, high voltage/low voltage power transformer and low voltage switchgear and controlgear.

Rated voltage of a RMU cabinet is defined by the rated voltages of its high voltage switchgear and controlgear.

Refer to IEC 62271-1:2007 and EDC-DTS-MV003 for high-voltage switchgear and controlgear.

Refer to IEC 60947-1 and 5.2 of IEC 61439-1:2011 and EDC-DTS-LV003 or EDC-DTS-LV005 for low-voltage switchgear and controlgear depending of the case.

Subclause 5.4.1 of IEC 60076-1:2014 is applicable for the transformer.

8.3.2 Rated insulation level

Subclause 4.2 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

Rated insulation level of a prefabricated substation and RMU cabinet is defined by the rated insulation levels of its high voltage switchgear and controlgear and low voltage switchgear and controlgear.

For high-voltage switchgear and controlgear, refer to IEC 62271-1:2007 and EDC-DTS-MV003, for low-voltage switchgear and controlgear refer to 5.2 of IEC 61439-1:2011 and IEC 60947-1:2007 and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case.

The minimum rated lightning impulse voltage withstands of the low-voltage switchgear and controlgear shall be at least the value given for overvoltage category IV in Table A.1 of IEC 60664-1:2007 and requested by EDC-DTS-LV003 or EDC-DTS-LV005 depending the case.

8.3.3 Rated frequency (fr)

Subclause 4.3 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

For high-voltage switchgear and controlgear, refer to IEC 62271-1:2007, and for low-voltage

switchgear and controlgear, refer to IEC 60947-1:2007 and 5.5 of IEC 61439-1:2011.

The rated frequency is 50Hz.

8.3.4 Rated normal current and temperature rise

8.3.4.1 Rated normal current (Ir)

Subclause 4.4.1 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

For high-voltage switchgear and controlgear, refer to IEC 62271-1:2007 and EDC-DTS-MV003, for low-voltage switchgear and controlgear, refer to 5.3 of IEC 61439-1:2011 and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case.

8.3.4.2 Temperature rise

Subclause 4.4.2 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

For any outer accessible part of the enclosure of the substation the maximum permissible temperature shall not exceed 70 °C at a maximum ambient temperature of 40ºC excluding solar radiation effects.

For high-voltage switchgear and controlgear, refer to IEC 62271-1:2007 and EDC-DTS-MV003.

For low-voltage switchgear and controlgear, refer to 9.2 of IEC 61439-1:2011 and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case.

For transformer function, refer to IEC 60076-2:2011 and IEC 60076-11:2004 and EDC-DTS-MV002 (22kV only).

Components in a prefabricated substation which are subject to individual specifications not covered by the scope of IEC 62271-1:2007, IEC 61439-1:2011, IEC 60076-2:2011 and IEC 60076-11:2004 shall not exceed the maximum permissible temperatures and temperature-rise limits stated in the relevant standard for each component.

The maximum permissible temperature rise for high voltage and low voltage interconnections are those specified in IEC 62271-1:2007 and 9.2 of IEC 61439-1:2011 as applicable for contacts, connections and metal parts in contact with insulation.

For the transformer, the load factor will be taken into account to comply with Clause 2 of IEC 62271-202 (Refer to Annex DD of this IEC), and also to IEC 60076-7 and to IEC 60076-12:2008.

Subclause 4.4.3 of IEC 62271-1:2007 is applicable.

8.3.5 Rated short-time withstand current (Ik)

Subclause 4.5 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

For the rated short-time withstand currents Ik and Ike of medium voltage switchgear and controlgear, high voltage interconnection and earthing circuit, 4.5 of IEC 62271-1:2007 as well as EDC-DTS-MV003 is applicable with the following additions:

Additional subclauses:

8.3.5.1 Rated short-time withstand current of high voltage switchgear and controlgear and high voltage interconnection (Ik)

Rated short-time withstand current Ik = 16kA shall be assigned to high voltage switchgear and also to high voltage interconnection.

8.3.5.2 Rated short-time phase to earth withstand current (Ike)

The rated short-time withstand phase to earth current assigned to the earthing circuit (Ike) is 16 kA.

8.3.5.3 Rated short-time withstand currents of low voltage switchgear and controlgear and low voltage interconnection (Icw)

Refer to 5.3.4 of IEC 61439-1:2011 and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case.

8.3.6 Rated peak withstand current

Subclause 4.6 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

For the rated peak withstand currents Ip and Ipe of high voltage switchgear and controlgear, high voltage interconnection and earthing circuit, 4.6 of IEC 62271-1:2007 and EDC-DTS-MV003 are applicable with the following additions:

Additional subclauses:

8.3.6.1 Rated peak withstand current (Ip)

The rated peak withstand current of a main circuit cannot exceed the corresponding rated values of its series connected components. However, for each circuit or high-voltage compartment, advantage can be taken of apparatus limiting the short-circuit current, such as current-limiting fuses, etc.

8.3.6.2 Rated peak phase to earth withstand current (Ipe)

The rated peak withstand phase to earth current assigned to the earthing circuit (Ipe) is 16 kA.

8.3.6.3 Rated peak withstand currents of low voltage switchgear and controlgear and low voltage interconnection (Ipk)

Refer to 5.3.3 of IEC 61439-1:2011 and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case.

8.3.7 Rated durations of short circuit (tk)

Subclause 4.7 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

For the rated durations of short circuit tk and tke for high voltage switchgear and controlgear, high voltage interconnection and earthing circuit 4.7 of IEC 62271-1:2007 is applicable with the following additions:

8.3.7.1 Rated duration of short circuit (tk)

The rated duration of short circuit assigned to high voltage switchgear and to high voltage interconnection is 1second.

8.3.7.2 Rated duration of phase to earth short circuit (tke)

The rated duration of phase to earth short circuit assigned to the earthing circuit is 1 second.

8.3.7.3 Rated duration of short circuits for low voltage switchgear and controlgear and low voltage interconnection

Refer to 5.3.4 of IEC 61439-1:2011 and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case, for low voltage switchgear and controlgear. The rated duration of short circuit of the low voltage interconnection is 3 seconds.

8.3.7.4 Rated duration of short circuits for transformers

Refer to IEC 60076-5:2006 , IEC 60076-11:2004 and EDC-DTS-MV002 (22kV only).

8.3.8 Rated supply voltage of closing and opening devices and auxiliary and control circuits (Ua)

Subclause 4.8 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

The rated voltage shall be 230/400 Volts

4.9 Rated supply frequency of closing and opening devices of auxiliary circuits

Subclause 4.9 of IEC 62271-1:2007 is not applicable for the prefabricated substation assembly.

The rated frequency shall be 50Hz.

8.3.9 Rated maximum power and class of enclosure

8.3.9.1 Rated maximum power of the prefabricated substation

The rated maximum power of the prefabricated substation is given by the maximum rated Power of 800 kVA and 1250 kVA depending type and version of PTT and the total losses of the transformer(s) (as defined in IEC 60076-1:2011 or IEC 60076-11:2004 and EDC-DTS-MV002 (22kV only)) for which the substation has been designed.

4.101.2 Rated class of enclosure

The rated class of the enclosure is the class of the enclosure corresponding to the rated maximum power of the prefabricated substation or RMU cabinet.

The rated class of enclosure is class 15.

8.3.10 Types of accessibility

Accessibility type shall be of IAC-AB: Internal Arc Classification-AB: for substations providing protection to both operators and the general public as per paragraph 4.102 and annex AA of IEC 62271-202:2014 and as follow:

Accessibility type A: for substations providing protection to the operators during normal operations inside or in front of the high voltage side of the substation.

NOTE 1 To verify the protection to the operators a distinction is made between two types of substations, depending on their operating mode.

a) Substation operated from inside: Authorized personnel inside the substation with the door open.

b) Substation operated from outside: Authorized personnel on the high voltage operating side of the substation with the door open.

Accessibility type B: for substations providing protection to the general public in the vicinity of the substation on all its sides at any time.

NOTE 2 To qualify for this classification, unrestricted accessibility is considered to all sides of the substation with all doors closed, irrespective of the operational mode of the substation (from the inside or from the outside).

Accessibility type AB: for substations providing protection to both operators and the general public. To qualify for this classification, these substations shall comply with the requirements for type A and type B with the same value of the test current in kA (16kA) and duration in second(s).

If requested (see paragraph 4.3) Type tests of internal arc shall be provided within the bid. If not the offer shall be rejected.

8.3.11 Rated arc fault currents (IA, IAe)
a) three-phase arc fault current (IA): 16 kA

b) single phase-to earth arc fault current (IAe): 87% of IA.

4.102.4 Rated arc fault duration (tA, tAe)

The three-phase arc fault duration (tA) shall be 1 second.

The test duration (tAe) of the single phase-to-earth arc fault shall be 1 second.

8.4 Design and construction

Clause 5 of IEC 62271-1:2007 is not applicable to the prefabricated substation assembly.

Compact prefabricated substations and RMU cabinets shall be designed so that normal service, inspection and maintenance can be carried out safely. Additionally, the substation and cabinet shall be designed and constructed in such a manner that the risk of unauthorized access is minimized. Attention shall be paid to hinges, vent covers, locking mechanisms, etc.

The design of the substation or cabinet shall take into account the possible interactions (e.g. electrical, mechanical and thermal) in the performance of different components.

All the components shall comply with their relevant IEC and EDC standards.

In particular,

- transformers according to IEC 60076-1:2011, IEC 60076-11:2004 or IEC 60076-13:2006 and EDC-DTS-MV002 (22kV only).
- high-voltage switchgear and controlgear according to IEC 62271-200:2011 or IEC 62271-201:2006 and EDC-DTS-MV003.
- low-voltage switchgear and control gear according to IEC 60947-1 and IEC 61439-2:2011and EDC-DTS-LV003 or EDC-DTS-LV005 depending the case

8.4.1 Earthing
A main earthing conductor system shall be provided to connect to the earth all metallic parts of the prefabricated substation not belonging to the main and/or secondary/auxiliary circuits of the equipment. It consists in a main earthing conductor on which each component is connected through a single circuit.

This earthing circuit shall be mandatorily firmly fixed onto the enclosure or frame using specific collars or brackets.

The main earthing copper conductor system shall be capable of carrying the rated short time and peak phase to earth withstand currents from each element of the prefabricated substation to the external earthing connection, under the neutral earthing condition of the system.

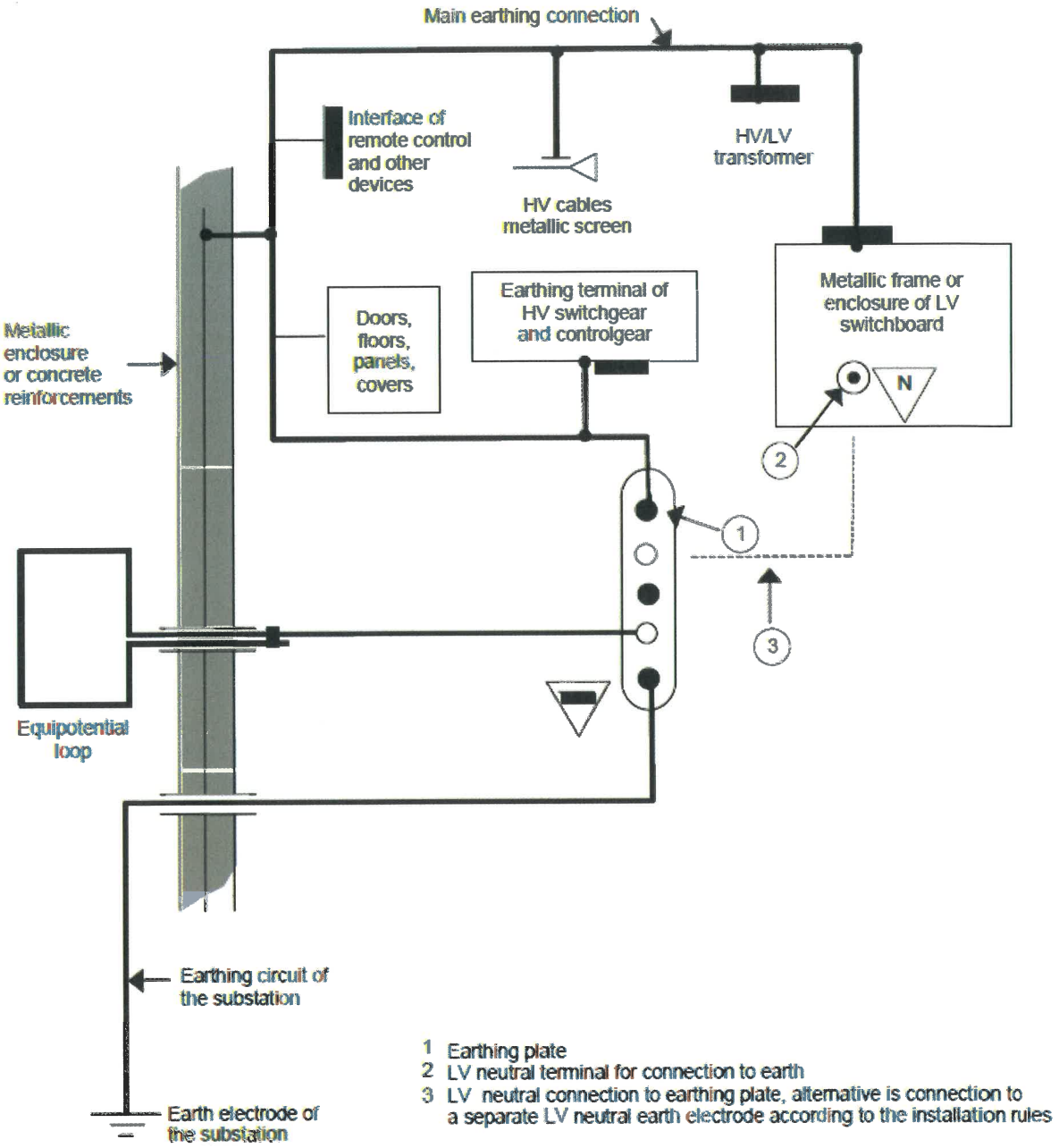
The earthing circuit is normally designed to withstand one occurrence of a single short-circuit fault, and maintenance could be needed after such an event.

If a dedicated earthing conductor is applied as earthing circuit of the switchgear and controlgear, its cross-section shall be not less than 35 mm2 and made of bare copper.

The continuity of the earth system shall be ensured and appropriate measures preventing corrosion, loosening bolts etc. shall be taken, taking into account the thermal and mechanical stresses caused by the current it may have to carry.

Components to be connected to the earthing circuit shall include:

- the enclosure of the prefabricated substation or RMU cabinet;
- the enclosure, if metallic, of the high-voltage switchgear and control gear from the terminal provided for that purpose;
- the metal screen and the earthing conductors of the high-voltage cables;
- the transformer tank or metal frame of dry-type transformers;
- the frame and/or enclosure, if metallic, of the low-voltage switchgear and control gear;
- the earthing connection of automatic controls and remote-control devices.
- Doors, floors, panels, covers, etc.



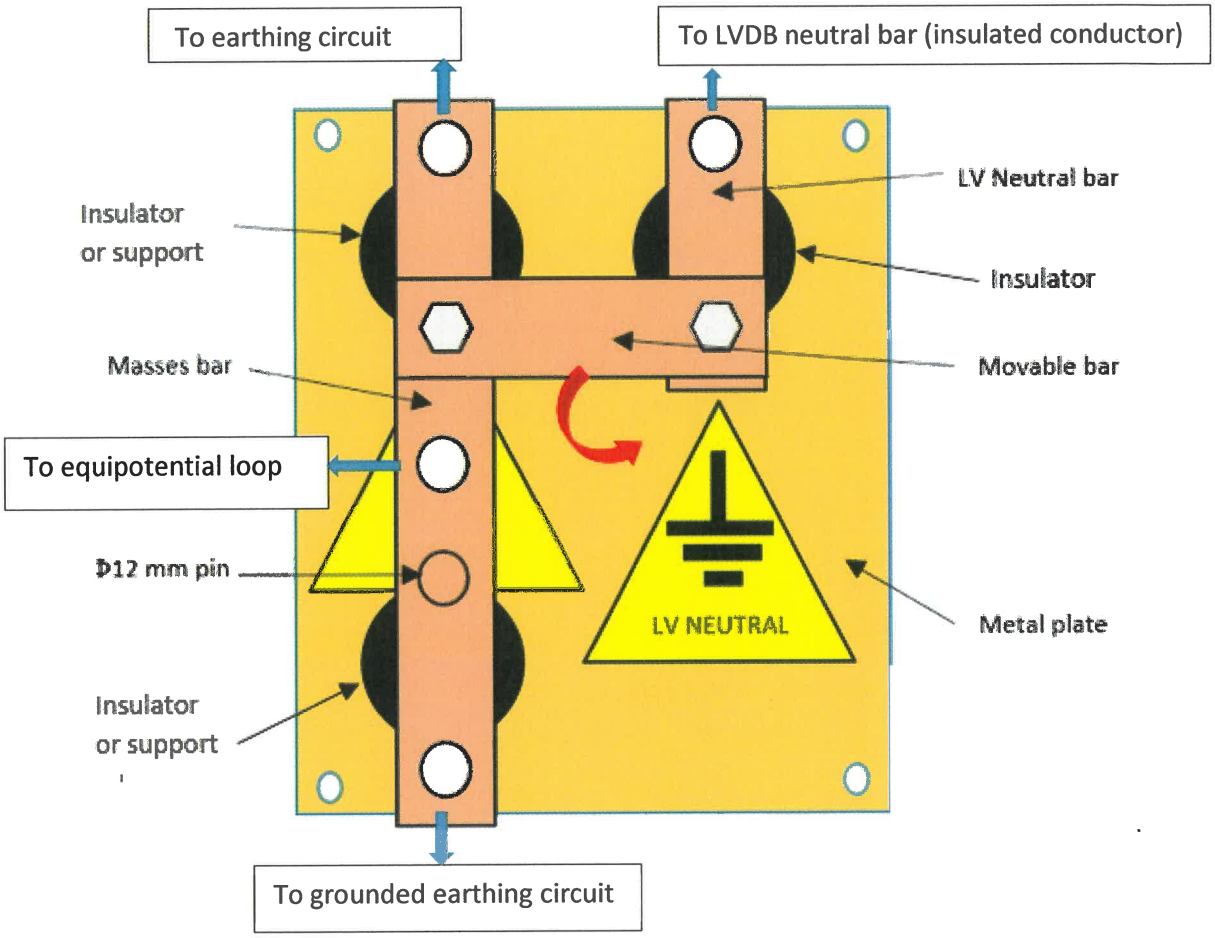
The earthing main circuit shall comprise a specific board at the end to be connected to the grounding system. This earthing board is defined in the EDC-DTS-MV015- Earthing equipment technical specification as follow:

This board shall be installed in all built substations, prefabricated substations, Ring main unit cabinets and One Pillar Substation for collecting mass earthing circuit (equipotential link, equipotential loop around the substation, cabinet, OPS and grounding circuit) and the LV neutral earthing link from the Low Voltage Distribution Board (in case of substation and OPS). It shall also allow an easy earthing ohmic measurement.

It shall be fixed again the walls thanks a metallic plate.

It comports:

- *One mass copper collecting copper bar (25mm x 3 mm) including 3 holes of 13 mm diameter plus one Diameter 12 mm and 40 mm length pin for connection of measurement apparatus,*
- *One LV neutral earthing link copper bar (25 mm x 3 mm) including 1 hole of 13 mm diameter,*
- *One movable copper bar link (20 x 4 mm) between mass and neutral bar*
- *2 isolators or metallic bars supporting the Mass copper bar*
- *1 isolator supporting the neutral bar*
- *Supporting plate*
- *Symbol of mass earthing and symbol LV neutral earthing*
- *4 M12 x 30 mm stainless steel bolts with 3 stainless steel spring washers*
- *2 M6 or M8 x 20 mm stainless steel bolts*



If the enclosure of the prefabricated substation is metallic, covers, doors and other accessible metallic parts of this enclosure shall be designed to carry 30 A (d.c.) from themselves to the prefabricated substation main earthing point, with a voltage drop of maximum 3 V. Adequate earthing measures around the prefabricated substation shall be provided to prevent dangerous touch and step voltages.

8.4.2 Auxiliary and control equipment

Subclause 5.4 of IEC 62271-1:2007 is not applicable.

For the low-voltage installation inside the prefabricated substation (for example, lighting, auxiliary supply, metering, etc.), refer to IEC 60364-4-41:2005 or IEC 61439-1:2011, as appropriate.

8.4.3 Nameplates

Instead of subclause 5.10 of IEC 62271-1:2007 the following applies.

Each prefabricated substation shall be provided with a durable and clearly legible nameplate, which shall contain at least the following information:

- manufacturer's name or trade mark;
- type designation;
- internal arc designation, where applicable;
- serial number;
- instruction book reference;
- Reference standard;
- year of manufacture.

The ratings of the high voltage switchgear and controlgear, power transformers and low voltage switchgear and controlgear shall be provided with separated nameplates, as in their respective product standard.

This plate shall be installed inside the LV compartment.

8.4.4 Degree of protection provided by enclosures

Subclause 5.13 of IEC 62271-1:2007 is applicable, with the following additions.

The minimum degree of protection of the enclosure of the transformer compartment and its own door(s) and ventilations of the prefabricated substation shall be **IP23D** in accordance with IEC 60529:1989, Amendment 1:1999, Amendment 2:2013.

For PTT, MV and LV compartments and their doors shall be of **IP54** protective index.

The IP for RMU cabinets shall be IP 54

8.4.5 Electromagnetic compatibility (EMC)

Subclause 5.18 of IEC 62271-1:2007 for high-voltage switchgear and controlgear and 9.4 of IEC 61439-1:2011 for low-voltage switchgear and controlgear are applicable.

Emission and immunity characteristics of a prefabricated substation are given by those of its active components.

8.4.6 Protection of the compact prefabricated substation and RMU cabinet against mechanical stress

The enclosure of a PTT and RMU cabinet as well that all doors, vents, etc.. shall have sufficient mechanical strength and shall withstand the following loads and impacts:

a) roof load:

- minimum 2 500 N/m2 (erection loads or other loads);

b) wind loads on the enclosure:

- The wind speed does not exceed 34 m/s corresponding to 700 Pa on cylindrical surfaces.

c) external mechanical impacts on enclosure, covers, doors and ventilation openings:

- external mechanical impacts with an energy of **20 J** corresponding to a degree of protection **IK10**.

Accidental mechanical impacts above this value (for example, traffic collisions) are not covered by this specification.

8.4.7 Protection of the environment due to internal defects

In the case of internal defects leading to hazardous liquids escaping from the equipment (example: oil of a transformer in PTT), provision shall be taken to retain hazardous liquids preventing the soil to be polluted.

If one or several retention tanks (pit) are part of the enclosure, their capacity shall be at least:

- for individual tank (PTT): the total hazardous liquid volume of the corresponding to at least 25% of hazardous liquid containing part (transformer)

These tanks or pits shall be suitably protected against corrosion.

8.4.8 Internal arc fault

A compact prefabricated substation and RMU cabinet that satisfies the requirements of this specification and IEC 62271-202 shall be designed, to prevent the occurrence of internal arc faults.

To achieve this objective the manufacturer of the prefabricated substation shall assure the correct manufacture, verifying it by carrying out routine tests according to Clause 7 of IEC 62271-202.

There should be little probability that an internal arc occurs during the entire service life, if the substation is installed, operated and maintained following the instructions provided by the manufacturer; however, this cannot be completely disregarded.

Failure within the enclosure of a prefabricated substation or RMU cabinet due either to a defect or an exceptional service condition or mal-operation may initiate an internal arc, which constitutes a hazard, if persons are present. Failures can occur in any part of the substation or cabinet. However, as no internal arc testing requirements for low voltage switchgear and transformers are described in their respective relevant standards, only arc faults occurring within the enclosure of the enclosed high voltage switchgear and controlgear and in the high voltage interconnections are taken into consideration in IEC 62271-202 standard (see 6.102).

IEC/TR 61641:2008 gives guidance for an internal arc test in enclosed low voltage switchgear and controlgear.

For substation arrangements without high voltage switchgear, see 6.102.2 of IEC 62271-202.

To consider this hazard, distinction shall be made between operators and general public. The operator shall in front of it (operated from outside). However, the general public may be around the substation at any time. The general public will never be inside the substation or in close proximity to the operating side when operations are being performed with the doors open as operated from outside. These areas are considered to be of restricted access only for operators.

Evidence of the effectiveness of the design at providing protection to general public and/or to operators in case of an internal arc fault shall be required. This evidence shall be obtained by testing the substation according to 6.102 and Annex AA of IEC 62271-202. Substations that have been successfully type tested qualify as class IAC-AB. **Type test reports shall be provided within the bid when required (see paragraph 4.3).**

In the event of an internal arc fault, some gases with toxic characteristics may be present. However, it is not relevant to the safety of the operator because in such situation evacuation of the switching room is mandatory. Later on, ventilation of the room is necessary before re-entering.

8.5 Enclosure

8.5.1 General

The enclosure shall meet the following conditions:

- the degree of protection shall comply with 8.3.4;
- parts of the enclosure made of non-conductive materials (if any) shall meet special dielectric requirements. Tests to verify compliance are described in 6.2.101.2.2 of IEC62271-202;
- measures shall be taken in order to avoid deformation, which could be caused by transport or handling when carried out according to the manufacturer's instructions;
- means shall be provided to guarantee safe access to operations concerning transformer tap-changer or for inspection, for example, by opening a door or, if necessary, by removing a cover;
- cooling of the prefabricated substation by **natural ventilation and by forced ventilation**;
- it is acceptable that part of the enclosure of a component becomes part of the substation enclosure. In such a case, this part shall comply with the applicable requirements of both this standard and the relevant product standard of the component.

8.5.2 Fire behaviour

8.5.2.1 General

The materials used in the construction of the enclosure of the prefabricated substation shall have the following minimum level of behaviour against fire occurring inside or outside of the prefabricated substation.

The materials shall be either non-flammable or, if synthetic materials are used, they shall be in accordance with 5.104.2.3 of 62271-202.

NOTE: For aesthetic reasons, additional cladding materials which cannot comply with non-flammability tests could be used. These materials do not form any part of the structure of the enclosure of the substation.

8.5.2.2 Materials

Only metals are used for PTT and RMU cabinets. They are considered as not flammable.

8.5.2.3 Synthetic materials

The use of enclosures made of synthetic materials is NOT accepted by EDC.

8.5.2.4 Concrete

Concrete enclosures are NOT accepted by EDC.

8.5.3 Authorized metal

8.5.3.1 General

The enclosure can be metallic, either of:

- Hot dip galvanized steel
- Electrolytic galvanized steel
- phosphated steel
- stainless steel
- Aluminum

In all cases, the enclosure shall be painted by epoxy paint with application of a primer in case of liquid paint or by epoxy powder electrolytic deposit and oven heating.

In all cases, the supporting structure shall be made of hot dip galvanized steel with a minimum zinc thickness of 60 microns (µm).

The materials of the enclosure should resist deterioration under the environmental conditions during its expected lifetime, provided that the maintenance recommendation given by the manufacturer is followed.

An additional epoxy coating or surface treatment can be used after primer application.

The colour of the outer surface of the compact substation shall be subject of EDC agreement or requirement. Nevertheless, if no specific colour is requested in the tender the default colour shall be RAL 7032.

To assess the performance of such treatments appropriate relevant international standards may be used.

The IEC 60068 series gives information on environmental testing procedures and severity of tests.

Characteristics of materials coatings and painting shall be stated by the manufacturer.

Additional information is given in Annex FF of 62271-202.

8.5.3.2 Metals

Protection against corrosion shall be ensured by the use of suitable materials or by the application of suitable protective coatings to the exposed surfaces. Additional information is given in FF.1.1 and FF.1.2 of 62271-202. The manufacturer shall carefully consider the corrosion characteristic of the material.

8.5.4 Roof

The slope of the roof shall not be less than **2%**

8.5.5 Covers and doors

Covers and doors are part of the enclosure. When they are closed, they shall provide the degree of protection; IP and IK specified for the enclosure. When ventilation openings are incorporated in covers or doors, reference is made to 5.104.5 of IEC 62271-202.

Two categories of covers or doors are recognized with regard to access to the compartments of the prefabricated substation:

- those which need to be opened for normal operation (removable covers, doors). These shall not require tools for their opening or removal. They shall be provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;
- all other covers, doors or roof. They shall be provided with locking facilities or it shall not be possible to open or remove them before doors used for normal operation have been opened. They shall require tools for their opening or removal.

The doors shall open outwards at an angle of at least 90° and be equipped with a device able to maintain them in an open position. In case where doors are horizontally hinged at the top the minimum opening angle should be 90º.

It shall be possible to secure the access hatch to prevent closure whilst operators are within the substation or working on the equipment from outside the substation.

8.5.6 Floor

The floor of the substation shall be designed and constructed to support the substation and whole its equipment.

It shall be suitably protected against corrosion (Hot dip galvanised)

Ventilation openings

Ventilation openings shall **be so arranged or shielded that the same degree of protection (IP code) and the same degree of protection against mechanical impacts (IK code) as specified for the enclosure**, or for the ventilated compartment including partitions, are maintained.

Such openings may make use of wire mesh or similar, provided that the IK level is maintained.

Transformer compartment doors shall be provided with a surface of ventilation of at least one square meter.

8.5.7 Fans

In addition to natural ventilation, all prefabricated substation's **transformer compartment** shall be fitted by exhaust fans. These fans shall be of industrial fans type made of metal. They shall be fitted with the necessary adjustable thermostat.

In all cases, if the fans are of "toilet type" the offer shall be rejected.

8.5.8 Partitions

There is no specific degree of protection of partitions. Nevertheless, partition shall be made with the same material that the enclosure.

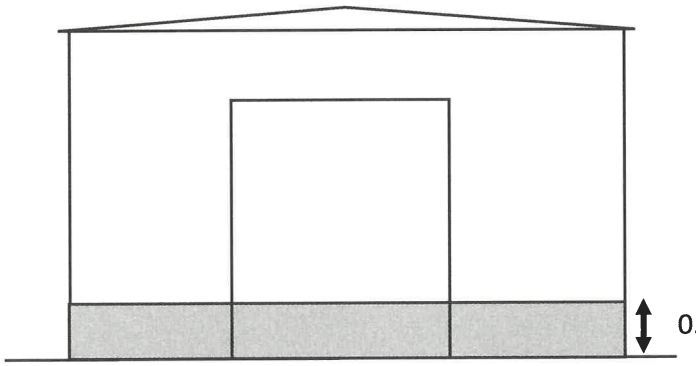
8.5.9 Corrosion protection

The lowest part of enclosures shall be coated by a specific thick coating in order to efficiently protect the base of PTT and RMU cabinets against water.

The two faces of the sheets (inside and outside) constituting the envelop and the doors of PTT and RMU cabinets shall be coated.

This coating shall be made of Rubson tm. (Or equivalent). Car bituminous protection coating is also accepted.

This coating is then painted with epoxy paint of the same colour than the enclosure.



8.5.10 Doors hinges

The hinges of doors located outside the envelop shall be suitably protected against corrosion. For this purpose, they could be made of stainless steel, hot dip galvanized steel or carefully painted with at least two layers of epoxy paint.

8.5.11 Internal wiring

8.5.11.1 MV wiring

The MV cables between RMU transformer protection electrical function, or 200A CB function, or MV metering cubicle shall be in accordance with the requirements of EDC-DTS-MV017.

Those cables and connecting accessories shall be long enough for connecting:

- Transformers from 100 to 800 kVA in case of type 2 PTT
- Transformers from 800 to 1250 kVA in case of type 3 PTT

In ALL cases, those MV cables shall be firmly attached on to enclosure or partitioning.

8.5.11.2 LV wiring

LV wiring between transformer and LVDB for public distribution type PTT shall be done with copper cables using XLPE insulation.

The number of LV cable and bars will depend of the transformer capacity and LVDB type as requested by EDC-DTS- LV003.

Those cables and connecting accessories shall be long enough for connecting:

- Transformers from 100 to 800 kVA in case of type 2 PTT
- Transformers from 800 to 1250 kVA in case of type 3 PTT

In ALL cases, those LV cables and bars shall be **firmly attached** at least on one location on to enclosure or partitioning thanks cable tray or ladder.

For private substation with MV metering only, LV cables can be replaced by insulated copper bars.

8.5.11.3 PTT Auxiliary LV wiring

The auxiliary LV wiring shall be powered from hhe MCB installed on the LVDB in case of public distribution substation or from a set of fuse holders located in the LV compartment in case of private substation.

All the wiring shall be done using LV cable with PVC insulation under PVC outer sheet with the following cross sections:

- 2x1.5 mm² for lighting
- 3x2.5 mm² for sockets

Cables and eventual tubes shall be firmly fixed inside the substation using specific collars.

8.5.11.3.1 Lighting

One light shall be installed in each compartment. The lighting shall be turned on/off when the compartment door is opened or closed.

Cable connections shall be done inside waterproof electrical boxes

8.5.11.3.2 Sockets

Two electrical sockets shall be installed inside the LV compartment:

- One for RMU cabinet
- One for other supply

Both sockets shall be waterproof sockets of type F.

8.5.11.4 UGC cable fault detectors

MV UGC cable fault detector could be requested to be installed in PTT or RMU cabinet.

The full wiring of UGC cable detector shall be done at factory and the necessary outdoor light shall be installed in the front face of the substation (road side) near the doors of the transformer compartment.

Wiring inside the substation shall be firmly fixed using specific collars.

8.5.11.5 Meter panel

An insulating and not flammable panel for fixing the meter (either LV or MV metering) shall be supplied and installed in the LV compartment.

The minimum dimensions shall be:

- H: 450 mm
- L: 350 mm

8.5.12 Entry for temporary or emergency cable

Each PTT shall be fitted by a cable entry for temporary LV cable in low voltage compartment.

An outlet with 100 mm diameter cable gland is provided on the rear face of the substation to be able to make a temporary connection of a LV cable. This hole is closed by a cover removable only from the inside.

This cable entry shall be located near the roof of the PTT.

8.5.13 Other provisions

8.5.13.1 Provisions for dielectric tests on cables

Enough space and proper means of access shall be provided to the high-voltage connection compartments and/or cable test points of the high voltage switchgear and controlgear in order to perform safely dielectric tests on the cables.

8.5.13.2 Accessories

Adequate space should be provided for keeping accessories, for example, earthing devices, operating handles, etc.

One side wall (inside) of the LV compartment shall be fitted with a specific pocket for storing the documentation and miscellaneous papers.

This pocket shall be made of metal or strong plastic and shall accept at least 10 pages of A4 format.

8.5.13.3 Operation aisle

The width of an operation aisle inside a prefabricated substation shall be adequate for performing any operation or maintenance. The width of such an aisle shall be 800 mm or greater. Doors of switchgear and controlgear inside the prefabricated substation shall either close in the direction of the exit or rotate such that they shall not reduce the width of the aisle.

Doors in any open fixed position or mechanical drives protruding from the switchgear and controlgear shall not reduce the width of the aisle to less than 500 mm.

8.5.13.4 Labels

Labels for warning, manufacturers' instructions, etc., and those according to EDC standards and regulations shall be durable and clearly legible.

8.5.14 Sound emission

The transformer is the main source of sound. On the other hand, there is no requirement in high voltage and low voltage switchgear and control gear relevant standards on this matter and the direct contribution of the high voltage and low voltage components to the sound level of the substation is considered, in principle, negligible.

8.5.15 Handling

Each prefabricated substation and RMU cabinet shall be fitted with at least 4 rings for handling. Similar purpose equipment may be proposed.

9 Technical data sheets

No.	Description	Unit	Requirements	Supplier's Offer
9.1	**Type 1 PTT (public distribution only)**			
1	Manufacturer Country		to be specified	
2	Manufacturer		to be specified	
3	Manufacturer's Reference of offered product		to be specified	
4	Manufacturing country		to be specified	
5	ISO 9001		To be provided with bid	
6	Applicable Standards		IEC 62271-202 (2014)	
6a	Prefabricated substation conforms to the requirement of IEC 62271-200 **and this technical specification**		Mandatory	
7	Type tests reports according the requirement of IEC 62271-202 with exception of internal arc type test		To be provided with bid	
8	Technical documents (drawings, catalogue, etc..)		To be provided with bid	
9	PTT strictly in accordance with the requirements of this technical specification		Mandatory	
10	Suitable to be installed at about 0.6 m (or more) above ground level		Yes	
11	Suitable to be Installed on a built (concrete/bricks) basement in any cases with air free volume (80cm) beneath		Mandatory	
12	Can include: • 1 Transformer conform to EDC-DTS-MV002 technical specification • LVDB 8 feeders conform to EDC-DTS-LV003 technical specification		Max capacity: 800 kVA Max: Type 8-1800 LVDB	

13	Includes 1 transformer compartment and 1 LV compartment		Mandatory	
14	Maximum dimensions of type 1 PTT	mm	Length (L) : 2200 mm Width (W) : 2000 mm Height (H) : 2500 m Real dimensions to be mentioned	
14a	Full drawing of prefabricated substation with all dimensions		Mandatory. If not the offer shall be rejected	
15	Metallic envelop construction		Mandatory	
16	Metal of frame (structure)		Galvanized steel	
16a	Minimum zinc thickness of frame	µm	60	
17	Metal of sheets		Hot dip galvanized steel Electrolytic galvanized steel Phosphated steel Stainless steel Aluminum	☐ ☐ ☐ ☐ ☐
17 a	Sheet thickness		To be mandatorily mentioned Roof: Walls: Doors: Vents:	
18	Thickness of zinc in case of galvanized steel sheets		To be mandatorily mentioned	
19	In case of Epoxy hot powder steel protection: Average thickness of Epoxy coating:	mm	To be mandatorily mentioned	
20	In case of paint, exterior coating of epoxy paint after primer application		Mandatory	

20a	Minimum thickness of paint		To be mandatorily mentioned	
21	Standard Colour		RAL 7032	
21a	Other colour requested by EDC		.....	
21b	Protection on 30 cm high as requested by Paragraph 8.5.9		Mandatory	
22	Transformer compartment Protection index from outdoor		IP23D	
23	LV compartment Protection Index from outdoor		IP54	
24	Mechanical protection index of whole substation including doors and ventilations		IK10	
25	Rated class of enclosure		15	
26	Accessibility of compact substation		IAC-AB	
27	Doors for transformer compartment, and LV compartment		Mandatory	
27a	The doors shall open outwards at an angle of :at least 90° and be	°	90° and more	
27b	All doors are equipped with a device able to maintain them in an open position		Mandatory	
27c	Doors provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;		Mandatory and description	
27d	Door hinges protected against corrosion		To be described	
28	Ventilation openings for transformer compartment		To be described	
28a	Ventilations degree of protection		IP23D	
28b	Ventilations degree of protection against mechanical impacts		IK10	

28c	The transformer compartment comprise a door with a ventilation opening of 1 m²		Mandatory	
29	Supplied with Fan		Mandatory	
29a	Fans are industrial metallic type and protected against corrosion		Mandatory	
29b	Fans are supplied with thermostat		Mandatory	
30	Earthing circuit strictly in accordance with paragraph 8.3.1 of the technical specification		Mandatory	
30a	Drawing of earthing circuit		To be supplied	
30b	Earthing board located in the LV compartment		Mandatory	
30c	Drawing of earthing board		To be supplied	
30d	Earthing circuit made of 35 mm² bare conductor		Mandatory	
30e	Earthing circuit firmly fixed onto enclosure or frame		Mandatory	
30f	Fitted with 2 waterproof type F sockets in LV compartment		Mandatory	
30g	Fitted with insulating and not flammable meter panel of 350x450 in LV compartment		Mandatory	
31	Substation fitted with supports or cable tray for LV cable between TRS and LVDB		Mandatory	
32	Substation supplied with all accessories (U beams, bolts, etc...) for installing and fixing equipment inside (Transformer, , etc....)		Mandatory	
33	Name plate located in LV compartment manufacturer's name or trade mark;		Yes Yes	

	type designation; internal arc designation, where applicable; serial number; Instruction book reference; Reference standard; year of manufacture.		Yes Yes Yes Yes Yes	
34	Enclosure fitted with handling rings or equivalent devices		To be described	
35	Include an oil tank (pit) under the transformer			
35 a	Volume of oil tank/pit	L	25% of 800 kVA transformer	
35 b	Oil tank/pit protected against corrosion		Mandatory	
35f	Fitted with 2 waterproof type F sockets in LV compartment		Mandatory	
35g	Fitted with insulating and not flammable meter panel of 350x450 in LV compartment		Mandatory	
36	LV compartment fitted with entry for temporary LV cables as per requirements of paragraph 8.5.12		Mandatory	
37	Auxiliary LV wiring strictly in accordance with the requirements of paragraph 8.5.11.3		Mandatory	
The offer shall include all drawings and dimensions as well as all technical catalogues. If not, the offer shall be rejected.				
If the required type tests are missing, the offer shall be rejected				
Supplier's offer column must be properly filled with the right figures. "Compliant, Yes, ",√, etc.... "are not accepted.				
Deviation from the technical specification:				

The bidder shall list point after point and explain here in after all deviation from the requested technical specification.

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Full technical information shall be supplied within the bid. If not, the offer shall not be considered

Bidder signature:

No.	Description	Unit	Requirements	Supplier's Offer
9.2	**Type 2A PTT (public distribution)**			
1	Manufacturer Country		to be specified	
2	Manufacturer		to be specified	
3	Manufacturer's Reference of offered product		to be specified	
4	Manufacturing country		to be specified	
5	ISO 9001		To be provided with bid	
6	Applicable Standards		IEC 62271-202 (2014)	
6a	Prefabricated substation conform to the requirement of IEC 62271-200 **and this Technical specification**		Mandatory	
7	Type tests reports according the requirement of IEC 62271-202 with exception of internal arc type test		To be provided with bid	
8	Technical documents (drawings, catalogue, etc..)		To be provided with bid	
9	PTT strictly in accordance with the requirements of this technical specification		Mandatory	
10	Suitable to be installed at about 0.6 m (or more) above ground level		Yes	
11	Suitable to be Installed on a built (concrete/bricks) basement in any cases with air free volume (80cm) beneath		Mandatory	
12	Can include : • 1 Transformer conform to EDC-DTS-MV002 technical specification • LVDB 8 feeders conform to EDC-DTS-LV003 technical specification		Max capacity: 800 kVA Max: Type 8-1800 LVDB	

	• 3 functions RMU in accordance with EDC-DTS-MV003		Mandatory	
12a	Suitable to house any RMU brand used by EDC		Mandatory	
13	Includes 1 MV compartment, 1 transformer compartment and 1 LV compartment		Mandatory	
14	Maximum dimensions of type 2 PTT	mm	Length (L) : 3300 mm Width (W) : 2000 mm Height (H) : 2500 mm Real dimensions to be mentioned	
14a	Full drawing of prefabricated substation with all dimensions		Mandatory. If not the offer shall be rejected	
15	Metallic envelop construction		Mandatory	
16	Metal of frame (structure)		Galvanized steel	
16a	Minimum zinc thickness of frame	µm	60	
17	Metal of sheets		Hot dip galvanized steel Electrolytic galvanized steel Phosphated steel Stainless steel Aluminum	☐ ☐ ☐ ☐ ☐
17 a	Sheet thickness		To be mandatorily mentioned Roof: Walls: Doors: Vents:	
18	Thickness of zinc in case of galvanized steel sheets		To be mandatorily mentioned	

19	In case of Epoxy hot powder steel protection: Average thickness of Epoxy coating:	mm	To be mandatorily mentioned	
20	In case of paint, exterior coating of epoxy paint after primer application		Mandatory	
20a	Minimum thickness of paint		To be mandatorily mentioned	
21	Standard Colour		RAL 7032	
21a	Other colour requested by EDC		.....	
21b	Protection on 30 cm high as requested by Paragraph 8.5.9		Mandatory	
22	Transformer compartment Protection index from outdoor		IP23D	
23	MV and LV compartment Protection Index from outdoor		IP54	
24	Mechanical protection index of whole substation including doors and ventilations		IK10	
25	Rated class of enclosure		15	
26	Accessibility of compact substation		IAC-AB	
27	2 doors for transformer compartment, 1 for MV compartment and 1 door for LV compartment		Mandatory	
27a	The doors shall open outwards at an angle of :at least 90° and be	°	90° and more	
27b	All doors are equipped with a device able to maintain them in an open position		Mandatory	
27c	Doors provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;		Mandatory and description	
27d	Door hinges protected against corrosion		To be described	

28	Ventilation openings for transformer compartment		To be described	
28a	Ventilations degree of protection		IP23D	
28b	Ventilations degree of protection against mechanical impacts		IK10	
28c	The transformer compartment comprise doors with a ventilation opening of 1 m^2		Mandatory	
29	Supplied with Fans		Mandatory	
29a	Fans are industrial metallic type and protected against corrosion		Mandatory	
29b	Fans are supplied with thermostat		Mandatory	
30	Earthing circuit strictly in accordance with paragraph 8.3.1 of the technical specification		Mandatory	
30a	Drawing of earthing circuit		To be supplied	
30b	Earthing board located in the LV compartment		Mandatory	
30c	Drawing of earthing board		To be supplied	
30d	Earthing circuit made of 35 mm^2 bare conductor		Mandatory	
30e	Earthing circuit firmly fixed onto enclosure or frame		Mandatory	
30f	Fitted with 2 waterproof type F sockets in LV compartment		Mandatory	
30g	Fitted with insulating and not flammable meter panel of 350x450 in LV compartment		Mandatory	
31	Substation fitted with supports or cable tray for LV cable between TRS and LVDB		Mandatory	
32	Substation supplied with all accessories (U beams, bolts,		Mandatory	

	etc...) for installing and fixing equipment inside (Transformer, , etc....)			
33	Name plate located in LV compartment manufacturer's name or trade mark; type designation; internal arc designation, where applicable; serial number; Instruction book reference; Reference standard; year of manufacture.		Yes Yes Yes Yes Yes Yes Yes Yes	
34	Enclosure fitted with handling rings or equivalent devices		To be described	
35	Include an oil tank (pit) under the transformer			
35 a	Volume of oil tank/pit	L	25% of 800 kVA transformer	
35 b	Oil tank/pit protected against corrosion		Mandatory	
36	LV compartment fitted with entry for temporary LV cables as per requirements of paragraph 8.5.12		Mandatory	
37	MV UGC fault indicator as per required installation in paragraph 8.5.11.4		Mandatory	
38	Auxiliary LV wiring strictly in accordance with the requirements of paragraph 8.5.11.3		Mandatory	
The offer shall include all drawings and dimensions as well as all technical catalogues. If not, the offer shall be rejected.				

If the required type tests are missing, the offer shall be rejected
Supplier's offer column must be properly filled with the right figures. "Compliant, Yes, ",√, etc.... "are not accepted.
Deviation from the technical specification: The bidder shall list point after point and explain here in after all deviation from the requested technical specification. 1/ 2/ 3/ **Full technical information shall be supplied within the bid. If not, the offer shall not be considered** Bidder signature:

No.	Description	Unit	Requirements	Supplier's Offer
9.3	**Type 2B PTT (Private)**			
1	Manufacturer Country		to be specified	
2	Manufacturer		to be specified	
3	Manufacturer's Reference of offered product		to be specified	
4	Manufacturing country		to be specified	
5	ISO 9001		To be provided with bid	
6	Applicable Standards		IEC 62271-202 (2014)	
6a	Prefabricated substation conform to the requirement of IEC 62271-200 **and this Technical specification**		Mandatory	
7	Type tests reports according the requirement of IEC 62271-202 with exception of internal arc type test		To be provided with bid	
8	Technical documents (drawings, catalogue, etc..)		To be provided with bid	
9	PTT strictly in accordance with the requirements of this technical specification		Mandatory	
10	Suitable to be installed at about 0.6 m (or more) above ground level		Yes	
11	Suitable to be Installed on a built (concrete/bricks) basement in any cases with air free volume (80cm) beneath		Mandatory	
12	Can include : • 1 Transformer conform to EDC-DTS-MV002 technical specification • 1x MCCB or ACB • 3 functions RMU in accordance with EDC-DTS-MV003 + MV metering cubicle		Max capacity: 800 kVA To be mentioned Mandatory	

12a	Suitable to house any RMU brand used by EDC		Mandatory	
13	Includes 1 MV compartment, 1 transformer compartment and 1 LV compartment		Mandatory	
14	Maximal dimensions of type 2 B PTT	mm	Length (L) : 3300 mm Width (W) : 2000 mm Height (H) : 2500 mm Real dimensions to be mentioned	
14a	Full drawing of prefabricated substation with all dimensions		Mandatory. If not the offer shall be rejected	
15	Metallic envelop construction		Mandatory	
16	Metal of frame (structure)		Galvanized steel	
16a	Minimum zinc thickness of frame	µm	60	
17	Metal of sheets		Hot dip galvanized steel Electrolytic galvanized steel Phosphated steel Stainless steel Aluminum	
17 a	Sheet thickness		To be mandatorily mentioned Roof: Walls: Doors: Vents:	
18	Thickness of zinc in case of galvanized steel sheets		To be mandatorily mentioned	
19	In case of Epoxy hot powder steel protection: Average thickness of Epoxy coating:	mm	To be mandatorily mentioned	
20	In case of paint, exterior coating of epoxy paint after primer application		Mandatory	

20a	Minimum thickness of paint		To be mandatorily mentioned	
21	Standard Colour		RAL 7032	
21a	Other colour requested by EDC		.....	
21b	Protection on 30 cm high as requested by Paragraph 8.5.9		Mandatory	
22	Transformer compartment Protection index from outdoor		IP23D	
23	MV and LV compartment Protection Index from outdoor		IP54	
24	Mechanical protection index of whole substation including doors and ventilations		IK10	
25	Rated class of enclosure		15	
26	Accessibility of compact substation		IAC-AB	
27	2 Doors for transformer compartment, 1 for MV compartment and 1 for LV compartment		Mandatory	
27a	The doors shall open outwards at an angle of :at least 90° and be	°	90° and more	
27b	All doors are equipped with a device able to maintain them in an open position		Mandatory	
27c	Doors provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;		Mandatory and description	
27d	Door hinges protected against corrosion		To be described	
28	Ventilation openings for transformer compartment		To be described	
28a	Ventilations degree of protection		IP23D	

28b	Ventilations degree of protection against mechanical impacts		IK10	
28c	The transformer compartment comprise doors with a ventilation opening of 1 m^2		Mandatory	
29	Supplied with Fan		Mandatory	
29a	Fans are industrial metallic type and protected against corrosion		Mandatory	
29b	Fans are supplied with thermostat		Mandatory	
30	Earthing circuit strictly in accordance with paragraph 8.3.1 of the technical specification		Mandatory	
30a	Drawing of earthing circuit		To be supplied	
30b	Earthing board located in the LV compartment		Mandatory	
30c	Drawing of earthing board		To be supplied	
30d	Earthing circuit made of 35 mm^2 bare conductor		Mandatory	
30e	Earthing circuit firmly fixed onto enclosure or frame		Mandatory	
30f	Fitted with 2 waterproof type F sockets in LV compartment		Mandatory	
30g	Fitted with insulating and not flammable meter panel of 350x450 in LV compartment		Mandatory	
31	Substation fitted with supports or cable tray for LV cable between TRS and LVDB		Mandatory	
32	Substation supplied with all accessories (U beams, bolts, etc...) for installing and fixing equipment inside (Transformer, , etc....)		Mandatory	

33	Name plate located in LV compartment manufacturer's name or trade mark; type designation; internal arc designation, where applicable; serial number; Instruction book reference; Reference standard; year of manufacture.		Yes Yes Yes Yes Yes Yes Yes	
34	Enclosure fitted with handling rings or equivalent devices		To be described	
35	Include an oil tank (pit) under the transformer			
35 a	Volume of oil tank/pit	L	25% of 800 kVA transformer	
35 b	Oil tank/pit protected against corrosion		Mandatory	
36	LV compartment fitted with entry for temporary LV cables as per requirements of paragraph 8.5.12		Mandatory	
37	Auxiliary LV wiring strictly in accordance with the requirements of paragraph 8.5.11.3		Mandatory	
38	MV UGC fault indicator as per required installation in paragraph 8.5.11.4		Mandatory	
The offer shall include all drawings and dimensions as well as all technical catalogues. If not, the offer shall be rejected.				
If the required type tests are missing, the offer shall be rejected				
Supplier's offer column must be properly filled with the right figures. "Compliant, Yes, ",√, etc.... "are not accepted.				

Deviation from the technical specification:

The bidder shall list point after point and explain here in after all deviation from the requested technical specification.

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Full technical information shall be supplied within the bid. If not, the offer shall not be considered

Bidder signature:

No.	Description	Unit	Requirements	Supplier's Offer
9.4	**Type 3A PTT (public distribution)**			
1	Manufacturer Country		to be specified	
2	Manufacturer		to be specified	
3	Manufacturer's Reference of offered product		to be specified	
4	Manufacturing country		to be specified	
5	ISO 9001		To be provided with bid	
6	Applicable Standards		IEC 62271-202 (2014)	
6a	Prefabricated substation conform to the requirement of IEC 62271-200 **and this Technical specification**		Mandatory	
7	Type tests reports according the requirement of IEC 62271-202 with exception of internal arc type test		To be provided with bid	
8	Technical documents (drawings, catalogue, etc..)		To be provided with bid	
9	PTT strictly in accordance with the requirements of this technical specification		Mandatory	
10	Suitable to be installed at about 0.6 m (or more) above ground level		Yes	
11	Suitable to be Installed on a built (concrete/bricks) basement in any cases with air free volume (80cm) beneath		Mandatory	
12	Can include : • 1 Transformer conform to EDC-DTS-MV002 technical specification • 1 or 2 x LVDB 8 feeders conform to EDC-DTS-LV003 technical specification • 3 or 4 functions RMU in accordance with		Max capacity: 1250 kVA Max: Type 8-1800 LVDB	

	EDC-DTS-MV003. Transformer protection is 200A CB		Mandatory	
12a	Suitable to house any RMU brand used by EDC		Mandatory	
13	Includes 1 MV compartment, 1 transformer compartment and 1 LV compartment		Mandatory	
14	Maximum dimensions of type 3 A PTT	mm	Length (L) : 4500 mm Width (W) : 2400 mm Height (H) : 3000 mm Real dimensions to be mentioned	
14a	Full drawing of prefabricated substation with all dimensions		Mandatory. If not the offer shall be rejected	
15	Metallic envelop construction		Mandatory	
16	Metal of frame (structure)		Galvanized steel	
16a	Minimum zinc thickness of frame	µm	60	
17	Metal of sheets		Hot dip galvanized steel Electrolytic galvanized steel Phosphated steel Stainless steel Aluminum	
17 a	Sheet thickness		To be mandatorily mentioned Roof: Walls: Doors: Vents:	
18	Thickness of zinc in case of galvanized steel sheets		To be mandatorily mentioned	

19	In case of Epoxy hot powder steel protection: Average thickness of Epoxy coating:	mm	To be mandatorily mentioned	
20	In case of paint, exterior coating of epoxy paint after primer application		Mandatory	
20a	Minimum thickness of paint		To be mandatorily mentioned	
21	Standard Colour		RAL 7032	
21a	Other colour requested by EDC		.....	
21b	Protection on 30 cm high as requested by Paragraph 8.5.9		Mandatory	
22	Transformer compartment Protection index from outdoor		IP23D	
23	LV and MV compartment Protection Index from outdoor		IP54	
24	Mechanical protection index of whole substation including doors and ventilations		IK10	
25	Rated class of enclosure		15	
26	Accessibility of compact substation		IAC-AB	
27	2 Doors for transformer compartment, 1 for LV compartment and 1 for MV compartment		Mandatory	
27a	The doors shall open outwards at an angle of :at least 90° and be	°	90° and more	
27b	All doors are equipped with a device able to maintain them in an open position		Mandatory	
27c	Doors provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;		Mandatory and description	
27d	Door hinges protected against corrosion		To be described	

28	Ventilation openings for transformer compartment		To be described	
28a	Ventilations degree of protection		IP23D	
28b	Ventilations degree of protection against mechanical impacts		IK10	
28c	The transformer compartment comprise doors with a ventilation opening of 1 m^2		Mandatory	
29	Supplied with Fan		Mandatory	
29a	Fans are industrial metallic type and protected against corrosion		Mandatory	
29b	Fans are supplied with thermostat		Mandatory	
30	Earthing circuit strictly in accordance with paragraph 8.3.1 of the technical specification		Mandatory	
30a	Drawing of earthing circuit		To be supplied	
30b	Earthing board located in the LV compartment		Mandatory	
30c	Drawing of earthing board		To be supplied	
30d	Earthing circuit made of 35 mm^2 bare conductor		Mandatory	
30e	Earthing circuit firmly fixed onto enclosure or frame		Mandatory	
30f	Fitted with 2 waterproof type F sockets in LV compartment		Mandatory	
30g	Fitted with insulating and not flammable meter panel of 350x450 in LV compartment		Mandatory	
31	Substation fitted with supports or cable tray for LV cable between TRS and LVDB		Mandatory	
32	Substation supplied with all accessories (U beams, bolts,		Mandatory	

	etc...) for installing and fixing equipment inside (Transformer, , etc....)			
33	Name plate located in LV compartment manufacturer's name or trade mark; type designation; internal arc designation, where applicable; serial number; Instruction book reference; Reference standard; year of manufacture.		Yes Yes Yes Yes Yes Yes Yes Yes	
34	Enclosure fitted with handling rings or equivalent devices		To be described	
35	Include an oil tank (pit) under the transformer			
35 a	Volume of oil tank/pit	L	25% of 1250 kVA transformer	
35 b	Oil tank/pit protected against corrosion		Mandatory	
36	LV compartment fitted with entry for temporary LV cables as per requirements of paragraph 8.5.12		Mandatory	
37	Auxiliary LV wiring strictly in accordance with the requirements of paragraph 8.5.11.3		Mandatory	
38	MV UGC fault indicator as per required installation in paragraph 8.5.11.4		Mandatory	
The offer shall include all drawings and dimensions as well as all technical catalogues. If not, the offer shall be rejected.				

If the required type tests are missing, the offer shall be rejected
Supplier's offer column must be properly filled with the right figures. "Compliant, Yes, ",√, etc.... "are not accepted.
Deviation from the technical specification: The bidder shall list point after point and explain here in after all deviation from the requested technical specification. 1/ 2/ 3/ **Full technical information shall be supplied within the bid. If not, the offer shall not be considered** Bidder signature:

No.	Description	Unit	Requirements	Supplier's Offer
9.5	**Type 3B PTT (Private)**			
1	Manufacturer Country		to be specified	
2	Manufacturer		to be specified	
3	Manufacturer's Reference of offered product		to be specified	
4	Manufacturing country		to be specified	
5	ISO 9001		To be provided with bid	
6	Applicable Standards		IEC 62271-202 (2014)	
6a	Prefabricated substation conform to the requirement of IEC 62271-200 **and this Technical specification**		Mandatory	
7	Type tests reports according the requirement of IEC 62271-202 with exception of internal arc type test		To be provided with bid	
8	Technical documents (drawings, catalogue, etc..)		To be provided with bid	
9	PTT strictly in accordance with the requirements of this technical specification		Mandatory	
10	Suitable to be installed at about 0.6 m (or more) above ground level		Yes	
11	Suitable to be Installed on a built (concrete/bricks) basement in any cases with air free volume (80cm) beneath		Mandatory	
12	Can include : • 1 Transformer conform to EDC-DTS-MV002 technical specification • 1 MCCB or ACB • 3 functions RMU in accordance with EDC-DTS-MV003.+ MV metering cubicle		Max capacity: 1250 kVA To be mentioned Mandatory	

	Transformer protection is 200A CB			
12b	Suitable to house any RMU brand used by EDC		Mandatory	
13	Includes 1 MV compartment, 1 transformer compartment and 1 LV compartment		Mandatory	
14	Maximum dimensions of type 3 B PTT	mm	Length (L) : 4500 mm Width (W) : 2400 mm Height (H) : 3000 mm Real dimensions to be mentioned	
14a	Full drawing of prefabricated substation with all dimensions		Mandatory. If not the offer shall be rejected	
15	Metallic envelop construction		Mandatory	
16	Metal of frame (structure)		Galvanized steel	
16a	Minimum zinc thickness of frame	µm	60	
17	Metal of sheets		Hot dip galvanized steel Electrolytic galvanized steel Phosphated steel Stainless steel Aluminum	
17 a	Sheet thickness		To be mandatorily mentioned Roof: Walls: Doors: Vents:	
18	Thickness of zinc in case of galvanized steel sheets		To be mandatorily mentioned	
19	In case of Epoxy hot powder steel protection: Average thickness of Epoxy coating:	mm	To be mandatorily mentioned	

20	In case of paint, exterior coating of epoxy paint after primer application		Mandatory	
20a	Minimum thickness of paint		To be mandatorily mentioned	
21	Standard Colour		RAL 7032	
21a	Other colour requested by EDC		.....	
21b	Protection on 30 cm high as requested by Paragraph 8.5.9		Mandatory	
22	Transformer compartment Protection index from outdoor		IP23D	
23	LV and MV compartments Protection Index from outdoor		IP54	
24	Mechanical protection index of whole substation including doors and ventilations		IK10	
25	Rated class of enclosure		15	
26	Accessibility of compact substation		IAC-AB	
27	2 Doors for transformer compartment, 1 for LV compartment and 1 for MV compartment		Mandatory	
27a	The doors shall open outwards at an angle of :at least 90°	°	90° and more	
27b	All doors are equipped with a device able to maintain them in an open position		Mandatory	
27c	Doors provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;		Mandatory and description	
27d	Door hinges protected against corrosion		To be described	
28	Ventilation openings for transformer compartment		To be described	
28a	Ventilations degree of protection		IP23D	

28b	Ventilations degree of protection against mechanical impacts		IK10	
28c	The transformer compartment comprises doors with a ventilation opening of 1 m^2		Mandatory	
29	Supplied with Fan		Mandatory	
29a	Fans are industrial metallic type and protected against corrosion		Mandatory	
29b	Fans are supplied with thermostat		Mandatory	
30	Earthing circuit strictly in accordance with paragraph 8.3.1 of the technical specification		Mandatory	
30a	Drawing of earthing circuit		To be supplied	
30b	Earthing board located in the LV compartment		Mandatory	
30c	Drawing of earthing board		To be supplied	
30d	Earthing circuit made of 35 mm^2 bare conductor		Mandatory	
30e	Earthing circuit firmly fixed onto enclosure or frame		Mandatory	
30f	Fitted with 2 waterproof type F sockets in LV compartment		Mandatory	
30g	Fitted with insulating and not flammable meter panel of 350x450 in LV compartment		Mandatory	
31	Substation fitted with supports or cable tray for LV cable between TRS and LVDB		Mandatory	
32	Substation supplied with all accessories (U beams, bolts, etc...) for installing and fixing equipment inside (Transformer, , etc....)		Mandatory	

33	Name plate located in LV compartment manufacturer's name or trade mark; type designation; internal arc designation, where applicable; serial number; Instruction book reference; Reference standard; year of manufacture.		Yes Yes Yes Yes Yes Yes Yes Yes	
34	Enclosure fitted with handling rings or equivalent devices		To be described	
35	Include an oil tank (pit) under the transformer			
35 a	Volume of oil tank/pit	L	25% of 1250 kVA transformer	
35 b	Oil tank/pit protected against corrosion		Mandatory	
36	LV compartment fitted with entry for temporary LV cables as per requirements of paragraph 8.5.12		Mandatory	
37	Auxiliary LV wiring strictly in accordance with the requirements of paragraph 8.5.11.3		Mandatory	
38	MV UGC fault indicator as per required installation in paragraph 8.5.11.4		Mandatory	
The offer shall include all drawings and dimensions as well as all technical catalogues. If not, the offer shall be rejected.				
If the required type tests are missing, the offer shall be rejected				
Supplier's offer column must be properly filled with the right figures. "Compliant, Yes, ",√, etc.... "are not accepted.				

Deviation from the technical specification:

The bidder shall list point after point and explain here in after all deviation from the requested technical specification.

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Full technical information shall be supplied within the bid. If not, the offer shall not be considered

Bidder signature:

No.	Description	Unit	Requirements	Supplier's Offer
9.6	**Type 1 and Type 2 RMU cabinet**			
1	Manufacturer Country		to be specified	
2	Manufacturer		to be specified	
3	Manufacturer's Reference of offered product		to be specified	
4	Manufacturing country		to be specified	
5	ISO 9001		To be provided with bid	
6	Applicable Standards		IEC 62271-202 (2014)	
6a	Prefabricated substation conform to the requirement of IEC 62271-200 **and this Technical specification**		Mandatory	
6b	To be supplied		Type 1 RMU cabinet ☐ Type 2 RMU cabinet ☐	
7	Type tests reports according the requirement of IEC 62271-202 with exception of internal arc type test		To be provided with bid	
8	Technical documents (drawings, catalogue, etc..)		To be provided with bid	
9	RMU cabinet strictly in accordance with the requirements of this technical specification		Mandatory	
10	Suitable to be installed at about 0.6 m (or more) above ground level		Yes	
11	Suitable to be Installed on a built (concrete/bricks) basement in any cases with air free volume (80cm) beneath		Mandatory	
12	Type 1 RMU cabinet can include • 3 functions RMU in accordance with EDC-DTS-MV003 • + RTU		Mandatory ☐	

12a	Type 2 RMU cabinet an include • 4 functions RMU (one could be 630A Circuit breaker) in accordance with EDC-DTS-MV003 • + RTU		Mandatory	
12b	Suitable to house any RMU brand used by EDC		Mandatory	
13	Includes only 1 MV compartment,		Mandatory	
13a	Internal dimensions suitable for RMU brands used by EDC		Mandatory	
14	External dimensions of type1 RMU Cabinet	mm	high: length: depth: To be mentioned	
14a	Internal dimensions of type1 RMU Cabinet	mm	high: length: depth: to be mentioned	
14b	External Dimensions of type2 RMU Cabinet	mm	high: length: depth: To be mentioned	
14c	Internal dimensions of type2 RMU Cabinet	mm	high: length: depth: To be mentioned	
14d	Full drawing of RMU cabinet with all dimensions		Mandatory. If not the offer shall be rejected	
15	Metallic envelop construction		Mandatory	
16	Metal of frame (structure)		Galvanized steel	
16a	Minimum zinc thickness of frame	µm	60	

17	Metal of sheets		Hot dip galvanized steel Electrolytic galvanized steel Phosphated steel Stainless steel Aluminum	
17 a	Sheet thickness		To be mandatorily mentioned Roof: Walls: Doors:	
18	Thickness of zinc in case of galvanized steel sheets		To be mandatorily mentioned	
19	In case of Epoxy hot powder steel protection: Average thickness of Epoxy coating:	mm	To be mandatorily mentioned	
20	In case of paint, exterior coating of epoxy paint after primer application		Mandatory	
20a	Minimum thickness of paint		To be mandatorily mentioned	
21	Standard Colour		RAL 7032	
21a	Other colour requested by EDC		.....	
21b	Protection on 30 cm high as requested by Paragraph 8.5.9		Mandatory	
23	MV compartment Protection Index from outdoor		IP54	
24	Mechanical protection index of whole Cabinet including doors		IK10	
25	Rated class of enclosure		15	
26	Accessibility of RMU cabinet		IAC-AB	
27	Doors for MV compartment,		Mandatory	
27a	The doors shall open outwards at an angle of :at least 90° and be	°	90° and more	

27b	All doors are equipped with a device able to maintain them in an open position		Mandatory	
27c	Doors provided with locking facilities unless the safety of persons is assured by a suitable interlocking device;		Mandatory and description	
27d	Door hinges protected against corrosion		To be described	
30	Earthing circuit strictly in accordance with paragraph 8.3.1 of the technical specification		Mandatory	
30a	Drawing of earthing circuit		To be supplied	
30b	Earthing board located in the MV compartment		Mandatory	
30c	Drawing of earthing board		To be supplied	
30d	Earthing circuit made of 35 mm^2 bare conductor		Mandatory	
30e	Earthing circuit firmly fixed onto enclosure or frame		Mandatory	
32	Cabinet supplied with all accessories (U beams, bolts, etc...) for installing and fixing equipment inside		Mandatory	
33	Name plate located in LV compartment manufacturer's name or trade mark; type designation; internal arc designation, where applicable; serial number; Instruction book reference; Reference standard; year of manufacture.		Yes Yes Yes Yes Yes Yes Yes Yes	

34	Enclosure fitted with handling rings or equivalent devices		To be described	
37	MV UGC fault indicator as per required installation in paragraph 8.5.11.4		Mandatory	

The offer shall include all drawings and dimensions as well as all technical catalogues. If not, the offer shall be rejected.

If the required type tests are missing, the offer shall be rejected

Supplier's offer column must be properly filled with the right figures. "Compliant, Yes, ",√, etc.... "are not accepted.

Deviation from the technical specification:

The bidder shall list point after point and explain here in after all deviation from the requested technical specification.

1/

2/

3/

Full technical information shall be supplied within the bid. If not, the offer shall not be considered

Bidder signature: