CAUTION!

When MV equipment is operating, certain components are live, other parts may be in movement and some may reach high temperatures. Therefore, the use of this equipment poses electrical, mechanical and thermal risks.

In order to ensure an acceptable level of protection for people and property, and in compliance with applicable environmental recommendations, Ormazabal designs and manufactures its products according to the principle of integrated safety, based on the following criteria:

- Elimination of hazards wherever possible.
- Where elimination of hazards is neither technically nor economically feasible, appropriate protection functions are incorporated in the equipment.
- Communication about remaining risks to facilitate the design of operating procedures which prevent such risks, training for the personnel in charge of the equipment, and the use of suitable personal protection equipment.
- Use of recyclable materials and establishment of procedures for the disposal of equipment and components so that once the end of their useful lives is reached, they are duly processed in accordance, as far as possible, with the environmental restrictions established by the competent authorities.

Consequently, the equipment to which the present manual refers complies with the requirements of section 11.2 of the forthcoming IEC standard 62271-1. It must therefore only be operated by appropriately qualified and supervised personnel, in accordance with the requirements of standard EN 50110-1 on the safety of electrical installations and standard EN 50110-2 on activities in or near electrical installations. Personnel must be fully familiar with the instructions and warnings contained in this manual and in other recommendations of a more general nature which are applicable to the situation according to current legislation.

The above must be carefully observed, as the correct and safe operation of this equipment depends not only on its design but also on general circumstances which are in general beyond the control and responsibility of the manufacturer. More specifically:

- The equipment must be handled and transported appropriately from the factory to the place of installation.
- All intermediate storage should occur in conditions which do not alter or damage the characteristics of the equipment or its essential components.
- Service conditions must be compatible with the equipment rating.
- The equipment must be operated strictly in accordance with the instructions given in the manual, and the applicable operating and safety principles must be clearly understood.
- Maintenance should be performed properly, taking into account the actual service and environmental conditions in the place of installation.

The manufacturer declines all liability for any significant indirect damages resulting from violation of the guarantee, under any jurisdiction, including loss of income, stoppages and costs resulting from repair or replacement of parts.

Guarantee

The manufacturer guarantees this product against any defect in materials and operation during the contractual period. In the event that defects are detected, the manufacturer may opt either to repair or replace the equipment. Improper handling of this equipment and its repair by the user shall constitute a violation of the guarantee.

Registered Trademarks and Copyrights

All registered trademarks cited in this document are the property of their respective owners. The intellectual property of this manual belongs to the manufacturer.

In view of the constant evolution in standards and design, the characteristics of the elements contained in this manual are subject to change without prior notification.

These characteristics, as well as the availability of components, are subject to confirmation by Ormazabal’s Technical - Commercial Department.
CONTENTS

1. DESCRIPTION AND MAIN CHARACTERISTICS ........................................................ 5
   1.1. PREFABRICATED ENCLOSURE........................................................................... 6
   1.2. ELECTRICAL EQUIPMENT .............................................................................. 7
       1.2.1. MV Switchgear: CGM COSMOS System ............................................... 8
       1.2.2. Remote Control Unit .............................................................................. 8
       1.2.3. Auxiliary Power Supply Voltage Transformer ......................................... 8
       1.2.4. Technical Characteristics ...................................................................... 8
   1.3. MECHANICAL CHARACTERISTICS ................................................................. 9
       1.3.1. Prefabricated Concrete Enclosure ............................................................ 9
       1.3.2. Total ..................................................................................................... 10

2. TRANSPORT ........................................................................................................... 11
   2.1. LIFTING METHODS ...................................................................................... 11
       2.1.1. Lifting the Concrete Enclosure ................................................................. 11
   2.2. TRANSPORT CONDITIONS .......................................................................... 12
       2.2.1. Access .................................................................................................. 12
       2.2.2. Land Transport .................................................................................... 12
       2.2.3. Sea Transport ....................................................................................... 13
   2.3. DELIVERY CONDITIONS ............................................................................. 14

3. INSTALLATION ...................................................................................................... 15
   3.1. LOCATION .................................................................................................... 15
   3.2. PLANNING ................................................................................................... 15
   3.3. EXCAVATION DIMENSIONS ....................................................................... 15
   3.4. LEVELLING PROCESS .................................................................................. 16
   3.5. EARTH CONNECTION ................................................................................. 16
       3.5.1. Protective Earth Connection .................................................................. 16
       3.5.2. External Earthing Circuit ...................................................................... 16
   3.6. MV CABLE ACCESS .................................................................................... 18
   3.7. MV CABLE CONNECTIONS ........................................................................ 19

4. SEQUENCE OF OPERATIONS ............................................................................. 20
   4.1. OPERATING THE MV SWITCHGEAR ......................................................... 20
5. MAINTENANCE........................................................................................................... 20
  5.1. REPLACING THE ELECTRICAL EQUIPMENT ................................................. 21
  5.2. REPLACEMENT OF THE AUXILIARY VOLTAGE TRANSFORMER .......... 24
6. ADDITIONAL INFORMATION..................................................................................... 25
  6.1. SPARES AND ACCESSORIES............................................................................. 25
1. DESCRIPTION AND MAIN CHARACTERISTICS

Ormazabal's CMS substation is an externally operated Switching and Breaking Substation that has been designed in accordance with standard EN 62271-202, to be used in public electrical distribution networks of up to 24 kV.

As an option, the CMS Switching and Breaking Substation incorporates a Remote Control Unit to be used in remote controlled electrical distribution networks.

Figure 1.1: CMS Main Components

Figure 1.2: Remote Controlled CMS Main Components
1.1. PREFABRICATED ENCLOSURE

Made up of:

- Concrete monoblock prefabricated construction with a door opening measuring 1180 mm high and 1310 mm wide.
- Prefabricated removable concrete cover.
- Double door measuring 1245x720 mm each, with a system enabling it to be fixed in place at 90° and 180°. It has a document holder with documentation relating to the Switching and Breaking Substation.
- Side window for accessing the voltage transformer unit. This window is covered by a blank plate that is removable by means of a latch that can be accessed from inside the enclosure.
- Grille around the upper part of the enclosure to facilitate natural ventilation.
- Six holes for entry/exit of cables measuring 160 mm in diameter on the front side, two on the left side and four on the right side. In addition to these, it has another two holes measuring 160 mm in diameter, one on each side.
- Hole measuring 140 mm in diameter located on the right side wall to be used for access of an auxiliary supply. It has a cover which ensures the IP rating and can only be unlocked from inside the enclosure.
- Connection point for the protective earth of the electrical equipment as well as for the enclosure, located on the inside of the enclosure’s left side wall.
- Fixing rails for assembling the electrical equipment.

![Figure 1.3: Prefabricated concrete enclosure](image-url)
1.2. ELECTRICAL EQUIPMENT

The electrical equipment, which is installed inside the enclosure and anchored to it, can be configured in 6 different ways:

- **Switching and Breaking Substation 3L**, comprised on the following components:
  - Switchgear unit made up of 3 MV feeder functions completely insulated in SF$_6$, with an insulation voltage of 24 kV.

- **Switching and Breaking Substation 2LP**, comprised on the following components:
  - Switchgear made up of 2 feeder functions and a MV protection function completely insulated in SF$_6$, with an insulation voltage of 24 kV.

- **Remote Controlled Switching and Breaking Substation 3L or 2LP**, comprised on the following components:
  - Switchgear made up of 3 feeder functions or 2 feeder functions and a MV protection function completely insulated in SF$_6$, with an insulation voltage of 24 kV.
  - Remote Control Unit.

- **Remote Controlled Switching and Breaking Substation 3L or 2LP with a Voltage Transformer for Auxiliary Supply**, comprised on the following components:
  - Switchgear made up of 3 feeder functions or 2 feeder functions and a MV protection function completely insulated in SF$_6$, with an insulation voltage of 24 kV. The incoming feeder functional unit has a base for a double cable, to allow the installation of the outgoing supply of the aforementioned voltage transformer, which is installed inside the base.
  - Remote Control Unit.
  - Voltage Transformer for supplying the remote control unit.
  - Direct cable interconnections between the MV switchgear and the voltage transformer.
  - Direct cable interconnections between the voltage transformer and the control box.

![Figure 1.4: Single wire diagram of the remote controlled CMS with voltage transformer](image-url)
1.2.1. MV Switchgear: CGMCOSMOS System

The MV switchgear used in the Switching and Breaking Substation is comprised of 3 feeder functions or 2 feeder functions and one protection function. The Switching and Breaking Substation may be configured in two ways:

- CGMCOSMOS-3L compact cubicle
- CGMCOSMOS-2LP compact cubicle

In the remote controlled electrical equipment, the driving mechanism used in the different cubicle configurations of the CGMCOSMOS system will be motorised.

1.2.2. Remote Control Unit

The remote control application of a CMS Switching and Breaking Substation is included in those Switching Substations that, because of their importance or their strategic location within a network, require a faster control and operation than what can be achieved in a non-remote controlled Switching and Breaking Substation.

1.2.3. Auxiliary Power Supply Voltage Transformer

We recommend the use of a two-phase voltage transformer for supplying the remote control unit.

This voltage transformer is powered through the incoming MV cubicle, by connecting two cable jumpers between the cubicle and the voltage transformer unit.

The main characteristics of the voltage transformer are the following:

<table>
<thead>
<tr>
<th>Electrical Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power</td>
</tr>
<tr>
<td>Transformation ratio</td>
</tr>
<tr>
<td>Rated insulation level</td>
</tr>
<tr>
<td>Number of phases</td>
</tr>
</tbody>
</table>

1.2.4. Technical Characteristics

<table>
<thead>
<tr>
<th>MV Switchgear Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF₆ insulation</td>
</tr>
<tr>
<td>Rated voltage</td>
</tr>
<tr>
<td>Insulation level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Busbar (IEC 62271-200):</td>
</tr>
<tr>
<td>Rated current</td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
</tr>
<tr>
<td>Peak value</td>
</tr>
</tbody>
</table>

[1] The CMS Switching and Breaking Substation document holder includes Ormazabal's IG-078 General Instructions document, which describes the operation and maintenance of the CGMCOSMOS cubicles.
### Switch-Disconnector (IEC 60265-1):

<table>
<thead>
<tr>
<th>Type</th>
<th>Rotation (category E3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current</td>
<td>400 A</td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
<td>16 kA eff. (1 s)</td>
</tr>
<tr>
<td>Peak value</td>
<td>40 kA</td>
</tr>
<tr>
<td>Short-circuit making capacity</td>
<td>16 kA / 40 kA</td>
</tr>
<tr>
<td>Nº of short-circuit closing operations CO/CO</td>
<td>5</td>
</tr>
</tbody>
</table>

### Earthing Switch (IEC 62271-102)

| Rated short-time withstand current | 16 kA eff. (1 s)       |
| Peak value                         | 40 kA                  |
| Short-circuit making capacity      | 16 kA / 40 kA (category E2) |
| Nº of short-circuit closing operations CO/CO | 5                     |

### Fuse Protection Function

| Rated current     | 200 A                  |
| Short-time current (main circuit) | 16 kA (1 s)          |
| Main switch making capacity       | 40 kA                  |
| Opening capacity Co/Co             | 16 kA                  |
| Nº of short-circuit closing operations CO/CO | 5                     |

## 1.3. MECHANICAL CHARACTERISTICS

The dimensions and weights of the CMS Switching and Breaking Substation are the following:

### 1.3.1. Prefabricated Concrete Enclosure

<table>
<thead>
<tr>
<th>Body</th>
<th>Total [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>2010</td>
</tr>
<tr>
<td>Visible</td>
<td>1500</td>
</tr>
<tr>
<td>Width</td>
<td>1700</td>
</tr>
<tr>
<td>Depth</td>
<td>1600</td>
</tr>
<tr>
<td>Weight</td>
<td>2275</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Removable Cover</th>
<th>Total [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>2030</td>
</tr>
<tr>
<td>Depth</td>
<td>1930</td>
</tr>
<tr>
<td>Weight</td>
<td>575</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prefabricated Enclosure</th>
<th>Total Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2850</td>
</tr>
</tbody>
</table>

Without electrical equipment
CAUTION:
MAX WEIGHT OF CMS EQUIPMENT (2 Feeder functions + 1 Protection function + Remote Control + Transformer): 3300 kg
2. TRANSPORT

2.1. LIFTING METHODS

2.1.1. Lifting the Concrete Enclosure

The CMS Switching and Breaking Substation has 4 DEHA inserts (6000-2, 5-0170), which enable it to be handled using the proper lifting beam, slings and hooks in order to guarantee a hoisting as balanced as possible.

![Diagram of correct coupling method using DEHA hooks]

**Figure 2.1:** Correct coupling method using DEHA hooks

For transversal balancing, the lifting beam has a series of numbered holes at its end (place this end on the right side of the enclosure):

![Diagram of placement of the lifting beam]

**Figure 2.2:** Placement of the lifting beam used for hoisting the CMS

---

Dimensions in millimetres
2.2. TRANSPORT CONDITIONS

2.2.1. Access
The site must be visited in advance to check if vehicles can have access and if there is sufficient space available for the unloading operation.

2.2.2. Land Transport
Transportation should be carried out using a truck. The CMS Switching and Breaking Substation electrical equipment is supplied screwed to the frames located on the floor of the concrete enclosure for transportation.

The concrete enclosure is lashed using ropes. These are hooked into the DEHA hooks in the building, thereby ensuring stability during transportation. To avoid any movement of the roof in respect to the body, slings should be attached above the cover.

Figure 2.3: Land Transport of the CMS
2.2.3. Sea Transport

The transportation should be carried out using "open top" or "flat-rack" containers.

To eliminate the risk of water intake, protect the peripheral ventilation outlets located under the cover with an elastic plastic band rolled around the perimeter several times.

Place two 1500 x 150 x 20 mm planks to support the CMS Switching and Breaking Substation in the container.

Once positioned inside the container, attach a 100 x 100 x 10 mm and 100 mm long square to each corner of the building. They must be welded to the floor of the container, in order to avoid any movement during transportation. Lastly, place two slings transversally over the enclosure, after having placed corner pieces below the slings in order to protect the enclosure from possibly rubbing against the slings.

![Figure 2.4: Sea Transport of the CMS](image-url)
2.3. DELIVERY CONDITIONS

The CMS Switching and Breaking Substation is supplied fully assembled and ready for connection to the MV supply.

Upon receipt of the CMS Substation, carefully check the following:

- That the characteristics of the different components that make up the electrical equipment that are listed in the corresponding name plates coincide with the order.
- The general condition of the assembly.

⚠️ CAUTION: ⚠️

In the event that any anomaly is found, please contact Ormazabal's Technical-Commercial Department immediately.
3. INSTALLATION

3.1. LOCATION
The site location should be precisely defined, indicating the alignment and height distances.

3.2. PLANNING
The coordination of the transport and the crane must be scheduled or, if this is not possible, a tow-truck suitable for the weight of the CMS Switching and Breaking Substation\(^2\).

Due to technical reasons concerning the protection and safety of people and property, the conditions of the installation site and its design must be in accordance with the applicable regulations on High Voltage.

Similarly, please take into account the assembly instructions provided by the Electric Utility, which is aware of the regulations and also takes into account any particularities in the electrical network to which the Switching and Breaking Substation is to be connected.

3.3. EXCAVATION DIMENSIONS
For the installation of the CMS Switching and Breaking Substation, an excavation including an earthing loop is necessary. Ensure that the building is not buried over the reference line marked on the walls of the concrete enclosure. The maximum burying height is 510 mm measured from the base.

The measurements below must be adapted in each case, depending on the solution adopted for the earthing network according to the earthing diagram.

\[\text{Figure 3.1: Excavation dimensions}\]

\[^2\] See sections 1.4 Mechanical Characteristics and 2.1.1 Concrete Lifting Methods
3.4. LEVELLING PROCESS

For the correct assembly of the enclosure, the ground levelling is important. The following equipment is recommended for correct levelling:

- A spirit level
- A square-end spade
- Levelling tools

**CAUTION:**
Consult Ormazabal’s Technical-Commercial Department in the event of installation on a slope.

A 100 mm thick compacted and levelled layer of sand is required at the bottom of the excavation in order to prevent differential settlements.

The installation operation consists of positioning the CMS in the excavation made for this purpose and of connecting the MV cables, along with the external earthing network.

3.5. EARTH CONNECTION

The CMS Switching and Breaking Substation has an internal earthing circuit to facilitate the connection of the different elements to the earthing network external to the Switching and Breaking Substation.

3.5.1. Protective Earth Connection

For the correct connection of the protective earth (metallic parts), the enclosure of the CMS Switching and Breaking Substation has a switching box located on the inside of the left side wall, which is accessible from the outside through the doors.

The MV switchgear unit earthing is routed to this connection point, which connects all the earth connections of all the concrete enclosure's electrical equipment.

3.5.2. External Earthing Circuit

The installation project must include a section corresponding to the earthing installation (check the Utility’s standard project), as well as the justification of its size.

Below is a recommended method for the installation of the earthing network from the operator safety perspective:

- Create an equipotential surface for both the switchgear and the operation area.
- Each project should include the study of the most suitable earthing diagram.
The copper braid cross-section, the terminations' contact surface and the tightening torques must be suitable for a fault current delimited by network protections. It is recommended an external protective earthing network of bare copper wire with a minimum cross-section of 50 mm².

It is recommended that the external earthing circuit is installed simultaneously. To this end, it is recommended to check the Switching and Breaking Substation installation standard project available at the Electric Utility that provides the service and is responsible for maintaining safety in the worksite earthing installation.

Adequate earthing measures around the Transformer Substation must be provided to prevent dangerous touch and step voltages.

The recommended tightening torque for electrical connections in the earthing network is shown in the following table:

<table>
<thead>
<tr>
<th>Metric</th>
<th>Tightening Torque [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.8 Steel</td>
</tr>
<tr>
<td>M8</td>
<td>21</td>
</tr>
<tr>
<td>M10</td>
<td>38</td>
</tr>
<tr>
<td>M12</td>
<td>60</td>
</tr>
</tbody>
</table>

**CAUTION:**
The use of a 600 mm deep continuous bare copper loop of 50 mm² is recommended. Use a conductor wire extended to the substation interior to be connected to the enclosure's earth connection point.

![Figure 3.2: Earthing Network](image-url)
3.6. MV CABLE ACCESS

The CMS Switching and Breaking Substation has six holes measuring 160 mm in diameter on the lower front side; in addition to these, the enclosure has another hole measuring 160 mm in diameter on each side.

To open a hole, punch it through with a hammer from outside to inside, then clean the concrete fragments from the interior of the enclosure.

The MV cables must meet the minimum radius of curvature indicated by the cable manufacturer, with the aim of having a sufficient length of cable inside the enclosure so as to enable a comfortable arrangement and handling of terminals\(^\text{[3]}\).

Once the MV connections have been performed, proceed with the sealing of the cable holes.

---

\(^\text{[3]}\) See section 3.7.
3.7. MV CABLE CONNECTIONS

MV incomings are made with cables. The connections of these cables with the MV switchgear bushings is carried out using type C 400 series elbow connectors. In Remote Controlled CMS with Auxiliary Power Supply Voltage Transformer, two type C 400 series T-connectors are used at the cubicle phases where the two-phase voltage transformer is installed. These connectors are connected to the cable jumpers between the voltage transformer and the MV cubicle.

The feeder cables are subsequently fixed onto their respective supports by means of clamps and the earth connectors of both the terminals and the cable shields are connected to the earthing bars of the MV switchgear unit.

If configured with a voltage transformer for powering the remote control, Ormazabal supplies the cable jumpers between the voltage transformer and the cubicle phases with the following EUROMOLD connectors for supplying the transformer:

- Elbow connector type A connection, 200 series: K158LR
- Reducing tap plug: K400RTPA
- Cable DHV 1x70 mm² 12/20 kV Cu / HEPRZ1 120 mm² Al

**NOTE:**

Ormazabal only supplies the cable jumper for the voltage transformer power and the connector reducing tap plug. The cable jumper is supplied unconnected.
4. SEQUENCE OF OPERATIONS

Once the CMS Switching and Breaking Substation is installed, the MV switchgear commissioning operations must be carried out.

4.1. OPERATING THE MV SWITCHGEAR

**CAUTION:**
Before carrying out any operation when voltage is present, we recommend checking the SF₆ gas pressure, using the manometer.

The operating sequences for starting up as well as shutting down the CGMCOSMOS-L cubicles used in the electrical equipment are specified in Ormazabal's IG-078 General Instructions document, which is supplied with the CMS.

5. MAINTENANCE

The requirements set out in the applicable legislation on Transformer Substations to protect people and property which may be affected by the installations must be met.

The driving mechanism of the MV cubicle does not require any type of maintenance to operate correctly during its estimated service life, under the conditions set out in IEC 60694.

The live parts of the main circuit and switching equipment of the MV cubicle do not require inspection or maintenance, as they are completely insulated in SF₆, and therefore unaffected by the external environment. The Class E3 electrical endurance tests mean that the breaking components are maintenance free.

The prefabricated building does not require any maintenance. Depending on the circumstances, the lock may need looking at and greasing.
5.1. REPLACING THE ELECTRICAL EQUIPMENT

The electrical equipment in the CMS Switching and Breaking Substation is replaced using the following procedures:

a) Open the doors to access the electrical equipment. The doors incorporate a system for locking them at 90° and 180°. To unlock the system, pull upward on the rod and open the corresponding door.

![Figure 5.1: Opening and closing the door](image)

b) Disconnect the power to the Electrical Equipment, switching the MV switchgear unit to the earthing position\(^4\).

c) Disconnect the inner earth cable that connects the cover and body of the CMS.

![Figure 5.2: Inner earth cable for the cover](image)

d) Remove the 4 protective caps from the threaded inserts of the cover.

e) Attach and screw in the four M20 eyebolts provided inside the Transformer Substation to the cover; remove the cover and place it on top of wooden planks.

![Figure 5.3: Hoisting eyebolts](image)

![Figure 5.4: Positioning over panels](image)

---

\(^4\) Refer to the IG-078 General Instructions document for the CGMCOSMOS cubicle system, located in the CMS Switching and Breaking Substation document holder.
f) Open the MV switchgear cable compartment cover\textsuperscript{[5]}. If a voltage transformer is installed, first disconnect the cable jumper that joins the voltage transformer to the power cable of the cubicle where it is installed. Subsequently disconnect the power cables and their earth connectors. If a transformer is not installed, disconnect the power cables and their earth connectors.

g) Disconnect the electrical equipment's earth connection from the MV switchgear's earthing bar on the left side of the cubicle located on the left hand side.

h) Unscrew the MV switchgear fixing points on the rails that are arranged over the base of the Switching and Breaking Substation.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Fixing Rails.png}
\caption{Fixing rails}
\end{figure}

\textsuperscript{[5]} Refer to the IG-078 General Instructions document for the CGMCOSMOS cubicle system, located in the CMS Switching and Breaking Substation document holder.

i) Extract the electrical equipment. To do this, the use of hoisting chains is required. If the electrical equipment is remotely controlled, the hoisting tools that are supplied inside the CMS Switching and Breaking Substation must be fixed to the points indicated in Figure 5.6, using a spanner. Hook the hoisting chains into the ring located at the ends of each hoisting tool for subsequent crane handling.
j) Insert the new compact electrical equipment using the elevation means mentioned in the previous section.

k) Unhook the hoisting chains. If the electrical equipment is the remote controlled type, unscrew the electrical equipment hoisting tools and place them inside the Switching and Breaking Substation in case they need to be used on another occasion.

l) With the MV switchgear connected to earth\(^\text{[6]}\), remove the cable compartment covers and screw the MV switchgear to the fixing rails located on the base of the Switching and Breaking Substation.

m) Connect the electrical equipment's earth connection to the MV switchgear earthing bar.

n) Re-connect the MV cables that supply power to the MV switchgear. If the electrical equipment is the remote controlled type, follow the procedures listed in section 3.7. *Connection of MV Cables*. If it also has a voltage transformer, connect the cable jumpers between the voltage transformer and the cubicle.

o) Re-attach the removable cover.

p) Once the cover has been attached and connected to its earth connector between the body and the cover, remove the lifting eyebolts from the cover and seal their housing holes.

q) Re-apply power to the CMS Switching and Breaking Substation.

\[^{[6]}\text{Refer to the IG-078 General Instructions document for the CGMCOSMOS cubicle system, located in the CMS Switching and Breaking Substation document holder.}\]
5.2. REPLACEMENT OF THE AUXILIARY VOLTAGE TRANSFORMER

We recommend following the steps described herein while paying special attention to the safety measures.

a) Open the access door to the remote controlled electrical equipment.

b) Switch the MV incoming cubicle where the voltage transformer is installed to earth position. Ensure there is no voltage in the CMS Switching and Breaking Substation feeder cable.

c) Open the MV switchgear cable compartment cover[^1], disconnect the cable jumpers that join the voltage transformer to the power cables of the cubicle where they are installed and connect them to earth.

d) Release the latch that closes the right side window used for accessing the voltage transformer by moving the latch upward.

e) Remove the access window to the voltage transformer.

f) Disconnect the cable jumpers that join the secondary of the voltage transformer to the control box.

g) Disconnect the transformer earth connection and the voltage transformer fixing bolts.

h) Insert and fix the new voltage transformer by tightening the fixing bolts using 40 Nm of torque and re-connect the transformer's earth connection.

i) Re-connect the cable jumpers that join the secondary of the voltage transformer to the control box.

j) Close the transformer access window once more by fixing the latch and close the access door to the remote controlled electrical equipment.

k) Re-connect the cable jumpers that join the voltage transformer to the MV cubicle where they are installed.

l) Re-apply power to the remote controlled electrical equipment.

[^1]: Refer to the IG-078 General Instructions document for the CGMCOSMOS cubicle system, located in the CMS Switching and Breaking Substation document holder.
6. ADDITIONAL INFORMATION

6.1. SPARES AND ACCESSORIES

The following accessories are sent with the concrete enclosure:

- First aid sign.
- Electrical warning sign.
- Lever for actuating the MV switchgear.
- Electrical equipment hoisting kit\(^8\).
- CMS Switching and Breaking Substation General Instructions, IG-172.
- CGMCOSMOS Cubicle System General Instructions, IG-078.

**NOTE:**
Some of these spares and accessories must be installed in the equipment by specialist personnel. Please contact Ormazabal’s Technical - Commercial Department.

---

\(^8\) Only if the electrical equipment is the remote controlled type.