F400
Air insulated switchboard
Withdrawable circuit breaker 1 to 40.5 kV

Cradle
September 2008
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Cradle types

M1 cradle

M2 cradle

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<td></td>
<td>1250 A</td>
<td>1250 A</td>
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<tr>
<td>Packing type</td>
<td>2a</td>
<td>4c</td>
</tr>
<tr>
<td>Width (cm)</td>
<td>118</td>
<td>127</td>
</tr>
<tr>
<td>Height (mm)</td>
<td>183.5</td>
<td>183.5</td>
</tr>
<tr>
<td>Depth (kg)</td>
<td>219</td>
<td>219</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>770</td>
<td>978</td>
</tr>
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</table>

The weight of cubicles includes the circuit-breaker weight.
Handling Instructions

Packing

Overland transport packing (2a)
Functional unit

Sea transport packing (4c)
Functional unit
Handling Instructions

Handling by lifting

Functional unit

Remove the transport hoops.

Sling up the device using the lifting lugs. Provide 2 m slings as a minimum.

The slings must not form an angle higher than 60°. Cubicle gradient must not exceed 10°.

Handling by rolling

Proceed as shown opposite.

Be careful not to distort the cradle floor bearing surface.
Handling Instructions

Storage

When stored, the equipment must remain in its original packing.

It must be placed on a dry floor or dampinsulating material.

Prolonged storage

For prolonged storage, the device must remain in its original packing. After prolonged storage, care must be taken to thoroughly clean all insulating parts by means of a dry, clean cloth prior to use.
Handling Instructions

Unpacking the cradles

The cradles must be prepared in the room where they are going to be fitted.

Avoid impacts and deformation. Unpack the cradle by removing the wooden uprights and then the plastic cover. Do not remove any component from the cradles.

Equipment identification

After unpacking, check that the features and descriptions marked on the cradle rating plates meet the requirement given in the contractual documents.

Removing the transportation devices from the removable part

Open the access door to the removable part by pulling and then rotating the handle rightwards.

Operating instructions relating to the standard cradle

Note: before sending the cradle back, fit the 2 reinforcements and their screws and bolts.

1: remove the 2 transport reinforcements (3 screws per reinforcement).
2: fit the 4 mounting screws of the front plate and contact washers.
Tightening torque: 8.5 Nm.
3: flap locking kit.
Handling Instructions

Operating instructions relating to the internal arc withstand cradle:

Note: before sending the cradle back, fit the 2 reinforcements and their screws and bolts.

1: remove the 2 transport reinforcements (3 screws per reinforcement).
2: fit the 4 screws used to fasten the front plate and contact washers contained in the bag of screws and bolts.
Tightening torque: 8.5 Nm.
3: flap locking kit.

How to extract the removable part (front plate with black background)

To extract the removable part and close the door, refer to “Operating Instructions”, section “Operation.”
General description

Glossary

Abbreviations

- **CT**: current Transformer or current sensor
- **LV**: low Voltage
- **MALT**: Mise A La Terre (earthing)
- **MV**: voltage class from 25 to 36 kV
- **NVC**: No-Voltage Check
- **SF**: range of SF6 circuit-breakers used in the F400 cradle
- **SMALT**: sectionneur de Mise A La Terre (earthing isolator)
- **VT**: Voltage Transformer.

Standard M1 cradle

Front side

- A: removable part compartment access door
- B: removable part position check view ports
- C: removable part interlocking and operating plate
- D: removable part blocking.

Left-hand view

- 1: MV connection
- 2: removable part compartment.
M1 internal arc protection cradle

Front side

A: removable part compartment access door
B: removable part position check view ports
C: removable part interlocking and operating plate
D: removable part blocking.

Left-hand view

1: MV connection
2: removable part compartment.
General description

Standard M2 cradle

Front side

A: removable part compartment access door
B: view ports
C: removable part interlocking and operating plate
D: removable part interlocking plate.

Left-hand view

1: busbar compartment
2: MV connection
3: removable part compartment.
M2 internal arc protection cradle

Front side

A: removable part compartment access door
B: view ports
C: removable part interlocking and operating plate
D: removable part interlocking plate.

Left-hand view

1: busbar compartment
2: MV connection
3: removable part compartment.
General description

Standard draw-out SF circuit-breakers

SF1
CEI 1250 A standard

SF2
CEI 1250 A standard

SF2
CEI 2500 A standard

Standard draw-out bar bridge

1250 A and 2500 A
General description

Internal arc draw-out SF circuit-breakers

SF1
CEI 1250 A standard

SF2
CEI 1250 A standard

SF2
CEI 2500 A standard

Internal arc draw-out bar bridge
1250 A or 2500 A
General description

Identification

Functional unit

SF draw-out removable part

A: features, descriptions and serial number
B: features, descriptions and serial number.

How to read the information on the front side

Removable part

1: mechanical opening push-button
2: removable part position selector
3: removable part operating crank insertion aperture.

A: removable part mechanical position indicator
B: slot for the disconnecting truck lock (optional).

Plug-in disabling

A: locking pull for plug-in disabling (plug-in disabling selector)
B: slot for the plug-in disabling lock.
General description

Symbols

Cradle

- "Plug-in disabling" position
- "Padlockable" position

Removable part

- "Operating" position
- "Drawn-out" position
- "Plugged-in" position
- "Insertion/extraction" position
Floor mounting

This step will help to define your civil engineering basis.

M1 cradle

Plug-in check on the operating site

Whenever a cradle has been fastened to the floor, use the circuit-breaker to check that plug-in and interlocking as well the opening and closing of the flaps are performed correctly.

To insert and plug in the removable part and close the door, refer to "Operating Instructions", section "How to insert the removable part".

M2 cradle
### Electrical connections

#### Screws, bolts and tightening torque

**Note:** all the necessary screws and bolts are supplied, except for the MV cable connection.

**Screws and bolts to be used**
Bolt joint for MV and LV indoor equipment. Class 8.8 as per Standard ISO 225, i.e. yield strength, \( \text{Re} \geq 627 \text{ Nm/mm}^2 \). The screws and bolts must not be lubricated.

**Tightening torque**
Connections must be tightened by means of a torque wrench, complying with the following torques:

**Application method**
The force of the bolts tightened to the recommended torques is better distributed thanks to the use of spring washers located on the outer surfaces of the terminal pads and busbars. If disassembly is performed, replace spring washers.

<table>
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<th>Screw</th>
<th>Torque in Nm</th>
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<tr>
<td>Ø 6</td>
<td>13</td>
</tr>
<tr>
<td>Ø 8</td>
<td>28</td>
</tr>
<tr>
<td>Ø 10</td>
<td>50</td>
</tr>
<tr>
<td>Ø 12</td>
<td>75</td>
</tr>
<tr>
<td>Ø 14</td>
<td>120</td>
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#### Connection of the earth bar

![Connection of the earth bar diagram]

- **Earthing connection point**
- **Front side**

#### Insulation

**Warning:** dielectric insulation shields are not supplied.

![Insulation diagram]

- **Front side**
- **Top view**
- **Insulation shields to be installed**

#### Connection of Low Voltage cables

- \( S \): trough
- \( T \): aperture.

![Connection of Low Voltage cables diagram]

- Through the bottom of the removable part compartment of each cradle, with trough \( S \) and aperture \( T \) communicating with the duct.
- Max. quantity of cables: 8.

- Multicore cable Ø 20 mm
- To have access to aperture \( T \), remove trough \( S \) cover.
Operating Instructions

How to extract the removable part

Initial status

Operation

**Warning:** for cradles with internal arc withstand option, loosen the 6 screws A before operating the handle.

- Open the access door to the removable part by pulling and then rotating the handle rightwards.
- Unplug the LV auxiliary connection cord.
- Clip the cable on the circuit-breaker.

**Warning:** the threshold bar must be removed before extracting the removable part.

- Press push-button 1. Hold it down to move selector 2 to position
- Then extract the removable part by pulling the handles.

**Warning:** to remove the threshold bar, loosen the nuts on top of it.

- Pull out the removable part.
Operating Instructions

Closing the door after extracting the removable part

*Warning:* the following steps MUST be followed to allow the door to be closed.

Before closing the access door to the removable part, lower the panel.

Inside the door, pull locking part 1. Rod 2 goes down.

*Warning:* put back the threshold bar.

The door closes but does not lock. Close the door.

How to insert the removable part

Open the access door to the removable part by pulling and then rotating the handle rightwards.

*Warning:* how to insert the removable part.

Insert the removable part in the cradle.
Operating Instructions

To move selector 2 to position
press push-button 1.
Hold it down to move selector 2 to
position
Push the removable part into the
cubicle until its is in abutment.
Then press push-button 1.
Hold it down to move selector 2 back to
position

Warning: lift protection flap V of pushbutton 1.

Putting back the threshold bar

Insert the threshold bar A tilting it
slightly, align slots B with threaded rods C, then fit the threshold bar.

Loosen nuts D.

Closing the door with the removable
part in place

Warning: if closing is impossible, check the following
points given in E and F.

E: before closing the access door to the
removable part, lift the panel and check
that it is properly latched at the top.

F: lift rod 2, topple locking part 1 over
and release rod 2.

The door closes but does not lock.

Close the door.
Operating Instructions

How to plug in the removable part

Initial status

Removable part
- The removable part is drawn out
- Operation should be allowed by means of the locks, if fitted
- The circuit-breaker LV auxiliaries are connected and the circuit-breaker compartment door is closed.

Operation

If it is key-locked: insert the key in H. Lower the protection flap of push-button 1.

Press push-button 1. Hold it down to move selector 2 to position .

Lift the protection flap of push-button 1.

Insert the crank in aperture 3. Plug in the removable part by rotating the crank clockwise until status change of position indicator A and locking of crank in rotation.

Move selector 2 to position .

The removable part is plugged-in. If a circuit-breaker is used, the electrical operation for switching on the downstream part of the equipment is now possible.

Final status
How to draw-out the removable part

Initial status

Removable part
- Removable part in plugged-in position.

Operation

If it is key-locked: insert the key in H. Lower the protection flap V of push-button 1.

Press push-button 1 (which triggers a circuitbreaker mechanical opening order). Hold it down to move selector 2 to position.

Lift protection flap V of push-button 1.

Insert the crank in aperture 3. Draw out the removable part by rotating the crank counter-clockwise until status change of position indicator A.

Move selector 2 to position.

The removable part is drawn out. The cubicle is in disconnected position.

Final status
Operating Instructions

Padlocking

Padlock with ø 6 to 8 mm can be used
- on the plug-in disabling selector
- on the protection flap of the removable part mechanical opening push-button
- on the flap opening mechanisms inside the removable part compartment,
- on the adjustable voltage transformer operating mechanism.

Disabling the removable part plug-in

Disabling the mechanical opening order of a circuit-breaker in operation position

This device can also be used as an additional plug-in and draw-out disabling system.

Opening the flaps

Refer to “Maintenance Instructions”, section “Access to upper and lower plug-in blocks”.

Operating the adjustable VT

Refer to “Adjustable voltage transformer”, section “How to operate the adjustable voltage transformers”.

Fit 1 to 3 padlocks on plug-in disabling selector D in the following position.

Fit a padlock on the protection flap of mechanical opening push-button 1.
Testing

Switchboard dielectric test

This test can be performed in a single operation. All circuit-breakers must be plugged-in and closed, with the cradle doors open. Furthermore, one of the outgoing cradles must have its MV cable compartment open for the connection of the test cable.

This preparation requires the manual disabling of interlocking to plug in the circuit-breakers, with the door open.

The sequence below must absolutely be followed.

Position the circuit-breaker in drawn-out position, with the door open. Lift and lock the door locking rod by means of a 55 mm high U-shaped wedge. Plug in the circuit-breaker. Remove the wedge.

The manual closing of the circuit-breaker by pressing button "I" is then possible by means of its mechanical control. Indicator A indicates the status of the circuit-breaker ("O" or "I"). The test can be performed.
Testing

Testing the current transformers

Injection at primaries
An injection at the current transformer primaries is possible by access to the fixed plug-in blocks located in the circuit-breaker compartment.

Injection at secondaries
The tests and settings will be preferably performed by injection at secondaries, using the test and injection boxes provided in the LV compartment.

Warning: the connection accessory must not damage the fixed block coating.

1: extract the removable part
2: close the earthing isolator
3: padlock the opening of the lower flap providing access to the fixed blocks on the busbar side
4: access the fixed blocks on the current transformer side through the upper flap opening
5: fit the injection device between the fixed block (primary terminal P1) and the cubicle earth bar which can be accessed in the circuit-breaker compartment. Terminal P2 of the transformer is connected to the cubicle earth bars by means of the earthing isolator in closed position.

Changing the winding ratios at the secondary.
Any change in the winding ratio is performed by access to a specific terminal board inside the low voltage compartment (see LV developed diagrams).

This operation is performed with the transformer primaries de-energized and earthed by closing of the earthing isolator.

After testing
1: remove the injection device
2: close the upper flap
3: remove the padlock blocking the opening of the lower flap
4: open the earthing isolator
5: insert the removable part.
Testing

Busbar earthing truck

The earthing of the Fluair 400 cradle busbar is provided by means of a circuit-breaker-type truck.

All circuit-breakers in the switchboard can be extracted if necessary. Busbar earthing truck F400 complies with the requirements of standard NFEN 60129.

Technical features

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>36 kV</th>
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<tr>
<td>Ith = i.e.</td>
<td>25 kA - 3s</td>
</tr>
<tr>
<td>Ith = i.e.</td>
<td>31.5 kA - 3s</td>
</tr>
</tbody>
</table>

"Power on" device: no

A double lock can be provided with separate operating mechanisms releasing cams that abut the polarization block located on the cradle floor.

The MALT trucks are planned to be inserted in a 1250 A cradle on the switchboard for the main earthing of the busbar.

Each double lock is then allocated to one of the ½ sets of cubicles (L-H or R-H) by means of a central key box.

Polarization of MALT trucks

The purpose of this optional device is to impose the draw-out of all circuit-breakers in a ½ set of cubicles and of the coupling before plugging in a busbar earthing truck.

Recommendations for operating MALT trucks

The plug-in of a MALT truck is performed by means of the propulsion mechanism used for circuit-breakers (crank). The closing-opening operations of the main contacts are performed manually by the operator, with the cubicle MV door open.

The MALT truck is used in the following conditions:

- possibility of plugging in the MALT truck with the cradle MV door open or closed
- the MALT truck only operates the lower flap of the plug-in bells
- the truck operates the plug-in/draw-out contacts of the cradle
- the positioning of closing springs is performed manually by means of the lever
- opening-closing operations are controlled by means of the buttons located on the front panel of the truck
- the «O-C» buttons are padlockable separately
- the truck can be inserted with the earthing isolator (SMALT) closed or open
- the SMALT remains operable with the MALT truck plugged-in
- the MALT truck is equipped with a separation prohibiting access to energized parts when the truck is plugged-in.
Testing

Once plugged in, the MALT truck is considered as potentially closed. As a result, it does not have the following auxiliaries:

- Auxiliary contacts indicating the status of the MV main contacts
- Electric control systems to ensure the remote opening-closing controls.

The “O-C” position mechanical indicator of HV contacts is:

- Black for OPEN
- White for CLOSED.
Maintenance instructions

Ordering parts

When preparing the order, refer to this manual supplied with the system to define the equipment desired very precisely.

To order any equipment, you must indicate:
- type of cradle
- manufacturing number (engraved on the identification plate located on the left-hand panel of the removable part compartment)
- If possible, attach a diagram of this manual on which the part is conspicuous.

Preventive maintenance

Before performing any task, make sure of the strict compliance with operating and safety instructions.

Warning: Schneider Electric cannot guarantee the durability and reliability of the equipment subjected to this type of cleaning process, even if followed with lubrication.

Our equipment is designed to guarantee optimum operation provided that the maintenance instructions described in this manual are strictly adhered to.

Start each maintenance task with the thorough cleaning of the cradle. The use of pressurized solvent projection as a cleaning process is prohibited.

The main risks related to this process are as follows:
- de-lubrication of sliding rails and joints (life lubricated)
- corrosion of unprotected parts
- damage and deformation due to high pressure
- overheating due to solvent on contact areas
- elimination of special protections.

Maintenance points

Removable part

Warning: should clamps be damaged, the corresponding MV fixed block in the cradle shall be inspected.

Warning: prior to any application, remove the old grease.

Extract the removable part (refer to section “How to extract the removable part”). Referring to its user’s manual, perform an overall check of the system.
- clean insulating parts
- apply a thin film of grease, “Kluber Amblygon TA 15/2” type or equivalent, to the plug-in clamps.

Warning: for electric contacts, do not use grease of “Kluber Isoflex Topas L152” type or equivalent.

Warning: prior to any application, remove the old grease. Remove dust and clean the inside of the compartment.

Removable part compartment

Warning: prior to any application, remove the old grease. Remove dust and clean the inside of the compartment.

Check and lubricate:
- pins and joints, mechanisms and sliding rails of flaps (“Kluber Isoflex Topas L152” or equivalent)
- the earthing plate (“Kluber Amblygon TA 15/2” or equivalent)
- behaviour at the LV wiring connection points.
Maintenance instructions

Access to upper and lower plug-in blocks

Opening the flaps

**Left-hand side**  
A: lower flap latch finger.

**Right-hand side**  
B: upper flap latch finger.

The plug-in blocks are accessed by manual opening of the lower flap:  
- on the busbar side, in an incoming/outcoming cubicle  
- on the left-hand busbar side, in a circuit-breaker coupling cubicle.

The plug-in blocks are accessed by manual opening of the bottom flap:  
- on the MV cable side, in an incoming/outgoing cubicle  
- on the right-hand busbar side, in a circuit-breaker coupling cubicle.

**Left-hand side**  
Padlock the opening of the upper flap (refer to section “Flap interlocking”).

**Left-hand side**  
Using a screwdriver, release latch finger A.

Push to open the flap.

After maintenance, close the flap by lifting it manually until it locks, then remove the padlock locking the upper flap.
Operating the upper flap

Right-hand side
Padlock the opening of the lower flap (refer to section “Flap interlocking”).

Right-hand side
Using a screwdriver, release latch finger B.

Holding latch finger B, in position, push the flap upwards.

After maintenance, lower the flap manually until it locks, then remove the padlock locking the lower flap.
## Trouble-shooting

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<th>Symptoms</th>
<th>Faulty devices</th>
<th>Possible causes and solutions</th>
</tr>
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</table>
| Abnormal noise with power on (crackling, vibrations) | - insulators | Damp or dirty  
- clean or dry them |
|  | - metal components | Incorrectly fastened  
- check fasteners |
|  | - upstream or downstream connection | Incorrect cubicle connection  
- check the connections |
| Excessive overheating at connection points | - connection | Connections incorrectly tightened  
- retighten them, see tightening torque, contact surfaces ill adapted or damaged  
- change or clean them |
| Operation requiring abnormal effort |  | Anomaly resulting from deformation  
- adjust |
| One of the “power on” Leds does not come on | - led | Abrupt handling, MV network overvoltage  
- change the “power on” block |
|  | - wiring | Faulty  
- check it (see wiring diagram) |
|  | - “power on” Led functional unit | Capacitor damaged  
- change the unit |
|  | - capacitor insulator | Insulator capacitor damaged  
- change insulator |
| Circuit-breaker does not close |  | Operation incomplete  
- refer to the removable part extraction chapter |
|  | - protection relay | Action of a protection  
- check the relay settings and remove the fault |
|  | - wiring | Faulty  
- check it by successive eliminations |
|  | - LV circuit-breaker | Faults on LV circuit  
- trouble-shooting by successive eliminations |
|  | - section switch | In “Out of operation” position  
- close it |
Mounting instructions

Connecting the LV cables

P: plate  
Q: terminal block  
R: terminal block  
S: trough  
T: aperture

Access to connection terminal blocks

LV terminal blocks are located at the top of the LV compartment. Loosen fastening screws and remove roof P.

The Low Voltage wiring can enter the cradle in 2 different ways depending on the equipment.

1: through the rear of the LV compartment.

2: through the bottom of the circuit-breaker compartment of each cradle, with trough S and aperture T communicating with the duct.

Max. quantity of cables: 8  
Multicore cable ø 20 mm  
To have access to aperture T, remove trough S cover.
Adjustable voltage transformer

Mounting instructions
Refer to the plan provided with the VT compartment kit

How to operate the adjustable voltage transformers

Voltage transformers can be in the position “in operation” (primary fuses and transformers connected to MV cables or switchboard busbars) or “out of operation” (primary fuses and voltage transformers disconnected).

“Out of operation” position
A: operating handle in the top position
B: latch
C: fuse ends visible
D: fuse extraction slot.

“In operation” position
A: operating handle in the bottom position
B: latch
C: fuse extraction slot
D: fuse slot retractable closing flap in closed position.

How to put the VTs in operation

Initial status
Handle A in top position, flap open and fuse ends C apparent, indicate that the transformers are out of operation.

1: push the latch to the left
2: pull the handle.
How to put the VTs out of operation

Initial status

Handle A in bottom position and flap closed, indicate that the transformers are in operation.

1: remove the padlock
2: pull the handle
3: push the latch to the left.

4: lift the handle.
5: block the assembly in position by pushing the latch to the right.

Handle A in top position, flap E open and fuse ends C apparent, indicate that the transformers are out of operation.
Adjustable voltage transformer

Replacing the VT position auxiliary contacts

Removal

Note: to access the auxiliary contact block, remove the closing plate.

A: auxiliary contacts.

For the auxiliary contacts, separate the crank on the compartment side and remove the 4 mounting screws.

Fitting

Proceed in the reverse order.

Replacing the fuses of the adjustable voltage transformers

Put the VTs out of operation (refer to section "How to put the VTs out of operation").

Release the two screws.

Rotate and remove the fuse.

Remove the fasteners and bayonet A from the fuse...
Adjustable voltage transformer

... and fit them on the new fuse.

Fully insert the fuse and rotate.
Lock the two screws to the recommended torque.
Put the VTs out of operation (refer to section "How to put the VTs in operation").
Interlocking the flap on the removable part compartment

Flap interlocking

Left-hand side
The plug-in blocks are accessed by manual opening of the lower flap:
- on the busbar side, in an incoming/outgoing cubicle
- on the left-hand busbar side, in a circuitbreaker coupling cubicle.

After the removable part has been extracted from the cubicle, the upper or lower flap can be locked by means of 1-2 or 3 padlocks.

Right-hand side
The plug-in blocks are accessed by manual opening of the upper flap:
- on the MV cable side, in an incoming/outgoing cubicle
- on the right-hand busbar side, in a circuitbreaker coupling cubicle.

1: position the part (K and L)
2: padlock.

Note: the 2 operating mechanisms are separate.
Key-locking

Disabling the plug-in of a removable part

Removable part in drawn-out position. Remove the key when the plug-in disabling selector is in the following position:

Draw-out is then impossible.

Disabling the draw-out of a removable part or of a disconnecting truck

Remove the key when selector 2 is in position .

Draw-out is then impossible.
“Power on” device

Testing “Power on”

As soon as the cables have been energized, the “power on” indicator Leds L1, L2 and L3 must come on.

Checking phase coincidence between two cradles

Phase coincidence:
- the tester lamp does not come on.
Phase unbalance:
- the tester lamp comes on.

Check that power is off.
- The “power on” indicator Leds are off.
- It is recommended to lock the tester in this position.

Replacing the “power on” Led block

Removal

Mark and disconnect the wiring connector.
- Remove the fasteners and free the “power on” Led block.

Fitting

Set the “power on” block according to the arrow direction (see above) and plug the connector in the rear side.
- Tighten the 2 screws to a 0.1m daN torque.
Mounting the busbars

**Warning:** the bars and all the contact surfaces must be clean on mounting.

The kit is supplied in a separate parcel including the following parts:
- busbars
- connectors and associated screws and bolts
- insulating covers.

Intermediate busbars

**Warning:** the sequence of operations and tightenings MUST be complied with.

| A: connector half | B: bushing | C: bare or insulated bars | D: hex socket screw Ø 14 + washer | E: cover half. |

1. assemble the bars and connectors and fit the fasteners

2. bring up the screws and nuts to the limit stop in the order shown below, but do not lock them in position:
   - 1-2-3-4-5

3. using a torque wrench, tighten the screws in the order recommended above in 2 successive runs.

   - For screws Ø 10:
     - 1st run to a 25 Nm torque
     - 2nd run to a final torque of 50 Nm.

   - For screws Ø 14:
     - 1st run to a 25 Nm torque
     - 2nd run to a final torque of 75 Nm.

4. assemble the 2 cover halves E by exerting pressure on clips.
Busbar

End busbars

A: connector half
B: bushing
C: bare or insulated bars
D: screwed-on sleeve
E: hex socket screw ø 14 + washer
F: cover
G: binding.

Warning: the sequence of operations and tightenings MUST be complied with.

Note: in this case, a sleeve D is screwed onto a connector half.

End

1: assemble the bars and connectors and fit the fasteners

2: bring up the screws and nuts to the limit stop in the order shown below, but do not lock them in position: 1-2-3-4-5
3: using a torque wrench, tighten the screws in the order recommended above in 2 successive runs.

For screws Ø 10:
- 1st run to a 25 Nm torque
- 2nd run to a final torque of 50 Nm.

For screws Ø 14:
- 1st run to a 25 Nm torque
- 2nd run to a final torque of 75 Nm.

4: fit the insulating cover F on the connector. Lock it in position by means of 2 plastic bindings G.

Maintaining the busbar compartment

Remove dust and clean the inside of the compartment and the insulators

Tightening torque
The connections must be tightened by means of a torque wrench, complying with the following torques:

<table>
<thead>
<tr>
<th>Screw</th>
<th>Torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 6</td>
<td>13</td>
</tr>
<tr>
<td>Ø 8</td>
<td>28</td>
</tr>
<tr>
<td>Ø 10</td>
<td>50</td>
</tr>
<tr>
<td>Ø 12</td>
<td>75</td>
</tr>
<tr>
<td>Ø 14</td>
<td>120</td>
</tr>
</tbody>
</table>

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