FBX

Operation
Maintenance

Instructions

AMTNoT132-02

AREVA T&D

AREVA

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1 AREVA at your service

Operations and maintenance may only be carried out by personnel who have received suitable authorisation for the operations and manœuvres they are responsible for performing.

If this is not the case, please refer to our Service Unit or Training Centre.
All locking-out operations must be performed according to the

”General Safety Instructions booklet for Electrical Applications”
UTE C 18 510
(or its equivalent outside FRANCE).

1.1 Our Service Unit: our specialists, and suitably adapted services...

- Guarantee extension contracts in relation to the selling of new equipment,
- Supervision of HVA switchgear installations,
- Technical advice, diagnoses of the facilities, expertise,
- Maintenance contracts adapted to operational constraints,
- Systematic or conditional preventive maintenance,
- Corrective maintenance in case of partial or complete failure,
- Supply of spare parts,
- Overhauling of equipment and requalification of installations in order to benefit from new technologies and extend the life of your switchgear by limited investments.

Contact the AREVA Service Unit for diagnoses and advice:
Working hours

☎ 33 (0)3 85 29 35 00
🖷 33 (0)3 85 29 36 30
or 33 (0)3 85 29 36 43

1.2 AREVA T&D Technical Institute: Together, let us develop our skills...

We can place at your disposal all of our trainers’ expertise, our teams’ pedagogical experience and the wealth of our equipment, to help you face the challenge of encouraging the personal development of each individual through the optimisation of their skills.

From a few hours up to several weeks, AREVA T&D Technical Institute has the control over all of the teaching processes in order to meet the needs of each customer.

- Specific training, directly operational with practical work on real machines.
- Small groups to facilitate communication.
- Balance between theory and practice.
- Evaluation and management of the skills: Measurement and optimisation of the trainees’ knowledge.

Faced with the direct and indirect training costs of the operational stoppages and shutdown, training is a real investment

AREVA T&D Technical Institute Aix-les-Bains
1 rue Paul Doumer - BP 601 - F-73106 Aix-les-Bains Cedex
☎ 33 (0)4 79 34 76 70 🖷 33 (0)4 79 34 76 76 ✉ training.aix@areva-td.com

2 With regards to this User Manual

2.1 Responsibilities

Our devices are quality controlled and tested at the factory in accordance with the standards and the regulations currently in force.

Apparatus efficiency and apparatus life depend on the compliance with the installation, commissioning and operation instructions described in this user manual. Non respect of these instructions is likely to invalidate any guarantee.
Local requirements especially about safety and which are in accordance with the indications given in this document, must be observed.

AREVA declines any responsibility for the consequences:
- due to the non respect of the recommendations in this manual which make reference to the international regulations in force.
- due to the non respect of the instructions by the suppliers of cables and connection accessories during installation and fitting operations,
- of any possible aggressive climatic conditions (humidity, pollution, etc.) acting in the immediate environment of the materials that are neither suitably adapted nor protected for these effects.

This user manual does not list the locking-out procedures that must be applied. The interventions described are carried out on de-energized equipment (in the course of being installed) or locked out (non operational).

2.2 Particular instructions for operations and interventions on energized equipment

When commissioning and operating the equipment under normal conditions, the General safety instructions for electrical applications must be respected, (protective gloves, insulating stool, etc.), in addition to standard operating instructions.

All manipulations must be completed once started.

The durations (for completing the operations mentioned) given in the maintenance tables are purely an indication and depend on on-site conditions.

2.3 Other technical notices to be consulted

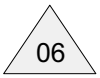
- AMTNoT131-02 FBX Gas-insulated HVA Switchboard Installation - Commissioning

2.4 Tools *(not supplied)* required for the operations described in this user manual

- Flat, thin screwdriver (4) + medium

- Leather gloves

2.5 Symbols & conventions



- Code for a product recommended and marketed by AREVA

- Tightening torque value
  Example: 1.6 **daN.m**

- Mark corresponding to a key

CAUTION! Remain vigilant!
Precautions to be taken in order to avoid accidents or injury

FORBIDDEN! Do not do it!
Compliance with this indication is compulsory, non compliance with this stipulation may damage the equipment.

INFORMATION - ADVICE
Your attention is drawn to a specific point or operation.

3 Functional interlocks

3.1 Functional mechanical interlocks

The FBX switchboard is equipped with internal mechanical interlocks, called ”functional”, intended to avoid any kind of operating error.

It is necessary to know these interlocks in order to operate the switchgear correctly.

Function Sb: The disconnection or earthing operation can only be carried out once suitably adapted lockout operations have been implemented on the network.

3.2 Interlocks for functions C and T1

	Position	Load Break Switch	Earthing switch	Access hatch to fuse electrodes or cables
Load Break Switch	Closed	-	Locked open	Locked closed
	Open	-	Free	Dependant on the position of the earthing switch
Earthing switch	Closed	Locked open	-	Free
	Open	Free	-	Locked closed
Access hatch to fuse electrodes or cables	Open	Locked open	Locked closed	-

3.3 Interlocks for function T2

	Position	Circuit breaker	Disconnector switch	Earthing switch	Access cover to cable compartment
Circuit breaker	Closed	-	Locked (closed or open)	Locked open	Locked closed
	Open	-	Free	Dependant on the position of the disconnector switch	Dependant on the position of the earthing switch
Disconnector switch	Closed	Free	-	Locked open	Locked closed
	Open	Free (Normally Open)	-	Free	Dependant on the position of the earthing switch
Earthing switch	Closed	Free (Normally Open)	Locked open	-	Free
	Open	Free (Normally Open)	Dependant on the position of the circuit breaker	-	Locked closed
Access panel to the cable compartment	Open	Free (Normally Open)	Locked open	Locked Closed	-

3.4 Interlocks for function Sb

	Position	Disconnector switch	Earthing switch
Disconnector switch	Closed	-	Locked open
	Open	-	Free
Earthing switch	Closed	Locked open	-
	Open	Free	-

4 Operating accessories

4.1 Reminder for Manual Operations

The operating manoeuvres are made without any special effort. Nevertheless, the force required is greater for latching controls (T1, T2) than for tumbler switches (C).

All movements of the lever must be frank and complete.

The lever moves through approximately 95°.

4.2 Operating accessories

- Standard operating lever for the earthing switch (red end).

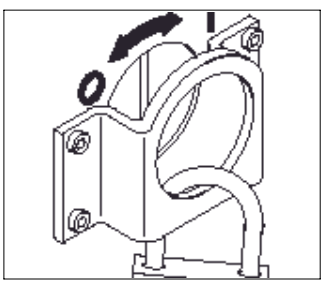
- Standard operating lever for the load-break switch (black end).

- Fuse electrode compartment key.

- Emergency manual control lever for motorised mechanisms.

4.3 Lockouts using padlocks *(Optional)*

Optional: Each mechanical control hub can be fitted so as to allow it to be locked out using a padlock (not supplied).

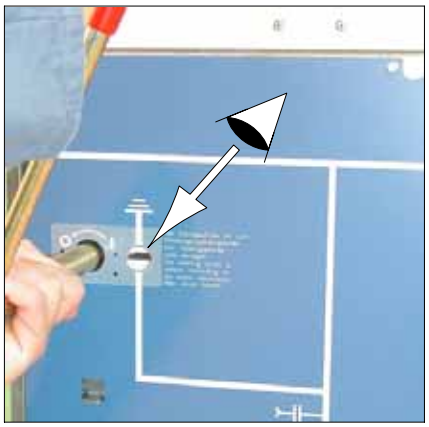


5 Use of the RE function

5.1 Opening the earthing switch

- Check that the tag is fully lowered.
- Insert the appropriate lever (red end) into the earthing switch socket.

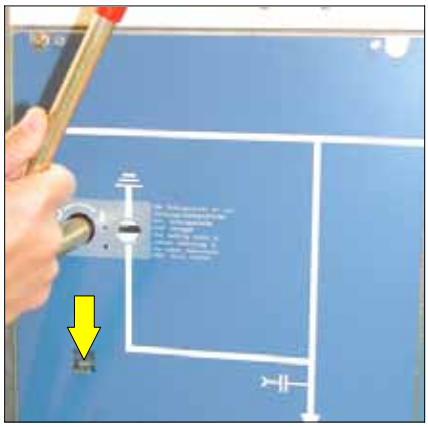
- Grasp the lever with both hands.



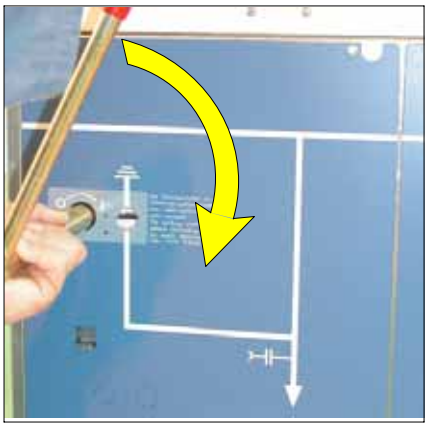
- Lift the lever: the earthing switch is now in the open position.
- Remove the lever.

5.2 Closing the earthing switch

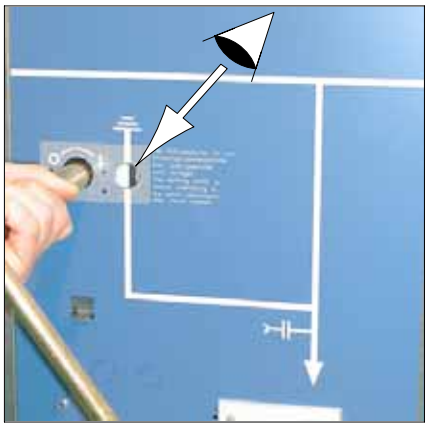
Before closing the earthing switch, ensure there is no voltage across the indicator units (see corresponding manual - § 2.3).



- Check that the tag is fully lowered.
- Insert the appropriate lever (red end) into the earthing switch socket.



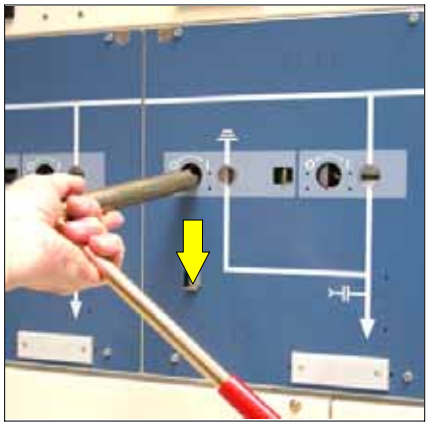
- Grasp the lever with both hands.



- Pull the lever down: the earthing switch is closed.
- Remove the lever.

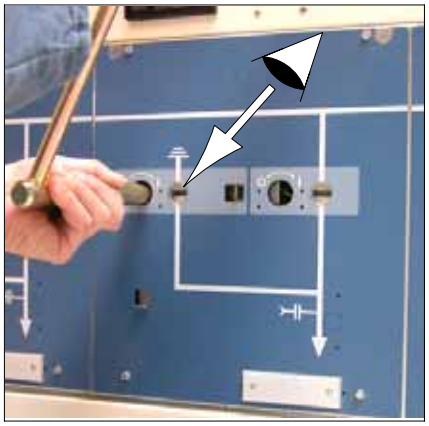
6 Use of the C function

6.1 Opening the earthing switch



- Check that the tag is fully lowered.
- Insert the appropriate lever (red end) into the earthing switch socket.

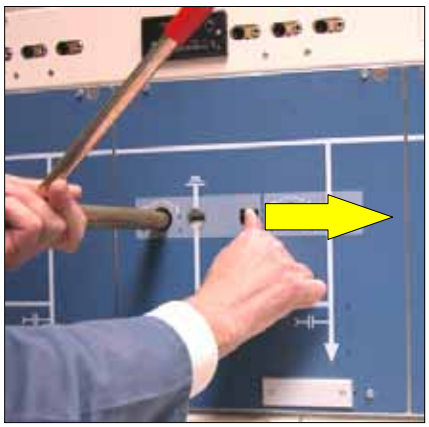
- Grasp the lever with both hands.



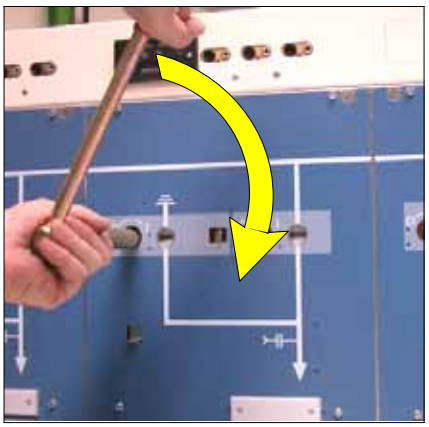
- Lift the lever: the earthing switch is now in the open position.
- Remove the lever.

6.2 Closing the earthing switch

Before closing the earthing switch, ensure there is no voltage across the indicator units (see corresponding manual - § 2.3).



- Check that the tag is fully lowered.
- Hold the locking tab open to the right.
- Insert the appropriate lever (red end) into the earthing switch socket.



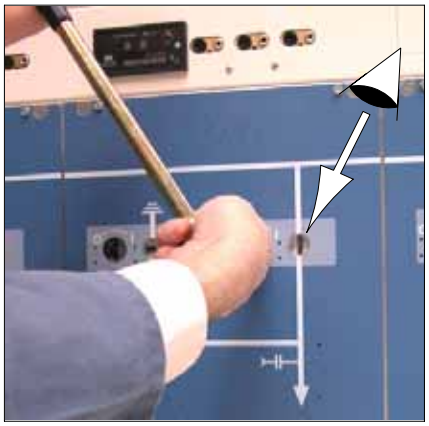
- Grasp the lever with both hands.

- Pull the lever down: the earthing switch is closed.
- Remove the lever.

6.3 Closing the load break switch

- Insert the appropriate lever (black end) into the load-break switch socket.

- Grasp the lever with both hands.

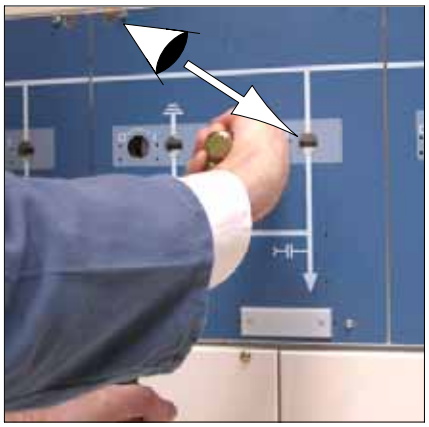


- Lift the lever: The switch is now closed.
- Remove the lever.

6.4 Opening the load break switch

- Insert the appropriate lever (black end) into the load-break switch socket.

- Grasp the lever with both hands.



- Pull the lever down: The switch is now open.
- Remove the lever.

6.5 Movements of motorised control mechanisms

See chapter 10.

7 Use of the T1 function

7.1 Opening the earthing switch

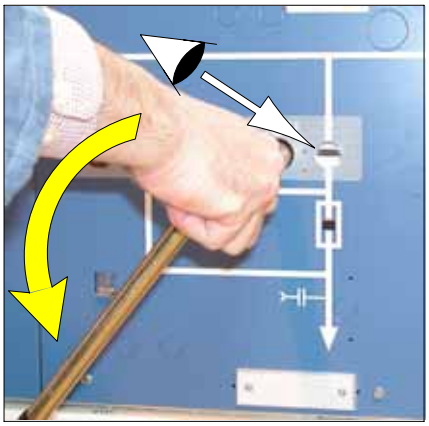
See instructions in § 6.1.

7.2 Closing the earthing switch

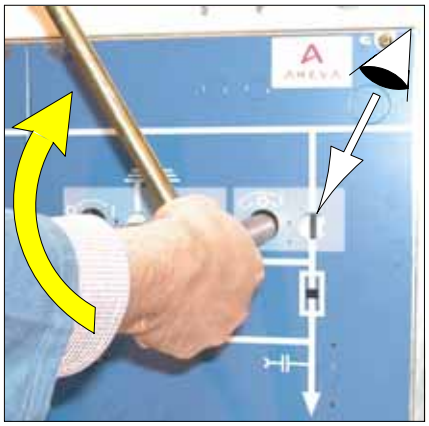
See instructions in § 6.2.

7.3 Closing the load break switch

- Insert the appropriate lever (black end) into the load-break switch socket.
- Grasp the lever with both hands.



- Lower the lever to its lowest position and release slowly (to ensure that the latch is engaged): The switch is now held permanently open.



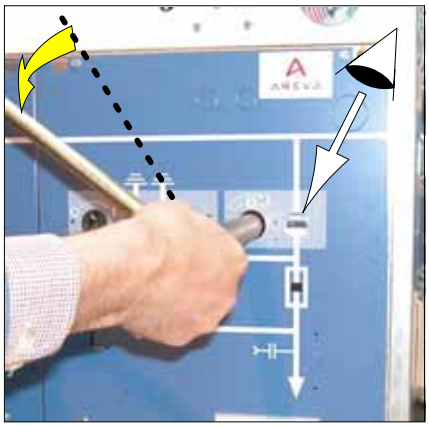
- Lift the lever fully: The switch is now closed.
- Remove the lever.

7.4 Manually opening the load break switch

NB: The switch can also be opened using a push-button (optional) or an electrical control.

- Insert the appropriate lever (black end) into the load-break switch socket.

- Grasp the lever with both hands.



- Lower the lever through approximately 20°: The switch is now open.
- Remove the lever.

7.5 Movements of motorised control mechanisms

See chapter 10.

8 Use of the T2 function

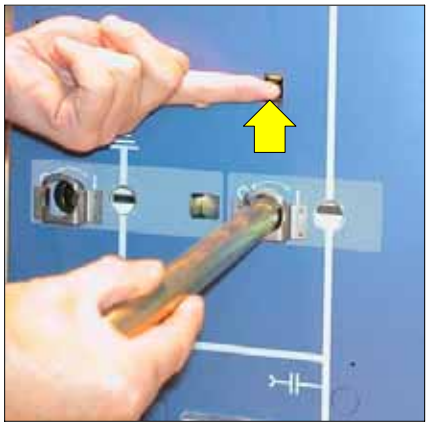
8.1 Opening the earthing switch

See instructions in § 6.1.

8.2 Closing the earthing switch

See instructions in § 6.2.

8.3 Closing the line isolating switch [circuit breaker open]



- Lift the locking tab.
- Insert the appropriate lever (black end) into the disconnector switch socket.

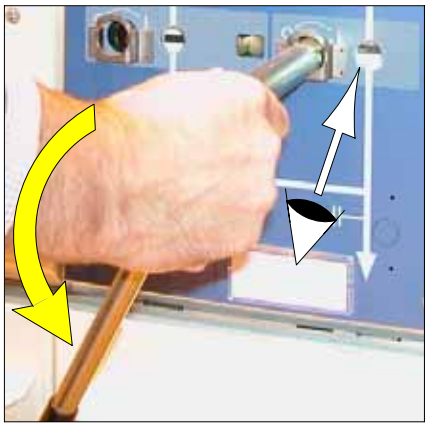
- Grasp the lever with both hands.

- Lift the lever: The line isolator is now closed.
- Remove the lever.

8.4 Opening the line isolating switch [circuit breaker open]

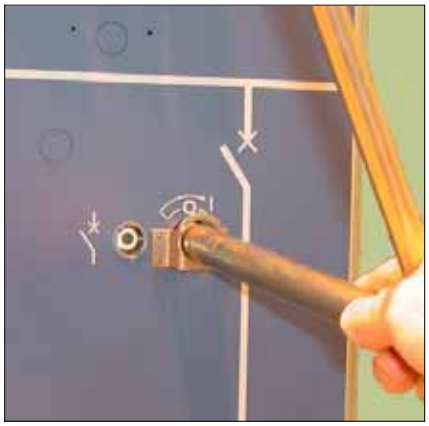
- Lift the locking tab.
- Insert the appropriate lever (black end) into the disconnector switch socket.

- Grasp the lever with both hands.

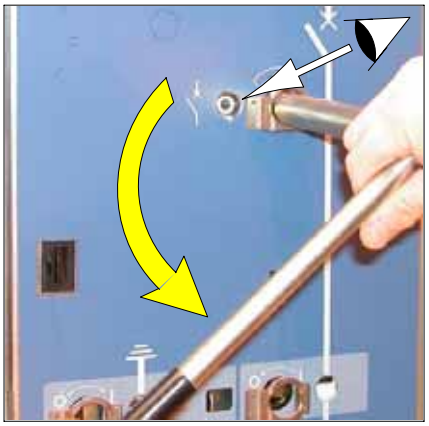


- Pull the lever down: The line isolator is now open.
- Remove the lever.

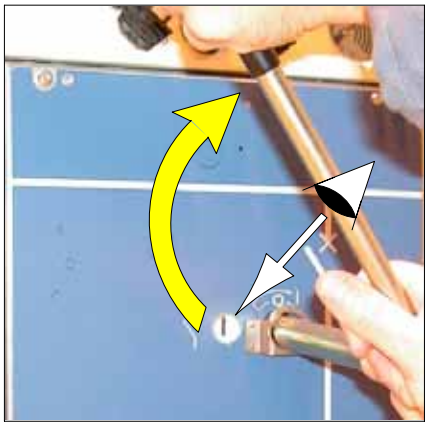
8.5 Closing the circuit breaker [Line Isolator closed]



- Insert the appropriate lever (black end) into the circuit breaker socket.
- Grasp the lever with both hands.



- Lower the lever to its lowest position and release slowly (to ensure that the hold-open latch is engaged): The switch is now held permanently open.

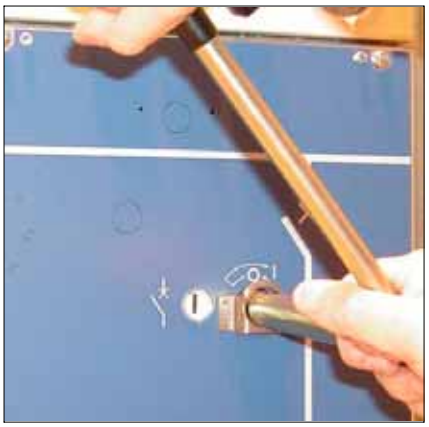


- Lift the lever fully: The circuit breaker is now closed.
- Remove the lever.

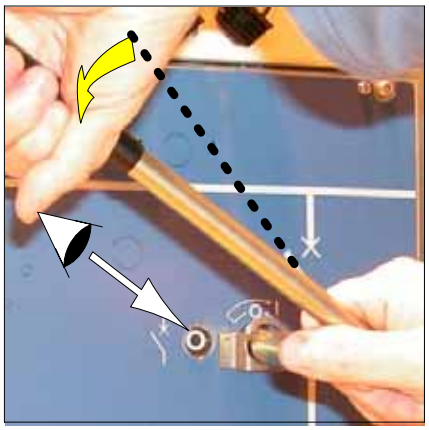
8.6 Opening the circuit breaker [Line Isolator closed]

NB: The switch can also be opened using a push-button (optional) or an electrical control.

- Insert the appropriate lever (black end) into the circuit breaker socket.



- Grasp the lever with both hands.



- Lower the lever through approximately 20°: The circuit breaker is now open.
- Remove the lever.

8.7 Closing the circuit breaker [Line Isolator open]

It is also possible to operate the CB when the line isolator is open.

This 'no-load' operation can be used to test and ensure that the circuit breaker is functioning correctly.

8.8 Movements of motorised control mechanisms

See chapter 10.

9 Use of Function Sb

9.1 Opening the earthing switch

Follow the instructions given in § 6.1.

9.2 Closing the earthing switch


The disconnection or earthing operation can only be carried out once suitably adapted lockout operations have been implemented on the network.


Before closing the earthing switch, ensure there is no voltage (or current) across the circuit in question (see corresponding manual - § 2.3).

Follow the instructions given in § 6.2.

9.3 Closing the load break switch

Follow the instructions given in § 6.3.

9.4 Opening the load break switch

Follow the instructions given in § 6.4.

9.5 Movements of motorised control mechanisms

Se reporter au chapitre 10.

10 Using motorised functions

10.1 Movements of motorised control mechanisms [Optional]

If the FBX switchboard is fitted with motorised controls (optional), the various functions can be energised/ de-energised remotely in accordance with the circuit diagram supplied as part of the contract.

For functions T1 and T2, opening operations can also be triggered by a push-button (optional) or electrical controls.

Function Sb: The disconnection or earthing operation can only be carried out once suitably adapted lockout operations have been implemented on the network.

10.2 Manual emergency movements of motorised controls

In the event of an outage of the motor supply source, a back-up control can be used to complete a manoeuvre underway or to carry out manual manoeuvres.

The position of the indicators should be verified after each operation.

If the supply is re-established whilst the handle is inserted, it will be pushed out of the socket.

When the earthing switch is closed the backup manual control lever cannot be fitted (Except for CB T2).

10.3 Approximate number of turns for backup manual control levers

	Switch Disconnector		Circuit breaker	
	To Open	To Close	To Open	To Close
Functions C and Sb	31 turns	31 turns		
Function T1	7 turns	50 turns		
Function T2	31 turns	31 turns	7 turns	50 turns

10.4 Manual interventions involving Functions C and Sb [Earthing switch open]

- Insert the backup handle for the switch into its hole.

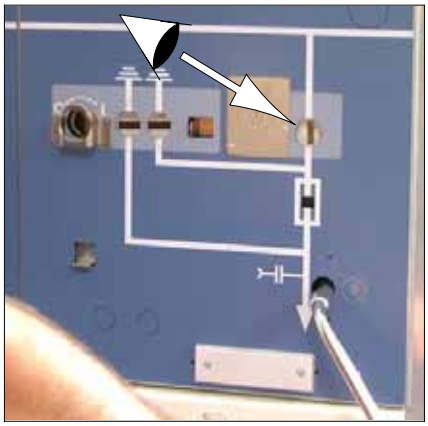
- To open (or close) the load-break switch, turn clockwise (See § 10.3).

- Continue until the operation is completed (mimic diagram changes).
- Remove the crank handle.

10.5 Manual interventions involving Function T1 [Earthing switch open]

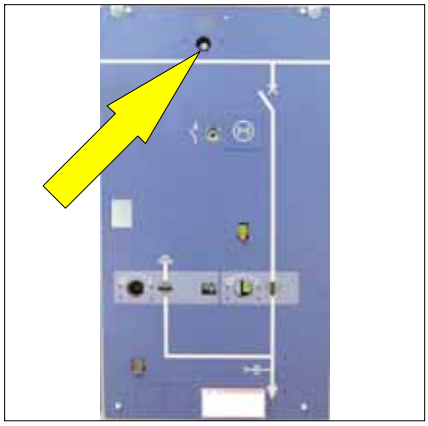
- Insert the backup handle for the switch into its hole.

- To open (or close) the load-break switch, turn clockwise (See § 10.3).

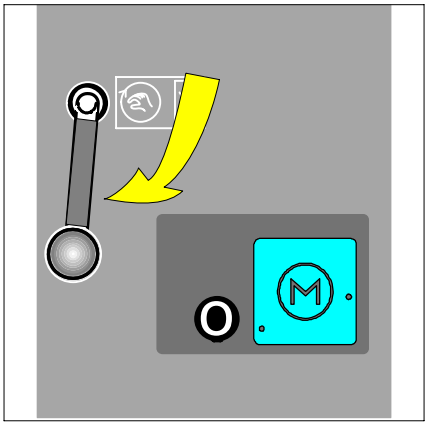


- Continue until the operation is completed (mimic diagram changes).
- Remove the crank handle.

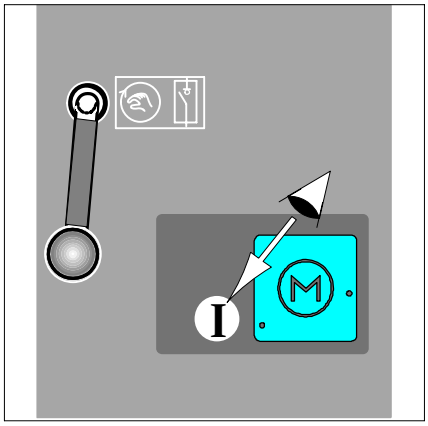
10.6 Manual interventions involving Function T2 [Earthing switch open]



- Insert the backup handle for the switch into its hole.



- To open (or close) the load-break switch, turn clockwise (See § 10.3).



- Continue until the operation is completed (mimic diagram changes).
- Remove the crank handle.

11 Maintenance

11.1 Levels of maintenance

Description	Levels
Operations recommended in the instructions manual "installation - operation - maintenance", carried out by suitably qualified personnel having received training allowing them to intervene whilst respecting the safety rules.	**1**
Complex operations, requiring specific expertise and the implementation of support equipment in accordance with AREVA's procedures. These must be carried out by AREVA or by a specialised technician trained by AREVA (See § 1.2) when starting the procedures, with the appropriate specific equipment.	**2**
All preventive and corrective maintenance, all renovation and reconstruction work is carried out by AREVA.	**3**

11.2 Preventive maintenance

PREVENTIVE MAINTENANCE	Frequency	Levels		
Recommended operations	6 years	1	2	3
Verification of the presence and condition of accessories (levers, etc.)	X	X	X	X
Visual inspection of the exterior (cleanliness, absence of oxidation, etc.)	X	X	X	X
Cleaning of external elements, with a clean, dry cloth.	X	X	X	X
Verification of the positioning of the status indicators (open and closed)	X	X	X	X
Verification of the functioning of the mechanical control mechanism by making several manoeuvres	X	X	X	X
Visual surveillance of the general appearance of connections	X	X	X	X

11.3 Corrective maintenance

CORRECTIVE MAINTENANCE		Levels		
Replacements or modifications	See §	1	2	3
Replacement of the three fuses	11.4	X	X	X
Replacement of a voltage indicator unit [E.g.: Type VPIS]	11.5	X	X	X

11.4 Replacement of the three fuses

Intervention	Busbar	Cables	Load Break Switch	Earthing switch
Normal	de-energized	de-energized	open	closed
Possible	energized	de-energized	open	closed

Locking out the Functional Unit All locking-out operations must be performed according to the particular rules for the network concerned.	Tools required: - Leather gloves - Compartment key - Small, flat-headed screwdriver	Parts required: - 3 fuses with the same reference *(verify values in accordance with the transformer power)*

See the corresponding chapter in the Installation Manual for the characteristics of the fuses (See § 2.3).

Replacement of a fuse

For an apparently single phase fault, it is **imperative** that all 3 fuses be replaced.

The body of a fuse can become very hot following a short circuit. Take standard precautions (leather gloves) before starting work.

Whenever changing or fitting a fuse, close the compartment immediately afterwards to avoid letting dust and humidity enter.

- Ensure that the function's earthing switch is closed.
- Open the compartment using the corresponding key.

- Lift the latch and open the panel.

- The end plugs on the fuse holders are now accessible.

- Pull the fuse holder out <u>without turning it</u>.

- Slowly remove the fuse cartridge – which may be hot.

- Place the assembly on a clean surface.
- Unscrew the small fixing screw (flat-headed screwdriver).
- Extract the fuse.

- Insert the new fuse into the housing and lightly tighten the small screw.

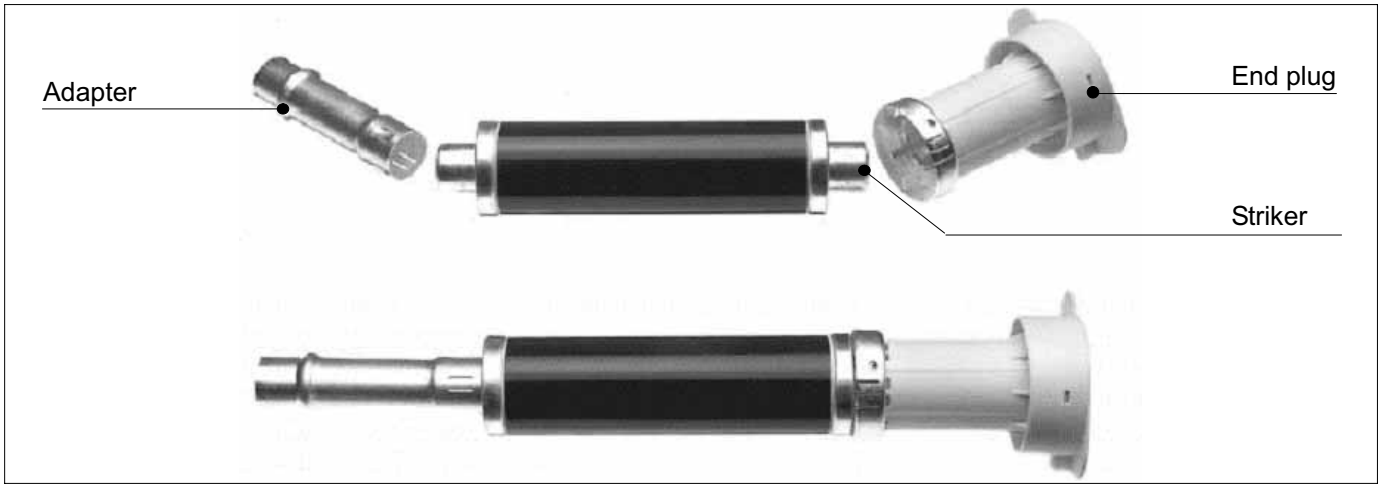
- Insert the fuse cartridge into its housing.

- Insert the fuse support lug into the slot in the insulated tube and press firmly.

- Re-position the fuse access cover.
- Push the panel fully in.
- Lock the panel with the key.

When using under 12 kV

For 12 kV networks, add the adapter (optional), which fits on to the end of the fuse.



11.5 Replacement of a voltage indicator unit [E.g.: Type VPIS]

Intervention	Busbar	Cables	Load Break Switch	Earthing switch
Normal	de-energized	de-energized	open	closed
Possible	energized	energized	closed	open

Locking out the Functional Unit	Tools required:	Parts required:
All locking-out operations must be performed according to the particular rules for the network concerned.	- Flat headed screwdriver	- VPIS Indicator Unit

- VPIS Unit

- Unscrew the two side screws

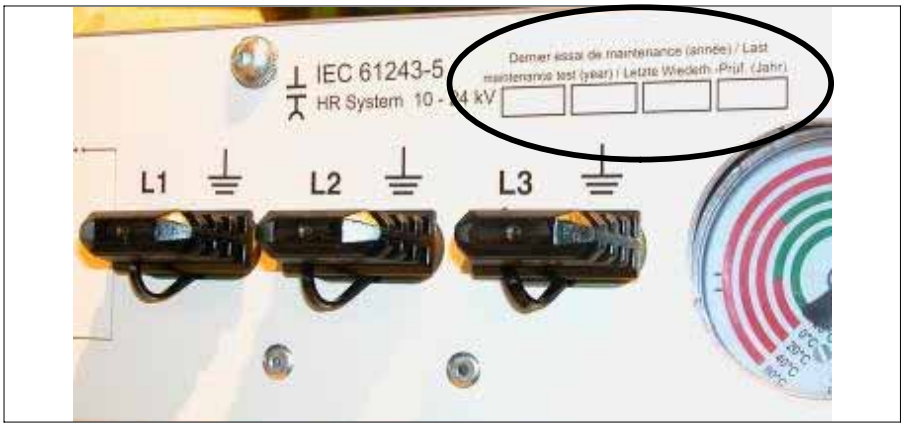
- Extract the unit by the front.

- Disconnect the box.

- To fit a new VPIS unit, repeat the operations in reverse order.

11.6 Periodic frequency for maintenance operations of the VDS boxes

- In the immediate proximity of the voltage taps, a rating plate mentions the date of the last maintenance testing procedure.



12 Spare parts

12.1 The spare part

Describes a part that is designed to replace a corresponding one with a view to re-establishing the original function.

The replacement of these parts can only be carried out by a person who is suitably qualified and trained for this operation.

For an explanation of the levels of maintenance, please refer to § 11.1.

Programmed replacement	Denomination	Replacement every	Levels		
			1	2	3
This concerns wearing parts, designed to be replaced after a predetermined number of uses. Use: Maintenance stock, necessary for optimum maintenance procedures every 6 years.	HV fuses (by 3)	20 years	X	X	X

Non-Programmed replacement	Denomination	Levels		
		1	2	3
Describes spare parts whose replacement intervenes in the course of corrective maintenance.	Illuminated Indicators	X	X	X

Exceptional replacement	Denomination	Levels		
		1	2	3
Describes the spare parts or assemblies whose foreseeable service life is at least equal to that of the equipment. Use: Spare parts or sub-assemblies conserved in a safety stock.	Cable strapping	X	X	X
	Manometer	X	X	X
	Motor	X	X	X
	Auxiliary contacts	X	X	X
	Operating lever for the earthing switch	X	X	X
	Load break switch operating lever	X	X	X
	Emergency manual control lever for motorised mechanisms	X	X	X
	Fuse electrode compartment key	X	X	X
	Mechanical control	X	X	X

12.2 Identification of materials

For all orders for spare parts, it is necessary to enclose the equipment characteristics form.

12.3 Storage conditions

The components should be stored away from dust, humidity or the sun. In order to facilitate the search, they must be marked by the AREVA reference number. Certain components are fragile, they should preferably be stored in their original packaging.

13 Cable testing

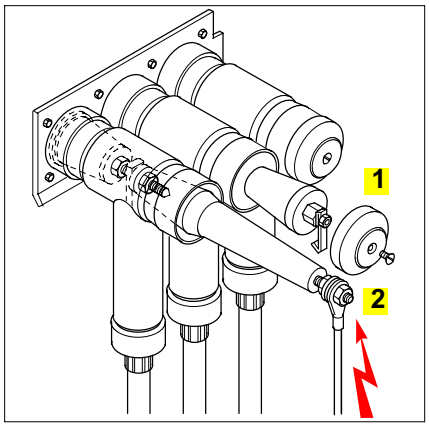
13.1 Preparation of the function

Implement lockout rules in accordance with the regulations specific to each network.

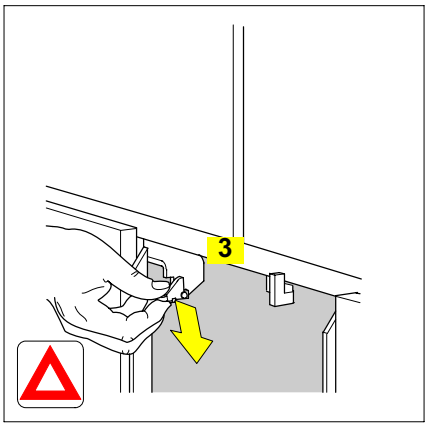
De-energise the loadbreak switch and close the earthing switch (See corresponding chapter).

Remove the cable compartment access panel.

13.2 Cable testing with plug-in 'T' piece connectors (busbar energised)



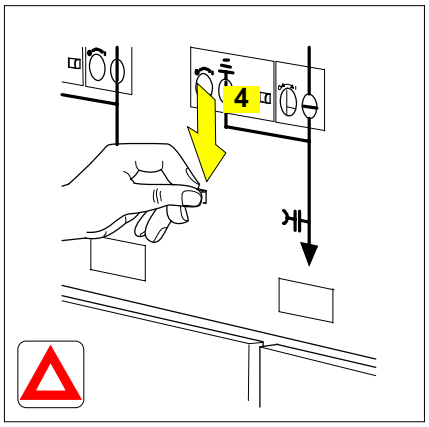
- **1**. Remove the end panel cover.
- **2**. Fit the test adapter.



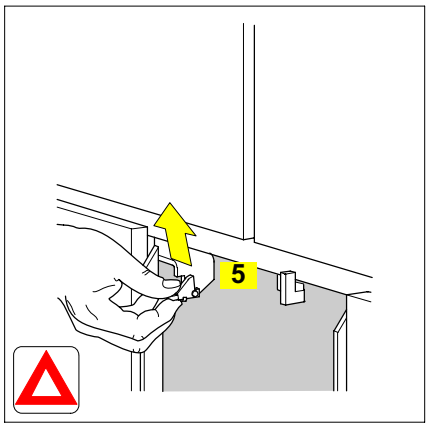
Simulate the presence of the door.

- **3**. Push the lock downwards: The earthing switch is now unlocked.

In this position, the switch can be moved, unless the switchboard is fitted with an additional interlock between the cable panel and the load break switch (optional).

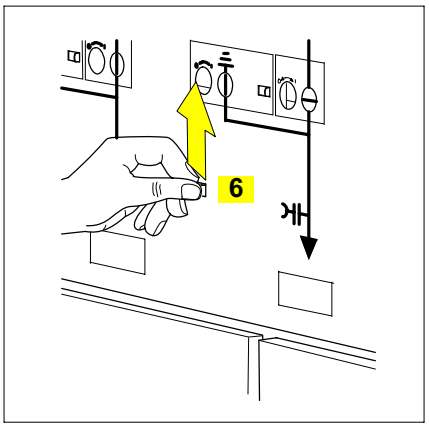


- **4**. Lower the locking tab.
- Open the earthing switch (See § 6.1).
- Procede with the tests.



- Close the earthing switch (See § 6.2).

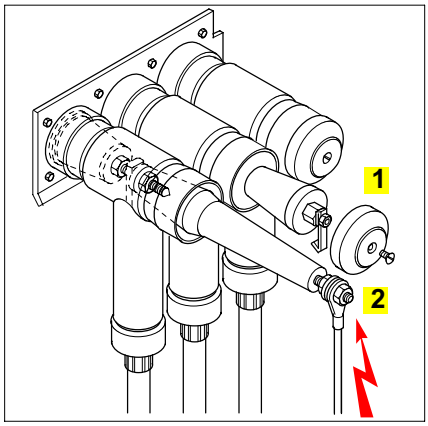
5. Pull the lock upwards.



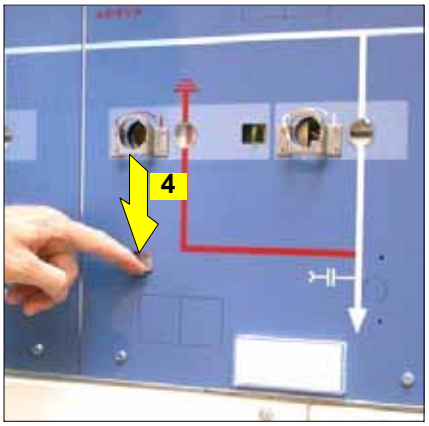
6. Raise the unlocking latch by hand.

- Remove the adapters.
- Screw the covers onto each extremity.
- Re-fit the cable compartment panel.

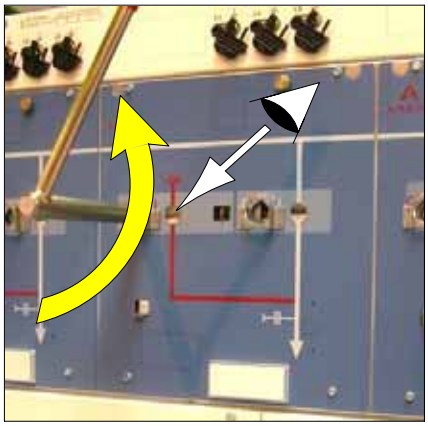
13.3 Cable tests: EON specification with plug-in 'T' piece connectors [busbar energised]



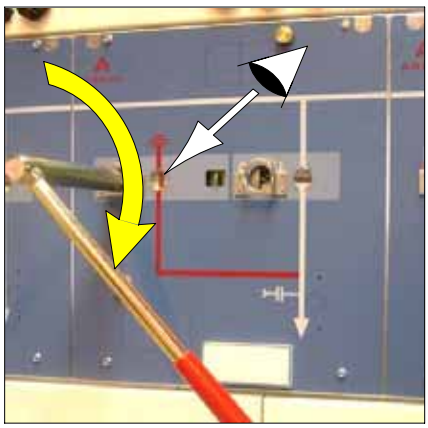
- **1**. Remove the end panel cover.
- **2**. Fit the test adapter.



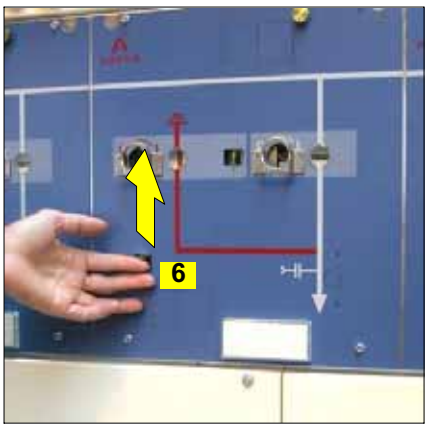
- **3**. Lower the unlocking latch by hand.



- Open the earthing switch.
- Procede with the tests.



- Close the earthing switch.



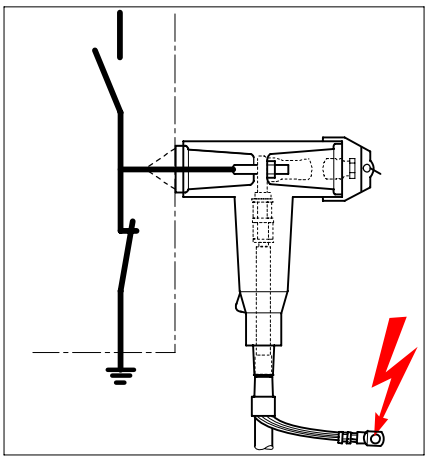
- **6.** Raise the unlocking latch by hand.

- Remove the adapters.
- Screw the covers onto each extremity.
- Re-fit the cable compartment panel.

13.4 Testing the casing of plug-in connectors

Consult the supplier of the plug-in connectors for all information and figures relating to such a test.

- To carry out this test:
  . Shut down the function.
  . Close the earthing switch.
  . Disconnect the earthing braid.
- Current injection is via the braid.
- After the test, re-connect the earthing braid to the general earthing circuit.



14 Characteristics and Volumes of SF6 gas

14.1 General characteristics

Type of Insulating Gas:
Sulphur Hexafluoride (SF6) – iaw IEC 60376.

Each switchboard comprises a tank, filled with SF6 gas, designed as a pressurised, sealed-unit system in accordance with the requirements of IEC 60694.

During the expected operating life and under normal operating conditions the gas should not need topping up.

Never pierce the pressurised tank!

Never attempt to open the tank.

14.2 Filling pressure

- At 20°C the filling pressure is 0.030 MPa
  (0.13 MPa absolute).

- A pressure gauge (on option) enables the SF6 gas pressure to be ensured, depending on the temperature (5 curves).

- The 2 black lines (on the left), correspond to an internal pressure equal to the atmospheric pressure (0.1 MPa absolute).

- Specific manometer (optional) for altitudes higher than 1000m.

14.3 Operating thresholds of the pressure gauge contacts

Thresholds	Temperature	Pressure
High	20°C	250 ± 30mbar
Low	20°C	140 + 50mbar

14.4 FBX functions

The loadbreak switches can only be manoeuvred whilst the needle is in the green sector (to the right) corresponding to ambient temperatures.

In case of an anomaly observed (needle in the red, for example), please contact your nearest AREVA representative.

15 At the end of the equipment's operational life

15.1 Valorization of the equipment

Our Functional Units are composed of recyclable elements.

The tables (§ 15.4) give information and figures for the types of materials, their quality and their methods of valorization.

They enable the following:
- Calculation to be made of the capacities for valorization,
- Optimising the valorization process,
- Evaluating the cost of valorization.

The indications given in tables (§ 15.4) facilitate co-operation between users and AREVA to valorize the product at the end of the product's service life.

FBX-C (IS) C-C-T1 (24 kV - 400 A)

15.2 Safety instructions

1 Do not dismantle the mechanical control mechanism springs without the releasing device.

2 Never attempt to open the sealed-tank of a Functional Unit.

3 Don't try to recuperate the SF6, without specific tools and out of a local dedicated to that operation.

15.3 Dismantling of the equipment service

Consult AREVA for all decommissioning services.

Recovery the SF6, and opening the tank can be realized only in a specific room, equiped for this type of service.

15.4 Distribution and valorization of the materials used for FBX (See § 15.1)

Total weight: FBX-C (IS) C-C-T1 + 3 fuses = **310.416 kg**.

Metals – incl. inserts	Weight (kg)	% of Materials	Valorization
Steel	155.810		**Yes**
Stainless steel	83.854		
Copper and copper-based alloys	26.5		**Yes**
Aluminium and aluminium alloys	9.8		
Silver	0.051		
Total	**276.015**	88.92	

Thermosetting parts	Weight (kg)	% of Materials	Valorization
Epoxy Resin*	12.141		**Cannot be valorized** (sent to Technical Burial Centres)
Total	**12.141**	3.91	

* mainly silica

Thermo-plastics	Weight (kg)	% of Materials	Valorization
Polyesters	7.330		**Yes**
Aromatic polyamides	2.964		
Polyamides	1.198		
Others	0.152		
Total	**11.645**	3.75	

Elastomers	Weight (kg)	% of Materials	Valorization
EPDM	**0.095**	0.03	**Cannot be valorized**

Gas	Weight (kg)	% of Materials	Valorization
SF6	**2.450**	0.79	**Yes** (regeneration)

Others	Weight (kg)	% of Materials	Valorization
Silica	3.000		**Yes**
Porcelain	2.993		
Cordierite	1.097		
Sodium Aluminosilicate	0.500		
Phenolic paper	0.430		
Grease	0.050		
Total	**8.070**	2.60	

16 Notes

If you have any comments on the use of this document or on the use of the equipment and services that are described in it, please send us your remarks, suggestions and wishes to:

AREVA Service Technique BP 84019 F-71040 Mâcon Cedex 9 - FRANCE

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