Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level II

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
15 December 2004	Date	**First edition** *(See last page for details on modifications)*

⚠ DANGER

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Device

Action

Visual check on the general condition of the circuit breaker (front plate, control unit, case, chassis, connections) and communication functions

Goal

Check that there are no visible signs of ageing or damage, due to operation or following long storage.

Frequency

Annual

Special indications

None

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			**Connected**	**Test**	**Disconnected**	**Removed**

Necessary tools

Procedure	Procedure	Action
	Front plate ■ Check the presence of: - fixing screws (5 for NW and 4 for NT), - identification labels, name plate, - the date of last maintenance. The front plate must not be cracked, split open or deformed.	If there is damage, replace the front plate. To replace the name plate, contact Schneider after-sales support.
	Control unit **Protection cover** ■ Visually check that the cover is in place to protect the setting dials of the Micrologic control unit. Micrologic A: transparent cover Micrologic P/H: non-transparent cover *Note. The cover must be opened to modify a setting or access the test connector.* When the cover is closed, it is not possible to modify the current protection settings. At the end of each test using the test connector: ■ remove the cable from the test connector, ■ close the cover, ■ make sure it is completely closed, ■ if necessary, install a lead seal.	 *Micrologic trip unit.* If there is not cover, remount or replace it. See the catalogue for replacement parts.
	Screen legibility ■ Visually check the display of data and settings on the Micrologic A, P and H control units. *Note. The loss of display does not affect the protection functions. Settings and data can be viewed via the test connector and the Micrologic RSU and RDU/RCU utilities.*	If the display is not legible, contact after-sales support.

	Case ■ Check: - for dust, - for cracks and changes in colour, - for traces of black smoke around the arc chutes and on the sides (remove the fixing brackets if necessary).	If there is dust: ■ clean as indicated in the maintenance guide. If there are cracks: ■ contact after-sales support. If there are traces of black smoke (indicating tripping for a short-circuit): ■ check the main contacts as indicated in user manual 04443720AA-A. If there is damage to the contacts, replace the breaking unit and contact after-sales support.
	Traces of black smoke due to breaking.  	
	Connection ■ Visually check: - for a change in colour of the terminals, indicating abnormal temperature rise, - the condition of cable insulation (cracks, shrinking, etc.).	If the cables show signs of colour change or damage to insulation: ■ apply the procedure for power connections (NIII_2_1).

	Prolonged storage of devices in corrosive environments (sulphur dioxide SO_2 - hydrogen sulphide H_2S) Example. Steel works, paper mills, synthetic fibres, refineries, sulphur chemical plants, etc. *Note.* ***Sulphuration (oxidation) of silver, due to the excessive temperature rise that it causes, can result in destruction of contacts.*** *Solid-silver and silver-plated contacts, when in contact with SO_2 (sulphur dioxide) and H_2S (hydrogen sulphide), blacken with the presence of a sulphide which increases contact resistance and temperature rise. Silver sulphide is not a passivation layer:* - *its surface resistivity varies between 10^5 and 10^{10} Ωm,* - *its hardness is approximately half that of silver, i.e. 150 N/mm².* **Fixed device** Check that terminals are not blackened. **Drawout device** Check that terminals, disconnecting contacts and clusters are not blackened.	If surfaces are blackened, clean them before remounting. For the disconnecting contacts and clusters, proceed with a complete cleaning using the chassis procedure on replacing the grease for disconnecting contacts.

Comments on maintenance	

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***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Mechanism

Action

Open/close device manually and electrically

Goal

Check operation of:

- charging mechanism using the handle,
- device opening and closing mechanism using the pushbuttons and the control auxiliaries,

and the indications of the position indicators.

Note. If there is an operation counter, check that it increments.

Frequency

Annual

Special indications

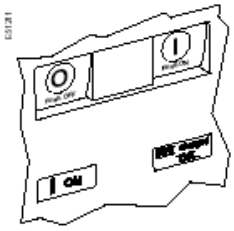
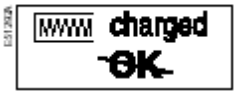
Supply the MX/XF/MN control auxiliaries.

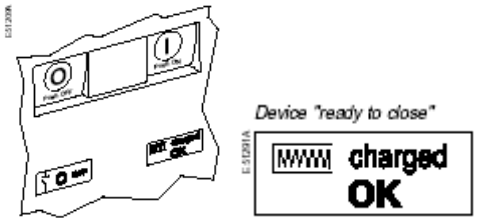
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**	Closed	**Open**		Closed	
Mechanism	Charged	**Discharged**	Charged		**Discharged**	
Device position in chassis			Connected	Test	Disconnected	Removed

Necessary tools

Procedure	Procedure	Action
	Manual opening / closing *Note. On fixed devices equipped with the motor mechanism, disconnect the auxiliary circuit for the MCH gear motor (terminals BA-B2).* ■ Manually charge the mechanism spring using the handle. Pump the handle seven times for NW and NT. After seven times, the handle no longer resists. ■ Press the ON button to close the device.	
	■ Check that the indicators show ON and Discharged. Circuit breaker closed and discharged 	
	■ Charge the circuit breaker again. ■ Check that the indicators show ON and Charged not OK. Circuit breaker closed, charged and not "ready to close"  *Device not "ready to close"* 	

	■ Press the OFF button to open the device again. ■ Check that the indicators show OFF and Charged OK. Circuit breaker open, charged and "ready to close"  	If one of these operations is not OK, check the troubleshooting list in the user manual. If the problem persists, contact after-sales support.
	Electrical opening / closing **With the XF control auxiliary** ■ Charge the mechanism spring using the handle. ■ Issue a closing order, the circuit breaker should close. ■ Check that the indicators show the correct values. **With the MF control auxiliary** ■ Issue an opening order. The circuit breaker opens. Check that the indicators show the correct values. **With the MN control auxiliary** ■ Supply the MN. ■ Close the circuit breaker. ■ Cut supply to the MN. The circuit breaker should open.	For each operation: If execution is not OK: ■ check the connections of the control auxiliary, If the connections are OK: ■ Check operation of control auxiliary as per the corresponding level III procedure.

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Reference documents	Masterpact NT/NW user manual.

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Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly — Mechanism

Action — Electrically charge the circuit breaker

Goal — Check operation of the gear motor.

Frequency — Annual

Special indications — Supply the MCH motor.

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism	**Charged**		**Charged**			
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

Procedure	Procedure	Action
	Manual opening / closing ■ Put the device in the open position. ■ Close the circuit breaker by pressing the ON button. **The device closes and the spring mechanism is automatically charged.** *Note. The charging time is approximately five seconds at Un.* ■ Press the OFF pushbutton.	 If the device does not close, check the troubleshooting list in the user manual. If the problem persists, contact after-sales support. If the charging time is significantly more than five seconds, run the test three more times. If the charging time does not improve, contact after-sales support. Change the gear motor and measure again.

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Subassembly

Mechanism

Action

Check complete closing of device (locking of three poles)

Goal

After device closing, check complete mechanical locking of the poles (risk of thermal runaway).

Frequency

Annual

Special indications

This test must be carried out manually.

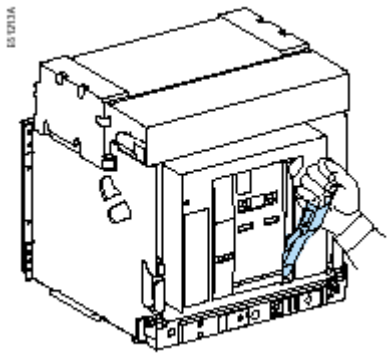
For fixed devices, disconnect the MCH (terminals B1-B2).

Pre-test conditions

The device must comply with the specification specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**			**Discharged**	
Device position in chassis			Connected	Test	**Disconnected**	**Removed**

Necessary tools

Procedure	Procedure	Action
	■ Manually charge the mechanism spring using the handle. ■ Close the circuit breaker by pressing the ON button. The circuit breaker closes. ■ Charge the mechanism. The poles should remain closed (the indicator shows ON).	If the circuit breaker opens, the poles are not in the locked position. Risk of major malfunction. Contact after-sales support.
		

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***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Mechanism

Action

Check number of device operating cycles

Goal

Determine whether the maximum recommended number of operating cycles has been reached and replace subassemblies if necessary.

Frequency

Annual

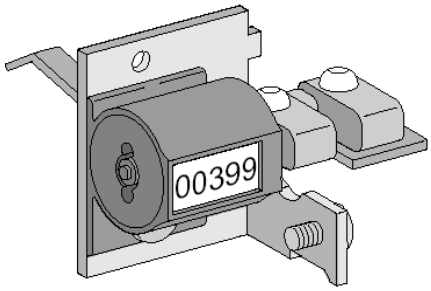
Special indications

Supply the Micrologic P or H control unit and the communication module (BCM) with 24 V to read the electronic operation counter.

Pre-test conditions

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**			**Discharged**	
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

Procedure	Procedure	Action
	With a mechanical operation counter  ■ Read the value. ■ Compare it to the maximum values indicated in the maintenance guide.	If the limit has been reached, change the breaking unit. Contact after-sales support.
	With an electronic operation counter Note. An electronic counter is available only with the communication module and a Micrologic E/P/H. The Micrologic must be supplied. ■ In the Service menu, select Event history and Operation counter. ■ Read the value. ■ Compare it to the maximum values indicated in the maintenance guide.	If the limit has been reached, change the breaking unit. Contact after-sales support.
	If there is no counter ■ Estimate the number of device operating cycles according to customer work habits.	

Comments on maintenance	

Reference documents	Operating limits, see the maintenance guide or the user manual. User manual for Micrologic P - 04443725, for Micrologic H - 04443727 AA-E. User manual for Micrologic P - 04443726 AA, for Micrologic H - 04443728AA-C.

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Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

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Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Mechanism

Action

Check gear-motor (MCH) charging time at 0.85 Un

Goal

Check operation of the gear motor.

For a drawout device, check the electrical continuity of the wiring.

Frequency

Every 2 years

Special indications

Resupply the MCH motor.

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

Adjustable external power supply, voltmeter and stop-watch.

Procedure	Procedure	Action
	■ Disconnect supply wires B1 and B2 (and B3 if connected) so that the gear motor is not supplied. ■ Supply terminals B1 and B2 with the adjustable, external power supply. ■ Set the voltage to 0.85 Un (minimum Un if the setting is for a range of voltages).Issue a closing order for the circuit breaker. When the device is closed, the gear motor immediately recharges the mechanism. ■ Measure the gear-motor charging time. *Note. Charging time = time between closing order and springs fully charged ➔ change in charge indicator.* ■ Open the circuit breaker. ■ Close the device again and simultaneously issue an opening order. ■ Measure again the gear-motor charging time (as above). ■ Reconnect the supply wires to terminals B1, B2 and B3 (if present) as they were prior to the test. ■ Run the measurement again using the normal supply.	The charging time during closing and closing/opening operations must not exceed **six seconds**. If the charging time is greater than **six seconds**: ■ during the charging time, check the supply voltage, ■ run the test again with an external source (terminals B1-B2), ■ if the time is still too long, before replacing the MCH, manually check using the handle that the required force is not too high, ■ if the required force is normal, replace the MCH. Otherwise, contact after-sales service to replace the breaking unit.

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Subassembly

Mechanism

Action

Check the general condition of the mechanism
(position of control auxiliaries, position indicators, position and condition of springs)

Goal

Check the general condition of the mechanism (cleanness).

Check circuit-breaker operation, accuracy of position indicators.

Frequency

Every 2 years

Special indications

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	Test	Disconnected	**Removed**

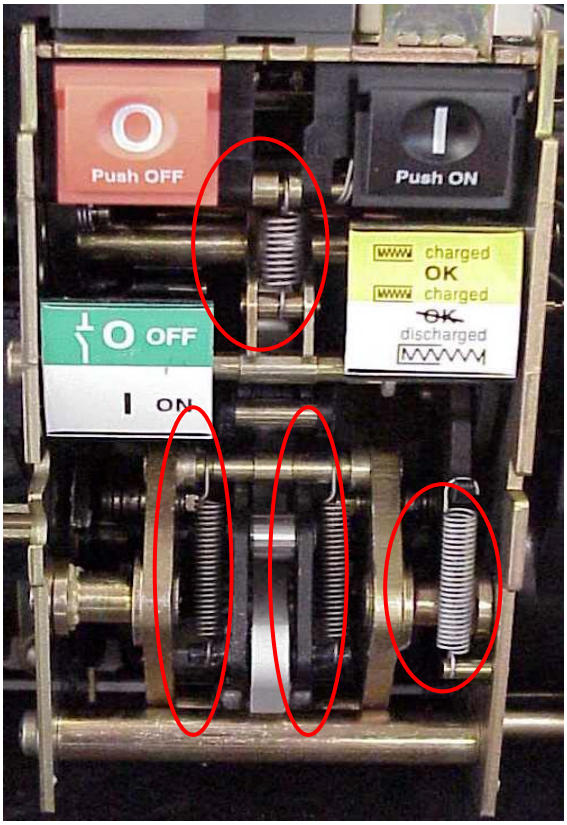
Necessary tools

Screwdriver.

Procedure

Procedure	Action
Remove front plate ■ **Masterpact NT** Using a thin screwdriver, release the tab holding the front plate on the left-hand side (do not break or bend it) and then free the right-hand side. ■ **Masterpact NW** Unscrew the screw holding the front plate on the right-hand side and pull the front plate.	
Check ■ Check the general condition of the mechanism: grease, lack of dust, etc. ■ Check that the MX/XF/MN control auxiliaries are correctly positioned. ■ Check the presence and the condition of the springs. ■ Check the number of operating cycles and compare it to the maximum for the connecting-rod springs.	If there is dust on the mechanism, contact after-sales service. If necessary, replace the control auxiliaries. If springs are damaged or lost, contact after-sales service. If the maximum has been reached, contact after-sales support.
Masterpact NT  	

Masterpact NW



Operation ■ Open and close the device as per procedure Mechanism NII_1_1. ■ Check the position indicators and the condition of the springs.	If there is a problem, contact after-sales support.

Comments on maintenance

Reference documents

Masterpact user manual.

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Subassembly

Breaking unit (arc chutes + contacts)

Action

Check cleanness and attachment of arc chutes

Goal

Avoid blocking of arc-chute filters which would increase internal pressure during a short circuit.

Check tightness of connections.

Frequency

Annual

Special indications

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**			**Discharged**	
Device position in chassis			**Connected**	**Test**	**Disconnected**	**Removed**

Necessary tools

Torque wrench

Procedure	Procedure	Action
	Clean the filters Vacuum dust rather than blow it using compressed air. **Note**. *To avoid dirtying the filters, do not use a cloth, particularly if there is dust and grease.*	If the filters are very dirty, replace the arc chutes. See the catalogue for replacement parts.
	Check tightness of connections **Masterpact NT:** tightening torque: 1.5 Nm **Masterpact NW:** tightening torque: 7 Nm	If screws are lost or damaged, contact after-sales support.

Comments on maintenance	

Reference documents	See the Masterpact user manual.

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Test equipment:
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Return to operation:
Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).

Subassembly

Control and indication auxiliaries

Action

Check auxiliary wiring and insulation

Goal

Maintain electrical continuity of auxiliary circuits and quality of connections

Frequency

Annual

Special indications

Cut power to the auxiliaries to work under risk-free conditions.

If there is a voltage measurement input, check the terminal block (UC4) to ensure that the system is de-energised.

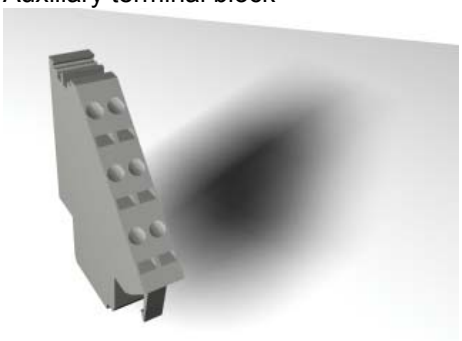
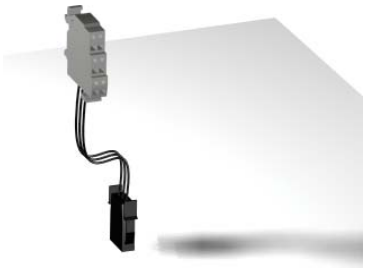
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	Test	Disconnected	**Removed**

Necessary tools

Flat screwdriver, 3 mm

Procedure	Procedure	Action
	Customer auxiliary wiring ■ Check: - secure connection of conductors in the terminals - insulation of wires. ■ Visually check the terminal blocks for warping or brown spots indicating temperature rise.	If wire insulation is cracked or damaged, replace the wires. If there are brown spots, replace the connector, see the catalogue for replacement parts.
	Auxiliary terminal block 	
	Chassis terminal block and connector for drawout circuit breakers ■ Remove the two screws on the cover. If necessary, remove the auxiliary terminal shield. ■ Check: - secure connection of conductors in the terminals, - insulation of wires. ■ Put the auxiliary terminal shield back in place.	If there is damage: ■ replace the connector, see the catalogue for replacement parts.
	Chassis terminal block and connector 	

Comments on maintenance	

Reference documents	Masterpact NT/NW catalogue: Fr ART 56505, En ART 56504

Document modifications	Index	Date	Author	Modification
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
15 December 2004	Date	**First edition** *(See last page for details on modifications)*

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control and indication auxiliaries

Action

Check operation of indication contacts (OF, PF, MCH)

Goal

Maintain electrical continuity of the installed contacts

Frequency

Every 2 years

Special indications

This test requires an external power source. For voltages greater than 50 V DC, all suitable measures to avoid electrocution must be taken.

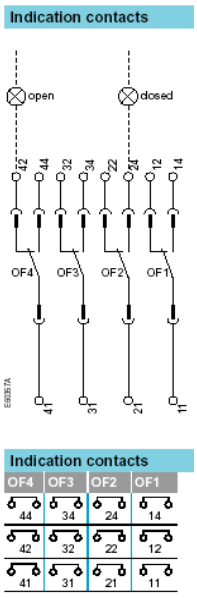
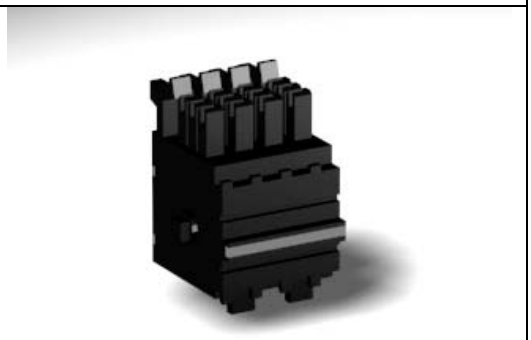
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

Ohmmeter
HHTK or FFTK

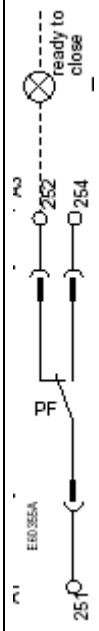
Procedure	Procedure	Action
	OF contact Circuit-breaker poles must be open. ■ Check continuity between terminals: (41 - 42) (31 - 32) (21 - 22) (11 - 12) Circuit-breaker poles must be closed. ■ Check continuity between terminals: (41 - 44) (31 - 34) (21 - 24) (11 - 14) Note. If the circuit breaker has 8 or 12 auxiliary contact blocks, check the corresponding contacts as well.	If the contacts do not operate: **Fixed device**: replace the OF contact block. **Drawout device**: run the test again in the disconnected position. If the fault stops, change the chassis wiring. If the fault persists, replace the OF contact block. See the catalogue for replacement parts.
	 	

<table>
<tr>
<td></td>
<td>PF contact (ready to close)
Operating conditions for PF contact:
■ circuit-breaker poles must be open and mechanism charged,
■ MN release, if it exists, must be supplied at rated voltage or mechanically disconnected from mechanism,
■ check that the circuit breaker is not in tripped position (reset button pressed).

When above conditions are met:
■ check continuity between terminals: (251 – 252)
■ if one of the operating conditions is not met, check that circuit continuity between terminals (251 – 252) is broken and that continuity between terminals (251 – 254) is established.</td>
<td>In the event of a malfunction:
Fixed device: replace the PF contact.

Drawout device: run the test again in the disconnected position. If the fault is cleared, change the chassis wiring.
If the fault persists, replace the PF contact.

See the catalogue for replacement parts.</td>
</tr>
<tr>
<td></td>
<td>PF
 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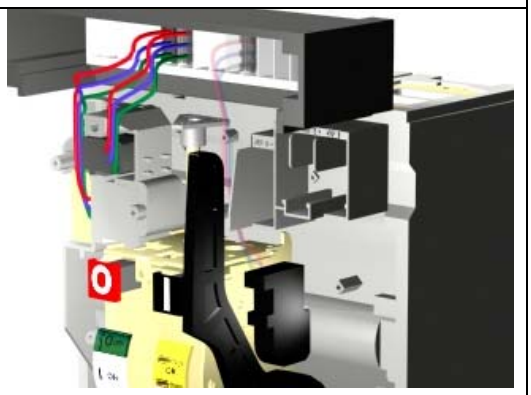
<td> 
</td>
</tr>
</table>

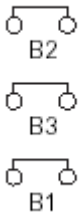
<table>
<tr>
<td></td>
<td>MCH contact

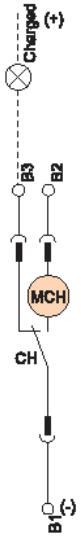
Circuit-breaker poles must be open and the mechanism discharged.

■ Check non-continuity between terminals (B1 - B3).
■ Manually charge the mechanism.
■ Check continuity between terminals (B1 - B2).
■ Supply terminals B1 and B2 with the rated voltage for the MCH motor.
■ Check that the motor is not excited.
■ Close the circuit breaker.
■ Check that the motor is excited and charge the spring mechanism.

The motor automatically cuts out at the end of recharging.

Note. As a safety measure at the end of the test, put the circuit breaker in disconnected position and discharge the mechanism by closing the poles.</td>
<td>If there is a problem:
■ replace the MCH motor.
See the catalogue for replacement parts.

If the problem persists, contact after-sales support.</td>
</tr>
<tr>
<td></td>
<td colspan="2">MCH
 


</td>
<td>MCH NT and NW
 

Electric motor (MCH) for Masterpact NT.
 

Electric motor (MCH) for Masterpact NW.</td>
</tr>
</table>

Comments on maintenance	

Reference documents	Catalogue: Fr: ART 56505, En: ART 56504

Document modifications	**Index**	**Date**	**Author**	**Modification**
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
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Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control and indication auxiliaries

Action

Check operation of control auxiliary XF at 0.85 Un

Goal

Check that XF closes the circuit breaker at 0.85 Un.

For a drawout device, check the electrical continuity of the wiring.

Frequency

Every 2 years

Special indications

This test requires an external power supply. For voltages greater than 50 V DC, all suitable measures to avoid electrocution must be taken.

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism	**Charged**		**Charged**		**Discharged**	
Device position in chassis			**Connected**	**Test**	**Disconnected**	**Removed**

Necessary tools

Adjustable external power supply

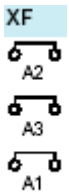
<table>
<tr><td rowspan="3">Procedure</td><td>Procedure</td><td colspan="2">Action</td></tr>
<tr><td>Note. It is advised to run a few opening and closing cycles as per the Level II "Open/close the device manually" procedure.

■ Disconnect supply wires A1 and A2 and connect the external supply.

Note. For a communicating XF, supply terminals A1 and A3 first, then connect A2.

■ Adjust the external supply to 0.85 Un.
■ Close the circuit breaker by pressing a pushbutton.

The circuit breaker should close.</td><td colspan="2">If the circuit breaker does not close:
Fixed device: replace the XF control auxiliary and plan maintenance on the mechanism.

Drawout device: run the test again in the disconnected position. If the fault is cleared, change the chassis wiring.
If the fault persists, replace the XF control auxiliary and plan maintenance on the mechanism.</td></tr>
<tr><td> 
</td><td> 
</td><td colspan="2"></td></tr>
</table>

Comments on maintenance	

Reference documents	Installation guide for XF control auxiliary

Document modifications

Index	Date	Author	Modification
A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

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ABT Services Product Manager	ABT Quality Manager	Index **A**
17 October 2004	Date	**First edition** *(See last page for details on modifications)*

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control and indication auxiliaries

Action

Check operation of control auxiliary MX at 0.7 Un

Goal

Check that MX opens the circuit breaker at 0.70 Un.

For a drawout device, check the electrical continuity of the wiring.

Frequency

Every 2 years

Special indications

This test requires an external power supply. For voltages greater than 50 V DC, all suitable measures to avoid electrocution must be taken.

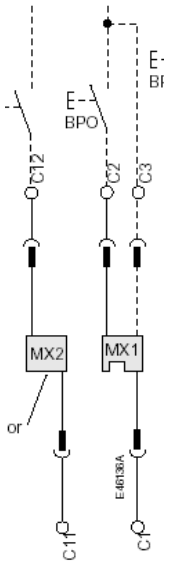
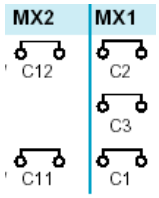
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles		**Closed**			**Closed**	
Mechanism	**Charged**	**Discharged**	**Charged**		**Discharged**	
Device position in chassis			**Connected**	**Test**	Disconnected	Removed

Necessary tools

Adjustable external power supply

Procedure	Procedure	Action
	Note. It is advised to run a few opening and closing cycles as per the Level II procedure "Open/close the device manually". ■ Disconnect supply wires C1 and C2. ■ Supply terminals C1 and C2 at 0.7 Un using the adjustable external supply. ***Note. For a communicating MX, supply terminals C1 and C3 first, then connect C2.*** The circuit breaker should open.	If the circuit breaker does not open: **Fixed device**: replace the MX control auxiliary and plan maintenance on the mechanism. **Drawout device**: run the test again in the disconnected position. - If the fault is cleared, change the chassis wiring. - If the fault persists, replace the MX control auxiliary and plan maintenance on the mechanism.
	 	

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Reference documents	Masterpact catalogue

Document modifications	Index	Date	Author	Modification
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
15 December 2004	Date	**First edition** *(See last page for details on modifications)*

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control and indication auxiliaries

Action

Check operation of control auxiliaries MN/MNR between 0.35 and 0.7 Un

Goal

Check operation of MN.

For a drawout device, check the electrical continuity of the wiring for MN.

Frequency

Every 2 years

Special indications

This test requires an external power supply. For voltages greater than 50 V DC, all suitable measures to avoid electrocution must be taken.

For MNR, take into account the time delay.

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism	**Charged**		**Charged**			
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

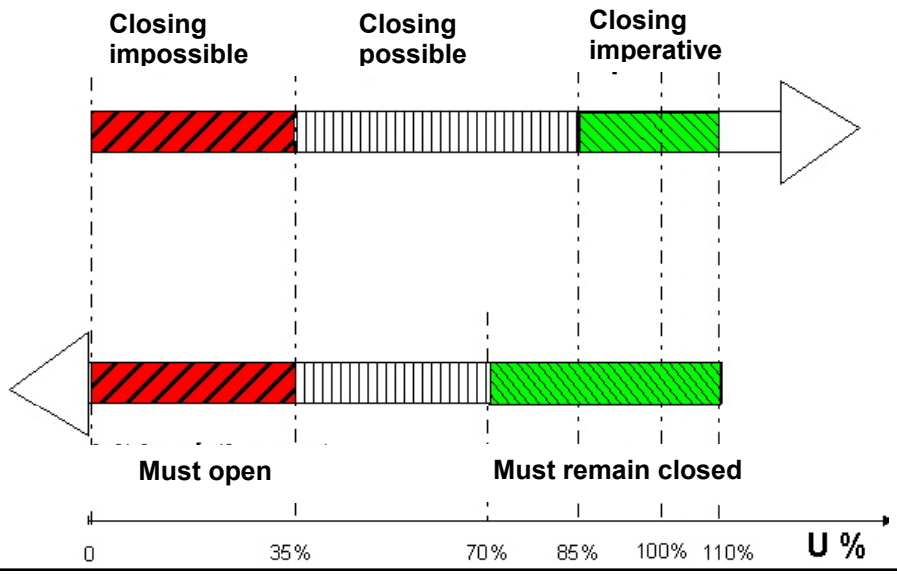
Adjustable external power supply

Procedure	Procedure	Action
	Note. It is advised to run a few opening and closing cycles as per the Level II procedure "Open/close the device manually". ■ Disconnect supply wires D1 and D2. ■ Supply terminals D1 and D2 at 0.7 Un using the adjustable external supply. ■ Close the circuit breaker. The circuit breaker should remain closed. ■ Gradually decrease the voltage, the device should open at a voltage higher than 0.35 Un. ■ Set the voltage to 0.35 Un. ■ Charge the device and issue a closing order. The circuit breaker should not close. ■ Gradually increase the voltage, check that the MN is reactivated before reaching 0.85 Un.	In the event of a malfunction: **Fixed device**: replace the MN control auxiliary and plan maintenance on the mechanism. **Drawout device**: run the test again in the disconnected position. If the fault is cleared, change the chassis wiring. If the fault persists, replace the MN control auxiliary and plan maintenance on the mechanism.
	 	

Comments on maintenance	

Reference documents	See the diagram below

Operating mode of an undervoltage release installed on a circuit breaker



Document modifications	**Index**	**Date**	**Author**	**Modification**
	A		Bretteville	First edition

Merlin Gerin
Square D
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Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

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ABT Services Product Manager	ABT Quality Manager	Index **A**
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Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control and indication auxiliaries

Action

Check delay of MNR devices at 0.35 and 0.7 Un

Goal

Check that the control auxiliary is not activated before the end of the selected time delay.

Frequency

Every 5 years

Special indications

This test requires an external power supply. For voltages greater than 50 V DC, all suitable measures to avoid electrocution must be taken.

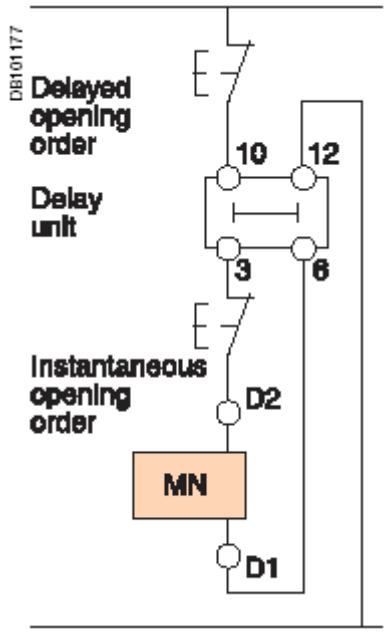
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles		**Closed**				**Closed**
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

Adjustable external power supply and stop-watch

Procedure	Procedure	Action
	■ Connect the stopwatch: Start: trip order Stop: device opening ■ Cut the supply or issue a delayed trip order. The time must be equal to the delay setting ± 15%. Note. If possible, the opening time should be measured using the main connections. If that is not possible, carry out the measurement on an OF contact.	In the event of a malfunction, replace the MNR.
		

Comments on maintenance	

Reference documents	

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	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
17 October 2004	Date	**First edition** *(See last page for details on modifications)*

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control and indication auxiliaries

Action

Measure MX tripping time

Goal

Check that the circuit breaker opens following an MX order within a time complying with catalogue characteristics.

Frequency

Every 5 years

Special indications

This test requires an external power supply. For voltages greater than 50 V DC, all suitable measures to avoid electrocution must be taken.

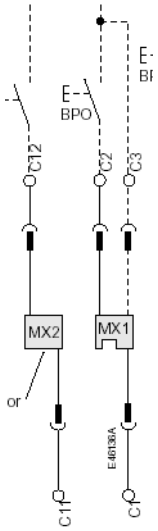
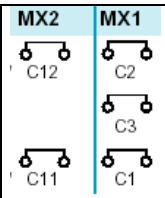
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles		**Closed**			**Closed**	
Mechanism		**Discharged**			**Discharged**	
Device position in chassis			Connected	Test	**Disconnected**	**Removed**

Necessary tools

Adjustable external power supply and stop-watch

Procedure	Procedure	Action
	Note. It is advised to run a few opening and closing cycles as per the Level II procedure "Open/close the device manually". ■ Connect the stopwatch: Start: trip order Stop: device opening ■ Disconnect supply wires C1 and C2. ■ Supply terminals C1 and C2 at Un using the adjustable external supply. *Note. For a communicating MX, supply terminals C1 and C3 first, then connect C2.* The circuit breaker should open in less than 60 ms. *Note. If possible, the opening time should be measured using the main connections. If that is not possible, carry out the measurement on an OF contact.*	If the opening time is not correct, replace the MX control auxiliary and run the test again. If the problem persists, plan maintenance on the mechanism and contact after-sales support.
		

Comments on maintenance	

Reference documents	

Document modifications	Index	Date	Author	Modification
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level II

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ABT Services Product Manager	ABT Quality Manager	Index **A**
12 December 2004	Date	**First edition** *(See last page for details on modifications)*

Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Control unit

Action

Trip the circuit breaker using the Schneider test tool and check operation of the fault-trip indication contacts (SDE1, SDE2)

Goal

Check operation of:

- the tripping mechanism (Mitop) controlled by the control unit when an electrical fault occurs,
- indication contacts SDE1 and SDE2,
- manual reset (device closing disabled following a trip due to an electrical fault).

Frequency

Annual

Special indications

If there is an MN, it must be removed or supplied at its rated voltage for the test.

Pre-test conditions

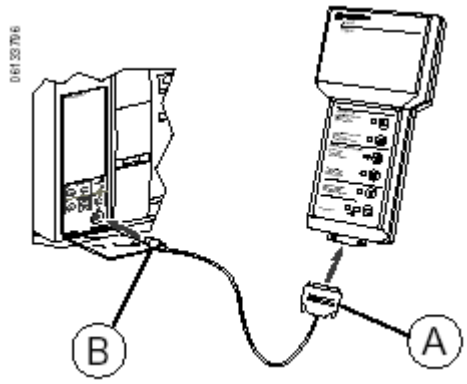
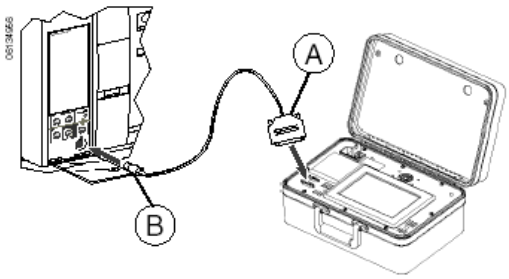
The device must comply with the conditions specified opposite.

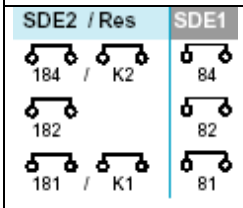
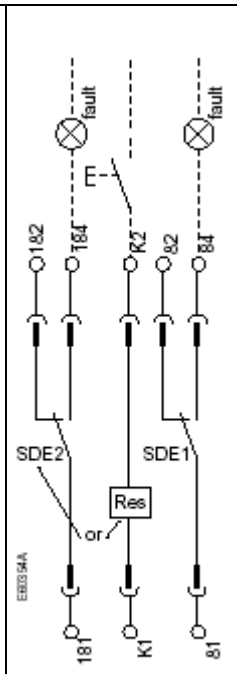
Device	**Fixed**		**Drawout**			
Position of poles		**Closed**			**Closed**	
Mechanism		**Discharged**			**Discharged**	
Device position in chassis			Connected	**Test**	**Disconnected**	Removed

Necessary tools

Test unit (HHTK, cat. no. 33594) or test equipment (FFTK, cat. no. 33595).

Spare parts - test cable (cat. no. 33590).

Procedure	Procedure	Action
	Check the Micrologic fault-indication LEDs Press the Test/Reset button on the front of Micrologic A/P/H control units. Check that the four LEDs go on.	 If the four LEDs do not go on, replace the battery (see section on replacement parts). If one of the LEDs does not go on, contact after-sales support.
	Connect the test tool (HHTK) or the test equipment (FFTK) to the Micrologic test connector.	
	HHTK (hand held test kit).  	
	FFTK (full function test kit).  	

	Trip test Trip the device as indicated in the user manual of the test tool. Check that the circuit breaker trips and the mechanical reset button on the front plate pops out. Check that one of the LEDs (Ir, Isd, Ii) is on. Reset the LED display by pressing the Test/Reset button.	If the circuit breaker does not trip, proceed as follows. Check that: - the device is closed, - Micrologic is supplied, - the manual reset button is pushed in. (See the troubleshooting list in the maintenance guide.) Start the test again. If the problem persists, contact after-sales support. If the button does not pop out, contact after-sales support.
	Check operation of SDE fault-trip indication contact **Circuit-breaker poles must be open.** Check continuity between terminals: SDE1: (81 - 84) and SDE2 if installed: (181 – 184) Reset the fault by pressing the red button on the front plate. Check continuity between terminals: SDE1: (81 - 82) SDE2 if installed: (181 – 182)	In the event of a malfunction: **Fixed device**: contact after-sales support. **Drawout device**: run the test again in the disconnected position. If the fault is cleared, change the chassis wiring. If the problem persists, contact after-sales support. See the catalogue for replacement parts.
	 	

	Issue a closing order for the circuit breaker. The circuit breaker should not close. Press the reset button to clear the fault. *Note. The results of this test are not recorded in Micrologic P / H event histories.*	If the device closes with the reset button out, it is set up for automatic recharging. To disable closing following a fault trip, contact after-sales support.

Comments on maintenance	

Reference documents	HHTK manual: 48049-184-01 FFTK manual: 48049-183-01 Auxiliary procedure

Document modifications

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Merlin Gerin
Square D
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Schneider Electric

Maintenance programme — Masterpact NT/NW — Level II

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
20 December 2004	Date	**First edition** *(See last page for details on modifications)*

Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

Circuit-breaker test*: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the* ***circuit breaker (device and chassis) and the auxiliary circuits de-energised****.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
Test equipment*: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
Return to operation: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).

Subassembly

Control unit

Action

Check earth-fault (Micrologic 6.0) or earth-leakage (Micrologic 7.0) protection function

Goal

Check operation of the protection functions against leakage currents.

Frequency

Annual

Special indications

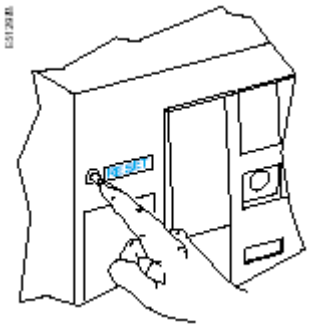
Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles		**Closed**			**Closed**	
Mechanism		**Discharged**			**Discharged**	
Device position in chassis			Connected	**Test**	Disconnected	Removed

Necessary tools

Procedure	Procedure	Action
	Note. *For the test, the Micrologic control unit must be supplied with 24 V.* *If there is an MN, it must be removed or supplied at its rated voltage for the test.* ■ Press the test button on the front of the Micrologic. Note. It is not necessary to remove the protection cover.  **The circuit breaker trips.** ■ Check that the red reset indicator on the front plate pops out following the trip. ■ Check that the corresponding LED (Ig IΔn) goes on. ■ Reset the LED display by pressing the Test/Reset button. ■ Charge the mechanism using the handle. ■ Press the ON button. **The circuit breaker should not close.**	If the circuit breaker does not trip, proceed as follows. ■ Check that: - the device is closed, - Micrologic is supplied, - the manual reset button is pushed in. ■ Start the test again. If the problem persists, contact after-sales support. If the device closes with the reset button out, it is set up for automatic recharging. To disable closing following a fault trip, contact after-sales support.

	■ Press the red reset button to clear the fault.  ■ Press the ON pushbutton. **The circuit breaker should close.**	If the device does not close, check the troubleshooting list in the maintenance guide. If the problem persists, contact after-sales support.

Comments on maintenance	

Reference documents	Micrologic A/P/H user manual.

Document modifications

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Maintenance programme — Masterpact NT/NW — Level III

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Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

Circuit-breaker test*: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the* ***circuit breaker (device and chassis) and the auxiliary circuits de-energised****.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
Test equipment*: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
Return to operation: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).

Subassembly

Control unit
Tripping curve

Action

Check:

- **tripping curves using test tool,**
- **indication LEDs (tripped, overload).**

Save the test results to a PC.

Goal

Check that the control unit operates for all types of electrical faults.

Frequency

Every 2 years

Special indications

If there is an MN, it must be removed or supplied at its rated voltage for the test.

Pre-test conditions

The device must comply with the conditions specified opposite.

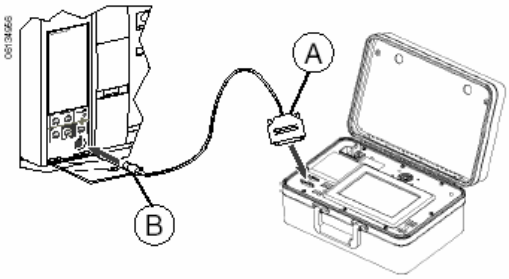
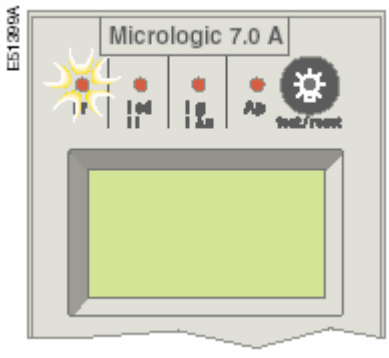
Device	**Fixed**		**Drawout**			
Position of poles		**Closed**				**Closed**
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	**Test**	Disconnected	Removed

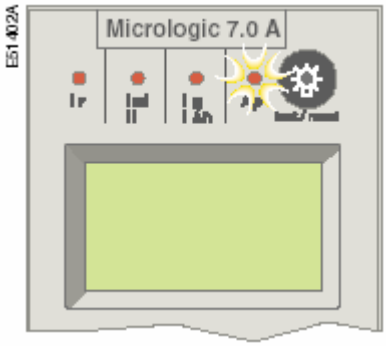
Necessary tools

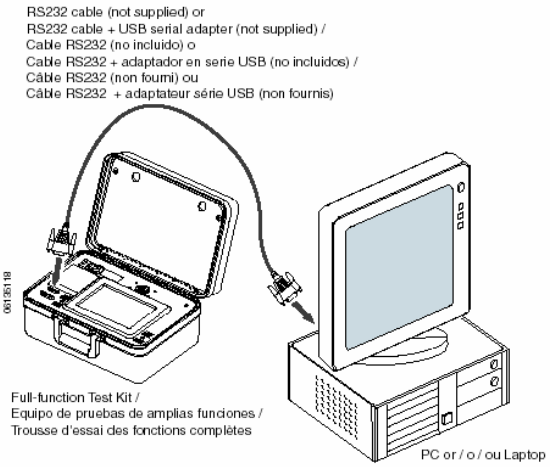
Test equipment (FFTK): cat. no. 33595.

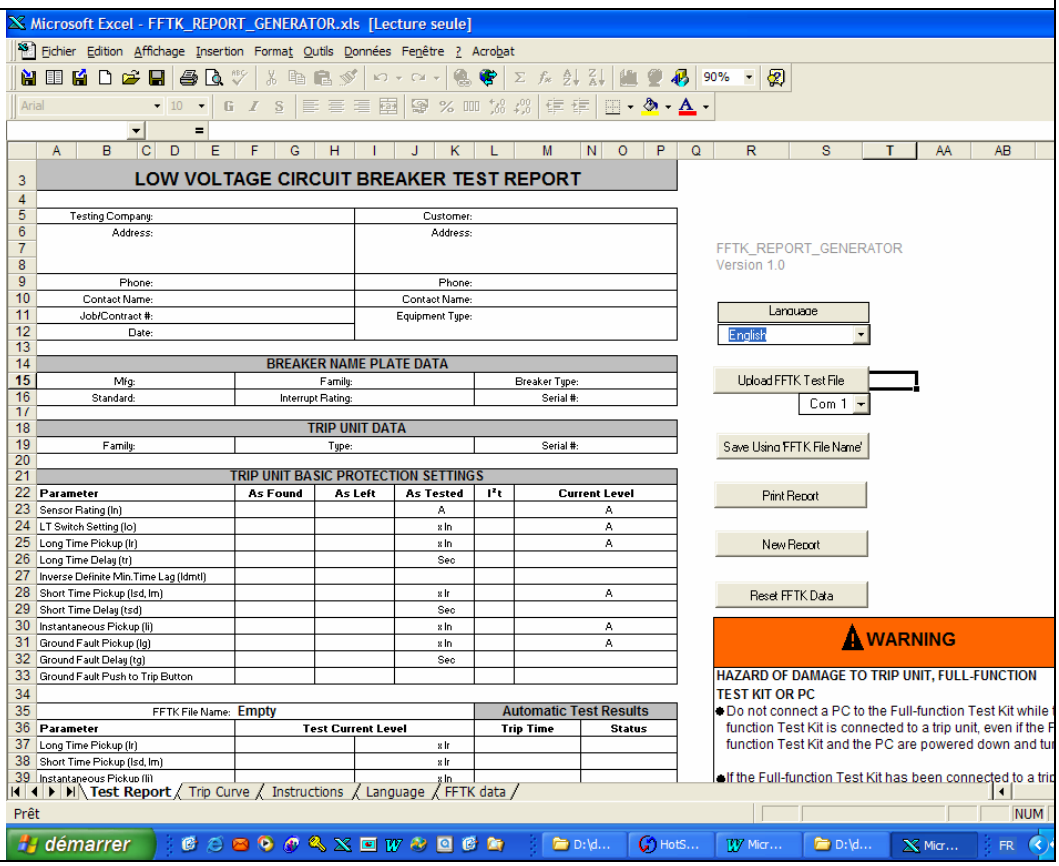
CD ROM with "FFTK report generator" program: cat. no. 34559.

Spare parts - test cable (cat. no. 33590).

Procedure	Procedure	Action
	Check the tripping curves and indication LEDs ■ Connect the test equipment to the Micrologic test connector. ■ Trip the device following the procedure indicated in the user manual of the FFTK test equipment. ■ It is preferable to run an automatic test. At the end of each test: ■ check that the corresponding LED goes on. *Note. The LEDs go on only when the device trips for a fault.* To restart the tests for the other protection functions, proceed as follows. ■ Reset the signal by pressing: - the Test/Reset button on Micrologic, - the red (reset) button on the circuit breaker. ■ Close the circuit breaker again. ■ Run the test for each type of fault: - short-circuit Isd and Ii, - earth-fault Ig (Micrologic 6), - earth-leakage fault Idn (Micrologic 7).	If the circuit breaker does not trip, contact after-sales support. If the LED does not go on: ■ press and hold the Test/Reset button to check LED operation and the battery charge, ■ replace the battery. If the problem persists, contact after-sales support.
	FFTK 	
		Checking the battery 
	Check the Ir overload LED ■ During the overload test, visually check that the yellow LED goes on while the current is injected.	If the LED does not go on and the test result is OK, contact after-sales support.

	For the record: **Check the AP LED** It is not necessary to perform this test every 2 years as it requires a specific test instrument. This test will be done during the Level IV maintenance performed every 5 years according to the procedure of the DIN/ DINF test ref ref : UC_NIV_3_3 by Schneider Electric After Sales Services *Note. The AP LED goes on when:* - *one of the advanced Micrologic protection functions is activated,* - *Micrologic encounters an internal fault,* - *the DIN/DINF protection is activated.*	If the test is carried out and If the LED does not go on: ■ press and hold the Test/Reset button to check LED operation and the battery charge, ■ Replace the battery. If the problem persists, contact after-sales support.
		
	Save the test results to a PC Use the CD ROM to install the "FFTK report generator" software on the PC in order to save FFTK tripping test results. After running the tripping tests and saving the results in the test equipment: connect the serial port on the PC to the RS232 port on the test equipment, run the program and follow the instructions as per the user manual on the CD ROM, see below, the results are saved to the PC and can be printed, go through the transfer procedure for each test result recorded on the FFTK.	For the catalogue number, see the catalogue. If there is no connection, check that the serial port on the PC is not occupied with another task (e.g. Palm Pilot).





Comments on maintenance	

Reference documents	HHTK manual: 48049-184-01 FFTK manual: 48049-183-01 FFTK report-generator manual.

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Maintenance programme — Masterpact NT/NW — Level II

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Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

Circuit-breaker test*: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the* ***circuit breaker (device and chassis) and the auxiliary circuits de-energised****.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
Test equipment*: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
Return to operation*: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly — Device locking

Action
Open and close keylocks installed on device

Goal
Check operation of key locks.

Frequency
Annual

Special indications
None

Pre-test conditions
The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	Test	Disconnected	**Removed**

Necessary tools

Procedure	Procedure	Action
	Note. It is possible to lock the circuit breaker with the poles in the open position. **Check on locking with circuit breaker open** ■ Press the OFF pushbutton. ■ Hold the OFF pushbutton down and turn the key on the front of the circuit breaker. ■ Remove the key and release the OFF pushbutton. ■ If necessary, charge the device mechanism. ■ Issue a closing order by pressing the ON pushbutton. Note. If the device is equipped with an MN, check that it is supplied with its rated voltage or neutralised. ■ Check that the circuit-breaker does not close.	If the key does not turn, replace the keylock. See the catalogue for replacement parts. If the circuit breaker closes: ■ check that the lock support is correctly installed, ■ run the test again. If the support is not OK, replace the support. If the problem persists, contact after-sales support.
	Unlock the circuit breaker The device must be locked and must not close (see above). ■ Put the key in the lock. ■ Press the OFF pushbutton and turn the key. ■ Release the OFF pushbutton. ■ Check that the key cannot be removed from the lock. ■ Issue a closing order by pressing the ON pushbutton. ■ Check that the circuit-breaker closes. ■ With the circuit breaker closed, check that the key cannot be turned unless the OFF pushbutton is pressed. **System with two keylocks** ■ Go through the procedure again with the second keylock.	If the circuit breaker does not close: ■ check that the lock support is correctly installed, ■ run the test again. If the support is not OK, replace the support. If the problem persists, contact after-sales support.

Comments on maintenance	

Reference documents	Masterpact NT user manual, doc. no. 51201115AA. Masterpact NW user manual, doc. no. 04443720AA.

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Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

Circuit-breaker test*: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the* ***circuit breaker (device and chassis) and the auxiliary circuits de-energised****.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
Test equipment*: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
Return to operation*: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly — Device locking

Action
Open and close padlocking system installed on device

Goal
Check operation of locking system.

Frequency
Annual

Special indications
None

Pre-test conditions
The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	Test	Disconnected	**Removed**

Necessary tools

Procedure	Procedure	Action
	Note. It is possible to lock the circuit breaker with the poles in the open position, using one to three padlocks. **Check on locking with circuit breaker open** Press the OFF pushbutton. Hold the OFF pushbutton down and pull out the padlocking tongue on the front of the circuit breaker. Install the padlock(s) and release the OFF pushbutton. If necessary, charge the device mechanism. Issue a closing order by pressing the ON pushbutton. Note. If the device is equipped with an MN, check that it is supplied with its rated voltage or neutralised. Check that the circuit-breaker does not close. **Unlock the circuit breaker** The device must be locked and must not close (see above). Remove the padlock(s) from the padlocking tongue. Release the tongue. Issue a closing order by pressing the ON pushbutton. Check that the circuit-breaker closes. With the circuit breaker closed, check that the padlocking tongue cannot be pulled out unless the OFF pushbutton is pressed.	If the padlocking tongue cannot be pulled out: - check that the support is correctly installed (remove the front plate), - replace it if necessary, - see the catalogue for replacement parts. If the circuit breaker closes: - check that the support is correctly installed (remove the front plate), - if the support is not OK, replace the support. If the problem persists, contact after-sales support. If the circuit breaker does not close: - check that the padlocking tongue is fully pushed in. If it is, check that the support is correctly installed and start again. If the support is not OK, replace the support. If the problem persists, contact after-sales support.

Comments on maintenance	

Reference documents	Masterpact NT user manual, doc. no. 51201115AA. Masterpact NW user manual, doc. no. 04443720AA.

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Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

Circuit-breaker test*: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the* ***circuit breaker (device and chassis) and the auxiliary circuits de-energised****.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
Test equipment*: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
Return to operation*: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly — Chassis locking

Action	**Open and close keylocks installed on chassis**						
Goal	Check operation of locking system.						
Frequency	Annual						
Special indications	None						
Pre-test conditions ***The device must comply with the conditions specified opposite.***	**Device**	**Fixed**		**Drawout**			
	Position of poles	**Open**		**Open**			
	Mechanism		**Discharged**			**Discharged**	
	Device position in chassis			Connected	Test	Disconnected	**Removed**
Necessary tools							

Procedure	Procedure	Action
	Note. The circuit-breaker chassis is equipped with one or two keylocks for locking in the disconnected position. **Check on locking with device in disconnected position** The crank must not be inserted in the racking mechanism. Turn the key in the keylock and remove it. ■ Check that the crank cannot be inserted in the racking mechanism.	If the crank can be inserted: ■ check that the keylock(s) is correctly installed (remove the lower bar), ■ put the bar back in place and start the procedure again. If the problem persists, contact after-sales support.
	Unlock the circuit breaker The device must be locked (see above). ■ Put the key in the lock and turn. ■ Check that the key cannot be removed from the lock. ■ Check that the crank can be inserted in the racking mechanism.	If the crank cannot be inserted: ■ check that the keylock(s) is correctly installed (remove the lower bar), ■ put the bar back in place and start the procedure again. If the problem persists, contact after-sales support.
	Note 1. If the chassis is equipped with two keylocks, one key is sufficient to lock in the disconnected position, but both keys are required to unlock. *Note 2. On customer request, it is also possible to lock the chassis in either the test or the connected position.*	

Comments on maintenance	

Reference documents	
	Masterpact NT user manual, doc. no. 51201115AA. Masterpact NW user manual, doc. no. 04443720AA.

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Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Chassis locking

Action

Open and close padlocking systems installed on device (chassis and shutter systems)

Goal

Check operation of the locking system:

- in the disconnected position,
- in the disconnected, test and connected positions.

Check that an NW device cannot be manoeuvred if the safety shutters are padlocked from the front.

Frequency

Annual

Special indications

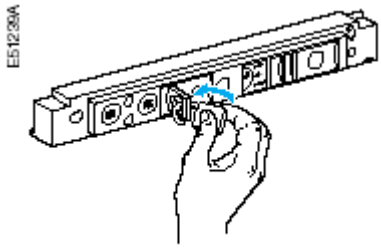
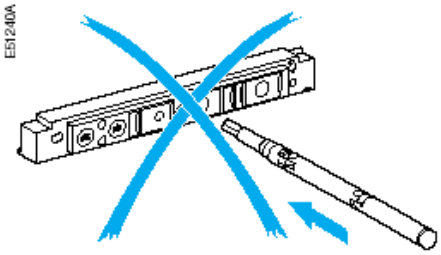
None

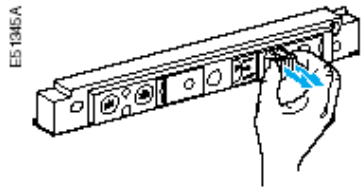
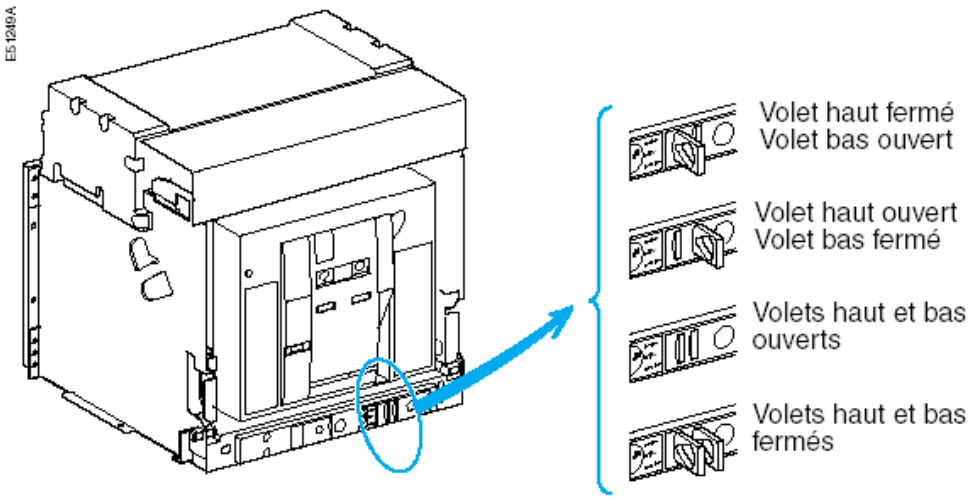
Pre-test conditions

Device	**Fixed**		**Drawout**			
Position of poles	**Open**		**Open**			
Mechanism		**Discharged**				**Discharged**
Device position in chassis			Connected	Test	Disconnected	**Removed**

Necessary tools

Procedure

Procedure	Action
Note. The chassis control panel is equipped: - (standard equipment) with a padlocking staple to lock the device in the disconnected position or in any of the three disconnected, test and connected positions, depending on the choice made by the customer, - (optional equipment) with padlocking staples to lock the safety shutters. The two shutters can be locked together or independently. Locking is possible with or without the device in the disconnected or test positions.	
Locking in the disconnected position or with device removed **Check on locking** ■ The crank must not be inserted in the racking mechanism. Pull out the staple(s) and install the padlock. ■ Check that the crank cannot be inserted in the racking mechanism. See the possible combinations in the table below.	If there is a problem, contact after-sales support.
	
Unlock the circuit breaker The device must be locked (see above). ■ Remove the padlock from the padlocking staple. ■ Check that the crank can be inserted in the racking mechanism.	If there is a problem, contact after-sales support.

	Locking in the connected, test and disconnected or removed position For each position: ■ check that the crank cannot be inserted when the padlocking staple is pulled out. ■ Check the possible combinations in the table below. **Unlock the circuit breaker** The device must be locked (see above). ■ Remove the padlock from the padlocking staple. ■ Check that the crank can be inserted in the racking mechanism.	If there is a problem, contact after-sales support.
	Locking of the safety shutters The crank must not be inserted in the racking mechanism, ■ pull out the padlocking staple(s) and install the padlock, ■ check that the crank cannot be inserted in the racking mechanism.	If there is a problem, contact after-sales support.
		
		

	Locking in connected position	Device position	Staple position	Crank insertion
		Connected	In	Possible
			Cannot be pulled out	
		Test	In	Possible
			Cannot be pulled out	
		Disconnected or removed	In	Possible
			Out	Not possible
	Locking in all positions	**Device position**	**Staple position**	**Crank insertion**
		Connected	In	Possible
			Out	Not possible
		Test	In	Possible
			Out	Not possible
		Disconnected or removed	In	Possible
			Out	Not possible

Comments on maintenance	

Reference documents	Masterpact NT/NW user manual.

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Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Chassis

Action

Remove device from chassis and put it back

Goal

Check operation of:

- device extraction mechanisms,
- device and chassis pre-tripping,
- chassis position indicator.

Frequency

Annual

Special indications

None

Pre-test conditions

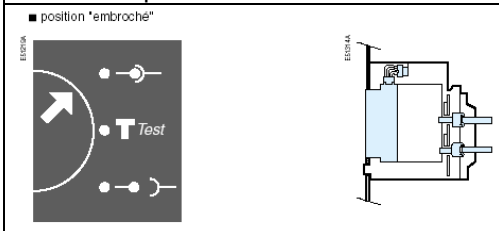
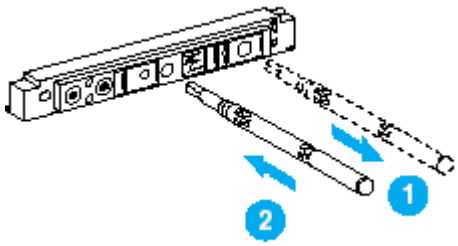
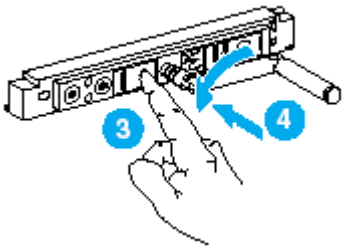
The device must comply with the conditions specified opposite.

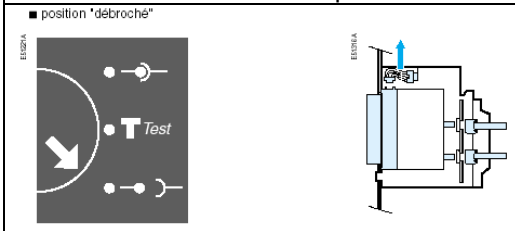
Device	**Fixed**		**Drawout**			
Position of poles	NA	NA			**Closed**	
Mechanism	NA	NA	**Charged**			
Device position in chassis			**Connected**	Test	Disconnected	Removed

Necessary tools

Crank

Procedure

Procedure	Action
Note. Drawout devices are racked in and out using a removable crank. **Disconnect a circuit breaker** The circuit breaker is in the chassis, in the connected position and closed. ■ Check that the position indicator on the front plate of the chassis indicates the connected position.	If the indicator is incorrect, contact after-sales support.
	
■ Insert the crank in the racking mechanism. 	If that is not possible, remove the padlock on the front plate of the chassis and/or turn the keys to the unlocked position (captive key). If the door interlock is activated, the enclosure door must be closed or press and hold the locking button on the right-hand side of the chassis. If the problem persists, contact after-sales support.
■ Press the position-release button. *Note. The crank cannot be turned if this button is not pressed.* 	
■ Turn the crank counter-clockwise. **Masterpact NT**: 1 turn **Masterpact NW**: 3 to 4 turns The circuit breaker should open automatically. ■ Continue turning the crank counter-clockwise until the test position is reached. ■ When the test position is reached, the mechanism blocks the crank. The position-release button pops out again.	If the crank cannot be turned, contact after-sales support. If the circuit breaker does not open, contact after-sales support. If the button does not pop out again, contact after-sales support.
■ Check that the position indicator indicates the test position.	If the indicator is incorrect, contact after-sales support.

■ position "test" 	
■ Press the position-release button and turn the crank counter-clockwise until the disconnected position is reached. *Note. The crank cannot be turned if this button is not pressed.* ■ When the disconnected position is reached, the mechanism blocks the crank.	If the crank cannot be turned, contact after-sales support.
■ Check that the position indicator indicates the disconnected position.	If the indicator is incorrect, contact after-sales support.
■ position "débroché" 	
Remove the circuit breaker ■ Disconnect the crank and put it back in its storage position. ■ Open the door of the switchboard.	
Masterpact NW ***Warning**: Before removing the device, check that the rack-out stops are in place.*	
■ Grasp the rail grips on each side of the device and press the black tabs. ■ Pull the rails to the stops. ■ The device is now fully disconnected from the chassis and can be removed.	In the device cannot be removed, contact after-sales service.
Masterpact NT ■ Release the black tabs by flipping them toward the back and pull the rails out to the stops to extract them from the chassis. ■ Check the general condition of the black tabs (photo). ■ Grasp the device at the top and bottom and slide it out on the rails. ■ The device is now fully disconnected from the chassis and can be removed.	If the tabs are damaged, contact after-sales service. In the device cannot be removed, contact after-sales service.

Position a device on the chassis **Masterpact NW** ■ Push the device into the chassis. On reaching the stops, the black tabs automatically lock. **Masterpact NT** ■ Push the device into the chassis to the stops. ■ Push the rails until the black tabs lock.	
Connect the circuit breaker ■ Close the switchboard door. ■ Check that the position indicator on the front plate of the chassis indicates the disconnected position. ■ Insert the crank in the racking mechanism. ■ Press the position-release button and turn the crank clockwise until the test position is reached. Note. The crank cannot be turned if this button is not pressed. ■ When the test position is reached, the mechanism blocks the crank. ■ Check that the position indicator indicates the test position. ■ Close the circuit breaker.	If the indicator is incorrect, contact after-sales support. If the indicator is incorrect, contact after-sales support. If the circuit breaker does not close, check that: ■ MN is supplied, ■ the device is charged. If the problem persists: ■ read the list of problems in the maintenance guide, then contact after-sales support.
■ Press the position-release button. *Note. The crank cannot be turned if this button is not pressed.* ■ Turn the crank clockwise. **Masterpact NT:** 1 turn **Masterpact NW:** 6 to 7 turns The circuit breaker should open automatically. ■ Continue turning the crank clockwise until the connected position is reached. ■ When the connected position is reached, the mechanism blocks the crank. ■ Check that the position indicator indicates the connected position. ■ Charge the device mechanism and close the device.	If the circuit breaker does not open, contact after-sales support. If the circuit breaker does not close, check that: ■ MN is supplied, ■ the device mechanism is charged. If the problem persists: read the list of problems in the maintenance guide, then contact after-sales support.

Comments on maintenance	

Reference documents	Masterpact NW user manual no. 04443719 AA Masterpact NT user manual no. 51201115 AA

Document modifications

Index	Date	Author	Modification
A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level II

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
14 December 2004	Date	**First edition** *(See last page for details on modifications)*

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Chassis

Action

Check operation of position contacts CE, CT, CD and EF

Goal

Check consistency between indications and actual position of the circuit breaker in the chassis.

The chassis can be equipped with different position contacts, namely CD (disconnected), CT (test), CE (connected) and EF (connected and closed).

Frequency

Annual

Special indications

If the various device positions in the chassis are indicated on the front panel of the switchboard, make sure that the auxiliary circuits are energised.

If the various device positions in the chassis are not indicated on the front panel of the switchboard, isolate the auxiliary circuits for testing using an ohm-meter or a tester.

Pre-test conditions

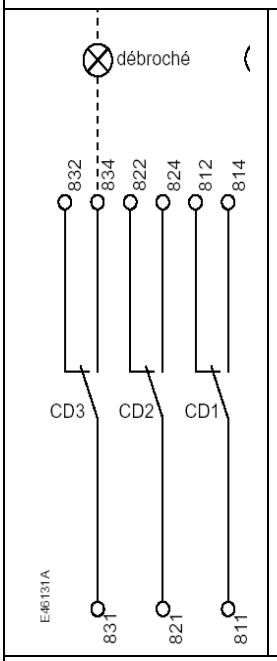
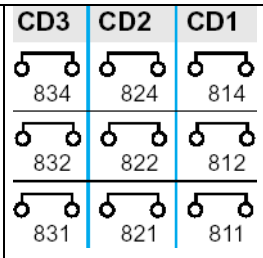
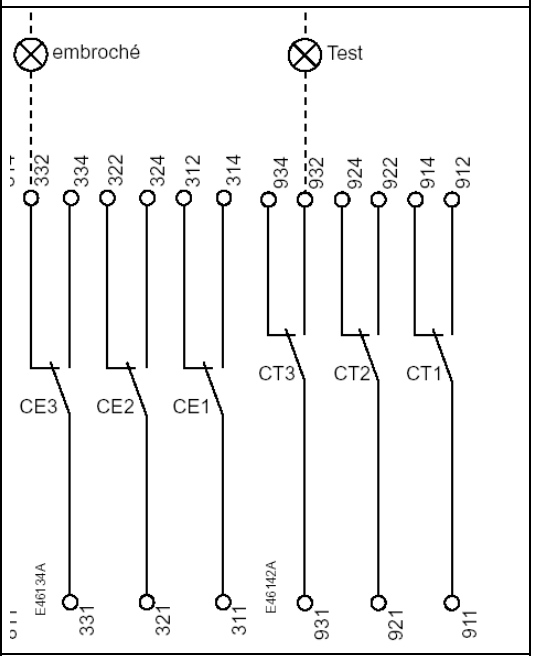
The device must comply with the conditions specified opposite.

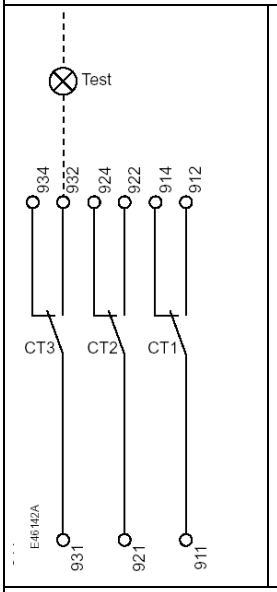
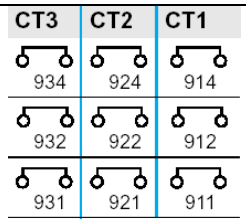
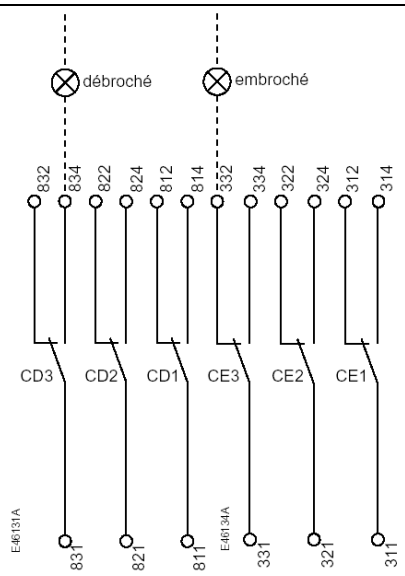
Device	**Fixed**		**Drawout**			
Position of poles	NA	NA	**Open**			
Mechanism	NA	NA			**Discharged**	
Device position in chassis			**Connected**	**Test**	**Disconnected**	Removed

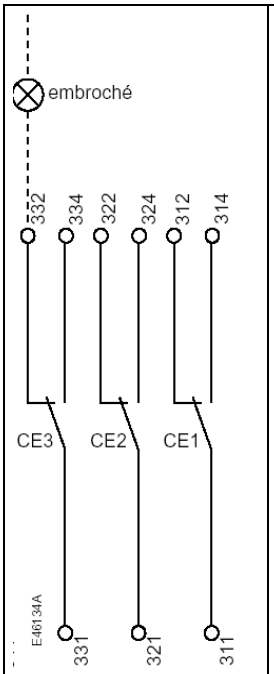
Necessary tools

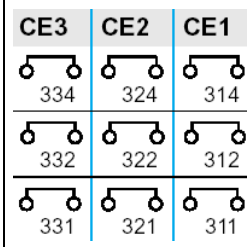
Ohm-meter or tester

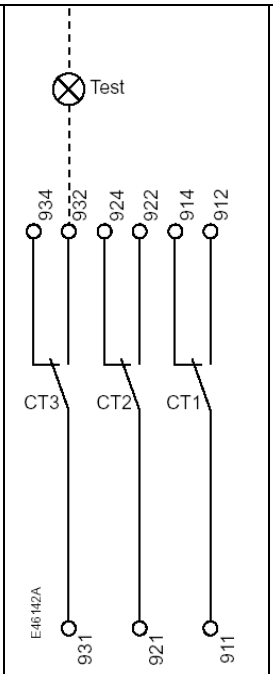
Procedure	Procedure	Action
	Note. It is advised to check the positions with the circuit breaker in the chassis to obtain the correct position of the actuators.	
	Put the device in the disconnected position. *Note. If in doubt, follow the procedure on removing a device from the chassis and putting it back (Doc. CH_NII_1_0).*	
	Check on CD contacts These contacts indicate the disconnected position of the circuit breaker. ■ If the switchboard is equipped with a LED, check that the signal is consistent with the position of the device. ■ If there is no LED, check with an ohm-meter or a tester. ■ Remove the auxiliary terminal shield. ■ Identify and disconnect all wires for the CD, CT and CE contacts.	If the LED does not operate, check its condition or check circuit continuity using the ohm-meter.
	Masterpact NW ■ Check electrical continuity of the contacts between terminals: CD1(811-814), CD2 (821-824), CD3 (831-834) ■ Check non-continuity for CT contacts between terminals (911-912), (921-922) (931-932) for CE contacts between terminals (311-314), (321-324), (331-334)	In the event the contact does not operate: manually flip the tripping blade and check contact status again. If the contact continues not to operate, replace the contact. If the problem persists, contact after-sales support.
	Masterpact NT ■ Check electrical continuity of the contacts between terminals CD1(811-814), CD2 (821-824). ■ Check non-continuity for CT contacts between terminals (911- 912) for CE contacts between terminals (311-314), (321-324), (331-334).	In the event the contact does not operate, manually flip the tripping blade and check contact status again. If the contact continues not to operate, replace the contact. If the problem persists, contact after-sales support.

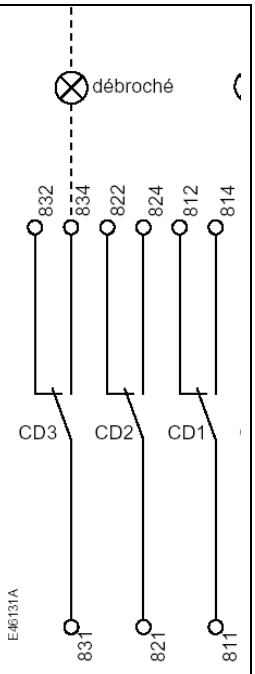
	■ Check continuity.	■ Check non-continuity.
	 	
	Check on CT contacts These contacts indicate the test position of the circuit breaker. ■ Put the device in the test position. ■ If the switchboard is equipped with a LED, check that the signal is consistent with the position of the device. ■ If there is no LED, check with an ohm-meter.	If the LED does not operate, check its condition or check circuit continuity using the ohm-meter.
	Masterpact NW ■ Check electrical continuity of the contacts between terminals: CT1 (911-912),CT2 (921-922), CT3 (931-932) ■ Check non-continuity for CD contacts between terminals (811-814) (821-824) (831-834) for CE contacts between terminals (311-314), (321-324), (331-334).	In the event the contact does not operate: manually flip the tripping blade and check contact status again. If the contact continues not to operate, replace the contact. If the problem persists, contact after-sales support.
	Masterpact NT ■ Check electrical continuity of the contacts between terminals: CT1 (911-912), ■ Check non-continuity for CD contacts between terminals (811-814) (821-824) for CE contacts between terminals (311-314), (321-324), (331-334).	In the event the contact does not operate: manually flip the tripping blade and check contact status again. If the contact continues not to operate, replace the contact. If the problem persists, contact after-sales support.

	■ Check continuity.	■ Check non-continuity.
	 	
	Check on CE contacts These contacts indicate the connected position of the circuit breaker. ■ Put the device in the connected position. ■ If the switchboard is equipped with a LED, check that the signal is consistent with the position of the device. ■ If there is no LED, check with an ohm-meter.	If the LED does not operate, check its condition or check circuit continuity using the ohm-meter.
	Masterpact NW ■ Check electrical continuity of the contacts between terminals: CE1(311-312), CE2 (321- 322), CE3(331- 332) ■ Check non-continuity for CD contacts between terminals (811-814), (821-824), (831-834) for CT contacts between terminals (911-912), (921-922), (931-932).	In the event the contact does not operate, manually flip the tripping blade and check contact status again. If the contact continues not to operate, replace the contact. If the problem persists, contact after-sales support.
	Masterpact NT ■ Check electrical continuity of the contacts between terminals: CE1(311-312), CE2 (321- 322), CE3(331- 332) ■ Check non-continuity for CD contacts between terminals (811-814), (821-824) for CT contacts between terminals (911-912). ■	In the event the contact does not operate, manually flip the tripping blade and check contact status again. If the contact continues not to operate, replace the contact. If the problem persists, contact after-sales support.
	Check continuity.	Check non-continuity.





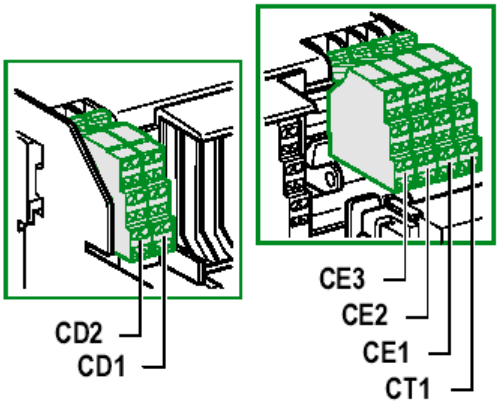




■ Reconnect all the wires for the CD, CT and CE contacts.
■ Mount the auxiliary terminal shield.

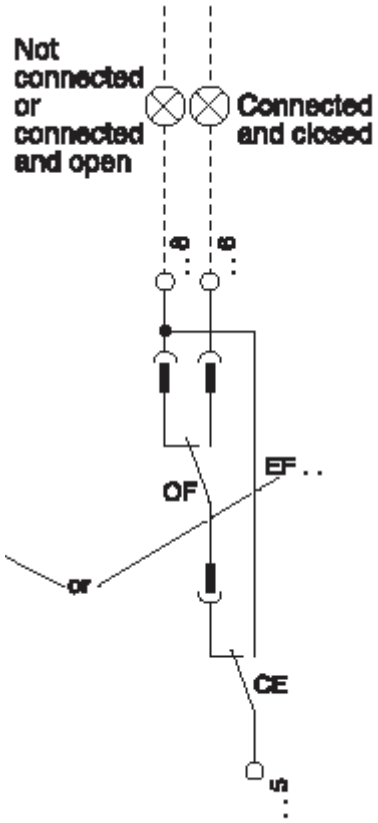
Position of contacts

Position of contacts on NT devices.



Position of contacts on NT devices.

	Check the EF contact *Note. This combined contact combines the "device connected" and "device closed" information to produce the "circuit closed" signal.* *This contact is supplied on option for the Masterpact NW only and must be used in conjunction with an OF contact.* ■ Put the device in the connected and closed position. If the switchboard is equipped with a LED for the connected/closed position, check that the signal is consistent with the position of the device. **Circuit-breaker with poles closed and chassis connected** ■ Check continuity between terminals: (45 - 46) (35 - 36) (25 - 26) (15 - 16) Check non-continuity between terminals: (45 - 48) (35 - 38) (25 - 28) (15 – 18) **Circuit-breaker with poles open and chassis connected** ■ Check continuity between terminals: (45 - 48) (35 - 38) (25 - 28) (15 – 18) Check non-continuity between terminals: (45 - 46) (35 - 36) (25 - 26) (15 - 16) **Circuit-breaker with poles closed and chassis in test position** ■ Check continuity between terminals: (45 - 48) (35 - 38) (25 - 28) (15 – 18) Check non-continuity between terminals: (45 - 46) (35 - 36) (25 - 26) (15 - 16) **Circuit-breaker with poles open and chassis in test position** ■ Check continuity between terminals: (45 - 48) (35 - 38) (25 - 28) (15 – 18) Check non-continuity between terminals: (45 - 46) (35 - 36) (25 - 26) (15 - 16) **Note. If the circuit breaker has a second auxiliary contact block, check the corresponding contacts as well.**	If the LED does not operate, check its condition or check circuit continuity using the ohm-meter. For all the cases listed below, if the contact does not operate, manually flip the CE tripping blade and check contact status again. If the fault persists, check the OF contact as per the Auxiliary procedure. If necessary, replace the OF contact block. If the OF contact block is OK, replace the EF contact. If the problem persists, contact after-sales support.



EF14	EF13	EF12	EF11
148	138	128	118
146	136	126	116
145	135	125	115

Comments on maintenance	

Reference documents	

Document modifications	Index	Date	Author	Modification
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level II

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
14 December 2004	Date	**First edition** *(See last page for details on modifications)*

⚠ DANGER

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Chassis

Action

Check operation of safety shutters

Goal

Check the insulation of the chassis power circuit when the device is extracted.

Frequency

Annual

Special indications

Cut power to the auxiliaries to work under risk-free conditions.

Pre-test conditions

The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	**NA**	NA	**Open**			
Mechanism	**NA**	NA			**Discharged**	
Device position in chassis			Connected	Test	Disconnected	**Removed**

Necessary tools

Procedure	Procedure	Action
	Check operation of safety shutters (rapid action) ■ Press the opening mechanism until the shutters open completely. ■ Release the mechanism. The shutters should shut completely.	If the shutters remain partially or completely open, proceed as indicated below. ■ Remove the shutters. ■ Remove the shutter mechanisms (NW only). ■ Clean mechanism actuators to remove any grease or dust. ■ Regrease using ISOFLEX grease. ■ Reinstall the shutter mechanisms (NW only). ■ Reinstall the shutters. ■ Run the test again. If the problem persists, contact after-sales support.
	Check operation of safety shutters (slow action) ■ Press the opening mechanism until the shutters open completely. ■ Slowly release pressure until the mechanism has returned to initial position. The shutters should shut completely.	If the shutters remain partially or completely open, proceed as indicated below. ■ Remove the shutters. ■ Remove the shutter mechanisms (NW only). ■ Clean mechanism actuators to remove any grease or dust. ■ Regrease using ISOFLEX grease. ■ Reinstall the shutter mechanisms (NW only). ■ Reinstall the shutters. ■ Run the test again. If the problem persists, contact after-sales support.
	■ Place the circuit breaker on the rails.	
	Recommence the procedure on manoeuvring a device in the chassis (Doc. CH_NI_1_0) from the point where the device was extracted.	

Comments on maintenance	

Reference documents	

Document modifications	Index	Date	Author	Modification
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
04 November 2004	Date	**First edition** *(See last page for details on modifications)*

⚠ DANGER

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**. Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.*
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Chassis

Action

Dust and regrease chassis

Goal

Check cleanness of chassis grease to avoid mechanical malfunctions during device connection and disconnection.

Frequency

Every 2 years

Special indications

Pre-test conditions

The device must comply with the conditions specified opposite.

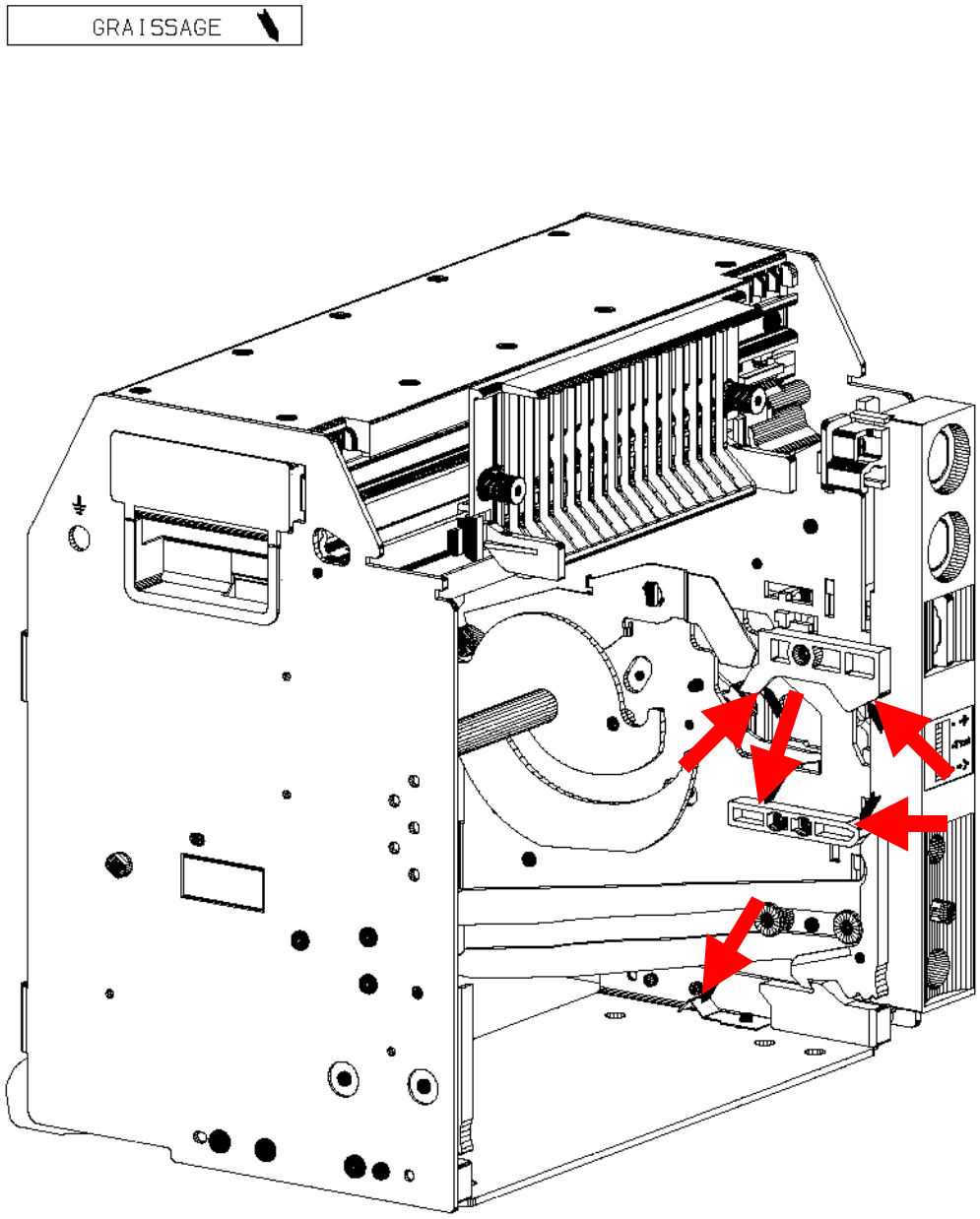
Device	**Fixed**		**Drawout**			
Position of poles			**Open**			
Mechanism					**Discharged**	
Device position in chassis			Connected	Test	Disconnected	**Removed**

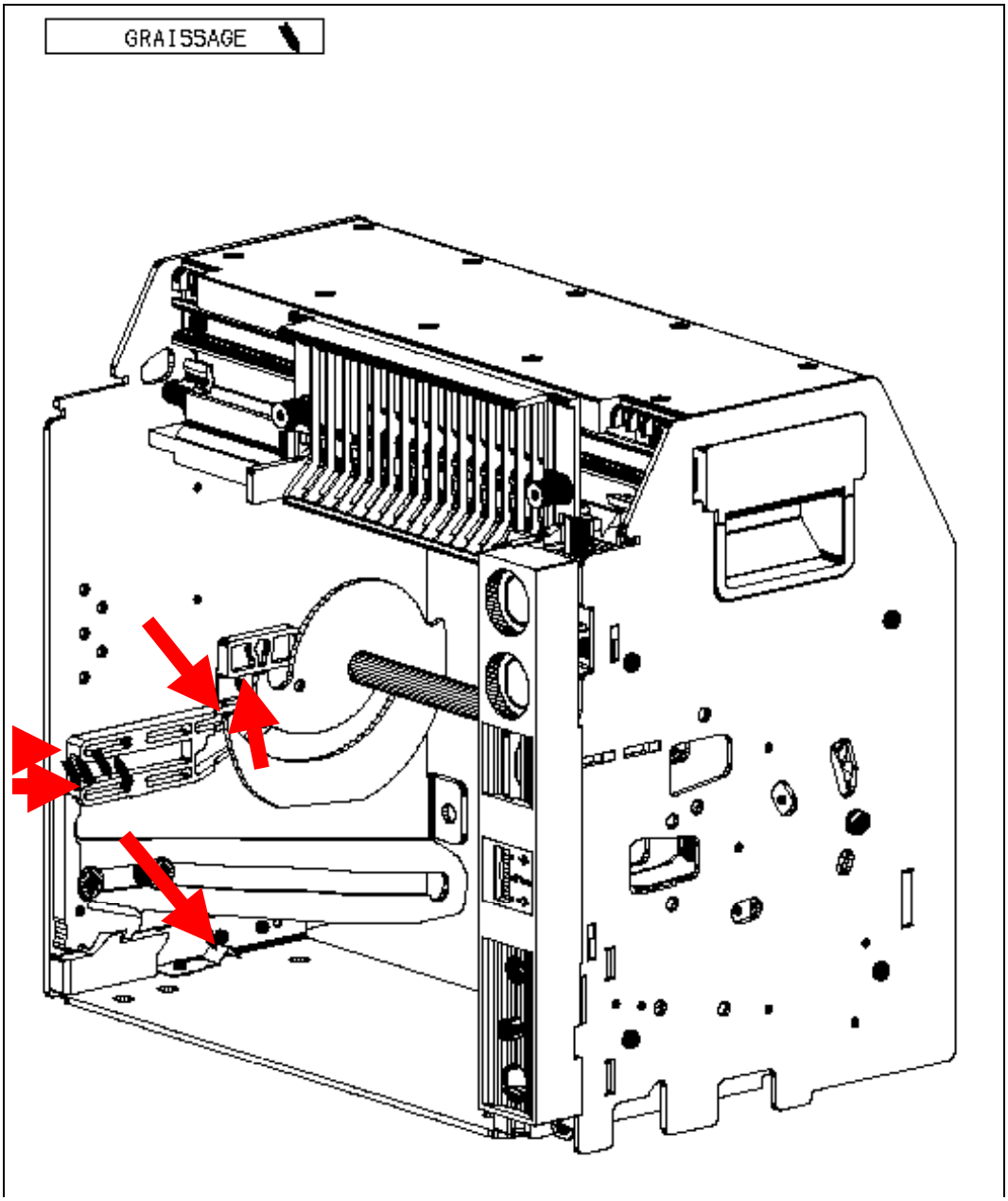
Necessary tools

Vacuum
Grease, cat. no. Mobilith SHC 100

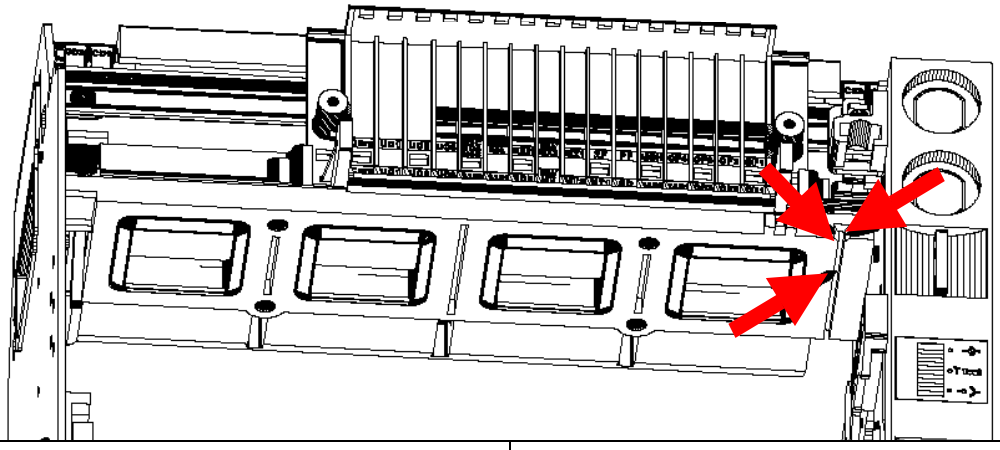
Procedure	Procedure	Action
	■ Remove the device from the chassis. *Note. If in doubt, follow the procedure on removing a device from the chassis and putting it back (Doc. CH_NII_1_0).*	
	■ Place the circuit breaker on a table.	
	■ Vacuum any dust in the lower section of the chassis and on the outside. ■ Using a dry cloth, remove all grease from the parts indicated in the diagrams below. ■ Regrease as indicated in the diagrams. *Note. Too little or too much grease impacts negatively on device operation.*	
	Masterpact NW only. Run the rails in and out several times to evenly spread the grease.	

■ Grease points on NT circuit breakers.



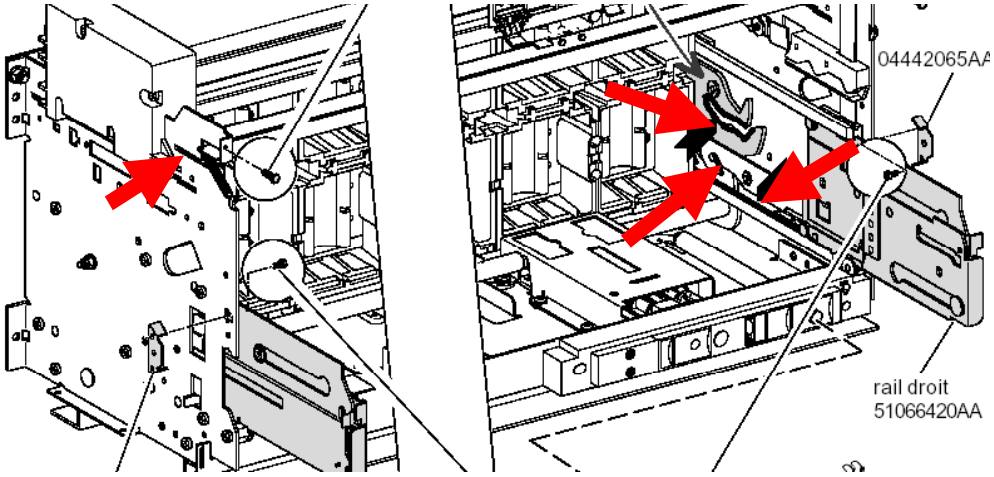

GRAISSAGE

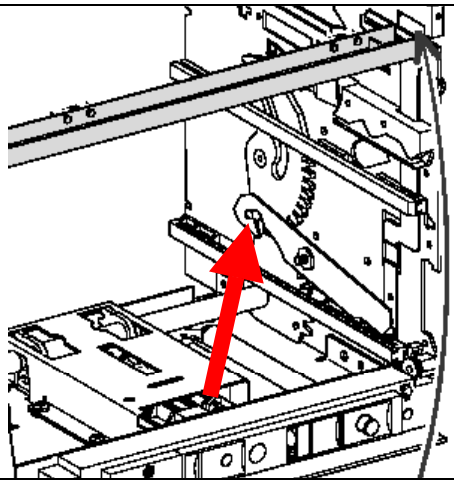
GRAISSAGE



■ Place the circuit breaker on the rails.	
■ Put the device in the connected position.	

Grease points on NW circuit breakers.





Comments on maintenance	

Reference documents	

Document modifications	**Index**	**Date**	**Author**	**Modification**
	A		Bretteville	First edition

Merlin Gerin
Square D
Telemecanique

Schneider Electric

Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
14 December 2004	Date	**First edition** *(See last page for details on modifications)*

⚠ DANGER

Warning:
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Chassis
Disconnecting contacts

Action

Regrease the disconnecting-contact clusters (for corrosive environments)

Goal

Check:

- correct contact between the clusters and disconnecting-contacts to avoid temperature rise,
- correct greasing (sliding contact) to avoid pulling the clusters out during disconnection.

Frequency

Every 2 years

Special indications

Pre-test conditions

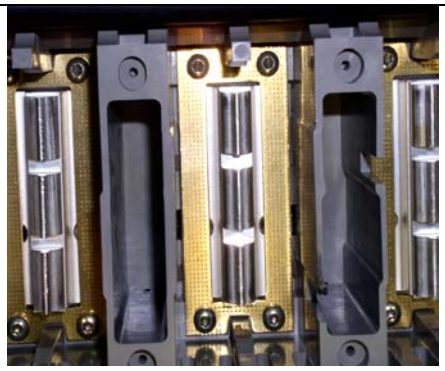
The device must comply with the conditions specified opposite.

Device	**Fixed**		**Drawout**			
Position of poles	NA	NA	**Open**			
Mechanism	NA	NA			**Discharged**	
Device position in chassis			Connected	Test	Disconnected	**Removed**

Necessary tools

MOBILITH SHC100 grease
Thiourea solution: 100 g Thiourea, 30 ml concentrated sulphuric acid, 1 litre distilled water

Procedure	Procedure	Action
	Disconnection procedure Run the procedure on manoeuvring a device in the chassis (Doc. CH_NI_1_0) to extact the device.	
	■ Place the circuit breaker on a table.	
	■ Remove the shutters. *Masterpact NT: Using installation manual 51201011AA, proceed in reverse order.* *Masterpact NW: Using installation manual 51156130AA, proceed in reverse order.*	
	■ Remove all the clusters using the cluster tool. ■ Clean the cluster supports at the bottom of the chassis according to the Thiourea-solution cleaning procedure, using a brush. *Note.* *Cleaning must be rapidly followed (less than five minutes) by abundant rinsing using the brush and water, then a new rinsing using distilled water.* *The Thiourea solution must be clean and show no sign of crystallisation (an indication of decomposition).* *It is advised to wear a mask and gloves to avoid burns and side effects.* ■ Clean the clusters according to the procedure presented above. ■ Check the surface of the clusters and cluster supports.	If copper is visible in the contact zones: ■ between a cluster and its support, replace both, ■ between a cluster and the device disconnecting contact, replace both. If the clusters and contacts are blackened: ■ see the section below on corrosive environments.
	■ Regrease the supports with MOBILITH SHC100 or AMBYGLON grease. *Note. Regrease as indicated in the diagrams.* *Masterpact NT: FIM NT L010* *Masterpact NW: FIM NW L 10*	



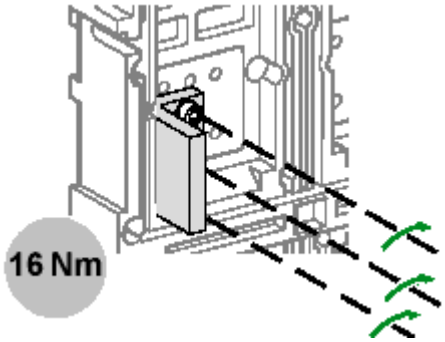
■ Reinstall the clusters.
Note. For Masterpact NW, reinstall the clusters as indicated in FIM NW L010.

■ Reinstall the shutters.
Note. For NT, the tightening torque is 0.8 Nm.
Check operation of the safety shutters as per the corresponding procedure.

Corrosive atmospheres

Note. Solid-silver and silver-plated contacts, when in contact with SO_2 (sulphur dioxide) and H_2S (hydrogen sulphide), blacken with the presence of sulphide which increases contact resistance and temperature rise.
Silver sulphide is not a passivation layer:
- *its surface resistivity varies between 10^5 and 10^{10} Ω.m,*
- *its hardness is approximately half that of silver, i.e. 150 N/mm².*

If the assembly (contacts and clusters) is gold-plated, no particular maintenance is required. Regrease every two years.

	Check the silver-plated surface on the sliding contacts (fixed and moving parts) ■ Remove the disconnecting contacts on the case. Example on NW 800-1200.  	
	■ Brush and clean loose particles on blackened surfaces. ■ Clean silver-plated surfaces using a Thiourea solution. *Note.* *Cleaning must be rapidly followed (less than five minutes) by abundant rinsing with water, then a new rinsing using distilled water.* *The Thiourea solution must be clean and show no sign of crystallisation (an indication of decomposition).* *It is advised to wear a mask and gloves to avoid burns and side effects.* ■ Regrease by applying a fine layer on the silver-plated surfaces to delay the appearance of silver sulphide (**Pyratex EP2 grease from the Condat company**). Note. Apply a fine layer of the fluorinated grease (a few microns are sufficient). ■ Reconnect the disconnecting contacts on the case, using new washers and the correct tightening torque (16 Nm).	■ If copper is visible in the contact zones between a cluster and the device disconnecting contact, replace the assembly.
	■ Place the circuit breaker on the rails.	
	Recommence the procedure on manoeuvring a device in the chassis (Doc. CH_NI_1_0) from the point where the device was extracted.	

Masterpact FIM- NT L 010

indice de modification : D
revision index :

indice de diffusion : P3
diffusion index :

réalisation : P.A.O.

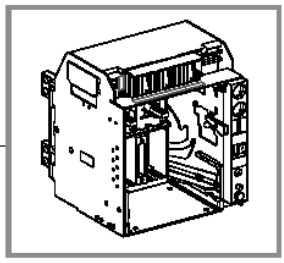
vérification : BM / A.Q.

date : 02 / 04 / 2003

adaptation des pinces sur fond chassis
cluster adaptation

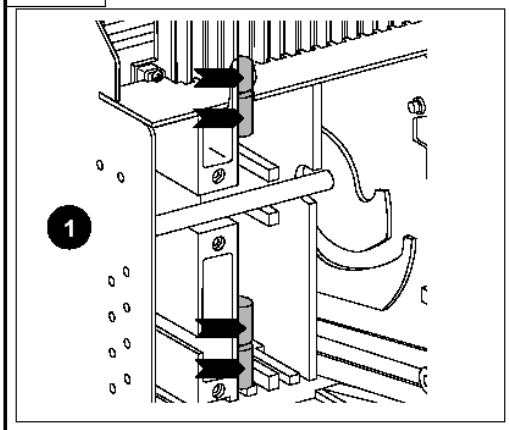
objet : à page 1 et 2,
ajouté zoom graissage pinces
page 1 & 2, added zoom clusters greasing

n° de dossier : sans

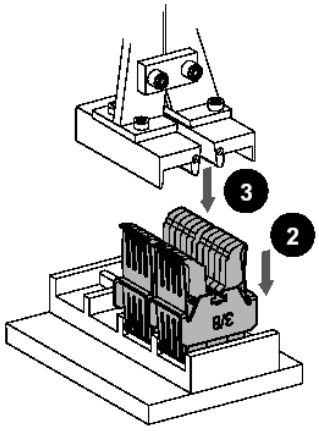


Graissage
greasing
Amblygon

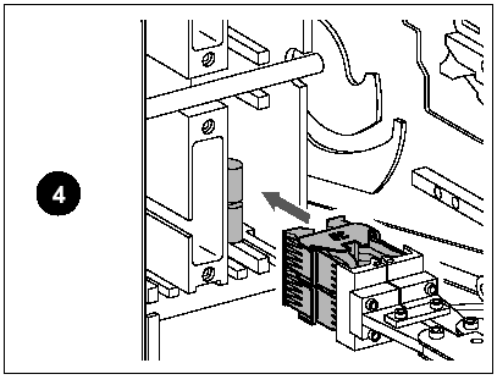
630 —> 1250

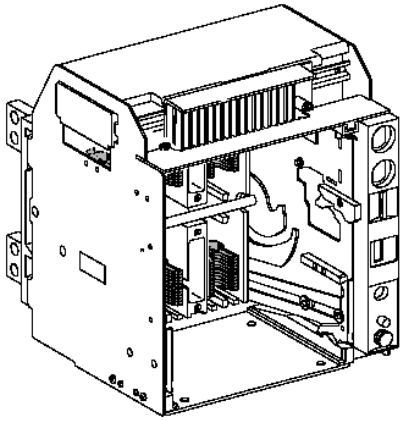


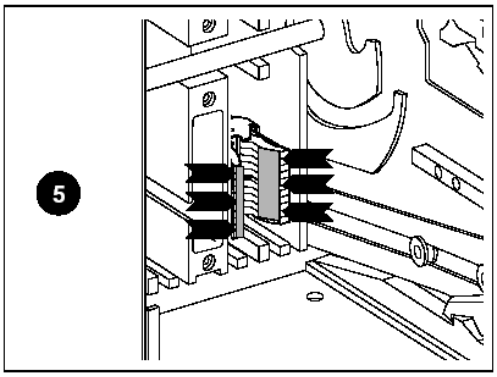
outil / *tool* : **5100237032A / 47554**

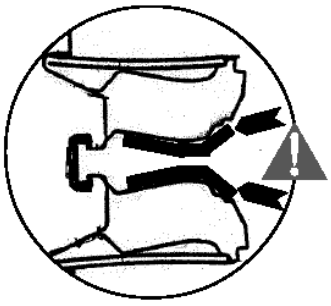


support / *support* : **5100237196 / 47549**









graissage
greasing

page 1/2 NT L010 FIM ... Nbre de copies : 3

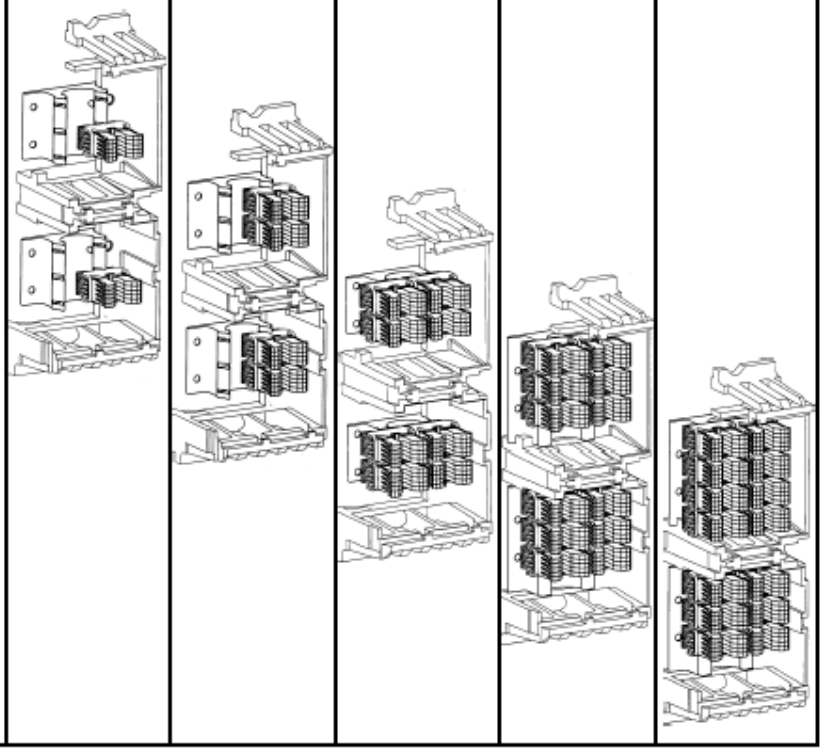
Masterpact FIM- NW L 010

indice de modification : G
revision index :

adaptation des pinces
surfond chassis
cluster adaptation

rating *Calibre*	*08*	*10 12*	*16*	*20*	*25*	*32*	*40*	*40b 50*	*63*
N1 - NA	1								
H1 - HA	2			3		4	5	4	
H2 - HF									
H3									
L1	3			5					

Gabarit Ⓐ positionnement *positioning tool*	montage 1 *mounting* 5100237142 / 47541	montage 2 *mounting* 5100237143 / 47542	montage 3 *mounting* 5100237144 / 47543	montage 4 *mounting* 5100237145 / 47544	montage 5 *mounting* 5100237146 / 47545
Support Ⓑ alignement *alignement support*	5100237196 / 47549				
Outil Ⓒ *tool*	5100237032A / 47554			5100237032B / 47554	5100237032C 5100237032B



page 2/3 - NW L 010 FIM - --- Nbre de capas : 3

Comments on maintenance	

Reference documents	Masterpact NW user guide no. 04443719 AA Masterpact NT user guide no. 51201115 AA

Document modifications

Index	Date	Author	Modification
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Merlin Gerin
Square D
Telemecanique

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Maintenance programme — Masterpact NT/NW — Level III

Issued by:	**Validated** by:	**Last modification**
ABT Services Product Manager	ABT Quality Manager	Index **A**
12 December 2004	Date	**First edition** *(See last page for details on modifications)*

⚠ DANGER

Warning.
For checks and preventive maintenance, the operator must take all necessary precautions to avoid injury.

***Circuit-breaker test**: Unless specified otherwise in the special indications below, all operations (inspection, test and preventive maintenance) must be carried out with the **circuit breaker (device and chassis) and the auxiliary circuits de-energised**.*
Checks to ensure that the circuit breaker is de-energised must be carried out on the upstream and downstream terminals.
***Test equipment**: The high voltages used for certain tests are dangerous and may result in serious injury or death. During the tests, it is strictly forbidden for anyone to touch the circuit breaker or the conductors while voltage is applied.*
***Return to operation**: Before putting the equipment back into operation, it is mandatory to check that all connections are made with the correct tightening torque, the inside of the cabinet is clean, all protective covers are in position and the circuit breaker is off (open position).*

Subassembly

Power connections
Device and customer connections

Action

Check and retighten doubtful connections following a visual inspection

Goal

Following a visual inspection (traces of temperature rise), check for possible untightness of terminals to the device and cables/bars to the terminals.

Frequency

Following a visual inspection of the device during which traces of temperature rise are noted.

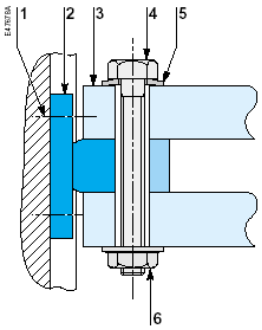
Special indications

Pre-test conditions

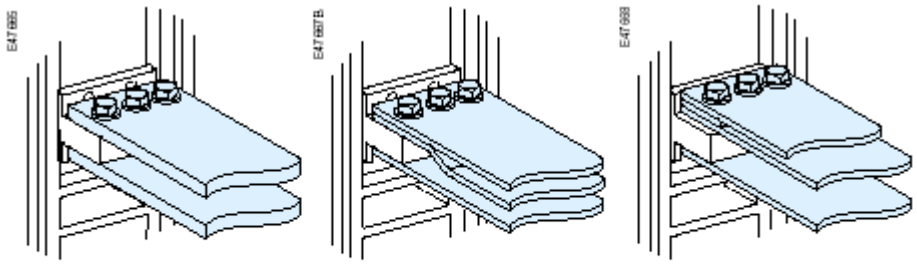
Device	**Fixed**		**Drawout**			
Position of poles	NA	NA	NA		NA	
Mechanism	NA	NA	NA		NA	
Device position in chassis			Connected	Test	Disconnected	Removed

Necessary tools

Torque wrench

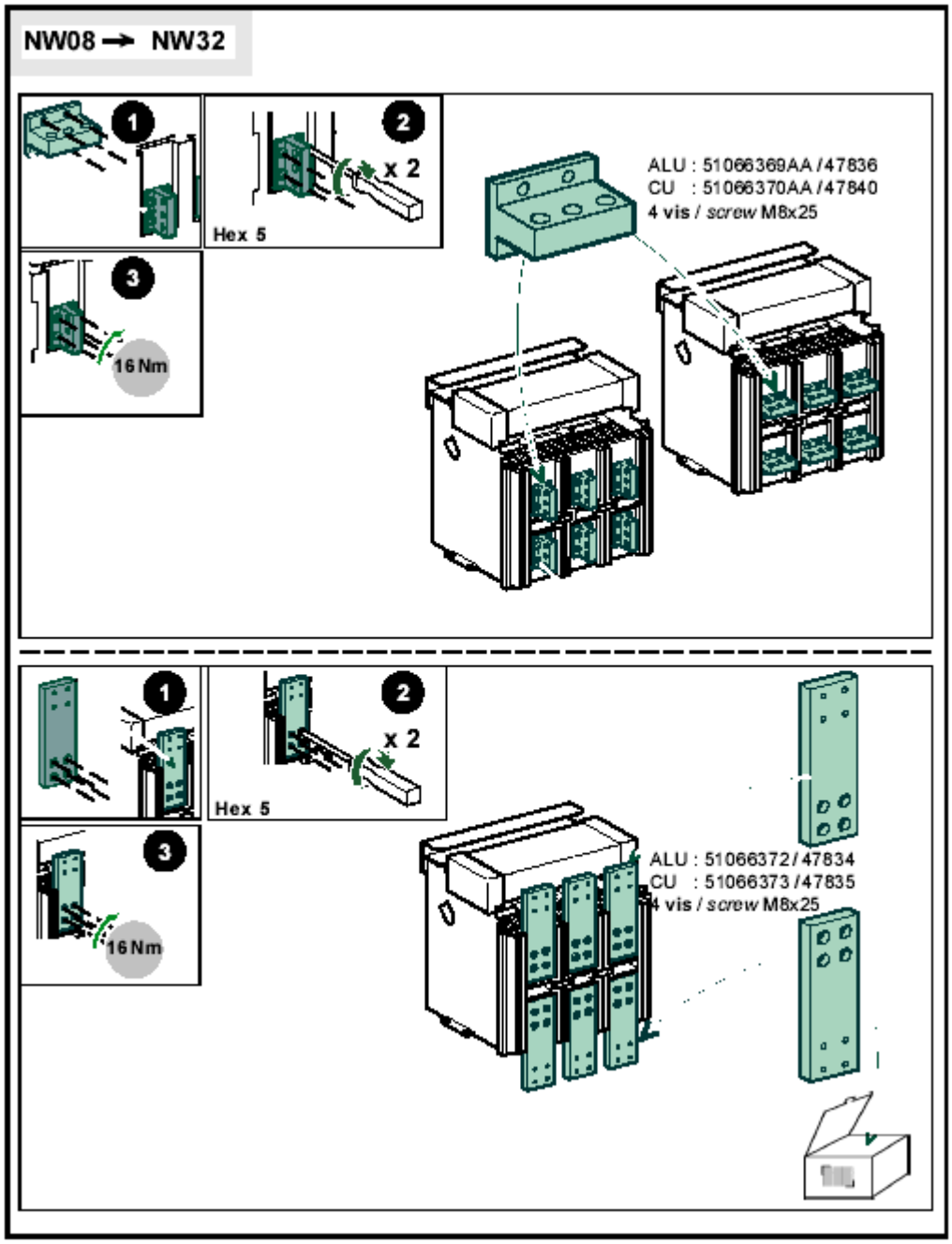
Procedure	Procedure	Action
	■ Disconnect cables/bars from the connection terminals. **Connection terminals** ■ Visually check the change in colour of the terminals, indicating abnormal temperature rise. ■ Check the tightening torque of the terminal by setting the torque wrench to 1 Nm under the value specified in the catalogue (see the table below). ■ Tighten. If the nut turns, adjust the wrench to the correct value and continue tightening.	If there is a major change in colour: ■ undo the connection, ■ clean the contact surfaces using very fine (000) Emery paper, ■ reconnect and tighten (correct torque) using new nuts and bolts. If the nut does not turn and there is no change in colour, the connection is considered OK.
	Cables/bars ■ Visually check the change in colour of the bars, indicating abnormal temperature rise. ■ Reconnect the cables/bars and tighten (correct torque) using new nuts and bolts. *Note.* *Standard connection hardware:* *class 8.8 steel hardware with contact washers.* *For NW 40, NW40b, NW50 and NW63, it is advised to use A80 stainless steel hardware.*	If there is a major change in colour, clean the contact surfaces using very fine (000) Emery paper.
	Hardware diagram  *1 vis des connecteur de raccordement sur l'appareil serrage usine (16 Nm pour NW, 13 Nm pour NT)* *2 connecteur de raccordement* *3 barres de connexion* *4 boulon* *5 rondelle* *6 écrou*	

Recommended tightening torque

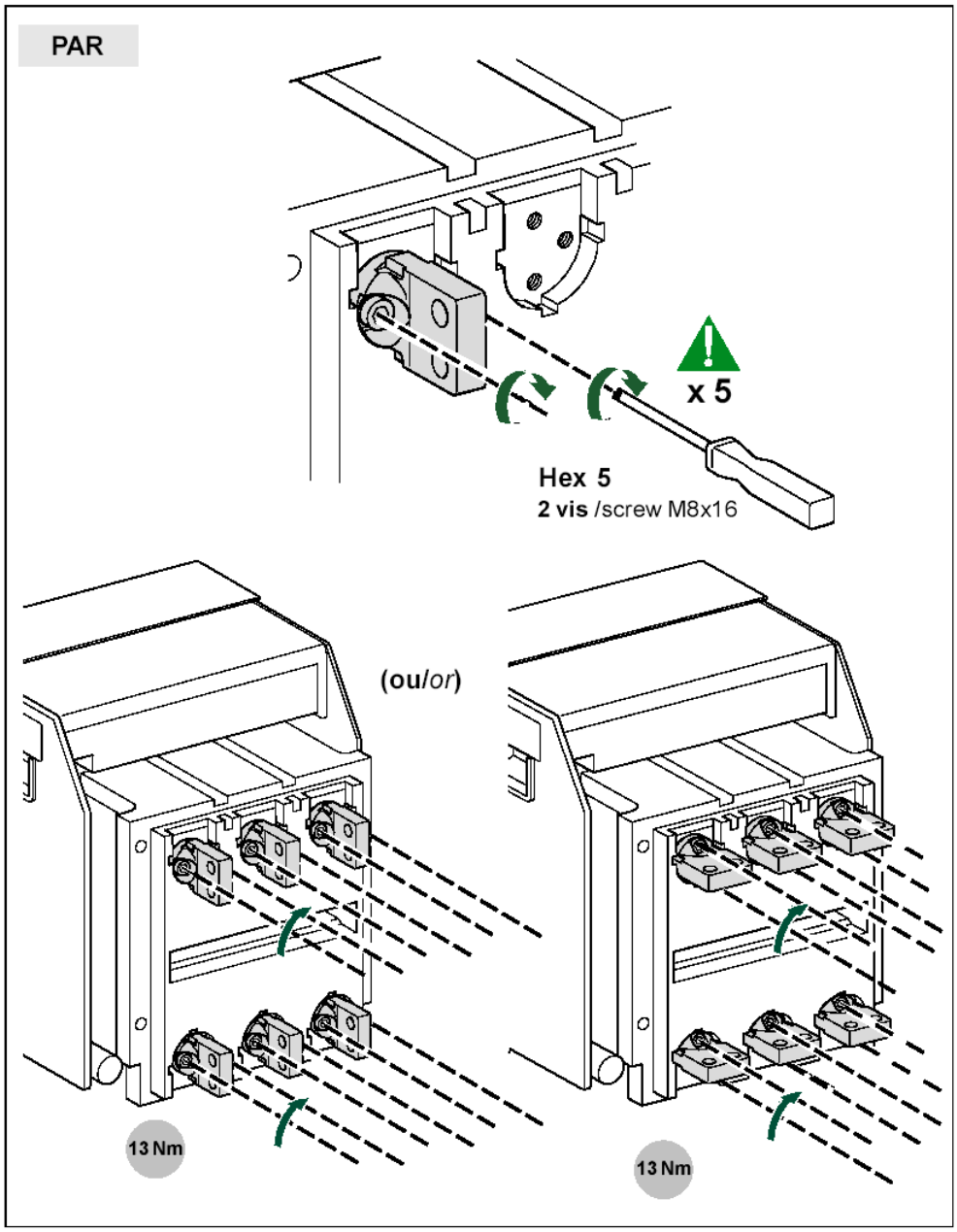


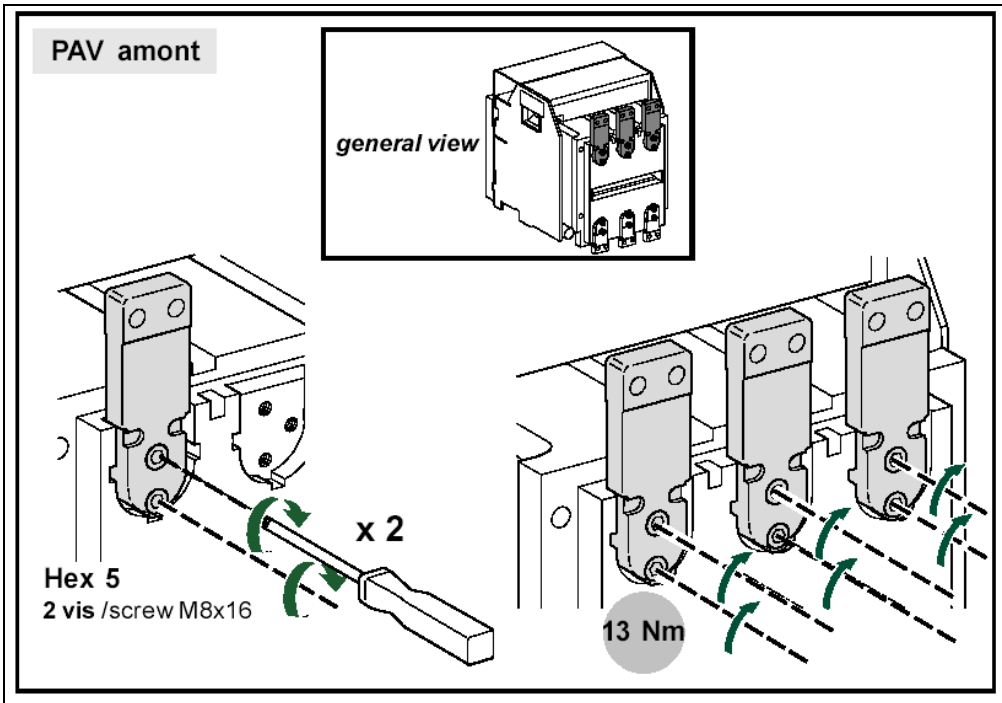
Couples de serrage des barres de raccordement			
Ø Nominal (mm)	Ø Perçage (mm)	Couple de serrage (Nm) plates ou grower	Avec rondelles contact ou éventail
10	11	37,5	50

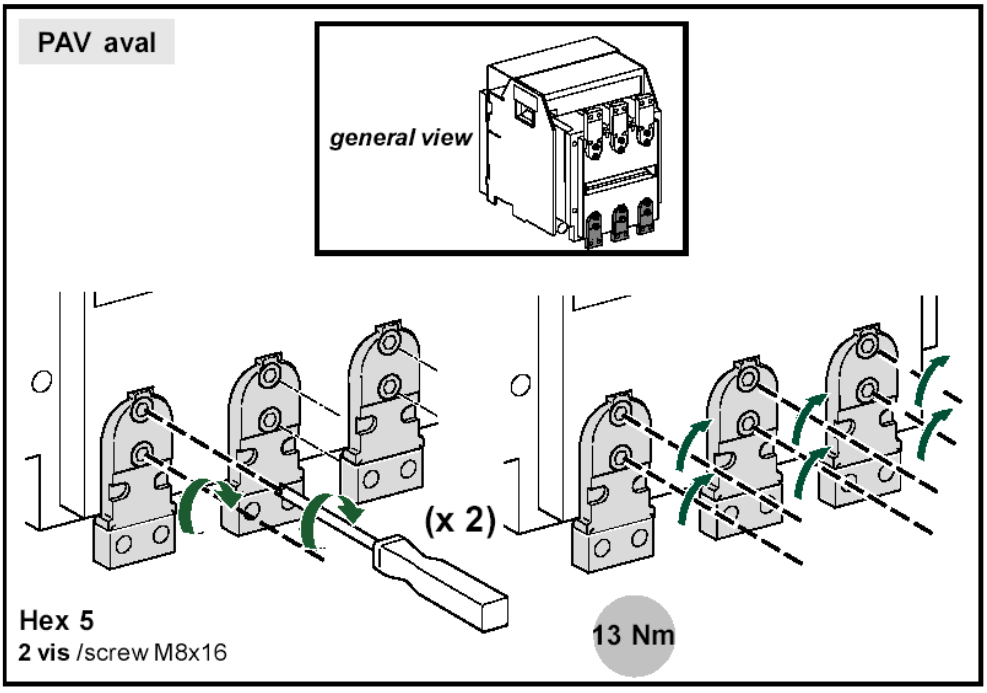
Masterpact NW - Terminal mounting on device and tightening torque.



Masterpact NT - Terminal mounting on device and tightening torque.




PAV amont
general view
x 2
Hex 5
2 vis /screw M8x16
13 Nm


PAV aval
general view
(x 2)
Hex 5
2 vis /screw M8x16
13 Nm

Comments on maintenance	

Reference documents	

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