



MAINTENANCE GUIDE



XL³ HP

LV ASSEMBLIES AND IS SYSTEM



LEGRAND

SUPPORTS YOU ON ALL YOUR PROJECTS

This Maintenance Guide describes the maintenance requirements that shall be strictly followed to maximize the performance and the service life of your low-voltage switchgear, controlgear, their assemblies and the built-in components, and to ensure the safety of your installation.

This document is composed of:

- a global section with the controls of the installation environment as well as the definition of skills for the interventions to be carried out,
- a dedicated section to enclosures, low voltage switchgear and controlgear and assemblies with a checklist of steps to verify
- a dedicated section to the maintenance or evolution of XL³ HP 6300 IS systems.

LEGAL INFORMATION

Presentation pictures do not always include Personal Protective Equipment (PPE), but this is a legal and regulatory obligation that must be scrupulously respected.

In accordance with its continuous improvement policy, Legrand reserves the right to change the specifications and illustrations without notice. All illustrations, descriptions and technical information included in this document are provided as indications and cannot be held against Legrand.

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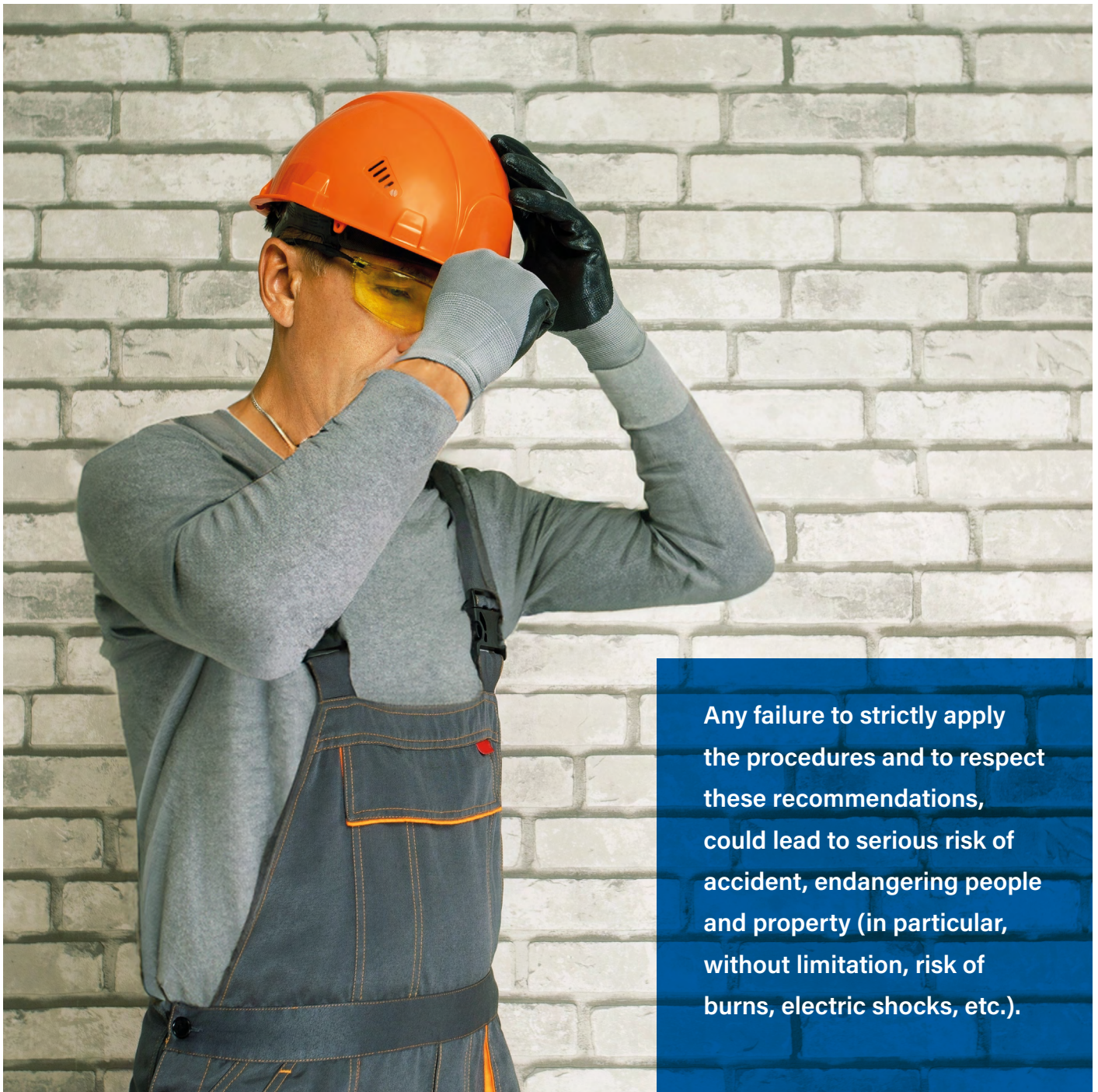
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SAFETY INSTRUCTIONS



Any failure to strictly apply the procedures and to respect these recommendations, could lead to serious risk of accident, endangering people and property (in particular, without limitation, risk of burns, electric shocks, etc.).



General information

- Use only the products and accessories recommended by the Legrand Group in the catalogue, instructions, technical data sheets and all other documents provided by Legrand (hereinafter referred to as «the Documentation») in compliance with the installation rules.



Improper installation and/or use may result in the risk of arcing in the enclosure, overheating or fire. The enclosures must be used under normal conditions, they must not be subjected to Voltage / Current / Temperature values other than those specified in the Documentation.

- Legrand declines all responsibility for any modification or repair of the equipment making up the enclosure that is not authorized by the Legrand Group, as well as any failure to comply with the rules and recommendations specified by Legrand in the Documentation. In addition, in the cases mentioned above, the warranty granted by Legrand will not be applicable.
- It is necessary to check that the characteristics of the products are appropriate for their environment and use during maintenance operations, and to refer to the Documentation.
- If you have any questions or require clarification, please contact Legrand Group.

Protection/security



- The installation, use and maintenance of the enclosures and their components must be carried out by qualified, trained and authorized personnel, in accordance with the regulations in force in each country.
- People working on the installation must have the appropriate electrical authorizations for the work to be carried out.
- Wear the PPE (Personal Protective Equipment) necessary to work on live products.



- Respect the safety rules related to electrical work.
- Improper electrical and mechanical use of equipment can be dangerous and may result in personal injury or damage to property.

Maintenance

- Depending on the maintenance operations to be carried out, partial or total power cuts of the enclosure concerned should be planned before any work.
- When performing operations that involve access to the inside of the enclosure, be aware of the risk of burns before touching any.
- Before turning the power back on, make sure that there are no foreign bodies and that all physical protections have been put back in place (e.g.: screens, covers, faceplates).



Risk of electric shock, burns and explosion.

The rules and recommendations in this document are based on our knowledge of the typical conditions of use of our products in the fields of application usually encountered. However, it is always the customer's responsibility to verify and validate that Legrand products are suitable for its installation and use.

The customer must ensure proper installation, maintenance and operation of the equipment to avoid any risk of injury to personnel or damage to property in the event of product failure, especially for applications that require a very high level of safety (e.g., those in which the failure of a component may endanger human life or health).

The rules for storage, handling, installation and maintenance and the appropriate precautions and warnings must be strictly observed and applied.





GENERAL INFORMATION

During their use, the products installed in your enclosure may be exposed to various wear factors, given by the amount of work carried out and other parameters such as high temperatures, overvoltages, environmental pollution (e.g. dust, fumes), wear and operational wear (contacts, terminals), etc.

These factors can have a negative impact on the equipment, and therefore reduce its lifespan and/or alter its correct operation.

Regular monitoring of the condition of the equipment in its operating environment is essential to prevent failures or damage.

Carrying out the various checks and maintenance at the recommended intervals is essential to ensure that the electrical enclosures operate in optimal conditions, maximizing their lifespan and preserving the safety of your installation.



This document does not apply to low-voltage switchgear and controlgear assemblies used in potentially explosive atmospheres.



Local regulations can differ from country to country.

When local regulations and legal obligations are in place, they take precedence over this document and the manufacturer's maintenance instructions.



General checking

Your installation must be maintained in accordance with the actions and the periodicity described in the following plan (according to Technical report IEC TR 63482).

Before carrying out the maintenance operations, make sure that your installation has not changed (or haven't been updated in case of IS/Increased safety XX3 installation).



It is strongly recommended that you keep an up-to-date maintenance log for each container, indicating all events that have occurred and all checks and maintenance operations performed. You can find at the end of this document some certificate example to complete for each maintenance checking.

ENVIRONMENTAL CONDITIONS CHECKING

- Room temperature,
- Percent load,
- Degree of hygrometry (relative humidity),
- Corrosive atmosphere,
- Presence of dust,
- Vibration,
- Ventilation of the room.

ELECTRICAL CHECKING (on electrical diagram)

- Evolution and nature of the loads.
- Ensure the proper grounding of the enclosure.



Unless you have an IS X3X installation, general maintenance must be carried out with the cabinet switched off.

Below is a summary table of measurement levels to define your environment conditions.

The maintenance actions periodicity indicated in tables on pages 9 and 11 correspond to the favourable or normal condition of an installation.

	ENVIRONMENTAL CONDITIONS		
	FAVOURABLE	NORMAL	SEVERE ⁽¹⁾
Ambient air temperature (Annual average ambient temperature outside the switchboard)	Ta ≤ 25 °C Air-conditioned electrical room or forced ventilation assembly	25 °C < Ta ≤ 35 °C Air-conditioned electrical room or forced ventilation assembly	35 °C < Ta ≤ 45 °C
Percent load (daily process 8/24 h or continuous process 24/24 h)	< 50 % of In	< 80 % of In	> 80 % of In
Harmonics THD	< 15 % of In	< 30 % of In	Harmonic current per phase > 30 % of In
Relative humidity	< 50 %	< 70 %	> 80 %
Corrosive atmosphere (IEC 60721-3-3:2019) environment	Device installed in category 3C1 or in a closed room that creates favourable operating conditions (air is conditioned and purified)	Device installed in category 3C2 or 3C3	Device installed in category 3C4 environment without any particular protection
Salt environment	None	None	Device installed less than 10 km from the coast without any particular protection
Dust	Negligible Device installed in a switchboard equipped with filters or a ventilated IP54 enclosure	Low level Device installed in a switchboard equipped with filters or a ventilated IP54 enclosure	High level Device not installed inside an enclosure equipped with filters or a ventilated IP54 enclosure
Vibration	None	Permanent vibration < 0,2 g	Continuous vibrations between 0,2 g and 0,5 g

⁽¹⁾ For severe environment, If a condition is met in this column, it will be considered severe for your entire installation.

The maintenance manager must adjust the frequency of actions and ensure that the use of products remains in accordance with the manufacturer's recommendations.



MAINTENANCE GUIDE

GENERAL INFORMATIONS



Type of maintenance

This document will describe 2 types of maintenance, than are planned and should respect the schedules actions with the correct skill for each one (p. 7) :

- scheduled maintenance
- condition-based maintenance



SCHEDULED MAINTENANCE

Maintenance carried out at established intervals in time.

It is a scheduled activity consisting of a series of systematic actions based on the assumed operating conditions and expected life of the assembly and its components.

It enables the planning of interruptions for maintenance, thereby minimising the costs associated with loss of production and allowing power to be available to the connected loads, when expected.



CONDITION-BASED MAINTENANCE

It is a flexible maintenance method that monitors the condition of equipment to determine the type and frequency maintenance task that can be carried out. Thanks to additional sensors in the equipments, they provide data to some forms of alarm/management system and allowing the time interval between two interventions to be reduced or extended as appropriate.

For low-voltage switchgear and controlgear assemblies, the maintenance required can be based on one of a number of parameters, for example, the number of mechanical operations, the number of over-current trips, loading, ambient environment data (temperature, dust, salt content in the atmosphere, etc.), current harmonics, increase of residual current, low power quality.

It is also a preventive maintenance based on the assessment of physical condition ; for example after modification of the cabinet or in case of a fault:

- After overload protection, after short-circuit protection, After ground fault protection, etc
- Penetration of liquids, Penetration of foreign bodies, etc
- After seismic events, After mechanical stress or impact, After exposure to chemical elements
- Auxiliary circuit faults



ADVANCED MAINTENANCE

Maintenance required after risk detection.



Maintenance's skill levels

Various levels of knowledge and skills are necessary for maintenance of devices and assemblies. For the tasks to be carried out, the level depends essentially upon the:

- Existing risk in the execution of the task (complexity);
- Specialist knowledge on devices, assemblies and software;
- Equipment and tools necessary to perform the maintenance.

Generally, this leads to 3 levels of skill: level 1 - level 2 and level 3

Unless required otherwise by national or local regulations, maintenance tasks are carried out by people with the appropriate level of competency: instructed persons, skilled persons or assembly manufacturer.

SKILL LEVEL 1



Tasks are simple actions undertaken by an **instructed person** following simple instructions and without exposure to hazardous live parts.

Examples of the tasks as:

- cleaning inside and outside of the assembly;
- checking the operation of displays (indicator lights, actuators, mechanical indicators, etc.);
- checking of barriers, shutters, covers doors and door locks;
- checking of conditions (temperature, dust, humidity, etc.);
- verification of mains and auxiliary cable conditions and their terminations;
- confirming protection settings are in accordance with the protection scheme;
- replacing fan filter in assemblies with forced ventilation.

SKILL LEVEL 2



Tasks are complex, require knowledge, training, supporting information and engineering judgment.

They are undertaken by a **skilled person** who understands the risks associated with partially energised equipment.

Examples of the tasks as:

- temperature measurement on mains connection or lugs, e.g. by using infra-red camera measurement;
- verification of insulation, busbar joints according to maintenance documentation;
- verification of effective earth continuity according to maintenance documentation;
- reviewing the wear and of ageing of components, e.g. erosion of main contacts and arc chutes⁽¹⁾ (where applicable)

(1): in case the products involved in the verification provide this type of control e.g. DMX³

SKILL LEVEL 3 EXPERT TEAM

Operations with procedures require the mastering of a particular technique or technology and / or the use of specialized supporting equipment. These tasks are carried out by personnel with **specialist skills**, for all these products it will be mandatory a Legrand expert, and include:

- verification and update of software (where applicable) according to maintenance documentation;
- incorporation of alternative devices when the original type is no longer available;
- verification according to maintenance documentation of mechanical and/or electrical interlocks where applicable;
- corrective maintenance and/or updating components.



PLAN FOR ENCLOSURES AND SWITCHGEAR & CONTROLGEAR EQUIPMENT



XL³ HP ENCLOSURES



In this section, you will find information concerning low voltage main distribution board with a checklist of steps to verify.

If your installation include IS system, you will find specific checking instruction p. 11



Unless you have an IS X3X installation, general maintenance must be carried out with the cabinet switched off.



Spare parts available in workshop book ► www.legrand.com



Scheduled maintenance

In environments such as data centers, hospitals... it is recommended to perform more frequent temperature checks depending on the criticality of the applications

OPERATIONS	PERIODICITY*	SKILL LEVEL 1	SKILL LEVEL 2
MECHANICAL INSTALLATION SYSTEM (ENCLOSURE, FACEPLATE, FUNCTIONAL UNIT...)			
Check that there are no foreign objects inside the enclosure	Annual	X	X
Condition of faceplates and IP protections	Annual	X	X
Cleaning (vacuum dusting)	Annual	X	X
Cleaning of air vents and fans (when existing)	Annual	X	X
Visually check for moisture and corrosion inside and outside the cabinet (condensation)	Annual	X	X
Check the good general condition of the functional unit (knocks, shocks, deformations, burns, ...)	Annual	X	X
Check the good condition of the barriers, forms, separation	Annual	X	X
Locking mechanism integrity	Annual	X	X
Lights efficiency on signalling devices	Annual	X	X
Retouching of possible scratches or corrosion points with specific varnish	Annual	X	X
Checking for the presence of information stickers	Annual	X	X
ELECTRICAL INSTALLATION SYSTEM			
Checking the continuity of the earthing connections and the protection circuit	2 months after commissioning then annual		X
Control of the automatic terminals	2 months after commissioning then annual	-	X
Control of the tightening : Conductors, power terminals of products, busbars	2 months after commissioning then annual	-	X
Temperature measurement and Thermographic control if necessary (sensitive points)	Annual	-	X
Controlgear and switchgear devices	Annual	-	X see detailed list of checkpoints p. 12
Verification of tightening torques : Busbars, conductors, power terminals of products	Every 3 years	-	X

* To be adjusted according to installation and usage conditions (see p. 5)



Condition-based maintenance: preventive maintenance based on environmental events, physical conditions or in case of fault should mandatory be undertaken by a skill level 2 or skill level 3 person (see p. 6)

Advanced maintenance

Maintenance carried out after fault detection to effect restoration, in accordance with the manufacturer's recommendations

OPERATIONS	SKILL LEVEL 1	SKILL LEVEL 2	SKILL LEVEL 3
Replacement part or components of LV assemblies	-	X (standard components only)	X

* To be adjusted according to installation and usage conditions (see p. 5)



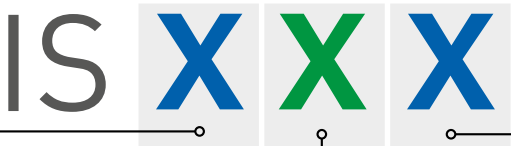
PLAN FOR CONTROLGEAR & SWITCHGEAR EQUIPMENT

XL³ HP 6300 IS



In this section, you will find information concerning low voltage main distribution board with IS system built-in, with a checklist of point to verify.

REMINDER FOR IS SYSTEM MAINTENANCE



OPERATION

Determines the consequences of a mechanical lockout or electrical lockout operation on the panel to allow work on the installation

1XX

Electrical panel shuts down completely

2XX

Just the functional unit affected shuts down completely

3XX

Power shutdown of the functional unit affected, but allows control system tests to be run in order to test the installation

MAINTENANCE

Determines the capacity of the panel to be maintained in the future

X1X

Electrical panel shuts down completely

X2X

Interruption limited to just the functional unit affected for a limited time (e.g. UTE: one hour). Reinsertion will require the connections to be remade

X3X

Interruption limited to just the functional unit affected for a limited time (e.g. UTE: fifteen minutes). Reinsertion will not require the connections to be remade

UPGRADING

Determines the capacity of the panel to be upgraded in the future

XX1

Electrical panel shuts down completely

XX2

Interruption limited to just the functional unit affected. Spare functional units are provided

XX3

Addition of any type of functional unit in an unequipped slot, without switching off the panel



Scheduled maintenance

Preventive maintenance carried out in accordance with a specified time schedule.

OPERATIONS	PERIODICITY*	SKILL LEVEL 1	SKILL LEVEL 2	SKILL LEVEL 3
Preventive maintenance for XL ³ HP enclosures (all operations should be done for XL ³ HP 6300 IS system in enclosures) p. 9				
Plugged-in/Draw-out IS 223 base	Annual	-	X	X
Plugged-in/Draw-out IS 233 base	Annual	X	X	X
Plugged-in/Test/Draw-out/Padlocking and position light (IS 333 base)/Position test	Annual	X	X	X
Checking for possible arcing or overheating	Annual	X (visual check only)	X (visual check only)	X
Checking the auxiliary contact terminal block (mobility, condition, lubrication and connections) (grease Cat. No 9 803 09)	Annual	-	X	X
Locking mechanism for mobile drawer with tripped circuit breaker (no load)	Annual	X	X	X
Clamp contact pressure	Every 3 years	-	-	X
Checking the installation of the fixed part	Every 3 years	-	X	X
Checking the presence of grease on the insertion contacts of the mobile drawer (grease Cat. No 9 803 09)	Annual	-	X	X
Cleaning and greasing of the insertion contacts of the mobile drawer (grease Cat. No 9 803 09)	Every 3 years	-	X	X
Checking the continuity of terminal block contacts	Annual	-	X	X
Controlgear and switchgear devices	Annual	-	X see detailed list of checkpoints p. 12	X see detailed list of checkpoints p. 12

* To be adjusted according to installation and usage conditions (see p. 5)



Condition-based maintenance: preventive maintenance based on environmental events, physical conditions or in case of fault should mandatory be undertaken by a skill level 2 or skill level 3 person (see p. 6)

Advanced maintenance

Maintenance carried out after fault detection to effect restoration, in accordance with the manufacturer's recommendations

OPERATIONS	SKILL LEVEL 1	SKILL LEVEL 2	SKILL LEVEL 3
Replacement of the connection clamps between IS Busbars and XL ³ HP 6300 IS Bases	-	-	X
Replacement of the mobile part	-	X	X

* To be adjusted according to installation and usage conditions (see p. 5)



Spare parts available in workshop book ► www.legrand.com



PLAN FOR CONTROLGEAR & SWITCHGEAR EQUIPMENT

MCBs / MCCBs / ACBs PERIODIC VERIFICATION

Please find below a list of checks and verifications to be carried out on all switchgear and controlgear equipments installed in XL³ HP enclosures. The XL³ HP 6300 IS system includes MCBs, MCCBs that must be verified.

OPERATIONS	MCBs	MCCBs	ACBs
GENERAL CHECK			
Check product integrity	X	X	X
Check correct installation	X	X	X
Verification of the absence of traces of surface discharges	X	X	X
Check presence of expected IP protections	X	X	X
Check for any traces of overheating	X	X	X
Check for any traces of electrical discharges	X	X	X
Check integrity of operating elements, handles or buttons	X	X	X
Check the correct maneuverability of the OPEN / CLOSE / TRIP product	X	X	X
Verification of the intervention history if possible	X	X	X
CHECK EXTERNAL ACCESSORIES			
Check rotary handle	-	X	-
Check integrity and completeness of the rotary handles	-	X	-
Check motor operator	X	X	X
- mechanical operation	-	X	-
- electrical operation	-	X	X
- handle integrity	-	X	-
Check connections, protections, clamps	X	X	(1)
Check integrity of protection	X	X	(1)
Self-release system	-	X	(1)
System to prevent extraction when closed	-	X	(1)
Check integrity of fixed part connections/ IP level	-	X	(1)
Check clamp contacts	X	X	(1)
Check the operation of the locking devices if is present	X	X	(1)
Check the tightening of the power connections	X	X	(1)

OPERATIONS		MCBs	MCCBs	ACBs
CHECK ELECTRICAL ACCESSORIES				
GENERAL MECHANICAL AND VISUAL CHECKS	ST coil integrity	X	X	(1)
	UVR coil integrity	X	X	(1)
	OC contact integrity	X	X	(1)
	CTR contact integrity	X	X	(1)
	ECTR contact integrity	X	X	(1)
	Check integrity of connector block	X	X	(1)
	Check integrity of connection accessories	X	X	(1)
ELECTRICAL CHECKS	Check electrical continuity of the power contacts	X	X	(1)
	Check electrical continuity of the auxiliary contacts	X	X	(1)
	Check the electrical functionality of the coils	X	X	(1)
	Motor operator functional check	X	X	(1)
	Functional check of RCD intervention Test T button	X	X	
ADDITIONAL SPECIALIST INSPECTION AND INSTRUMENTAL CHECKS				
Thermographic verification		X	X	X
Check RCB tripping test (real IΔ)		X	X	(1)
Dielectric check / insulation resistance check		X	X	X
Pole impedance checks (low voltage microohmmeter)		X	X	(1)
Check network quality and THD network analysis		X	X	X

(1) For the DMX³ refer to the specific guides and verification and maintenance protocols.



VERIFICATION REPORT

Date:/...../.....

Customer name:

Address:.....

Installer/constructor name:.....

Date of first installation:/...../..... Date of last maintenance:/...../..... IP:

Cabinet identification (serial number)Dimensions:.....x.....x.....mm No of column:.....

Type of equipment: ☐ ACBs ☐ MCCBs ☐ MCBs ☐ Measure ☐ Control devices

IS drawer type: ☐ 223 ☐ 233 ☐ 333 IS drawer equipment: ☐ DPX³250 HP ☐ DPX³630 ☐ modular devices

Room: Type of ventilation in the room:..... Average temperature: Degree of hygrometry:.....

Accomplished	Operations for XL ³ HP enclosures	Yes	No
☐	Check that there are no foreign objects inside the enclosure	☐	☐
☐	Condition of faceplates and IP protections	☐	☐
☐	Cleaning (vacuum dusting)	☐	☐
☐	Cleaning of air vents and fans (when existing)	☐	☐
☐	Visually check for moisture and corrosion inside and outside the cabinet (condensation)	☐	☐
☐	Check the good general condition of the functional unit (knocks, shocks, deformations, burns, ...)	☐	☐
☐	Check the good condition of the barriers, forms, separation	☐	☐
☐	Locking mechanism integrity	☐	☐
☐	Lights efficiency on signalling devices	☐	☐
☐	Retouching of possible scratches or corrosion points with specific varnish	☐	☐
☐	Checking for the presence of information stickers	☐	☐
☐	Checking the continuity of the earthing connections and the protection circuit	☐	☐
☐	Control of the automatic terminals	☐	☐
☐	Control of the tightening : Conductors, power terminals of products, busbars	☐	☐
☐	Temperature measurement and Thermographic control if necessary (sensitive points)	☐	☐
☐	Controlgear and switchgear devices	☐	☐
☐	Verification of tightening torques : Busbars, conductors, power terminals of products	☐	☐
☐	Replacement part or components	☐	☐
Accomplished	Operations dedicated to XL ³ HP 6300 IS system	Yes	No
☐	Plugged-in/Draw-out IS 223 base	☐	☐
☐	Plugged-in/Draw-out IS 233 base	☐	☐
☐	Plugged-in/Test/Draw-out/Padlocking and position light (IS 333 base)/Position test	☐	☐
☐	Checking for possible arcing or overheating	☐	☐
☐	Checking the auxiliary contact terminal block (mobility, condition, lubrication and connections)	☐	☐
☐	Locking mechanism for mobile drawer with tripped circuit breaker (no load)	☐	☐
☐	Clamp contact pressure	☐	☐
☐	Checking the installation of the fixed part	☐	☐
☐	Checking the presence of grease on the insertion contacts of the mobile drawer	☐	☐
☐	Cleaning and greasing of the insertion contacts of the mobile drawer	☐	☐
☐	Checking the continuity of terminal block contacts	☐	☐
☐	Replacement of the connection clamps between IS Busbars and XL ³ HP 6300 IS Bases	☐	☐
☐	Replacement of the mobile part	☐	☐





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