



IS SYSTEM

(WITHDRAWABLE SWITCHBOARD)

& XL³ HP FORMS

TECHNICAL GUIDE



#LegrandImprovingLives*

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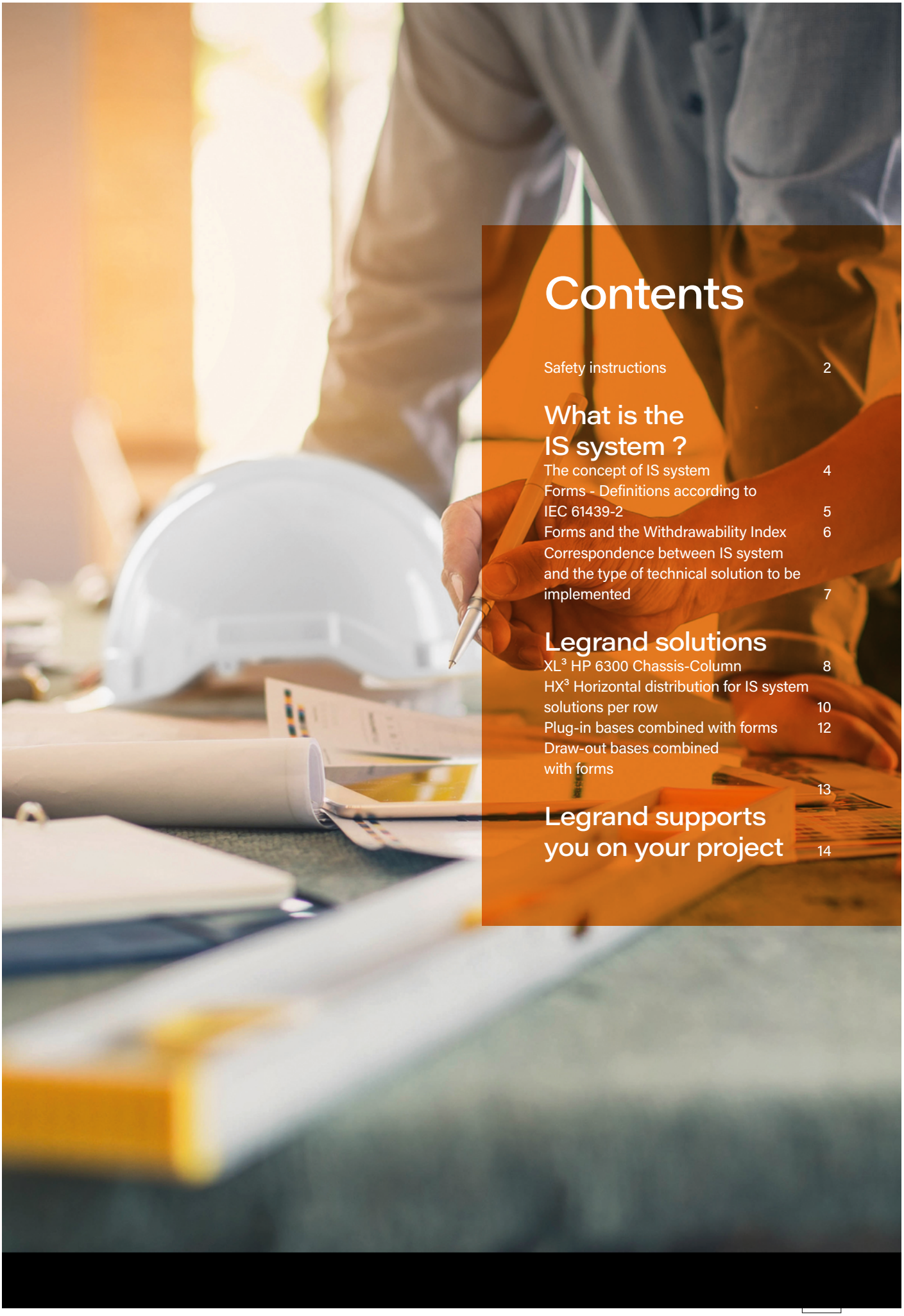
LEGRAND SUPPORTS YOU ON ALL YOUR PROJECTS

The Service Index (SI), defined by the UTE C 63-429 guide, is a specification tool that helps designers and users accurately determine the appropriate level of service continuity during the operation, maintenance, and upgrade phases of a switchboard. It represents both the specification the switchboard must meet and the level of intervention required from personnel during these three phases.

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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IS SYSTEM (WITHDRAWABLE SWITCHBOARD) & XL^3 HP FORMS

SAFETY INSTRUCTIONS



Any failure to strictly apply the procedures and non-compliance with these recommendations may expose the operator to serious accident risks, endangering people and property (including, without limitation, risks of burns, electric shocks...).

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 part.
- 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.

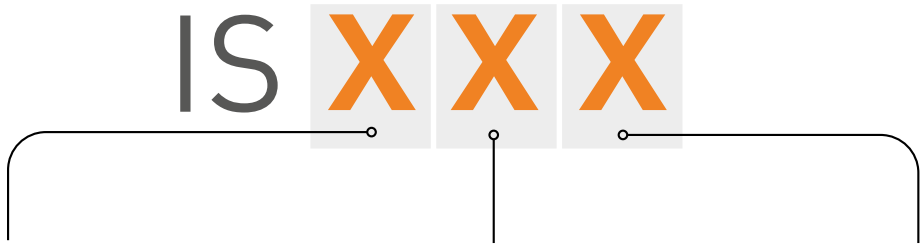
The customer must ensure proper installation, maintenance and operation of the equipment to avoid any risk of injury to personnel or damage to property in the event of product failure, especially for applications that require a very high level of safety (e.g., those in which the failure of a component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

WHAT IS THE IS SYSTEM ? (withdrawable switchboard)

The concept of IS system

The objective of the IS system is to qualify the level of service offered by any type of low-voltage switchboard in response to all types of interventions, during the three different phases of its life: operation, maintenance, evolution.



OPERATION

Determines the consequences of a mechanical contamination operation or electrical isolation of the switchboard for an intervention on the installation

1XX
Complete shutdown of the switchboard

2XX
Complete shutdown of the concerned functional unit only

3XX
Shutdown of the power of the concerned functional unit, but allows automation tests to check the installation

MAINTENANCE

Determines the ability of the switchboard to meet a maintenance requirement

X1X
Complete shutdown of the switchboard

X2X
Interruption limited to the concerned functional unit only and for a short time (example UTE: one hour). Reinstallation will require intervention on the connections.

X3X
Interruption limited to the concerned functional unit only and for a short time (example UTE: fifteen minutes). Reinstallation will be done without intervention on the connections.

EVOLUTION

Determines the ability of the switchboard to meet a future upgrade

XX1
Complete shutdown of the switchboard

XX2
Interruption limited to the concerned functional unit only. Spare functional units are planned.

XX3
Addition of any type of functional unit in an unequipped location, without shutting down the switchboard

Operation of the Assembly
Includes maneuvers necessary to allow mechanical or electrical maintenance of circuits and receivers in the installation, including tests under load.
The IS system determines whether it is possible to separate (electrically) and/or lock out (mechanically) any part of the installation to perform interventions and tests under load safely, with controlled consequences on its operation.

Maintenance of the Assembly
Includes operations for maintenance, repair, or control (diagnosis or replacement of defective parts) aimed at maintaining the assembly's characteristics.
The IS system determines whether it is possible to maintain safety with controlled consequences on the installation's operation.

Evolution of the Assembly
Includes operations for modifying the assembly through adjustments (calibrations), adjonction, or replacement of elements.
Certain evolutions require an interruption of the concerned functional unit: power increase, technology change.

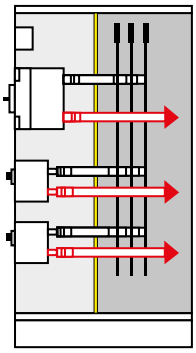
⚠ The Legrand IS system (withdrawable switchboard) allows work in cabinets while live; however, the concerned circuit must always be OFF LOAD: CIRCUIT BREAKER OPEN!

Forms - Definitions according to IEC 61439-2

To meet the requirements of Service Indexes, separation forms are generally implemented to comply with the operational, maintenance, and scalability requirements of the different indexes.

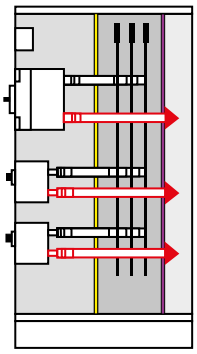
▪ Form 1: No internal separation

▪ Form 2a



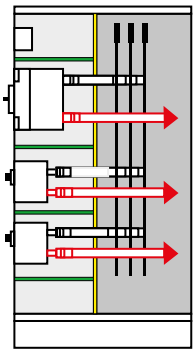
- Separation of busbars from all functional units.
- **Terminals for external conductors not separated from busbars.**

▪ Form 2b



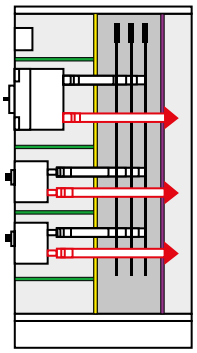
- Separation of busbars from all functional units.
- **Terminals for external conductors separated from busbars.**

▪ Form 3a



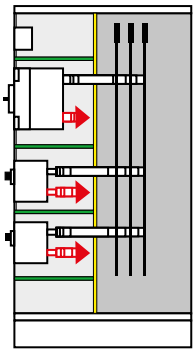
- Separation of busbars from all functional units.
- Separation of all functional units from one another.
- Separation of terminals for external conductors and functional units, but not from the terminals for external conductors of other functional units.
- **Terminals for external conductors not separated from busbars.**

▪ Form 3b



- Separation of busbars from all functional units.
- Separation of all functional units from one another.
- Separation of terminals for external conductors and functional units, but not from the terminals for external conductors of other functional units.
- **Terminals for external conductors and external conductors separated from busbars.**

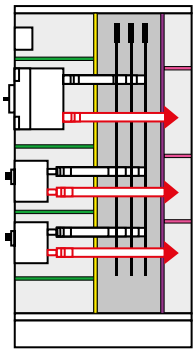
▪ Form 4a



- Separation between busbars and all functional units.
- Separation of all functional units from one another.
- Separation of terminals for external conductors associated with a functional unit from those for external conductors of all other functional units and the busbars.
- Separation of the external conductors from the busbars.
- Separation of the external conductors associated with a functional unit from other functional units and their terminals for external conductors.
- **Terminals for external conductors in the same compartment as the associated functional unit.**

ⓘ It is not necessary to separate the external conductors from each other.

▪ Forme 4b



- Separation between busbars and all functional units.
- Separation of all functional units from one another.
- Separation of terminals for external conductors associated with a functional unit from those for external conductors of all other functional units and the busbars.
- Separation of the external conductors from the busbars.
- Separation of the external conductors associated with a functional unit from other functional units and their terminals for external conductors.
- **Terminals for external conductors not in the same compartment as the associated functional unit, but in individual, separate, enclosed protected spaces or compartments.**

ⓘ It is not necessary to separate the external conductors from each other.

WHY THE IS SYSTEM ? (continued) (withdrawable switchboard)

Forms and the Withdrawability Index

The separation forms and the types of electrical connections of Functional Units (FUs) are defined in the EN/IEC 61439-1 and 2 standards **(p. 5).**

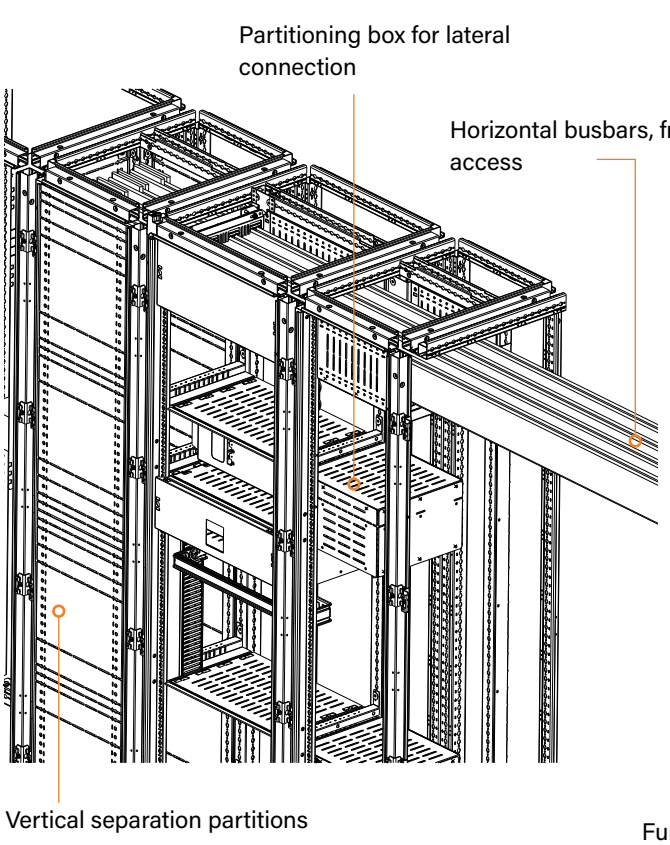
The forms define the barriers to be implemented to ensure more or less significant protection against contact with hazardous parts.

The type of electrical connection of Functional Units (FUs) indicates the technical solutions chosen for the “withdrawability” of Functional Units (FUs) (F: fixed, D: disconnectable, W: withdrawable) for incoming and outgoing power circuits and auxiliary circuits.

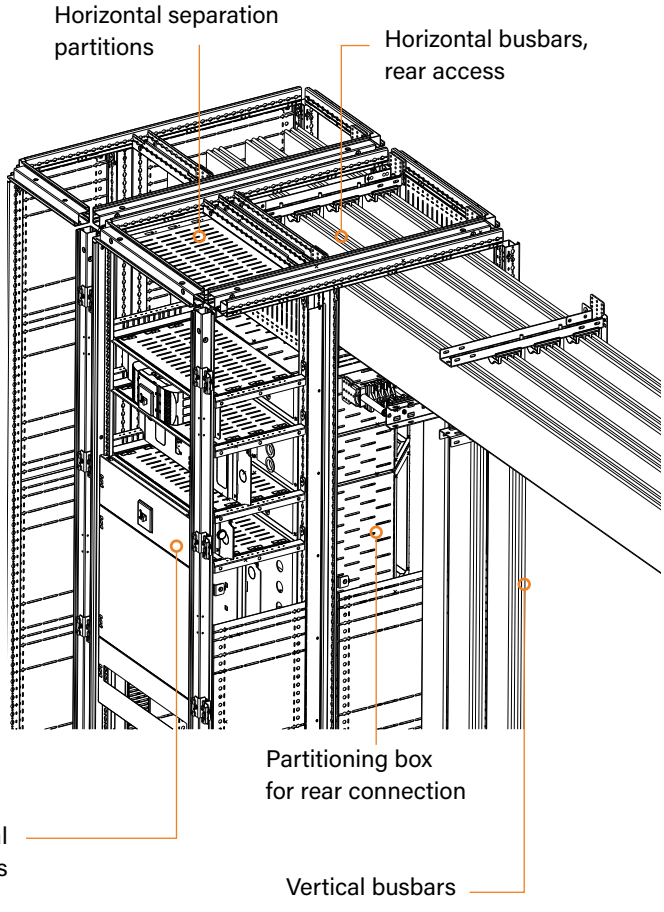
These two aspects describe technical solutions applicable to assemblies but do not define an actual need for safety level and maintenance time.

Legrand partitioning equipment allows achieving all form levels:
- up to 4b in XL^3 HP 6300 cabinets,
- up to 2b in XL^3 HP 630 cabinets and enclosures.

FRONT CONNECTION



REAR CONNECTION



Correspondence between IS system and the type of technical solution to be implemented

Each IS system corresponds to a form level and a design of functional units within the switchboard:
F: fixed connections
D: disconnectable connections
W: withdrawable connections

Codification of the withdrawability index according to EN/IEC 61439-1:

1st letter: main incoming circuit (upstream) - 2nd letter: main outgoing circuit (downstream) - 3rd letter: auxiliary circuit

Even though the IS system is not mentioned in the EN/IEC 61439 series of standards, there are, of course, interactions, particularly regarding separation forms and the withdrawability index. For example, an IS system X2X implies at least a Form 3b (see table below). Separation forms address aspects related to safety but do not take into account the concept of switchboard scalability. Conversely, the IS system considers the locking of functional units and testing of auxiliary circuits during the three life phases of the switchboard.

The IS system therefore goes beyond the recommendation of forms in ensuring the safety of people who need to intervene for the operation, maintenance, and evolution of low-voltage switchboards.

The XL³ HP enclosure range, associated with Legrand distribution systems, meets all needs, from the most basic (IS 111 – Form 1 – withdrawability FFF) to the most complete (IS 333 – Form 4b – withdrawability WWW).

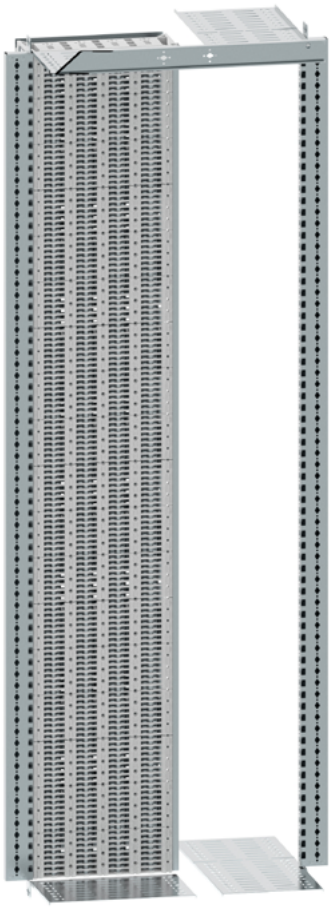
DESIRED MINIMUM IS SYSTEM	MINIMUM FORM OF SEPARATION	MINIMUM WITHDRAWABILITY INDEX	PROPOSED LEGRAND SOLUTIONS	LEGRAND WITHDRAWABILITY INDEX
111	1	FFF	Fixed version devices	FFF
211	1	FFF	IS 223 bases DPX³ with plug-in bases	DFF/DFD
221	3b	DFF	IS 223 bases DPX³ with plug-in bases + form(1)	DFF/DFD
222	3b	DFF	IS 223 bases DPX³ with plug-in bases + provision for future devices + form(1)	DFF/DFD
223	3b	DFF	IS 223 bases HX³ automatic connection distributor (p. 10)	DFF/WFD
231	3b	DDD	IS 233 bases DPX³ with plug-in bases + form(1)	DDD
232	3b	DDD	IS 233 bases DPX³ with plug-in bases + form(1)	DDD
233	3b	DDD	IS 233 bases DPX³ with plug-in bases + provision for future devices + form(1)	WWD
311	1	WWW	IS 333 bases DPX³/DMX³ with draw-out bases	WWW
321	3b	WWW	IS 333 bases DPX³/DMX³ with draw-out bases + form	WWW
322	3b	WWW	IS 333 bases DPX³/DMX³ with draw-out bases + provision for future devices + form	WWW
323	3b	WWW	IS 333 bases	WWW
331	3b	WWW	IS 333 bases DPX³/DMX³ with draw-out bases + form	WWW
332	3b	WWW	IS 333 bases DPX³/DMX³ with draw-out bases + provision for future devices + form	WWW
333	3b	WWW	IS 333 bases	WWW

[1]: To reach this level of forms, it is possible to use external terminals or terminal covers.

LEGRAND SOLUTIONS

XL³ HP 6300 Chassis-Column

For solutions up to IS 333



COMPOSITION:

CHASSIS-COLUMN
+
ALUMINUM BUSBARS
+
IS BASES
+
IS FACEPLATES

Chassis-Column

Height 1600 mm or 1800 mm

Common to all IS XX3 system and can only be installed in XL³ HP 6300 enclosures with a width of 700 mm and a height of 1800 mm, 2000 mm, or 2200 mm.

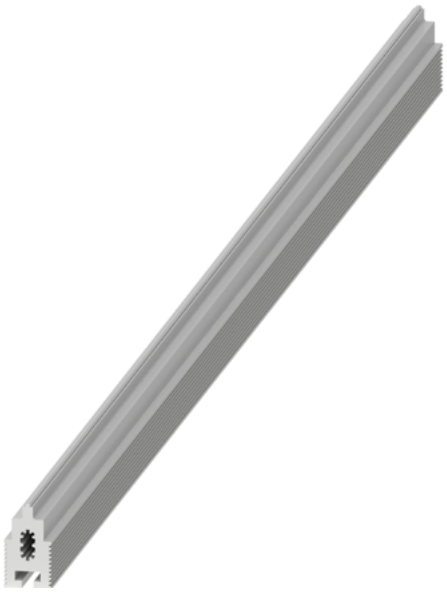
The bases are available with left or right side outlets, allowing the use of a commun sleeve. The IS chassis is positioned accordingly.

The depth can be 400 mm only if the version includes front terminals.

Aluminum busbars with dedicated profile

For chassis-column height 1600 mm or 1800 mm

Allows powering IS bases up to 2000 A

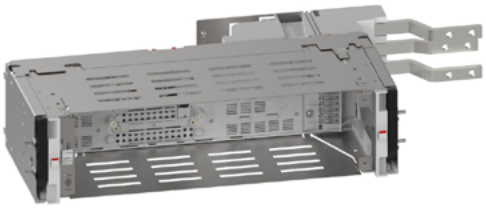


IS Bases

Available in 3 versions: IS 333, IS 233, or IS 223.

Allow the connection of functional units (up to 630 A) and the connection/disconnection of upstream circuit breakers while live (circuit breaker open: circuit off-load).

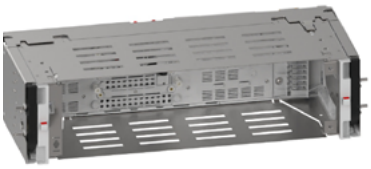
Connect to the 2000 A vertical aluminum busbar via replaceable link connectors.



IS 333 Base



IS 233 Base



IS 223 Base

	IS 333 Base	IS 233 Base	IS 223 Base
Compatibility with protective devices	DPX³ 630 and DPX³ 250 HP	DPX³ 630 and DPX³ 250 HP	DPX³ 630, DPX³ 250 HP and modular devices
Compatibility with building energy management systems	YES	YES	YES
Construction	Withdrawable drawer with levers	Withdrawable drawer with levers	Withdrawable drawer with levers. Drawer screwed onto the fixed base
Push buttons (lever unlocking)	YES	YES	NO
Positions	3 positions: connected / test / disconnected	2 positions: connected / disconnected (1)	2 positions: connected / disconnected
Mechanical position indicator	YES	YES	NO
Possibility to install modular equipment on the front	YES	YES	YES
Upstream connection	On chassis-column	On chassis-column	On chassis-column
Downstream connection	Offset on rear or lateral sockets	Offset on rear or lateral sockets	On circuit breaker, with terminal covers

(1): In drawn-out position, remains attached to the main switchboard.

IS faceplates

Install the specific faceplates for IS bases dedicated to the installed protective devices.
The faceplate locks with a 1/4 turn on the IS base.

LEGRAND SOLUTIONS (continued)

HX³ Horizontal distribution for IS system solutions per row

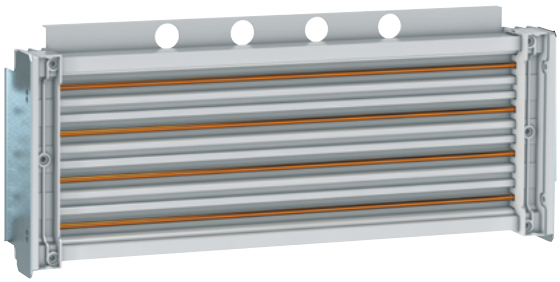
The HX³ horizontal distributors allow, under installation conditions, compliance with an IS 223 per row.



Automatic connection distributor for HX³ distribution up to 125 A

Connection and disconnection under voltage (no load) in complete safety (IP XXB) via connection module

► Mounting in XL³ HP 160, XL³ HP 630, and XL³ HP 6300 cabinets and enclosures on rail



Automatic connection distributor for HX³ distribution up to 400 A

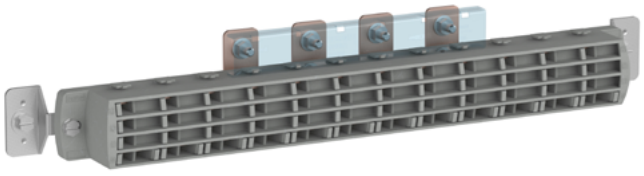
Connection and disconnection under voltage (no load) in complete safety (IP XXB) via support bases for DPX³ 160 and DPX³ 250

► Mounting in XL³ HP 630 and XL³ HP 6300 cabinets and enclosures on functional uprights

Lexiclic distributor for HX³ distribution up to 250 A

Connection and disconnection under voltage (no load) in complete safety (IP XXB) using cords with automatic locking connectors

► Mounting in XL³ HP 630 and XL³ HP 6300 cabinets and enclosures on functional uprights or crosspieces



Workshop specifications available, for more information on assembling these products:
► Check the online catalog at legrand.com



IS 223 PER ROW

This system provides an IP xxB protection level as live parts are inaccessible without tools.

- During operation:
Each circuit can be controlled independently of the others. However, it is not possible to test the auxiliary circuits of a disconnected Functional Unit (FU).

- During maintenance:
A Functional Unit (FU) can be replaced without disconnecting the other circuits in the cabinet. However, intervention on the upstream connection will be required.

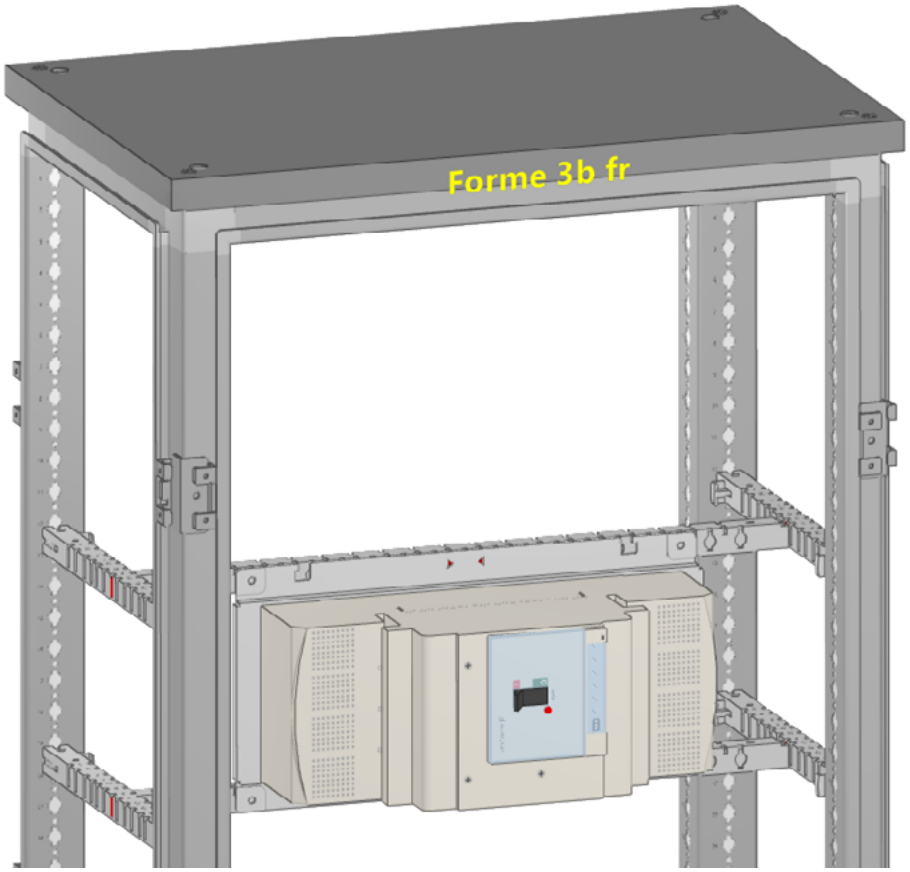
- During upgrades:
It is possible to add any type of Functional Unit (FU) (single device or a row of devices) in an unequipped location.
The system allows for scalability under live conditions (IS XX3), either for the entire row or per device, after ensuring that the devices are in the "OPEN" position.

These distributors can be complemented to achieve an IS 223 per row with other Legrand products for building a low-voltage switchboard.
All these components, tested with Legrand equipment, make it possible to create assemblies compliant with IEC 61439-2, while reducing installation time, optimizing enclosure size, and ensuring user safety (including partitioning forms).

LEGRAND SOLUTIONS (continued)

Plug-in bases combined with forms

For IS 222 or IS 232 solutions





View within the software
XLPro4 Panels 6300

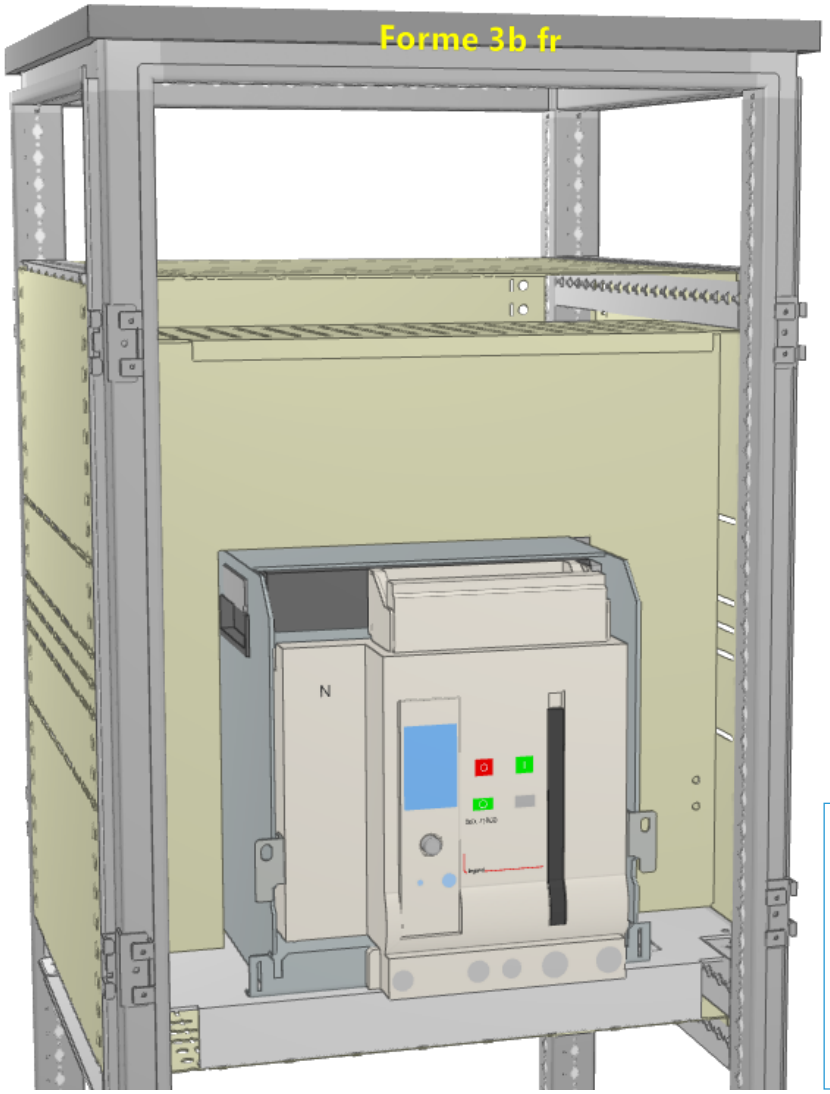
To meet the requirements of a IS system 222 or 232, DPX³ devices equipped with plug-in bases can be used, combined with a minimum separation form of 3b.

- **During operation:** Each functional unit can be shut down independently.
- **During maintenance:** Interruption is limited to the functional unit concerned. In addition, reinstallation will not necessarily require intervention on the connections.
- **For future upgrades:** Plan for one or more unequipped bases inside the switchboard to allow for future expansion without the need to de-energize the switchboard. The type of unit will therefore be planned in advance and cannot be modified without shutting down the switchboard.

Plug-in bases are available for DPX³ 250 HP and DPX³ 630.
For DPX³ 1600, a draw-out base must be used.

Draw-out bases combined with forms

For IS 322 or IS 332 solutions





View within the software
XLPro4 Panels 6300

To meet the requirements of a IS system 322 or 332, draw-out bases can be used in combination with a minimum separation form of 3b or 4b.

- **During operation:** each functional unit can be shut down independently. It is also possible to set the circuit breaker to the test position, allowing auxiliary circuit testing while ensuring isolation of the power circuit for the specific functional unit.
- **During maintenance:** limit the interruption to the functional unit concerned. In addition, reinstallation will not require intervention on the connections.
- **For future upgrades:** Plan for one or more unequipped bases inside the switchboard to allow for future expansion without the need to de-energize the switchboard. This type of unit will therefore be planned in advance and cannot be modified without shutting down the switchboard.

From DPX³ 250 HP up to DMX³ 6300, our wide range of draw-out bases supports all types of MCCBs and ACBs for this type of IS system.

LEGRAND SUPPORTS YOU IN YOUR PROJECT

Legrand supports you throughout your project in compliance with IEC 61439-2, from the project study to the realization of your PSA, so that the documents can be delivered to the project management and installers.

DESIGN AND EXECUTION ENGINEERING OFFICES
Drafting of the specifications and study of the electrical architecture of the project.

PANEL BUILDER
Realization of the PSA.

PROJECT STUDY





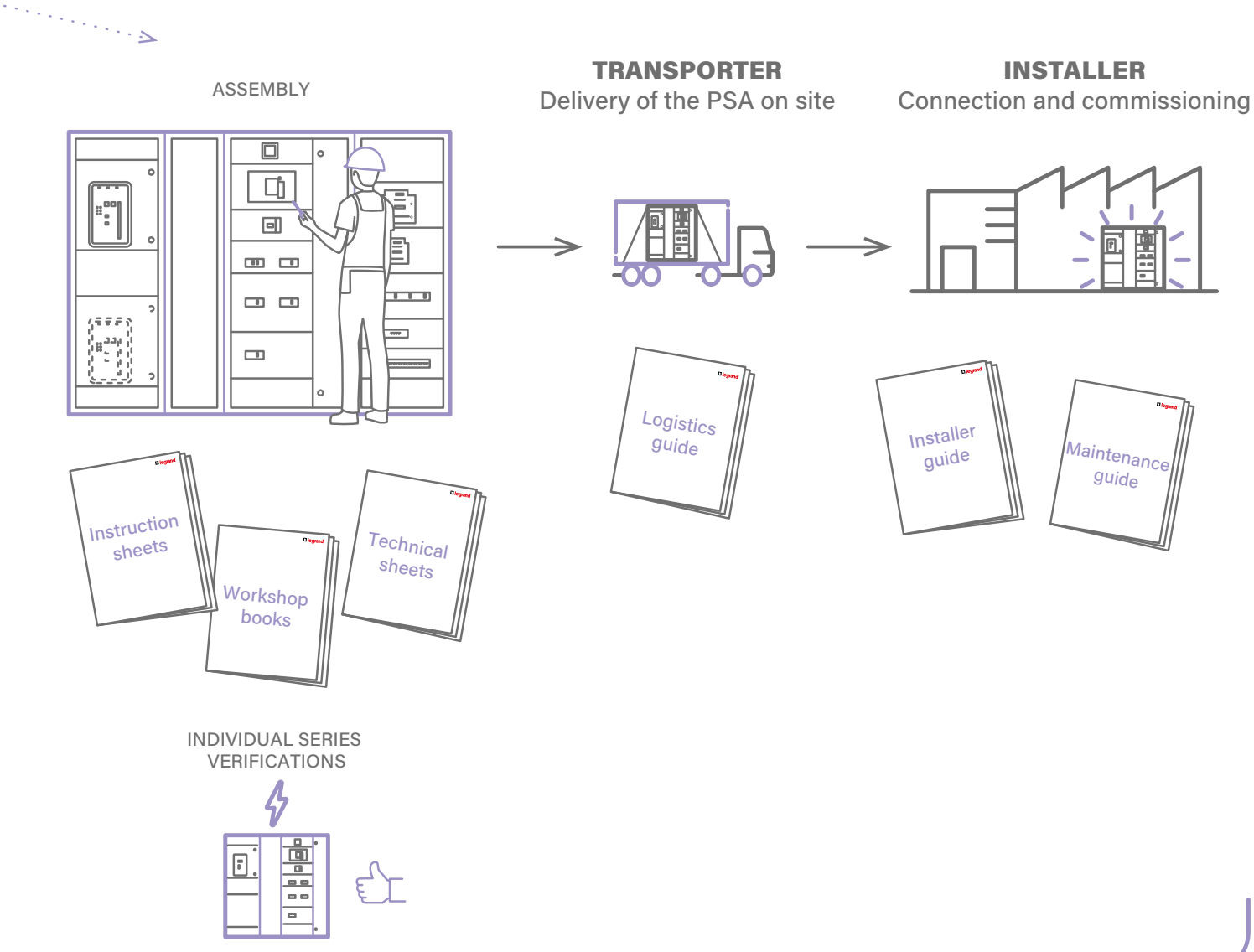
The XLPro4 Panels software allows you to:
- create adapted electrical diagrams
- design the PSA layout
- perform thermal studies





The XLPro4 Calcul 6300 software allows you to produce calculation notes.

Different tools help you save time and provide the essential technical elements to meet the requirements of the standard: XLPro4 Calcul 6300 and XLPro4 Panels 6300 software, instruction sheets, technical sheets, workshop books, technical guides, etc.



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NOTES

NOTES







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