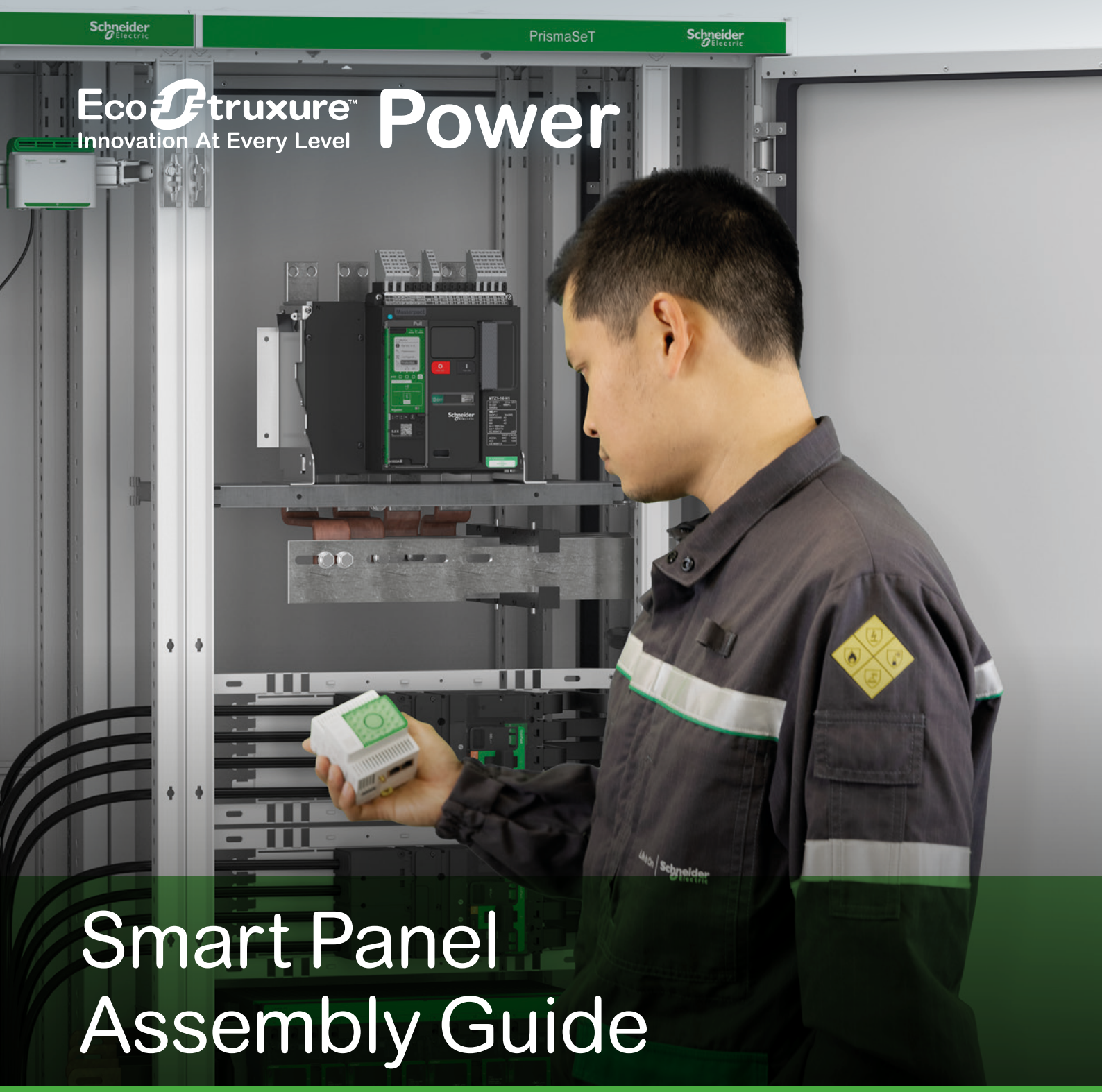
EcoStruxure™ Innovation At Every Level Power



Smart Panel Assembly Guide

An Assembly Guide for Panel Digitalization for Commercial and Industrial Buildings

07/2024

se.com/ww/ecostruxure-power

Life Is On Schneider Electric

Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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Purpose of this Document

Target Audience

This assembly guide is primarily intended for panel builders. However, it could also be useful for design firms or any other qualified personnel working with Smart Panels.

Objective

As panel digitalization becomes more common, there is a larger selection of connectable products available. With a complex panel combining various connected products and different forms of internal separation, deciding which products to use, finding space for cabling and determining the limitations of wireless communication are common challenges.

The objective of this guide is to describe the installation and testing process of network equipment, limiting the scope to low-voltage distribution panels (LVDP) and final distribution switchboards for non-critical small to medium-sized buildings.

This guide starts with a short introduction to the examples which will be used as the framework. It includes basic installation rules as well as more in-depth information on auxiliary power supplies and low-power communication circuits.

Please always keep in mind that it is essential to comply with installation and implementation best practices, to avoid any risk of shutdown or malfunction due to insufficient distances between devices, temperature increases, electromagnetic compatibility or other related issues.

TO OPTIMIZE YOUR NAVIGATION EXPERIENCE:
To enhance your navigation experience (especially the option to use the back button), it is advised to download the PDF document and open it on your computer.

Purpose of this Document

Related Documents

Guides

Title document	Reference number
EcoStruxure™ Power Design - Selection Guide	**ESXP1G001EN**
ULP System for MasterPacT™ and ComPacT™ - User Guide	**DOCA0093EN**
EcoStruxure™ for Connected Panels and Facility Expert - Commissioning Guide	**ESXP1G004EN**
PacT series - Cybersecurity Guide	**DOCA0122EN**

Instruction Sheets

Title document	Reference number
ULP* Port Module for Fixed MasterPacT MTZ - Instruction Sheet	**NVE40791**
ULP* Port Module for Drawout MasterPacT MTZ1 - Instruction Sheet	**NVE40796**
ULP* Port Module for Drawout MasterPacT MTZ2/MTZ3 - Instruction Sheet	**NVE40797**
BSCM Breaker Status Control Module - Instruction Sheet	**GHD16046AA**
ComPacT NSX, NSX Cord - Instruction Sheet	**GHD16047AA**
ComPacT NSX, Insulated NSX Cord - Instruction Sheet	**GHD16313AA**
IFM Interface for Circuit Breaker - Instruction Sheet	**NVE85393**
Enerlin'X IFE Ethernet Switchboard Server - Instruction Sheet	**QGH13473**
EIFE Embedded Ethernet Interface - Instruction Sheet	**NVE23550**
Enerlin'X I/O Module Interface - Instruction Sheet	**HRB49217**
Wireless Indication Auxiliary (ComPacT NSXm) - Instruction Sheet	**NNZ8881001**
Wireless Indication Auxiliary (ComPacT NSX) - Instruction Sheet	**NNZ8882801**
Wireless Auxiliary Contact - Instruction Sheet	**NNZ4314501**
Acti9 Active Vigi iC60 - Instruction Sheet	**PKR58950**
Acti9 Active Vigi iDT40 - Instruction Sheet	**PKR58952**
Acti9 Active VigiARC iC60 - Instruction Sheet	**NNZ96047**
Acti9 Active VigiARC iDT40 - Instruction Sheet	**NNZ96043**
Acti9 Active AFDD iC60 - Instruction Sheet	**NNZ96046**
Acti9 Active AFDD iDT40 - Instruction Sheet	**NNZ96042**
PowerTag Energy Rope - Instruction Sheet	**GDE25175**
PowerTag Energy M250 - Instruction Sheet	**QGH46815**
PowerTag Energy M630 - Instruction Sheet	**QGH46820**
PowerTag Energy F160 - Instruction Sheet	**MFR85580**
PowerTag Energy M63 - Instruction Sheet	**PHA39639**
PowerTag Energy F63 - Instruction Sheet	**JYT32195**
PowerTag Energy P63 - Instruction Sheet	**JYT31928**
EcoStruxure Panel Server Entry - Instruction Sheet	**NNZ76760**
EcoStruxure Panel Server Universal - Instruction Sheet	**GDE74119**
EcoStruxure Panel Server Advanced - Instruction Sheet	**JYT24469**
I/O Smart Link - Instruction Sheet	**PKR5509302**
HeatTag - Instruction Sheet	**MFR5173801**
Enerlin'X FDM121 - Instruction Sheet	**QGH80971**
Enerlin'X FDM128 - Instruction Sheet	**HRB45777**
Modicon MCSESU Unmanaged Switch - Instruction Sheet	**NNZ7563404**
Auxiliary Power Supply - Instruction Sheet	**GDE5437201**

*ULP: Universal Logic Plug

You can download these technical publications and other technical information from our website at **www.se.com/ww/en/download**.

You shall always refer to the instruction sheet.

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Safety Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it.

The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER
DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING
WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION
CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE
NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid hazards involved.

Safety Information

Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, a start-up test should be run on the system by qualified personnel to check that the equipment is operating correctly. It is important to schedule sufficient time and make the necessary arrangements to ensure complete and satisfactory testing.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future reference.

The software must be tested in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (for example, according to the National Electrical Code in the U.S.A.). If high potential voltage testing is necessary, follow the recommendations in the equipment documentation to help prevent accidental equipment damage.

Before energizing the equipment:

- Remove any tools, meters, and debris from the equipment.
- Close the equipment enclosure door.
- Perform all start-up tests recommended by the manufacturer.

Please Note

The following precautions are from the NEMA Standards Publication ICS 7.1-195 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to adjust the equipment incorrectly and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to help prevent unauthorized changes to operating characteristics.

Safety Information

Safety Precautions

The following safety messages apply to the installation, configuration and operation of Smart Panels.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- Only qualified personnel familiar with low and medium voltage equipment are to perform work described in this set of instructions. Workers should understand the hazards involved in working with or near low and medium voltage circuits.
- Perform such work only after reading and understanding all of the instructions contained in this bulletin.
- Turn off all power before working on or inside equipment.
- Use a properly rated voltage sensing device to confirm that the power is off.
- Before performing visual inspections, tests, or maintenance on the equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of back feeding.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.
- Beware of potential hazards, wear personal protective equipment and take adequate safety precautions.
- Do not make any modifications to the equipment or operate the system with the interlocks removed. Contact your local field sales representative for additional instruction if the equipment does not function as described in this manual.
- Carefully inspect your work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors and covers before turning on power to this equipment.
- All instructions in this manual are written with the assumption that the customer has taken these measures before performing maintenance or testing.

Failure to follow these instructions will result in death or serious injury.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Always consult product User Manuals and Instruction Sheets before installing, commissioning and operating a product.

Failure to follow these instructions will result in death or serious injury.

NOTICE

NETWORK INOPERABILITY

Do not make unauthorized changes in the network configuration.
Failure to follow these instructions can result in an unstable or unusable network.

This document is intended to describe how to select and configure the Smart Panel system.

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications ans products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contains terms that are deemed inappropriate by some customers.

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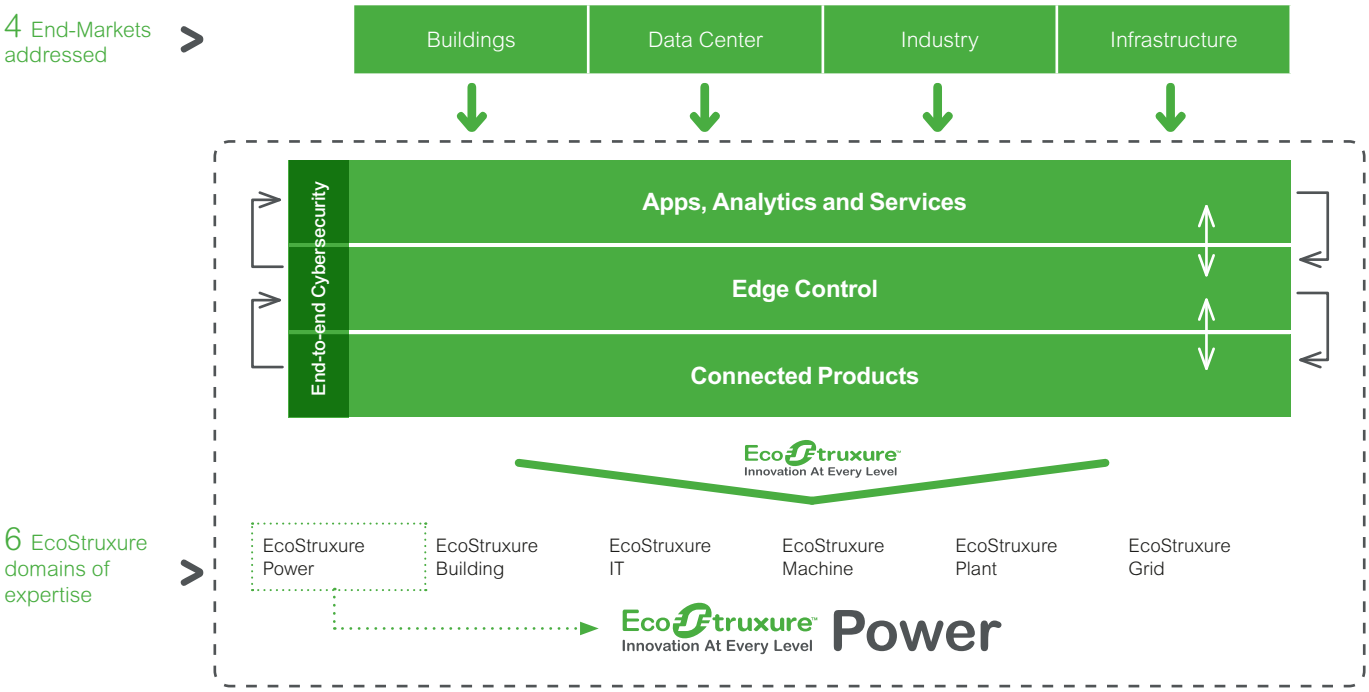
INTRODUCTION

Introduction to EcoStruxure

EcoStruxure Platform

As shown in the diagram below, and indicated by the green arrows, EcoStruxure Power is one of the six domains of EcoStruxure, our IoT-enabled architecture and platform.

EcoStruxure Power plays a key role in all four End-Markets (Building, Data Center, Industry and Infrastructure). This involves bringing the world of electrical distribution to those End-Markets.



EcoStruxure's integrated architecture serves four End-Markets with its six domains of expertise.

OUR VISION OF A NEW ELECTRIC WORLD

The world is becoming more electric and digital, and power is becoming more distributed, more complex to manage, and more integrated into our everyday lives. We envision a New Electric World where building staff and occupants are safer, with zero electrical safety incidents. Where power is 100% available, with zero unplanned downtime. Where energy and operations are more efficient, with zero energy waste. And where operational systems are resilient, with zero cyber intrusions.

We strive to make this vision a reality with our IoT-enabled EcoStruxure architecture and platform, which we deliver through our connected energy management ecosystem – a collective of partners and industry experts who are openly collaborating with us to drive innovation, enhance productivity, reduce risk, and unlock new growth opportunities.

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Introduction to EcoStruxure

EcoStruxure Power Value Proposition

- **EcoStruxure Power digitizes and simplifies low and medium voltage electrical distribution systems.** It provides essential data to aid the decisions that help protect people, safeguard assets, maximize operational efficiency and business continuity, and maintain regulatory compliance.

- **EcoStruxure Power is an open architecture and platform** designed with the intention of making it easy to add, upgrade, and swap components. The world is full of electrical distribution systems in various stages of maturity, produced by a variety of manufacturers. Interoperability with EcoStruxure Power is essential to making these power distributions systems future ready. The added benefit of a holistic Schneider Electric system is plug-and-play connectivity to achieve faster and lower risk integration and commissioning.

- **EcoStruxure Power architectures are cost-optimized** to deploy, using only the right technology to deliver the desired business outcomes for our customers – no more, no less. However, customer needs or demands change over time.

- **The EcoStruxure Power system is scalable** from light commercial and industrial buildings to critical facilities such as hospitals, data centers or infrastructure such as airports, rail and oil and gas. The scalability of EcoStruxure Power means it also grows and evolves with changing needs or demands through its modular architecture.

- **EcoStruxure Power architectures are fully flexible power distribution systems** with the ability to adapt to dynamic and ever-changing conditions, such as balancing supply and demand by the hour or minute or adding and then scaling on-site renewable generation capabilities over time. Connecting IT and OT systems into a single, easy-to-manage Ethernet IP network is at the heart of our digitization story. With EcoStruxure Power, facility managers can use the data they collect to make real-time decisions to maximize business continuity and optimize operations.

- **EcoStruxure Power architectures enable remote and on-site consultancy** to help maximize uptime, optimize maintenance costs and improve operator efficiency while extending asset and system life expectancy.

More about EcoStruxure Power

se.com/ww/ecostruxure-power

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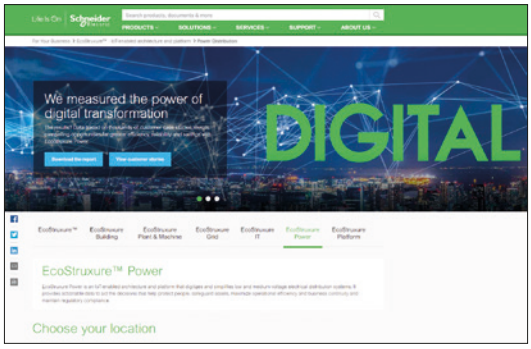

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Introduction to Smart Panels

Digitize your Panel

Connected Products make the base layer of EcoStruxure solutions and are essential to make your panel a Smart Panel (also known as a connected panel or digital panel). To get the benefits from EcoStruxure Power, it is essential to add connectivity to your panel.

There are several ways to connect a panel, and keep in mind that only what is measured can be managed. Connectivity can range from a simple I/O module to connecting multiple sophisticated products with communication via wireless and/or wired communication. Thus, the benefits of EcoStruxure Power will depend on how the panel is connected, including which products are used, how the information is transferred to the two top layers of EcoStruxure (Edge Control and Apps, Analytics and Services), and finally which software solution is used as well as how it is set up. As an example, an Indication Auxiliary (OF/SD) in a ComPacT NSX circuit breaker can give you the status of your circuit breaker, but not information regarding recent events, energy measurements or information on the power quality.

Connectivity can be added in a new panel (Greenfield) or a preexisting panel (Brownfield). Adding connectivity in an existing panel can sometimes be complicated, as there could be additional space restrictions, as well as an impact if downtime is needed to work on the panel. Nevertheless, there are solutions that make it easier to add connectivity in these types of panels.

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About the Guide

Structure of the Document

Section 1: Panel and Product Architecture

This section provides an overview of products designed to digitize your non-connected panel.

Section 2: Product Installation Guidelines

This section includes installation details, including device installation, power supply requirements and wiring rules and recommendations.

Section 3: Panel Commissioning and Verification Guidelines

In this section the factory quality control is addressed. It includes commissioning utilizing EcoStruxure Power Commission, firmware revision and communication system test.

Appendix

The Appendix includes product references for the digital products and accessories described in this guide.

EcoXpert and Green Premium

Information about our EcoXpert and Green Premium programs is available at the end of the guide.

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SECTION 1

Panel and Product Architecture

Introduction

Purpose of this Section

Section 1 provides an overview of a Smart Panel; the first example shows a panel with no connectivity, and the second example shows the same panel now digitized with products to make it into a Smart Panel. The panels are set up to show several different types of solutions for connectivity. This includes both wired and wireless solutions, as well as solutions that will give different levels and types of information.

Switchboard > 630 A

Non-connected Switchboard > 630 A

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MasterPacT MTZ main switchboard

At the switchboard head, the drawout MasterPacT MTZ circuit breaker helps to protect the building's entire electrical distribution system.

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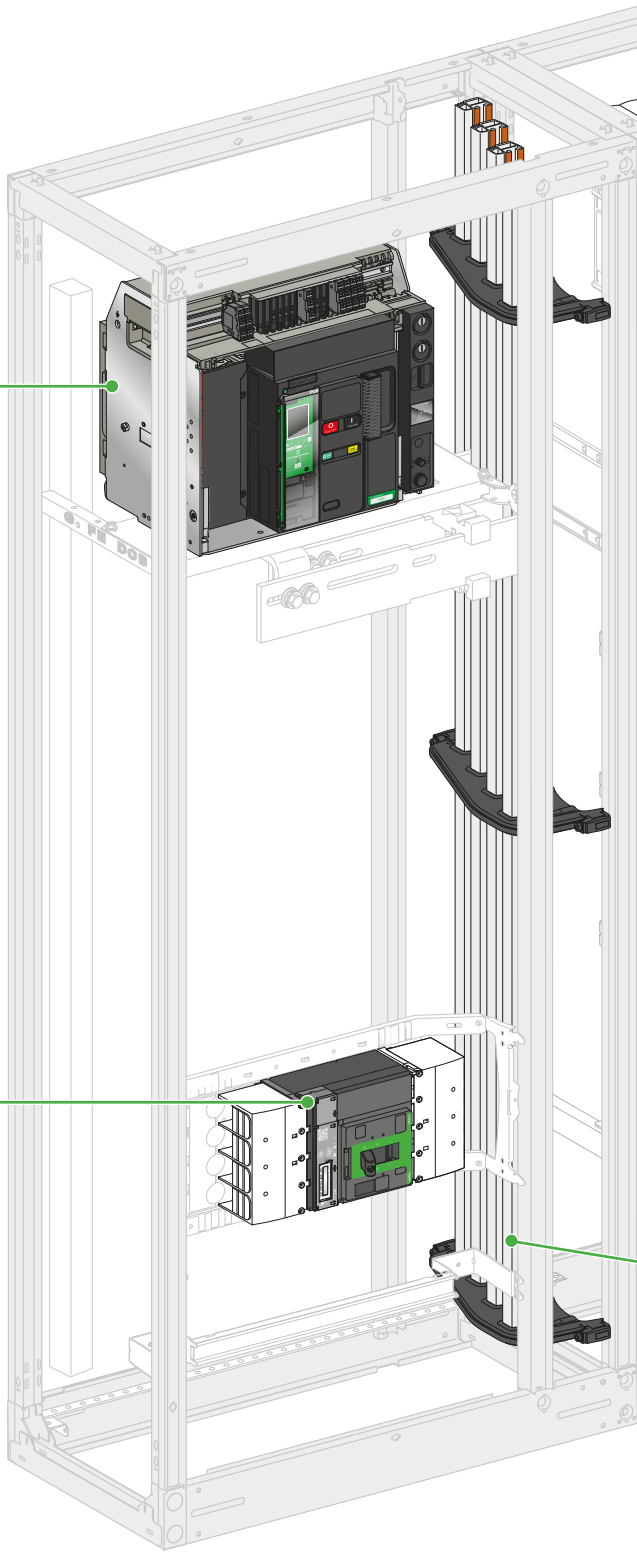

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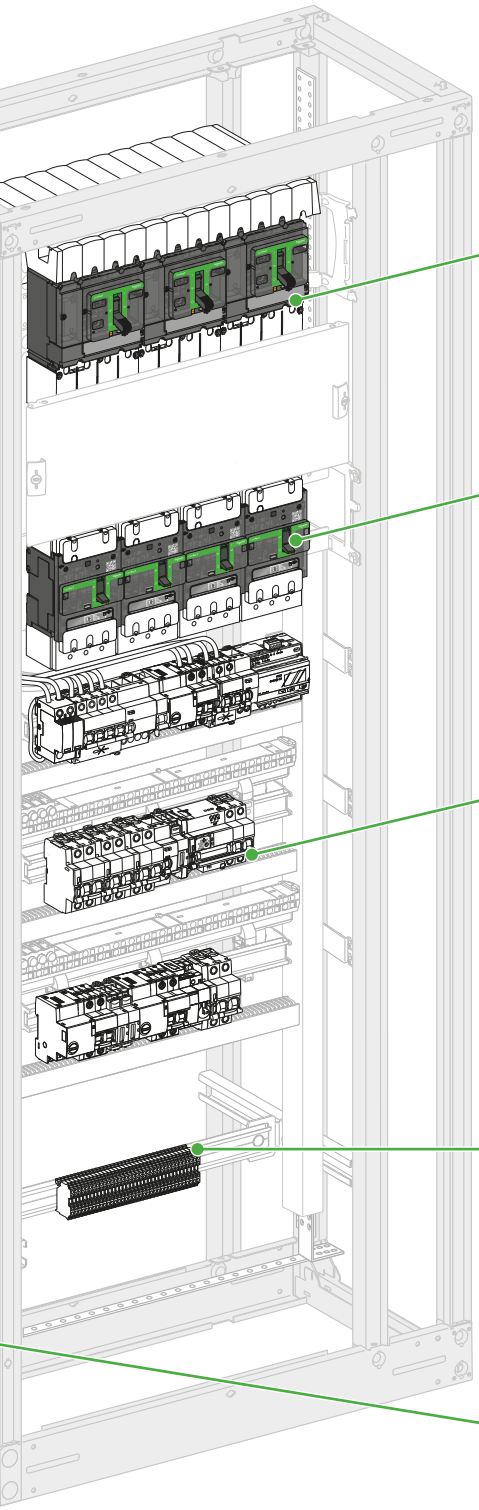
ComPacT NSX630 A circuit breaker

The ComPacT NSX circuit breaker, rated up to 630 A, helps to protect the final distribution feeders.

Switchboard > 630 A

Non-connected Switchboard > 630 A



ComPacT NSX250 A

The main loads have their own individual protection, thanks to three ComPacT NSX outgoing lines. This circuit breaker is rated up to 250 A.

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ComPacT NSXm 160 A

The smallest circuit breaker in the ComPacT range, rated up to 160A

PB124093.eps

Final switchboard

The Acti9 range circuit breakers helps to protect the terminal loads.

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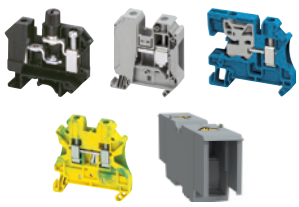
Terminal connection blocks

The Linergy terminal blocks and busbars are designed to provide the rapid connection performances expected from a high-quality installation.



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Linergy LGY busbar

The Linergy LGY busbar powers the switchboard.

PD390408.eps

Switchboard > 630 A

Connected Switchboard > 630 A

PB124031.eps

Ethernet interface embedded in the MTZ

The EIFE Ethernet interface is available for MTZ drawout circuit breakers, and provides a direct connection to the Ethernet network.

PB124032.eps

MicroLogic X

MicroLogic 5/6 X releases (Energy and Maintenance) can be fitted on all MasterPacT MTZ, regardless of their performance level. They come with an embedded screen, as well as Bluetooth and NFC wireless communication protocols. They include the basic LSI protection (MicroLogic 5), which can be supplemented by Ground fault protection (MicroLogic 6), and can be customized with Digital Modules. They also come with measurement, alarm and communication functions.

PB111801-32_reps

FDM128 local interface

The FDM128 has a wide but shallow screen. The anti-reflection graphic screen is backlit for easy reading, even in a dark environment or at unusual viewing angles. Please refer to the Enerlin'X catalog.

PB124033.eps

Ethernet switch

Ethernet switch, 5 copper ports. Communication port protocols: Ethernet TCP/IP.

Ethernet port: 10BASE-T/100BASE-TX-5.

Max. number of connected switches: unlimited.

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24 V DC power supply

A 24 V DC power supply is required for a networked installation, whatever the MicroLogic types installed in the switchboard.

The requisite specifications are:

- output voltage 24 V DC +/-5%, SELV
- ripple: +/-1%
- overvoltage category: OVC IV - as specified by standard IEC 60947-1.

PB124035.eps

MicroLogic 5/6 E for NSX100 to 630 A

MicroLogic 5/6 E (Energy) releases can be fitted on all ComPacT NSX100 to 630 with performance B/F/H/N/S/L/R/ HB1/HB2. They come with a display. They include the basic LSI protection (MicroLogic 5), which can be supplemented by Ground fault protection (MicroLogic 6). They also come with measurement, alarm functions and are communication ready.

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Enerlin'X I/O module

The I/O (Input/Output) module for LV circuit breakers is part of the ULP system. It offers predefined or configurable functions and applications and helps ensure that requirements can be met precisely. Two I/O modules can be connected to the same ULP network.

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Acti9 Active

Acti9 Active is a family of all-in-one protection devices with wireless connectivity. When connected to a gateway, it enables remote monitoring, diagnostics, pre-alarming, and alarming.

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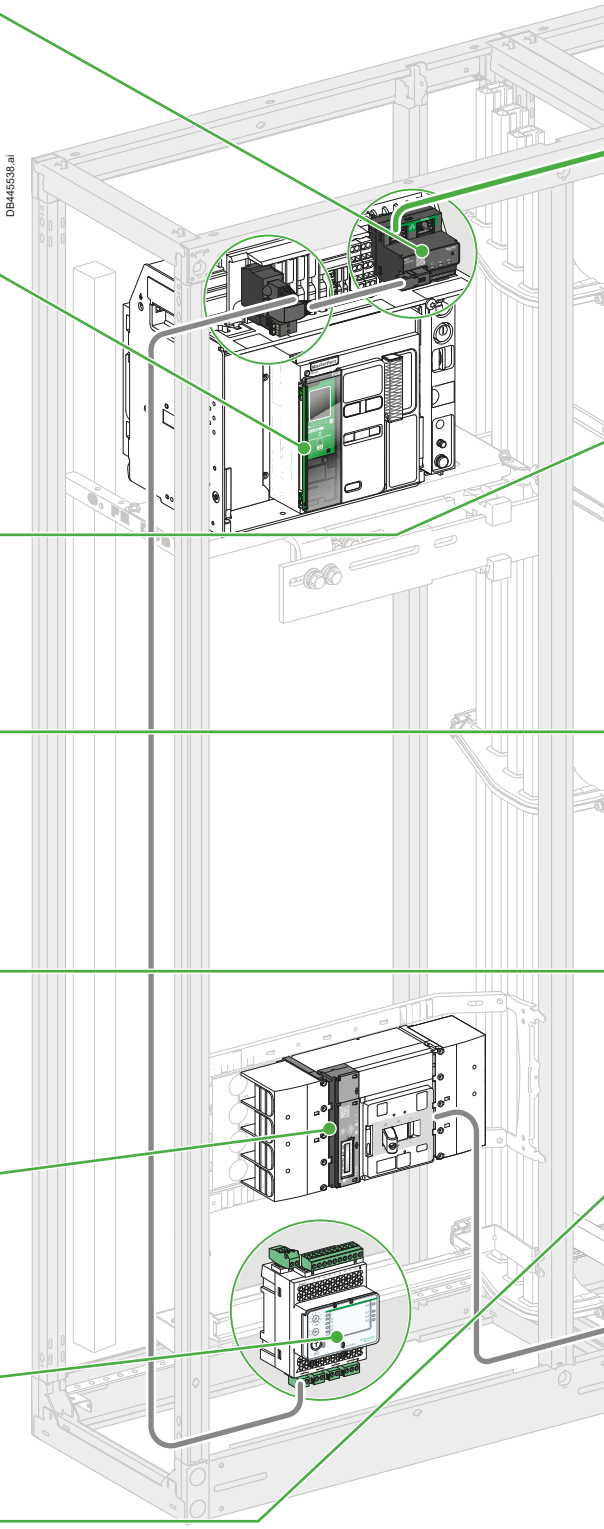
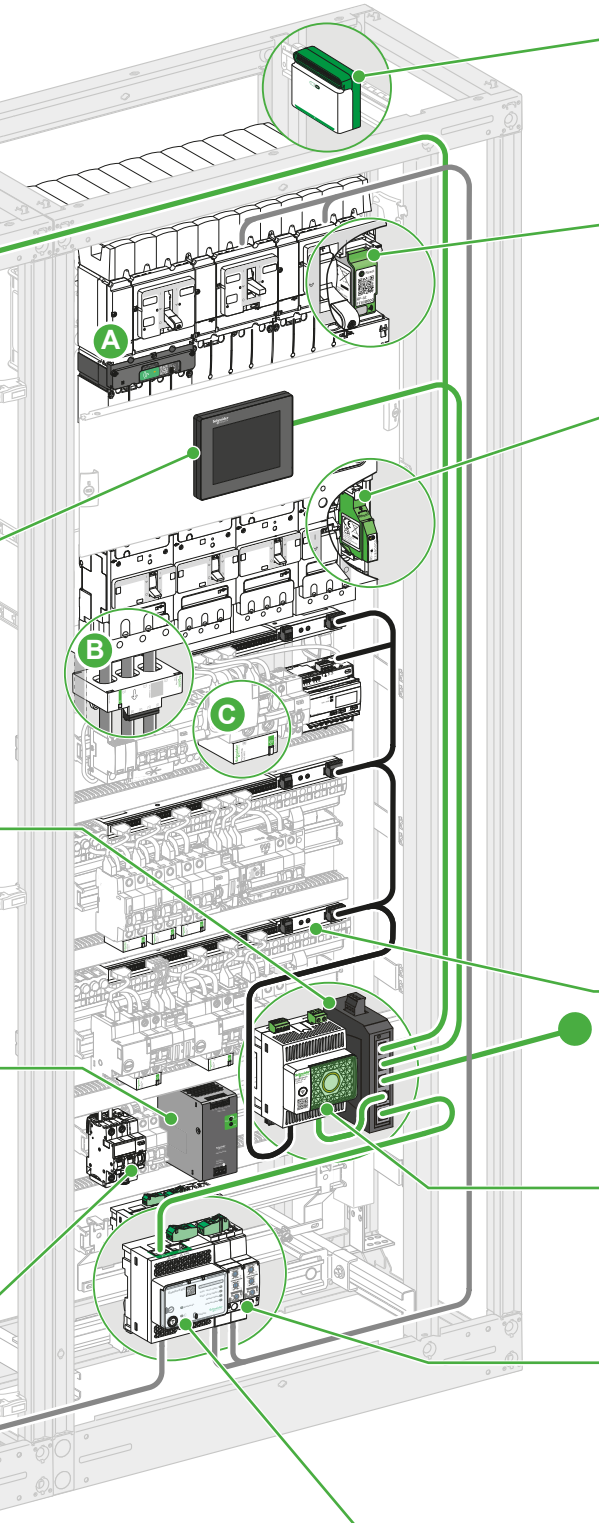


Switchboard > 630 A

Connected Switchboard > 630 A



Modbus
Ethernet network
ULP Universal Logic Plug system

PowerLogic HeatTag

HeatTag analyzes suspended gases and particles inside the switchboard to detect invisible yet hazardous transformations of cable insulators.

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Wireless Indication Auxiliary for ComPacT NSX

The Wireless Indication Auxiliary provides remote indications of the circuit breaker status.

PB124038.eps

Wireless Indication Auxiliary for ComPacT NSXm

The Wireless Indication Auxiliary provides remote indications of the circuit breaker status.

PB124040.eps

PowerLogic PowerTag Energy

PowerTag Energy sensors measure electrical quantities and send these wirelessly to a gateway such as Panel Server.

A PowerTag Energy M250/M630

PowerTag Energy M250/M630 are modules for ComPacT NSX, INS/INV and for TeSys GV5/GV6/GV7. For ComPacT NSX, these modules are fitted directly downstream of the circuit breaker or the Vigi extension.

PB124039.eps

B PowerTag Energy F160

PowerTag Energy F160 is a version used on ComPacT NSXm, ComPacT INS up to 160 A, Acti9 NG125, Acti9 C120, TeSys GV4, and all other devices rated 63 to 160 A.

PB124041.eps

C PowerTag Energy M63

PowerTag Energy M63 are designed to fit directly on the Acti9 or Multi9 range devices with 18mm pitch up to 63 A.

PB124042.eps

EcoStruxure I/O Smart Link

The I/O Smart Link is used for monitoring and controlling Acti9 range devices via a Modbus serial connection.

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EcoStruxure Panel Server

The Panel Server gateway is designed to connect and digitize the electrical distribution installation and to perform energy management and monitoring, from the enclosure incomer down to the load level. It is mandatory when using wireless devices.

PB124043.eps

Enerlin'X IFM Modbus Interface module

For ComPacT NS/NSX and MasterPacT: makes a circuit breaker fitted with a ULP port accessible via a Modbus serial network. Data that may be transmitted includes the circuit breaker settings, alarms, voltage, current, power factor, energy, and power.

IFMV2_image.eps

Enerlin'X IFE Ethernet Interface module

For ComPacT NS/NSX and MasterPacT: provides an IP address and makes a circuit breaker fitted with a ULP port (could be via IFM) accessible via an Ethernet network. Data that may be transmitted includes the circuit breaker settings, alarms, voltage, current, power factor, energy, and power.

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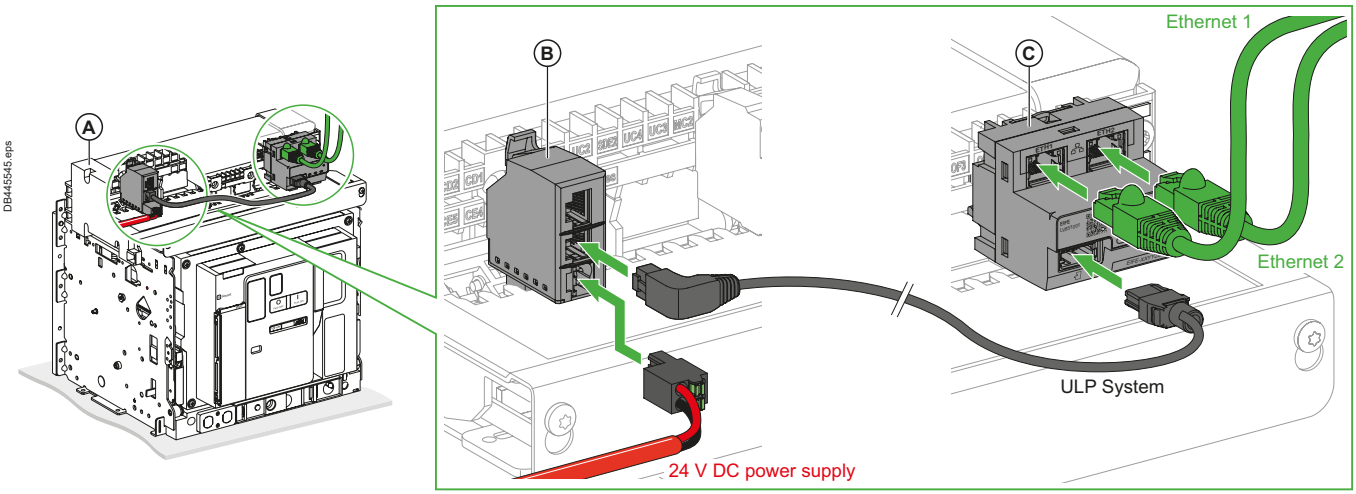
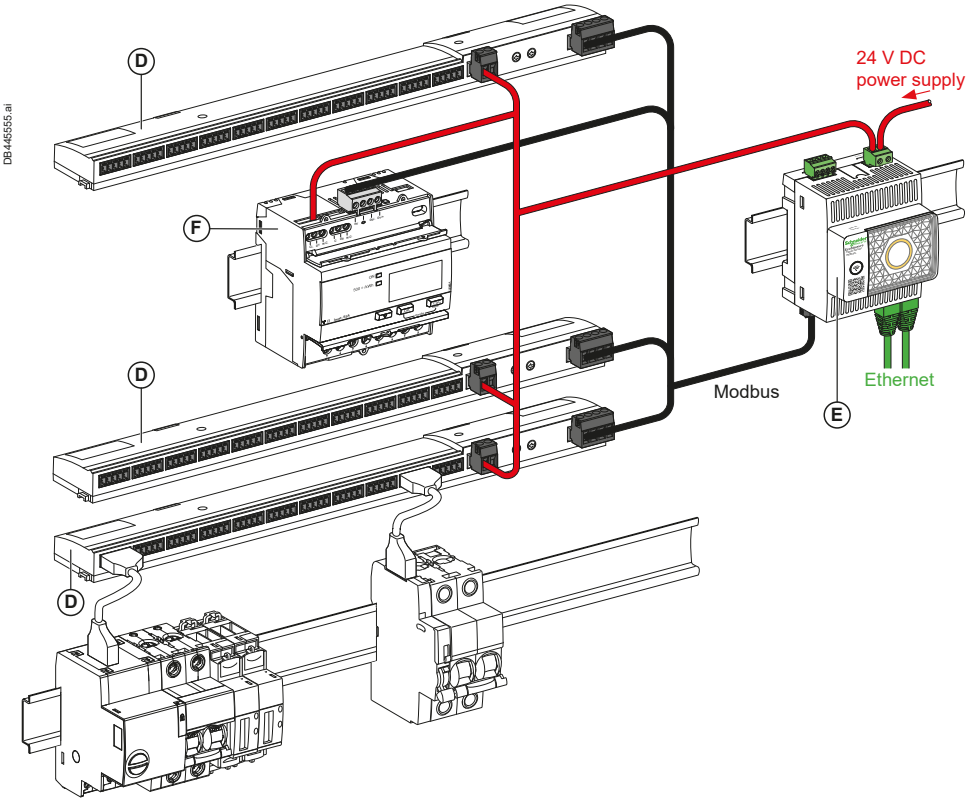
Switchboard > 630 A

Communication and Power Supply Cabling

Head Circuit Breaker Functional Unit



Final Distribution Functional Unit

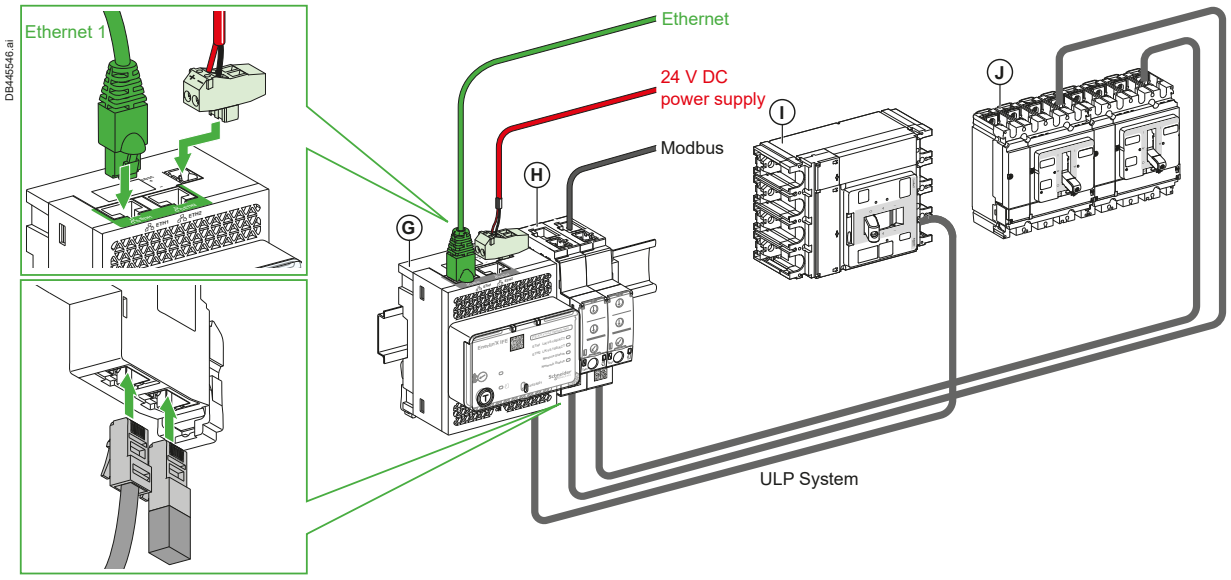


(A) MasterPacT MTZ circuit breaker
(B) ULP port
(C) Enerlin'X EIFE
(D) EcoStruxure I/O Smart Link
(E) EcoStruxure Panel Server
(F) Acti9 iEM Energy Meter

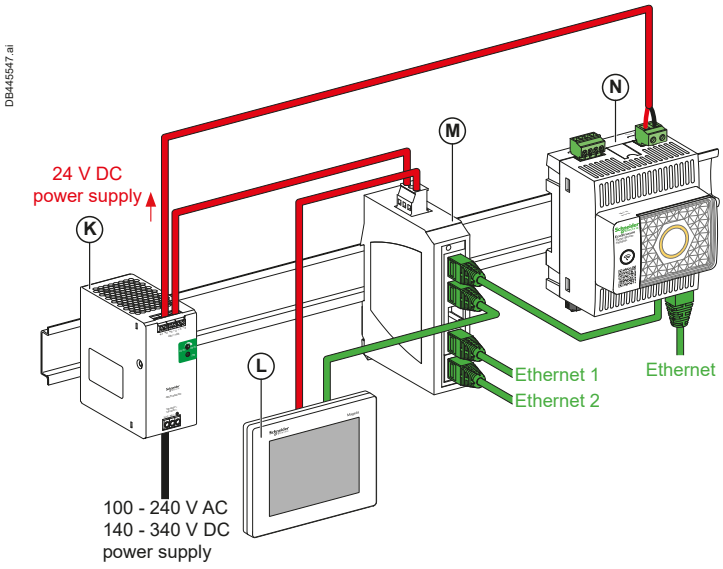
Switchboard > 630 A

Communication and Power Supply Cabling

Secondary Circuit Breakers Functional Unit



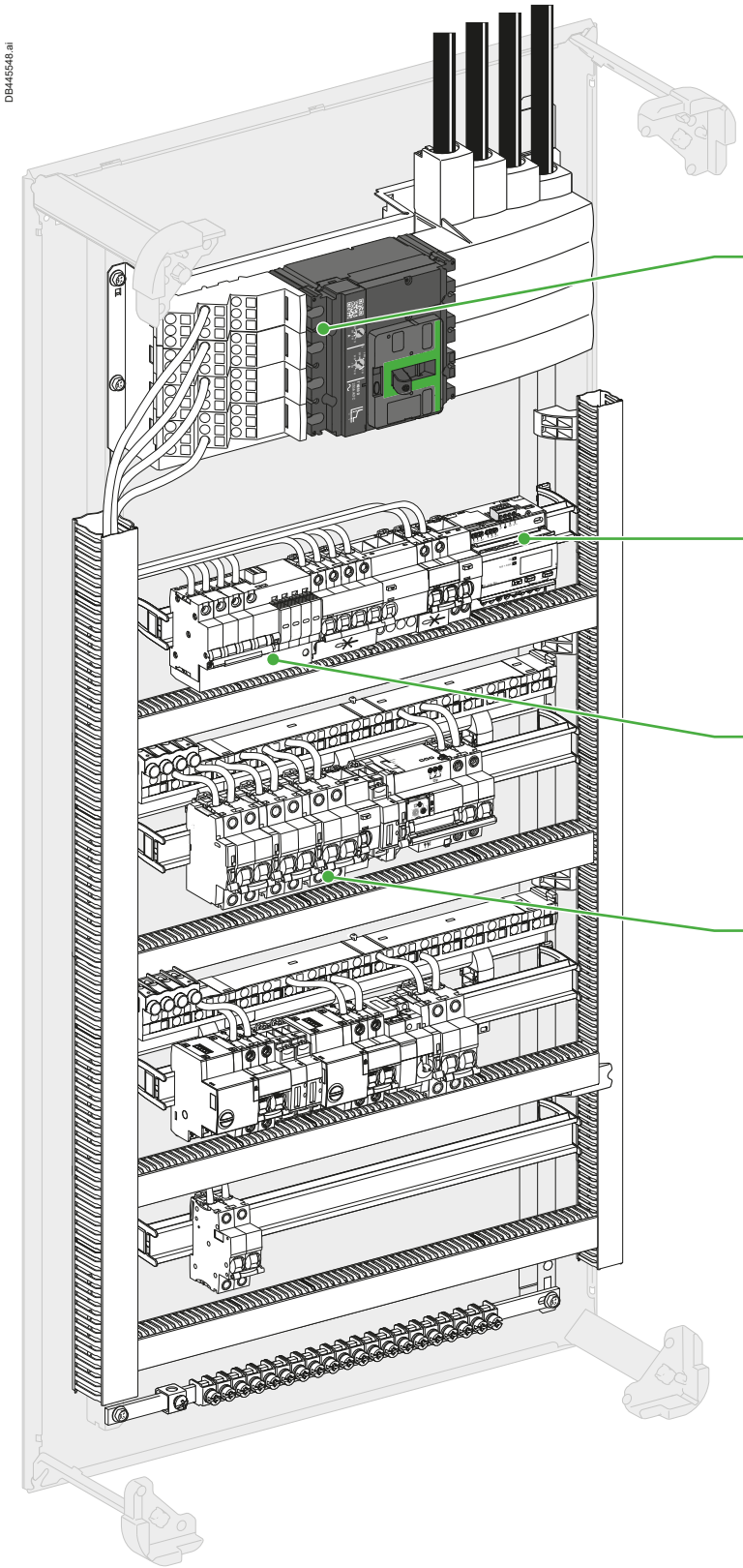
Data Server and Display



- (G) Enerlin'X IFE Ethernet interface
- (H) Enerlin'X IFM Modbus interface
- (I) ComPacT NSX630 circuit breaker
- (J) ComPacT NSX250 circuit breaker
- (K) 24 V DC power supply
- (L) Enerlin'X FDM128 Switchboard local display unit
- (M) Ethernet Switch
- (N) EcoStruxure Panel Server

Switchboard ⩽ 630 A

Non-connected Switchboard ⩽ 630 A



ComPacT NSX or NSXm TMD 160A circuit breaker

The ComPacT TMD is a non-connected thermal-magnetic circuit breaker, used here to help protect the final distribution circuit breakers. When a TMD Trip Unit is used, a PowerTag Energy or a separate meter is needed to obtain measurement information.

Acti9 iEM3255 energy meter

Acti9 range three-phase energy meter, mountable on DIN rail. The iEM3255 meter provides a comprehensive view of both energy consumption and generation on site, as well as measures active and reactive energy transmitted and received.

Acti9 iQuick surge protection device

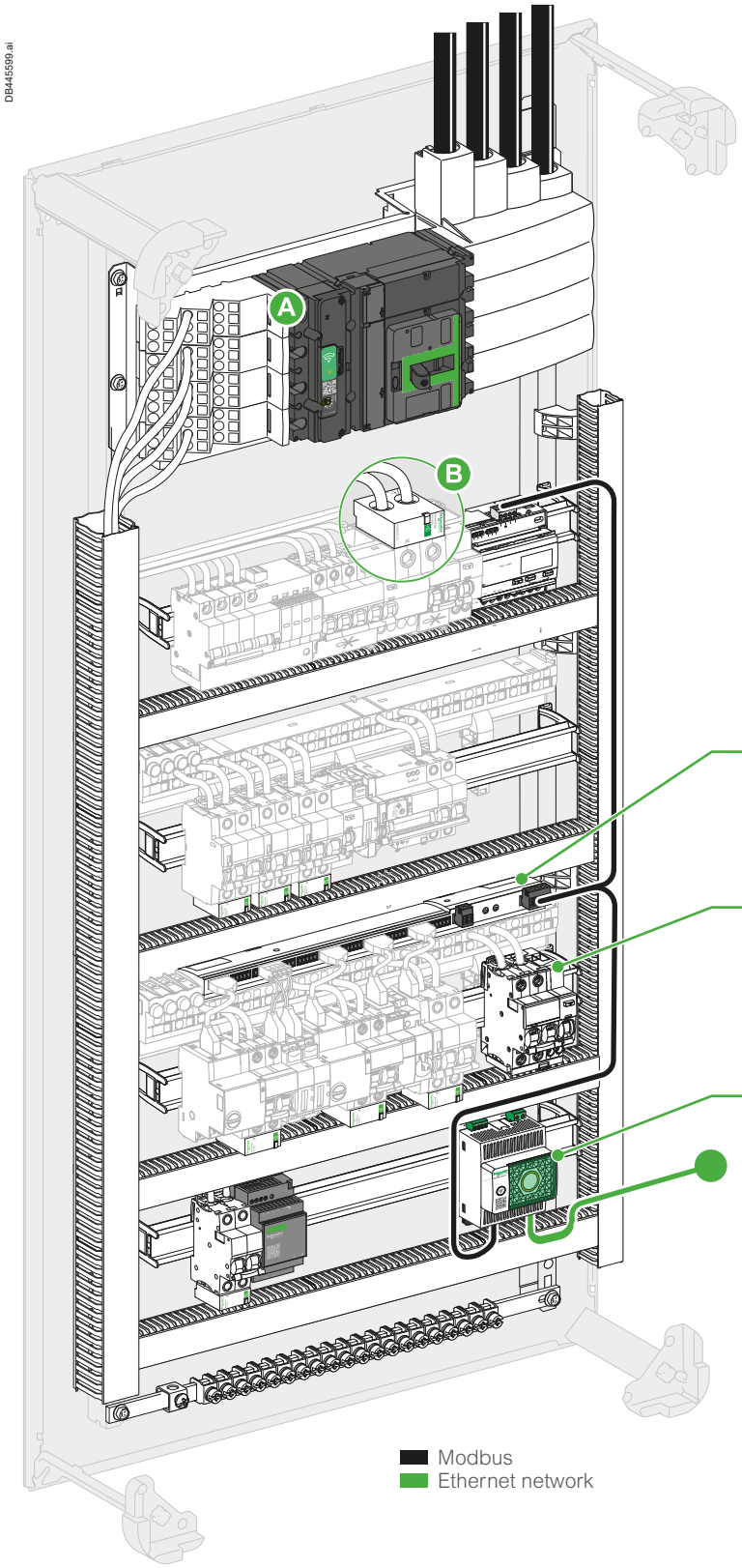
This surge protection device helps to protect the switchboard against peaks up to 25 kA.

Acti9 circuit breakers for the final distribution

Acti9 range circuit breakers help to protect the terminal loads.

Switchboard ⩽ 630 A

Connected Switchboard ⩽ 630 A



PowerLogic PowerTag Energy

PowerTag Energy sensors measure electrical quantities and send these wirelessly to a gateway such as Panel Server.

A PowerTag Energy M250/M630

PowerTag Energy M250/M630 are modules for ComPacT NSX, INS/INV and for TeSys GV5/ GV6/GV7. For ComPacT NSX, these modules are fitted directly downstream of the circuit breaker or the Vigi extension.


PB124039.eps

B PowerTag Energy M63

PowerTag Energy M63 modules is designed to fit directly on the Acti9 or Multi9 range devices with 18mm pitch up to 63 A.


PB124042.eps

Acti9 I/O Smart Link

The I/O Smart Link is used for monitoring and controlling Acti9 range devices via a Modbus serial connection.


PB107753_80.eps

Acti9 Active

Acti9 Active is a family of all-in-one protection devices with wireless connectivity. When connected to a gateway, it enables remote monitoring, diagnostics, pre-alarming, and alarming.


PB124071.eps

EcoStruxure Panel Server

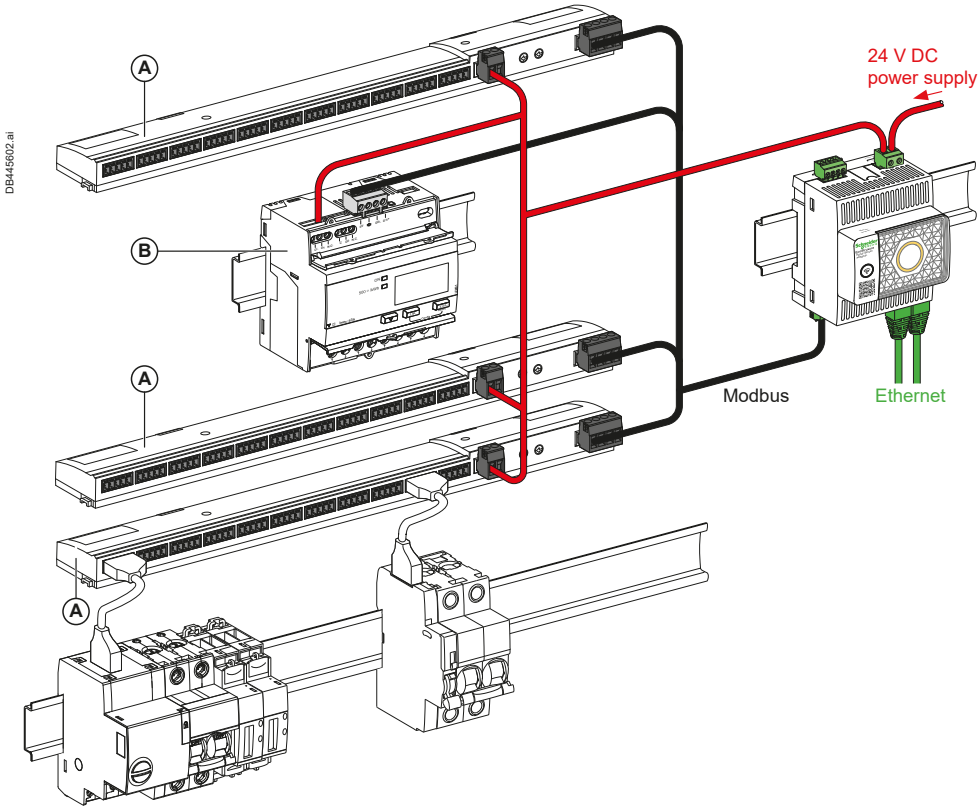
The Panel Server gateway is designed to connect and digitize the electrical distribution installation and to perform energy management and monitoring, from the enclosure incomer down to the load level. It is mandatory when using wireless devices.


PB124043.eps

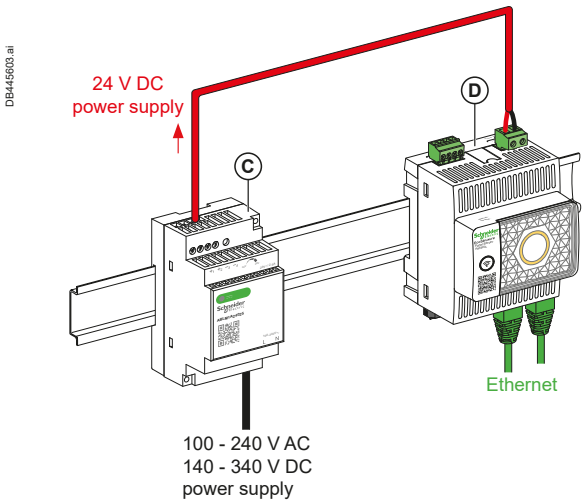
Switchboard ⩽ 630 A

Communication and Power Supply Cabling

Secondary Circuit Breaker Functional Unit



Data Server and Display



(A) EcoStruxure I/O Smart Link
(B) Acti9 iEM Energy Meter
(C) 24 V DC power supply
(D) EcoStruxure Panel Server

SECTION 2

Product Installation Guidelines

Introduction

Purpose of this Section

Section 2 provides details on how to install the digital products introduced in Section 1, as well as some additional products. It describes the general installation rules, the placement of the different types of products inside a panel, the power supply requirements and the wiring rules and recommendations.

For any product installation, you shall always refer to the instruction sheet.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- Only qualified personnel familiar with low and medium voltage equipment are to perform work described in this set of instructions. Workers should understand the hazards involved in working with or near low and medium voltage circuits.
- Perform such work only after reading and understanding all of the instructions contained in this bulletin.
- Turn off all power before working on or inside equipment.
- Use a properly rated voltage sensing device to confirm that the power is off.
- Before performing visual inspections, tests, or maintenance on the equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of back feeding.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.
- Beware of potential hazards, wear personal protective equipment and take adequate safety precautions.
- Do not make any modifications to the equipment or operate the system with the interlocks removed. Contact your local field sales representative for additional instruction if the equipment does not function as described in this manual.
- Carefully inspect your work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors and covers before turning on power to this equipment.
- All instructions in this manual are written with the assumption that the customer has taken these measures before performing maintenance or testing.

Failure to follow these instructions will result in death or serious injury.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Always consult product User Manuals and Instruction Sheets before installing, commissioning and operating a product.

Failure to follow these instructions will result in death or serious injury.

Installing the Devices

Positioning Rules

Related Standard	Good Practice
Table 6 in IEC 61439-1	**1** Define the layout of devices in the column, depending on the constraints below: • the entry and exit points of the customer's wires (from the top, or the bottom of the column or other specific configuration) and the position of the main busbars in order to have the shortest possible connections, • the routing of prefabricated wires or connections at the input and output of the switchboard, • the space required for the device to work correctly (volume of device, safety perimeter, connection pads, radius of curvature of wires, control units, etc.), • the accessibility of the various control units and connection zones (side, rear, etc.) of devices, • heat dissipation of devices that contributes to increasing the internal temperature of the column, • the mutual thermal and electromagnetic influence between the main busbars and the devices, • the maintenance or upgrade of the system (for example, enable the opening of the motorized control of a circuit breaker). The resulting layout of the switchgear should also be studied to optimize connection zones, busbars, enclosure sizes, etc.
IEC 60480	**2** Place devices with high heat dissipation in the upper part of the switchboard to: • avoid heating the entire switchgear installed in the column, • maintain the performance of lower-power devices placed at the bottom to minimize derating, • enable greater legibility of the electric layout.
Tip To maintain the internal temperature of the switchboard within the operating limits of most devices (< 70 °C), forced ventilation of cubicles may be necessary, to limit temperature derating, in order to optimize the volume of copper and reduce the cost.	**3** Several devices with high heat dissipation may be installed in the same column if: • the maximum internal temperature is observed (below the manufacturer's recommendations), • the capacity of the busbars to convey the rated current is observed (see derating tables), • the expected performance of each device is reached (see derating tables).
Table 6 in IEC 61439-1	**4** Validate that the temperature rise limits comply with standard IEC 61439-1 recommendations.

Installing the Devices

Positioning Rules

Related Standard

Good Practice

5 For cable compartments with natural ventilation it is recommended to install a HeatTag at the top of the compartment. See **DOCA0338EN** and **DOCA0327EN** for details.

Table 6 in IEC 61439-1

6 To avoid serious malfunctions, do not install devices that are sensitive to temperature rises (e.g. control/command devices) near devices with high heat dissipation.

It is recommended to separate the switchboard into two zones (high-power devices and low-power devices) to improve the efficiency of the installation.

It is recommended to install the communication devices at the bottom of the switchboard (see example given below).

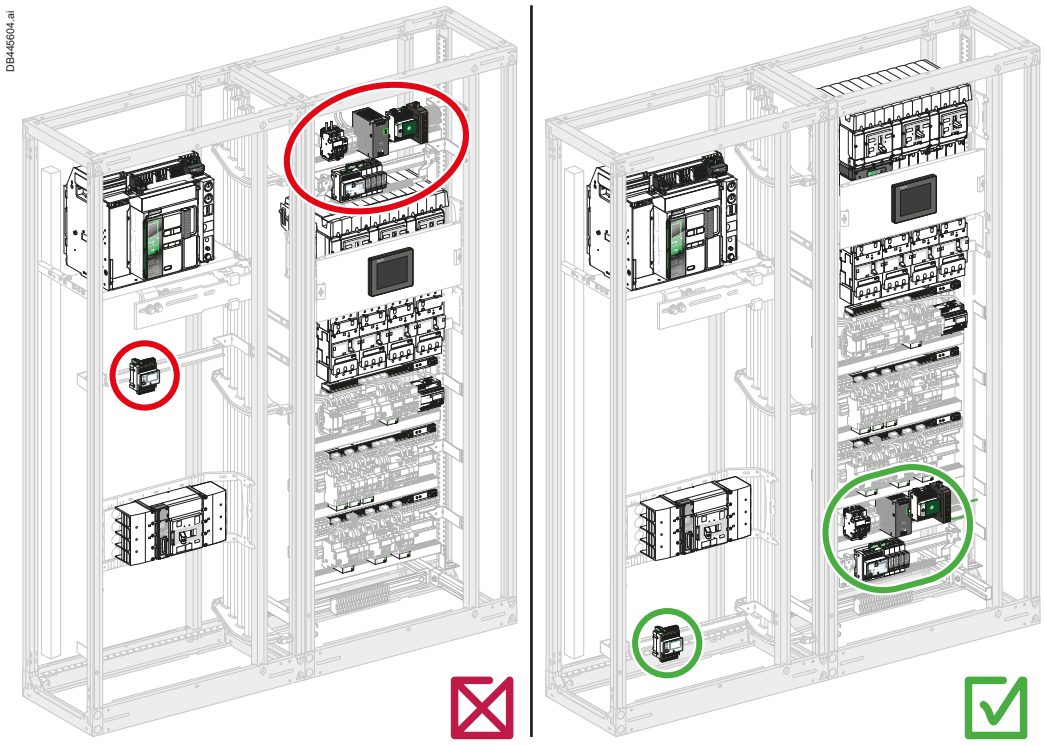
Tip

For the electromagnetic compatibility of the switchboard, it is recommended to use shielding sheets for all communicating devices.

Tip

It is recommended to use separate routings for power cables and communication cables.

Example



Installing the Devices

Positioning Rules

Related Standard

IEC 61439-1
IEC 60947-x

Tip

For electrical panels with a high operating voltage of 690 V, it may be necessary to install additional barriers to reduce the risk of sparking in case of a short-circuit.

Good Practice

7 Keep within the safety perimeter defined by the manufacturer for each device and make sure they are working properly:
- minimum distance between two devices,
- minimum distance of the device from surrounding components (frame, plate, etc.),
- minimum distance from powered live busbars.

Note:
The safety perimeter is usually stated by the manufacturer in the device technical manual or the catalogs.

8 The safety perimeter is a zone where it is forbidden to:
- route wires other than those intended for the connection of the device itself,
- install other devices.

9 Connect the devices with care.
In particular:
- do not strip insulated flexible busbars and connection cables too much, to avoid all risk of sparking between phases in the event of a short-circuit,
- position the lugs correctly on the connection pads,
- if necessary, install barriers, terminal covers or insulating sleeves between each phase.

Sleeves used for marking wires do not act as insulators.

10 Position measurement devices requiring a visual inspection at a height of 0.2 m to 2.2 m from the floor. Their exact position should be determined in consultation with the switchboard user.

Example

Installing the Devices

Communication Architecture

General Information Regarding Communication Architectures

It is common to have several different protocols present in a Smart Panel. In some cases, there are both wired and wireless alternatives, while in other cases there is only one solution.

For wireless communication inside a panel, IEEE802.15.4 (for example ZigBee) is used. The signal is concentrated in a gateway which can communicate to a software solution, either wirelessly (e.g. Wi-Fi) or wired (e.g. Modbus TCP/IP).

For wired communication, there is a wide range of protocols. This guide focuses on products that use ULP, Modbus RTU (also known as Modbus SL or Modbus Serial) and/or Modbus TCP/IP. ULP can be converted to Modbus RTU using an IFM, and to Modbus TCP/IP using an IFE/EIFE, while Modbus RTU can be converted to Modbus TCP/IP using an IFE.

- Example of wireless only: HeatTag
- Example of wired vs wireless alternative: PowerTag Energy meter as a wireless alternative to iEM wired meters
- Example of wired only: FDM local display (HMI)

For projects where communication is to be added in a preexisting panel, it is generally easier to use wireless solutions, as these solutions require less space, and result in less cabling.

Installing the Devices

Circuit Breakers with Communicating MicroLogic Protection

ULP Bus

The ULP (Universal Logic Plug) system can be used to construct an electrical distribution solution which integrates metering, communication, and operating assistance functions for circuit breakers, including ComPacT NSX, ComPacT NS, MasterPacT NT/NW and MasterPacT MTZ. It can be used to transform circuit breakers into metering and supervision devices.

Other ULP system features can be included using:

- An Ethernet communication link for access and remote monitoring with the IFE interface or EIFE interface (MasterPacT MTZ drawout circuit breakers only).
- Web access to monitor and control the circuit breaker connected to an IFE interface or EIFE interface (MasterPacT MTZ drawout circuit breakers only).
- An input/output application with an I/O module. This benefits from the extended capability of the I/O module to monitor and control the position of the drawout circuit breakers in the cradle, circuit breaker operation, and custom application, etc.
- Test, setup, and maintenance functions with EcoStruxure Power Commission through an IFM or IFE.
- A Modbus RTU communication link for access and remote monitoring with the IFM interface.
- Local display of measurements and operating assistance data with the FDM121.

Note:

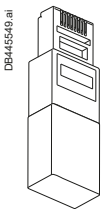
The ULP system in the switchboard should be designed in accordance with the recommendations of the ULP System User Guide (ref. **DOCA0093EN**), considering the compatibility of the hardware and firmware of the ULP modules, the ULP system connection and power supply rules and the architectures recommended by Schneider Electric.

Note:

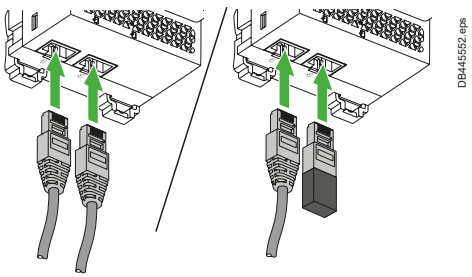
This guide describes MasterPacT MTZ and ComPacT NSX connection to the ULP Bus. For other circuit breakers, please refer to the ULP System User Guide (ref. **DOCA0093EN**).

ULP Line Termination

For unused RJ45 ULP ports, use a ULP line termination (**TRV00880**). Without this, it could affect the quality of the communication.



ULP line termination



Example of ULP line termination on IFE depending on the RJ45 ULP port usage

Note:

With an architecture comprising an EIFE interface connected to a ULP port module, the ULP port module marks the end of the ULP line.

Installing the Devices

Circuit Breakers with Communicating MicroLogic Protection

Connecting MasterPacT MTZ Circuit Breakers to the ULP System

Use the RJ45 ULP lead to connect the MasterPacT MTZ circuit breakers to the ULP system. The circuit breaker should be equipped with a ULP port module.

ULP Port Module

Depending on the circuit breaker type, the ULP port module is supplied:

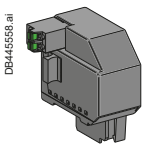
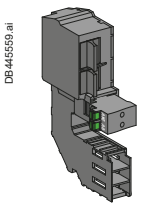
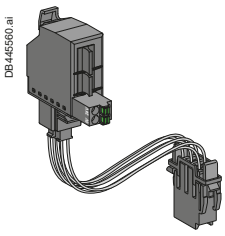
- As standard (on MasterPacT MTZ2/MTZ3 drawout circuit breakers)
- As an option (on MasterPacT MTZ1/MTZ2/MTZ3 fixed circuit breakers and MasterPacT MTZ1 drawout circuit breakers). It is then fitted with the circuit breaker's terminal blocks.

The ULP port module:

- Powers the MicroLogic X release,
- Includes the ULP line termination,
- Enables connection to external ULP modules, such as I/O or IFE interface modules.

Moreover, on MasterPacT MTZ drawout circuit breakers with optional EIFE interface, the ULP port module:

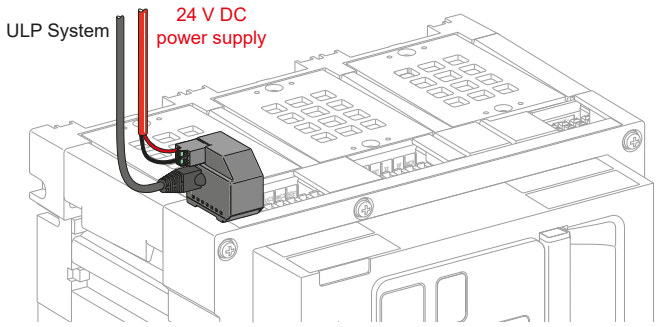
- Powers the EIFE interface,
- Connects the EIFE interface to the other ULP modules (e.g. I/O module).

	Description	Reference	Instruction Sheet
 DB445558.ai	ULP port module for MasterPacT MTZ1 fixed circuit breaker	**LV850063SP**	For more information on the **ULP Port Module,** refer to the instruction sheet **NVE40791.**
	ULP port module for MasterPacT MTZ2/MTZ3 fixed circuit breaker	**LV850061SP**	
 DB445559.ai	ULP port module for MasterPacT MTZ1 withdrawable circuit breaker	**LV850064SP**	For more information on the **ULP Port Module,** refer to the instruction sheet **NVE40796.**
 DB445560.ai	ULP port module for MasterPacT MTZ2/MTZ3 withdrawable circuit breaker	**LV850062SP**	For more information on the **ULP Port Module,** refer to the instruction sheet **NVE40797.**

Installing the Devices

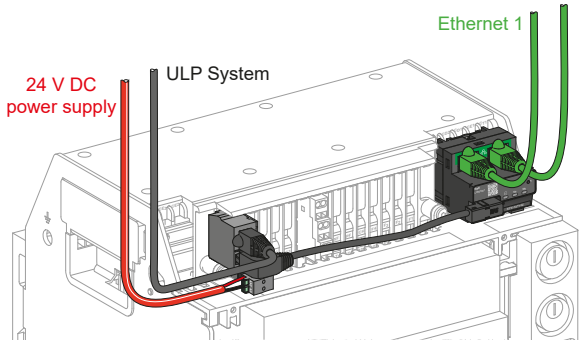
Circuit Breakers with Communicating MicroLogic Protection

DB445717.ai



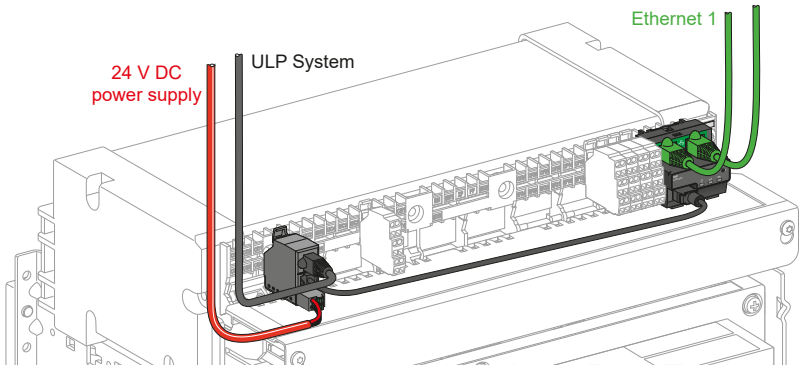
ULP Port Module for MasterPacT MTZ1/MTZ2/MTZ3 Fixed

DB445718.ai



ULP Port Module for MasterPacT MTZ1 Drawout with EIFE

DB445719.ai



ULP Port module for MasterPacT MTZ2/MTZ3 Drawout with EIFE

Installing the Devices

Circuit Breakers with Communicating MicroLogic Protection

Connecting ComPacT NSX Circuit Breakers to the ULP System

Presentation

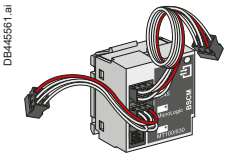
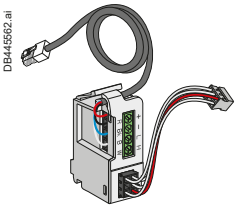
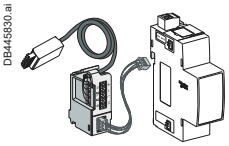
To obtain more data from a ComPacT NSX Circuit Breaker than just the circuit breaker status (Closed, Open, Tripped), the trip unit needs to be the MicroLogic 5, 6 or 7. This needs to be combined with a BSCM (Breaker Status Command Module) and an NSX Cord. The insulated ComPacT NSX Cord is mandatory for system voltages greater than 480 V AC.

The NSX Cord can then be connected to an IFM, an IFE or directly to an FDM121. It can also be connected to an IFM which is connected to an IFE. This solution can save space in the panel by stacking several IFM modules (up to 8 recommended) to 1 IFE.

The ComPacT NSX ULP system receives a 24 V DC power supply via the IFM or IFE.

ULP Connection

For more details on all the configurations, consult the ULP System User Guide (ref. **DOCA0093EN**) or the ComPacT NSX user manual (ref. **DOCA0187EN**).

	Description	Reference	Instruction Sheet
	BSCM (Breaker Status Command Module)	**LV434205**	For more information on the **BSCM,** refer to the instruction sheet **GHD16046AA.**
	NSX Cord	L = 0.35 m **LV434200** L = 1.3 m **LV434201** L = 3 m **LV434202**	For more information on the **NSX Cord,** refer to the instruction sheet **GHD16047AA.**
	Insulated NSX Cord	L = 1.3 m **LV434204**	For more information on the **Insulated NSX Cord**, refer to the instruction sheet **GHD16313AA.**

Watch our How-To video >>>

https://www.youtube.com/embed/9NnEB6bcGjQ

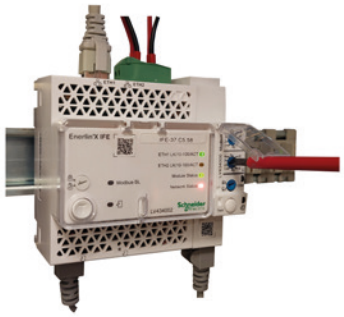
Installing the Devices

Circuit Breakers with Communicating MicroLogic Protection

IFM: Modbus Communication Interface

Presentation

The IFM is a Modbus interface module. It is required for connection of MasterPacT or ComPacT circuit breakers to a Modbus Serial Line network. Once connected, the circuit breaker is considered as a server (slave) by the Modbus client (master).



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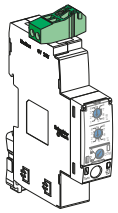
Modbus Addresses

Modbus addresses should be set with the two rotary switches (X1 and X10 symbols). The X10 symbol refers to the tens and the X1 symbol to the units.

As an example, to set the Modbus address to 4, proceed as follows:

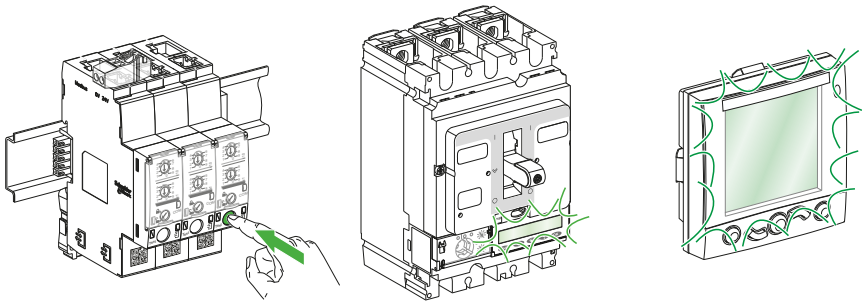
On the IFM rotary switch:

- set the X10 switch to 0
- set the X1 switch to 4

	Description	Reference	Instruction Sheet
DB445664.ai 	IFM Modbus	**LV434000**	For more information on the **IFM Modbus,** refer to the instruction sheet **NVE85393.**

Check the connection between the IFM and the circuit breaker: press the test button on the IFM and visually check that the associated MicroLogic trip unit flashes simultaneously (ON: 1s/OFF: 1s):

DB445550.ai



Note:

If an FDM121 is used, its screen also flashes.

Installing the Devices

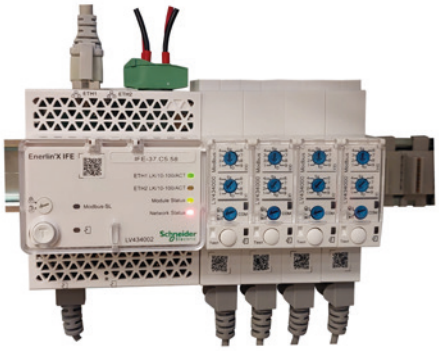
Circuit Breakers with Communicating MicroLogic Protection

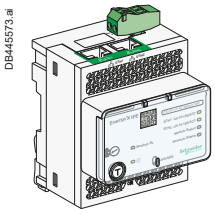
Enerlin'X IFE Ethernet Switchboard Server

Presentation

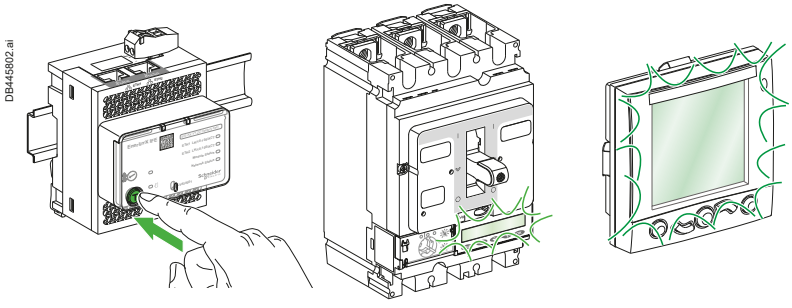
The IFE is an Ethernet interface module. It provides an Ethernet access to one or several MasterPacT or ComPacT circuit breakers.

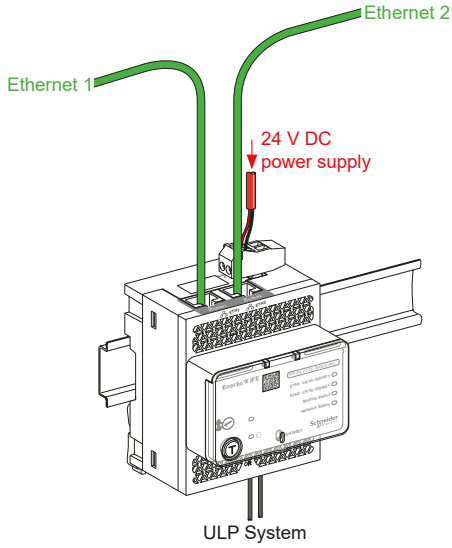
The gateway version incorporates a Modbus gateway. In this case, the IFE is the network Modbus client (master) and the IFMs are the server (slave). Their addresses are configured using rotary selectors as explained above. Thanks to this stacking system, the Modbus addresses become the only Modbus settings requiring configuration: the serial line settings are automatically detected by the stacked devices.



	Description	Reference	Instruction Sheet
	IFE - Ethernet Interface IFE - Ethernet Interface & Gateway	**LV434001** **LV434002**	For more information on the **IFE Module,** refer to the instruction sheet **QGH13473.**

Check the connection between the IFE, I/O module application and circuit breaker using the "ULP test button". Press the test button on the IFE and visually check that the IFE, I/O module application and associated MicroLogic trip unit flash simultaneously (ON: 1 ms/OFF: 1 ms).





Note:
If an FDM121 is used, its screen also flashes.

Installing the Devices

Circuit Breakers with Communicating MicroLogic Protection

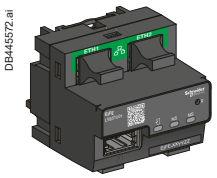
EIFE: Ethernet Communication Interface Embedded in the MasterPacT MTZ Drawout

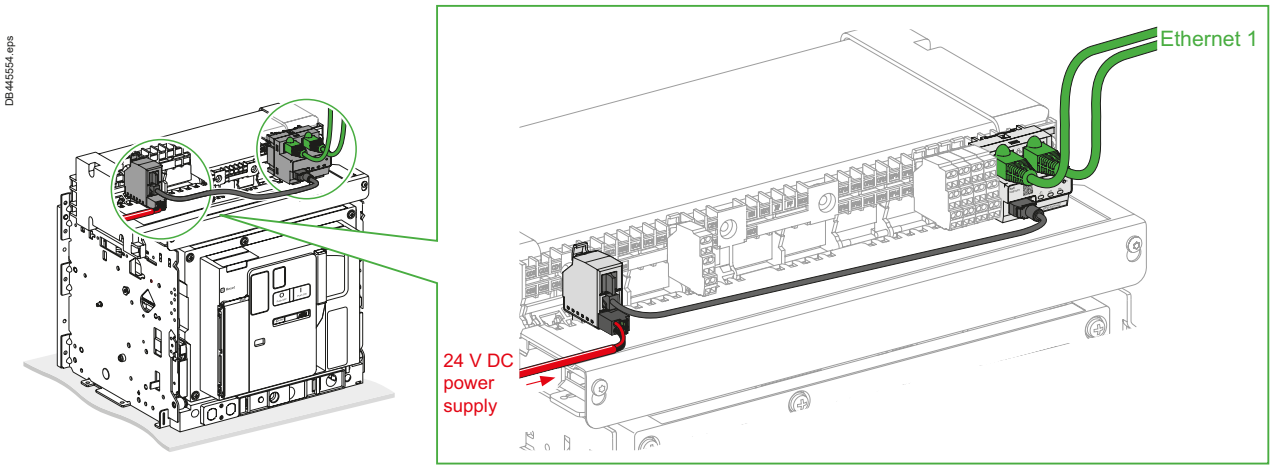
Presentation

The EIFE is used to connect the MasterPacT MTZ drawout to Ethernet. It retrieves data through the embedded ULP port.

It also monitors the three positions of the circuit breaker when inserted into its chassis:

- Circuit Breaker racked IN
- Circuit Breaker racked OUT
- Circuit Breaker in test position.

	Description	Reference	Instruction Sheet
	EIFE - Embedded Ethernet Interface		For more information on the **EIFE - Embedded Ethernet Interface,** refer to the instruction sheet **NVE23550.**
	for MTZ1	**LV851100**	
	for MTZ2/3	**LV851200**	



Specifications of Ethernet Communication Interfaces

Ethernet Connection:

The IFE/EIFE has two Ethernet ports, ETH1 and ETH2.

Ethernet Cabling:

100 base T - 2*RJ45 - ETH1 and ETH2.

Ethernet 1 and Ethernet 2 ports act as a non-manageable switch.

Notes:

IFE/EIFE does not a support a redundant Ethernet protocol (MRp, Hyper Ring etc.). IFE/EIFE provides RSTP support and an Ethernet daisy chain connection.

If a daisy chain loop is requested, an Ethernet loop manager should be used.

Be careful with ULP and Ethernet connections as both use RJ45 connectors.

The ULP system supplies 24 V DC power to all connected devices. Incorrect connection can cause serious damage.

Installing the Devices

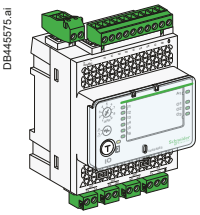
Circuit Breakers with Communicating MicroLogic Protection

Enerlin'X I/O Module

Presentation

The I/O module provides predefined applications for circuit breaker management. It is an Input/Output interface for ComPacT and MasterPacT circuit breakers.

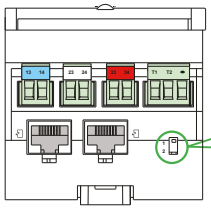

PB503929.eps

Description	Reference	Instruction Sheet
 DB445575.ai I/O Module Interface	**LV434063**	For more information on the **I/O Interface,** refer to the instruction sheet **HRB49217.**

I/O Module Identification Setting

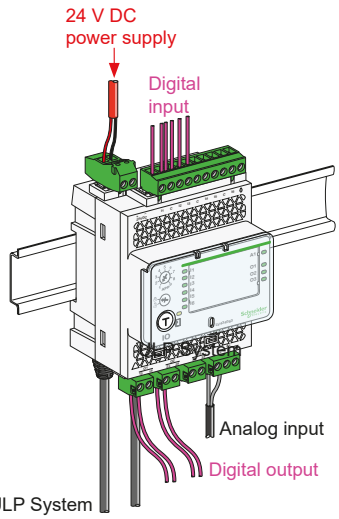
Two I/O modules can be used for the same circuit breaker connected to a ULP system (I/O Module 1 or I/O Module 2).

When two I/O modules are connected in the same ULP network, the two I/O modules are differentiated by the position of the dip switches located on the bottom of the I/O module.


DB445576.ai

1 2 Dip switch in position 1 for I/O module 1 (factory setting).

1 2 Dip switch in position 2 for I/O module 2.

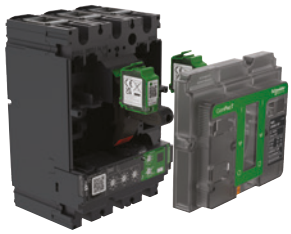


Installing the Devices

Indication Auxiliary (OF/SD) for ComPacT NSX and ComPacT NSXm

Presentation

Indication Auxiliaries are used to warn of circuit breaker status changes. This solution exists in both wired and wireless versions.

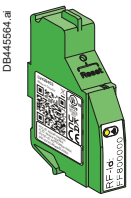
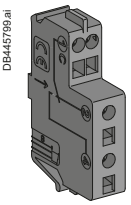
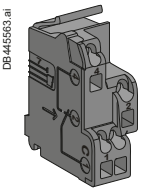


QUASAR_full_range_200629-05.eps

Regardless of wired or wireless, the Indication Auxiliary will indicate the status of the circuit breaker depending on its placement inside the circuit breaker.

The different placements are:

- OF – Closed/Open
- SD – Not tripped/Tripped
- SDE – Not tripped/Tripped due to electrical fault (only for ComPacT NSX)
- SDV – Not tripped/Tripped due to earth fault (only for ComPacT NSX with wired version)

	Description	Reference	Instruction Sheet
 DB445564.ai	Wireless Indication Auxiliary The Wireless Indication Auxiliary communicates via IEEE802.15.4 to a gateway. It does not require any wiring, but does contain a battery. ComPacT NSXm: • Battery lifetime: 5 years	**LV429453**	For more information on the **Wireless Indication Auxiliary,** refer to the instruction sheet **NNZ8881001.**
 DB445565.ai	ComPacT NSX: • Battery lifetime: 10 years	**LV429454**	For more information on the **Wireless Indication Auxiliary,** refer to the instruction sheet **NNZ8882801.**
 DB445799.ai	Wired Auxiliary Contact The Wired Auxiliary Contact is a dry contact. This means it can be used to control an indicator light on the front of the panel, for example. ComPacT NSXm	**LV426950**	For more information on the **Wired Auxiliary Contact,** refer to the instruction sheet **EAV91204.**
 DB445563.ai	ComPacT NSX	**29450**	For more information on the **Wired Auxiliary Contact,** refer to the instruction sheet **NNZ4314501.**

For wireless and wired versions, see the ComPacT NSX & NSXm Catalog (ref. **LVPED221001EN**).

Note:

Brownfield Tip (For preexisting panels)

Use Wireless Indication Auxiliaries together with a PowerTag Energy, to obtain data on circuit breaker status and energy measurements without cabling and potentially avoiding changing the trip unit.

Installing the Devices

Acti9 Active

Presentation

Acti9 Active is a family of all-in-one protection devices with wireless connectivity. When connected to a gateway, it enables remote monitoring, diagnostics, pre-alarming, and alarming.

It is fully integrated in both Acti9 iC60 and iC40 systems.

In addition to wireless connectivity, Acti9 Active integrates overvoltage, earth leakage and arc fault protection. It includes also short circuit and overload protection due to the associated Miniature Circuit Breaker.

Acti9 Active is available in 3 versions:

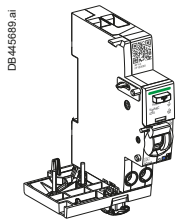
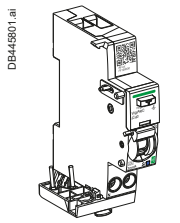
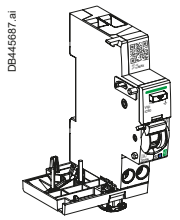
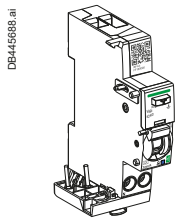
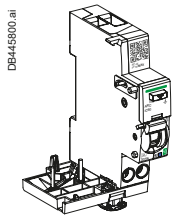
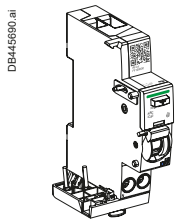
- Acti9 Active VigiARC, with earth leakage and arc fault protections
- Acti9 Active ARC, with arc fault protection
- Acti9 Active Vigi, with earth leakage protection

Acti9 Active VigiARC with iC40

Acti9 Active VigiARC with iC60

Installing the Devices

Acti9 Active

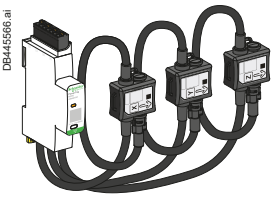
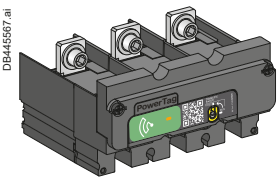
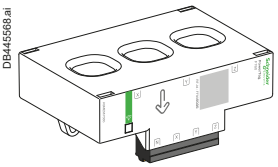
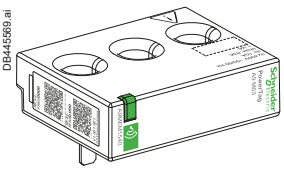
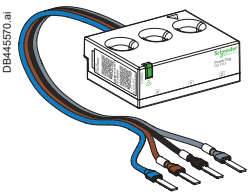
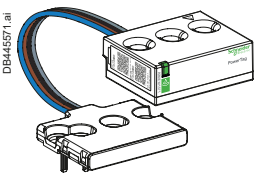
	Description	Reference	Instruction Sheet
	**Acti9 Active VigiARC iC60** Acti9 Active iC60 module with earth leakage & arc fault protections – 25 A Acti9 Active iC60 module with earth leakage & arc fault protections – 40 A	**A9TYBE225** **A9TYBE240**	For more information on the **Acti9 Active VigiARC iC60,** refer to the instruction sheet **GDE67266.**
	**Acti9 Active VigiARC iC40** Acti9 Active iC40 module with earth leakage & arc fault protections – 25 A Acti9 Active iC40 module with earth leakage & arc fault protections – 40 A	**A9TYBE625** **A9TYBE640**	For more information on the **Acti9 Active VigiARC iC40,** refer to the instruction sheet **GDE67262.**
	**Acti9 Active Vigi iC60** Acti9 Active iC60 module with earth leakage protection – 25 A Acti9 Active iC60 module with earth leakage protection – 40 A	**A9V8E225** **A9V8E240**	For more information on the **Acti9 Active Vigi iC60,** refer to the instruction sheet **PKR58951.**
	**Acti9 Active Vigi iC40** Acti9 Active iC40 module with earth leakage protection – 25 A Acti9 Active iC40 module with earth leakage protection – 40 A	**A9Y8E625** **A9Y8E640**	For more information on the **Acti9 Active Vigi iC40,** refer to the instruction sheet **PKR57370.**
	**Acti9 Active ARC iC60** Acti9 Active ARC iC60 module with arc fault protection – 25 A Acti9 Active ARC iC60 module with arc fault protection – 40 A	**A9TAB2225** **A9TAB2240**	For more information on the **Acti9 Active ARC iC60,** refer to the instruction sheet **GDE67264.**
	**Acti9 Active ARC iC40** Acti9 Active ARC iC40 module with arc fault protection – 25 A Acti9 Active ARC iC40 module with arc fault protection – 40 A	**A9TAB2625** **A9TAB2640**	For more information on the **Acti9 Active ARC iC40,** refer to the instruction sheet **GDE67260.**

Installing the Devices

PowerLogic PowerTag Energy Sensors

PowerLogic PowerTag Energy Overview

PowerTag Energy works well in both new panels (greenfield) and existing panels (brownfield). These sensors are easy to install and communicate wirelessly to a gateway.

	Description	Reference	Instruction Sheet
	PowerTag Energy Rope up to 2000 A	**A9MEM1590** **A9MEM1591** **A9MEM1592** **A9MEM1593**	For more information on the **PowerTag Energy Rope,** refer to the instruction sheet **GDE25175.**
	PowerTag Energy M250	**LV434020** **LV434021**	For more information on the **PowerTag Energy M250,** refer to the instruction sheet **QGH46815.**
	PowerTag Energy M630	**LV434022** **LV434023**	For more information on the **PowerTag Energy M630,** refer to the instruction sheet **QGH46820.**
	PowerTag Energy F160	**A9MEM1580**	For more information on the **PowerTag Energy F160,** refer to the instruction sheet **MFR85580.**
	PowerTag Energy M63	**A9MEM1520** **A9MEM1521** **A9MEM1522** **A9MEM1540** **A9MEM1541** **A9MEM1542** **A9MEM1543**	For more information on the **PowerTag Energy M63,** refer to the instruction sheet **PHA39639.**
	PowerTag Energy F63	**A9MEM1560** **A9MEM1564** **A9MEM1570** **A9MEM1573** **A9MEM1574**	For more information on the **PowerTag Energy F63,** refer to the instruction sheet **JYT32195.**
	PowerTag Energy P63	**A9MEM1561** **A9MEM1562** **A9MEM1563** **A9MEM1571** **A9MEM1572**	For more information on the **PowerTag Energy P63,** refer to the instruction sheet **JYT31928.**

Installing the Devices

PowerLogic PowerTag Energy Sensors

PowerLogic PowerTag Energy Rope up to 2000 A

With its flexible and openable current sensors, this PowerTag Energy Rope can be installed easily on busbars and cables without having to disconnect the conductors and is suitable for 3P or 3P+N applications.

The module can be mounted on a DIN rail or secured with brackets where needed in a panel.

Its removable spring connector for voltage picking makes it easy to install.

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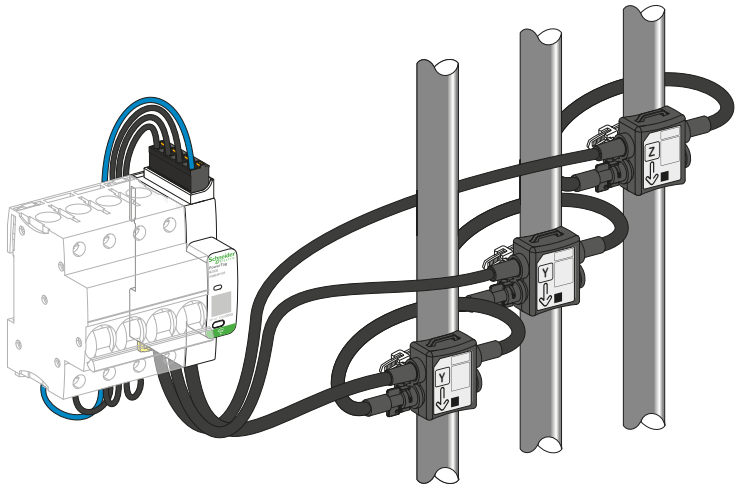

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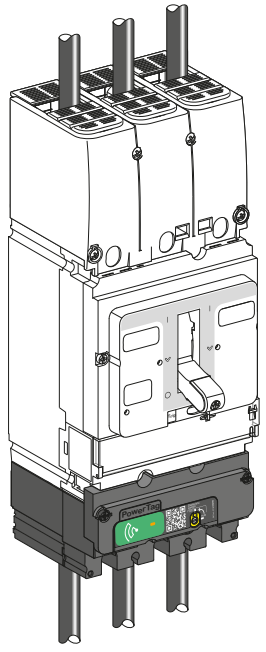
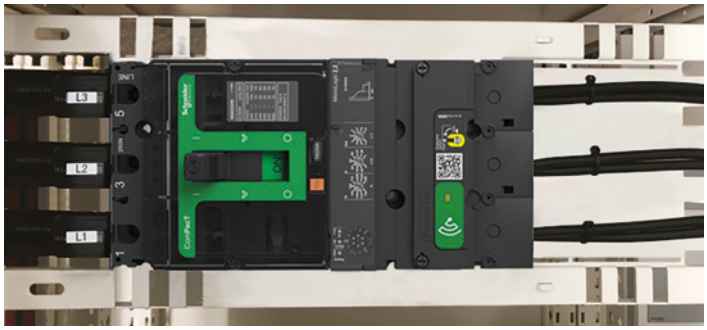
PowerLogic PowerTag Energy M250 up to 250 A / M630 up to 630 A

PowerTag Energy M250/M630 are designed for Molded Case Circuit Breakers and Switches (ComPacT and TeSys) for 3P and 3P+N electrical networks.

This PowerTag Energy is mounted directly on the bottom side of the circuit breaker or the Vigi add-on, if any. Thanks to its integrated design, it does not require any specific wiring, and is compatible with the same connection accessories of the device which it is mounted on.

DB445721.ai





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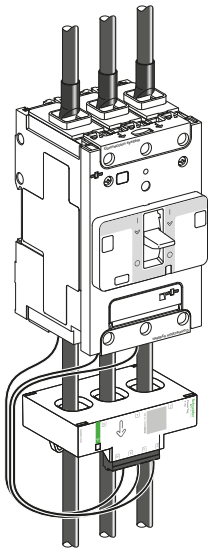
Installing the Devices

PowerLogic PowerTag Energy Sensors

PowerLogic PowerTag Energy F160

With its flex design, this PowerTag Energy can be used on many products or group of loads up to 160A on 3P or 3P+N networks. Its removable spring connector for voltage picking makes it easy to install, and the shapes for potential brackets enable mounting and holds in the panel, where needed.

DB445722.ai



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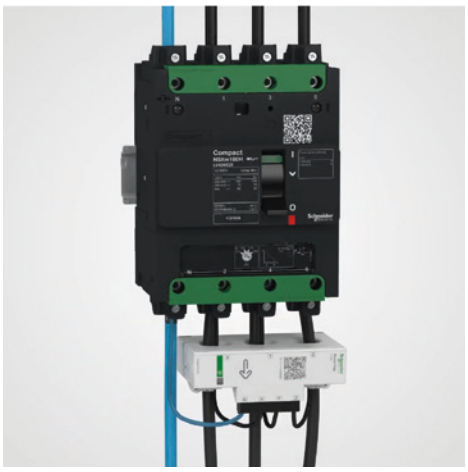


PowerLogic PowerTag Energy M63

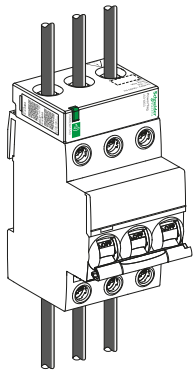
This PowerTag Energy is used for Acti9 and Multi9 Monoconnect offers: “Single-terminal” circuit breakers, RCDs and switches with 18 mm pitch between phase and neutral, rated less than or equal to 63 A.

It is designed to fit the following devices: iC60, Reflex iC60, DT60, iID.

Two rules should be carefully followed for these PowerTag Energy sensors (refer to the product Instruction Sheet page 46):

- Consider aligning the neutral on the PowerTag and circuit breaker: on the PowerTag, neutral is indicated on the front by the letter N.
- Strip an 18 mm section of the wires before screwing them into the circuit breaker.

DB445723.ai



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PB124083.eps

Installing the Devices

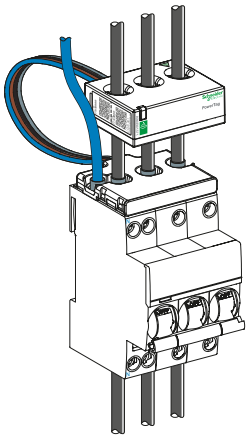
PowerLogic PowerTag Energy Sensors

PowerLogic PowerTag PhaseNeutral P63

This PowerTag Energy is used for Acti9 and Multi9 PhaseNeutral offers: “Single-terminal” circuit breakers, RCDs and switches with pitch of 9 mm between phase and neutral, rated less than or equal to 63 A.

It is designed to fit the following devices: DT40, iDPN, C40, i DPN Vigi.

DB445725.ai



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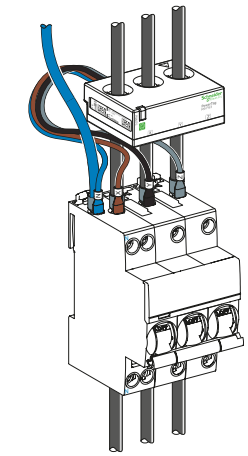
PB124086.eps

PowerLogic PowerTag Energy F63

This PowerTag Flex is used for other devices and specific installations, rated less than or equal to 63 A.

It is designed to fit the following devices: Vigi iDT40, Vigi iC40, Vigi iC60, iC60 double terminal, iID double terminal.

DB445724.ai



PB124084.eps

Note:
For additional information and the list of compatible Schneider Electric devices and concentrators, please refer to the Selection Guide **CA908058E**.

Installing the Devices

EcoStruxure Panel Server

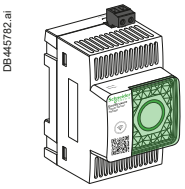
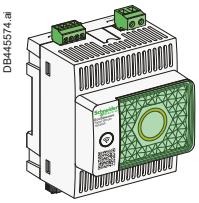
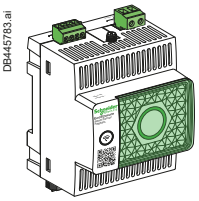
EcoStruxure Panel Server is a data concentrator and gateway with both wired and wireless communication capabilities:

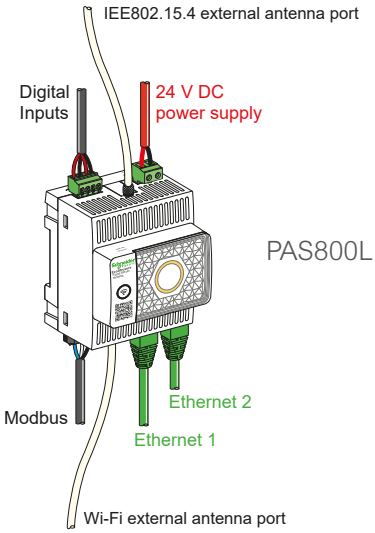

PB124101.eps

Upstream of the Panel Server:
- Modbus TCP/IP
- Wi-Fi

Downstream of the Panel Server:
- IEEE 802.15.4
- Modbus TCP/IP (*)
- Modbus RTU (SL) (*)
- Digital inputs (*)

(*): depending on the version. See table on the next page.

	Description	Reference	Instruction Sheet
 DB445782.ai	Panel Server Entry	**PAS400**	For more information on the **Panel Server Entry,** refer to the instruction sheet **NNZ76760.**
 DB445574.ai	Panel Server Universal	**PAS600L** **PAS600**	For more information on the **Panel Server Universal,** refer to the instruction sheet **GDE74119.**
 DB445783.ai	Panel Server Advanced	**PAS800L** **PAS800** **PAS800P**	For more information on the **Panel Server Advanced,** refer to the instruction sheet **JYT24469.**



PAS800L

Installing the Devices

EcoStruxure Panel Server

Main features		EcoStruxure Panel Server		
		Entry	Universal	Advanced
Power supply	24 Vdc	-	PAS600L	PAS800L
	110-277 V AC/V DC	PAS400	PAS600	PAS800
	Power over Ethernet (PoE)	-	-	PAS800P
10/100BASE-T Ethernet		One RJ45 port	Two RJ45 ports	Two RJ45 ports
Upstream Modbus TCP/IP connectivity (edge connection)		✓	✓	✓
Upstream Wi-Fi connectivity		✓	✓	✓
Downstream Modbus TCP/IP connectivity		-	✓	✓
Downstream IEEE 802.15.4 connectivity		✓	✓	✓
Downstream Modbus RTU (SL) connectivity		-	✓	✓
Digital inputs (including WAGES (Water, Air, Gas, Electricity, Steam))		-	Two digital inputs (PAS600L)	Two digital inputs (PAS800L)
Wi-Fi external antenna		-	✓	✓
IEEE 802.15.4 external antenna		-	-	✓
Data sampling		✓	✓	✓
Energy Server		-	-	✓
Data logging		-	-	3 years
Commissioning tool of Panel Server and connected devices		• EcoStruxure Power Commission software • EcoStruxure Panel Server webpages		
Schneider Electric cloud applications		• EcoStruxure Energy Hub • EcoStruxure Asset Advisor • EcoStruxure Resource Advisor		

Wireless Devices/Wi-Fi Antenna for EcoStruxure Panel Server

The Panel Server Antenna (Ref: **PASA-ANT1**) can be used to extend the wireless network.

- It can be used with both Universal (**PAS600**, **PAS600L**) and Advanced (**PAS800**, **PAS800L**, **PAS800P**) Panel Servers to extend the Wi-Fi network.
- It can be used with Panel Server Advanced (**PAS800**, **PAS800L**, **PAS800P**) to extend the IEEE 802.15.4 network.

The antenna is provided with a 3m cable.

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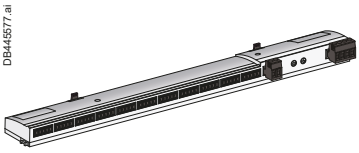
Refer to **DOCA0289EN** for more information on the Panel Server and the wireless communication restrictions with IEEE 802.15.4.

Installing the Devices

EcoStruxure I/O Smart Link

Via Ti24 connectors, I/O Smart Link is used to:
- monitor and control I/O equipment, such as the Acti9 range or Standard I/O devices
- collect data from WAGES (water, air, gas, electricity and steam) meters.

The I/O Smart Link can act as a Modbus RTU server with a Universal or Advanced Panel Server as the client.

	Description	Reference	Instruction Sheet
	I/O Smart Link	**A9XMSB11**	For more information on the **I/O Smart Link,** refer to the instruction sheet **PKR5509302.**

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Ti24 Connectors:

11 input/output channels
- Pin 1: 0 V
- Pin 2: I1 Input 1
- Pin 3: I2 Input 2
- Pin 4: Q Output
- Pin 5: +24 V DC

Modbus Server Cabling:

RS485 Modbus
- Pin 1: D1 Modbus
- Pin 2: D0 Modbus
- Pin 3: Shielding
- Pin 4: Common/0 V

Modbus Server Adressing:

With a rotary switch, the Modbus address must be unique

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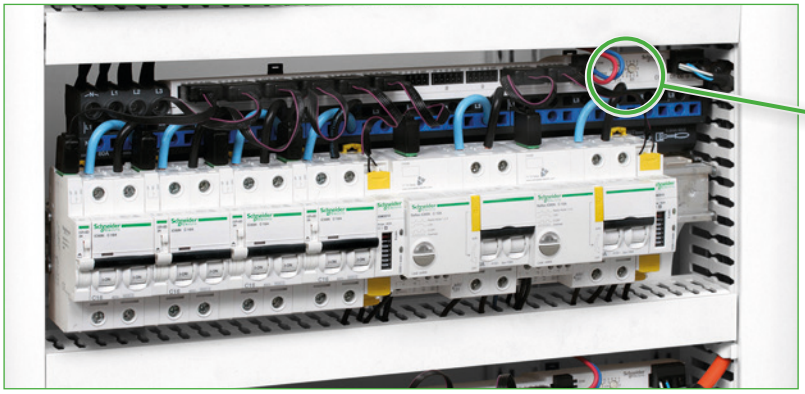

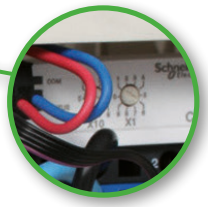

Rotary Switch Modbus addressing

I/O Smart Link Installation

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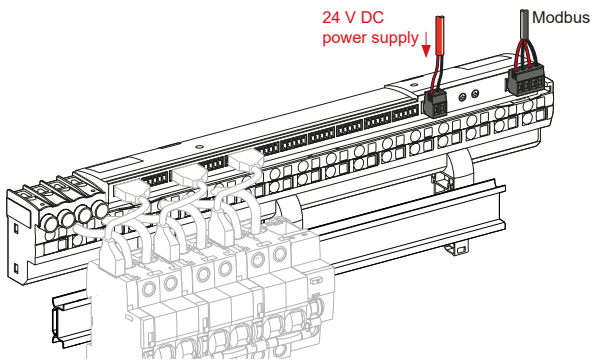
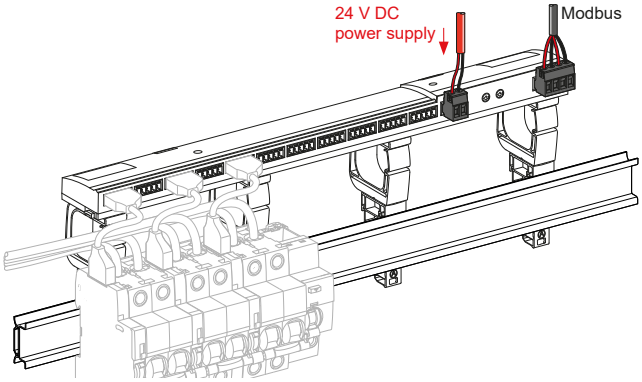


I/O Smart Link with Linergy FM Installation

DB445798.ai



I/O Smart Link without Linergy FM Installation

Installing the Devices

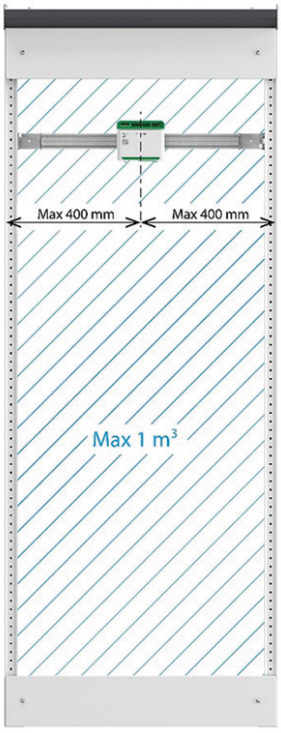
PowerLogic HeatTag

HeatTag is a wireless sensor for early detection of overheating wire connections or overheating cables.

The HeatTag sensor helps prevent electrical distribution switchboards from being damaged by analyzing gas and micro-particles in the air of the switchboard and sending alerts before any smoke or insulator browning occurs. For detailed information on this device, refer to the “PowerLogic catalog”.

	Description	Reference	Instruction Sheet
 DB445578.ai	HeatTag	**SMT10020**	For more information on the **HeatTag,** refer to the instruction sheet **MFR5173801.**

- Generally, one HeatTag sensor is recommended to be installed per cubicle to mitigate the risk of fire caused by thermal runaway.
- HeatTag can be installed in cubicles with an IP range from IP20 to IP55 (with natural ventilation)
- One HeatTag can cover a maximum volume equivalent to 1 m^3
- The cubicle width cannot exceed 400 mm on either side of the HeatTag sensor
- HeatTag can be installed in panels with Form 1, 2, 3 and 4
- HeatTag can detect overheating of power cables and/or of auxiliary cables (>=1.5 mm^2)



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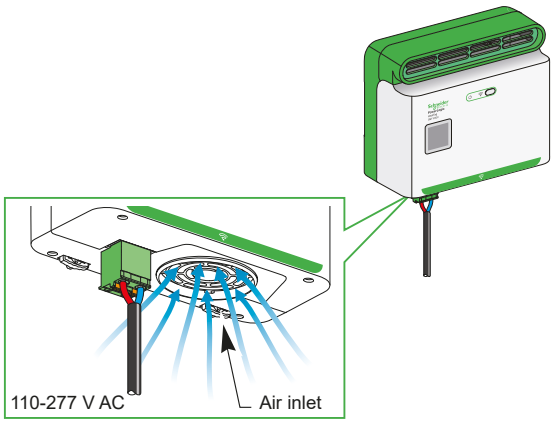
HeatTag Installation



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Installing the Devices

Local Display: Enerlin'X FDM121 and FDM128

The FDM121 and FDM128 are both device displays. They are intended to display measurements, trips, and operating information. They cannot be used to modify the protection settings. Measurements are easily accessed via a menu. Trips are automatically displayed. A pop-up window displays the time-stamped description of the trip.


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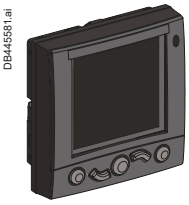
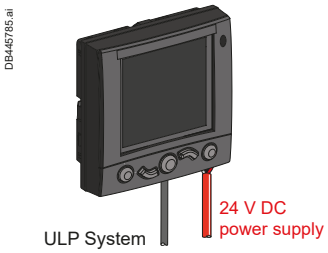
PB124104.eps

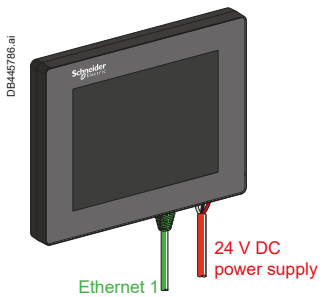
The FDM121 can be connected via ULP to one individual circuit breaker such as:
- MasterPacT MTZ1, MTZ2, MTZ3
- ComPacT NS, NSX

The FDM128 is an intelligent Ethernet touch screen. It collects the data from devices via Modbus TCP/IP. It is designed to manage up to 8 devices such as:
- MasterPacT MTZ1, MTZ2, MTZ3
- ComPacT NS
- ComPacT NSX
- EcoStruxure Panel Server

	Description	Reference	Instruction Sheet
 DB445581.ai	FDM121	**TRV00121**	For more information on the **FDM121,** refer to the instruction sheet **QGH80971.**
 DB445582.ai	FDM128	**LV434128**	For more information on the **FDM128,** refer to the instruction sheet **HRB45777.**

FDM121 and FDM128 Installation





Note:
The FDM121 and FDM128 are usually mounted on a door or panel, at approximately 1.65 m.

Installing the Devices

Ethernet Switch and Auxiliary Power Supply

The 24 V DC auxiliary power supply devices and Ethernet switch are key components in digitized switchboards to help ensure the availability of the communication network and monitoring/ control functions.

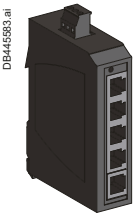
Ethernet Switch

The Modicon Networking range has a wide variation of Ethernet Switches. For most Smart Panels for Commercial and Industrial buildings, a standard, unmanaged Modicon Networking switch with 5 or 8 copper ports is sufficient.


PB124105.eps


PB124106.eps

- DIN rail mounted
- Compact footprint to maximize the space
- Wide DC power supply input range from 9.6 V DC to 32 V DC
- Lower power consumption than our legacy offers and other products on the market

	Description	Reference	Instruction Sheet
 DB445583.ai	Ethernet Switch	**MCSESU053FN0** (5 copper ports) **MCSESU083FN0** (8 copper ports)	For more information on the **Ethernet Switch,** refer to the instruction sheet **NNZ7563404.**

Modicon Regulated Power Supply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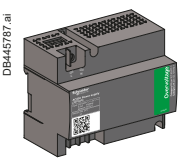
For information on choosing and installing the auxiliary 24 V DC power supply, refer to page 61.

	Description	Reference	Instruction Sheet
 DB445667.ai	24 V DC power supply (0.4 A)	**ABLM1A24004**	For more information on the **Auxiliary Power Supply,** refer to the instruction sheet **GDE54356.**
	24 V DC power supply (0.6 A)	**ABLM1A24006**	
	24 V DC power supply (1.2 A)	**ABLM1A24012**	
	24 V DC power supply (2.5 A)	**ABLM1A24025**	
	24 V DC power supply (2.1 A)	**ABLS1A24021**	For more information on the **Auxiliary Power Supply,** refer to the instruction sheet **GDE5437201.**
	24 V DC power supply (3.1 A)	**ABLS1A24031**	
	24 V DC power supply (5 A)	**ABLS1A24050**	
	24 V DC power supply (10 A)	**ABLS1A24100**	
	24 V DC power supply (20 A)	**ABLS1A24200**	
 DB445787.ai	24 V DC power supply (1A)		For more information on the **Auxiliary Power Supply,** refer to the instruction sheet **NVE93696.**
	24–30 V DC input voltage	**LV454440**	
	48–60 V DC input voltage	**LV454441**	
	100–125 V DC input voltage	**LV454442**	
	110–130 V DC input voltage	**LV454443**	
	200–240 V DC input voltage	**LV454444**	

Installing the Devices

Surge Protection Device

General Information

Current standards define three Surge Protection Device (SPD) categories for low-voltage electrical installations:

Type 1: capable of carrying a high lightning current, generally from the earth to the energy distribution network. It is installed in the main switchboard if the building is equipped with a lightning rod.

Type 2: a surge protection device designed to carry the currents generated by indirect lightning strikes and causing overvoltage induced or conducted in the energy distribution network. It is installed in the main distribution switchboard.

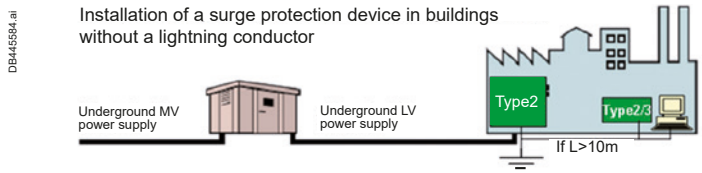
Type 3: a surge protection device installed in addition to Type 2 and designed to reduce overvoltage on the terminals of sensitive devices. Its current-carrying capacity is limited, so it cannot be used alone.

Surge Protection Device Selection and Installation Location:

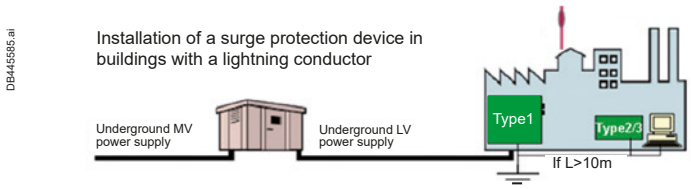
Lightning protection should be understood as a whole system. Depending on the application scenario (e.g. large industrial sites, data centers or hospitals), a risk analysis method may be required to help ensure the right choice is made for optimum protection (lightning rod, surge protection device).

In other scenarios (e.g. residential, offices or buildings not sensitive to industrial risks), it is easier to adopt the following protection principle:

Install a Type 2 surge protection device in the electrical installation's head switchboard. Then, determine the distance separating this surge protection device from the devices to be protected. If this distance exceeds 10 meters, an additional surge protection device (Type 2 or Type 3) should be installed near the devices.



If the building is equipped with a lightning rod, it is necessary to install a Type 1 surge protection device at the installation head. There are surge protection devices combining Type 1 and Type 2 in the same housing.



Surge Protection Device Sizing:

The sizing of Type 2 surge protection devices depends primarily on the exposure zone (moderate, medium, high): There are various carrying capacities for each of these categories (Imax = 20, 40, 65 kA (8/20)).

For Type 1 surge protection devices, the minimum carrying capacity is Iimp = 12.5 kA (10/350) per branch. Higher values may be required by the risk analysis, if this needs to be performed.

Selecting the Protection Device Associated with the Surge Protection Device:

Finally, the protection arrangement associated with the surge protection device (circuit breaker or fuse) will be chosen according to the short-circuit current at the installation point. In other words, for a room switchboard, it is necessary to choose a protection device with Isc < 6 kA.

For office applications, Isc is generally < 20 kA.

The manufacturers should provide the coordination table between surge protection devices and their associated protection devices. Increasingly, surge protection devices already come with this protection device built into the housing.

Installing the Devices

Surge Protection Device

Positioning Rules

Related Standard

Theory

1 Recommendation: In Smart Panels, Surge Protection devices are highly recommended

With direct lightning to electrical distribution or indirectly via trees, the ground or buildings generates a surge with a high level of energy which can have consequences if Surge Protection is not installed in Smart Panels.

Surges are hardly observable and transient but they have multiple consequences on electronic equipment and installations.

In many cases, surges cause malfunctions and damage: such as operation stop, loss of data or interruption of manufacturing processes. It can be difficult to investigate the causes.

Example

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2 What are the Consequences if Surge Protection is not Installed in Smart Panels?

- Surges that can damage electronic components, and even vaporize conductors.
- Superposition of noise on analog signals that generates false indications (e.g. wrong temperature)
- Possibility of data loss or change in saved data
- Lower transmission speed due to repetitions
- System reset, etc.

3 Which Devices are Sensitive to Electrical Surges?

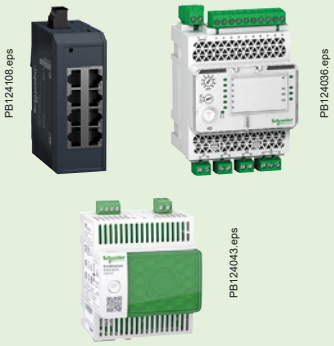
Example

Smart Panel devices have an integrated Metal Oxide Varistor (MOV) for surge protection.

This only protects against industrial surges and cannot withstand atmospheric surges.

The following devices in Smart Panels must be protected by a Surge Protection Device (SPD) - minimum Type 1+2, Iimp = 12.5 kA in incoming switchboards and Type 2, Imax = 20 kA in secondary distribution boards:

- Reclosing remote control mechanisms,
- Smart programmable relays,
- Power supplies,
- Panel and WEB servers,
- I/O application modules, etc.



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PB124043.eps

Installing the Devices

Surge Protection Device

Installation (1/3)

Related Standard

Good Practice

1

1 Back-up Protection

According to IEC 61643-11, it is mandatory to install an SPD with overcurrent protection upstream, e.g.: circuit breaker or fuse, internal or external.

Integrated back-up protection

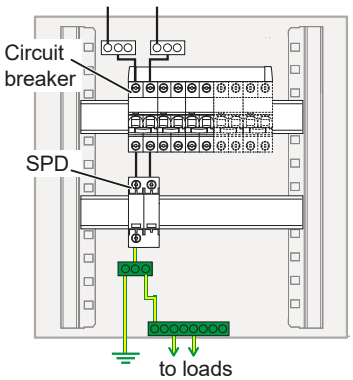
External back-up protection

DB445714.ai

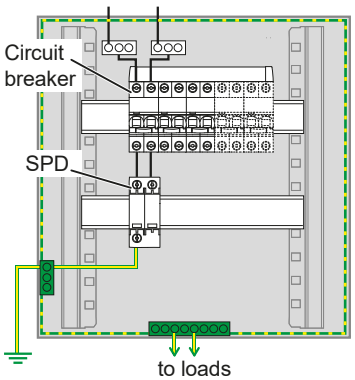
1.1 Proper Installation of SPD with Back-up Protection

- The SPD connections to the loads should be as short as possible in order to reduce the value of the voltage protection level (installed)
- On the terminals of the back-up protection device.
- The total length of the SPD connections to the network and the earth terminal block should not exceed 50 cm.

How to connect a SPD in a plastic enclosure



How to connect a SPD in a metallic enclosure



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Installing the Devices

Surge Protection Device

Installation (2/3)

Related Standard

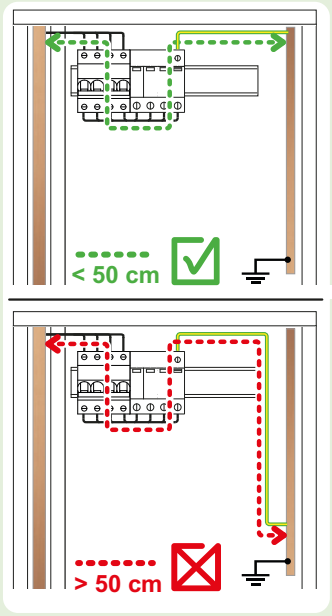
Good Practice

2 Installation in a "Convenient Place or a Free Space"

Equipment installation should be designed according to installation rules: the cable length must be less than 50 cm.

Standard IEC 60364 recommends the following cable cross-sections at the installation head:

- 4 mm² (Cu) for Type 2 surge protection device connections.
- 16 mm² (Cu) for Type 1 surge protection device connections.



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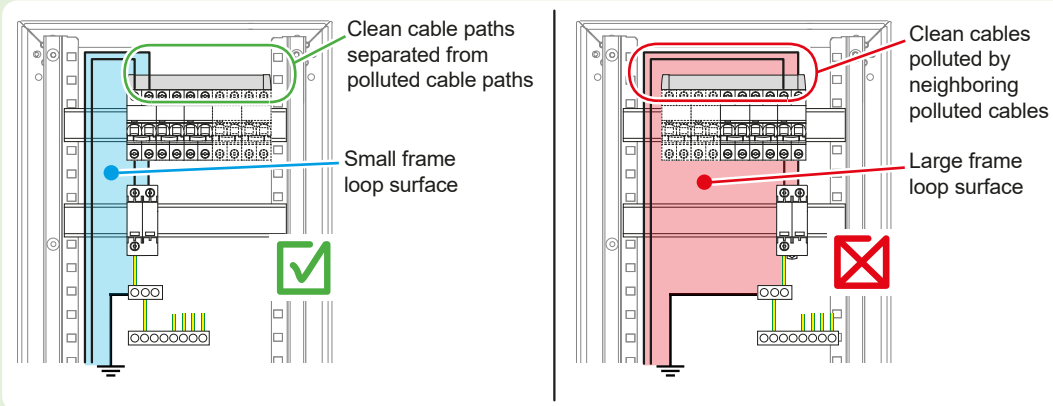
3 Minimizing the Impact of Magnetic Fields

The incoming feeder phase, neutral and protection (PE) conductors should run alongside one another to reduce the loop surface. The incoming conductors of the SPD should be remote from the protected outgoing conductors to avoid polluting them by coupling. The cables should be pinned against the metallic parts of the enclosure (if any) in order to minimize the surface of the frame loop, and hence benefit from a shielding effect against EM disturbances.



DB445716.ai

Installing the Devices

Surge Protection Device

Installation (3/3)

Related Standard

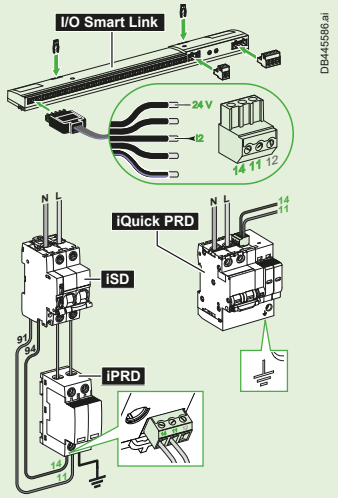
Good Practice

4 Surge Protection Device Status Remote Monitoring

Monitoring SPD with an I/O Smart Link is important to verify the status of the cartridge and back-up protection, connecting to OF auxiliary contact.

- PRD/iPRF1 connection (standalone SPD),
- Quick PRD connection (SPD with integrated protection).

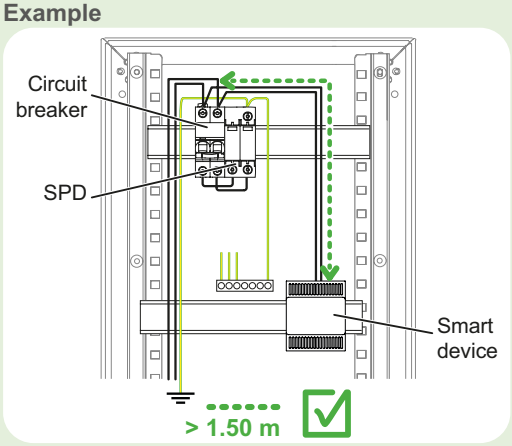
Example



5 Coordination between SPD and "Smart Devices"

In order to direct all surge current to the SPD but not to the internal surge protection of "connected devices", it is recommended to maintain a minimum of 1.5 meters cable distance between a surge protection device and "smart devices".

Example



6 Mix of Brands

⚠ ⚠ WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

In the case of a mix of brands of the Surge Protection Device and back-up protection, the coordination of the association must be tested and validated in a laboratory.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

To avoid doing any tests, use coordinated SPD and back-up protection: see page 56 for more information.

Auxiliary Power Supplies

ULP Generalities

ULP (Universal Logic Plug) System

The 24 V DC power supply of the ULP system must be SELV (Safety Extra Low Voltage) to provide insulation coordination (IEC 60664-1 and IEC 61204-7) and distribute a SELV along the entire length of the ULP connections. The 24 V DC power supply must be connected at the primary end to a low-voltage distribution zone, with an overvoltage category which is less than or equal to that of the 24 V DC power supply:

- Power supplies in overvoltage category IV can be connected directly to the busbar system of a main low-voltage distribution board. Schneider Electric MicroLogic Power Supplies are overvoltage category IV.
- Power supplies in an overvoltage category lower than IV cannot be connected directly to the busbar system of a main low-voltage distribution board. A minimum of one circuit isolation transformer is therefore needed between the busbar system of a main low-voltage distribution board and a control circuit that can be connected to the primary of the 24 V DC power supply. Schneider Electric ABL power supplies are overvoltage category II (III for ABLM).

The 24 V DC SELV power supply of the ULP system can be used to power other devices, provided that they have double insulation, or reinforced insulation, to retain the SELV nature of the power supply. These devices must not connect either the 0 V or the 24 V DC to the local machine ground or the protective ground.

The ULP modules have built-in current protection of 3 A, with Isc = 20 A. The 24 V DC external power supply should be able to protect the ULP module with Isc limited to maximum 20 A.

It is recommended to use star topology to limit EMC disturbances. The connection between the power supply and the terminal block (+/-) should be as short as possible. In case of a serial topology, connect the last device to the power supply with an additional cable.

Some devices can be powered directly via one of the two ULP RJ45 ports on an IFE/IFM or the I/O modules. But only one device can be powered through the ULP cord. This device must be at the end of the ULP line. This is only possible for the following devices:

- FDM121 display.
- BSCM module and MicroLogic trip unit for ComPacT NSX circuit breakers.
- BCM ULP module for MasterPacT NT/NW and ComPacT NS circuit breakers.

All IFE and I/O modules (two I/O modules maximum on the same ULP bus) shall have a direct connection with the power supply and cannot be powered by ULP.

The same 24 V DC external power supply can be used for the micrologic control unit and the communication devices (IFE, IFM, I/O, FDM) or programmable contacts (M2C, ESM). But a separate 24 V DC power supply must be used to supply the MN/MX/XF voltage releases or the MCH gear motor.

ComPacT and MasterPacT with MicroLogic

For MasterPacT (MTZ, NT, NW) and ComPacT (NSX, NS630b…1600, NS1600b…3200) with MicroLogic it is recommended to use an external power supply connected to the MicroLogic in order to:

- keep the display and the energy metering energized, even if Current < 20% In
- enable the display to be used even if the circuit breaker is open or not supplied
- display fault currents after tripping
- modify the settings when the circuit breaker is open (OFF position).

The 24 V DC external power supply is not required for basic LSIG protections.

It is highly recommended that each panel (1 panel can have several columns) has its own 24 V DC to supply MicroLogic and ULP systems. For EMC reasons, this 24 V DC shall not go out of the panel.

Auxiliary Power Supplies

Enerlin'X IFM/Modbus Specificities

Specific Information for IFM

The IFM interface must always be supplied with 24 V DC:

- IFM interfaces stacked to an IFE server are supplied by the IFE server and it is not necessary to supply them separately.
- If IFM interfaces are stacked without an IFE server, only one of the IFM interfaces must be supplied with 24 V DC.
- A single IFM interface must be supplied with 24 V DC.

It is recommended not to exceed 8 Modbus servers for one Modbus client. This will help ensure a better response time (IFE). To optimize the communication system, stack the IFMs on the IFEs (for enhanced performance and behavior in terms of EMC). For TRV00210 only, the 0 V terminal on IFM interfaces shall be connected to ground at only one point on the Modbus line (first stacked IFM interface or at the Modbus client if IFM interfaces are not stacked with an IFE server).

No other devices, including IFM LV434000, must have 0 V connected to ground.

Modbus devices connected to a Modbus IFM interface must have a floating Modbus 0 V. This Modbus 0 V must not be wired to any other 0 V connection points, such as the one on the power supply.

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Segmented power supplies are required in the following case:

If the length of the Modbus cable is such that the voltage drop is excessive (for example, cable longer than 15 m with a 3 A power supply), independently powered Modbus cable segments must be created:

- Only the 24 V DC wire is interrupted between two segments.
- The continuity of the 0 V wire (which is also the Modbus common) must be assured along the entire length of the Modbus network.

The maximum number of power supply segments is 3 segments for a single Modbus network.

When an installation consists of several Modbus networks, one 24 V DC power supply must be used for each Modbus network. Since the 0 V of the 24 V DC power supply is also the Modbus common, the power supplies must be separated to make the Modbus networks independent from one another.

Auxiliary Power Supplies

Floating Power Supply

Limitation of the Number of MasterPacT MTZ and ComPacT NSX Circuit Breakers with Floating Power Supply

In the case of a floating power supply, and when no IFM interface with part number TRV00210 is installed in the ULP system, the number of MasterPacT MTZ and ComPacT NSX circuit breakers is limited by earth leakage currents as described in the following tables.

The limitation is valid for all MasterPacT MTZ and ComPacT NSX circuit breakers used with a ULP connection.

Limiting the maximum number of such products on the same external DC power supply limits the cumulated leakage currents under 0.5 mA (human sensitivity level) or 3.5 mA (class I equipment).

Number of MicroLogic trip units or control units in the case of 0.5 mA maximum leakage current:

Ue (V L-N/U L-L) (Vac)	Maximum number of MicroLogic X control units without VPS power supply (MasterPacT MTZ circuit breakers)	Maximum number of MicroLogic X control units with VPS power supply (MasterPacT MTZ circuit breakers)	Maximum number of MicroLogic trip units (ComPacT NSX circuit breakers)
66/115	144	23	66
127/220	75	12	34
230/400	41	6	19
347/600	27	4	12
400/690	24	9	11
1.000	16	6	0

Number of MicroLogic trip units or control units in the case of 3.5 mA maximum leakage current:

Ue (V L-N/U L-L) (Vac)	Maximum number of MicroLogic X control units without VPS power supply (MasterPacT MTZ circuit breakers)	Maximum number of MicroLogic X control units with VPS power supply (MasterPacT MTZ circuit breakers)	Maximum number of MicroLogic trip units (ComPacT NSX circuit breakers)
66/115	344	57	156
127/220	180	29	81
230/400	99	16	44
347/600	66	10	29
400/690	57	23	26
1.000	39	16	0

Auxiliary Power Supplies

24 V Power Supply

Recommendations for 24 V DC Wiring to Reduce Electromagnetic Interference

- The input and output wires of the 24 V DC power supply must be physically separated as much as possible.
- Do not connect the positive terminal to earth.
- Do not connect the negative terminal to earth.
- The maximum length for each conductor (+/-) is 10 meters.
- For connection distances greater than 10 meters, the plus and minus conductors of the 24 V DC supply must be twisted to improve EMC.
- The 24 V DC conductors must cross the power cables perpendicularly. If this is difficult or impossible, the plus and minus conductors must be twisted.
- Power supply conductors must be cut to length. Do not loop excess conductor.

24 V DC Power Supply

The voltage range of the auxiliary power supply shall be 24 V DC +/- 10%. The overvoltage category (OVC) of the 24 V power supply should be compatible with the installation network connection point.

In a noisy environment, we recommend using the MicroLogic Power Supply, due to its low stray primary secondary capacitance, in order to help ensure optimal operation of the MicroLogic control unit.

MicroLogic Power Supply (1 A Output, OVC IV)	Input
LV454440	24–30 V DC
LV454441	48–60 V DC
LV454442	100–125 V DC
LV454443	110–130 V AC
LV454444	200–240 V AC

ABLM Power Supply (100…240 V AC, OVC III)	W	A
ABLM1A24004	10	0.4
ABLM1A24006	15	0.6
ABLM1A24012	30	1.2
ABLM1A24025	60	2.5

ABLS Power Supply (100…240 V AC – 140…340 V DC, OVC III)	W	A
ABLS1A24021	50	2.1
ABLS1A24031	75	3.1
ABLS1A24050	120	5.0
ABLS1A24100	240	10.0
ABLS1A24200	480	20.0

ABL8 Power Supply (100…120 V AC – 200…500 V AC)	W	A
ABL8RPS24030	72	3.0
ABL8RPS24050	120	5.0
ABL8RPS24100	240	10.0
ABL8RPM24200/ABL8WPS24200	480	20.0

Auxiliary Power Supplies

Nominal Power Consumption of Products

Devices nominal consumption @ 24 V DC/20 °C	W	mA
MasterPacT BCM ULP	0.96	40
MasterPacT MTZ MicroLogic X	6.00	250
MasterPacT MTZ M2C/ESM	1.20	50
ComPacT NSX BSCM ULP	0.22	9
ComPacT NSX MicroLogic 5, 6 or 7	0.72	30
IFE, EIFE	2.88	120
IFM	0.72	30
I/O Module	3.96	165
1 I/O module input	0.12	5
1 I/O module output	2.40	100
OF/SD24, iOF/SD24	0.24	10
iACT24, iATL24	0.36	15
Reflex iC60, RCA iC60	0.36	15
1 iEM2010 pulse meter	0.12	5
2 iEM2010 pulse meters	0.12	5
FDM121	0.50	21
FDM128	6.84	285
I/O Smart Link with no load	0.24	10
Panel Server	<3.50	<150

Wiring Rules and Recommendations

Introduction

Related Standard

Theory

1 Cables should be prepared using tools or machines in good working condition that are correctly calibrated. They should be connected according to professional good practice to avoid any temperature rises that may cause serious damage.
> See the “Connections” section in this chapter.

2 Toroids are mounted on cables to detect leakage currents. They transmit a signal that is proportional to the current measured to the related receiver.
Toroids are fragile components. They should be installed in the switchboard according to professional good practice.

Tip

Current-measuring device circuits are generally made with a wiring section of 2.5 mm^2. Cables with reinforced insulation are used to reduce mechanical damage.

Wiring Rules and Recommendations

Routing Cables

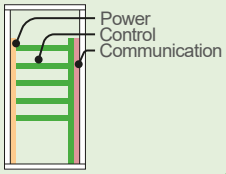
General Circulation Rules

Related Standard

Good Practice

Tip

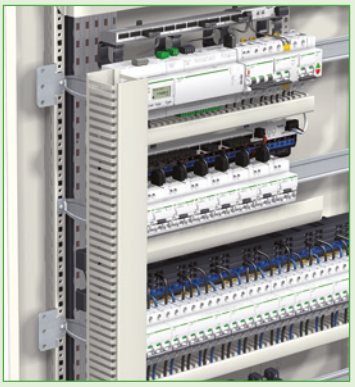
The cable run in the enclosure should be organized as illustrated in the diagram below, in "ladder" form, ensuring the low-power cables (cross-section ⩽ 6 mm²) and power cables (cross-section > 6 mm²) are separated.



1 Use separate routings for the auxiliary circuit and low-power cables (cross-section ⩽ 6 mm²) and power cables (cross-section > 6 mm²).

Moreover, given their sensitivity to electromagnetic disturbance, it is preferable to separate control/monitoring cables from communication cables.

Example



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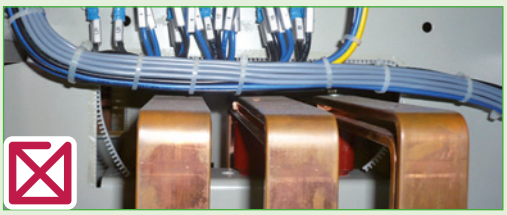
2 It is recommended to avoid routing cables between or too close to power busbars to limit the risk of:

- a temperature rise in the cable,
- damage to the insulator,
- electromagnetic disturbance.

Example



The cables are routed too close to the power busbars.

dikarang 024.eps

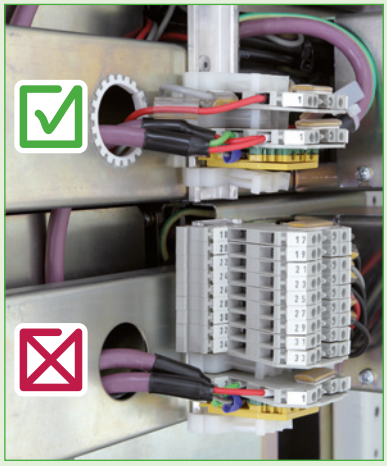
3 If a conductor insulating sleeve is damaged, this will impair its dielectric characteristics and increases the likelihood of arcing and therefore of a short-circuit.

To limit the risks of damage or cuts to the insulating sleeve:

- do not route cables on parts with sharp edges.
- protect cables that are routed through a hole in a sheet with grommets, cable glands, gaskets, plastic rings, etc.

In the specific case of a cable routed in a form sheet, make sure that the degree of protection is IP2X. Use a membrane gland plate to do this.

Example



A plastic ring is used to protect cables from the hole in the sheet.

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Wiring Rules and Recommendations

Routing Cables

General Cable Routing Rules

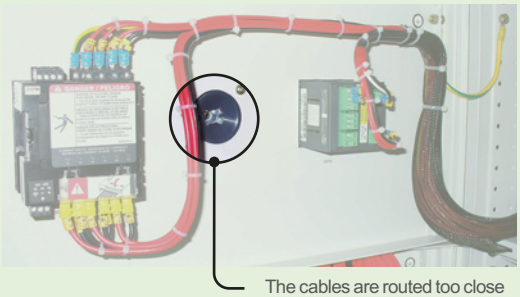
Related Standard

Good Practice

4 It is recommended to avoid routing the cables:

- in the safety perimeter of the device, e.g. installation of ducts above the circuit breaker gas evacuation areas,
- close to moving parts (handle, reset button, mechanical interlocking, rotary handle, etc.) where there is a risk of blocking the cable.

Example

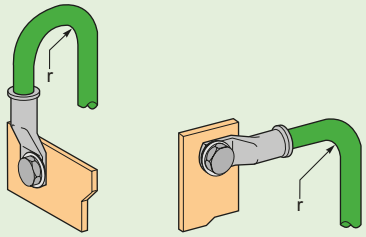


The cables are routed too close to the rotary handle.

5 Comply with the permissible curvature radius for each type of cable.

Notably:

- allow sufficient space to connect the cables, with a minimum curvature radius (6 to 8 times the external diameter of the cables),



- Do not use tools to bend the cable.

Not following these recommendations could lead to an abnormal temperature rise in the conductors or damage their insulation.

Tip

The permissible curvature radius values are given by the cable suppliers.

They depend on the type of:

- core (copper or aluminum),
- insulator.

Wiring Rules and Recommendations

Routing Cables

Cable Routing in Ducts

Related Standard

Good Practice

Tip

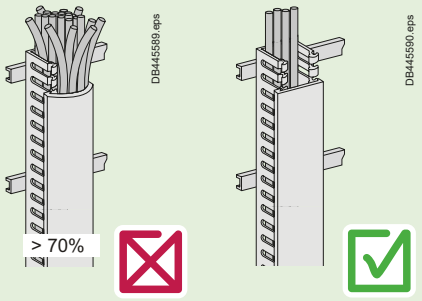
Trunking in halogen-free materials does not generate toxic or corrosive gases in case of combustion.

1 Choose trunking adapted to the cross-section and the number of cables to be held.

Leave sufficient space in the trunking for future extensions.

The final fill rate should not exceed 70%.

Example

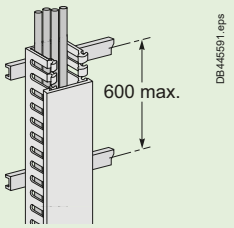


2 Never install trunking in contact with or between power busbar conductors.

3 Define the number of fastening points of the trunking based on its mechanical characteristics and the fill rate. The trunking should be straight after fastening.

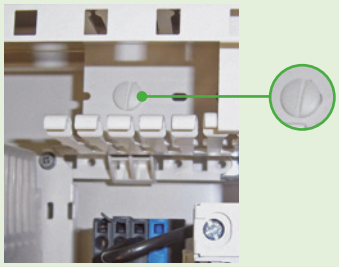
The center distance between fastening points should not be more than 600 mm.

Example



4 Fasten the trunking using rivets or plastic screws to reduce the risk of damaging the cables.

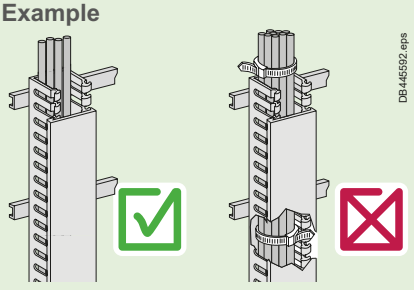
Example



5 To facilitate heat dissipation, it is recommended to avoid tying the cables inside the trunking

Never stretch a wiring cable as this risks disconnecting the cable. As a rule, there should always be some slack between the duct outlet and the connection point.

Example



Wiring Rules and Recommendations

Routing Cables

Cable Routing in Straps

Related Standard

Good Practice

1 Cable straps are used to enable faster installation, and facilitate the modification of operations and maintenance.

Choose the size of the straps based on the number of cables to be held.
The final fill rate should not exceed 70%.

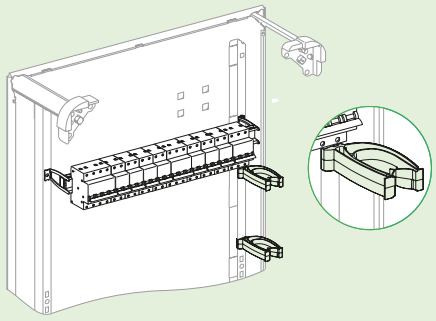
2 Lock the straps on a modular rail or vertical mounting plate.

Fit a sufficient number of straps to help ensure that cables are properly held in place: 1 strap approximately every 8 cm.

Note: To facilitate heat dissipation, it is recommended to avoid tying the cables running inside the straps.

Example

In Schneider Electric enclosures, horizontal and vertical straps can be installed to optimize cable running and make it easier to read.



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Wiring Rules and Recommendations

Routing Cables

Cable Routing Using Cable Ties

Related Standard

Good Practice

1 Choose ties that are adapted to the strand.

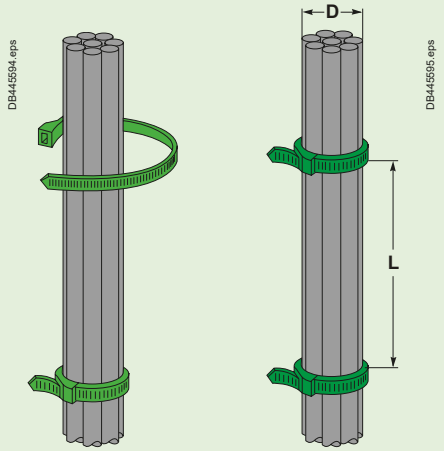
They should be:

- mechanically resistant enough to keep the cables fastened in case of a short-circuit,
- of a length that is adapted to the strand circumference,
- wide enough not to damage the cable insulating sleeve.

2 Fit a sufficiently large number of ties to help ensure that cables are properly held in place.

Center distance recommended according to strand diameter:

Diameter D of strand	Distance L between ties	
(in mm)	Min. (in mm)	Max. (in mm)
< 20	60	120
Between 20 and 30	70	140
Between 31 and 45	90	180
Between 46 and 75	125	200



Wiring Rules and Recommendations

Routing Cables

Cable Routing Using Tightening Clips

Related Standard

Good Practice

1 Never run a strand in contact with or between power busbar conductors to avoid any temperature rise and damage to the insulators.

2 If the cables of the strand do not meet the class 2 requirements, fasten the strand on insulation supports. If these are metal supports, insert an insulating wedge between the strand and each metal support.

Cables which meet the class 2 requirements can be fastened directly on the metal supports.

3 Strands should be run flush with doors, panels, swivelling front panels or panels that hold the switchgear so as to minimize the risks of damaging or pinching the cables.

The strand is protected mechanically by:

- a tubular plastic sleeve,
- a braided polyester sleeve,
- a spiral bearing.

Follow the recommendations below to mount the strand:

- make sure that the strand allows the moving part to move without any risk of damage to the cables.
- make sure that the cables are not subject to twisting or pulling. If necessary, divide the strand to limit mechanical stresses.
- comply with the permissible curvature radius.
- fasten the strand firmly on the fixed part (framework) as well as on the moving part (door, faceplate, panel, etc.).

Example

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Wiring Rules and Recommendations

Routing Cables

Cable Routing Between Columns

Related Standard

Good Practice

1 There are two possible scenarios depending on the switchboard configuration:

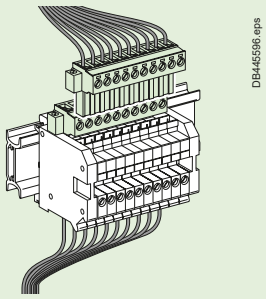
- with a limited number of columns and cables to connect, it is preferable to connect the cables directly to the switchgear concerned. In this case, it is necessary to protect conductors against risks of damage (strand protected by a polyester sleeve, cable tray or trunking),
- with a large number of columns and cables to connect, use terminal blocks to facilitate the installation and connection on site (faster and more reliable laying) and any maintenance operations.

In both cases:

- identify the cables with marks consistent with those of the switchboard in order to facilitate subsequent operations.

Example

Schneider Electric provides terminal blocks to be mounted on modular rails to enable auxiliary circuit cables to be connected between two columns.



This type of terminal block can be disconnected. It enables fast connection and disconnection during maintenance.

2 For the voltage collector power supply, choose an appropriate cable cross-section that will limit voltage drops (usually 6 mm^2).

Wiring Rules and Recommendations

Communicating Circuits

General Rules

Related Standard

Good Practice

1 The earthing mesh inside a switchboard is an important parameter. All metal structures will be interconnected with an electric contact.

☛ Be careful of the various protective coatings, which are generally insulating.

2 The communication switchgear installed should meet the requirements of the relevant immunity and emission standards.

☛ The wiring rules that follow are general ones. They do not replace the wiring guidelines given by the switchgear and controlgear manufacturer.

Example

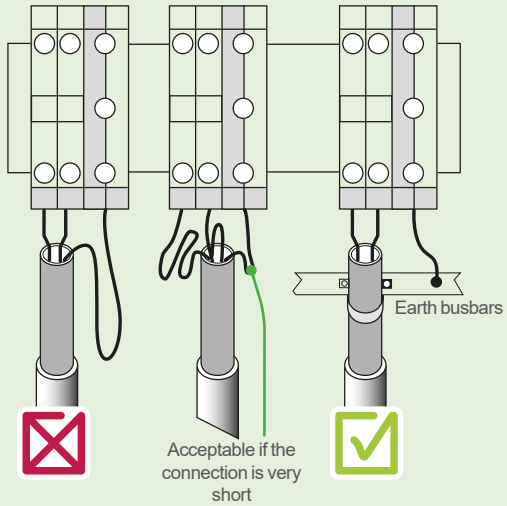
Sensitivity of the various cable families

Family	Cables	Type of signal	EMC behavior
1	Analog	Power supply and measurement circuits of analog sensors	Sensitive signals
2	Digital and Telecom	Digital circuits and data bus	These signals are sensitive. They are also disruptive for family 1
3	Relay	Dry-contact circuits with risks of re-priming	These signals are disruptive for families 1 and 2
4	Power supply	Power supply and power circuits	These signals are disruptive

Note: a shielded cable is neither disruptive nor sensitive.

3 Use shielded cables or double shielded strands to help protect circuits against radiated parasites. The metal armor must be earthed correctly. All free conductors in a cable (except for the analog cable) must be systematically earthed at both ends.

Example



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Earthing terminals with metal fastening system with modular rail.

Wiring Rules and Recommendations

Communicating Circuits

Wiring Rules (1/3)

Related Standard

Good Practice

1 **General Wiring Recommendations**

- Do not bend or damage the cables.
- Minimum bending radius: 10 x cable diameter.
- Avoid sharp angles on cable paths or passages.
- Minimize the cable shield connection length.
- Several shields can be connected together.
- Make a physical mark at the end of each cable.
- Identify the logical name and the address of each device.

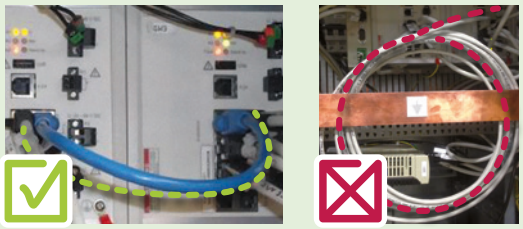
Wiring should be colored as follows:

Wire type		Wire color
AC Power		Black
Neutral		Light blue (RAL 5024)
Control wire	24 V DC	Dark blue (RAL 5013)
	0 V DC	Gray (RAL 7001)
	24 V AC	Red
	0 V AC	Ivory (RAL 1015)
Earth		Green/Yellow

2 Adjust the cable length to actual requirements. Cables should be as short as possible by avoiding creating loops that generate parasitic currents resulting from magnetic fields.

Cables should be stripped as close as possible to the connection point.

Example



3 Avoid all earth loops: these are very sensitive to power magnetic fields.

Example

Img05B.eps

Wiring Rules and Recommendations

Communicating Circuits

Wiring Rules (2/3)

Related Standard

Good Practice

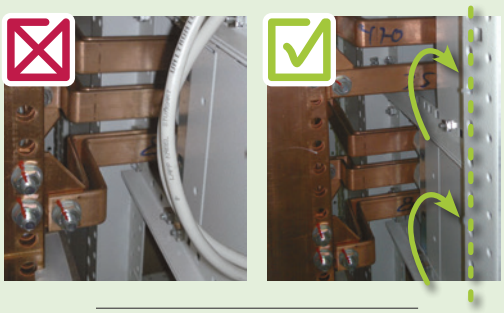
4 Never position communication cables close to busbars or power cables.

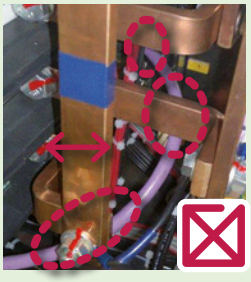
- Use flexible metal tubing.

① Metal tubing

- Secure the communication cable inside the metal profile when possible, or stick it on metal parts.

Example





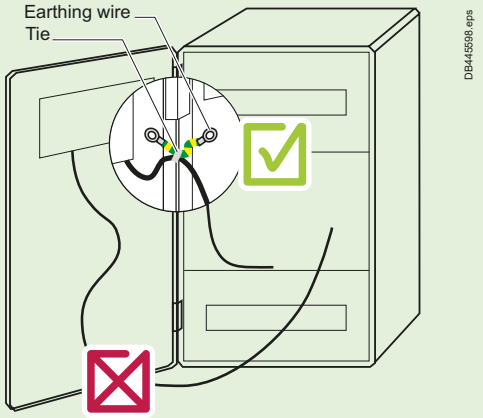
5 The presence of many earth structures in switchboards provides optimum protection. When routing to moving parts (doors, front plate), route the communication cable close to a hinge or earthing wire.

Example

Protective effect inside a switchboard:

- all the cables should be flattened against earthing structures,
- plastic cabling ducts can be used because they are installed on DIN rails connected to the switchboard earth.

Cables should be routed close to assembly points (hinges) or be doubled by an earthing wire.



Wiring Rules and Recommendations

Communicating Circuits

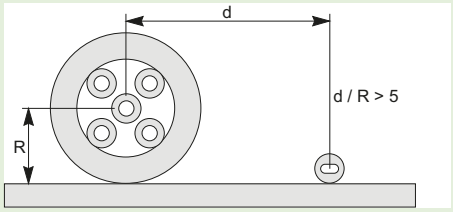
Wiring Rules (3/3)

Related Standard

Good Practice

6 Divide the cables into three separate groups (1-power, 2-command and 3-communication) to enable them be routed in separate paths. The wires in groups 2 and 3 may be routed in the same ducts. However, they should not be mixed in the same sheath or tightened into a single strand.

Note:
To maintain the protective effect, the ratio of the distance (d) between cables to the radius (R) of the largest cable must be over 5.



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7 When communication cables have to cross over power cables (e.g. when drawer space is small), the angle between the two types of cables should be as close as possible to 90°.

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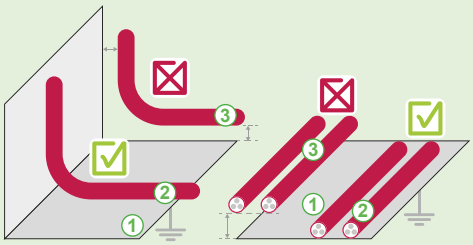
1. Power cable
2. Communication cable
3. Right angle
4. Parallel cable routing (NOK)

8 Communication cables should be placed as close as possible to an earthed plane, i.e. on the steel plates of cubicles.



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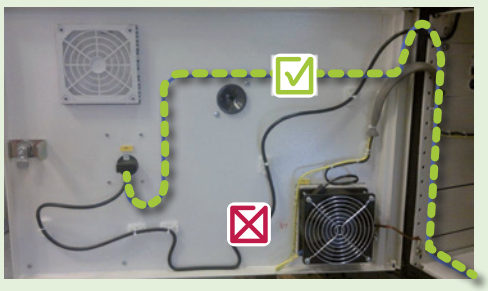
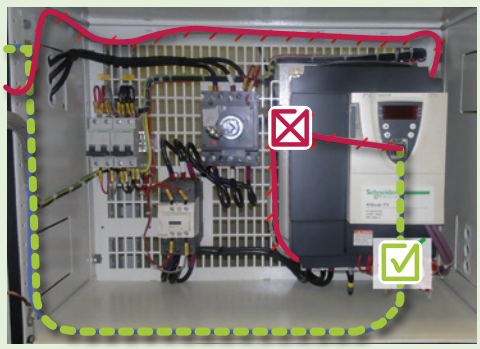
1. Earthed metal plane
2. Communication cable laid on the metal parts
3. Communication cable far from the metal parts





Wiring Rules and Recommendations

Communicating Circuits

Screen Continuity (1/2)

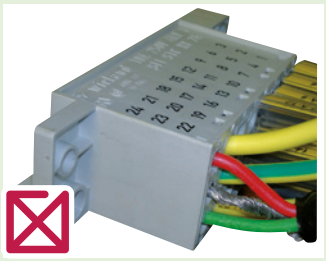
Related Standard

Good Practice

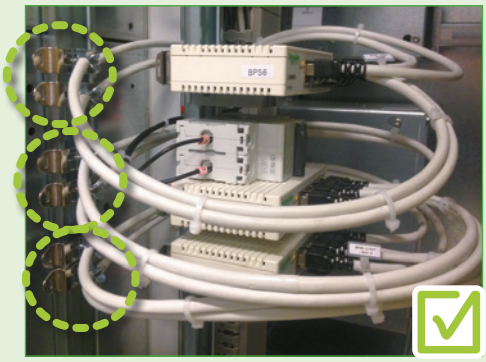
1 To help ensure screen continuity, it is recommended to avoid using the connector pins and “pig tails” (very poor efficiency at high frequency).

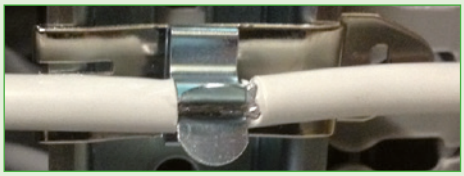
Connect the cable screens directly on the metal plate:

- to reduce the common impedance,
- to divert disturbances directly to earth (outside the products).



2 For RS485 communication networks, it is recommended to use an earthing clip on the DIN rail.





Wiring Rules and Recommendations

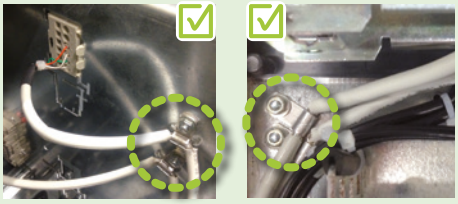
Communicating Circuits

Screen Continuity (2/2)

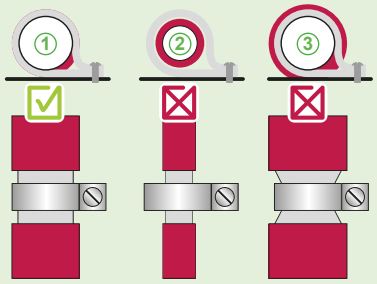
Related Standard

Good Practice

3 360° steel earthing clamp (it is not recommended to use aluminum clamps).

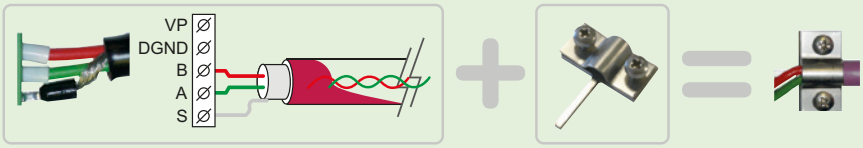


The clamp diameter shall be adapted to the cable screen diameter.



① Clamp adapted to screen diameter
② Clamp too large
③ Clamp too small

4 **Device with an Open-style Connector**



Add heat shrink tubing at the screen cable end (to contain braid metallic particles).

5 **Modbus Tap Earthing and Bonding**

Do not isolate the screws, as the connection to earth is via the screws.

Wiring Rules and Recommendations

Communicating Circuits

Connection and Grounding

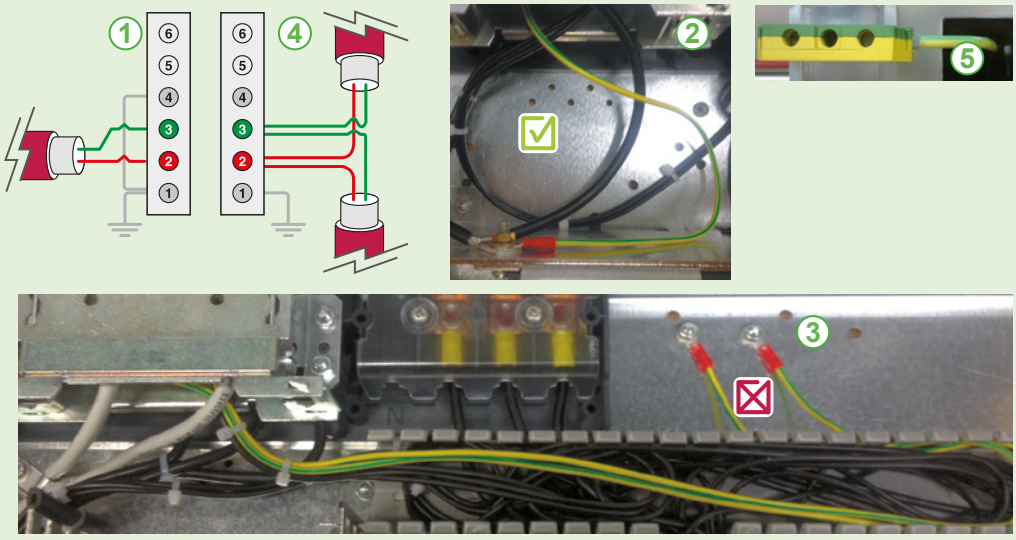
Related Standard

Good Practice

1 Electrical continuity

The electrical continuity between the drawer frame and the cubicle structure shall be obtained using the connector pins.

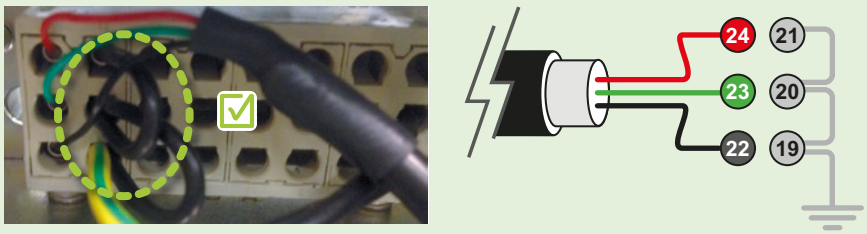
The connection length should be as short as possible.



① Internal FU connector
② Connector earthing
③ Earthing connection too long
④ External FU connector
⑤ Earthing by an earth terminal mounted on a DIN rail

2 Electromagnetic Barrier

Connect all the “earthing” contacts of the removable connector (=electromagnetic barrier) together with the drawer earth.



Wiring Rules and Recommendations

Communicating Circuits

Ethernet Network Wiring (1/2)

Related Standard

Good Practice

Tip

Types:
- FTP (Foil Twisted Pair): not permitted; risk of breakage if bended
- STP (Shielded Twisted Pair): suitable.
- SFTP (Shielded Foil Twisted Pair): recommended.

1

Although there are 4 twisted pairs of wires, 10 Base-T/100 Base-T Ethernet uses only 2 pairs: White/Orange (pins 1 & 2) and White/Green (pins 3 & 6).

As a minimum, an Ethernet line cable should be screened (overall braided screen) and screened also by a foil (SF/UTP).

There are different Ethernet topologies, they can be used separately or mixed.

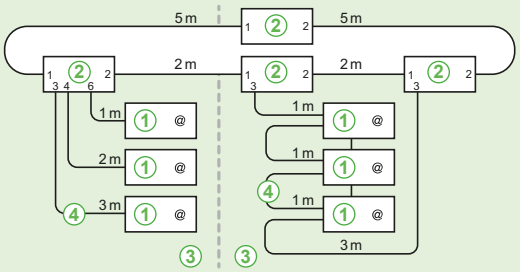
Rules	Standard Ethernet	Smart Panels
Maximum number of devices per network	No limits	No limits
Transmission rate	10/100 Mbit/s and 1 Gbit/s	100 Mbit/s
Maximum length	Twisted pair 100 m - Multi-mode Fiber optic: 2 km - Mono-mode Fiber optic > 2 km	100 m
Cable type	Depends on the transmission rate	Cat 5e SFTP or Cat 6 SFTP

2

It is highly recommended to attach a communications wiring diagram in addition to the electrical wiring diagram.

This diagram should show the following data:
- network name and number of each link,
- name, address and location of the equipment,
- identify used ports for each switch,
- all the elements of the architecture (routers, switches, by-pass switch, etc.),
- cable length.

Example

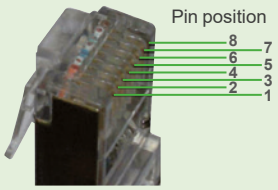


① Name of devices
② Name of the switches
③ Name of the network, number and location
④ Name of the link, number and location

3

Detailed view of correct wiring

Use a straight-through cable connection in accordance with TIA/EIA- 568- B (T568B) for the number of pins, number of pairs and color coding.



Pin No.	Pair No.	Color
1	1	White/Orange
2	1	Orange
3	2	White/Green
4 & 5	3	
6	2	Green
7 & 8	4	

Wiring Rules and Recommendations

Communicating Circuits

Ethernet Network Wiring (2/2)

Related Standard

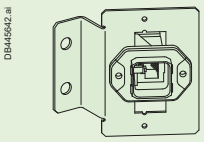
Good Practice

4 **Harmony XB5PRJ45** Panel Mounted RJ45 Port can be used as an RJ45 interface installed on the switchboard.

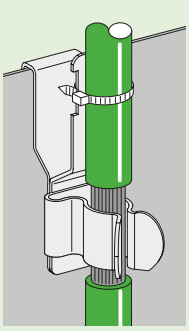
Linergy LGY4230 Plate Mounted RJ45 Port can be used to connect switchboards or as an RJ45 interface in Prisma, with a plastic cable gland to provide IP protection for the switchboard.

It is recommended to install a clip (stainless steel) before the switch, since a clip does not cause any deviation in the disruptions toward the housing.

XB5PRJ45 metal



LGY4230 metal



Wiring Rules and Recommendations

Communicating Circuits

Particular Rules for Modbus RTU (1/3)

Related Standard

Good Practice

1

The Modbus RTU protocol (a.k.a. Modbus SL) is based on a Client-Server (Master-Slave) concept.

In the standard Modbus system, all the devices are connected to a 3-wire main cable.
Two wires form a balanced twisted pair, on which bi-directional data are transmitted.

The Modbus topology is a main cable with devices connected directly (daisy chaining) or by short derivation cables.

The main cable, a.k.a. “Bus”, should be connected at its two extremities with Line Terminations.

Generally speaking, the sum of all the derivation lengths should be lower than the length of the bus.

The “Common” circuit should be connected directly to protective ground, preferably at one point only for the entire bus. In general, this point is chosen either on the client device or on the polarization device.

A Modbus Serial Cable should be shielded. The shield should be connected to protective ground at both ends.

Rules	Standard Modbus RTU	Smart Panels
Maximum number of devices per bus	32 (without repeater)	8
Bus speed	1200 bps to 115.2 Kbps	19.2 Kbps
Maximum bus length	1300 m (without repeaters) and depending on the transmission rate	1000 m
Maximum length of the sum of the derivations	Depends on the transmission rate	40 m
Cable type	TIA/EIA - 485 Standard	TIA/EIA - 485 Standard
Location of the terminations	Line termination at the 2 extremities of the bus (R or RC)	Line termination at the 2 extremities of the bus (Only R = 120 Ω)
Location of the polarization	The polarization is given by only one piece of equipment at the beginning of the bus (in general: the client (master))	The client (master) has a built-in polarization at the beginning of the bus

Wiring Rules and Recommendations

Communicating Circuits

Particular Rules for Modbus RTU (2/3)

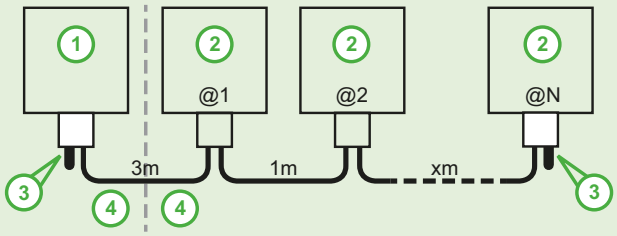
Related Standard

Good Practice

2 It is strongly recommended to attach a communications wiring diagram to the electrical wiring diagram.

This diagram should include:

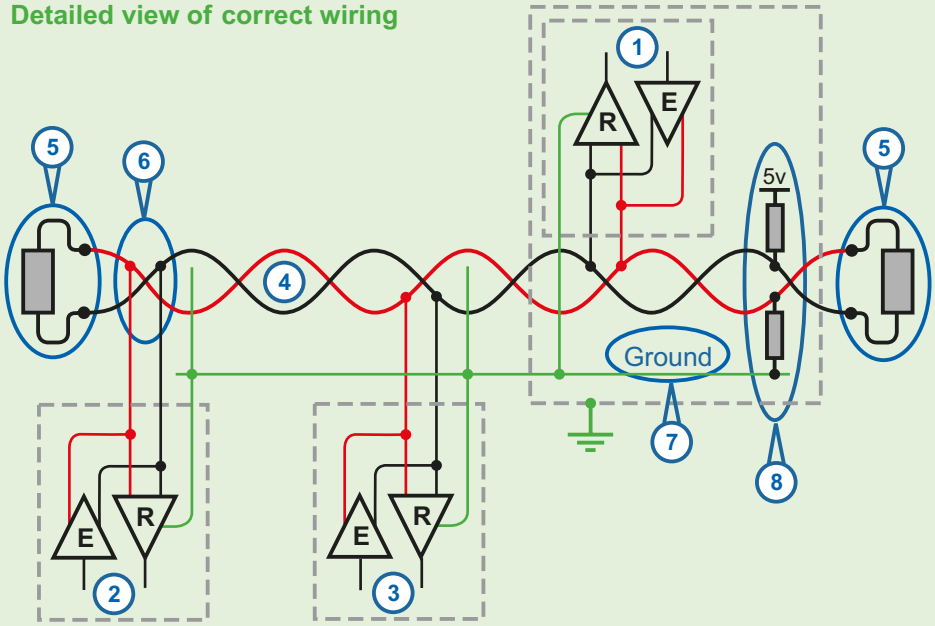
- name, address and location of equipment,
- all the elements in the architecture (copper and fiber optic repeaters, coupling, bridges)
- line termination,
- cable length.



DB445600.eps

① Name of client (master)
② Names of servers (slaves)
③ Line termination
④ Name of bus, number and location

3 **Detailed view of correct wiring**



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① Client (Master)
② Server 1 (Slave 1)
③ Server n (Slave n)
④ Balanced twisted pair
⑤ Line termination at the 2 extremities of the bus
⑥ Length of the main > sum of server (slaves) derivation lines
⑦ Ground signal to reference all the devices
⑧ Polarity resistor (generally integrated in the client (master))

SECTION 3

Panel Commissioning and Verification Guidelines

Introduction

Purpose of this Section

Section 3 gives you the information you need to commission and perform communication and quality verification checks on your Smart Panel. It introduces EcoStruxure Power Commission, which can be used for commissioning and testing smart devices. This section also covers important quality control checks.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- Only qualified personnel familiar with low and medium voltage equipment are to perform work described in this set of instructions. Workers should understand the hazards involved in working with or near low and medium voltage circuits.
- Perform such work only after reading and understanding all of the instructions contained in this bulletin.
- Turn off all power before working on or inside equipment.
- Use a properly rated voltage sensing device to confirm that the power is off.
- Before performing visual inspections, tests, or maintenance on the equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of back feeding.
- Handle this equipment carefully and install, operate, and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.
- Beware of potential hazards, wear personal protective equipment and take adequate safety precautions.
- Do not make any modifications to the equipment or operate the system with the interlocks removed. Contact your local field sales representative for additional instruction if the equipment does not function as described in this manual.
- Carefully inspect your work area and remove any tools and objects left inside the equipment.
- Replace all devices, doors and covers before turning on power to this equipment.
- All instructions in this manual are written with the assumption that the customer has taken these measures before performing maintenance or testing.

Failure to follow these instructions will result in death or serious injury.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Always consult product User Manuals and Instruction Sheets before installing, commissioning and operating a product.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not use the software to control time-critical functions because communication delays can occur between the time a control is initiated and when that action is applied.
- Do not use the software to control remote equipment without securing it with an authorized access level, and without including a status object to provide feedback about the status of the control operation.

Failure to follow these instructions can result in death or serious injury.

Introduction

Purpose of this Section

⚠ WARNING

INACCURATE DATA RESULTS

- Do not incorrectly configure the software, as this can lead to inaccurate reports and/or data results.
- Do not base your maintenance or service actions solely on messages and information displayed by the software.
- Do not rely solely on software messages and reports to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Consider the implications of unanticipated transmission delays or failures of communications links.

Failure to follow these instructions can result in death, serious injury, equipment damage, or permanent loss of data.

NOTICE

LOSS OF DATA

- Be sure to activate product and component licenses prior to the expiry of the trial license.
- Ensure that you activate sufficient licenses for the servers and devices in your system.
- Back up or archive any SQL Server database data before adjusting any database memory options.
- Only personnel with advanced knowledge of SQL Server databases should make database parameter changes.

Failure to follow these instructions can result in loss of data.

NOTICE

UNAUTHORIZED OR UNINTENDED ACCESS TO CUSTOMER DATA

- Personnel setting up third-party authentication of the software must be aware that links to data are not secure.
- Do not setup access links to sensitive or secure data.

Failure to follow these instructions can result in unauthorized or unintended access to sensitive or secure customer data.

NOTICE

NETWORK INOPERABILITY

Do not make unauthorized changes in the network configuration.

Failure to follow these instructions can result in an unstable or unusable network.

EcoStruxure Power Commission Software

About the Software

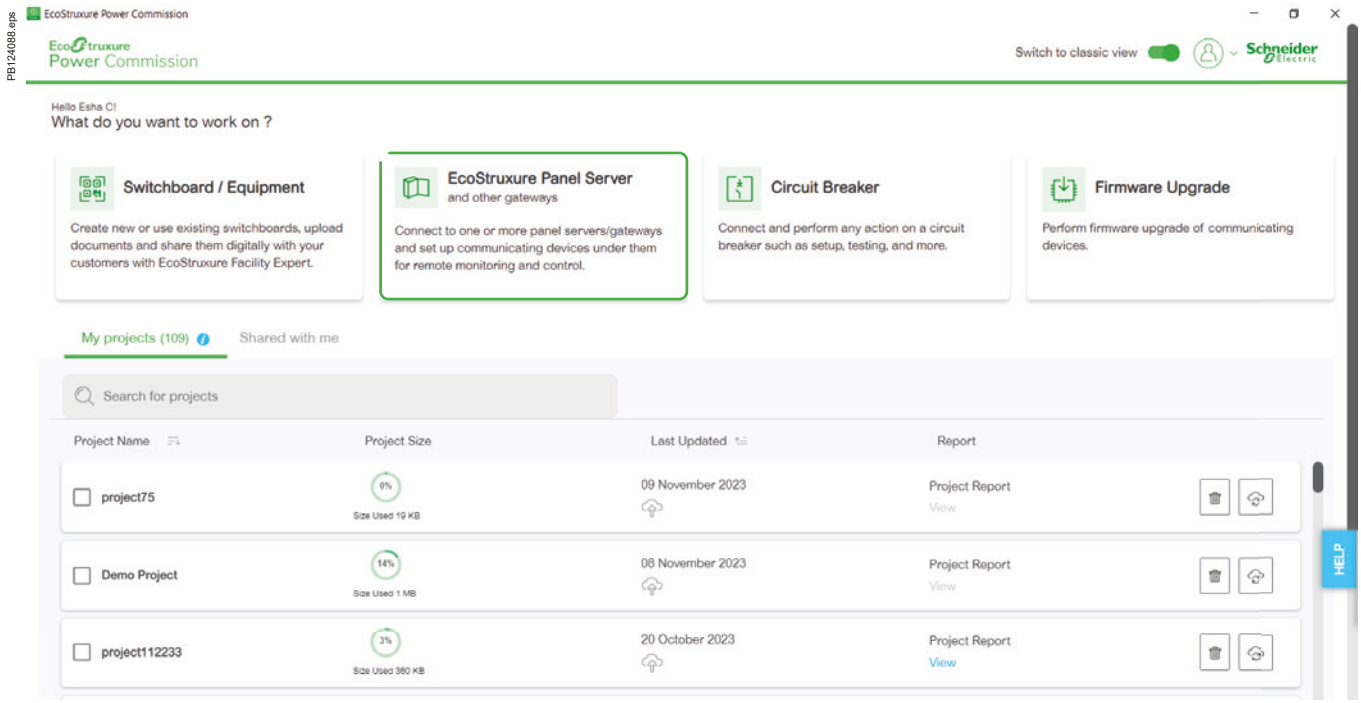
EcoStruxure Power Commission (EPC) is an all-in-one software tool used to configure, test and provide reporting for smart devices in your electrical equipment. It drastically reduces the commissioning time of Smart Panels and supports the system during maintenance. It allows the user to set up, test and generate comprehensive reports for connected panels and circuit breakers, track and digitize assets for paperless sharing of project documents and perform firmware upgrades on communicating devices.

EcoStruxure Power Commission Software

Project Creation

EcoStruxure Power Commission allows you to create a project using device discovery. Device discovery enables you to discover the devices in the network and add them to your project.

Connect your laptop to the local Ethernet network of the Smart Panels and click the "**EcoStruxure Panel Server** and other gateways" button. This enables you to connect to one or more panel servers/gateways and set up communicating devices under them for remote monitoring and control.



EcoStruxure Power Commission offers two different displays for the electrical installation:

- Switchboard view: shows the electrical topology of the installation.
- Communication view: shows the communication network architecture.

EcoStruxure Power Commission Software

Communication Test Report

EcoStruxure Power Commission provides an easily accessible communication test report to demonstrate that communication wiring and parameters have been correctly set up and confirming that the Modbus parameters and Gateway IP addresses are correct.

This can be used on the final inspection report for the electrical panel, to show that the communication settings are compliant.

This test report feature is available without an Internet connection. From your project, click on the “TEST” tab and select “Communication”. Finally, run the test and, if required, generate the report to save it locally to your computer.

See How to Create a Communication Test Report with EcoStruxure Power Commission

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Watch our How-To video >>>

https://www.youtube.com/watch?v=6-qp9koxxLM

EcoStruxure Power Commission Software

Checking and Updating the Firmware Versions

To check the consistency of the system baseline or update the firmware, follow the detailed steps in the video:

See How to Check and Update Device Firmware with EcoStruxure Power Commission

PB124091.eps

Watch our How-To video >>>

https://www.youtube.com/watch?v=Ew48U1080uE

EcoStruxure Power Commission Software

Low-Voltage Circuit Breaker System Testing

EcoStruxure Power Commission can be used for the configuration and testing of LV circuit breakers.

Circuit Breaker Configuration

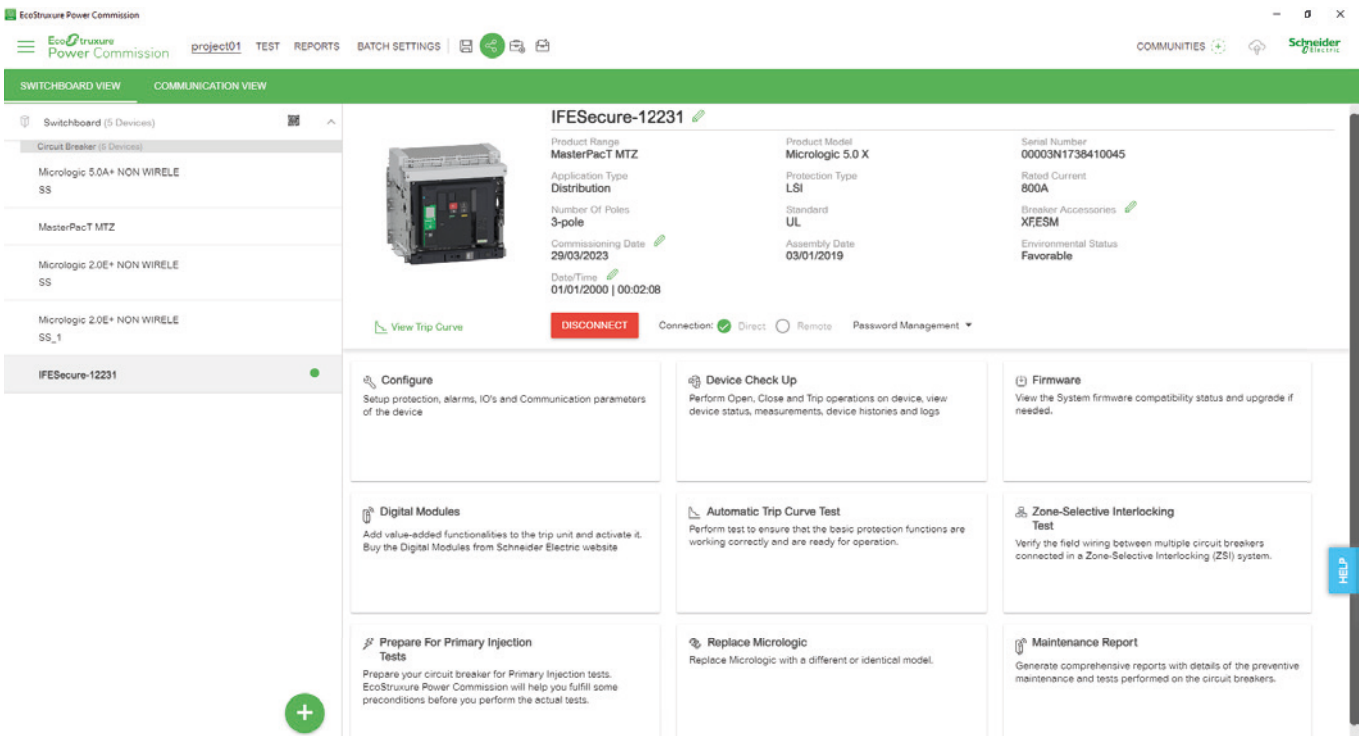
- EcoStruxure Power Commission helps the user to set the protection settings and alarms on devices, including dual settings and I/O module configuration. It allows configurations or settings to be downloaded and uploaded for multiple devices. The user can also compare settings between the project (original settings) and device (current settings).
- EcoStruxure Power Commission also reads information (alarms, measurements, parameters) & display diagnostic information.

Circuit Breaker Test and Maintenance

Users can test the protection trip curve and other functions for low-voltage circuit breakers using EcoStruxure Power Commission. The following tests can be performed:

- Automatic Trip Curve Test
- Zone-Selective Interlocking Test
- Prepare for Primary Injection Tests
- Circuit Breaker Status and Cradle Position Test
- Micrologic X Replacement (for MasterPacT MTZ only)

Example for a MasterPacT MTZ with a MicroLogic 5.0 X:



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Quality Control

Communication System Test

Note: The list of control points presented is not exhaustive.

It lists the minimum checks required and may be completed depending on the organisation in the workshop and/or recurrences of defects encountered.

Minimum checks required	Control points	Control resources	Self-control
☑	> Modbus addressing	> Installation guide	☐
☑	> Device connection	> Test button on ULP	☐
☑	> Earthing continuity	> Installation guide	☐
☑	> Communication of devices	> Internet browser	☐

Objectives

- Verify access to each communication devices
- Verify the global health of the system
- Provide a test report

Quality Control

IEC Standards and Quality Inspection

Routine Verification

Routine verification is designed to detect materials and manufacturing defects and to help ensure that the manufactured assembly is working properly. It is performed on each assembly.

Panel builders should determine whether routine verification is carried out during and/or after manufacturing.

If necessary, the routine verification should ensure that design verification is available.

Routine Verification

1 "Construction" verifications (see sections 11.2 to 11.8 of the standard)

1. Degree of protection of enclosures
2. Clearances and creepage distances
3. Protection against electric shock and integrity of protective circuits
4. Incorporation of built-in components
5. Internal electrical circuits and connections
6. Terminals for external conductors
7. Mechanical operation

2 "Performance" verifications (see sections 11.9 to 11.10 of the standard)

1. Dielectric properties
2. Wiring, operational performance and function

What is the risk if the quality inspection is not conducted (during and/or after manufacturing)?

- Quality organisation not complying with standard
- Customer not satisfied
- Hazardous Installation
- Negative impact on the image of the panel builder and manufacturer
- Higher costs of intervention
- Operating loss (break in service continuity)
- Financial loss

Quality Control

Quality Organization Recommended by Schneider Electric

Organize Quality Checks

Organize quality checks (self-checks) throughout the switchboard assembly and installation process, from acceptance of components to the delivery of the switchboard (see quality control check list opposite).

Benefits

- Increased accountability of operators
- Improved traceability
- Optimization of installation rules
  E.g. busbar tightening should be checked at the end of manufacturing (involves the dismounting of sheets, resulting in a significant loss of time).

Conduct a Final Quality Inspection

This should be done in a secured area dedicated for this purpose (in particular during electric checks).

Note: The final quality inspection must be performed by qualified and authorized personnel.

Documents required for the final inspection

- Check lists of quality checks (self-checks) conducted throughout the switchboard assembly and installation process
- Final inspection report
  (See example provided in the guide on opposite page)
  Note: To be completed depending on the customer specifications and requirements.
- Other useful documents: notification of non-compliance, check list of missing components, quality measurements
- Manufacturing file
- Switchgear guide
- Technical documentation

> To find out more about the final quality inspection, see the "Quality inspection guide" written by our experts.

Quality Control

Quality Inspection (1/2)

Make sure that self-checks have been performed throughout the assembly and installation process or validated (e.g. by the line controller).

Control points	Control resources	Final control
Compliance checks		
> Identification & column numbers > Type > Dimensions > Compliance of front panel, block diagram > Handling devices	> Assembly drawing file > Customer specifications	☑
Visual checks		
> Paint (color, homogeneity, finishing) > No scratches and deformations	> Visual inspection	☑
Frame, structure		
> Functioning of doors, swiveling front panels > Locks (type, functioning) > IP degree of protection	> Operating test > Specifications, visual inspection > Visual inspection, technical guide	☑
Switchgear		
> Position > Fastening > Characteristics: nominal range, breaking capacity > Identification and marking > Safety perimeter > Mechanical operation > Mechanical indication (test position, connected, etc.) > Plugging-in and withdrawing procedure > Striker pin > Accessibility of switchgear > Ability to connect on terminals or pads > Accessibility for connection > Locking, foolproofing	> Visual inspection > Visual inspection > Specifications, visual inspection > Specifications, visual inspection > Technical guide > Operating test > Operating test > Operating test > Operating test > Visual inspection > Visual inspection > Visual inspection > Visual inspection	☑
Busbars		
> Busbar cross-section > Coating and internal arc device > Busbar support (fastening device and number) > Marking > Compliance of joint blocks	> Technical guide > Customer drawings and specifications file > Technical guide > Customer drawings and specifications file > Technical guide	☑
Cables & flexible busbars		
> Cross-section and characteristics of conductors > Compliance of installation mode (fastening, sharp edges, etc.) > Auxiliary Power separation > EMC protection	> Technical guide > Technical guide > Assembly and installation guide and communication guide > Assembly and installation guide and communication guide	☑
Connection		
> Compliance and quality of bolted connections (e.g. covering and fastener type) > Torque and marking > Crimping quality	> Technical guide	☑
Protection of persons		
> Earth busbar (cross-section and fastening) > Earthing braids > Forms > Bonding continuity > IP of measuring devices (fastened on doors) > Blanking shutters > Terminal guards and covers > Fastening of protective barriers	> Technical guide and assembly technical guide	☑
Safety distances		
> Clearance > Creepage distances	> Assembly and installation guide and visual inspection > Installation and assembly guide	☑
Dielectric check (power circuit)		
> Devices which cannot withstand the voltage from the dielectric check should be disconnected before the test.	> Insulation tester	☑

Quality Control

Quality Inspection (2/2)

Control points	Control resources	Final control
Insulation check (power circuit)		
	> Megohmmeter	☑
Electrical compliance		
> Phase order > Voltages, control polarities > Distribution of polarities (inter-column connections)	> Phasing test > Electric tests, voltmeter > Electric tests, voltmeter	☑
Functional tests: > Operating sequence (controls and signalling) > Checking of source transfer > Electrical and mechanical interlocking > Checking of opening/closing orders of units > Trip tests (defects) > Information report (OF-SDE-SD) > Signaling (indicator lights, etc.) > Injection on protection and measurements (values, etc.)	> Test consoles, injection test bench, etc.	
Measurement and protection: > Protection tests (fault tripping, etc.) > Injection on measuring devices (Pa, PWH, etc.) > CT winding direction	> Electric tests	
Device settings (circuit monitors, protections, etc.)	> Technical documentation	
Automation and communication: > Equipment addressing > Network tests (read/write) > Verification of PLC inputs/outputs > Validation of the PLC (according to functional specifications)	> Customer specifications	
Cleaning and preparation of columns		
> Functioning of doors, swiveling front panels > Locks (type, functioning) > IP degree of protection		
Documentation related to switchboard		
> Switchboard building drawings > Installation and maintenance documents > Switchgear guides > List of shortages		
Packaging		
> Compliance of the packaging packing list > Compliance of packaging	> Packing list > Compliance with packaging contract terms	

Objectives

- Avoid having to repeat the process from the beginning
- Meet the customer's specifications to the letter
- Provide a product of high quality, with zero defects from the design phase to delivery

Quality Control

"Routine Verification — Test Report" Form Template

Manufacturer of the assembly: .....
Address: .....
Original Manufacturer: .....

Routine verification - checking report

Customer: .....
Project: .....
.....
Switchboard identification: .....
.....
Equipment: .....
Quantity: .....
Drawing No: .....

Report No: .....
Customer ref.: .....
.....
Project ref.: .....
.....
Rev. Index: .....

Checking program

Routine verification checks are carried out in compliance with the Std. IEC 61439-2

1. Construction	Done	✔
a. Degree of protection of enclosures	V	
b. Clearances and creepage distances	V	
c. Protection against electric shock and integrity of protective circuits	V & T	
If electrical control, indicate meter reference Ohm Value		.....
d. Incorporation of built-in components	V	
e. Internal electrical circuits and connections	V & T	
f. Terminals for external conductors	V	
g. Mechanical operation	T	

V: visual
T: test

2. Performance		
a. Dielectric properties	T	

Meter Ref. .....

Circuits		Main circuits	Auxiliaries
Rated insulation voltage Ui	V		
Dielectric check voltage	V		

Option: up to 250 A, the dielectric check can be replaced by insulating checks under 500 V: .....

Circuit		Main circuits	Auxiliaries
Applied voltage			
Insulation value			

b. Wiring, operational performance and function	T	

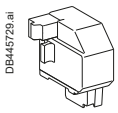
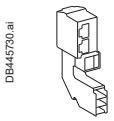
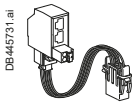
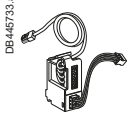
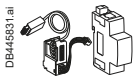
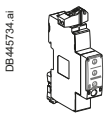
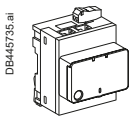
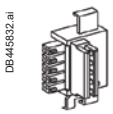
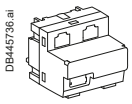
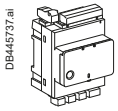
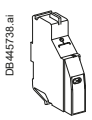
Comments:

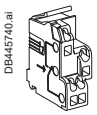
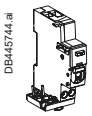
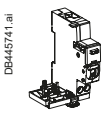
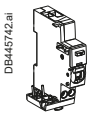
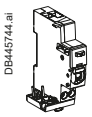
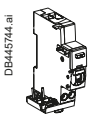
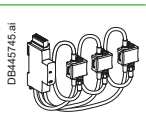
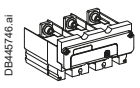
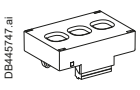
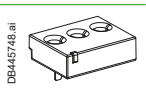
Having passed the above checks, the LV switchgear assembly under consideration is in compliance with the Std. IEC 61439-2 (IEC/EN 61439-2).

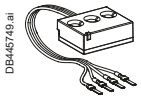
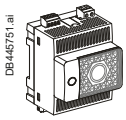
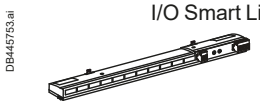
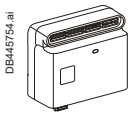
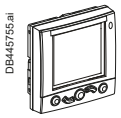
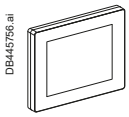
.....
.....

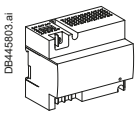
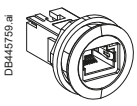
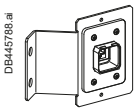
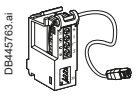
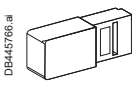
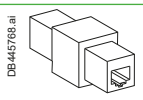
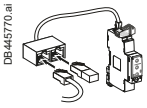
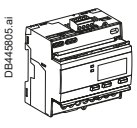
Customer representative	**Quality inspector**	**Quality manager**
.....	.....	.....
Date	**Date**	**Visa** .....
Visa	**Visa**	.....

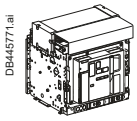
APPENDIX

	Description	Reference
	ULP port module for MasterPacT MTZ1 fixed circuit breaker	**LV850063SP**
	ULP port module for MasterPacT MTZ2/MTZ3 fixed circuit breaker	**LV850061SP**
	ULP port module for MasterPacT MTZ1 withdrawable circuit breaker	**LV850064SP**
	ULP port module for MasterPacT MTZ2/MTZ3 withdrawable circuit breaker	**LV850062SP**
	BSCM	**LV434205**
	NSX Cord	L = 0.35 m **LV434200**
		L = 1.3 m **LV434201**
		L = 3 m **LV434202**
	Insulated NSX Cord	L = 1.3 m **LV434204**
	IFM Modbus	**LV434000**
	IFE - Ethernet Interface	**LV434001**
	IFE - Ethernet Interface & Gateway	**LV434002**
	Stacking connector for IFM/IFE	**TRV00217**
	EIFE - Embedded Ethernet Interface	
	for MTZ1	**LV851100**
	for MTZ2/3	**LV851200**
	I/O module interface	**LV434063**
	ComPacT NSXm Wireless Indication Auxiliary	**LV429453**
	ComPacT NSX Wireless Indication Auxiliary	**LV429454**

	Description	Reference
	ComPacT NSXm Wired Auxiliary Contact	**LV426950**
	ComPacT NSX Wired Auxiliary Contact	**29450**
	Acti9 Active VigiARC iC60	**A9TYBE225** **A9TYBE240**
	Acti9 Active VigiARC iC40	**A9TYBE625** **A9TYBE640**
	Acti9 Active Vigi iC60	**A9V8E225** **A9V8E240**
	Acti9 Active Vigi iC40	**A9Y8E625** **A9Y8E640**
	Acti9 Active ARC iC60	**A9TAB2225** **A9TAB2240**
	Acti9 Active ARC iC40	**A9TAB2625** **A9TAB2640**
	PowerTag Energy Rope	**A9MEM1590** **A9MEM1591** **A9MEM1592** **A9MEM1593**
	PowerTag Energy M250	**LV434020** **LV434021**
	PowerTag Energy M630	**LV434022** **LV434023**
	PowerTag Energy F160	**A9MEM1580**
	PowerTag Energy M63	**A9MEM1520** **A9MEM1521** **A9MEM1522** **A9MEM1540** **A9MEM1541** **A9MEM1542** **A9MEM1543**

	Description	Reference
	PowerTag Energy F63	**A9MEM1560** **A9MEM1564** **A9MEM1570** **A9MEM1573** **A9MEM1574**
	PowerTag Energy P63	**A9MEM1561** **A9MEM1562** **A9MEM1563** **A9MEM1571** **A9MEM1572**
	Panel Server	**PAS400** **PAS600L** **PAS600** **PAS800L** **PAS800** **PAS800P**
	Wi-Fi Antenna	**PASA-ANT1**
	I/O Smart Link	**A9XMSB11**
	HeatTag	**SMT10020**
	FDM121	**TRV00121**
	FDM128	**LV434128**
	Ethernet Switch	**MCSESU053FN0** (5 copper ports) **MCSESU083FN0** (8 copper ports)
	24 V DC power supply (0.4 A) 24 V DC power supply (0.6 A) 24 V DC power supply (1.2 A) 24 V DC power supply (2.5 A) 24 V DC power supply (2.1 A) 24 V DC power supply (3.1 A) 24 V DC power supply (5 A) 24 V DC power supply (10 A) 24 V DC power supply (20 A)	**ABLM1A24004** **ABLM1A24006** **ABLM1A24012** **ABLM1A24025** **ABLS1A24021** **ABLS1A24031** **ABLS1A24050** **ABLS1A24100** **ABLS1A24200**

	Description	Reference
	24 V DC MicroLogic power supply (1 A)	
	24–30 V DC input voltage	**LV454440**
	48–60 V DC input voltage	**LV454441**
	100–125 V DC input voltage	**LV454442**
	110–130 V DC input voltage	**LV454443**
	200–240 V DC input voltage	**LV454444**
	RJ45 connector	**XB5PRJ45**
		**LGY4230**
	ULP cord, shielded cable	L = 0.35 mm **LV434195**
		L = 1.3 mm **LV434196**
		L = 3 m **LV434197**
	RJ45 Ethernet cable	L = 1 m **ACTPC6FULS10WE**
		L = 0.5 m **ACTPC6FULS05WE**
	10 ULP line terminators	**TRV00880**
	ULP cable, shielded cable	L = 0.3 m **TRV00803**
		L = 0.6 m **TRV00806**
		L = 1 m **TRV00810**
		L = 2 m **TRV00820**
		L = 3 m **TRV00830**
		L = 5 m **TRV00850**
	5 RJ45 connectors	**TRV00870**
	Modbus T connector	L = 0.3 m **VW3A830 6TF03**
		L = 1 m **VW3A8306TF10**
	iEM3255 energy meter	**A9MEM3255**



MasterPacT MTZ
(MicroLogic X)

LVPED216026EN

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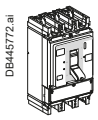

ComPacT NSX100-630 A

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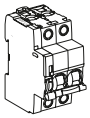
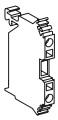


Acti9

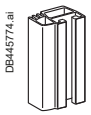
Acti9 Series

3



Terminal connection

DESW026EN



Linergy

DESW026EN

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Innovation At Every Level

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An EcoXpert™ is a Schneider Electric **partner company** that is **trained and certified on EcoStruxure™**, our open, interoperable, IoT-enabled system architecture and platform.

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More than **4,000** EcoXpert partners in **74** countries

Cross-expertise knowledge

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- Power Distribution and Management (5 badges)
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Why Call On an EcoXpert Partner?

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Find the right partner to support your project

Green Premium™

An industry leading portfolio of offers delivering sustainable value

Green Premium™

More than 75% of our product sales offer superior transparency on the material content, regulatory information and environmental impact of our products:

- RoHS compliance
- REACh substance information
- Industry leading # of PEPs*
- Circularity instructions

Discover what we mean by green
Check your products!

The Green Premium program stands for our commitment to deliver customer valued sustainable performance. It has been upgraded with recognized environmental claims and extended to cover all offers including Products, Services and Solutions.

CO_2 and P&L impact through… Resource Performance

Green Premium brings improved resource efficiency throughout an asset's lifecycle. This includes efficient use of energy and natural resources, along with the minimization of CO_2 emissions.

Cost of ownership optimization through… Circular Performance

We're helping our customers optimize the total cost of ownership of their assets. To do this, we provide IoT-enabled solutions, as well as upgrade, repair, retrofit, and remanufacture services.

Peace of mind through… Well-being Performance

Green Premium products are RoHS and REACh compliant. We're going beyond regulatory compliance with step-by-step substitution of certain materials and substances from our products.

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Green Premium delivers strong value propositions through third-party labels and services. By collaborating with third-party organizations we can support our customers in meeting their sustainability goals such as green building certifications.

*PEP: Product Environmental Profile (i.e. Environmental Product Declaration)

Notes

Notes

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RCS Nanterre 954 503 439
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