PacT Series

Service Interface for Master**PacT** NT/NW, Com**PacT**, Power**PacT**, and **Easy**PacT Circuit Breakers

User Guide

PacT Series offers world-class breakers and switches.

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02/2025

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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 this 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 and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Cybersecurity Safety Notice

⚠ WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

- Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.
- Disable unused ports/services and default accounts to help minimize pathways for malicious attackers.
- Place networked devices behind multiple layers of cyber defenses (such as firewalls, network segmentation, and network intrusion detection and protection).
- Use cybersecurity best practices (for example, least privilege, separation of duties) to help prevent unauthorized exposure, loss, modification of data and logs, or interruption of services.

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

About the Document

Document Scope

The objective of this document is to provide the field engineers and maintenance personnel with the technical information and procedure needed to configure and test Schneider Electric circuit breakers using the EcoStruxure™ Power Commission (EPC) software with Service Interface.

Validity Note

This document applies to Service Interface with firmware version 001.001.052 or later.

Online Information

The technical characteristics of the devices described in this guide also appear online. To access the information online, go to the Schneider Electric Country Website.

The information contained in this guide is likely to be updated at any time. Schneider Electric strongly recommends that you have the most recent and up-to-date version available on www.se.com/ww/en/download/.

General Cybersecurity Information

In recent years, the growing number of networked machines and production plants has seen a corresponding increase in the potential for cyber threats, such as unauthorized access, data breaches, and operational disruptions. You must, therefore, consider all possible cybersecurity measures to help protect assets and systems against such threats.

To help keep your Schneider Electric products secure and protected, it is in your best interest to implement the cybersecurity best practices as described in the Cybersecurity Best Practices document.

Schneider Electric provides additional information and assistance:

- Subscribe to the Schneider Electric security newsletter.
- Visit the Cybersecurity Support Portal web page to:
  - Find Security Notifications.
  - Report vulnerabilities and incidents.
- Visit the Schneider Electric Cybersecurity and Data Protection Posture web page to:
  - Access the cybersecurity posture.
  - Learn more about cybersecurity in the cybersecurity academy.
  - Explore the cybersecurity services from Schneider Electric.

Related Documents for IEC Devices

The following table lists documents for IEC devices compatible with the Service Interface.

Title of documentation	Reference number
Service Interface - Instruction Sheet	GDE78167
Service Interface - Firmware Release Notes	DOCA0176EN
MasterPacT NT - Circuit Breakers and Switch-Disconnectors from 630 to 1600 A - User Guide	51201116AA (EN) EAV16739 (ES) 51201115AA (FR)
MasterPacT NW - Circuit Breakers and Switch-Disconnectors from 800 to 6300 A - User Guide	04443720AA (EN) EAV16740 (ES) 04443719AA (FR)
MasterPacT NT/NW - Circuit Breakers and Switch-Disconnectors - Maintenance Guide	LVPED508016EN LVPED508016FR
MasterPacT NT/NW - Circuit Breakers and Switch-Disconnectors - Basic and Standard End-User Maintenance Procedures	HRB16483EN HRB16483FR
ComPacT NS - MicroLogic Trip Units - User Guide	DOCA0217EN DOCA0217ES DOCA0217FR DOCA0217ZH
ComPacT NS - MicroLogic A/E Trip Units - User Guide	DOCA0218EN DOCA0218ES DOCA0218FR DOCA0218ZH
ComPacT NS - MicroLogic P Trip Units - User Guide	DOCA0219EN DOCA0219ES DOCA0219FR DOCA0219ZH
ComPacT NS - Circuit Breakers and Switch-Disconnectors - User Guide	DOCA0221EN DOCA0221ES DOCA0221FR DOCA0221ZH
ComPacT NSX - Circuit Breakers and Switch-Disconnectors - User Guide	DOCA0187EN DOCA0187ES DOCA0187FR DOCA0187ZH
ComPacT NSX - MicroLogic 5/6/7 Electronic Trip Units - User Guide	DOCA0188EN DOCA0188ES DOCA0188FR DOCA0188ZH
ComPacT NSX - Modbus Communication - User Guide	DOCA0213EN DOCA0213ES DOCA0213FR DOCA0213ZH
FDM121 Front Display Module for One Circuit Breaker - User Guide	DOCA0088EN DOCA0088ES

Title of documentation	Reference number
	DOCA0088FR DOCA0088ZH
Enerlin'X IO Input/Output Application Module for One Circuit Breaker User Guide	DOCA0055EN DOCA0055ES DOCA0055FR DOCA0055ZH
Energy Reduction Maintenance Setting (ERMS) System Installation and User Guide	NHA67346
Alternate Maintenance Setting (AMS) Switch - Installation Instructions	NHA40218 (EN, ES, FR)
Maintenance Mode Switch (MMS) Installation Instructions	MFR70008 (EN, ES, FR)
EasyPacT MVS - User Manual	MVS21734

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

Related Documents for UL/ANSI Devices

The following table lists documents for UL/ANSI devices compatible with the Service Interface.

Title of documentation	Reference number
Service Interface - Instruction Sheet	GDE78167
Service Interface - Firmware Release Notes	DOCA0176EN
MasterPacT NT Low-Voltage Power/Insulated Case Circuit Breaker - Instruction Bulletin	0613IB1209 (EN, ES, FR)
MasterPact NW Low-Voltage Power/Insulated Case Circuit Breaker - Instruction Bulletin	0613IB1204 (EN, ES, FR)
PowerPacT R-Frame and NS1600b–NS3200 Circuit Breakers - Instruction Bulletin	48049-243–04 (EN, ES, FR)
PowerPacT P-Frame and NS630b–NS1600 Circuit Breakers - Instruction Bulletin	48049-148–05 (EN, ES, FR)
PowerPacT P-Frame Drawout Circuit Breakers - Instruction Bulletin	48049–336–02 (EN, ES, FR)
PowerPacT H-, J-, and L-Frame Circuit Breakers with MicroLogic Trip Units - User Guide	48940–313–01 (EN, ES, FR)
MicroLogic 5 and 6 Electronic Trip Units for PowerPacT H-, J-, and L-Frame Circuit Breakers - User Guide	48940–312–01 (EN, ES, FR)

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

Information on Non-Inclusive or Insensitive Terminology

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

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Service Interface Presentation

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Introduction

PacT Series Master Range

Future-proof your installation with Schneider Electric's low-voltage and medium-voltage PacT Series. Built on legendary Schneider Electric innovation, the PacT Series comprises world-class circuit breakers, switches, residual current devices and fuses, for all standard and specific applications. Experience robust performance with PacT Series within the EcoStruxure-ready switchgear, from 16 to 6300 A in low-voltage and up to 40.5 kV in medium-voltage.

Overview

The Service Interface with part number LV485500 is a portable instrument for field testing.

The Service Interface is used:

- For configuration of Enerlin'X devices.
- For testing and configuration of MicroLogic™ trip units mounted in the following low voltage circuit breakers:
  - MasterPacT™ NT/NW circuit breakers
  - EasyPacT™ MVS circuit breakers
  - ComPacT™ NS circuit breakers
  - PowerPacT™ P- and R- frame circuit breakers
  - ComPacT™ NSX circuit breakers
  - PowerPacT™ H-, J-, and L-frame circuit breakers

  NOTE:

  - The information related to the new generation of ComPacT NSX and PowerPacT H-, J-, and L-frame circuit breakers in this guide applies to the existing range ComPact NSX and PowerPact H-, J-, and L-frame circuit breakers also. The exceptions are mentioned wherever applicable.
  - The information related to the new generation of ComPacT NS and PowerPacT P- and R-frame circuit breakers in this guide applies to the existing range ComPact NS and PowerPact P- and R-frame circuit breakers also. The exceptions are mentioned wherever applicable.
  - These new ranges are based on the same technical and dimensional architecture as that of the existing range of circuit breakers.

EcoStruxure™ Power Commission (EPC) software is used for testing the circuit breakers and communication accessories through the Service Interface.

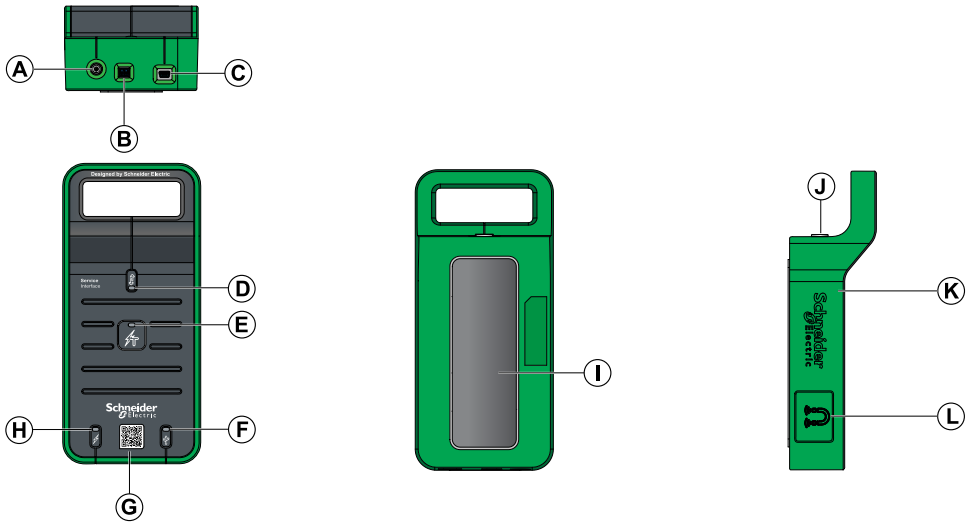
Features

The main features of Service Interface are:

- Single connector interface for testing different circuit breakers.
- 24 Vdc at 120 mA power output for external devices.
- 12 kV safety impulse protection between user interface and test port.
- Magnet mountable.
- EPC user interface for test and configuration.

Hardware Description

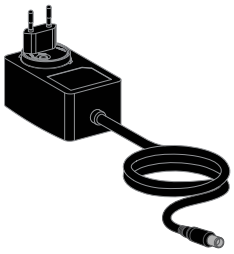
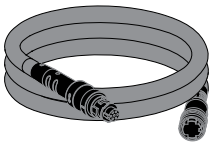
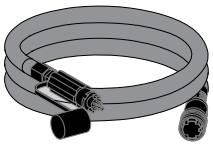
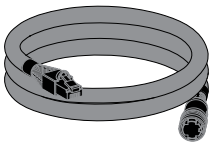
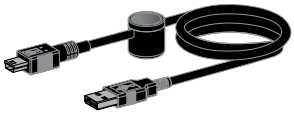
Service Interface Description



A. 24 Vdc power input
B. 24 Vdc power output
C. Mini-B USB port
D. Test port LED
E. Status LED
F. USB LED
G. QR code to product information
H. Power LED
I. Magnetic Service Interface holder
J. Test port
K. Rubber protective cover
L. Magnetic cable holder

Accessories Part Numbers

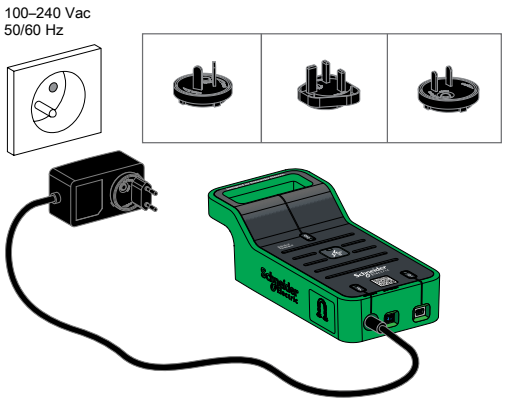
The Service Interface is delivered with the following accessories:

Accessories	Description	Part number
	AC/DC power	LV485511SP
	7-pin cable for 630–6300 A ACB MCCB trip units	LV485512SP
	7-pin cable for 100–630 A MCCB trip units	LV485513SP
	ULP cable	LV485514SP
	USB cable with magnet	LV485517SP
	24 Vdc power output connector	Dinkle - EC350V–02P Phoenix Contact - 1840366

Power Supply

The Service Interface is supplied with 24 Vdc through the 24 V power adapter port. 110...230 Vac to 24 Vdc adapter is supplied with Service Interface along with adapter plugs for Europe (RPE), UK (RPK), USA (RPA), and Australia (RPS). The plugs are 2-pin type.

The Service Interface is also fitted with a 24 Vdc at 120 mA output to power any auxiliary devices, if necessary.



Test Port LED

The test port LED indicates the connection status of the Service Interface.

LED indication	LED color	Status description
ON	Green	Successful connection between Service Interface and MicroLogic trip unit mounted in the following circuit breakers with a cable LV485512SP. • MasterPacT NT/NW • EasyPacT MVS • ComPacT NS • PowerPacT P- and R-frame
	Blue	Successful connection between Service Interface and MicroLogic trip unit mounted in the following circuit breakers with a cable LV485513SP. • ComPacT NSX • PowerPacT H-, J-, or L-frame
FLASH (every 1 s)	Orange	Successful connection between Service Interface and Enerlin'X device with a cable LV485514SP.

LED indication	LED color	Status description
FLASH (every 2 s)	Green	Unsuccessful connection between Service Interface and MicroLogic trip unit mounted in the following circuit breakers with a cable LV485512SP. • MasterPacT NT/NW • EasyPacT MVS • ComPacT NS • PowerPacT P- and R-frame The possible reasons for unsuccessful connection are: • The cable is inoperative. • The cable is not properly connected to the trip unit. • The communication between the Service Interface and trip unit is unstable.
	Blue	Unsuccessful connection between: • Service Interface and MicroLogic trip unit mounted in the following circuit breakers with a cable LV485513SP. ◦ ComPacT NSX ◦ PowerPacT H-, J-, or L-frame • Service Interface and Enerlin'X device with a cable LV485514SP. The possible reasons for unsuccessful connection are: • The cable is inoperative. • The cable is not properly connected to the trip unit. • The communication between the Service Interface and trip unit or an Enerlin'X device is unstable.
OFF	–	Service Interface is not connected to a trip unit.

Power LED

The green power LED indicates the power supply status.

LED indication	Status description
ON	Power input connected
OFF	Power input not connected

USB LED

The green USB LED indicates the USB connection status.

LED indication	Status description
ON	USB connected
OFF	No USB connected

Status LED

The orange status LED indicates the Service Interface status.

LED indication	Status description
ON	Service Interface in Boot mode
OFF	Service Interface operational

EcoStruxure Power Commission Software

Overview

EcoStruxure Power Commission (EPC) software helps you to manage a project as part of testing, commissioning, and maintenance phases of the project life cycle. The innovative features in it provide simple ways to configure, test, and commission the smart electrical devices.

EPC software automatically discovers the smart devices and allows you to add the devices for an easy configuration. You can generate comprehensive reports as part of Factory Acceptance Test and Site Acceptance Test to replace your heavy manual work. Additionally, when the panels are under operation, any change of settings made can be easily identified by a yellow highlighter. This indicates the difference between the project and device values, and hence provides a system consistency during the operation and maintenance phase.

For more information, refer to the *EcoStruxure Power Commission Online Help*.

Click here to download the latest version of EcoStruxure Power Commission.

Features

EPC software performs the following actions through Service Interface:

- Create projects by device discovery.
- Save the project in the EPC cloud for reference.
- Download the protection settings from the device.
- Perform test operation in a secured way.
- View the communication architecture between the devices in graphical representation.
- Check system firmware compatibility status.
- Update to the latest device firmware.
- Perform automatic trip curve, Zone-Selective Interlocking (ZSI) tests, force trip tests, and prepare for primary injection tests.
- Generate and print test reports.

Technical Characteristics

Environmental Characteristics

Characteristics		Value
Conforming to standards		• IEC 61010-1 • IEC 60947-6-2 • UL 61010-1
Certification		cULus, 61010-1 CE
Ambient temperature	Storage	-40 °C...+85 °C (-40 °F...+185 °F)
	Operation	-10 °C...+55 °C (14 °F...+131 °F)
Protective treatment		ULV0, conforming to IEC/EN 60068-2-30
Pollution		Level 3

Service Interface Electrical Characteristics

Characteristics	Value
Input voltage	24 Vdc –20%/+10%, 525 mA Max
Rated power	10 W
Output voltage	24 Vdc –20%/+10%,120 mA

External Adapter Electrical Characteristics

Characteristics	Value
Adapter type	AC/DC wall mount adapter
Input voltage	110...230 Vac, Class 2
Rated power	12 W
Output voltage	24 Vdc

Mechanical Characteristics

Characteristics	Value
Mechanical impact	Conforming to IEC 62262 IK07
Mounting	Wall or table mount module
Connections	Magnet

Firmware Update

Description

Use the latest version of EcoStruxure Power Commission software for all firmware updates.

The latest version of Service Interface firmware is updated in a single operation through EcoStruxure Power Commission software.

For more information about Service Interface firmware versions, refer to *Service Interface - Firmware Release Notes*.

Signed Firmware

All firmware designed for the IMU with a MasterPacT NT/NW, EasyPacT MVS, ComPacT NS, PowerPacT P- and R-frame, ComPacT NSX, or PowerPacT H-, J-, or L-frame circuit breaker is signed using the Schneider Electric public key infrastructure.

The digital certificates used to authenticate genuine Schneider Electric firmware and software must be regularly verified to ensure that they are still valid. Digital certificates that are no longer valid are published on the Certificate Revocation List (CRL) available on the Schneider Electric Cybersecurity Support Portal.

For more information on cybersecurity for the MasterPacT MTZ circuit breakers, refer to *MasterPacT, ComPacT, PowerPacT - Cybersecurity Guide*, page 7.

Updating the Firmware Version

To update the Service Interface firmware with EcoStruxure Power Commission software:

1. Select **Connect to device directly** on the home screen.
2. Check the Service Interface firmware version in **Analyze Firmware Status**.
3. If the recommended action is to update the firmware, select the check box next to Service Interface then click **Next**.
4. Click **Upgrade**.
5. Enter the Service Interface password in the dialog box and click **CONTINUE**.

   Firmware update begins. A green icon with a tick displays when firmware update is completed.

   IMPORTANT: Do not disconnect the Service Interface until the firmware update is complete.
6. Click the arrow next to **Module upgraded** to display the current and latest Service Interface firmware versions.
7. Close the **Analyze Firmware Status** window.

For more information, refer to the *EcoStruxure Power Commission Online Help*.

Test Functions for MasterPacT NT/NW, EasyPacT MVS, ComPacT NS, and PowerPacT P- and R-Frame Circuit Breakers

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Introduction

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MicroLogic Trip Unit Compatibility

MasterPacT NT/NW, ComPacT NS, and PowerPacT P- and R-Frame Circuit Breakers

The following table indicates which functions are applicable for MicroLogic trip units:

MicroLogic trip unit		Configuration	Automatic trip curve test using secondary injection	Force trip test	ZSI test	Preparation for primary injection tests	
Family	Type					Inhibit thermal memo-ry	Inhibit ground fault
Non-communicating trip units	MicroLogic 2.0, 3.0, 5.0	–	✓	✓	–	–	–
Communicating trip units	MicroLogic 2.0 A, 3.0 A, 5.0 A, 7.0 A	–	✓	✓	✓	✓	–
	MicroLogic 2.0 E, 5.0 E	–	✓	✓	✓	✓	–
	MicroLogic 5.0 P, 7.0 P	✓	✓	✓	✓	✓	–
	MicroLogic 5.0 H, 7.0 H	✓	✓	✓	✓	✓	–
	MicroLogic 6.0 A, 6.0 E	–	✓	✓	✓	✓	✓
	MicroLogic 6.0 P, 6.0 H	✓	✓	✓	✓	✓	✓

These MicroLogic trip units are mounted in the following circuit breakers:

- MasterPacT NT/NW circuit breakers
- ComPacT NS circuit breakers
- PowerPacT P- and R-frame circuit breakers

NOTE: Due to trip unit limitation, the non-communicating MicroLogic 6.0 trip unit cannot be tested through Service Interface and EPC.

EasyPacT MVS Circuit Breakers

The following table indicates which functions are applicable for ET trip systems:

ET trip systems		Configuration	Automatic trip curve test using secondary injection	Force trip test	ZSI test	Preparation for primary injection tests	
Family	Type					Inhibit thermal memory	Inhibit ground fault
Non-communicating trip systems	ET 2.I, ET 5S	–	✓	✓	–	–	–
Communicating trip systems	ETA 2.I, ETA 5S	–	✓	✓	✓	✓	–
	ETV 2.I, ETV 5S	–	✓	✓	✓	✓	–
	ETA 6G, ETV 6G	–	✓	✓	✓	✓	✓

These trip systems are mounted in EasyPacT MVS circuit breakers.

NOTE: Due to trip system limitation, the non-communicating ET 6G trip system unit cannot be tested through Service Interface and EPC.

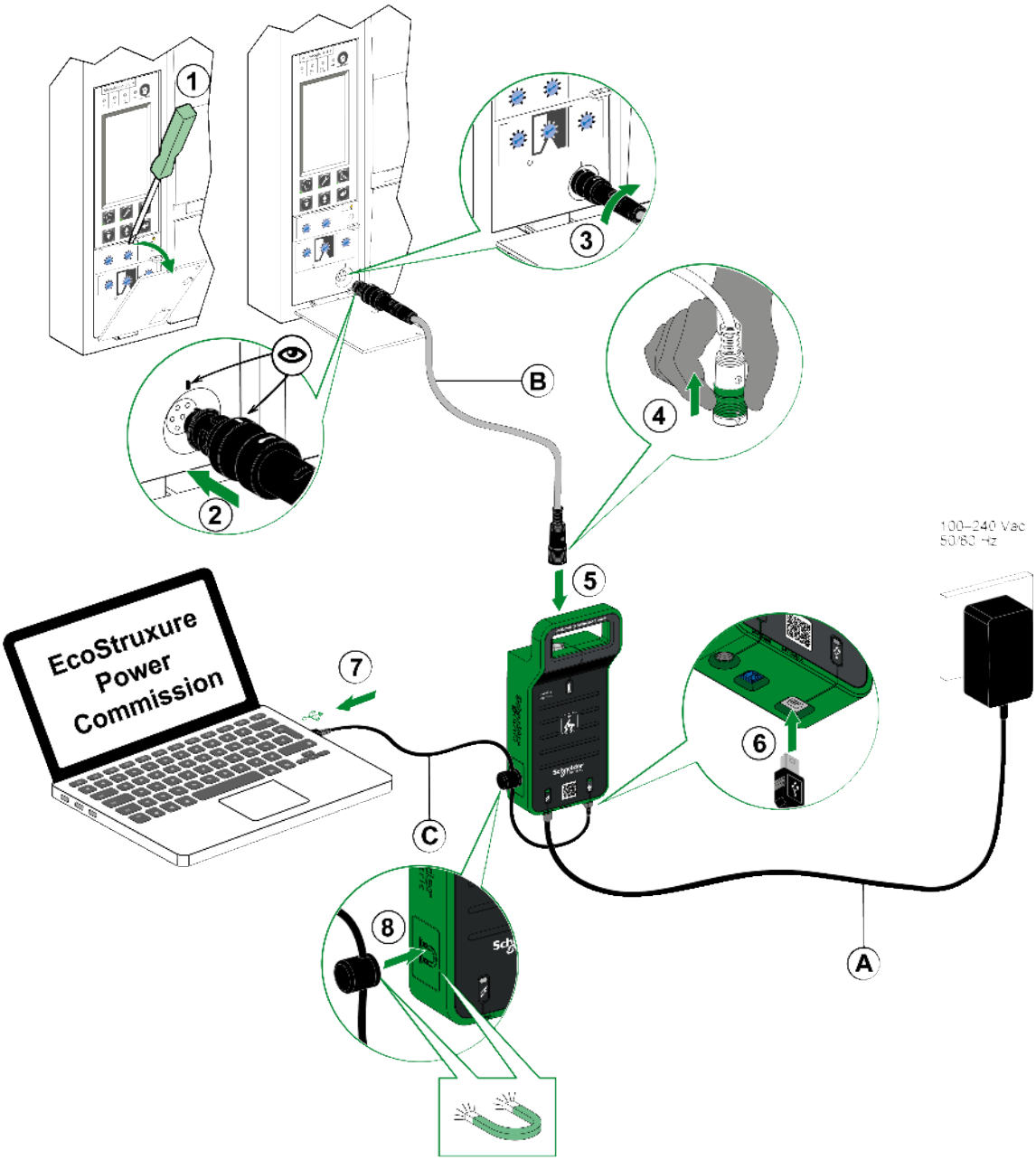
Configuration Function

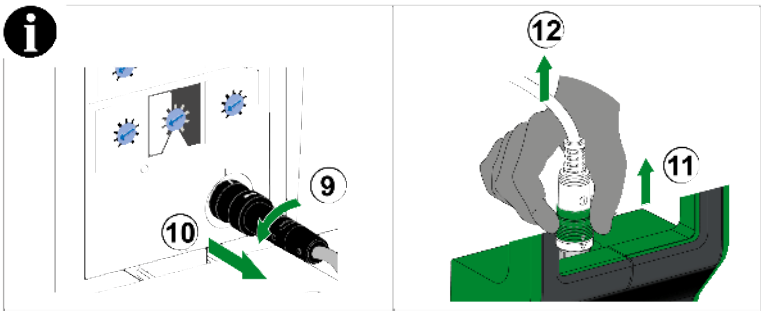
You can configure the MicroLogic A, E, P, and H trip units with the Service Interface from EPCwhen the PC is connected to the MicroLogic trip unit.

You can save the configurations of MicroLogic A, E, P, and H trip units in the EPC.

Connection of the Service Interface to a MicroLogic Trip Unit

Connect the Service Interface to the MicroLogic trip unit test port using the cable LV485512SP.





A. AC/DC power
B. 7-pin cable for 630–6300 A ACB MCCB trip units
C. USB cable with magnet

Testing Communicating MicroLogic Trip Units

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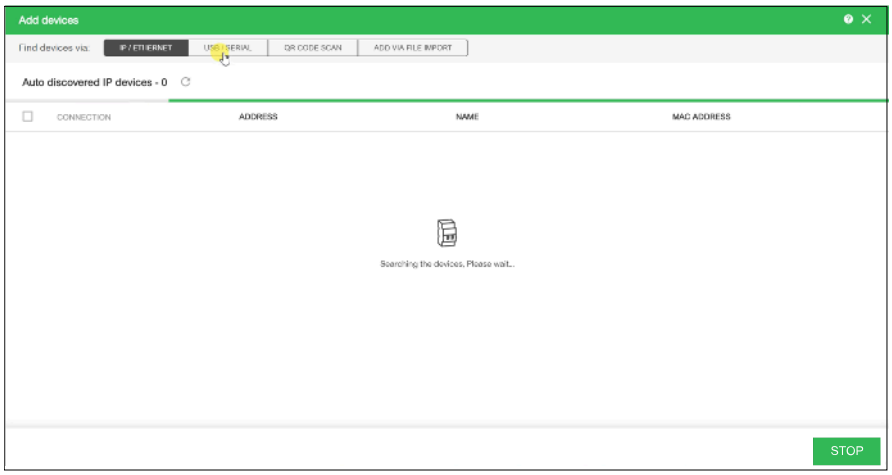
Discovering Trip Units

After the PC is connected to the communicating MicroLogic trip unit to test using the Service Interface, you can start the EPC.

Perform the following steps to discover the devices:

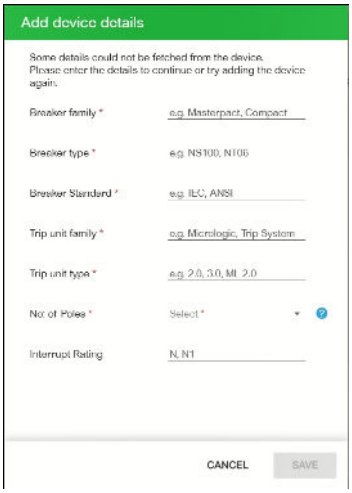
1. Click **Launch Device Discovery**.

   The **Add devices** window is displayed.



2. Click **USB/SERIAL** from **Find devices via**.
3. Select the device to test or click **FIND DEVICES**.
4. Select the device to test from the Device List and click **ADD DEVICES**.

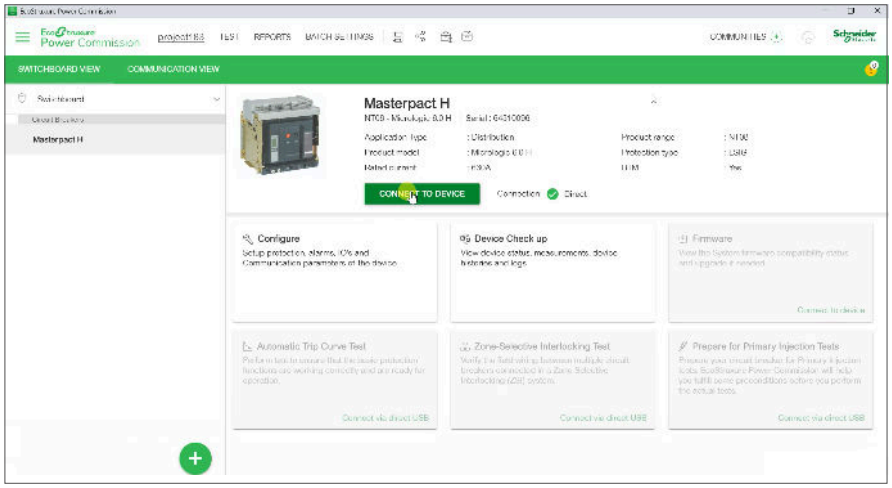
   The **Add device details** dialog box is displayed.



5. Enter device details and click **SAVE**.

6. Enter project and customer details and then click **CONTINUE**.

   The Device view page is displayed.



7. Click **CONNECT TO DEVICE**.

   The following buttons for the selected device are displayed:

   - Configure
   - Device Check up
   - Firmware
   - Automatic Trip Curve Test
   - Zone-Selective Interlocking Test
   - Prepare for Primary Injection Test

For more information, refer to the *EcoStruxure Power Commission Online Help*.

Test Functions

EPC software allows you to:

- Perform the following tests on communicating MicroLogic trip unit through the Service Interface.
  - Automatic trip curve test using secondary injection
  - Device check up (Force trip test)
  - ZSI test
- Prepare primary injection tests on communicating MicroLogic trip unit through the Service Interface.

Automatic Trip Curve Tests

The automatic trip curve test provides an automated test of the circuit breaker's time-current curve, allowing the Service Interface to verify long-time, short-time, instantaneous, and ground-fault protection.

The Service Interface injects digital or analog signals based on MicroLogic trip unit type and the circuit breaker's pickup and delay settings. The Service Interface measures the duration of the applied test signal before the circuit breaker trips. This data is automatically compared to the circuit breaker's time-current curve to determine if the device is within tolerance. This comparison of data determines which specific protection functions have passed or failed.

To perform the automatic trip curve test, select one of the following options:

- **Preconfigured test point**: The test points are preconfigured and selected to minimize the test time required to test each trip curve segment.
- **Custom test point**: You can define the test points by entering the secondary injected test current and time.

Automatic Trip Curve Tests with Preconfigured Test Points

Overview

Before running the automatic trip curve tests with preconfigured test points, you must select one of the following time-current trip curve test:

- **Normal**: Test the trip curves of the protection functions available on the MicroLogic trip unit.
- **ERMS**: Test the instantaneous protection trip curve when the Energy Reduction Maintenance Settings (ERMS) mode is active.
- **AMS/MMS**: Test the short-time protection trip curve when the Alternate Maintenance Settings (AMS) or Maintenance Mode Switch (MMS) mode is active.

The decision to perform the ERMS or AMS/MMS test depends on the trip unit version and the available maintenance switch.

After selecting the time-current trip curve to test, you can select the protection functions available on the MicroLogic trip unit you want to test. By default:

- With Normal test, all protection functions available on the MicroLogic trip unit are preselected for testing.
- With ERMS test, only the instantaneous protection function is preselected for testing. You can add other protection functions available on the MicroLogic trip unit.
- With AMS/MMS test, only the short-time protection function is preselected for testing. You can add other protection functions available on the MicroLogic trip unit.

ERMS Test

The ERMS test is the recommended method for testing the arc energy reduction settings in compliance with NEC 240.87 (c).

You can perform ERMS test on the communicating MicroLogic P and H trip units with the firmware version 8.282 or later.

The ERMS mode is controlled by an optional IO module added to the IMU and configured to perform the pre-defined application 3 or the ERMS user-defined application.

Before running the ERMS test, you must activate the ERMS mode by using a selector switch connected to the IO module. When the ERMS mode is engaged, **ERMS** is displayed on the MicroLogic trip unit display and a light connected to output O3 is in the ON state.

For more information, refer to:

- *Enerlin'X IO Input/Output Application Module for One Circuit Breaker User Guide*.
- *Energy Reduction Maintenance Setting (ERMS) System Installation and User Guide*.

AMS/MMS Test

The AMS and MMS tests are legacy methods of testing the arc energy reduction feature performance in compliance with NEC 240.87 (c) requirements.

You can perform the AMS or MMS tests on the communicating MicroLogic P and H trip units and MicroLogic 5.0 A, 6.0 A or 7.0 A trip units, irrespective of the firmware version.

Activating the AMS Mode

The AMS mode is controlled by the AMS switch.

Before running the AMS test, you must activate the AMS mode by turning the AMS switch to the ON position. The indicator light in the AMS switch and the maintenance mode indicator light near the circuit breaker must be in the ON state.

For more information, refer to *Alternate Maintenance Setting (AMS) Switch – Instruction Sheet*.

Activating the MMS Mode

The MMS mode is controlled by the MMS switch.

Before running the MMS test, you must activate the MMS mode by turning the MMS switch to the ON position. The indicator light in the MMS switch must be in the ON state.

For more information, refer to *Maintenance Mode Switch (MMS) – Instruction Sheet*.

Automatic Trip Curve Tests with Custom Test Points

It is recommended that you follow the guidelines while defining the custom test points:

- Decimal values for the injection current are considered as invalid inputs.
- The selected protection trip type must match the test segment of the time-current curve. If an incorrect value is selected, the test results may be misleading. For example:
  - If you select the short-time protection trip type and enter the injection current value within the short-time current range, then the MicroLogic trip unit trips in short-time segment. This indicates a **Passed** test status.
  - If you select the short-time protection trip type and enter the injection current value within the long-time current range, then the MicroLogic trip unit trips in long-time segment.

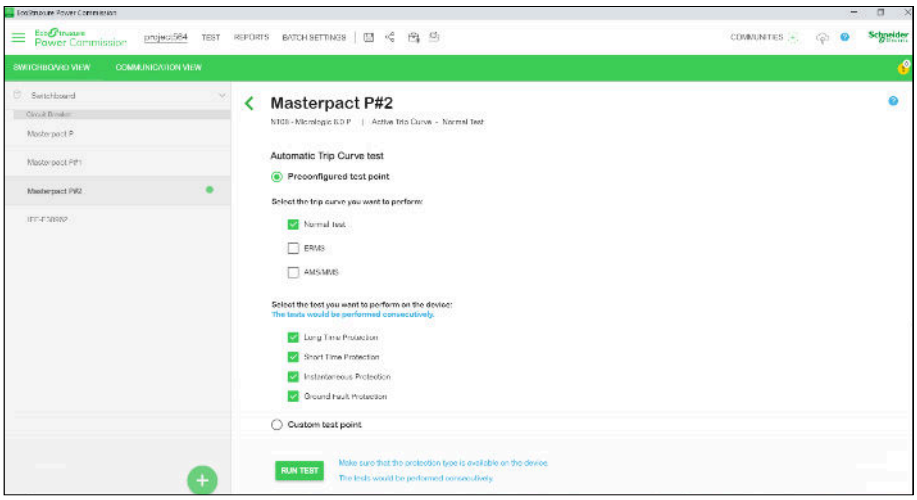
    The test results do not display the cause of the trip. Because the circuit breaker has tripped, the test results indicate a **Passed** test status.
  - If you want to test the ground fault protection but select any protection type that inhibits ground fault protection, then the test results are incorrect.

Test Procedure

Perform the following steps for automatic trip curve test:

1. Click **Automatic Trip Curve Test** in the Device view page.

   The Automatic trip curve test screen is displayed.



2. Select **Preconfigured test point** or **Custom test point** and click **RUN TEST**.

   The **NOTICE** message is displayed.

NOTICE
HAZARD OF LOSS OF POWER • During these tests, the circuit breaker will trip, resulting in loss of power to downstream devices. • It is recommended to perform these tests in conjunction with proper planning, precautions, and per the test schedules. **Failure to follow these instructions can result in disruption due to loss of power.**

   For **Preconfigured test point**, to run a different protection test to generate a report, refer to Automatic Trip Curve Tests with Preconfigured Test Points, page 30.

3. Read the **NOTICE** message, and if understood, click **I UNDERSTAND**.

   The **Password Required** dialog box is displayed.

4. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

5. Reset and open the circuit breaker.

6. Click **OK**.

   The protection test starts.

   NOTE: During the long-time protection test:

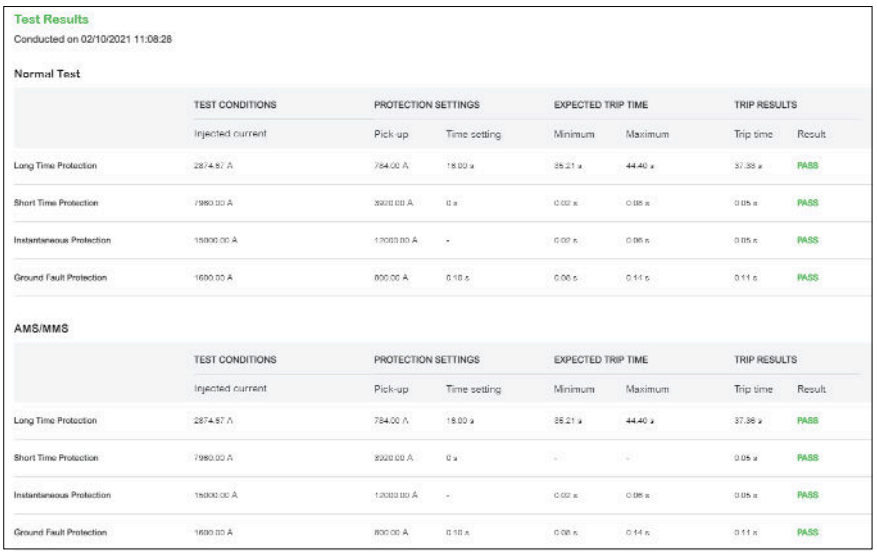
   - **Injection Time** and **Remaining Time before trip** (in seconds) are displayed.
   - You can click **ABORT** to stop the running test. This cancels all the subsequent tests.

   NOTE: The short-time protection cannot be tested if **Ir x Isd > Ii**.

7. Repeat step 5 and 6 for the next test.

   The test result is displayed at the end of the test. After completing all the tests, the **Test Results** screen is displayed with:

   - The list of protection functions tested.
   - The injection current.
   - The protection settings.
   - The expected trip time and the real trip time.
   - The test result.



Test Results

Conducted on 02/10/2021 11:08:28

Normal Test

	TEST CONDITIONS	PROTECTION SETTINGS		EXPECTED TRIP TIME		TRIP RESULTS	
	Injected current	Pick-up	Time setting	Minimum	Maximum	Trip time	Result
Long Time Protection	2874.67 A	784.00 A	18.00 s	35.21 s	44.40 s	37.38 s	PASS
Short Time Protection	7980.00 A	3920.00 A	0 s	0.02 s	0.05 s	0.05 s	PASS
Instantaneous Protection	15000.00 A	12000.00 A	-	0.02 s	0.06 s	0.05 s	PASS
Ground Fault Protection	1600.00 A	800.00 A	0.10 s	0.06 s	0.14 s	0.11 s	PASS

AMS/MMS

	TEST CONDITIONS	PROTECTION SETTINGS		EXPECTED TRIP TIME		TRIP RESULTS	
	Injected current	Pick-up	Time setting	Minimum	Maximum	Trip time	Result
Long Time Protection	2874.67 A	784.00 A	18.00 s	35.21 s	44.40 s	37.38 s	PASS
Short Time Protection	7980.00 A	3920.00 A	0 s	-	-	0.05 s	PASS
Instantaneous Protection	15000.00 A	12000.00 A	-	0.02 s	0.06 s	0.05 s	PASS
Ground Fault Protection	1600.00 A	800.00 A	0.10 s	0.06 s	0.14 s	0.11 s	PASS

Test Report

Perform the following steps to generate automatic trip test report:

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

   The project report is a confirmation of accurate protection settings of the circuit breaker.

Zone-Selective Interlocking Test

The Zone-Selective Interlocking (ZSI) test verifies field wiring between multiple circuit breakers connected in a ZSI system.

While connected to a downstream MicroLogic trip unit, the Service Interface causes the MicroLogic trip unit to transmit a secondary injection signal to all connected upstream compatible devices (Communicating MicroLogic trip units, Restraint Interface Module (RIM) module, and ZSI interface module).

NOTE:

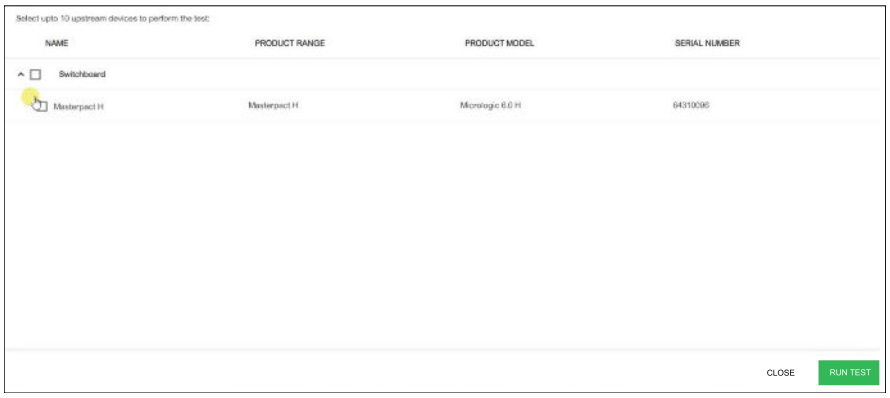
- To perform the ZSI test and to generate the project report with the test details, you must have downstream and upstream circuit breakers in the same EPC project.
- The ZSI test is performed for maximum of 15 minutes before automatically shutting down.

Test Procedure

Perform the following steps for the ZSI test:

1. Click **Zone-Selective Interlocking Test** in the Device view page.

   The **Zone-Selective Interlocking Test** screen is displayed.



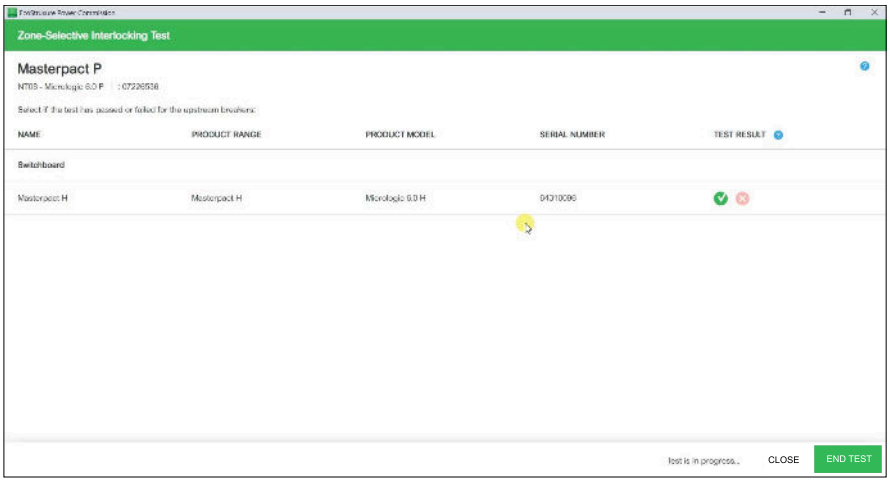
2. Select the upstream devices from the list by selecting the check box against **Name**, **Switchboard**, or by selecting each individual device and click **RUN TEST**.

   NOTE: You can select a maximum of ten devices for test.

   The **Password Required** dialog box is displayed.

3. Enter the downstream MicroLogic Administrator password and click **CONTINUE**.

   The test begins and a message is displayed at the bottom of the screen to indicate the test is in progress.



4. Do one of the following:

   - Click icon in the **TEST RESULT** column if the **Isd**/**Ii** and/or **Ig** LEDs on the upstream MicroLogic trip unit flash.

     This indicate that the test is passed.

   - Click icon if the LEDs do not flash to indicate that the test is not passed.

     This indicate that the test is not passed.

   The selected icon in the **TEST RESULT** column gets highlighted.

5. Click **END TEST**.

   The test is terminated.

   NOTE: If you want to perform the test again, click **RETEST**.

6. Click **CLOSE** to return to the Device view page.

Test Report

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

The project report is a confirmation that the ZSI test verifies field wiring between multiple circuit breakers connected in a ZSI system.

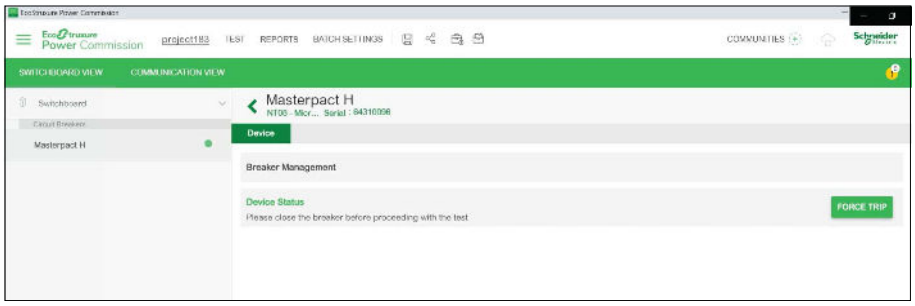
Device Check up (Force Trip Test)

The Force Trip test is performed to check the tripping circuit and condition of the circuit breaker.

Test Procedure

Perform the following steps for the force trip test:

1. Click **Device Check up** in the Device view page.
2. Click the **Device** tab.
3. Close the circuit breaker or verify that the circuit breaker is closed.
4. Click **FORCE TRIP**.



The **DANGER** safety message is displayed.

⚠⚠DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

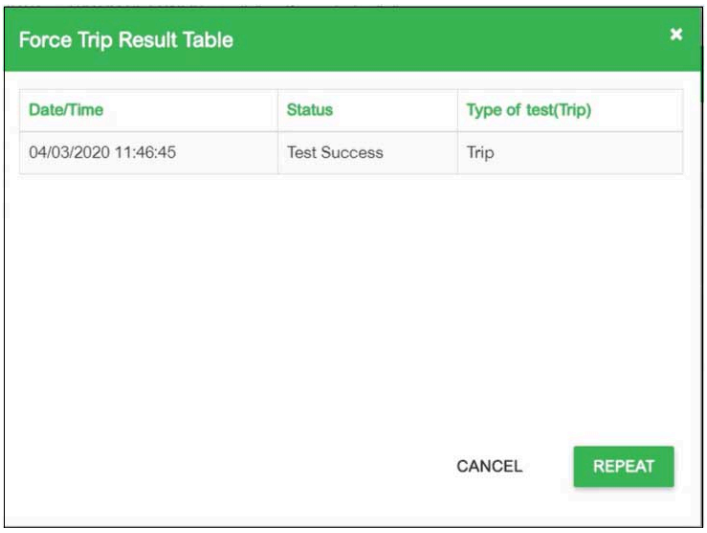
Do not continue with this operation without confirming that doing so will not create a hazardous situation.

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

5. Read the **DANGER** safety message, and if understood, click **I UNDERSTAND**.
6. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

7. Verify that the circuit breaker is tripped.

   The **Force Trip Result Table** displays the force trip status as successful.



   NOTE: Click **REPEAT**, if required.

   The test procedure is repeated from step 4.

   The **WARNING** safety message is displayed.

⚠ WARNING
HAZARD OF EXECUTING INJECTION TEST Make sure to reset and close the circuit breaker before executing an injection test. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

8. Click **CANCEL** to close the **Force Trip Result Table** dialog box.

Test Report

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

   The project report is the confirmation of correct mechanical operation trip of the circuit breaker.

Preparation for Primary Injection Tests

The preparation for primary injection does not perform any test. It prepares the circuit breaker for doing the primary injection tests and fulfills preconditions before the actual test is performed.

- **Reset thermal memory**: Thermal memory is a function that models temperature of the cables that are connected to the circuit breaker after a tripping event. This function causes the circuit breaker to trip faster than the published time-current curve, if the wiring had not cooled. Under normal conditions, 15 minutes delay is required following a device tripping to allow the system to cool before returning to normal functionality. The reset thermal memory function inhibits thermal memory, thus overriding the 15 minutes delay and allowing for multiple consecutive primary injection tests.
- **Inhibit ground fault protection**: This function allows a single phase primary injected test current to be applied without causing the circuit breaker to trip on ground fault. It is used when testing the LSI protection functions of the circuit breaker.

  NOTE: Ground fault protection option is available when connected to MicroLogic 6.0 A, 6.0 E, 6.0 P, or 6.0 H trip unit.

After performing the above actions, manually connect an external power source on the primary of the circuit breaker to do the test.

NOTE:

- The secondary injection testing is the Schneider Electric preferred method for testing circuit breakers. Inappropriate primary injection testing can cause damage to the circuit breakers. Inability to conduct primary injection testing in the proper manner could result in inappropriate test results, while ultimately damaging the integrity of the circuit breaker long term.

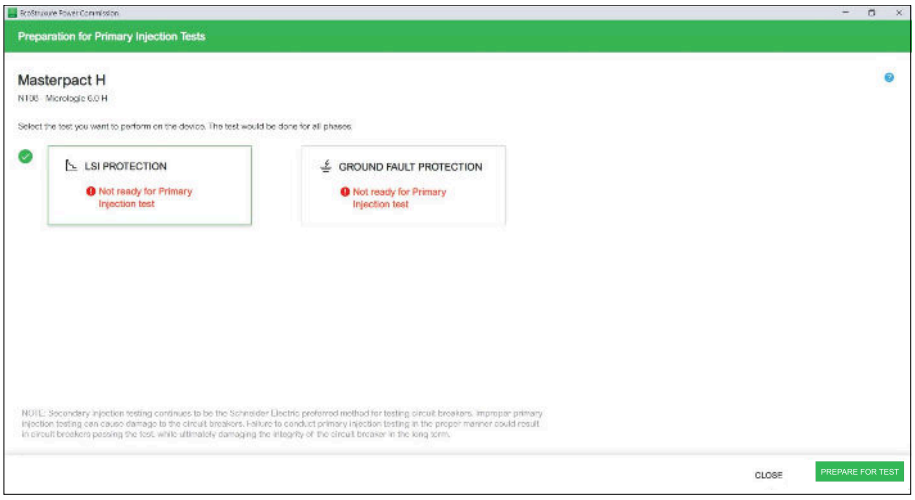
  For information on secondary injection testing, refer to Automatic Trip Curve Tests, page 30.
- The circuit breaker is automatically restored to normal mode in 75 minutes, if the test functions are not manually stopped.

Test Procedure

Perform the following steps to prepare for primary injection test:

1. Click **Prepare for Primary Injection Tests** in the Device view page.

   The **Preparation for Primary Injection Tests** screen is displayed.



.

2. Select the test you want to perform on the device and then click **PREPARE FOR TEST**.

   The **NOTICE** message is displayed.

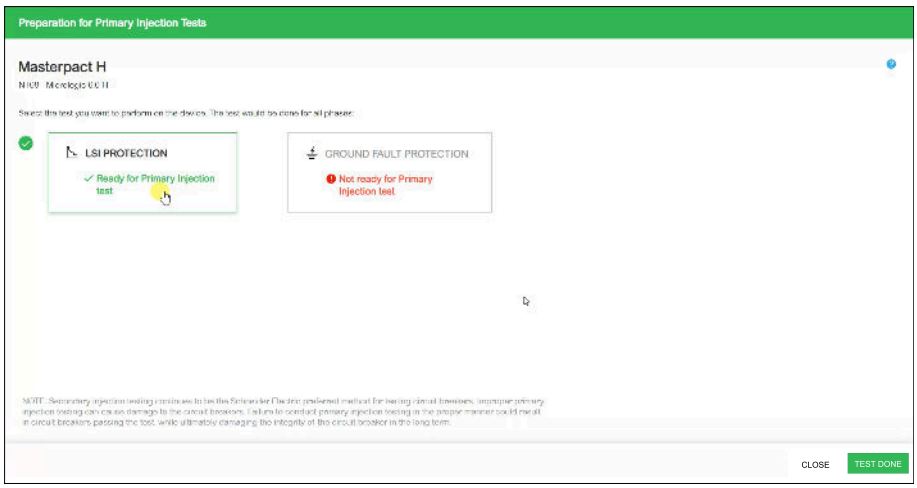
NOTICE
HAZARD OF LOSS OF POWER • During these tests, the circuit breaker will trip, resulting in loss of power to downstream devices. • It is recommended to perform these tests in conjunction with proper planning, precautions, and per the test schedules. **Failure to follow these instructions can result in disruption due to loss of power.**

3. Read the **NOTICE** message, and if understood, click **I UNDERSTAND**.

   The **Password Required** dialog box is displayed.

4. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

   EPC starts preparing the circuit breaker for primary injection test and when it is ready, the following screen is displayed.



   Ready for Primary Injection test: Indicates that the thermal memory and ground fault protection is inhibited for 15 minutes.

   Not ready for Primary Injection test: Indicates that the ground fault protection is not inhibited.

5. Inject the required current for test and evaluate the behavior of the circuit breaker by checking that the circuit breaker trips within its published trip time and the correct trip indicator (if available) turns ON according to the tested protection.

6. Click **TEST DONE**.

   The successful settings restoration dialog box displays and the circuit breaker is restored to normal mode, end of inhibition of ground fault or LSI protection test.

7. Click **CLOSE** to return to the Device view page.

Testing Non-Communicating MicroLogic Trip Units

What's in This Chapter

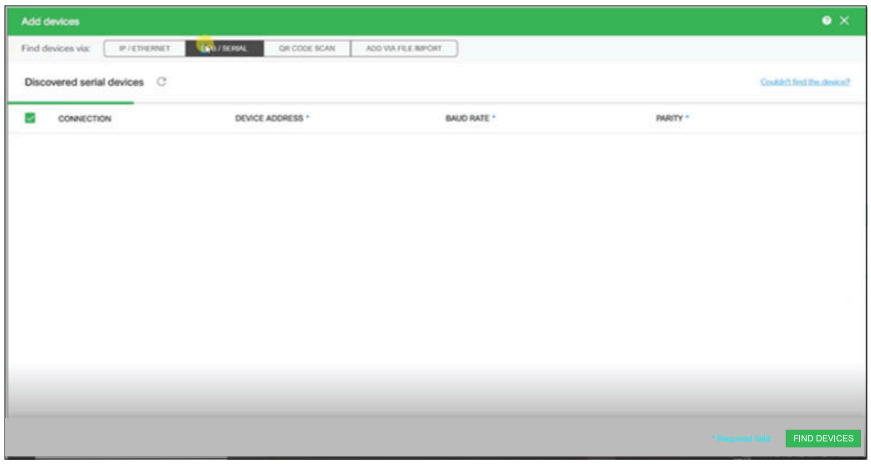
Discovering Trip Units.....41
Test Functions.....43

Discovering Trip Units

After the PC is connected to the non-communicating MicroLogic trip unit to test through the Service Interface, you can start the EPC.

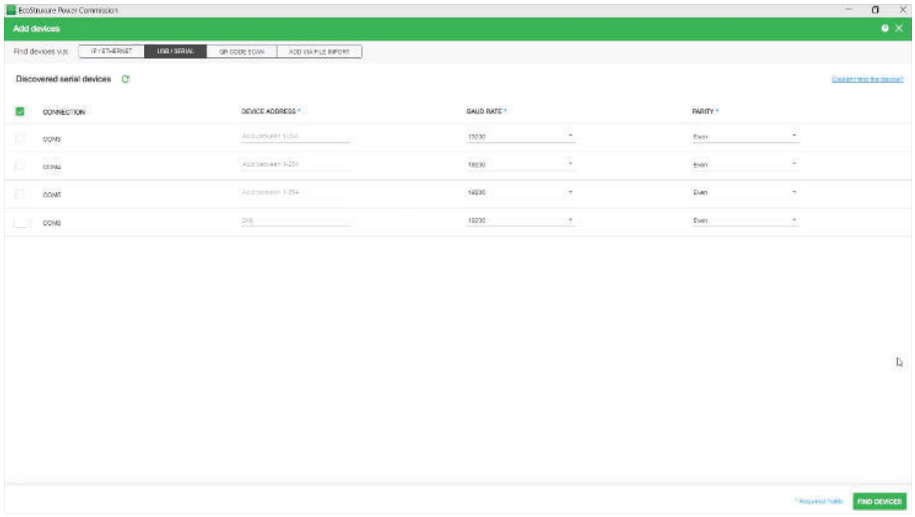
Perform the following steps to discover the devices:

1. Click **Launch Device Discovery**.

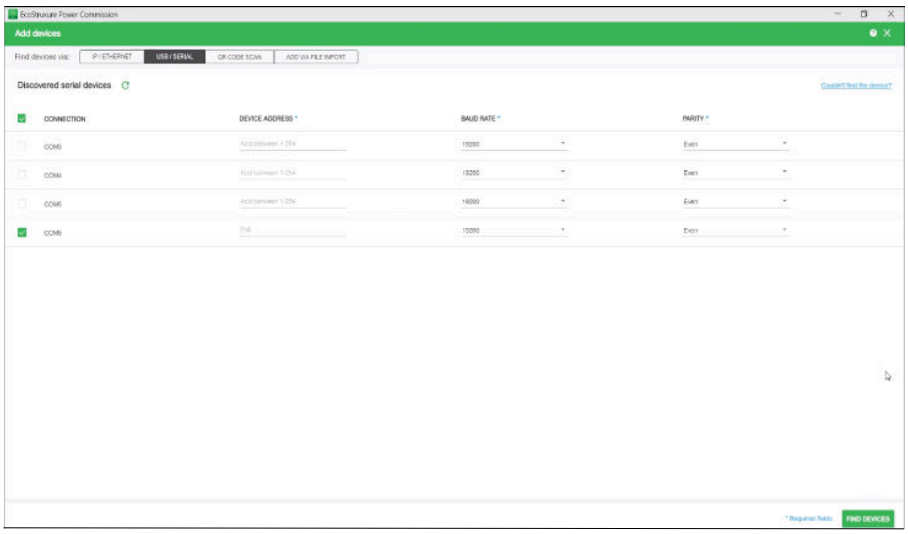


The **Add devices** window is displayed.

2. Click **USB/SERIAL** from **Find devices via** option button.

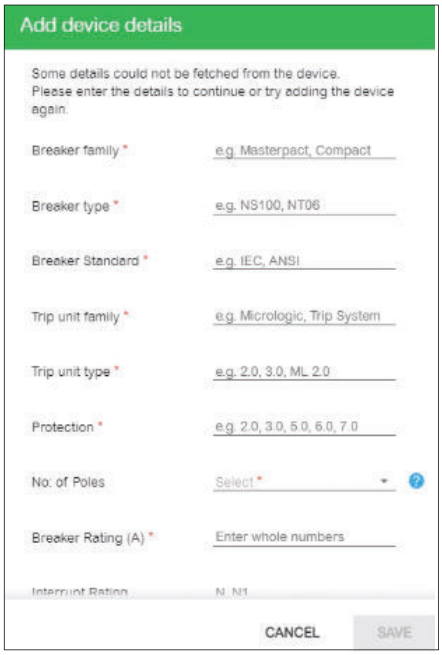


3. Select the device to test or click **FIND DEVICES**.



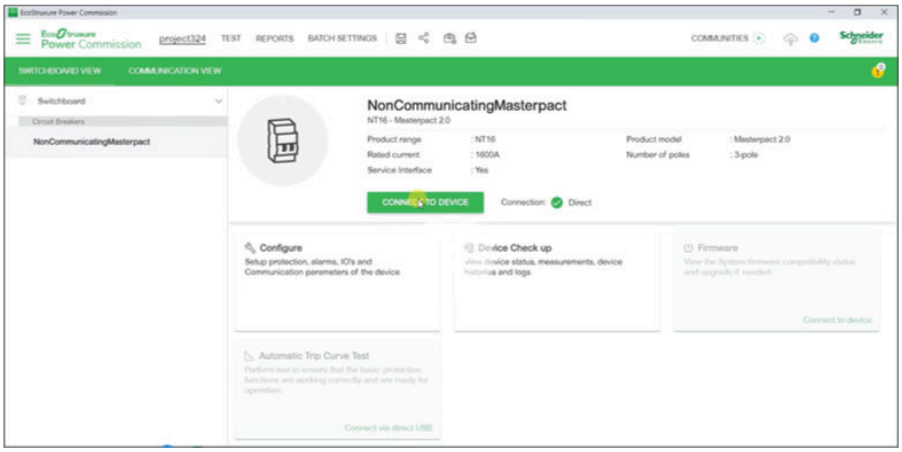
4. Select the **COM** port of Service Interface from the list and click **ADD DEVICES**.

   The **Add device details** dialog box is displayed.



5. Enter device details and click **SAVE**.
6. Enter project and customer details and then click **CONTINUE**.

   The Device view page is displayed.



7. Click **CONNECT TO DEVICE**.

   The following buttons for the selected device are displayed:

   - Configure
   - Device Check up
   - Firmware
   - Automatic Trip Curve Test

   For non-communicating trip units, Configure and Firmware buttons are displayed but not available. Configuration and firmware update are not supported in non-communicating trip units.

   For more information, refer to the *EcoStruxure Power Commission Online Help*.

Test Functions

EPC allows you to perform the following tests on non-communicating MicroLogic trip units through the Service Interface:

- Automatic trip curve test using secondary injection
- Device check up (Forced trip test)

Automatic Trip Curve Tests

The automatic trip curve test provides an automated test of the circuit breaker's time-current curve, allowing the Service Interface to verify long-time, short-time, instantaneous, and ground-fault protection.

The Service Interface injects digital or analog signals based on MicroLogic trip unit type and the circuit breaker's pickup and delay settings. The Service Interface measures the duration of the applied test signal before the circuit breaker trips. This data is automatically compared to the circuit breaker's time-current curve to determine if the device is within tolerance. This comparison of data determines which specific protection functions have passed or failed.

To perform the automatic trip curve test, select one of the following options:

- **Preconfigured test point**: The test points are preconfigured and selected to minimize the test time required to test each trip curve segment.
- **Custom test point**: You can define the test points by entering the secondary injected test current and time.

Preconfigured Test Point

Displays the sections of the time-current curve that can be selected for test. The testable sections of the time current curve are based on the type of the MicroLogic trip unit.

NOTE: Test points are selected to minimize test time required to adequately test each trip curve segment.

Custom Test Point

It is recommended that you follow these guidelines while defining the custom test points:

- Decimal values for the injection current are considered as invalid inputs.
- The value entered for the protection trip type must match to the protection setting being tested. For example:
  - In **Short Time** section, if you enter the value of injection current within the short-time current range, the MicroLogic trip unit will trip in short-time segment. This will indicate a **Passed** test status.
  - In **Long Time** section, if you enter the value of injection current within the long-time current range, the MicroLogic trip unit will trip in long-time segment. The test result may display the incorrect cause of the trip as short-time. During the test, as the circuit breaker has tripped within the expected trip time, the test result will indicate a **Passed** test status.

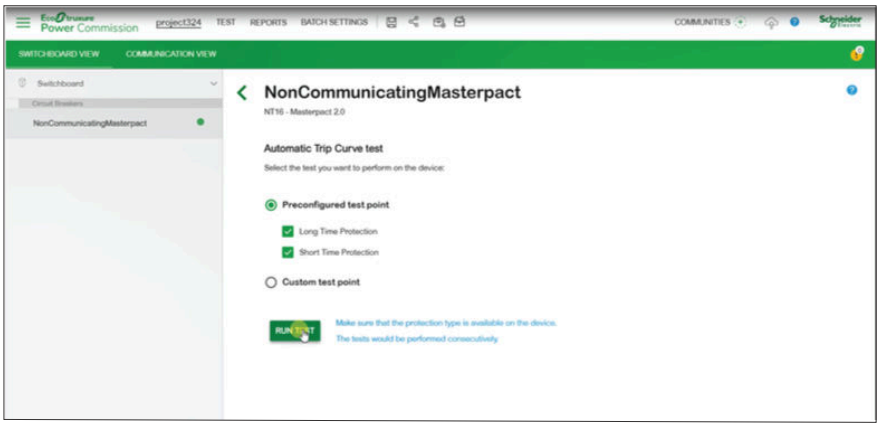
The following table shows the protection functions available on the non-communicating trip units:

Non-communicating trip unit	Protection function
MicroLogic 2.0, ET 2.I	• Long-time protection • Short-time protection
MicroLogic 3.0, ET 5S	• Long-time protection • Instantaneous protection
MicroLogic 5.0	• Long-time protection • Short-time protection • Instantaneous protection

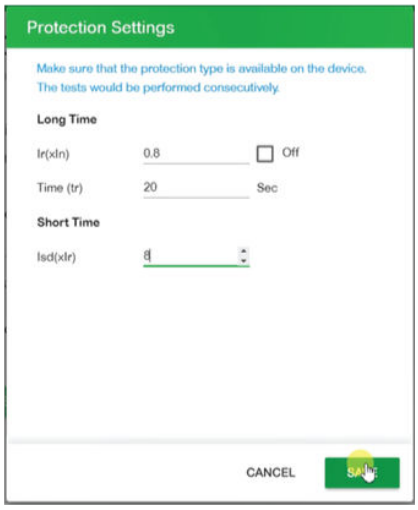
Test Procedure

Perform the following steps for the automatic trip curve test:

1. Click **Automatic Trip Curve Test** in the Device view page.
   The Automatic trip curve test screen is displayed.



2. Select **Preconfigured test point** or **Custom test point** and click **RUN TEST**.
   The **Protection Settings** dialog box is displayed.



3. Enter the protection settings details and click **SAVE**.

   The **NOTICE** message is displayed.

NOTICE
HAZARD OF LOSS OF POWER • During these tests, the circuit breaker will trip, resulting in loss of power to downstream devices. • It is recommended to perform these tests in conjunction with proper planning, precautions, and per the test schedules. **Failure to follow these instructions can result in disruption due to loss of power.**

4. Read the **NOTICE** message, and if understood, click **I UNDERSTAND**.

   The **Password Required** dialog box is displayed.

5. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

6. Reset and close the circuit breaker.

7. Click **OK**.

   The protection test starts.

   NOTE: During the long-time protection test:

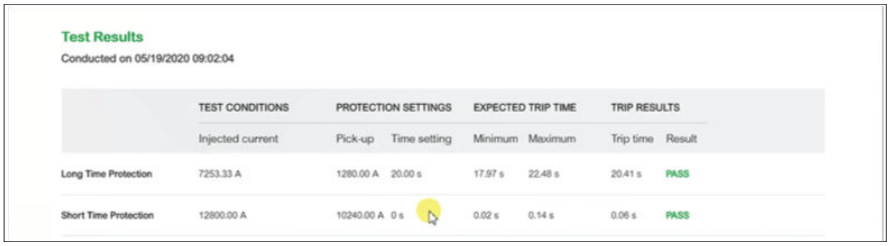
   - **Injection Time** and **Remaining Time before trip** (in seconds) are displayed.
   - You can click **ABORT** to stop the running test. This cancels all the subsequent tests.

   NOTE: The short-time protection cannot be tested if **Ir x Isd > Ii**.

8. Repeat step 6 and 7 for the next test.

   The test result is displayed at the end of the test. After completing all the tests, the **Test Results** screen is displayed with:

   - The list of protection functions tested.
   - The injection current.
   - The protection settings.
   - The expected trip time and the real trip time.
   - The test result.



Test Results

Conducted on 05/19/2020 09:02:04

	TEST CONDITIONS	PROTECTION SETTINGS		EXPECTED TRIP TIME		TRIP RESULTS	
	Injected current	Pick-up	Time setting	Minimum	Maximum	Trip time	Result
Long Time Protection	7253.33 A	1280.00 A	20.00 s	17.97 s	22.48 s	20.41 s	PASS
Short Time Protection	12800.00 A	10240.00 A	0 s	0.02 s	0.14 s	0.06 s	PASS

   NOTE: For non-communicating trip units, the Service Interface cannot reset thermal memory. Therefore, 15 minutes time period must be observed between long time tests.

Test Report

Perform the following steps to generate automatic trip test report:

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

   The project report is the confirmation of accurate protection settings of the circuit breaker.

Device Check up (Force Trip Test)

The Force Trip test is performed to check the tripping circuit and condition of the circuit breaker.

Test Procedure

Perform the following steps for the force trip test:

1. Click **Device Check up** in the Device view page.
2. Click the **Device** tab.
3. Close the circuit breaker or verify that the circuit breaker is closed.
4. Click **FORCE TRIP**.

The **DANGER** safety message is displayed.

DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

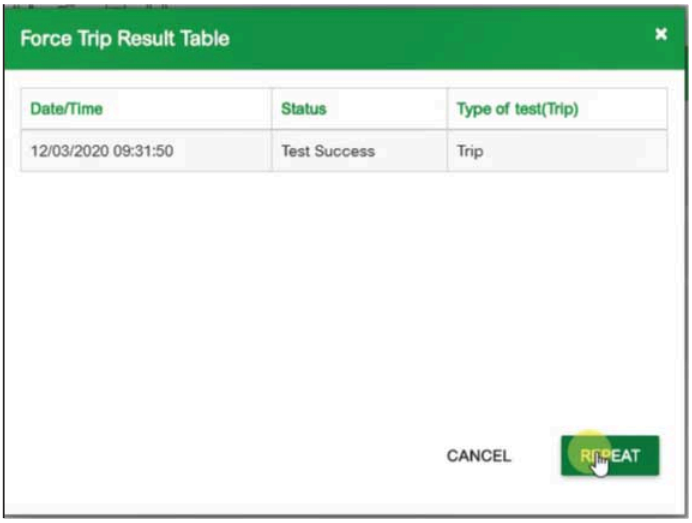
Do not continue with this operation without confirming that doing so will not create a hazardous situation.

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

5. Read the **DANGER** safety message, and if understood, click **I UNDERSTAND**.
6. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

7. Verify that the circuit breaker has physically tripped.

   The **Force Trip Result Table** displays the force trip status as successful.



   NOTE: Click **REPEAT**, if required.

   The test procedure is repeated from step 4.

   The **WARNING** safety message is displayed.

⚠ WARNING
HAZARD OF EXECUTING INJECTION TEST Make sure to reset and close the circuit breaker before executing an injection test. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

8. Click **CANCEL** to close the **Force Trip Result Table** dialog box.

Test Report

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

   The project report is the confirmation of correct mechanical operation trip of the circuit breaker.

Troubleshooting

What's in This Chapter

Troubleshooting of Automatic Trip Curve Test 50
Troubleshooting of Zone-Selective Interlocking Test 51
Troubleshooting of Primary Injection Test 52

Troubleshooting of Automatic Trip Curve Test

Condition	Probable causes	Solutions
Circuit breaker trips faster than minimum trip band for instantaneous protection when performing automatic trip curve test on short-time or instantaneous segments of time-current curve and in EPC if test result appears as fail and trip time is less than 10 ms.	Secondary injected fault into trip unit has exceeded one or more of the following circuit breaker protection levels: • Instantaneous override • Close and latch • Selectivity	Make sure that the circuit breaker is always in closed position before beginning secondary injection of each fault. This avoids tripping due to close and latch protection. Does long-time segment of time-current curve pass when performing automatic trip curve test? A. YES For communicating MicroLogic trip units, if **Ap** trip indicator LED on trip unit turns ON when testing short-time or instantaneous segments of time-current curve, then circuit breaker has tripped on instantaneous override, close and latch, or selectivity protection functions. For non-communicating MicroLogic trip units, no trip indicator LED is available. Check that peak value for signal being injected does not exceed instantaneous override or selectivity protection levels. See published time-current curves. B. NO Contact your field service representative.
Circuit breaker is not receiving ZSI restraint during secondary injection testing, but trips as though it is receiving a restraint signal. Circuit breaker trips according to time delay setting for short time (tsd) or ground fault (tg) instead of tripping with no intentional delay.	This is normal operation for the secondary injection test. The Service Interface ZSI self-restrains the short time and the ground fault protection functions during secondary injection testing.	None - Normal operation

Troubleshooting of Zone-Selective Interlocking Test

Condition	Probable causes	Solutions
Isd/Ii and/or Ig LED not flashing on upstream circuit breaker when performing ZSI test.	• Upstream circuit breaker not wired for ZSI configuration. • Trip unit on upstream circuit breaker does not have power applied to it. • Interface screen displays communication error. • Upstream circuit breaker not wired for short time ZSI restraint. • Upstream circuit breaker not wired for ground-fault ZSI restraint. • MicroLogic 3.0 trip unit connected to the Service Interface. (MicroLogic 3.0 trip unit does not provide short-time or ground-fault protection.)	• ZSI test cannot be performed. • Connect and turn on auxiliary 24 V power source to upstream circuit breaker. Replace with new Service Interface. • Check that pins of seven-pin test cable have not been bent, pushed in, pulled out or otherwise damaged. • Refer to MicroLogic Trip Unit Compatibility to determine if test is applicable to trip units. If both upstream and downstream trip units are powered and trip indicator LEDs are not flashing, verify wiring between devices. • Terminal Z1 from downstream trip unit must be connected to terminal Z3 of upstream trip unit. • Terminal Z2 of downstream trip unit must be connected to terminals Z4 (for short time) and Z5 (for ground fault) of upstream trip unit. If wiring is correct and trip indicators do not flash while Service Interface is initiating ZSI test, then verify trip unit is not self-restrained. Use an ohmmeter to verify terminal Z3 is not shorted to terminals Z4 and/or Z5. All devices are factory-shipped in self-restrained configuration with Z3 shorted to Z4 and Z5. If system includes Restraint Interface Module (RIM) module, push-to-test button sends a ZSI test signal to upstream devices. For correct wiring and operation instructions, refer to the *RIM Instruction Bulletin*.

Troubleshooting of Primary Injection Test

Condition	Probable causes	Solutions
Circuit breaker trips earlier than expected during primary injection test with either ground-fault inhibit function or thermal-imaging inhibit function enabled.	Ground-fault inhibit function or thermal-imaging inhibit function was not disabled and restarted after circuit breaker tripped during previous primary injection test.	Stop and restart either ground-fault inhibit function or thermal-imaging inhibit function after each circuit breaker tripping event.
Circuit breaker trips up to twice as long as expected when performing primary injection test.	While performing primary injection using either ground-fault or thermal-image inhibit function, interface screen displays communication error. In response ground fault or thermal imaging was re-inhibited without stopping primary injection causing circuit breaker to trip long when long-time segment of time-current curve tested.	Terminate primary injection test completely. Start ground-fault or thermal-image inhibit function and start primary injection test.
Circuit breaker installed with MicroLogic 6.0A, 6.0E, 6.0H or 6.0P trip unit does not trip when performing ground-fault test.	• Fault level injected not high enough to cause trip on ground-fault protection. • Circuit breaker connected in Modified Differential Ground-fault (MDGF) or source ground return configuration.	1. Inject higher fault current. 2. Refer to MicroLogic Trip Unit Compatibility to determine if test is applicable to trip units. 3. The ground fault protection function cannot be tested for circuit breakers configured for Modified Differential Ground Fault (MDGF) or Source Ground Return (SGR) protection. These configurations require primary injection testing.

Test Functions for ComPacT NSX and PowerPacT H-, J-, and L-Frame Circuit Breakers

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Introduction

What's in This Chapter

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Configuration Function.....56
Connection of the Service Interface to a MicroLogic Trip Unit.....57

MicroLogic Trip Unit Compatibility

The following table indicates which functions are applicable for MicroLogic trip units:

MicroLogic trip units	Configuration	Alarm simulation	Firmware update	Automatic trip curve test using secondary injection		Force trip test	ZSI test	Preparation for primary injection tests	
				With pre-configured test points	With custom test points			Inhibit thermal memory	Inhibit ground fault
MicroLogic 1.2, 1.3, 2.2, 2.3, 3.2, 3.3, 4.2, 4.3	–	–	–	✓	✓	✓	–	✓	–
MicroLogic 5.2 B, 5.3 B	✓	–	–	✓	✓	✓	–	✓	–
MicroLogic 5.2 A/E, 5.3 A/E	✓	✓	✓	✓	✓	✓	✓	✓	–
MicroLogic 6.2 A/E, 6.3 A/E	✓	✓	✓	✓	✓	✓	✓	✓	✓
MicroLogic 7.2 E, 7.3 E	✓	✓	✓	✓	✓	✓	✓	✓	–

These MicroLogic trip units can be mounted in the following circuit breakers:

- ComPacT NSX circuit breakers
- PowerPacT H-, J-, and L-frame circuit breakers

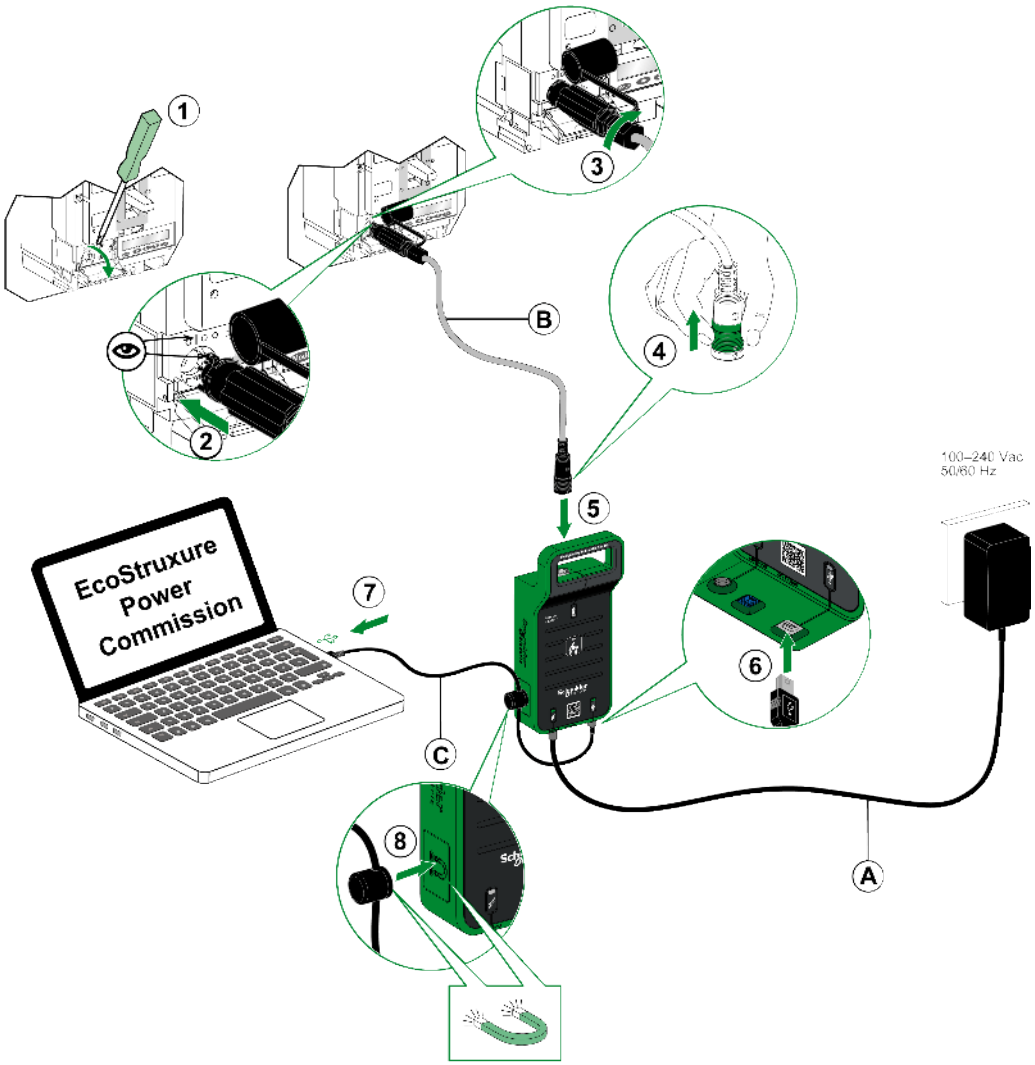
Configuration Function

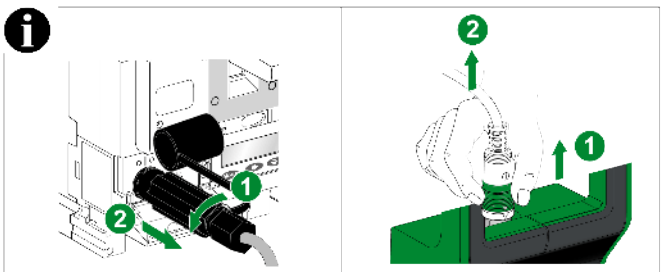
You can configure the MicroLogic 5, 6, and 7 trip units with the Service Interface from EPC software when the PC is connected to the MicroLogic trip unit.

The settings of MicroLogic 5, 6, and 7 trip units can be saved by using EPC software.

Connection of the Service Interface to a MicroLogic Trip Unit

Connect the Service Interface to the MicroLogic trip unit test port using the cable LV485513SP.





A. AC/DC power

B. 7-pin cable for 100-630 A MCCB trip units

C. USB cable with magnet

IMPORTANT: It is recommended to supply the MicroLogic 5/6/7 trip unit with a 24 Vdc external power supply during the tests to reduce the test duration.

Testing MicroLogic Trip Units

What's in This Chapter

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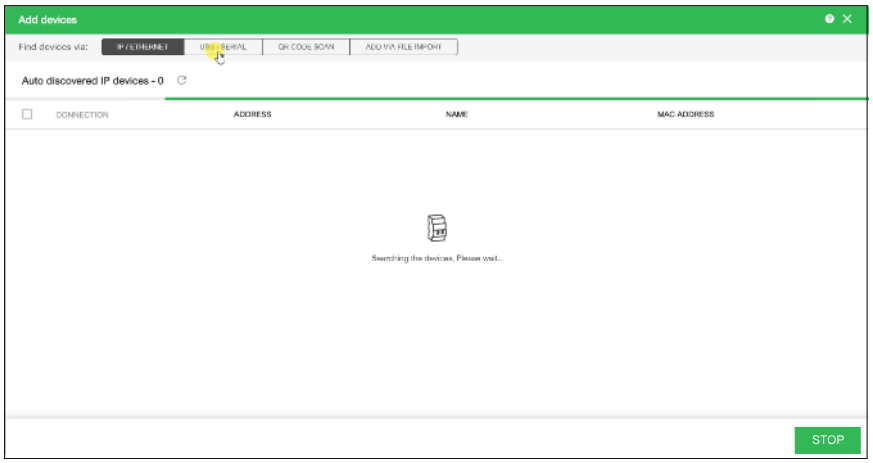
Discovering Trip Units

After the PC is connected to the MicroLogic trip unit to test using the Service Interface, you can start the EPC.

Perform the following steps to discover the devices:

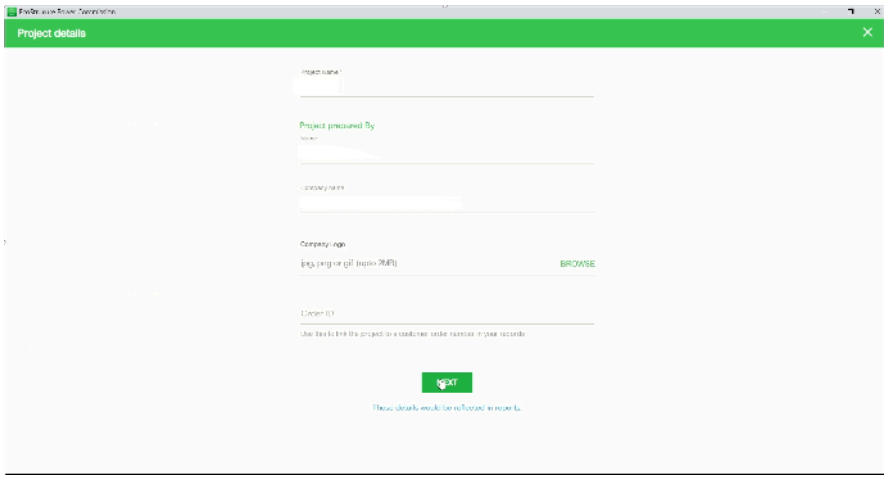
1. Click **Launch Device Discovery**.

   The **Add devices** window is displayed.



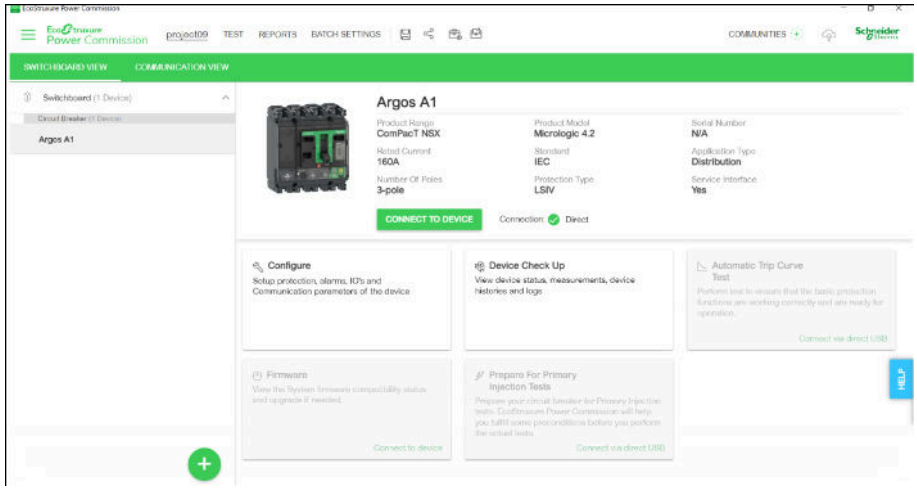
2. Click **USB/SERIAL** from **Find devices via**.
3. Select the device to test or click **FIND DEVICES**.
4. Select the device to test from the Device List and click **ADD DEVICES**.

   The **Project details** dialog box is displayed.



5. Enter project and customer details and then click **NEXT**.

   The Device view page is displayed.



6. Click **CONNECT TO DEVICE**.

   The following buttons for the selected device are displayed:

   - Configure
   - Device Check up
   - Firmware
   - Automatic Trip Curve Test
   - Zone-Selective Interlocking Test
   - Prepare for Primary Injection Test

   For more information, refer to the *EcoStruxure Power Commission Online Help*.

Alarm Simulation

MicroLogic 5, 6, and 7 Alarms

MicroLogic 5, 6, and 7 trip units can generate:

- One or two pre-alarms (depending on the type of trip unit) assigned to:
  - Long-time protection (PAL Ir) for the MicroLogic 5 trip unit.
  - Long-time protection (PAL Ir) and ground-fault protection (PAL Ig) for the MicroLogic 6 trip unit.
  - Long-time protection (PAL Ir) and earth-leakage protection (PAL IΔn) for the MicroLogic 7 trip unit.

    By default, these alarms are active.
- Ten alarms defined by the user as required, using EPC software. The user assigns each of these alarms to a measurement.

  By default, these alarms are not active.

The pre-alarms and user-defined alarms are accessible:

- Using EPC software.
- Using the communication network.
- On the FDM121 display.

The pre-alarms and user-defined alarms can be assigned to an SDx module output using EPC software.

For more information on MicroLogic 5, 6 and 7 alarms, refer to *ComPacT NSX MicroLogic 5/6/7 Electronic Trip Units – User Guide*, page 7.

Alarm Simulation Objectives

The objectives of the alarm simulation function are:

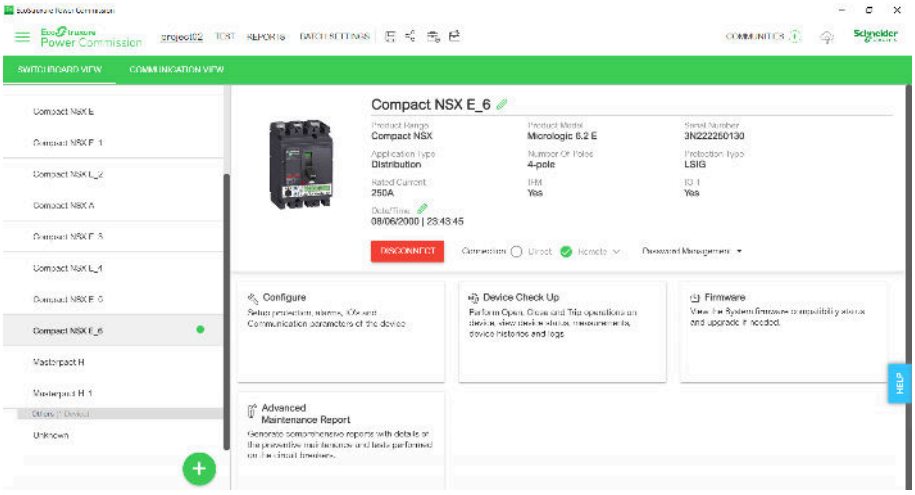
- To simulate each MicroLogic activated pre-alarm and user-defined alarm.
- To simulate and check the alarms with EPC software.
- To check that, depending on the application and the MicroLogic configuration, the simulated alarms are reported:
  - On the FDM121 display.
  - On the Modbus registers.
  - On the SDx module.

Alarm Simulation Procedure

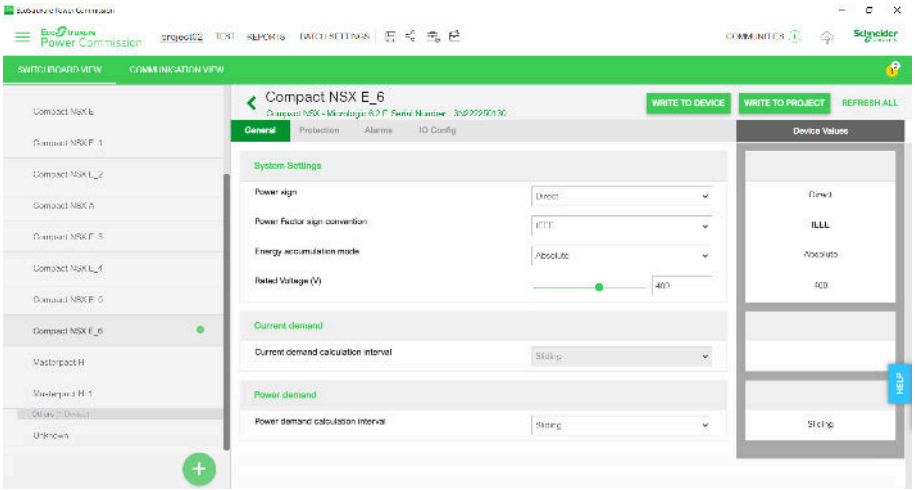
The simulation procedure is the same for pre-alarms or user-defined alarms.

Perform the following steps for the simulation of one alarm:

1. Select **Configure** in the Device view page.

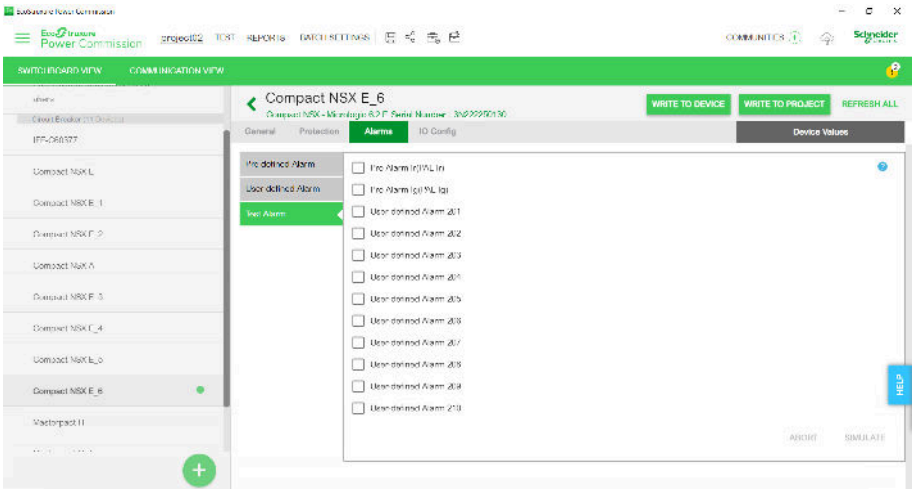


The **Configuration** screen is displayed.



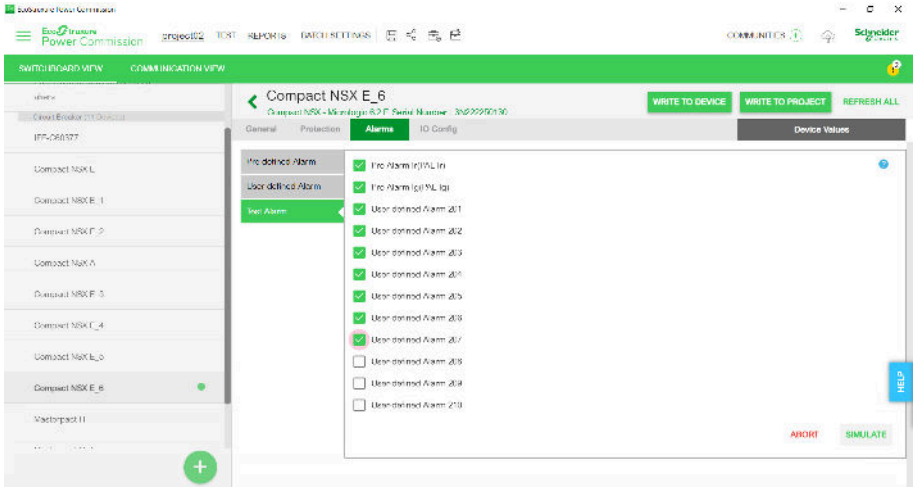
2. Select the **Alarms** tab on the Alarm screen and click **Test Alarm**.

   The list of MicroLogic pre-alarms and the 10 possible user-defined alarms are displayed.



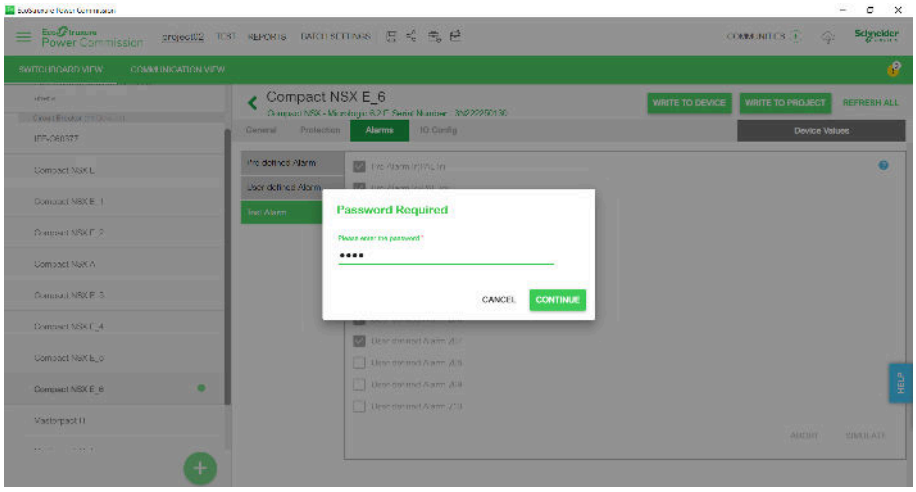
3. Select one or several activated alarms to simulate and click **SIMULATE**.

   NOTE: Select only activated alarms. The simulation of deactivated alarms will be unsuccessful.

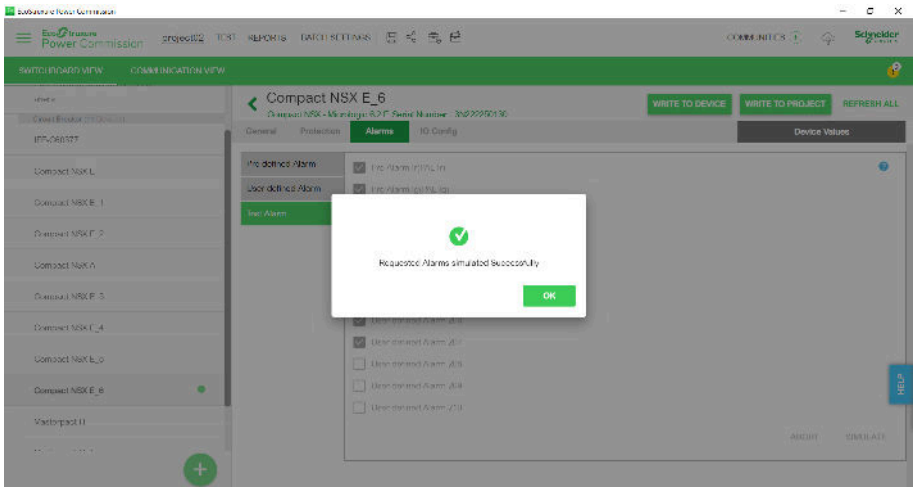


   NOTE: Click **ABORT** to reset the selection of alarms to simulate.

4. Enter the MicroLogic Administrator password and click **CONTINUE**.



The selected alarms are simulated and the simulation result is displayed.



Alarm Simulation with FDM121 Display

When the MicroLogic 5, 6, or 7 trip unit is connected to an FDM121 display, the alarm simulation allows to check the correct management of the alarm on the FDM121 display.

1. Run the alarm simulation procedure for each activated alarm separately.
2. If the result of the alarm simulation is successful for EPC software, check the simulation result on the FDM121 display. The alarm simulation results depend on the alarm priority level:
   - If the simulated alarm is a high priority alarm:
     - The alarm is logged in the FDM121 alarm history.
     - The FDM121 LED flashes.
     - A dialog box informs the user that the alarm is active.

       The LED turns OFF and the pop-up screen disappears when the user presses the Clear button on the FDM121 display (considering the alarm is no more active).
   - If the simulated alarm is a medium priority alarm:
     - The alarm is logged in the FDM121 alarm history.
     - The FDM121 LED is constantly ON.

       The LED turns OFF when the user reads the FDM121 alarm history.
   - If the simulated alarm is a low priority alarm, the alarm is logged in the FDM121 alarm history but there is no display of the alarm.
   - If the simulated alarm is a no priority alarm, the alarm is not logged in the FDM121 alarm history.

For more information on the alarms displayed on the FDM121 display, refer to *FDM121 Front Display Module for One Circuit Breaker – User Guide*, page 7.

Alarm Simulation with Communication Network

When MicroLogic 5, 6, or 7 alarms is connected to a communication network, the alarm simulation allows to check the correct management of the alarm by the communication network.

1. Run the alarm simulation procedure for all activated alarms.
2. If the result of the alarm simulation is successful for EPC software, check that the alarm status is correctly reported remotely through the communication network.

For more information, refer to *ComPacT NSX – Modbus Communication – User Guide*, page 7.

Alarm Simulation with SDx Module

When MicroLogic 5, 6, or 7 alarms are assigned to an SDx module output, the alarm simulation allows to check the correct management of the alarm on the SDx module.

1. Run the alarm simulation procedure for each activated alarm assigned to an SDx module output separately.
2. If the result of the alarm simulation is successful for EPC software, check that the SDx module output changes state.

For more information on MicroLogic 5, 6 and 7 alarms, refer to *ComPacT NSX MicroLogic 5/6/7 Electronic Trip Units – User Guide*.

Test Functions

EPC software allows you to perform the following tests on MicroLogic trip unit through the Service Interface:

- Automatic Trip Curve test using secondary injection
- Device check up (Force trip test)
- ZSI test

EPC software also allows you to prepare primary injection tests on MicroLogic trip unit through the Service Interface.

Automatic Trip Curve Tests

The automatic trip curve test provides an automated test of the circuit breaker's time-current curve, allowing the Service Interface to verify long-time, short-time, instantaneous, and ground-fault protection.

The Service Interface injects digital or analog signals based on MicroLogic trip unit type and the circuit breaker's pickup and delay settings. The Service Interface measures the duration of the applied test signal before the circuit breaker trips. This data is automatically compared to the circuit breaker's time-current curve to determine if the device is within tolerance. This comparison of data will determine which specific protection functions have passed or failed.

To perform the automatic trip curve test, you can choose one of the following options:

- **Preconfigured test point**: The test points are preconfigured and chosen to minimize the test time required to adequately test each trip curve segment.
- **Custom test point**: The test points are defined by the user by entering the secondary injected test current and time.

Automatic Trip Curve Tests with Preconfigured Test Points

You can select the protection functions available on the MicroLogic trip unit you want to test. By default, all protection functions available on the MicroLogic trip unit are preselected for testing.

Automatic Trip Curve Tests with Custom Test Points

It is recommended that you follow the guidelines while defining the custom test points:

- Decimal values for the injection current are considered as invalid inputs.
- The selected protection trip type must match the segment of the time-current curve to be tested. If an incorrect value is selected, the test results may be misleading. For example:
  - If you select the short-time protection trip type and enter the injection current value within the short-time current range, then the MicroLogic trip unit will trip in short-time segment. This will indicate a **Passed** test status.
  - If you select the short-time protection trip type and enter the injection current value within the long-time current range, then the MicroLogic trip unit will trip in long-time segment.

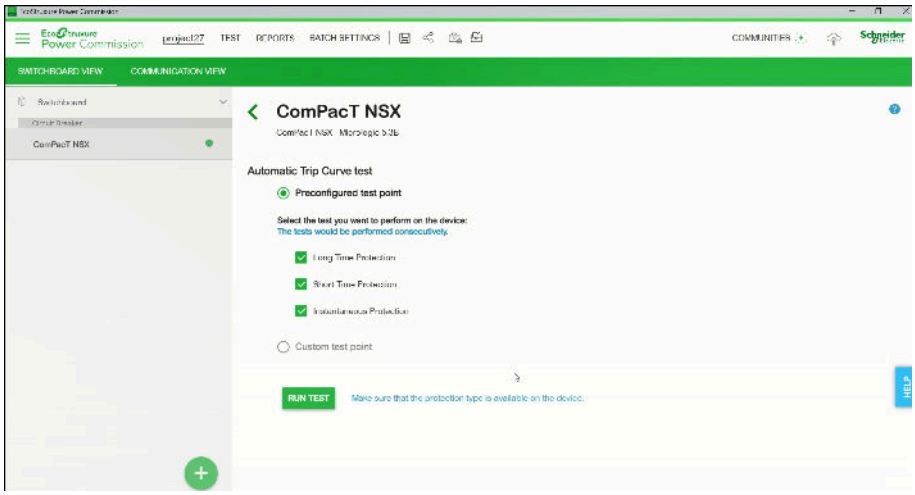
    The test results will not display the cause of the trip. As the circuit breaker has tripped, the test results will indicate a **Passed** test status.
  - If you want to test the ground fault protection but select any protection type that inhibits ground fault protection, then the test results will be incorrect.

Test Procedure

Perform the following steps for the automatic trip curve test:

1. Click **Automatic Trip Curve Test** in the Device view page.

   The Automatic trip curve test screen is displayed.



2. Click **RUN TEST**.

   The **NOTICE** message is displayed.

NOTICE
HAZARD OF LOSS OF POWER • During these tests, the circuit breaker will trip, resulting in loss of power to downstream devices. • It is recommended to perform these tests in conjunction with proper planning, precautions, and per the test schedules. **Failure to follow these instructions can result in disruption due to loss of power.**

3. Read the **NOTICE** message, and if understood, click **I UNDERSTAND**.

   The **Password Required** dialog box is displayed.

4. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

5. Reset and open the circuit breaker.

6. Click **OK**.

   The protection test starts.

   NOTE: During the long-time protection test:

   - **Injection Time** and **Maximum remaining time before trip** (in seconds) are displayed.
   - You can click **ABORT** to stop the running test. This cancels all the subsequent tests.

   NOTE: The short-time protection cannot be tested if **Ir x Isd > Ii**.

7. Repeat step 5 and 6 for the next test.

   The test result is displayed at the end of the test. After completing all the tests, the **Test Results** screen is displayed with:

   - The list of protection functions tested.
   - The injection current.
   - The protection settings.
   - The expected trip time and the real trip time.
   - The test result.

Test Results

Conducted on 01/25/2022 12:55:10

	TEST CONDITIONS	PROTECTION SETTINGS		EXPECTED TRIP TIME		TRIP RESULTS	
	Injected current	Pick-up	Time setting	Minimum	Maximum	Trip time	Result
Long Time Protection	922.00 A	250.00 A	16.00 s	34.73 s	42.89 s	39.35 s	PASS
Short Time Protection	1890.00 A	1125.00 A	0.43 x	0.35 x	0.50 x	0.43 x	PASS
Instantaneous Protection	3750.00 A	2000.00 A		0.01 s	0.08 s	0.05 s	PASS

Test Report

Perform the following steps to generate automatic trip test report:

1. Click **Reports > Automatic Trip Test Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

   The project report is the confirmation of accurate protection settings of the circuit breaker.

Zone-Selective Interlocking Test

The Zone-Selective Interlocking (ZSI) test verifies field wiring between multiple circuit breakers connected in a ZSI system.

While connected to a downstream MicroLogic trip unit, the Service Interface causes the MicroLogic trip unit to transmit a ZSI test signal to all connected upstream compatible devices (Communicating MicroLogic trip units, Restraint Interface Module (RIM) module, and ZSI interface module).

NOTE:

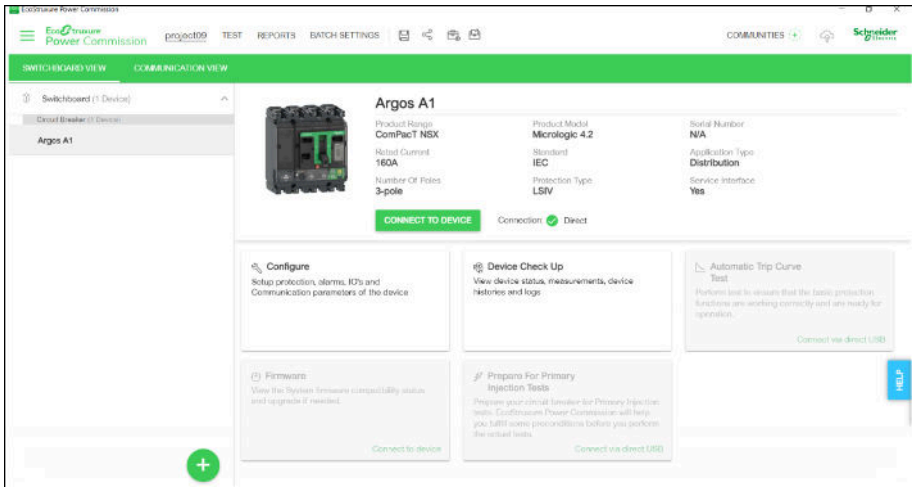
- To perform the ZSI test and to generate the project report with the test details, you must have downstream and upstream circuit breakers in the same EPC project.
- The ZSI test can be performed for maximum of 15 minutes before automatically shutting down.

Test Procedure

Perform the following steps for the ZSI test:

1. Click **Zone-Selective Interlocking Test** in the Device view page.

   The Zone-selective interlocking test screen is displayed.



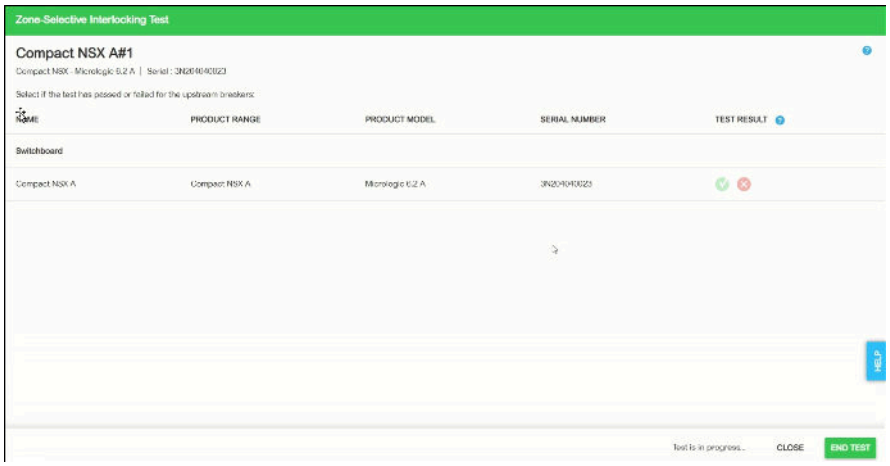
2. Select the upstream devices from the list by selecting the check box against **Name**, **Switchboard**, or by selecting each individual device and then click **RUN TEST**.

   NOTE: You can select a maximum of ten devices for test.

   The **Password Required** dialog box is displayed.

3. Enter the downstream MicroLogic Administrator password and click **CONTINUE**.

   The test begins and a message is displayed at the bottom of the screen to indicate the test is in progress.



4. Do one of the following:

   - Click icon in the **TEST RESULT** column if the **Isd**/**Ii**, and **Ig** LEDs on the upstream MicroLogic trip unit flash to indicate that the test is passed.
   - Click icon if LEDs do not flash to indicate that the test is not passed.

   The selected icon in the **TEST RESULT** column gets highlighted.

5. Click **END TEST**.

   The test is terminated.

   NOTE: If you want to perform the test again, click **RETEST**.

6. Click **CLOSE** to return to the Device view page.

Test Report

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

The project report is a confirmation that the ZSI test verifies field wiring between multiple circuit breakers connected in a ZSI system.

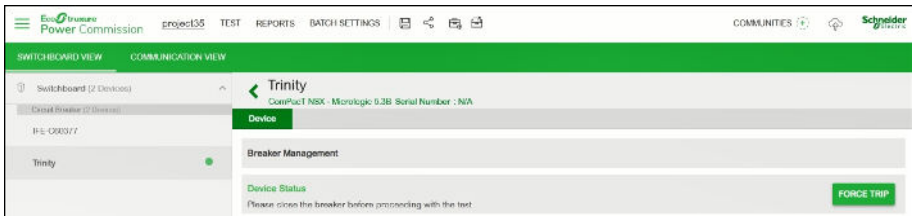
Device Check up (Force Trip Test)

The Force Trip test is performed to check the tripping circuit and condition of the circuit breaker.

Test Procedure

Perform the following steps for the force trip test:

1. Click **Device Check up** in the Device view page.
2. Click the **Device** tab.
3. Close the circuit breaker or verify that the circuit breaker is closed.
4. Click **FORCE TRIP**.



The **DANGER** safety message is displayed.

⚠⚠DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

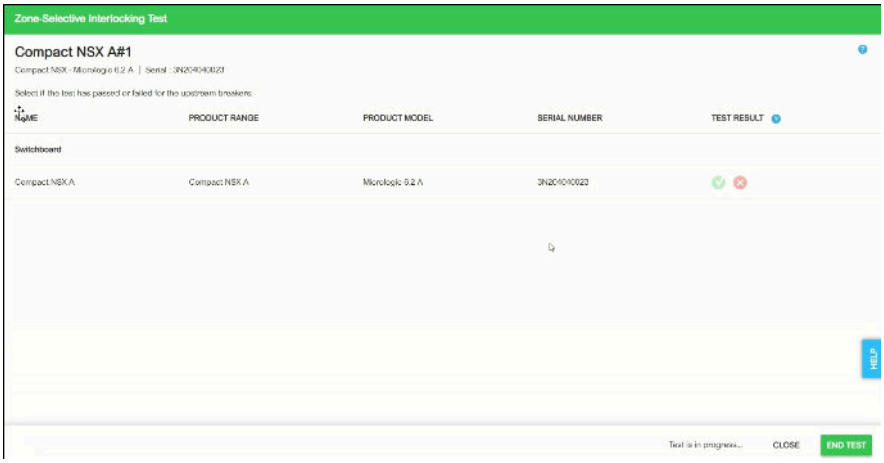
Do not continue with this operation without confirming that doing so will not create a hazardous situation.

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

5. Read the **DANGER** safety message, and if understood, click **I UNDERSTAND**.
6. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

7. Verify that the circuit breaker is physically tripped.

   The **Force Trip Result Table** displays the force trip status as successful.



   NOTE: Click **REPEAT**, if required.

   The test procedure is repeated from step 4.

   The **WARNING** safety message is displayed.

⚠ WARNING
HAZARD OF EXECUTING INJECTION TEST Make sure to reset and close the circuit breaker before executing an injection test. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

8. Click **CANCEL** to close the **Force Trip Result Table** dialog box.

Test Report

1. Click **Reports > Project Report**.

   The generated project report is displayed in a new tab.

2. Save or print the project report as required.

   The project report is the confirmation of correct mechanical operation trip of the circuit breaker.

Preparation for Primary Injection Tests

The preparation for primary injection does not perform any test by itself. It only prepares the circuit breaker for doing the primary injection tests and fulfills some preconditions before the actual test is performed.

- **Reset thermal memory**: Thermal memory is a function that models temperature of the cables that are connected to the circuit breaker after a tripping event. This function causes the circuit breaker to trip faster than the published time-current curve, if the wiring had not cooled. Under normal conditions, 15 minutes delay is required following a device tripping to allow the system to cool before returning to normal functionality. The reset thermal memory function inhibits thermal memory, thus overriding the 15 minutes delay and allowing for multiple consecutive primary injection tests.
- **Inhibit ground fault protection**: This function allows a single phase primary injected test current to be applied without causing the circuit breaker to trip on ground fault. It is used when testing the LSI protection functions of the circuit breaker.

  NOTE: Ground fault protection option is available when connected to MicroLogic 6.2 A/E or 6.3 A/E trip unit.

After doing these actions, manually connect an external power source on the primary of the circuit breaker to do the test.

NOTE:

- The secondary injection testing is the Schneider Electric preferred method for testing circuit breakers. Inappropriate primary injection testing can cause damage to the circuit breakers. Inability to conduct primary injection testing in the proper manner could result in inappropriate test results, while ultimately damaging the integrity of the circuit breaker long term.

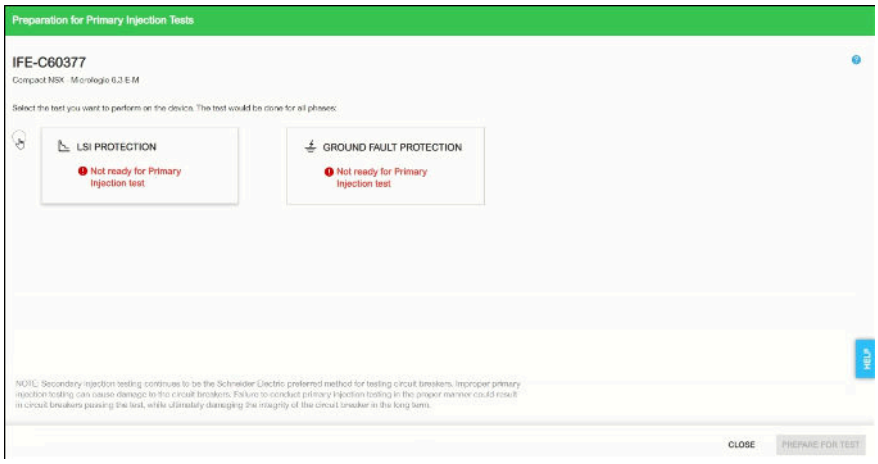
  For information on secondary injection testing, refer to Automatic Trip Curve Tests, page 66.
- The circuit breaker is automatically restored to normal mode in 75 minutes, if the test functions are not manually stopped prior to that.

Test Procedure

Perform the following steps to prepare for primary injection test:

1. Click **Prepare for Primary Injection Tests** in the Device view page.

   The **Preparation for Primary Injection Tests** screen is displayed.



2. Select the test you want to perform on the device and then click **PREPARE FOR TEST**.

   The **NOTICE** message is displayed.

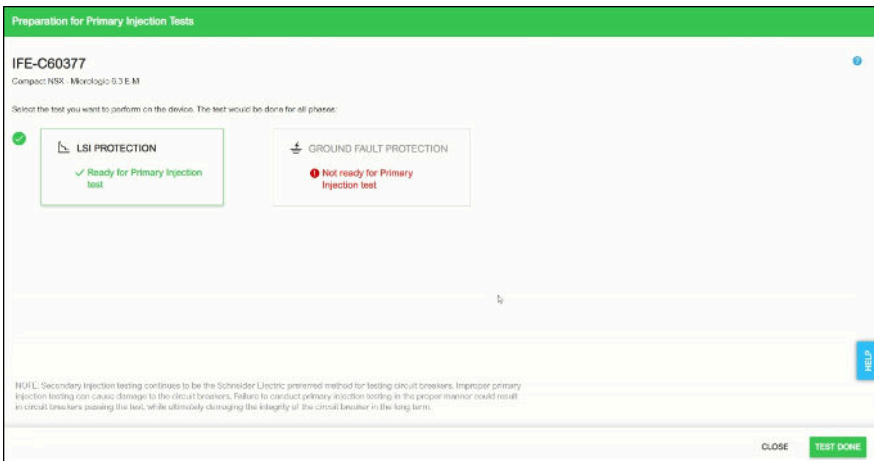
NOTICE
HAZARD OF LOSS OF POWER • During these tests, the circuit breaker will trip, resulting in loss of power to downstream devices. • It is recommended to perform these tests in conjunction with proper planning, precautions, and per the test schedules. **Failure to follow these instructions can result in disruption due to loss of power.**

3. Read the **NOTICE** message, and if understood, click **I UNDERSTAND**.

   The **Password Required** dialog box is displayed.

4. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.

   EPC software starts preparing the circuit breaker for primary injection test and when it is ready, the following screen is displayed.



   Ready for Primary Injection test: Indicates that the thermal memory and ground fault protection is inhibited for 15 minutes.

   Not ready for Primary Injection test: Indicates that the ground fault protection is not inhibited.

5. Inject the required current for test and evaluate the behavior of the circuit breaker by checking that the circuit breaker trips within its published trip time and the correct trip indicator (if available) illuminates according to the tested protection.

6. Click **TEST DONE**.

   The successful settings restoration dialog box displays and the circuit breaker is restored to normal mode, end of inhibition of ground fault or LSI protection test.

7. Click **CLOSE** to return to the Device view page.

Troubleshooting

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Troubleshooting of Primary Injection Test 76

Troubleshooting of Trip Unit Discovery

Condition	Probable causes	Solutions
The MicroLogic trip unit is not identified by the Service Interface.	Time period between the tests of two MicroLogic trip units mounted in ComPacT NSX and PowerPacT H-, J-, and L-Frame circuit breakers is less than 5 seconds.	Proceed as follows: 1. Disconnect the Service Interface from the MicroLogic trip unit. 2. Wait for 5 seconds. 3. Reconnect the trip unit again for identification.

Troubleshooting of Primary Injection Test

Condition	Probable causes	Solutions
Circuit breaker trips earlier than expected during primary injection test with either ground-fault inhibit function or thermal-imaging inhibit function enabled.	Ground-fault inhibit function or thermal-imaging inhibit function was not disabled and restarted after circuit breaker tripped during previous primary injection test.	Stop and restart either ground-fault inhibit function or thermal-imaging inhibit function after each circuit breaker tripping event.
Circuit breaker trips up to twice as long as expected when performing primary injection test.	While performing primary injection using either ground-fault or thermal-image inhibit function, interface screen displayed communication error. In response ground fault or thermal imaging was re-inhibited without stopping primary injection causing circuit breaker to trip long when long-time segment of time-current curve tested.	Terminate primary injection test completely. Start ground-fault or thermal-image inhibit function and start primary injection test.
Circuit breaker installed with MicroLogic 6.2 A/E, or 6.3 A/E trip unit does not trip when performing ground-fault test.	• Fault level injected not high enough to cause trip on ground-fault protection. • Circuit breaker connected in Modified Differential Ground-fault (MDGF) or source ground return configuration.	1. Inject higher fault current. 2. Refer to MicroLogic Trip Unit Compatibility to determine if test is applicable to trip units. 3. The ground fault protection function cannot be tested for circuit breakers configured for Modified Differential Ground Fault (MDGF) or Source Ground Return (SGR) protection. These configurations require primary injection testing.

Configuration Functions for Enerlin'X Devices

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Configuration Function 79
Connection of the Service Interface to an Enerlin'X Device 80

Enerlin'X Device Compatibility

The following table lists which functions are applicable for Enerlin'X devices with the Service Interface connected to PC with EPC software:

Device	Part number	Configuration	Firmware update
IO input/output application module for one circuit breaker	LV434063	✓	✓
FDM121 front display module for one circuit breaker	TRV00121	–	✓
	STRV00121		
IFE Ethernet interface for one circuit breaker	LV434001	–	✓
IFE switchboard server	LV434002	–	✓
IFM Modbus-SL interface for one circuit breaker with Modbus-SL RJ45 port	LV434000	✓	✓
IFM Modbus-SL interface for one circuit breaker with Modbus-SL 5-pin connector	TRV00210	–	✓
	STRV00210		
BSCM circuit breaker status control module	LV434205	–	–
	S434205		
BCM ULP circuit breaker communication module	33106	–	✓

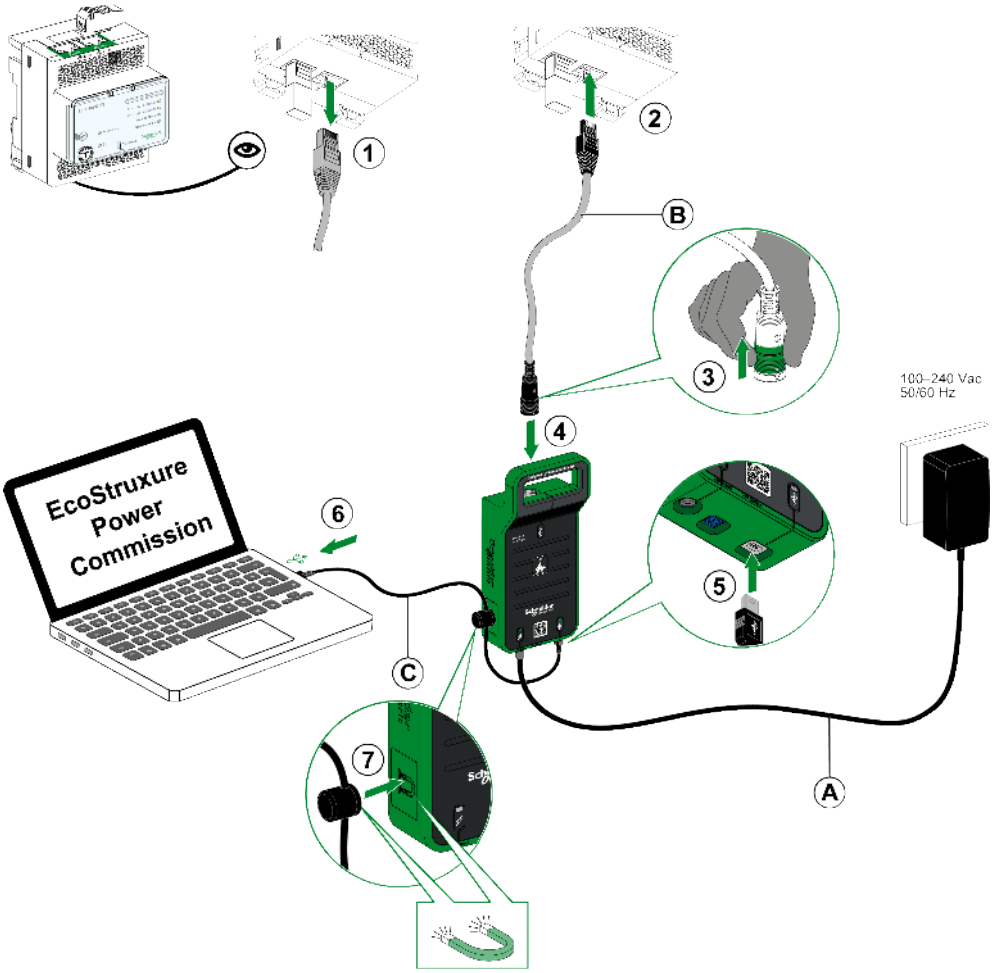
Configuration Function

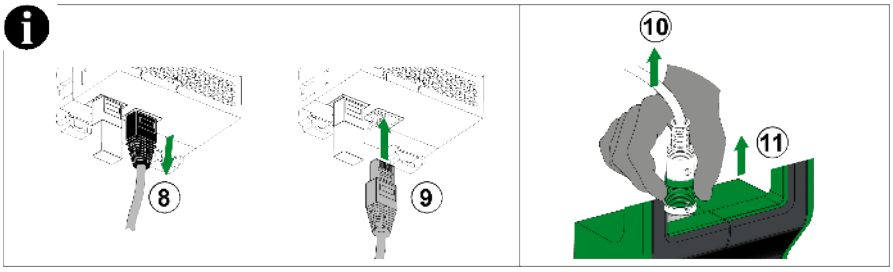
You can configure the Enerlin'X device using the Service Interface from EPC software when the Service Interface is connected to the ULP port of the Enerlin'X device.

Connection of the Service Interface to an Enerlin'X Device

Use the cable LV485514SP to connect the Service Interface to one of the RJ45 ULP ports of the following Enerlin'X devices:

- IFM interface
- IFE interface
- IFE server
- IO module
- FDM121 display





A. AC/DC power
B. ULP cable
C. USB cable with magnet

After connected, you can use EcoStruxure Power Commission software to configure and/or update the firmware of:

- The Enerlin'X device on which the Service Interface is connected.
- The other Enerlin'X devices in the IMU, including the BCM ULP.

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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