

Pact Series

Service Interface for MasterPact NT/NW, ComPact NS, and PowerPact P-, R-Frame Circuit Breakers

User Guide

Pact Series offers world-class circuit breakers and switches

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Safety Information

Important Information

NOTICE

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 manual 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 accompany this symbol to avoid possible injury or death.

⚠ DANGER
<p>DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p> <p>Failure to follow these instructions will result in death or serious injury.</p>
⚠ WARNING
<p>WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>
⚠ CAUTION
<p>CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p>
NOTICE
<p>NOTICE is used to address practices not related to physical injury.</p>

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 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 Book

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 001.000.001 or greater.

Online Information

The information contained in this document 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/en/download.

The technical characteristics of the devices described in the present document also appear online. To access the information online, go to the Schneider Electric home page at www.se.com.

Related Documents for IEC Devices

Title of Documentation	Reference Number
MasterPact NT - Circuit Breakers and Switch-Disconnectors - User Guide	51201116AA (EN)
MasterPact NW - Circuit Breakers and Switch-Disconnectors - User Guide	04443720AA (EN)
MasterPact NT/NW - Circuit Breakers and Switch-Disconnectors - Maintenance Guide	LVPED508016EN
MasterPact NT/NW - Circuit Breakers and Switch-Disconnectors - Maintenance Procedures Level II and Level III	HRB16483 (EN, FR)
ComPact NS 630b-1600 - Circuit Breakers and Switch-Disconnectors - User Guide	51201640AA (EN)

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

Related Documents for UL Devices

Title of Documentation	Reference Number
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)

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

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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 is a portable instrument designed for field testing. The Service Interface with part number LV485500 is used for testing and configuration of MicroLogic™ trip units mounted in the following low voltage circuit breakers:

- ComPact™ NS 630b-1600 circuit breakers
- ComPact™ NS 1600b-3200 circuit breakers
- PowerPact™ P- and R- frame circuit breakers
- MasterPact™ NT/NW circuit breakers

EcoStruxure™ Power Commission (EPC) is a global software with test functions features for testing the circuit breakers and communication accessories through the Service Interface.

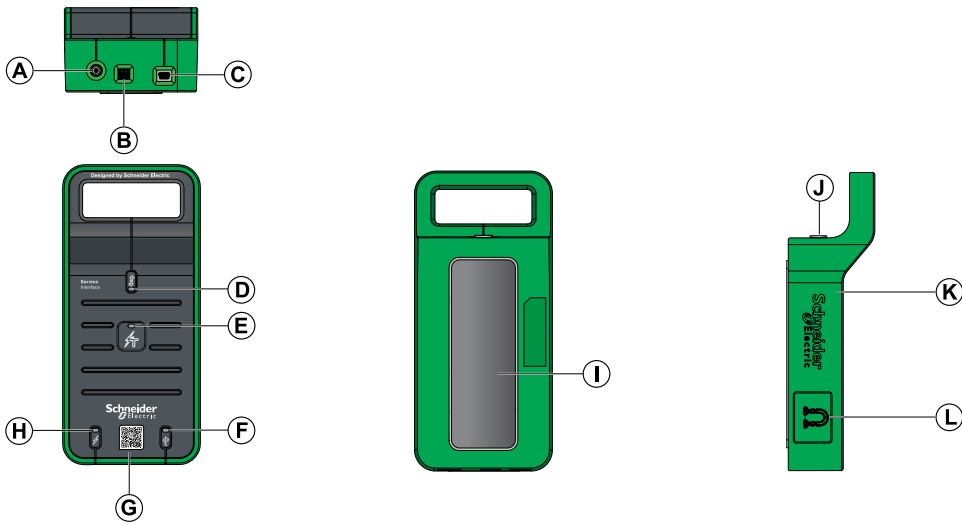
Features

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

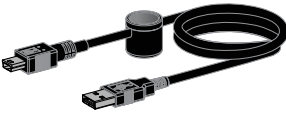



- A 24 Vdc power input
- B 24 Vdc power output
- C Mini USB port
- D Test port LED
- E Status LED
- F USB LED
- G QR code to product information
- H Power LED
- I Magnetic Service Interface holder
- J Test port
- K Rubber protective cover
- L Magnetic cable holder

Accessories Part Numbers

The Service Interface is delivered with the following accessories:

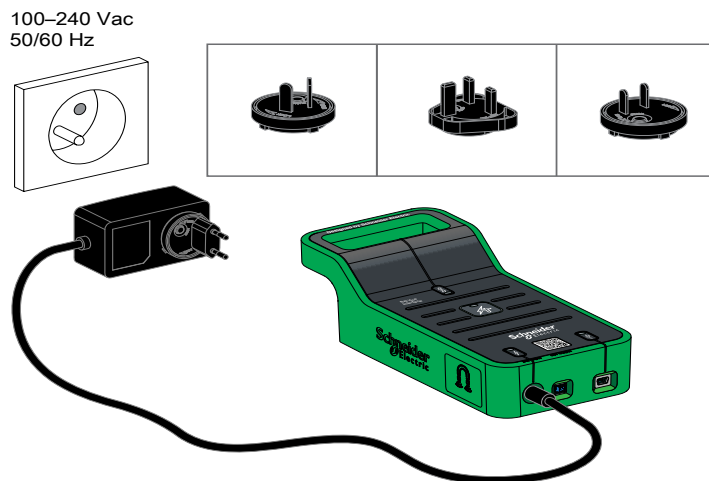
Accessories	Description	Part Number
	Service Interface kit	LV485500
	Service Interface module	LV485510SP
	AC/DC power	LV485511SP
	7-pin cable for 630–6300 A ACB MCCB trip units	LV485512SP
	7-pin cable for 100–630 A MCCB trip units	LV485513SP
	ULP cable	LV485514SP

Accessories	Description	Part Number
	USB cable with magnet	LV485517SP
	24 Vdc power output connector	Dinkle Part Number - EC350V-02P Phoenix Contact - 1840366

24 Vdc Power Supply

The Service Interface must always be 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 green test port LED indicates the status of MicroLogic trip unit connection to the Service Interface.

LED Indication	Status Description
ON	MicroLogic trip unit connected
OFF	No MicroLogic trip unit connected

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
Blinking orange (250 ms ON, 250 ms OFF)	Service Interface out of calibration
OFF	Device default condition

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*.

The EPC software is available at www.se.com.

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, ZSI, force trip, and prepare for primary injection tests
- Generate and print test reports

Technical Characteristics

Environmental Characteristics

Characteristics		Value
Conforming to standards		<ul style="list-style-type: none"> IEC 61010-1 IEC 60947-6-2 UL 61010-1
Certification		cULus, 61010-1 CE
Ambient temperature	Storage	-40...+85 °C (-40...+185 °F)
	Operation	-10...+55 °C (14...+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

Schneider Electric Green Premium™ Ecolabel

Description

Green Premium by Schneider Electric is a label that allows you to develop and promote an environmental policy while preserving your business efficiency. This ecolabel is compliant with up-to-date environmental regulations.



Accessing Green Premium

Green Premium data on labeled products can be accessed online through any of the following ways:

- By navigating to the [Green Premium](#) page on the Schneider Electric website.
- By scanning the QR code displayed in the following image:



Checking Products Through the Schneider Electric Website

To check the environmental criteria of a product using a PC or smartphone, follow these steps

Step	Action
1	From www.se.com , select Support > Green Premium .
2	Click Find Green Premium Offers to open the search tool webpage.
3	Fill in the fields: <ul style="list-style-type: none"> • Enter the commercial reference or product range of the product to search for. • Optional: Enter the manufacturing date code of the product with format YYWW. By default, this field is filled with the date of the search.
4	To search for several products simultaneously, click the Add product button, and then fill in the fields.
5	Click Check product(s) to generate a report of the environmental criteria available for the products with the entered commercial references.

Environmental Criteria

The Green Premium ecolabel provides documentation on the following criteria about the environmental impact of the products:

- RoHs: European Union Restriction of Hazardous Substances (RoHS) directive.
- REACh: European Union Registration, Evaluation, Authorization, and Restriction of Chemicals regulation.
- PEP: Product Environmental Profile.
- EoLI: End of Life Instructions.

RoHs

Schneider Electric products are subject to RoHS requirements at a worldwide level, even for the many products that are not required to comply with the terms of the regulation. Compliance certificates are available for products that fulfill the criteria of this European initiative, which aims to eliminate hazardous substances.

REACH

Schneider Electric applies the strict REACH regulation on its products at a worldwide level, and discloses extensive information concerning the presence of SVHC (Substances of Very High Concern) in all of these products.

PEP

Schneider Electric publishes complete set of environmental data, including carbon footprint and energy consumption data for each of the life cycle phases on all of its products, in compliance with the ISO 14025 PEP ecopassport program. PEP is especially useful for monitoring, controlling, saving energy, and/or reducing carbon emissions.

EoLI

These instructions provide:

- Recyclability rates for Schneider Electric products.
- Guidance to mitigate personnel hazards during the dismantling of products and before recycling operations.
- Part identification for recycling or for selective treatment, to mitigate environmental hazards/incompatibility with standard recycling processes.

Test Functions for MasterPact NT/NW, ComPact NS and PowerPact P- and R-Frame

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MicroLogic Trip Unit Compatibility

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

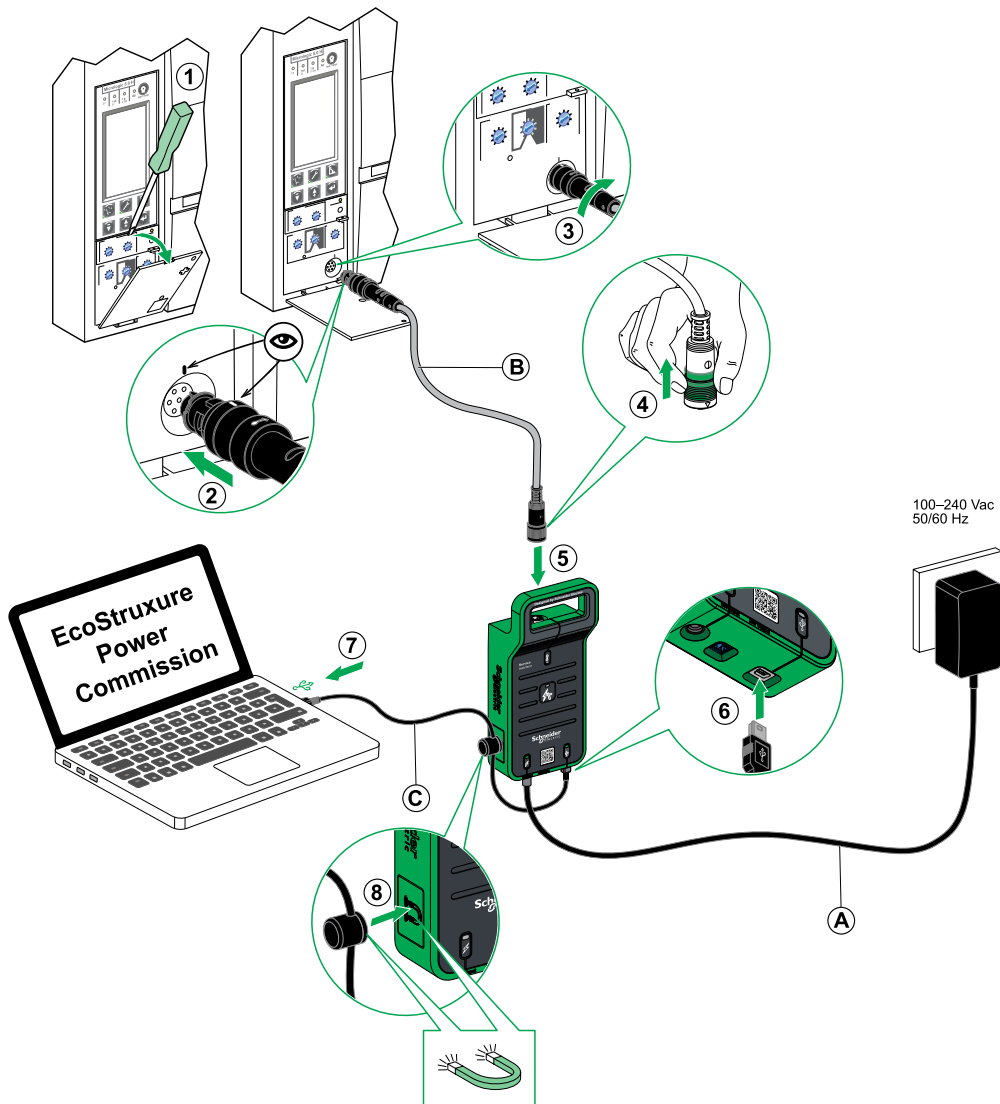
MicroLogic Trip Unit		Test Functions				
Family	Type	Automatic Trip Curve	Force Trip	Zone-Selective Interlocking (ZSI)	Preparation for Primary Injection	
					Inhibit Thermal Memory	Inhibit Ground Fault
Non-communicating trip units	MicroLogic 2.0, 3.0, 5.0	✓	✓	—	—	—
Communicating trip units	MicroLogic 2.0A, 3.0A, 5.0A, 7.0A	✓	✓	✓	✓	—
	MicroLogic 2.0E, 5.0E	✓	✓	✓	✓	—
	MicroLogic 5.0P, 7.0P	✓	✓	✓	✓	—
	MicroLogic 5.0H, 7.0H	✓	✓	✓	✓	—
	MicroLogic 6.0A, 6.0E, 6.0P, 6.0H	✓	✓	✓	✓	✓

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

- ComPact NS 630b-1600 circuit breakers
- ComPact NS 1600b-3200 circuit breakers
- PowerPact P- and R- frame circuit breakers
- MasterPact NT/NW circuit breakers

Connection of the Service Interface to a MicroLogic Trip Unit

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



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

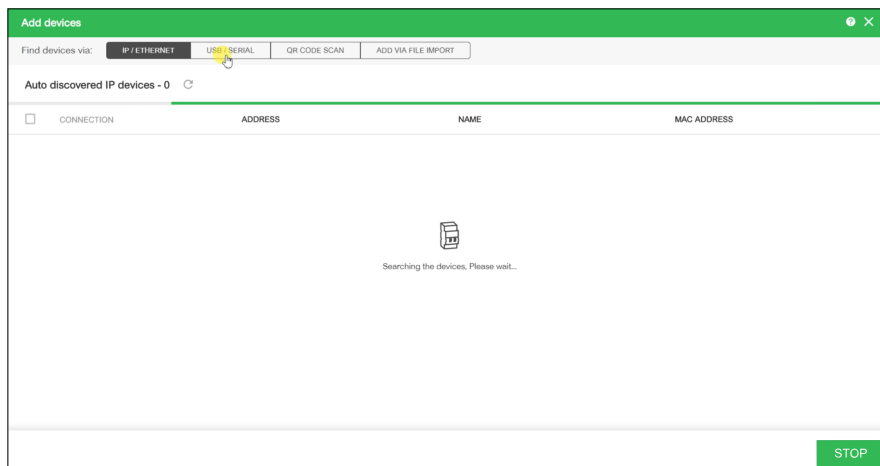
Discovering Communicating MicroLogic Trip Units

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

Follow the below steps to discover the devices:

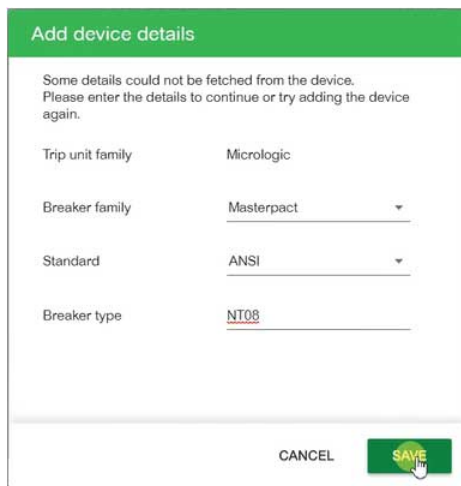
1. Click **Launch Device Discovery** in the EPC welcome screen.

Result: Add devices window is displayed.



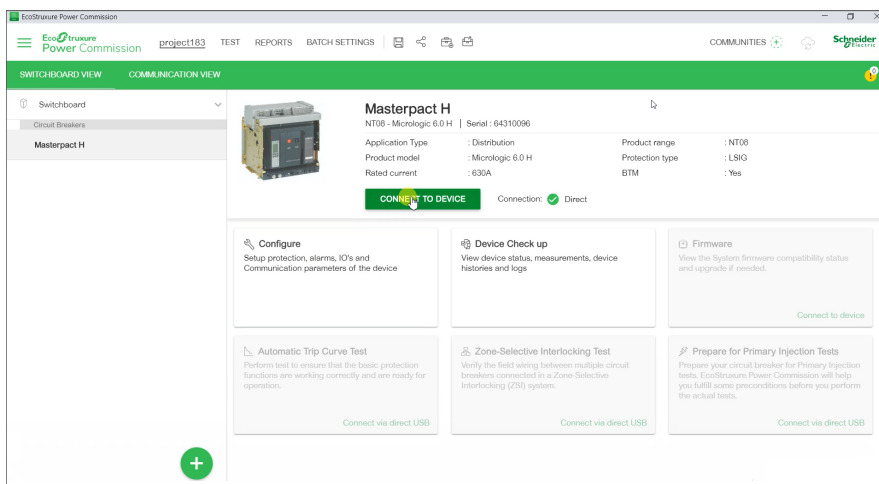
2. Click **USB/SERIAL** from **Find devices via** option button.
3. Select the device to test or click **FIND DEVICES**.
4. Select the device to test from the Device List and click **ADD DEVICES**.

Result: Add device details dialog box is displayed.



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

Result: Device view page is displayed.



7. Click **CONNECT TO DEVICE**.

Result: 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*.

Testing Communicating MicroLogic Trip Units

Overview

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

1. Automatic trip curve tests
2. Device check up (Force trip test)
3. Zone-selective interlocking test (ZSI)
4. Preparation for primary injection tests

Automatic Trip Curve Tests

Description

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 variant 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.

Test Points

To perform the automatic trip curve test, you can choose either preconfigured test point or custom test point:

- **Preconfigured test point:** Displays the section(s) of the time-current curve that can be selected for test. The testable sections of the time current curve are based on the model type of the MicroLogic trip unit. By default, all the available tests are selected.

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

- **Custom test point:** Defines the secondary injected test current and time.

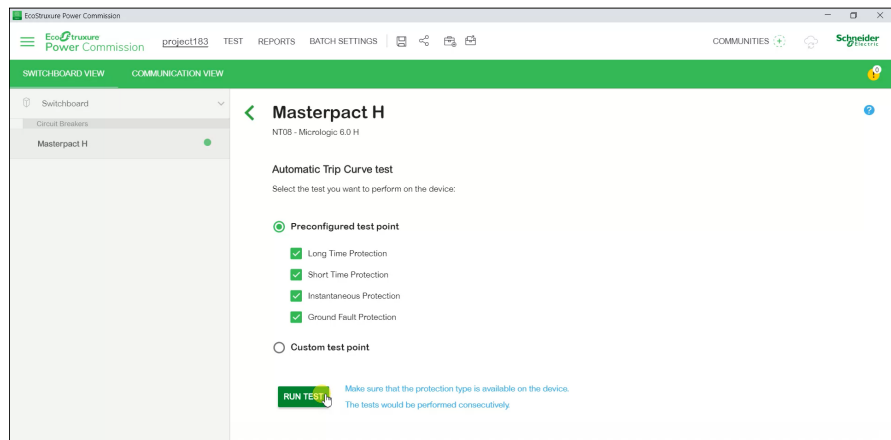
NOTE: In cases where the user enters the injection current higher or lower than the allowable limit, the test results may seem incorrect. It is recommended that you follow the guidelines while defining the custom test points:

- Values less than or equal to zero are considered as invalid inputs
- Decimal values are considered as invalid inputs
- The selected protection trip type matches 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 short-time protection trip type and enter the injection current value in short-time current range, then the MicroLogic trip unit shall trip in short-time segment. This will indicate a **Passed** test status.
 - If the protection trip type selection segment and trip injection current value do not match, then the MicroLogic trip unit may trip too fast or too slow. This will indicate a **Failed** test status.
 - If you want to test ground fault but select any protection type that inhibits ground fault, then the test results will be incorrect.

Test Procedure

Follow the below steps to perform the automatic trip curve test:

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



2. Select **Preconfigured test point** or **Custom test point** and click **RUN TEST**.
Result: The **NOTICE** message is displayed.

<h1>NOTICE</h1>
<p>HAZARD OF LOSS OF POWER</p> <ul style="list-style-type: none"> 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. <p>Failure to follow these instructions can result in disruption due to loss of power.</p>

3. Read the **NOTICE** message, and if understood, click **I UNDERSTAND**.
Result: The **Password Required** dialog box is displayed.
4. Enter the MicroLogic Administrator password in the dialog box and click **CONTINUE**.
5. Reset and close the circuit breaker. Click **OK**.

Result: 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 $I_r \times I_{sd} > I_i$.

6. Repeat step 5 for the next test.

Result: 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

Automatic Trip Curve test
Select the test you want to perform on the device:

- Long Time Protection
- Short Time Protection
- Instantaneous Protection
- Earth Leakage Protection

RUN TEST The tests would be performed consecutively.

Conducted on 9/14/2017 at 4:53:05 PM hours

	TEST CONDITIONS	PROTECTION SETTINGS		TRIP RESULTS	
	Injected current	Pick-up	Time setting	Trip time	Result
Long Time Protection	5333.333 A	4000 A	2 s	62.029 s	PASS
Short Time Protection	7800 A	6000 A	0.4 s	0.43 s	PASS
Instantaneous Protection	12000 A	9600 A	-	0.037 s	PASS
Earth Leakage Protection	1 A	0.5 A	0.06 s	0.066 s	PASS

Test Report

Follow the below steps to generate automatic trip test report:

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

Result: The generated project report is displayed in a new tab.

2. Save or print the project report as required.

These reports will be a confirmation of accurate protection settings of the circuit breaker.

Zone-Selective Interlocking Test

Description

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 (Commutating MicroLogic trip units, Restraint Interface Module (RIM) module, ZSI interface module).

NOTE:

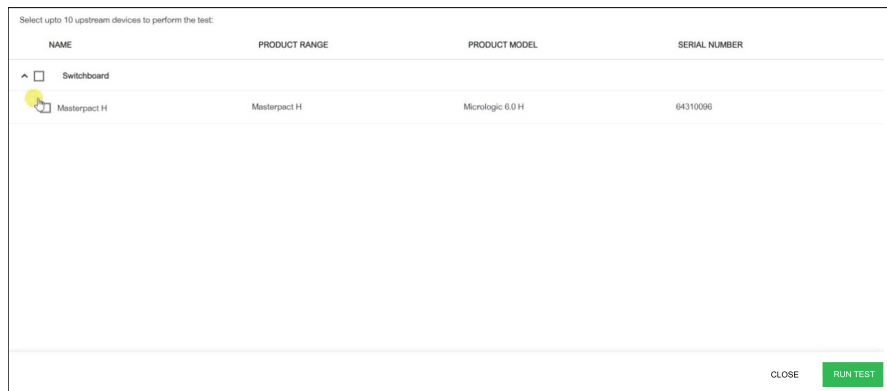
- To perform the ZSI test and to generate the project report with the test details, you must have downstream and upstream circuit breakers in the same EPC project.
- The ZSI test can be performed for maximum of 15 minutes before automatically shutting down.

Test Procedure

Follow the below steps to perform the ZSI test:

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

Result: The Zone-selective interlocking test screen is displayed.



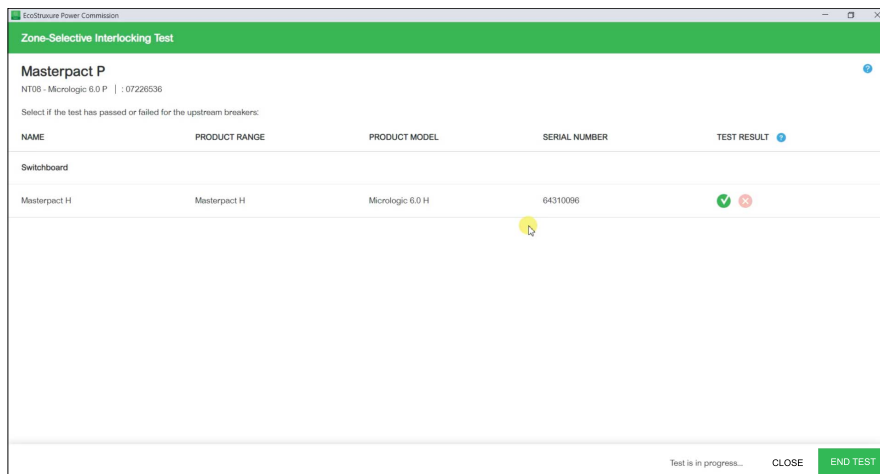
2. Select the upstream devices from the list by selecting the check box against **Name, Switchboard**, or by selecting each individual device and then click **RUN TEST**.



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

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

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

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



4. Click the check mark  icon in the **TEST RESULT** column if the **I_{sd}/I_i**, and/or **I_g** LEDs on the upstream MicroLogic trip unit are blinking to indicate test is passed or click the cross  icon if the LEDs are not blinking to indicate test is not passed.

Result: Icon selected in the **TEST RESULT** column gets highlighted.

5. Click **END TEST**.

Result: 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**.

Result: The generated project report is displayed in a new tab.

2. Save or print the project report as required.

These reports will be a confirmation that ZSI test verifies field wiring between multiple circuit breakers connected in a ZSI system.

Device Check up (Force Trip Test)

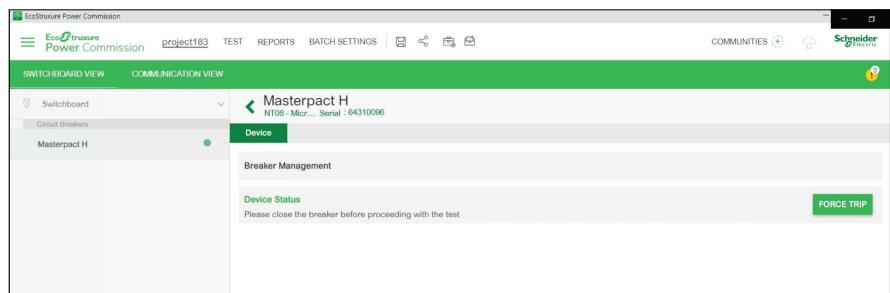
Description

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

Test Procedure

Follow the below steps to perform 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**.



Result: 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 tripped.

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

Date/Time	Status	Type of test(Trip)
04/03/2020 11:46:45	Test Success	Trip

CANCEL REPEAT

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

Result: 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**.

Result: The generated project report is displayed in a new tab.

2. Save or print the project report as required.

These reports will be a confirmation of correct mechanical operation trip of the circuit breaker.

Preparation for Primary Injection Tests

Description

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.

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

NOTE:

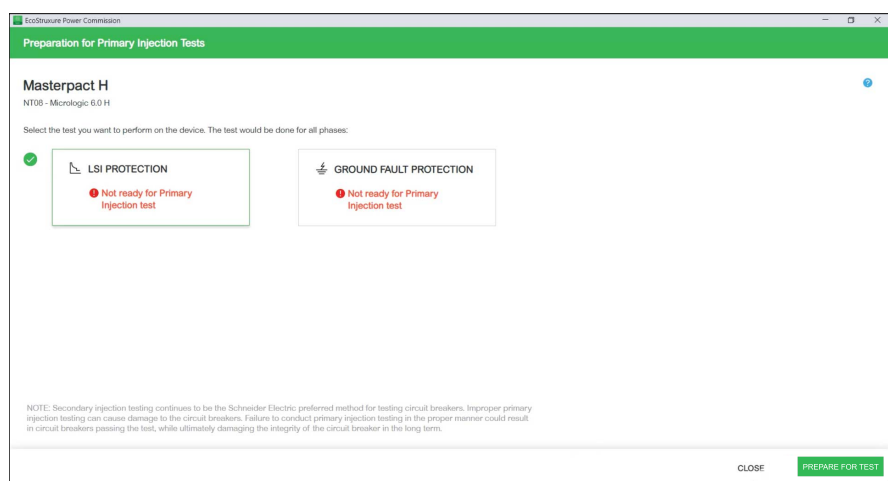
- The secondary injection testing is the Schneider Electric preferred method for testing circuit breakers. Inappropriate primary injection testing can cause damage to the circuit breakers. Inability to conduct primary injection testing in the proper manner could result in inappropriate test results,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

Follow the below steps to prepare for primary injection test:

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

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



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.

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

Result: 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.

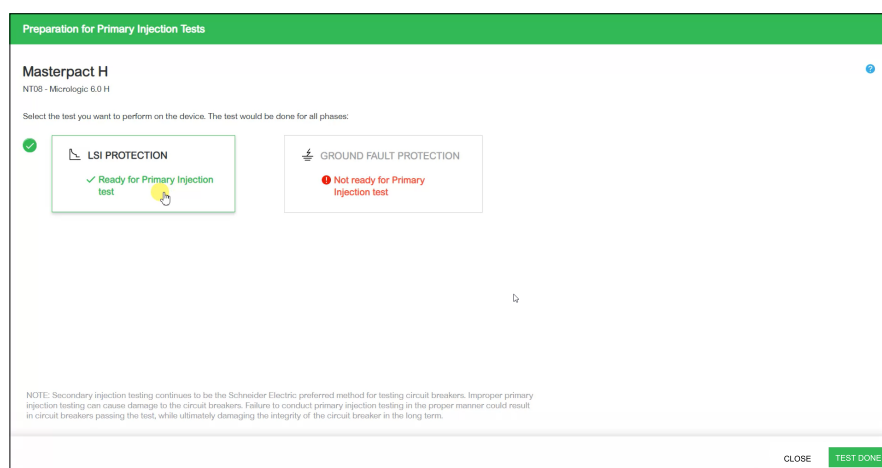
Failure to follow these instructions can result in disruption due to loss of power.

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

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

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

Result: 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**.

Result: 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.

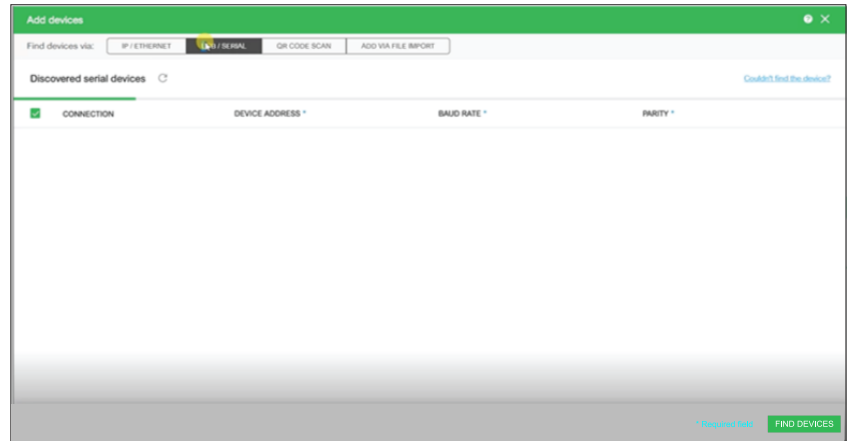
Discovering Non-Communicating MicroLogic Trip Units

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

Follow the below steps to discover the devices:

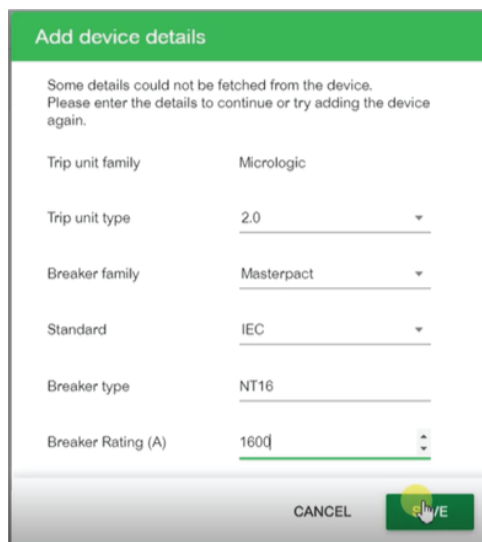
1. Click **Launch Device Discovery** in the EPC welcome screen.

Result: 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 device to test from the Device List and click **ADD DEVICES**.

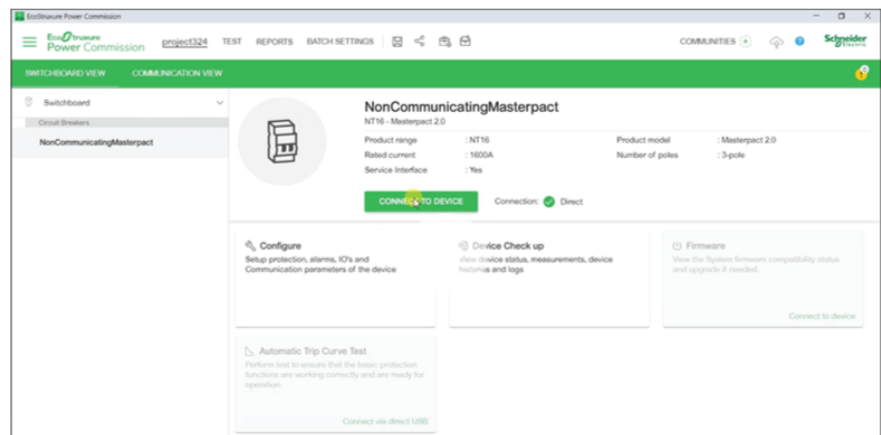
Result: Add device details dialog box is displayed.



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

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

Result: Device view page is displayed.



7. Click **CONNECT TO DEVICE**.

Result: The following buttons for the selected device are displayed:

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

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

Testing Non-Communicating MicroLogic Trip Units

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

1. Automatic trip curve tests
2. Device check up (Forced trip test)

Automatic Trip Curve Test

Description

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 variant 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.

Test Points

To perform the automatic trip curve test, you can choose either preconfigured test point or custom test point:

- **Preconfigured test point:** Displays the section(s) of the time-current curve that can be selected for test. The testable sections of the time current curve are based on the model type of the MicroLogic trip unit.
 - NOTE:** Test points are chosen to minimize test time required to adequately test each trip curve segment.
- **Custom test point:** Defines the secondary injected test current and time.
 - NOTE:** In cases where the user enters the injection current higher or lower than the allowable limit, the test results may seem incorrect. It is recommended that you follow the guidelines while defining the custom test points:
 - Values less than or equal to Zero are considered as invalid inputs
 - Decimal values are considered as invalid inputs
 - The selected protection trip type matches 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 short-time protection trip type and enters the injection current value in short-time current range, then the MicroLogic trip unit shall trip in short-time segment. This will indicate a **Passed** test status.
 - If the protection trip type selection segment and trip injection current value do not match, then the MicroLogic trip unit may trip too fast or too slow. This will indicate a **Failed** test status.
 - If you want to test ground fault but select any protection type that inhibits ground fault, then the test results will be incorrect.

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

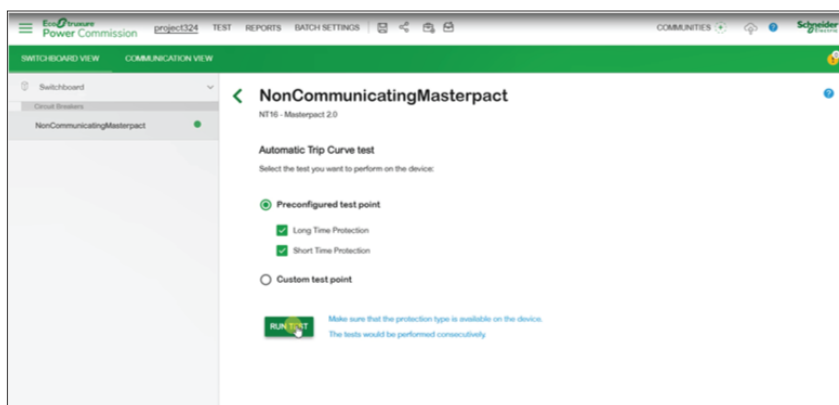
Non-communicating MicroLogic Trip Unit	Protection Type
MicroLogic 2.0	<ul style="list-style-type: none"> • Long-time protection • Short-time protection
MicroLogic 3.0	<ul style="list-style-type: none"> • Long-time protection • Instantaneous protection
MicroLogic 5.0	<ul style="list-style-type: none"> • Long-time protection • Short-time protection • Instantaneous protection

Test Procedure

Follow the below steps to perform the automatic trip curve test:

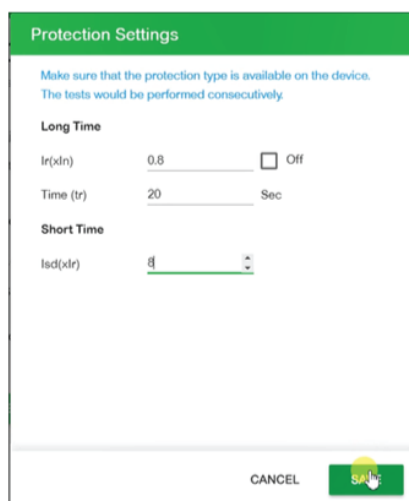
1. Click **Automatic Trip Curve Test** in the Device view page.

Result: The Automatic trip curve test screen is displayed.



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

Result: **Protection Settings** dialog box is displayed.



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

Result: 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**.

Result: 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. Click **OK**.

Result: 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 $I_r \times I_{sd} > I_i$.

7. Repeat step 6 for the next test.

Result: 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 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

Follow the below steps to generate automatic trip test report:

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

Result: The generated project report is displayed in a new tab.

2. Save or print the project report as required.

These reports will be a confirmation of accurate protection settings of the circuit breaker.

Device Check up (Force Trip Test)

Description

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

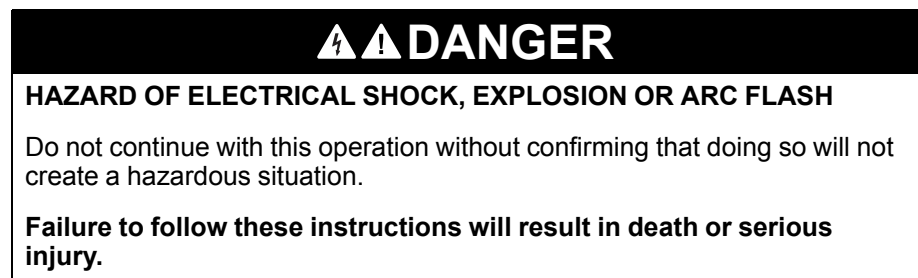
Test Procedure

Follow the below steps to perform 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**.



Result: The **DANGER** safety message is displayed.



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.

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

Date/Time	Status	Type of test(Trip)
12/03/2020 09:31:50	Test Success	Trip

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

Result: 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**.

Result: The generated project report is displayed in a new tab.

2. Save or print the project report as required.

These reports will be a confirmation of correct mechanical operation trip of the circuit breaker.

Troubleshooting

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Common Problems

Troubleshooting of Automatic Trip Curve Test

Condition	Probable Causes	Solutions
<p>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.</p>	<p>Secondary injected fault into trip unit has exceeded one or more of the following circuit breaker protection levels:</p> <ul style="list-style-type: none"> • Instantaneous override • Close and latch • Selectivity 	<p>Make sure circuit breaker is always in closed position before beginning secondary injection of each fault. This will eliminate tripping due to close and latch protection.</p> <p>Does long-time segment of time-current curve pass when performing automatic trip curve test?</p> <p>A. YES</p> <p>For communicating MicroLogic trip units, if AP trip indicator LED on trip unit comes 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.</p> <p>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.</p> <p>B. NO</p> <p>Contact your field service representative.</p>
<p>Circuit breaker is not receiving ZSI restraint during secondary injection testing, but trips as though it is receiving a restraint signal (i.e. circuit breaker trips according to time delay setting for short time (tsd) or ground fault (tg) instead of tripping with no intentional delay)</p>	<p>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.</p>	<p>None - Normal operation</p>

Troubleshooting of Zone-Selective Interlocking Test

Condition	Probable Causes	Solutions
<p>Isd/Ii and/or Ig LED not flashing on upstream circuit breaker when performing ZSI test.</p>	<ol style="list-style-type: none"> 1. Upstream circuit breaker not wired for ZSI configuration. 2. Trip unit on upstream circuit breaker does not have power applied to it. 3. Interface screen displayed communications error. 4. Upstream circuit breaker not wired for short time ZSI restraint. 5. Upstream circuit breaker not wired for ground-fault ZSI restraint. 6. MicroLogic 3.0 trip unit connected to the Service Interface. (MicroLogic 3.0 trip unit does not provide short-time or ground-fault protection.) 	<ol style="list-style-type: none"> 1. ZSI test cannot be performed. 2. Connect and turn on auxiliary 24 V power source to upstream circuit breaker. Replace with new Service Interface for this purpose. 3. Check that pins of seven-pin test cable have not been bent, pushed in, pulled out or otherwise damaged, thereby compromising connection between Service Interface and trip unit. 4. Refer to <i>MicroLogic Trip Unit Compatibility</i>, page 21 to determine if test is applicable to trip units. <p>If both upstream and downstream trip units are powered and trip indicator LEDs are not flashing, verify wiring between devices.</p> <ol style="list-style-type: none"> 1. Terminal Z1 from downstream trip unit must be connected to terminal Z3 of upstream trip unit. 2. Terminal Z2 of downstream trip unit must be connected to terminals Z4 (for short time) and Z5 (for ground fault) of upstream trip unit. <p>If wiring is correct and trip indicators still 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.</p> <p>If system includes RIM module, push-to-test button will also send a ZSI test signal to upstream device(s). For correct wiring and operation instructions, refer to the <i>RIM Instruction Bulletin</i>.</p>

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 then restarted after circuit breaker tripped during previous primary injection test.	Stop and then 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 Communications 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 then 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.	<ol style="list-style-type: none"> 1. Fault level injected not high enough to cause trip on ground-fault protection. 2. Circuit breaker connected in Modified Differential Ground-fault (MDGF) or sourceground return configuration. 	<ol style="list-style-type: none"> 1. Inject higher fault current. 2. Refer to MicroLogic Trip Unit Compatibility, page 21 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.

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