



# Legal Information

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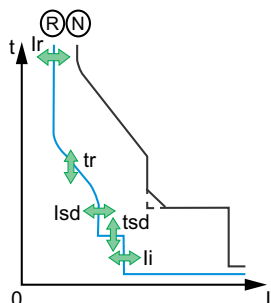
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# Introduction to Energy Reduction Maintenance Settings (ERMS)

## Arc Energy Reduction with MTZ Energy Reduction Maintenance Settings (ERMS)



N = Normal: Tripping curve for standard protection functions with ERMS disengaged.

R = Reduced: Tripping curve for standard protection functions with ERMS engaged.

MasterPact™ MTZ circuit breakers provide an Energy Reduction Maintenance Settings (ERMS) function to reduce the arc flash incident energy and meet 240.87 2017 NEC requirements. The ERMS allows the user to set the MTZ circuit breaker control unit to "no intentional delay" to reduce the clearing time while work is done within an arc flash boundary as defined in the NFPA 70E-2015, Standard for Electrical Safety in the Workplace, and then set the control unit back to a normal setting after the potentially hazardous intervention is completed.

MasterPact MTZ circuit breakers provide two means of engaging the ERMS function when used with the purchased ERMS digital module (LV850009)

- Use of a physical switch
- Use of the EcoStruxure Power Device App for Android and iOS devices

The physical switch option allows the user to remotely engage/disengage the circuit breaker's ERMS function.

The EcoStruxure Power Device App allows a user to engage and disengage the ERMS function via Bluetooth wireless communications using an Android or iOS compatible device.

For Android devices, the ERMS can also be engaged/disengaged using the Micrologic X control unit's USB On The GO (OTG) link.

When engaged through the EcoStruxure Power Device App, a digital lock is created between the EcoStruxure Power Device App and the Micrologic X control unit.

- The "digital lock" sends a unique and randomly generated key from the control unit to the smart device being used to engage the ERMS function. This key prevents another user from disengaging the ERMS from a different smart device.  
**NOTE:** For Micrologic X control units with firmware versions < 3.0 and EcoStruxure Power Device App versions (Android > 3.0, iOS > 3.0), the Micrologic X firmware must be upgraded to version 3.0 or higher to be able to use the ERMS function.
- The smart device that engages the ERMS function must be the same device that disengages the ERMS function.  
If the smart device breaks, is lost, or is no longer present, the ERMS function can be forced to disengaged. (Contact Schneider field services for more information on Micrologic X control units with firmware versions less than 3.0.)
- The EcoStruxure Power Device App can also add a digital lock to systems that use the physical switch. In these systems, both the ERMS physical switch and the EcoStruxure Power Device App must be set to disengaged before the control will become disengaged (see ERMS Operation table below).

### ERMS Operation

ERMS Switch	EcoStruxure Power Device App	Control Unit ERMS State	Indicator Lamp in ERMS Switch and/or Remote Indicator	Control Unit HMI Backlight	ERMS LED on Control Unit's HMI
Disengaged (Switch Closed)	Disengaged	Disengaged	OFF	NORMAL	OFF
Engaged (Switch Open)	Disengaged	Engaged	ON	ON—Blue	ON—Blue
Disengaged (Switch Closed)	Engaged	Engaged	ON	ON—Blue	ON—Blue
Engaged (Switch Open)	Engaged	Engaged	ON	ON—Blue	ON—Blue

## ERMS Minimum System Requirements

### Minimum System Requirements

Device	Software/Firmware Revision
Micrologic X control unit Firmware	2.000.003
EcoStruxure Power Commission PC app	2.12

## ERMS Passwords

Default passwords for the ERMS functions using EcoStruxure Power Commission tool or EcoStruxure Power Device app:

- Level 4 password: 0000
- Level 3 password: 3333

**NOTE:** Passwords may have been changed at end user site. For information on password management, see document DOCA01102EN (<https://www.schneider-electric.us/en/download/document/DOCA01102EN/>).

## ERMS Reference Documents

For additional information, see:

- MRF75427: Wiring Instructions for LV851101SP ERMS Switch and LV851202SP ERMS Remote Indicator

# Configure ERMS System

The ERMS protection settings can be configured through the MTZ smart device app or through EcoStruxure Power Commission software.

**NOTE:** A system administrator password is required to be able to make changes to ERMS settings

## Factory Default Settings for ERMS Protections Settings

Micrologic X Type	Description	Setting	Unit	Setting Range	Factory Setting
Micrologic 2.0 X, 3.0X, 5.0 X, 6.0 X, 7.0 X	Long Time Pickup	I <sub>r</sub>	A	0.4–1 x I <sub>n</sub>	1 x I <sub>n</sub>
	Long Time Delay	t <sub>r</sub>	s	0.5–24	0.5
Micrologic 5.0 X, 6.0 X, 7.0 X	Short Time Pickup	I <sub>sd</sub>	A	1.5–10 x I <sub>r</sub>	1.5 x I <sub>r</sub>
	Short Time Delay	t <sub>sd</sub>	s	0–0.4	0
Micrologic 2.0 X	Short Time Pickup	I <sub>sd</sub>	A	1.5–10 x I <sub>r</sub>	1.5 x I <sub>r</sub>
Micrologic 3.0X	Instantaneous Pickup	I <sub>i</sub>	A	1.5–12 x I <sub>n</sub>	1.5 x I <sub>n</sub>
		I <sub>i</sub> tripping mode	—	Standard/Fast	Fast
Micrologic 5.0 X, 6.0 X, 7.0 X	Instantaneous Pickup	I <sub>i</sub> mode	—	ON/OFF	ON
		I <sub>i</sub> tripping mode	—	Standard/Fast	Fast
		I <sub>i</sub>	A	2.0–15 x I <sub>n</sub>	2.0 x I <sub>n</sub>
Micrologic 6.0 X IEC Standard	I <sub>g</sub> Mode	—	—	ON/OFF	ON
	Ground Fault Pickup	I <sub>g</sub> <sup>1</sup>	A	0.2–1 x I <sub>n</sub>	0.2 x I <sub>n</sub>
	Ground Fault Delay	t <sub>g</sub>	s	0–0.4	0
Micrologic 6.0 X UL Standard	Ground Fault Pickup	I <sub>g</sub> for I <sub>n</sub> ≤ 1200 A <sup>1</sup>	A	0.2–1 x I <sub>n</sub>	0.2 x I <sub>n</sub>
		I <sub>g</sub> for I <sub>n</sub> > 1200 A	A	500–1200	500
	Ground Fault Delay	t <sub>g</sub>	s	0–0.4	0

1. For I<sub>n</sub> ≤ 400 A, the I<sub>g</sub> setting range is 0.3–1 x I<sub>n</sub> (factory setting: 0.3 x I<sub>n</sub>)

## Configure Using EcoStruxure Power Device App

The ERMS protection settings can be configured through the control unit's Bluetooth link for both Android and iOS operating systems. In addition, the settings can be changed using a direct USB On The Go (OTG) link between an Android device and the control unit.

**NOTE:** ERMS settings cannot be changed when ERMS is engaged.

### Android—Configure ERMS Protection Settings

Example: Configure the ERMS protection settings using the EcoStruxure Power Device App (Android).

1. Press trip curve icon button.

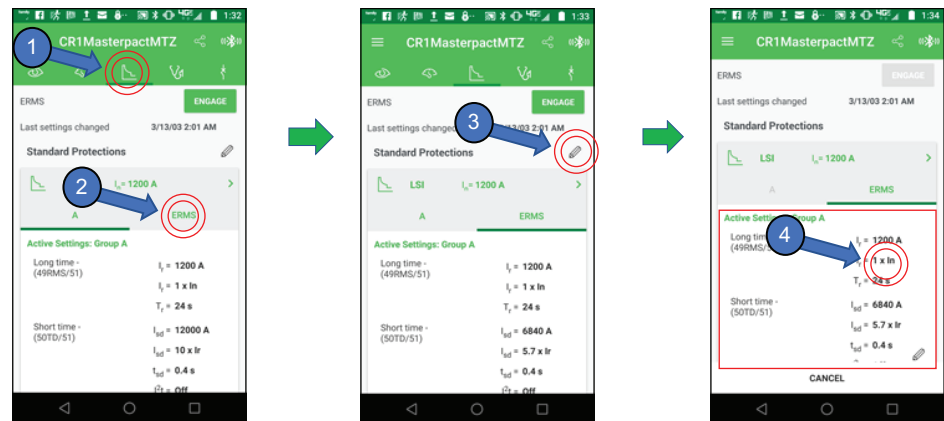
2. Press “ERMS” button.

3. Press edit pencil.

4. Press anywhere on the protection settings.

5. Set protection settings to desired values.

6. Apply settings.





## Configure Using iOS Device

Example: Configure the ERMS protections settings using the EcoStruxure Power Device App (iOS).

1. Press trip curve icon button.

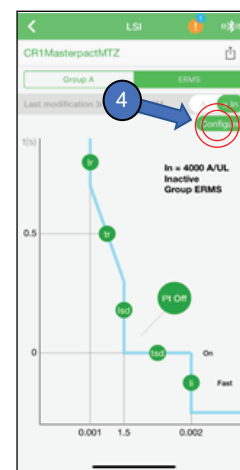
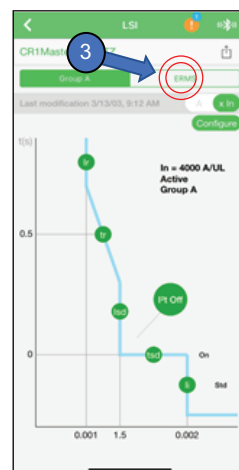
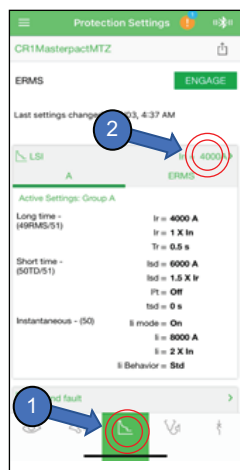
2. Press the "In = ..." arrow.

3. Press ERMS button.

4. Select "Configure".

5. Set protection settings to desired values.

6. Apply settings.

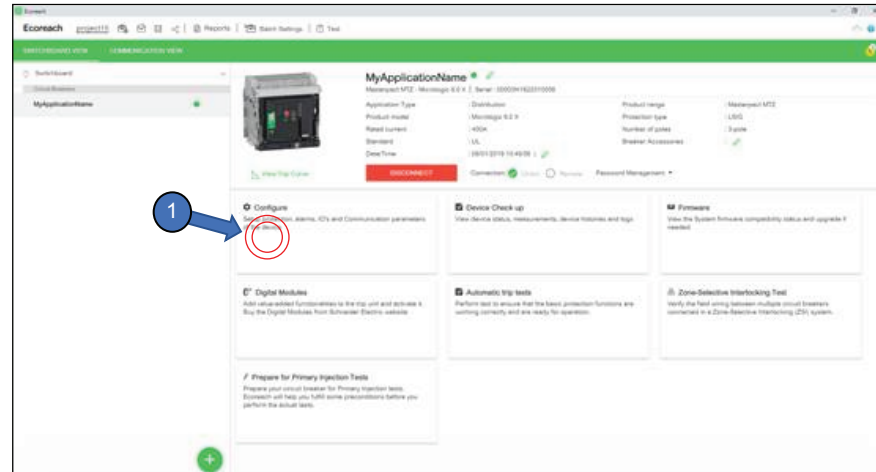


# Configure Using EcoStruxure Power Commission Software

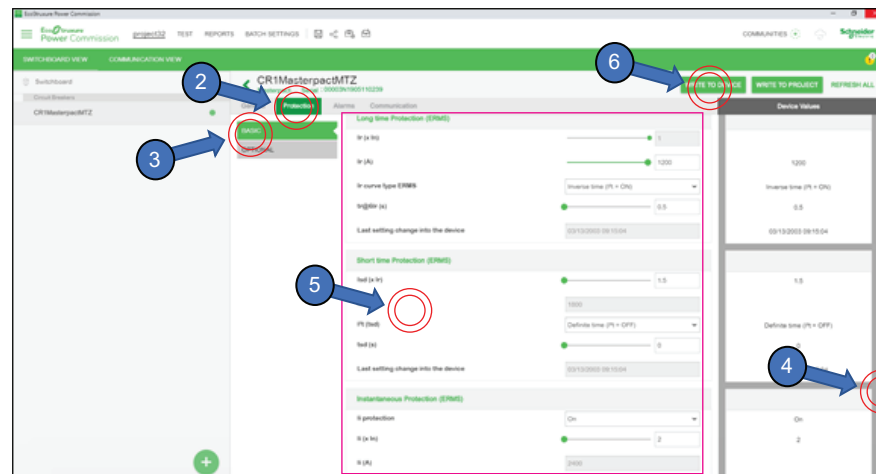
## Configure ERMS Protection Settings

**NOTE:** ERMS settings cannot be changed when ERMS is engaged.

1. Press "Configure" button.



2. Press "Protection" tab.
3. Press "BASIC" tab.
4. Scroll down to ERMS settings.
5. Make changes to protection settings.
6. Press "WRITE TO DEVICE".



# Energy Reduction Maintenance Settings (ERMS) Engagement/Disengagement Using EcoStruxure Power Device App

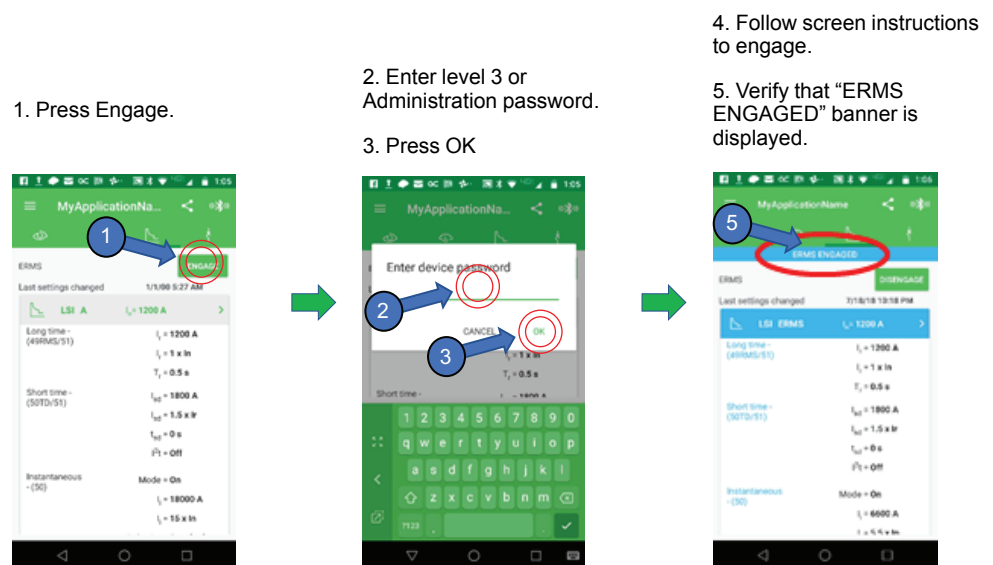
The Energy Reduction Maintenance Settings (ERMS) function can be engaged/disengaged using the control unit's Bluetooth link for both Android and iOS operating systems. In addition, ERMS can be engaged/disengaged via a direct USB OTG link between an Android device and the control unit.

**NOTE:** ERMS can be engaged/disengaged by only one smart device at a time.

**NOTE:** For Micrologic X control units with firmware versions < 3.0 and EcoStruxure Power Device App versions (Android > 3.0, iOS > 3.0), the Micrologic X firmware must be upgraded to version 3.0 or higher to be able to use the ERMS function.

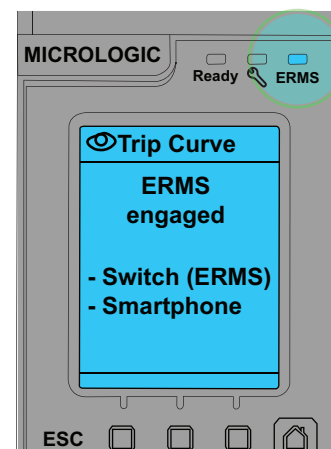
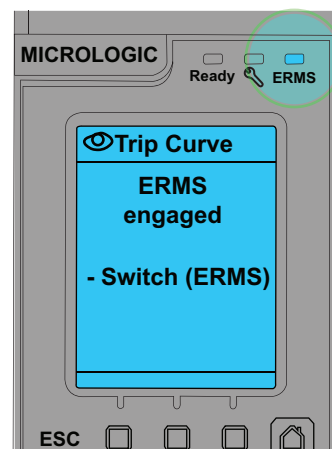
## Engagement/Disengagement using Android Device

### Engagement Using an Android Device



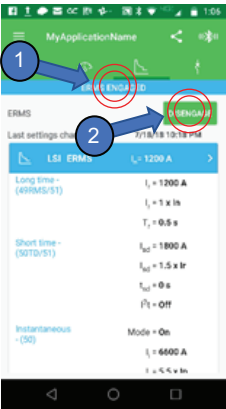
ERMS Function Engaged by EcoStruxure Power Device App

ERMS Function Engaged by External ERMS Switch and by EcoStruxure Power Device App



Disengagement Using Android Device

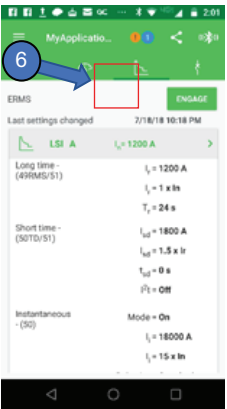
- 1. Confirm “ERMS ENGAGED” banner is displayed.
- 2. Press Disengage.



- 3. Enter level 3 or Administration password.
- 4. Press OK.



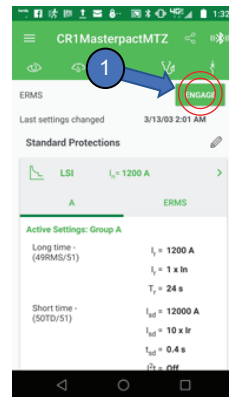
- 5. Follow screen instructions to disengage.
- 6. Verify that “ERMS ENGAGED” banner is no longer displayed.



# Engagement/Disengagement Using iOS Device

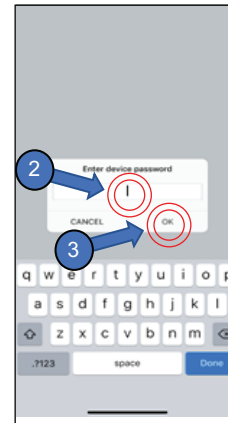
## Engagement Using iOS Device

1. Press Engage.



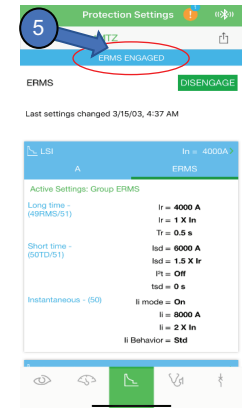
2. Enter level 3 or Administration password.

3. Enter OK.



4. Follow screen instructions to engage.

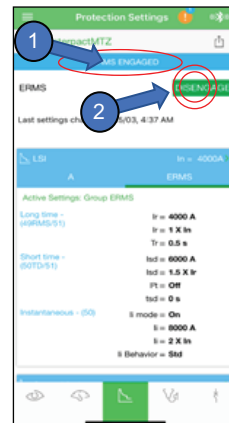
5. Verify that "ERMS ENGAGED" banner is displayed.



## Disengagement Using iOS Device

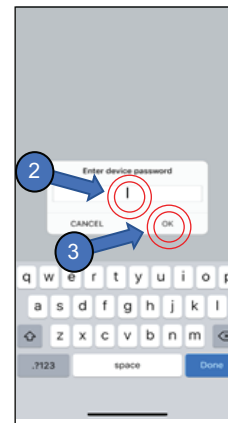
1. Confirm "ERMS ENGAGED" banner is displayed.

2. Press Disengage.



3. Enter level 3 or Administration password.

4. Press OK.



5. Follow screen instructions to disengage.

6. Verify that "ERMS ENGAGED" banner is no longer displayed.



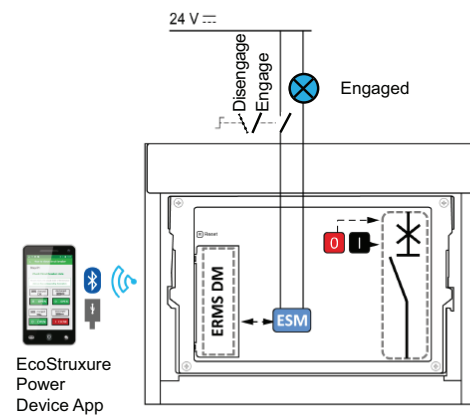
# ERMS Engagement/Disengagement Using an ERMS Switch

## ⚠ DANGER

### HAZARD OF ARC FLASH

Do not use the ERMS switch as a method to reduce the arc flash incident energy during the closing of the circuit breaker where control unit's 24 Vdc power is applied after the circuit breaker is closed.

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



The optional ERMS switch module (ESM) is used with an external lockable selector switch (supplied as part of kit LV851101SP) to engage or disengage the ERMS function. It is equipped with:

- An input dedicated to the ERMS selector switch, with the following characteristics:
  - When the input is energized (i.e. ERMS switch is closed), the ERMS function is disengaged.
  - When the input is not energized (i.e. ERMS switch is open), the ERMS function is engaged.
- An output to activate an external pilot light when the ERMS function is engaged.
- The ERMS digital module must be installed in the control unit for the ERMS function to operate properly.

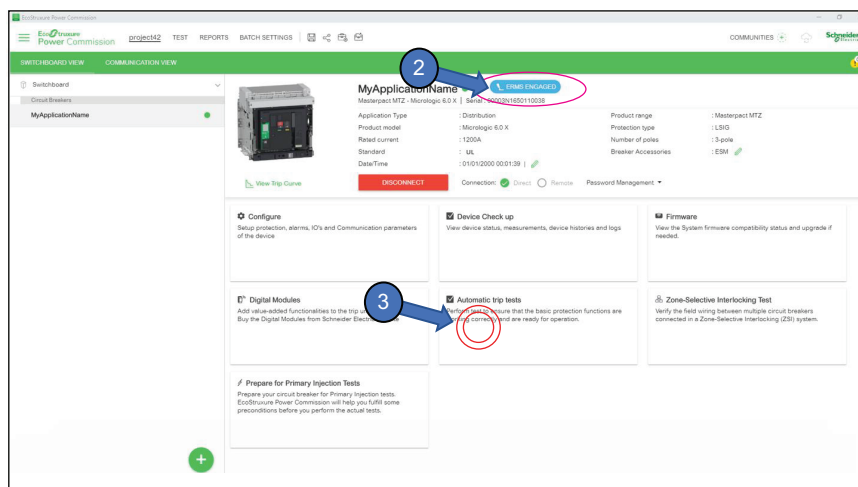
**NOTE:** The Ecostruxure Power Device app can be used to indicate the status of the ERMS function (Engaged or Disengaged).

# Testing Energy Reduction Maintenance Settings (ERMS)

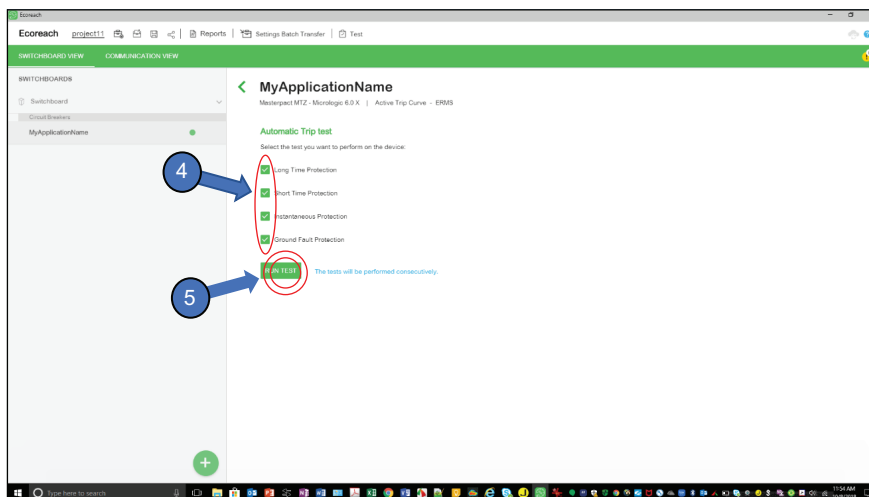
## Secondary Injection Using EcoStruxure Power Commission Software

The ERMS protection function can be tested using EcoStruxure Power Commission software's automatic trip curve test.

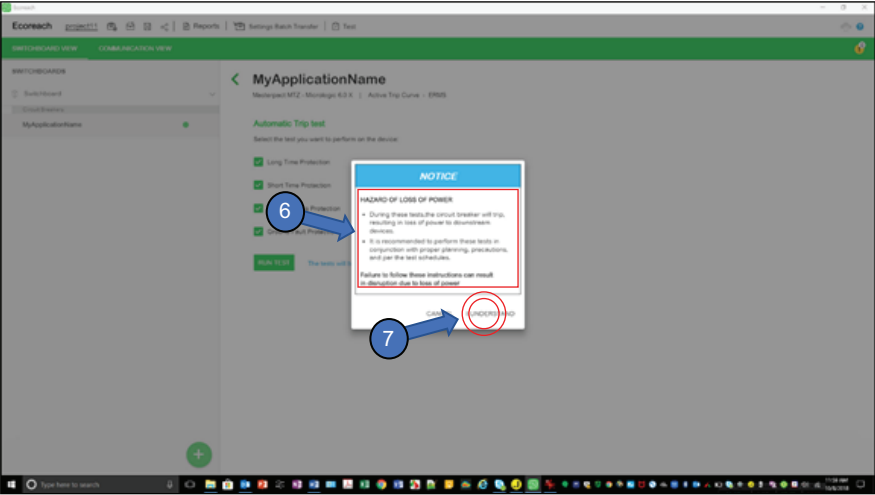
1. With the PC directly connected to the control unit's USB port and with EcoStruxure Power Commission software connected to the control unit, place the circuit breaker into ERMS mode by turning the physical ERMS switch to the "ON" state or engaging the circuit through the EcoStruxure Power Device app.
2. Verify that the ERMS banner is being displayed.
3. Press "Automatic trip tests".



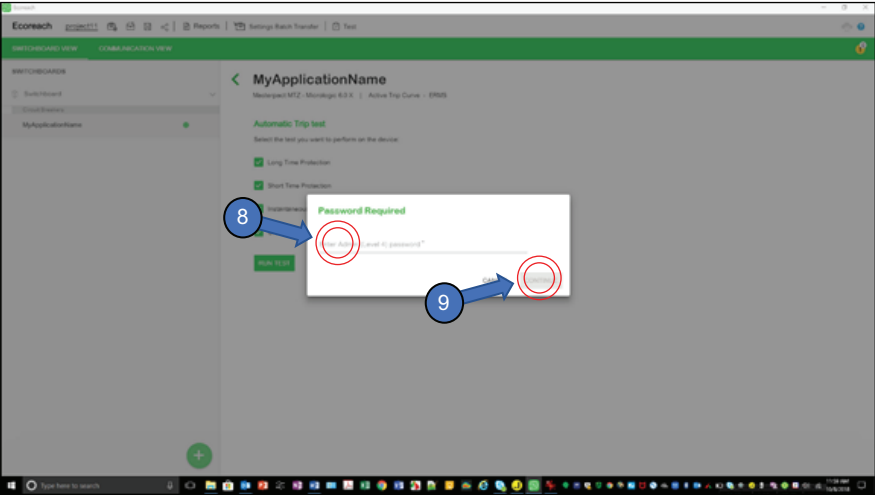
4. Select segment of the trip curve to be tested.
5. Press "RUN TEST".



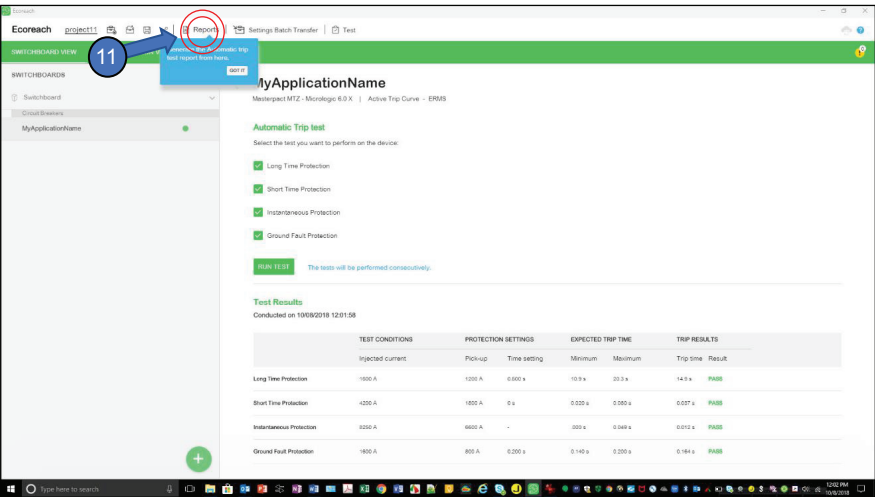
- 6. Read and understand notice.
- 7. Press “I UNDERSTAND”.



- 8. Enter level 3 or admin password.
- 9. Press “CONTINUE”.



- 10. Follow the posted steps to perform secondary digital injection testing.
- 11. Select “Report” from menu bar to obtain the test report information.





## Primary Injection Testing

The ERMS function can be tested through primary injections means.

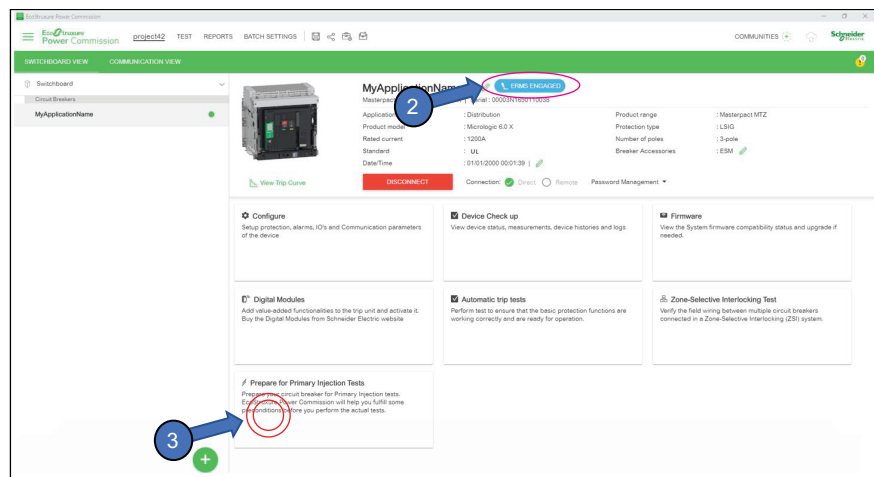
- Use EcoStruxure Power Commission software to prepare the circuit breaker for primary injection testing.
- The "Prepare for Primary Injection" button allows access to the "LSI Protection" and "Ground Fault Protection" functions.

These functions are used for:

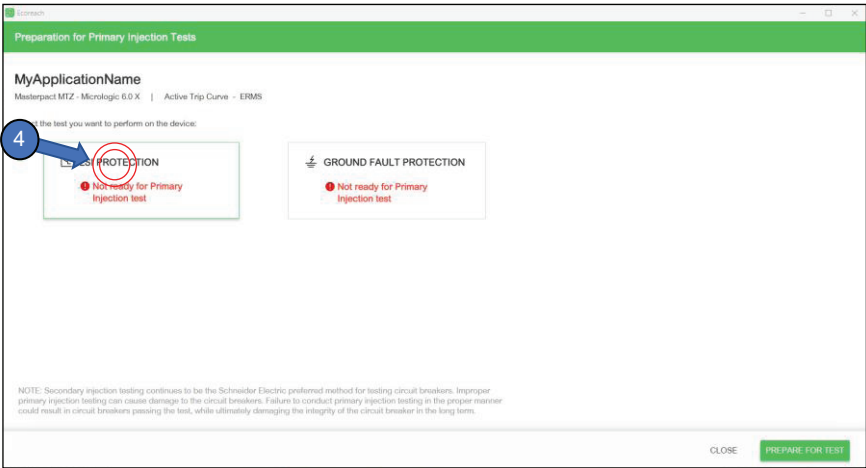
- LSI PROTECTION
  - Temporarily disable the ground fault function so that a single phase primary injected current can be applied without causing a Micrologic 6.0X control unit to trip on ground fault.
  - Reset the thermal memory of the circuit breaker so that the circuit breaker can be tested multiple times without the thermal memory function affecting the trip times.
- GROUND FAULT PROTECTION
  - Reset the thermal memory of the circuit breaker so that the circuit breaker can be tested multiple times without the thermal memory function affecting the trip times.

## Overload and Short Circuit (LSI) Protection

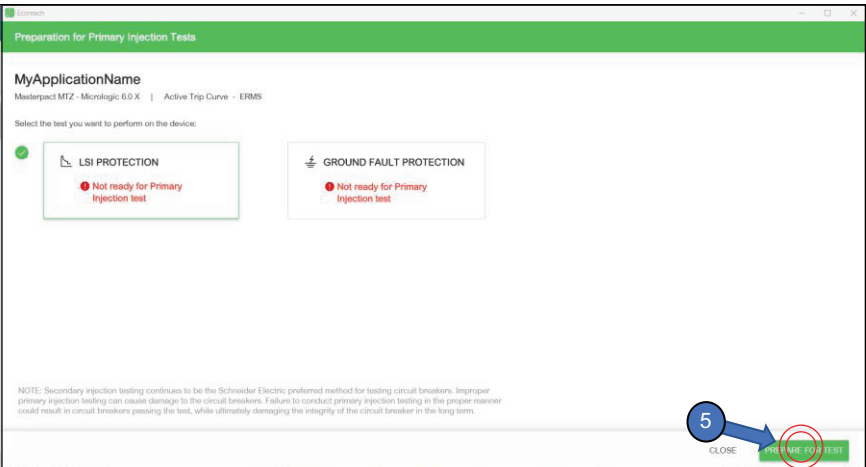
1. With the PC directly connected to the control unit's USB port and with EcoStruxure Power Commission software connected to the control unit, place the circuit breaker into ERMS mode by turning the physical ERMS switch to the "ON" state or engaging the function through the EcoStruxure Power Device app.
2. Verify "ERMS ENGAGED" banner is displayed.
3. Select "Prepare for Primary Injection Tests".



4. Select “LSI Protection”.

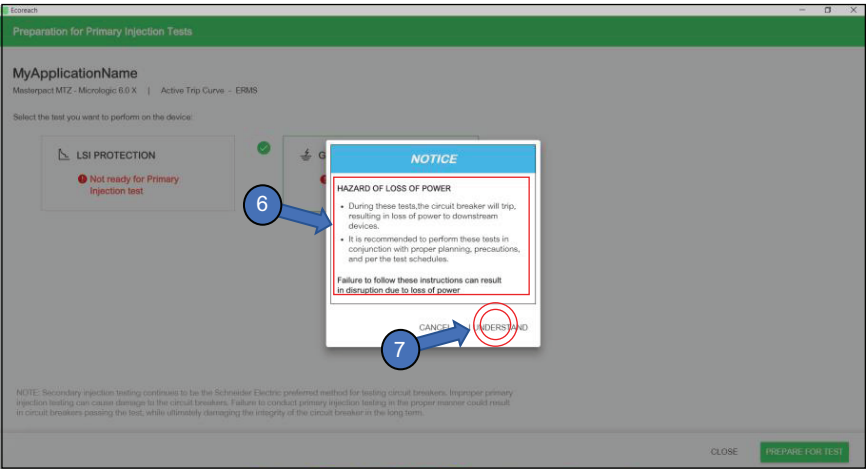


5. Click “Prepare for Test”.



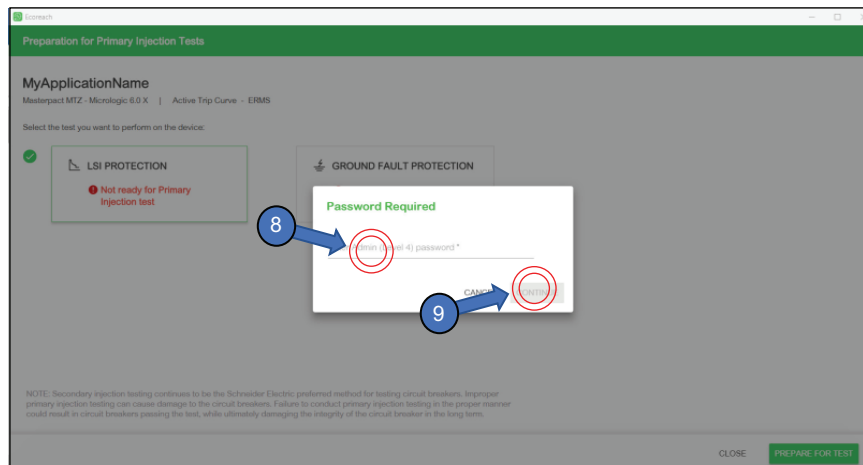
6. Read and understand notice.

7. Press “I UNDERSTAND”.

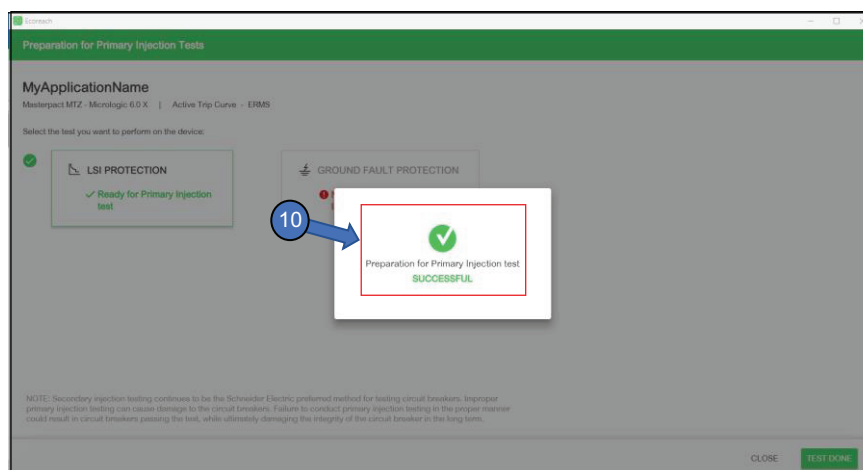


8. Enter level 3 or administrator password.

9. Click "Continue".



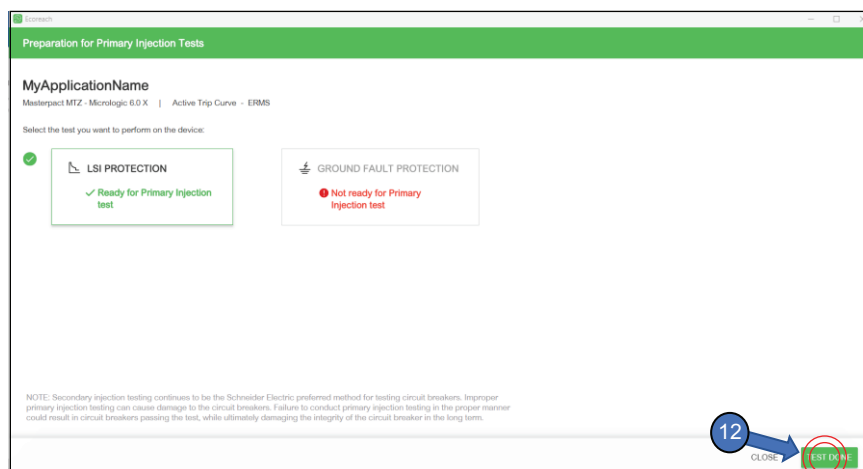
10. Software confirms device is prepared for primary injection testing.



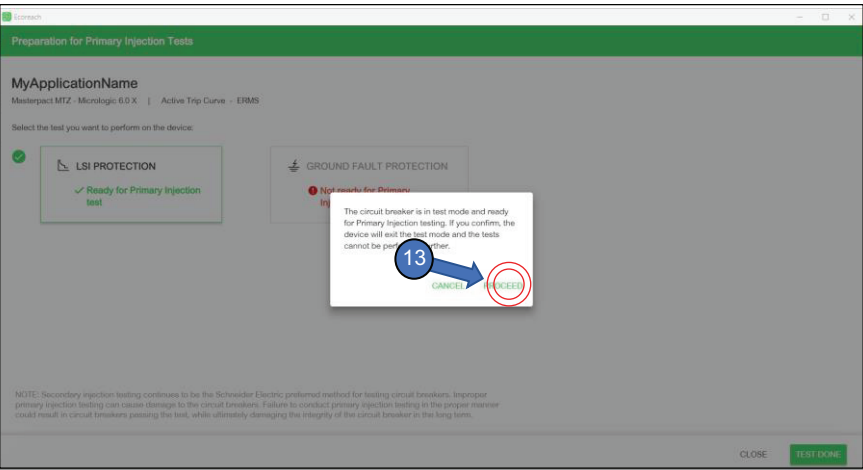
11. Apply the primary current to the circuit breaker.

12. Select the "TEST DONE" button for the following:

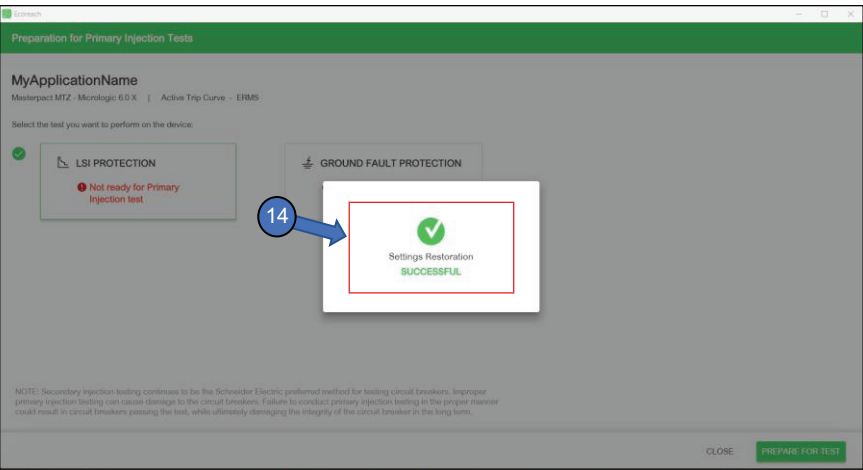
- Testing is completed.
- Circuit breaker trips – any time the circuit breaker trips while the LSI protection function is active, the LSI PROTECTION function must be restarted.



13. To confirm testing is done, press “Proceed”.

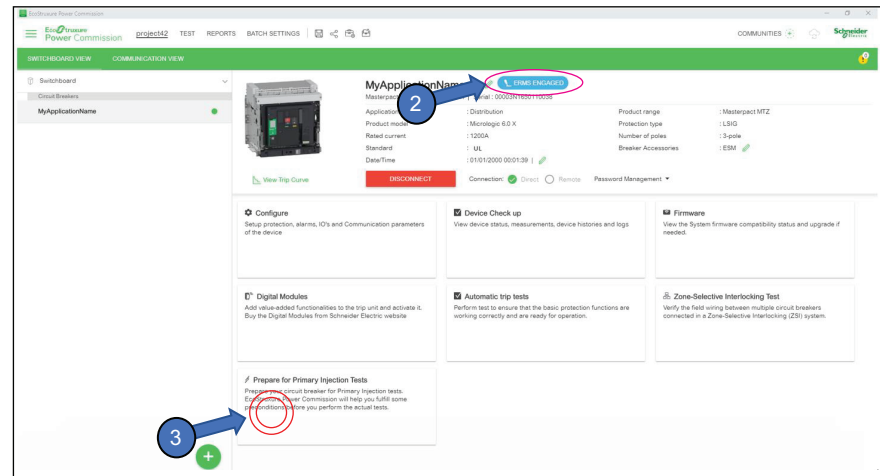


14. Screen confirms testing is over and settings have been restored.

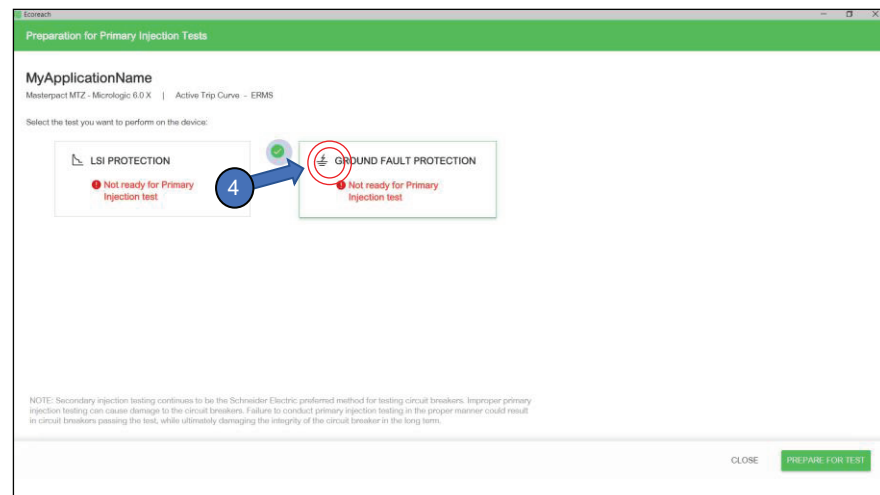


## Testing Ground Fault Protection

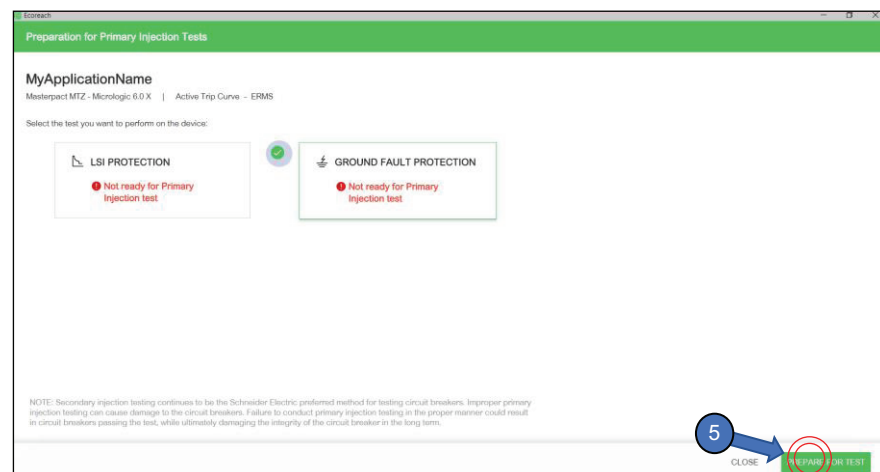
1. With the PC directly connected to the control unit's USB port and with EcoStruxure Power Commission software connected to the control unit, place the circuit breaker into ERMS mode by turning the physical ERMS switch to the "ON" state or engaging the function through the EcoStruxure Power Device app.
2. Verify "ERMS ENGAGED" banner is displayed.
3. Select "Prepare for Primary Injection Tests".



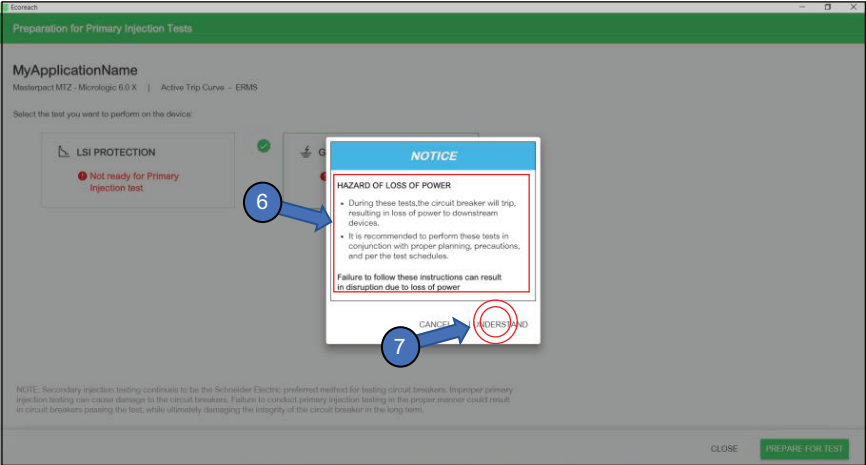
4. Select "Ground Fault Protection".



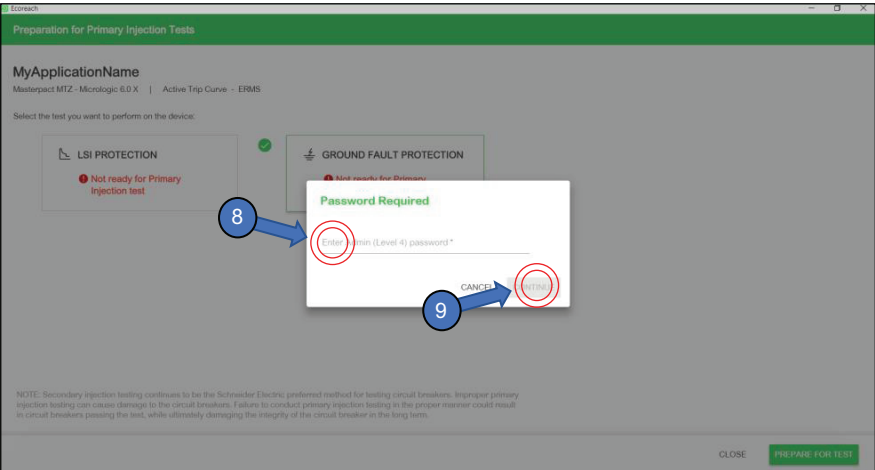
5. Click "Prepare for Test".



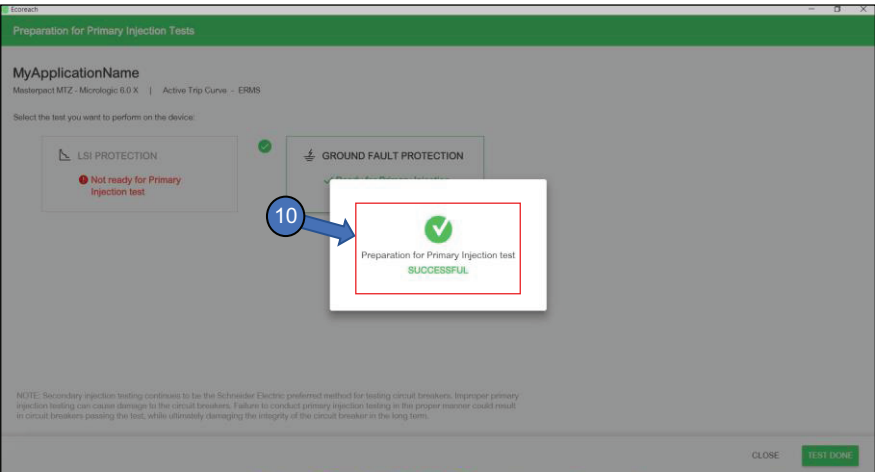
- 6. Read and understand notice.
- 7. Press “I UNDERSTAND”.



- 8. Enter level 3 or Administrator password.
- 9. Press “Continue”.



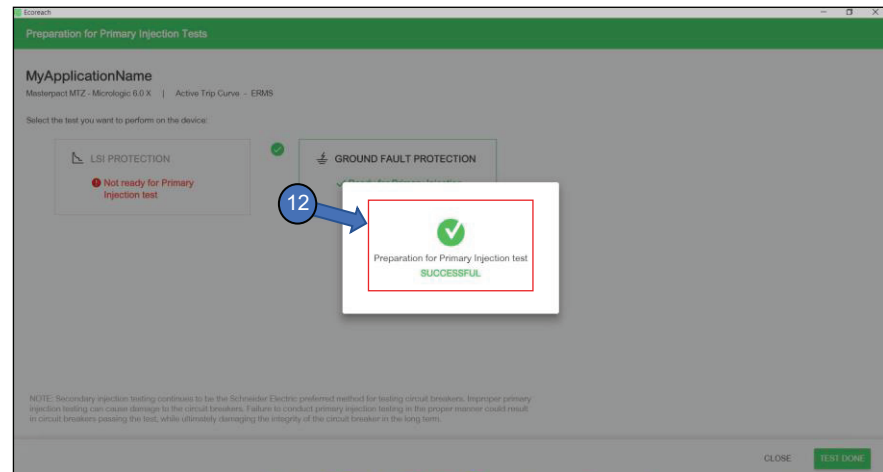
- 10. Software confirms device is prepared for primary injection testing.



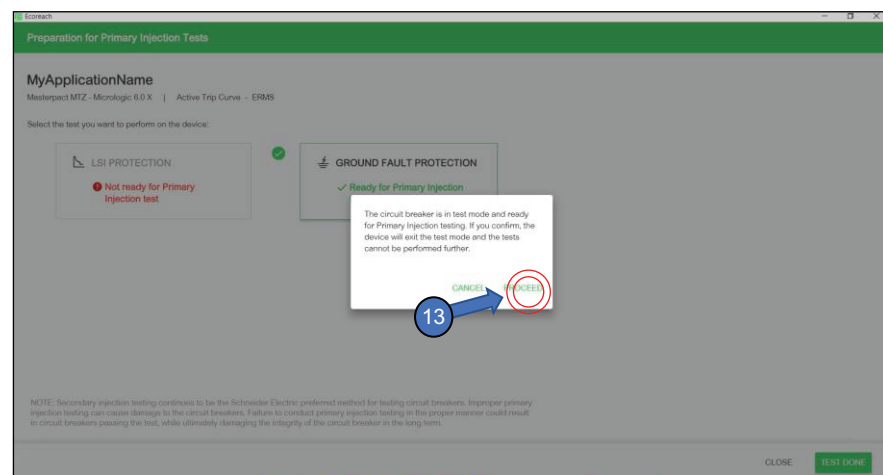
11. Apply the primary current to the circuit breaker.

12. Select the "TEST DONE" button for the following:

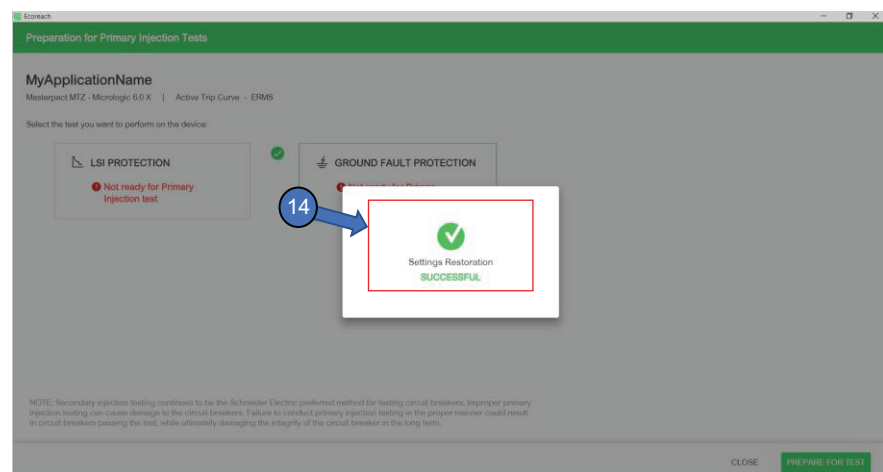
- Testing is completed.
- Circuit breaker trips – any time the circuit breaker trips while the ground-fault protection function is active, the Ground-Fault Protection function must be restarted.



13. To confirm testing is done, press "Proceed".



12. Screen confirms testing is over and settings have been restored.



# Troubleshooting Energy Reduction Maintenance Settings (ERMS)

Issue	Cause	Description	Recommendation
Unable to engage ERMS using the ERMS switch.	Loss/insufficient power applied to the Micrologic X control unit via the circuit breaker's ULP port.	If the ERMS is in the disengaged (OFF) state (ERMS LED located on the the control unit is not illuminated) and the ERMS switch is set to the engaged (ON) state the control unit will remain in the disengaged (OFF) state. This is the case if the control unit is being powered by only USB port, Voltage Power Supply (VPS), and/or by current passing through the circuit breaker.	Check power supply connections and voltage level applied to the Micrologic X control unit.
	Loss of communication between ESM module and Micrologic X control unit.	If the ERMS is in the disengaged (OFF) state (ERMS LED located on the the control unit is not illuminated) and the ERMS switch is set to the engaged (ON) state, the control unit will remain in the disengaged (OFF) state. An alarm will display on the Micrologic X control unit indicating that there has been a loss of communication with the ESM module.	Check to see if there is an alarm displayed on the Micrologic X control unit's HMI screen.
	ESM module is not declared in the Micrologic X control unit.	—	Use EcoStruxure Power Commission PC app to declare the presence of the ESM module.
	Incorrect connections to the ESM module and/or ERMS switch.	—	Check connections to ESM module and ERMS switch.
Unable to engage ERMS using the EcoStruxure Power Device app.	ERMS Digital module is not installed.	—	Purchase and/or install ERMS digital module.
ERMS unintentionally switches to the engaged (ON) state.	Loss of external signal source to the input of the ESM module.	—	Verify connections to the ESM module and to the ERMS switch.
	Input signal source voltage is too low.	—	Verify that the signal voltage at the input to the ESM module connections is sufficient.
Unable to modify ERMS protection settings.	ERMS function is in the engaged (ON) state.	ERMS protection settings can not be modified while the Micrologic X control unit is in the engaged (ON) state	Disengage (set to OFF) ERMS function and then make changes to the ERMS protection settings.
	ERMS Digital module is not installed.	ERMS digital module should be factory installed for circuit breakers ordered with ESM module.	Purchase and/or install ERMS digital module.
Unable to disengage ERMS using ERMS switch.	Loss/insufficient power applied to the Micrologic X control unit via the circuit breaker's ULP port.	If the ERMS is in the engaged (ON) state (ERMS LED located on the the control unit is illuminated) and the ERMS switch is set to the disengaged (OFF) state the control unit will remain in the engaged (ON) state. This is the case if the control unit is being powered only by the USB port, Voltage Power Supply (VPS), and/or by current passing through the circuit breaker.	Check power supply connections and voltage level applied to the Micrologic X control unit.
	Loss of communication between ESM module and Micrologic X control unit.	"If the ERMS is in the engaged (ON) state (ERMS LED located on the the control unit is illuminated) and the ERMS switch is set to the disengaged (OFF) state, the control unit will remain in the engaged (ON) state. An alarm will display on the Micrologic X control unit indicating that there has been a loss of communication with the ESM module."	Check to see if there is an alarm displayed on the Micrologic X control unit's HMI screen.
	ESM module is not declared in the Micrologic X control unit.	If the ESM module is not declared in the Micrologic X control unit while the ERMS function is in the engaged (ON) state, the ERMS cannot be disengaged through the ERMS switch.	Declare ESM module using EcoStruxure Power Commission PC app.

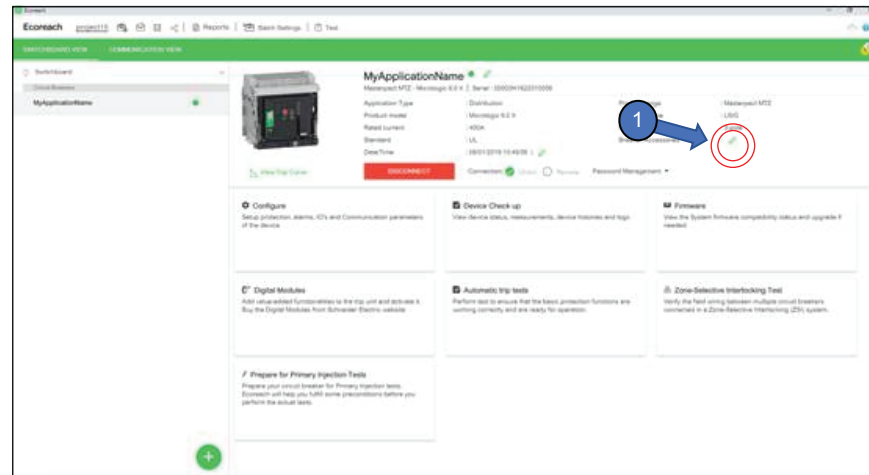


Issue	Cause	Description	Recommendation
	ERMS is still engaged through the EcoStruxure Power Device App.	To disengage (set to OFF) the ERMS function, all methods used to engage (ON) the ERMS function (ERMS switch and/or EcoStruxure Power Device App) need to be set to the disengaged (OFF) state.	Disengage the ERMS function through EcoStruxure Power Device App.
Unable to disengage (set to OFF) ERMS using EcoStruxure Power Device.	ERMS is still engaged (ON) through the ERMS switch.	To disengage (set to OFF) the ERMS function, all methods used to engaged (ON) the ERMS function (ERMS switch and/or EcoStruxure Power Device App) need to be set to the disengaged (OFF) state.	Disengage the ERMS function through the ERMS switch.

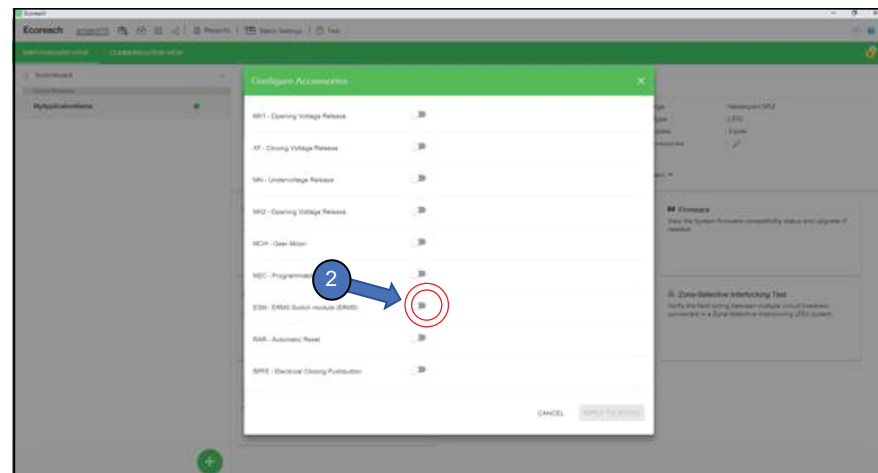
# Appendix—Declaring Installation of the ESM Module

The following steps show how to declare the ESM module in the control unit

1. Press Breaker Accessories edit pencil.



2. Press "ESM-ERMS Switch module (ERMS)".





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