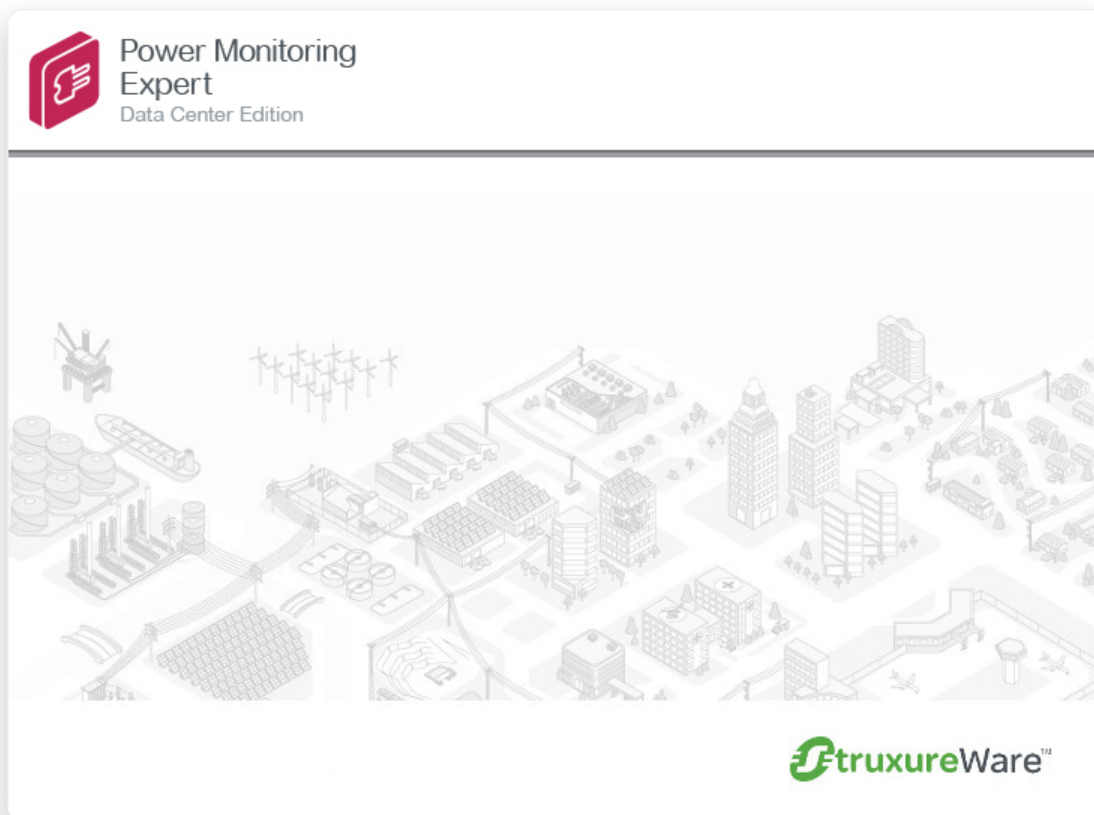


StruxureWare™ Power Monitoring Expert 8.0 – Data Center Edition

Breaker Performance Guide

7EN02-0367-01

06/2015



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 bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



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



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

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

Please Note

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

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

Safety precautions

Installation, wiring, testing and service must be performed in accordance with all local and national electrical codes.

DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. In the USA, see NFPA 70E.
- Only qualified electrical workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system.
- Consider all sources of power, including the possibility of backfeeding.
- Turn off all power supplying the power meter and the equipment in which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Before closing all covers and doors, carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Use caution while removing or installing panels so that they do not extend into the energized bus; avoid handling the panels, which could cause personal injury.
- The successful operation of this equipment depends upon proper handling, installation, and operation. Neglecting fundamental installation requirements may lead to personal injury as well as damage to electrical equipment or other property.
- NEVER bypass external fusing.
- The power meter should be installed in a suitable electrical enclosure.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

- ION modules and registers must only be configured by personnel with a thorough understanding of ION architecture and the system in which the meters and software are installed.
- Do not use meters or the software for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Do not use an ION meter's digital output for any safety critical application due to possible unexpected change of state during power cycles, power outages, configuration changes or firmware upgrades.

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

WARNING

INACCURATE REPORT RESULTS

- Do not incorrectly configure the system, this can lead to inaccurate reports and/or data results.
- Do not rely solely on reports to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Use reports as a supplement to proper workplace practices or equipment maintenance, not as a substitute.

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

WARNING

INACCURATE DATA RESULTS

Do not install incorrect drivers for the circuit breakers in your system. This can lead to algorithms not functioning correctly and to incomplete or inaccurate reports and/or data results.

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

NOTICE

UNINTENDED OPERATION

Make sure to enable the logs in the groups section when configuring the device.

Failure to enable the logs in the groups section will result in the inputs not being available and not appearing in the Generator Performance Tool.

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Circuit Breaker Aging Configuration Tool

The Circuit Breaker Aging Configuration Tool supplies circuit breaker aging and wear data information for devices in your system to Power Monitoring Expert - Data Center Edition. Using this feature, you can monitor and report on the status of circuit breaker aging and wear in your electrical system.

WARNING

INACCURATE DATA RESULTS

Do not install incorrect drivers for the circuit breakers in your system. This can lead to algorithms not functioning correctly and to incomplete or inaccurate reports and/or data results.

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

Supported devices

The Circuit Breaker Aging Configuration Tool in Power Monitoring Expert - Data Center Edition supports the following devices:

Standard / Country	Circuit Breaker Range	Control Unit Range
IEC	<ul style="list-style-type: none"> • Masterpact NT • Masterpact NW • Compact NS630b-3200 	<ul style="list-style-type: none"> • Micrologic 2 A/E • Micrologic 5 A/E/P/H • Micrologic 6 A/E/P/H • Micrologic 7 A/P/H
	Compact NSX	<ul style="list-style-type: none"> • Micrologic 5 A/E • Micrologic 6 A/E/E-M
China	Compact NS630b-1600	<ul style="list-style-type: none"> • Micrologic 2 A • Micrologic 5 A • Micrologic 6 A
	Masterpact MT	<ul style="list-style-type: none"> • Micrologic 2 A • Micrologic 5 A/E/D/P/H • Micrologic 6 A/E/D/P/H • Micrologic 7 A/P/H
	PowerPact H-, J-, and D-Frame	Same as above
USA	<ul style="list-style-type: none"> • Masterpact NT for IEC, UL, and ANSI standards • Masterpact NW for IEC, UL, and ANSI standards • Compact NS630b-3200 • PowerPact H-, J-, and L-Frame 	<ul style="list-style-type: none"> • Micrologic 2 A • Micrologic 3 A • Micrologic 5 A/P/H • Micrologic 6 A/P/H
	PowerPact H-, J-, and D-Frame	Same as above

Setting up the system

Adding Circuit Breaker devices

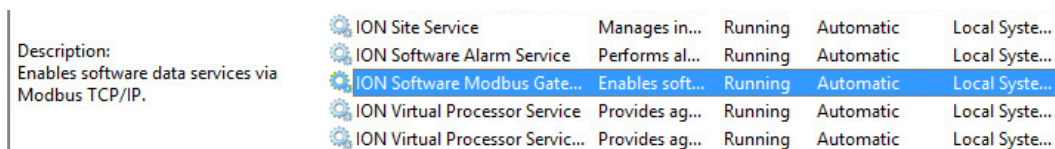
Add all necessary Circuit Breaker devices to your Power Monitoring Expert - Data Center Edition system using the Management Console.

Add any necessary Power E Box devices to the Management Console. These devices are optional for the breaker aging and wear calculations.

For instructions on how to add Circuit Breaker devices to Management Console, see ["Adding the SER3200 to Management Console"](#) on page 1.

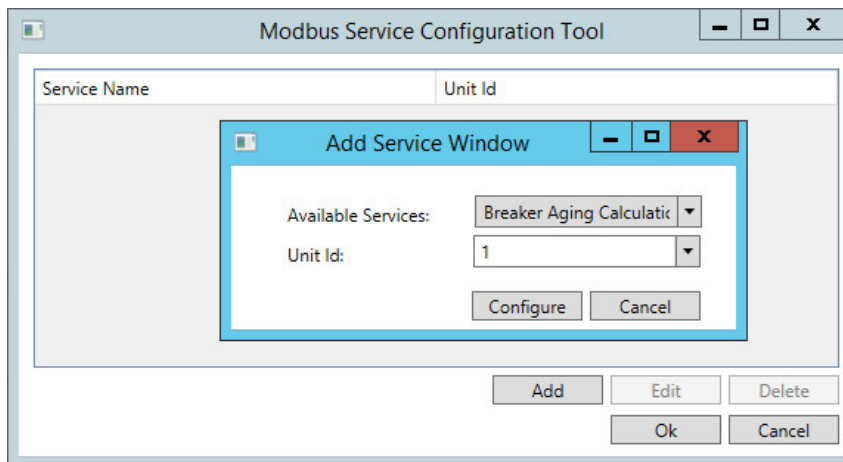
Starting the ION software Modbus Gateway service

1. Open the Windows Services panel by clicking **Start > Administrative Tools > Services**.
2. Make sure that **ION software Modbus Gateway Service** is both enabled and started/running. If the service is not enabled, then start and enable the service.



Adding new calculation service provider

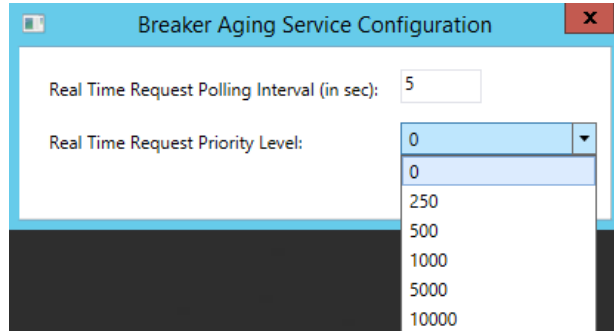
1. In Windows Explorer navigate to [path] \system\bin and double-click **ModbusServiceConfigurationTool.exe** to run it. The configuration dialog appears.
2. Click **Add**. The **Add Service Window** dialog appears.



3. **Available Services:** Select **Breaker Aging Calculation Service** from the dropdown list.
4. **Unit ID:** Enter a value of "1" if this is the first service provider you are adding. Otherwise, enter the next logical value for Unit ID.

NOTE: If you have already setup the Telvent Weather Data Import Service and have used UNIT ID = 1, then you must input a unit ID other than 1, (for example, 2).

5. Click **Configure**. The **Breaker Aging Service Configuration** dialog appears. Leave these values as the default.



NOTE: These settings are for advanced users only and may be modified if certain load conditions in the system require that the polling priority and frequency of real-time meter data be decreased or increased.

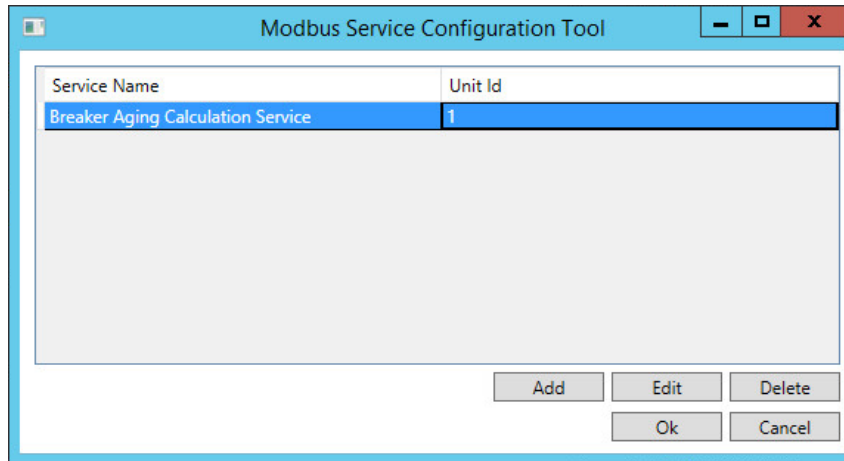
These settings only apply to real-time data requests for breaker aging and wear calculations, and are independent of other types of requests in the Power Monitoring Expert system (such as VISTA diagrams, Gadgets, and so forth).

Real Time Request Polling Interval (in sec): This is the frequency (in seconds) that is used to request real-time meter data for calculations.

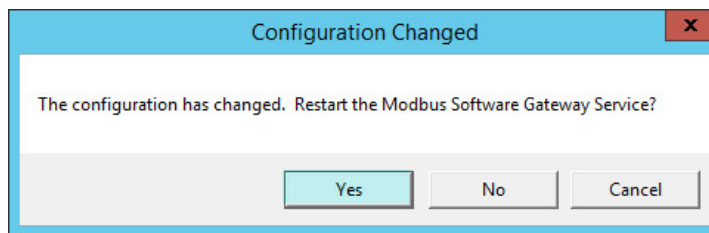
Real Time Request Priority Level: This is the level of priority for real-time meter request. The levels are:

	Frequency (in seconds)	Priority
	0	Low
	250	Medium
	500	High
	1000	Intermediate
	5000	Urgent
	10000	Control

6. Click **OK** to proceed. The **Breaker Aging Calculation Service** appears in the list.



A dialog appear about the change in configuration.



7. Click **Yes** to continue and to restart the Modbus Software Gateway Service.

Adding new site for the calculation service

Add a new site in Management Console that will communicate with the Circuit Breaker Aging Calculation service.

NOTE: These steps are only necessary if you have not yet set up and configured a site for a service (that uses the Modbus Software Gateway Service), such as the **Telvent Weather Data Import Service**. If you have already set up and configured a site for a service, you can ignore the following steps.

1. Open **Management Console**. The **Management Console** dialog appears.
2. In the left pane, click **Site**.
3. Right-click on the dialog and choose **New > Ethernet Gateway Site**.

The **Ethernet Gateway Site Configuration** dialog appears. Complete the fields. Items in red are mandatory.

Name	BreakerAgingWearSite
TCP/IP Address	STANDALONE
TCP/IP Port	ModbusTCP Device 502
Computer	STANDALONE
Time Synch ION Enabled	No
Time Synch 3XXX Enabled	No
Time Synch 3720 Enabled	No
Enabled	Yes
Description	

Name
Enter a name to identify the site.

OK Cancel

4. **Name:** Enter **BreakerAgingWearSite**.
5. **TCP/IP Address:** Enter **<your local server IP address>**.
6. **TCP/IP Port:** Enter **ModbusTCP Device|502**.
7. **Computer:** Enter **<your local server IP address>**.
8. Click **OK**. The new site is created.

Adding new device for the calculation service

Add a new device in Management Console to the new BreakerAgingWearSite that will communicate with the Circuit Breaker Aging Calculation service.

1. Open **Management Console**. The **Management Console** dialog appears.
2. In the left pane, click **Device**.
3. Right-click on the dialog and choose **New > Serial Device on Ethernet Gateway Site**. The **Serial Device Configuration** dialog appears. Complete the fields. Items in red are mandatory.

Group	BREAKERS
Name	BreakerAgingWearProvider
Device Type	Breaker Aging And Wear Provider
Unit ID	1
Site	BreakerAgingWearSite
Enabled	Yes
Description	

Site
Select the site used to communicate with the device.

4. **Group:** Enter **BREAKERS**.
5. **Name:** Enter **BreakerAgingWearProvider**.
6. **Device Type:** Enter **Breaker Aging And Wear Provider**.
7. **Unit ID:** Enter the same Unit ID you configured in the Modbus Gateway Service configuration tool.
8. **Site:** Enter the same site name you entered in the configuration tool.
9. **Enabled:** Enter **Yes**.
10. Click **OK**. The new device appears in the list.

Configuring breaker devices

Use the Breaker Aging Configuration Tool to configure breaker devices. You must the configure breaker devices, switchboards, and groups in order to generate the Circuit Breaker Aging Report.

To configure breaker devices:

1. Navigate to the [path]\system\bin folder and double-click **Breaker Aging Configuration Tool**. If this is the first time you are configuring data, choose the regional setting for circuit breaker and wear library and then click **OK**.

Breaker Aging Engine - Region Setting:

IEC

IEC

US

China

Cancel

The **Breaker Aging Configuration Tool** dialog appears.

2. Click the **Breaker Device** tab, and then click **New** to add one or more breakers to the system. The configuration dialog appears.
3. For each breaker device enter the following information:
 - **Name:** Enter a unique name to identify this breaker in the generated Vista diagrams and the Circuit Breaker Aging report.
 - **Source:** Associate the device that is to provide data for this breaker (such as load values, total harmonic distortion, and so forth). Note that you can only associate each device in the system with one breaker device.
 - Use the dropdown lists to select values for **Range**, **Designation**, **Rating**, and **Control Unit Rating**.
 - **Voltage:** Enter a value.
4. Click **Is existing breaker device?** if the breaker device already exists in the system.
5. If you select this check box, complete the available fields for each existing breaker device.

NOTICE

UNINTENDED OPERATION

If you select the check box for **Is existing breaker device?**, then go to the SEC website and search for "Is existing breaker device." Open and read the knowledgebase article, and then follow the instructions.

Failure to follow the instructions in the knowledgebase article will result in this feature not functioning as intended.

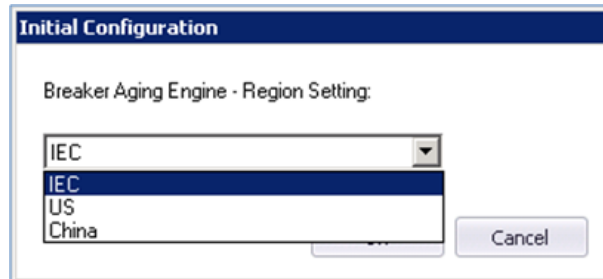
After you finish adding and configuring all necessary breaker devices, create any switchboards necessary.

Configuring switchboards

Use the Breaker Aging Configuration Tool to configure switchboards. You must the configure breaker devices, switchboards, and groups in order to generate the Circuit Breaker Aging Report.

To configure the switchboards:

1. In Windows Explorer navigate to the [path]\system\bin folder and double-click **Breaker Aging Configuration Tool**. If this is the first time you are configuring data, choose the regional setting for circuit breaker and wear library and then click **OK**.



The **Breaker Aging Configuration Tool** dialog appears.

2. Click the **Switchboard** tab, and then click **New** to add one or more Switchboards to the system. The configuration dialog appears.

3. For each switchboard enter the following information:

- **Name:** Enter a unique name to identify this switchboard in the generated Vista diagrams and the Circuit Breaker Aging report
- **Critical Threshold %** and **Moderate Threshold %:** Enter default values (0-100%) to be used for each breaker associated with this switchboard when performing analysis of their electrical aging and electrical wear levels.

NOTE: If necessary, a Power E Box device can be shared across multiple switchboards.

- **Environmental Conditions:** Use dropdown lists to select values for **Switchboard IP**, **Salty Atmosphere**, **Corrosive Gas**, and **Dust Level**.
- **Sensor Data:** Select one of two modes, and then use the dropdown lists to select values for the parameters.
 - **Manual:** Define static values for humidity, temperature and vibration levels experience in the switchboard.
 - **Monitored:** Associate the switchboard with an optional IO device (Power E Box) in the system that is to provide real-time values for humidity, temperature, and vibration levels measured in the switchboard. If necessary, a Power E Box device can be shared across multiple switchboards. The device must first be configured in the Management Console.

NOTE: If you enter a value of "0" (zero), that level is ignored for the calculations.

- **Breakers:** Select one or more breakers from the list. Note that each breaker can be associated with only one switchboard in the system.
4. Click **Is existing switchboard?** if the switchboard already exists in the system.
 5. If you select this check box, use the dropdown lists to complete the fields for **Vibration Level**, **Temperature**, and **Humidity** for each existing switchboard.

NOTICE

UNINTENDED OPERATION

If you select the check box for **Is existing switchboard?**, then go to the SEC website and search for "Is existing switchboard." Open and read the knowledgebase article, and then follow the instructions.

Failure to follow the instructions in the knowledgebase article will result in this feature not functioning as intended.

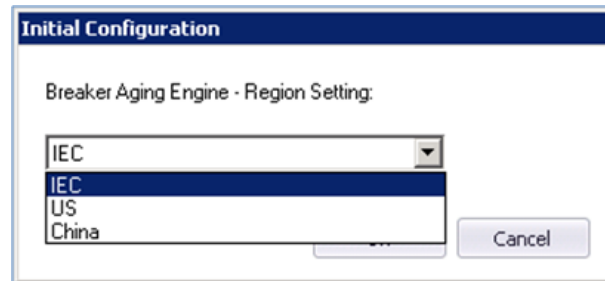
After you finish configuring all existing switchboards, create any groups necessary.

Configuring groups

Use the Breaker Aging Configuration Tool to configure groups. You must configure breaker devices, switchboards, and groups in order to generate the Circuit Breaker Aging Report.

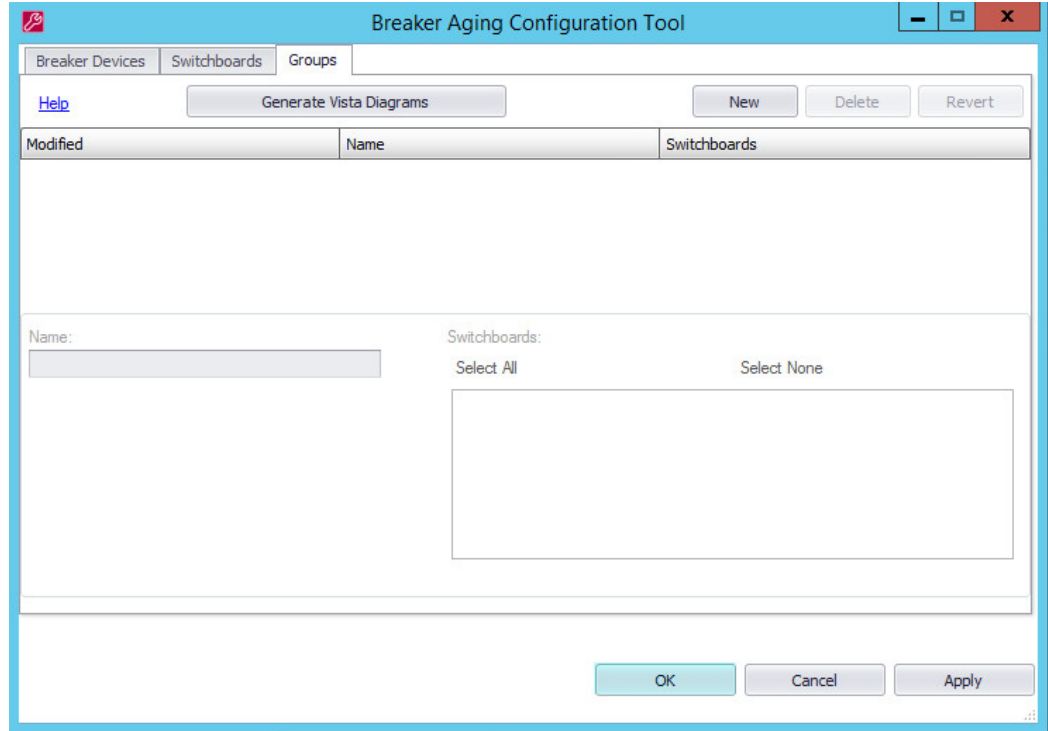
To configure groups:

1. Navigate to the .../StruxureWare Power Monitoring Expert DC Ed folder and double-click **Breaker Aging Configuration Tool**. If this is the first time you are configuring data, choose the regional setting for circuit breaker and wear library and then click **OK**.



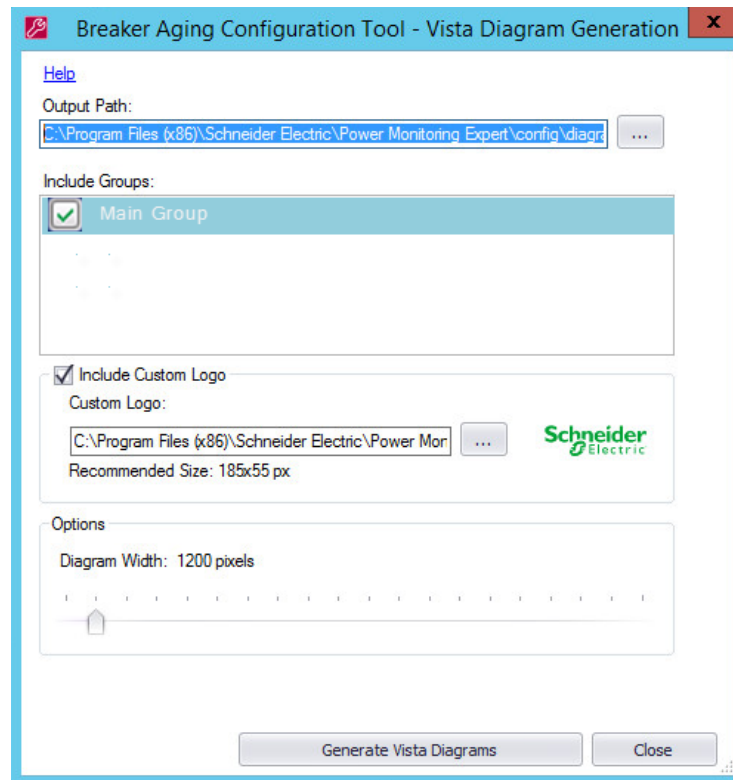
The **Breaker Aging Configuration Tool** dialog appears.

2. Click the **Groups** tab, and then click **New** to add one or more Switchboards to the system. The configuration dialog appears.



3. For each group enter the following information:
 - **Name:** Enter a unique name to identify this group in the generated Vista diagrams and the Circuit Breaker Aging report
 - **Switchboards** Select one or more switchboards from the list. Note that a switchboard can be used in multiple groups, if necessary.

After you have created all breakers, switchbreakers, and groups, you can generate a set of optional Vista diagrams.
4. Click the **Groups** tab, and then click **Generate Vista Diagrams**. A **Vista Diagram Generation** configuration dialog appears.



Note that the **Output Path** shows the location where the Vista diagram .dgm file is saved after clicking **Generate Vista Diagrams**.

5. Click **Include Custom Logo** and then navigate to and select the file in order to include a custom logo in your diagrams. Otherwise, a Schneider logo appears.
6. Under **Options**, drag the indicator to define the width of Vista diagrams you generate.
7. Click **Generate Vista Diagrams** to generate the .dgm files, then click **OK** and **Close**.

Pasting the Circuit Breaker Aging framework in VIP

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- ION modules and registers must only be configured by personnel with a thorough understanding of ION architecture and the system in which the meters and software are installed.
- Do not use meters or the software for critical control or protection applications where human or equipment safety relies on the operation of the control circuit.
- Do not use an ION meter's digital output for any safety critical application due to possible unexpected change of state during power cycles, power outages, configuration changes or firmware upgrades.

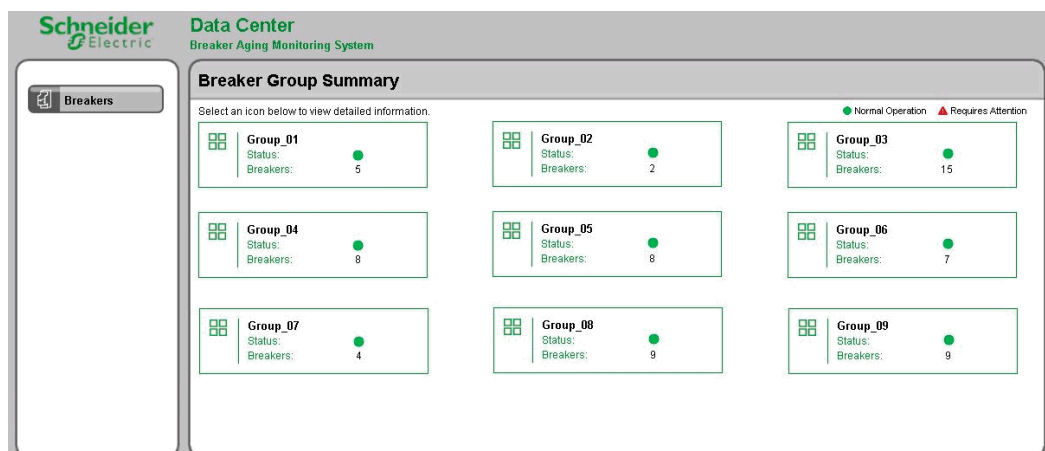
Failure to follow these instructions can result in death, serious injury, or equipment damage.

1. Open the **Designer** tool and open the **VIP.<servername>**. node.

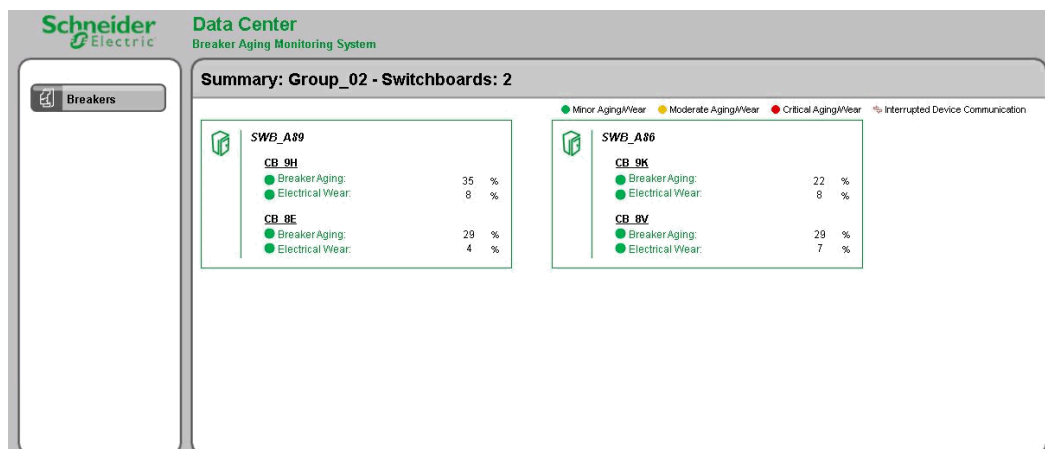
2. Drag a Grouping Object and open it.
3. Go to ... \Schneider Electric\Power Monitoring Expert DC Ed\config\fmwk\BreakerAging and select **Edit > Paste** to paste the framework. Depending on the number of Circuit Breakers and groups, you may need to set up the framework,
4. Connect the inputs of each AND/OR module (Circuit Breaker) to the critical operation and battery usage status.
5. Repeat this step for each Circuit Breaker in the group and for all of the Circuit Breakers in the other groups.
6. Save the framework after you finish modifying the framework based on your Circuit Breaker system.

Opening Vista diagrams and linking the status

1. Log in to Vista, select Open File and then browse to ... \Schneider Electric\Power Monitoring Expert DC Ed\config\diagrams\ud\BreakerAging\Groups.dgm.



2. Manually link the status object to the framework you pasted in VIP in the previous steps.



- Repeat this step for all other groups. Your Circuit Breaker Monitoring system is now setup.

Any Circuit Breakers in the groups that require attention show a red LED indicator.

- Manually link the status object from the framework you pasted in the VIP in previous steps.

After you finish configuring all circuit breakers, you can configure and run the Circuit Breaker Aging Report.

Configuring and running the Circuit Breaker Aging Report

Use the Reports module to configure and produce the Circuit Breaker Aging Report.

- In the Reports Library, expand the **Equipment Performance** folder and click **Circuit Breaker Aging Report**.

The report template appears.

Circuit Breaker Aging Report

Title	<input style="width: 80%;" type="text" value="Circuit Breaker Aging Report"/>
Select Group	<input style="border-bottom: 1px solid black; border-top: 1px solid black; border-right: 1px solid black; border-left: 1px solid black;" type="text" value="Main Group"/> ▾
Grouped By	<input style="border-bottom: 1px solid black; border-top: 1px solid black; border-right: 1px solid black; border-left: 1px solid black;" type="text" value="Switchboard Name first and Threshold Level second"/> ▾
Include Breakers with Minor Aging and Wear	<input checked="" type="radio"/> Yes <input type="radio"/> No
Include Data Warnings	<input type="radio"/> Yes <input checked="" type="radio"/> No

- Complete the fields to define the report.
 - **Title** - Enter a name for the report. It appears in the header section of the report.
 - **Select Group** - Select a group from the dropdown list to be used for determining which switchboards and breakers are used for the analysis.
 - **Grouped By** - Select from the dropdown list to determine how the circuit breaker aging and electrical wear analysis results are sorted.
 - **Switchboard Name first and Threshold Level second** - The results are sorted first by the names (in alphabetical order) of all the switchboards associated with the selected group, and then by the criticality level in descending order of importance (Critical, Moderate, Minor).
 - **Threshold Level first and Switchboard Name second** - The results are sorted first by criticality level in descending order of importance (Critical, Moderate, Minor), and then by the names (in alphabetical order) of all the switchboards associated with the selected group

- **Include Breakers with Minor Aging and Wear** - Select Yes or No. Selecting Yes allows all of the breakers to appear in the report regardless of the current electrical aging and electrical wear levels. Selecting No allows only breakers with moderate or critical electrical aging and electrical wear to appear.
 - **Include Data Warnings** - Select Yes or No.
3. Click **Generate Report** to produce the report. The report appears.

Schneider Electric					Circuit Breaker Aging Report	
					4/1/2015	
Breaker Aging and Wear Summary						
Switchboard	Level	Breaker Name	Electrical Aging (%)	Electrical Wear (%)		
Sample Switchboard	Minor					
		Sample Breaker	0.0	0.0		

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Circuit Breaker Aging and Wear maintenance

Before you perform any maintenance for aging or wear on your circuit breakers, refer to the Solutions Expert Community (SEC) for the latest instructions on circuit breaker maintenance actions in circuit breaker aging configuration:

1. Navigate to the [Solutions Expert Community](#) (SEC) website.
2. Search for all circuit breaker aging documentation.
3. Read and follow the instructions in the documentation for circuit breaker aging and wear maintenance.

Breaker Performance Guide

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