

# CAPMD™

## INSTALLATION & INSTRUCTION MANUAL



First Release				Modification				Revision
Prepared By	Date	Approved by	Control	Checked by:	Date	Approved by	Control	01
MNL	9-06-2024	—	—	—	—	—	—	

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**CAUTION:** The equipment covered by these instructions should be installed and serviced only by competent personnel utilizing proper safety practice and procedures. These instructions are written for such personnel and are not intended as a substitute for adequate training and experience in safety procedures for this type of equipment. These instructions do not purport to cover all details or variations in the equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to GE.

## 1 INTRODUCTION

GE's CapMD, Capacitor Health Monitoring Sensor delivers unprecedented information about your capacitor bank. Once installed and configured, the onboard electromechanical display gives you instant information when energized. It can display individual capacitor health status such as normal operation, warning or verge of failure and an actual capacitor unit failure.

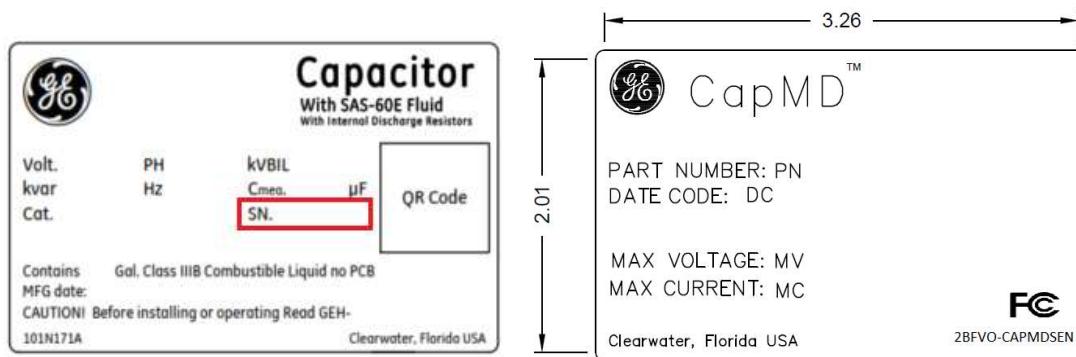


Regular surveys of the sensors give you advance warning of imminent failures, and when a failure does happen the ground crews can tell exactly which capacitors are problematic in a capacitor bank without the need for individual capacitor testing.

The CapMD sensor requires no additional wiring for power or communications and can be quickly installed on each can. A red LED blinks and indicates cap bank is energized, and sensors are monitoring. When running, each sensor continuously monitors the electrical characteristics of the individual capacitor it is mounted to and using these values, the sensor can indicate the health status of the capacitor unit. This indication happens by way of an electromechanical indicator (fluorescent yellow flip-dots) that is clear and easy to see at a distance (approximately within 50-60ft beyond which a binoculars could be required), while requiring no energy to maintain its state. This means that even when a capacitor or bank is completely powered down, the warning/failure indication is still available but no red LED blinking. Sensors are mainly designed to be installed on fuseless cap banks with no/minimum harmonic content – in case of special applications, please contact our team.

## 2 INSTRUCTIONS FOR INSTALLATION

To identify a capacitor unit, look for the serial number on the nameplate, same for the CAPMD. This information will be needed for any requests related to sale/replacement/service. If sensors/can are shipping assembled, GE will crossmatch sensors vs cans. If sensors are installed at site on existing can, we recommend listing sensor serial # vs existing can serial # and keep for records.

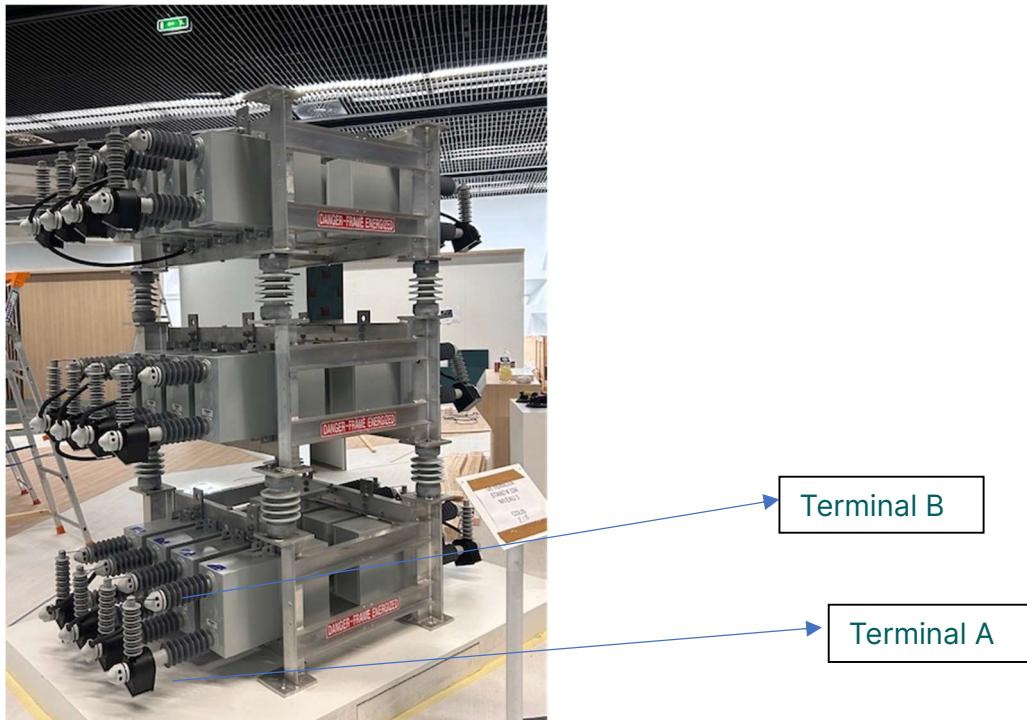


## 3 SENSOR FIELD INSTALLATION

The CapMD Sensor can be mounted in two different configurations to ensure the best viewing angle for the electro-mechanical indicators. Select the best option for your bank and location. Keep in mind If you have also purchased CapMD receivers, select mounting configurations that give each sensor as close to a line-of-sight with a receiver as possible.



Once you have determined your sensor mounting configuration, you are ready to proceed with installation. In these instructions the capacitor terminal that the sensor body will be mounted on is designated "Terminal A", and the capacitor terminal that the voltage divider will be connected to is designated "Terminal B."



1. Remove any animal protection from both Terminal A and Terminal B.
2. Remove all connections from Terminal A.
3. Set the new animal protection ring on Terminal A.
4. Set the Sensor housing onto Terminal A.
5. Hand screw the terminal extender onto Terminal A over the Sensor housing. Do not tighten yet.
6. Insert the voltage divider into the Sensor housing socket.
7. Secure the voltage divider the Sensor housing socket with the voltage divider bolt.
8. Torque the voltage divider screw
9. Cover the voltage divider bolt with the voltage divider bolt cover.
10. Align the Sensor to the desired mounting configuration.
11. Add the voltage divider cable to Terminal B.
12. Secure the voltage divider cable to Terminal B with the voltage divider nut and torque it to 38-42 N.m (M16) or 10-11 ft.lb (0.50")
13. Torque the terminal extender on Terminal A to 38-42 N.m or 10-11 ft.lb
14. Reinstall all removed connections from Terminal A back onto the terminal extender. Torque the nut to 38-42 N.m or 10-11 ft.lb.
15. Reinstall animal protection onto both Terminal A and Terminal B.

## 4 SENSOR FIELD VALIDATION TEST

Once installed, verify the sensor is operational via the following procedure.

1. Remove the protective cap from the auxiliary power connector.
2. Plug the auxiliary power supply into the auxiliary power connector. Can be a 9V battery.
3. Observe the sensor for at least 30 seconds. You should see the LED blinking.
4. If the sensor is not factory configured, use the field configuration software to set the nominal impedance for this particular capacitor. See the section on the field configuration software.
5. Disconnect the auxiliary power supply.
6. Replace the protective cap onto the auxiliary power connector.

## 5 FIELD CONFIGURATION SOFTWARE

*Currently the sensor configuration will be performed by the GE grid solutions service team.*

## 6 USING THE CAPMD SENSOR

The target capacitor impedance and the warning/failure thresholds will be set at the factory or by the field service team.

On a regular schedule, or whenever desired, visually check the indicators on each sensor. Compare the sensor appearance to each of the following states:

### CAPACITOR UNIT - GOOD STATE

The status LED is blinking, and both electromechanical indicators are black.

The current capacitor impedance matches the configured capacitor impedance. The capacitor and sensor are operating as expected and no interventions are required.

## **CAPACITOR UNIT - WARNING STATE**

The status LED is blinking and one electromechanical indicator is yellow.

The current capacitor impedance is slightly varied from the configured capacitor impedance. Schedule capacitor bank maintenance soon to avoid potential capacitor failure.

## **CAPACITOR UNIT - FAILURE STATE**

The status LED is blinking, and both electromechanical indicators are yellow.

The current capacitor impedance is significantly varied from the configured capacitor impedance. The capacitor may have failed and confirm it by measuring the capacitance of the unit. Schedule bank maintenance as soon as possible and replace this capacitor with a capacitor with as close an impedance as possible to the failed capacitor. The sensor may be re-used and re-installed onto the new capacitor.

## **SENSOR - FAILURE STATE**

The bank is energized, but the status LED is not blinking and both electromechanical indicators are black.

There is a problem with either the sensor or the capacitor. When the bank is powered off, check the capacitance on the capacitor. If it is bad, replace it. Check the sensor installation and check that all terminals are torqued properly per the installation instructions. Run the Sensor Field Test. If the problem persists, replace the sensor with a new one.

## **7 CAPACITOR UNIT FIELD MEASUREMENT**

To measure capacitor unit capacitance, use a GE's NCM-20 capacitance meter or equivalent. Disconnect the leads, remove the sensor (needed?) and test capacitance between terminal A and B as per instructions of the capacitance meter manual/manufacturer.



If capacitance is out of expected range when compared to test reports, capacitor needs replacement.

## 8 FCC - ELECTRONIC LABELING GUIDANCE

FCC Statements This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: —Reorient or relocate the receiving antenna. —Increase the separation

between the equipment and receiver. —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. —Consult the dealer or an experienced radio/ TV technician for help. RF Exposure: This equipment complies with FCC RF Exposure requirements and should be installed and operated with a minimum distance of 20cm between the radiator and any part of the human body. Antenna Info: This equipment uses the following Antennas and may not be used with other antenna types or with antennas of higher gain: Mfg.: \_\_\_\_\_ Molex\_\_\_\_\_ Type:\_\_\_\_Flex\_\_\_\_\_ Gain:\_\_\_\_3.2dBi\_\_\_\_\_ Note: Antenna info above not required for permanently attached antennas such as chip antenna or trace antenna. Modifications: Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## 9 SENSOR TROUBLESHOOTING

If the sensor is presenting any malfunctioning, please remove it and proceed the installation field testing. If sensor is not responding, please contact us with serial#. The sensor can be replaced by a spare one while the investigation is performed.

## 10 SUPPORT CONTACTS

**Factory address:** GE ITI - 1925 Calumet St, Clearwater, FL 33765

**Factory contacts - Sales:** [capmd-sales@ge.com](mailto:capmd-sales@ge.com)

**Factory contacts - Service:** [capmd-sales@ge.com](mailto:capmd-sales@ge.com)

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