solar**edge**

Application Note – StorEdge Systems Monitoring and Control Using Non-SolarEdge Gateways

Contents

Introduction

This document is intended to assist SolarEdge installers to design and implement StorEdge-based solutions for a variety of use cases involving third-party monitoring and control systems. In each use case, the solar, electrical, communications, and third-party infrastructures employed may differ. For each case, an optimized solution is described, together with the relevant installation and configuration procedures.

This application note should be used in conjunction with the following documents:

- Technical Note – SunSpec Logging in SolarEdge Inverters

  http://www.solaredge.com/sites/default/files/sunspec-implementation-technical-note.pdf

- StorEdge Solution with Backup – Installation Guide – for Europe, APAC, and South Africa

  http://www.solaredge.com/sites/default/files/storedge_backup_installation_guide.pdf

- StorEdge Installation Guide – for North America

  http://www.solaredge.com/sites/default/files/storedge_backup_installation_guide_NA.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa

  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for North America

  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

Contact SolarEdge support to obtain the following documents:
- Technical Note – Power Control Protocol for SolarEdge Inverters

Communications Technologies

StorEdge uses an open, industry-standard communications stack in order to provide efficient messaging between SolarEdge and third-party devices and applications.
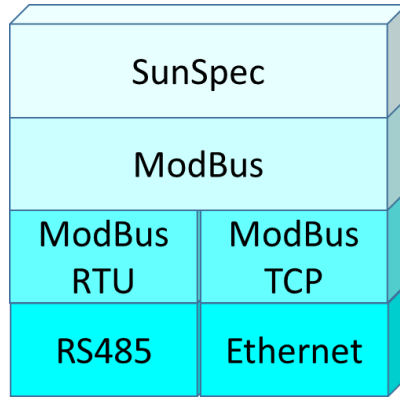

Figure 1: StorEdge Communications Stack

The communications stack components are briefly described below.

SunSpec

SunSpec is an application-layer communications protocol designed to achieve interoperability between Distributed Energy Resource (DER) components and smart grid applications.

Modbus

Modbus is a serial communications protocol typically used to connect data collection terminals to a centralized processing unit. StorEdge uses Modbus to perform SunSpec messaging over two types of physical/link-layer channels:

- **Modbus RTU**: Remote Terminal Unit (RTU) Modbus over a serial RS485 connection
- **Modbus TCP**: Modbus over an Ethernet connection

Monitoring

RTU-Based Monitoring

Modbus over RS485 (RTU)

In this use case, a StorEdge system is monitored by a third-party gateway. A StorEdge Inverter and the third-party gateway are connected via Modbus over RS485.
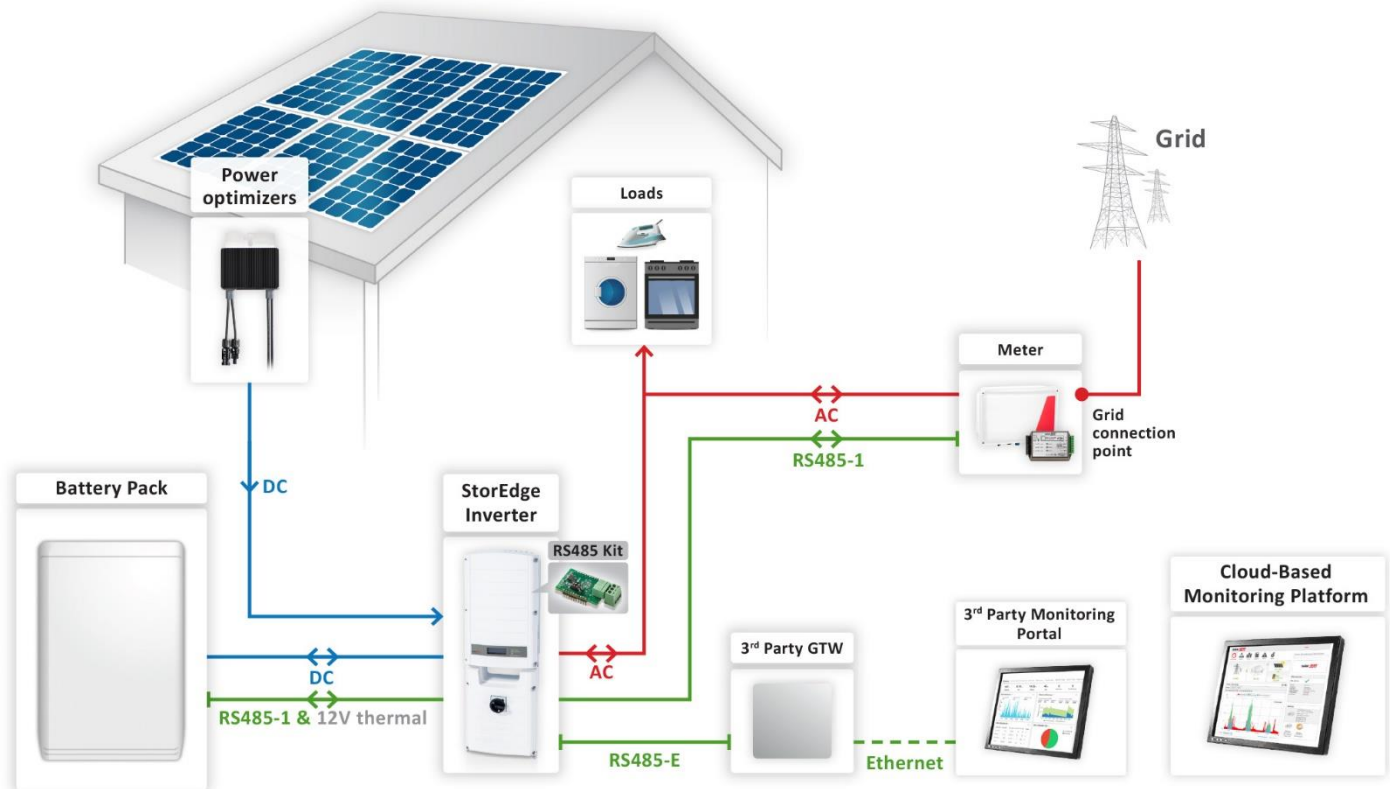

Figure 2: RS485-based monitoring solution

► **To install and configure a RS485-based monitoring solution:**

1 Install the StorEdge system as described in the document relevant to your location:

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for North America
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 Install the RS485 Expansion Kit in the StorEdge Inverter, and connect the kit to the 3rd Party Gateway.

3 Connect the StorEdge Inverter RS485 Expansion port to the 3rd Party Gateway RS485 port using an RS485 twisted pair cable.

4 Perform the following steps on the LCD screen of the StorEdge Inverter:

- Select: **Communication → RS485-E Conf → Enable**. Press **Enter** to continue.
- Select: **Device Type → Non SE Logger**
- Select: **Protocol → Sunspec**
- Select: **Device ID.** Set the required MODBUS ID (default is 1).

Modbus over RS485 (RTU) – AC coupled

In this use case, an AC-coupled StorEdge system with a non-SolarEdge inverter is monitored by a third-party gateway. A StorEdge Inverter and the third-party gateway are connected via Modbus over RS485.
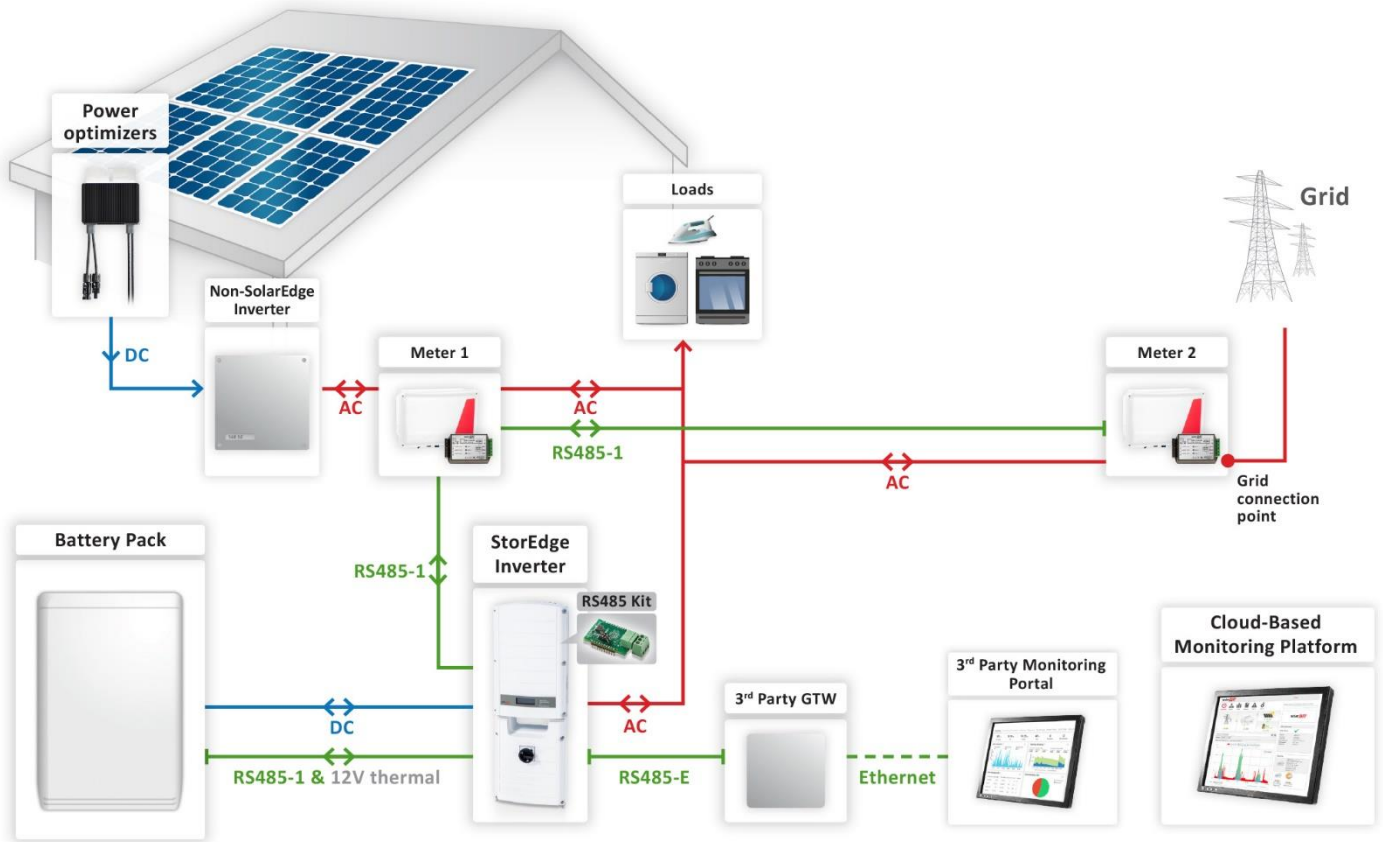
Figure 3: RS485-based monitoring solution for an AC-coupled system

► **To install and configure a RS485-based monitoring solution for an AC-coupled system:**

1 Install the StorEdge system as described in the *AC Coupling using a non-SolarEdge Inverter* section of the document relevant to your location:

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa
http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for North America
http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 Install the RS485 Expansion Kit in the StorEdge Inverter, and connect the kit to the 3rd Party Gateway.

3 Connect the StorEdge Inverter RS485 Expansion port to the 3rd Party Gateway RS485 port using an RS485 twisted pair cable.

4 Perform the following steps on the LCD screen of the StorEdge Inverter:

- Select: **Communication → RS485-E Conf → Enable**. Press **Enter** to continue.
- Select: **Device Type → Non SE Logger**
- Select: **Protocol → Sunspec**
- Select: **Device ID.** Set the required MODBUS ID (default is 1).

TCP-Based Monitoring

Modbus over Ethernet (TCP)

In this use case, a StorEdge system is monitored by a third-party gateway. An Ethernet switch connects a StorEdge inverter and the third-party gateway to a 3rd Party monitoring portal.
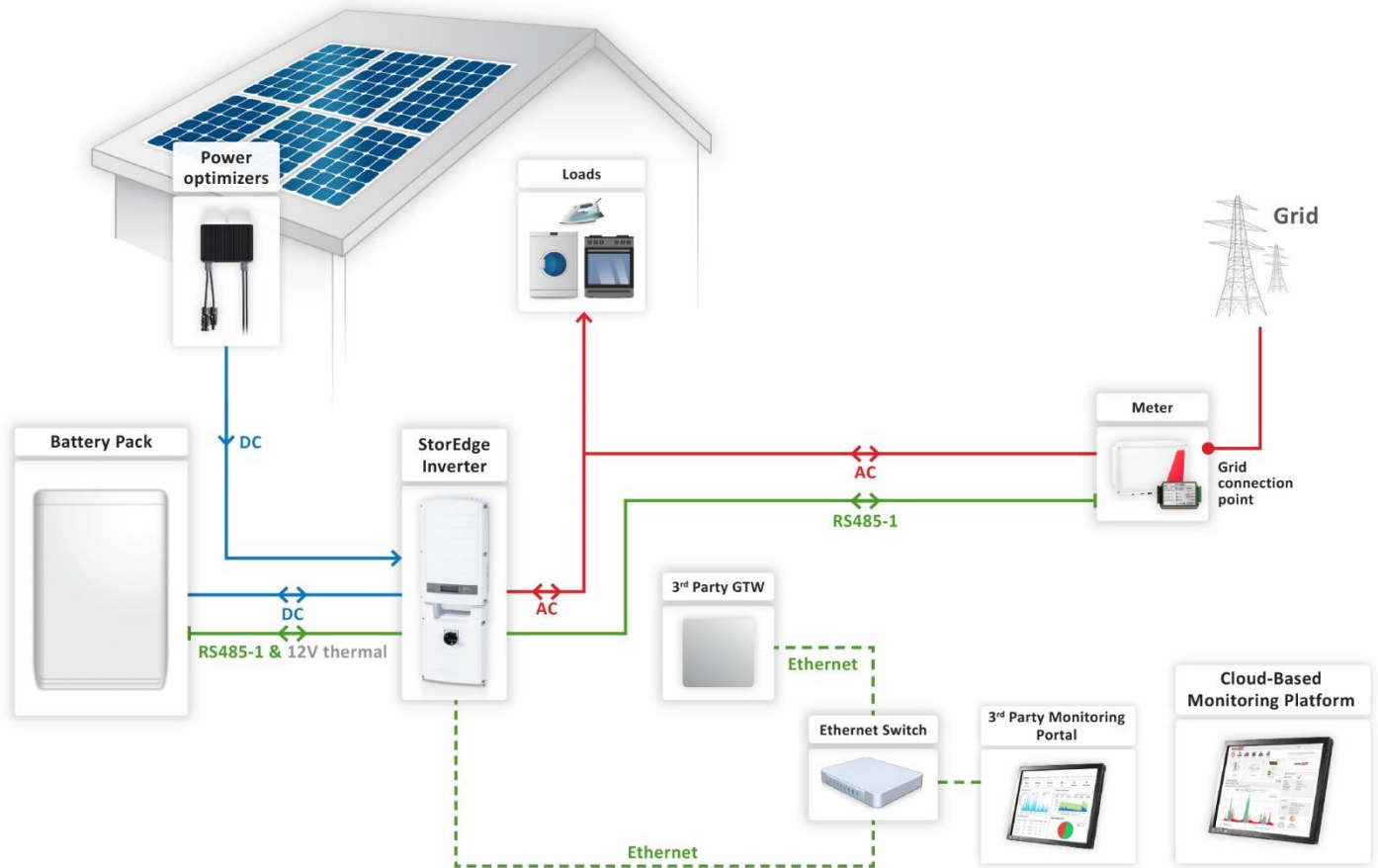
Figure 4: Ethernet-based monitoring solution

► **To install and configure an Ethernet-based monitoring solution:**

1 Install the StorEdge system as described in the document relevant to your location:
   - StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa
     http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf
   - StorEdge Solution Applications – Connection and Configuration Guide – for North America
     http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 Connect the Inverter to the Ethernet switch using an Ethernet cable.

3 Connect the 3rd Party Gateway to the Ethernet switch using an Ethernet cable.

4 Configure Modbus TCP as described in the Technical Note – SunSpec Logging in SolarEdge Inverters:
   http://www.solaredge.com/sites/default/files/sunspec-implementation-technical-note.pdf.

Modbus over Ethernet (TCP) – AC coupled

In this use case, an AC-coupled StorEdge system with a non-SolarEdge inverter is monitored by a third-party gateway. An Ethernet switch connects a StorEdge inverter and the third-party gateway to a 3rd Party monitoring portal.
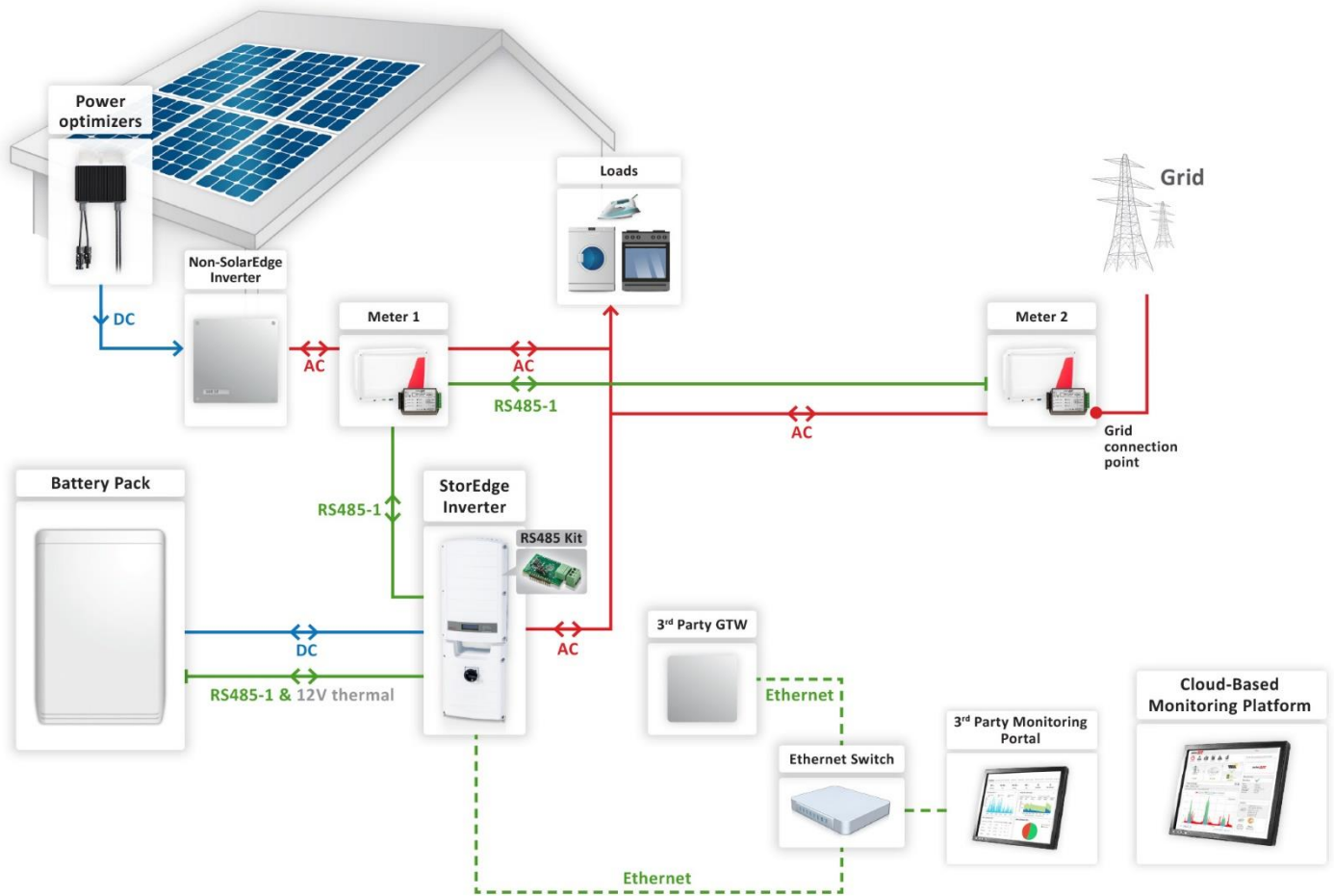

Figure 5: Ethernet-based monitoring solution for an AC-coupled system

► To install and configure an Ethernet-based monitoring solution for an AC-coupled system:

1 Install the StorEdge system as described in the *AC Coupling using a non-SolarEdge Inverter* section of the document relevant to your location:

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for North America
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 Connect the Inverter to the Ethernet switch using an Ethernet cable.

3 Connect the 3rd Party Gateway to the Ethernet switch using an Ethernet cable.

4 Configure Modbus TCP as described in the Technical Note – SunSpec Logging in SolarEdge Inverters:
http://www.solaredge.com/sites/default/files/sunspec-implementation-technical-note.pdf.

Modbus over Ethernet (TCP) – Double Power and Capacity

In this use case, a StorEdge system with multiple StorEdge inverters is monitored by a third-party gateway. An Ethernet switch connects the StorEdge master inverter and the third-party gateway to a 3rd Party monitoring portal.
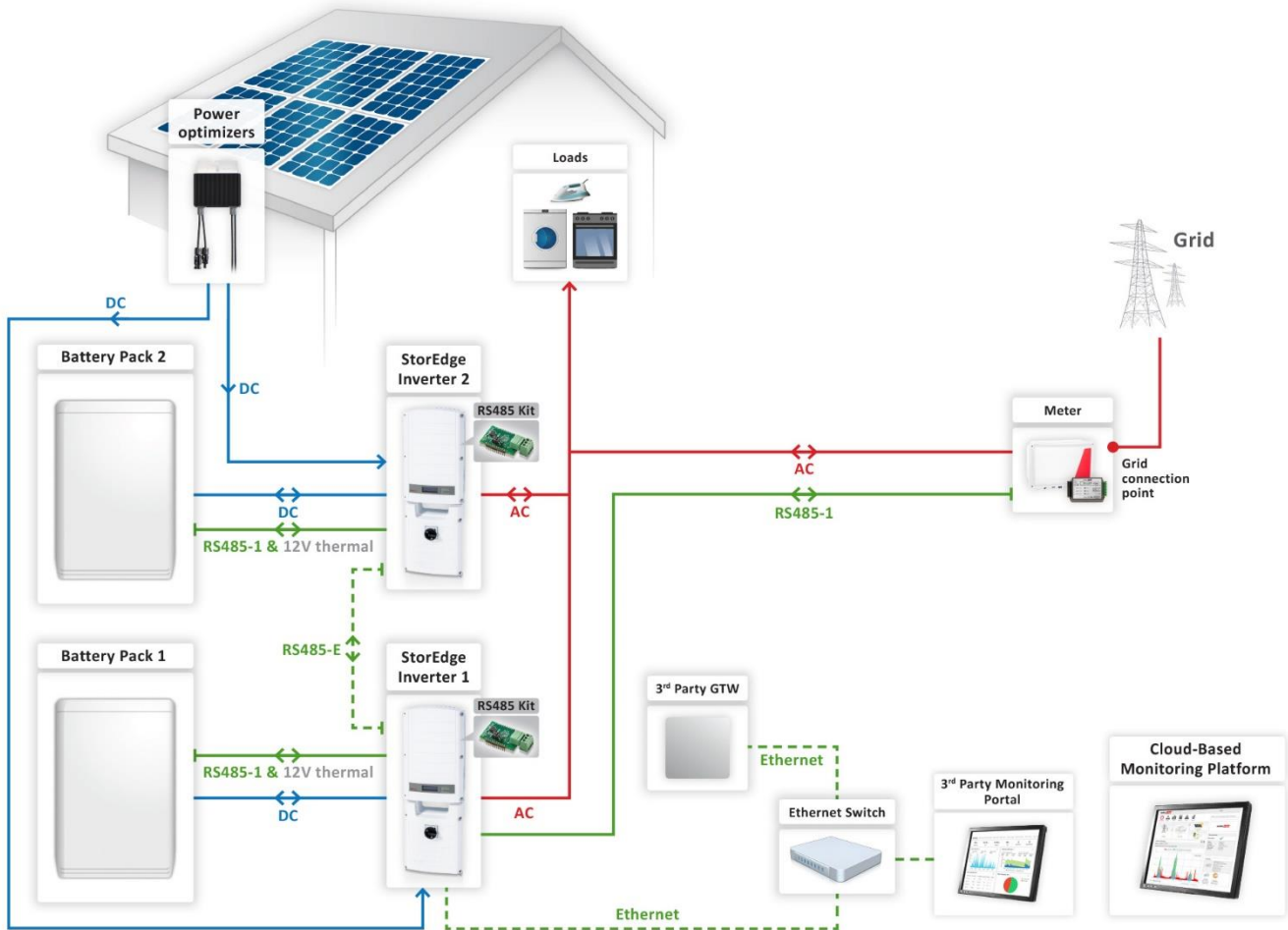

Figure 6: Ethernet-based monitoring solution for a high-capacity, high-power system

▶ **To install and configure an Ethernet-based monitoring solution for a high-capacity, high-power system:**

1 Install the StorEdge system as described in the *Additional Capacity and Power* section of document relevant to your location:

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa:
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for North America:
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 Connect the Inverter to the Ethernet switch using an Ethernet cable.

3 Connect the 3rd Party Gateway to the Ethernet switch using an Ethernet cable.

4 Configure Modbus TCP as described in the Technical Note – SunSpec Logging in SolarEdge Inverters:
http://www.solaredge.com/sites/default/files/sunspec-implementation-technical-note.pdf.

Monitoring & Control

RTU-Based Monitoring and Control

Modbus over RS485 (RTU)

In this use case, a StorEdge system is controlled and monitored by a third-party gateway. A StorEdge Inverter and the third-party gateway are connected via Modbus over RS485.
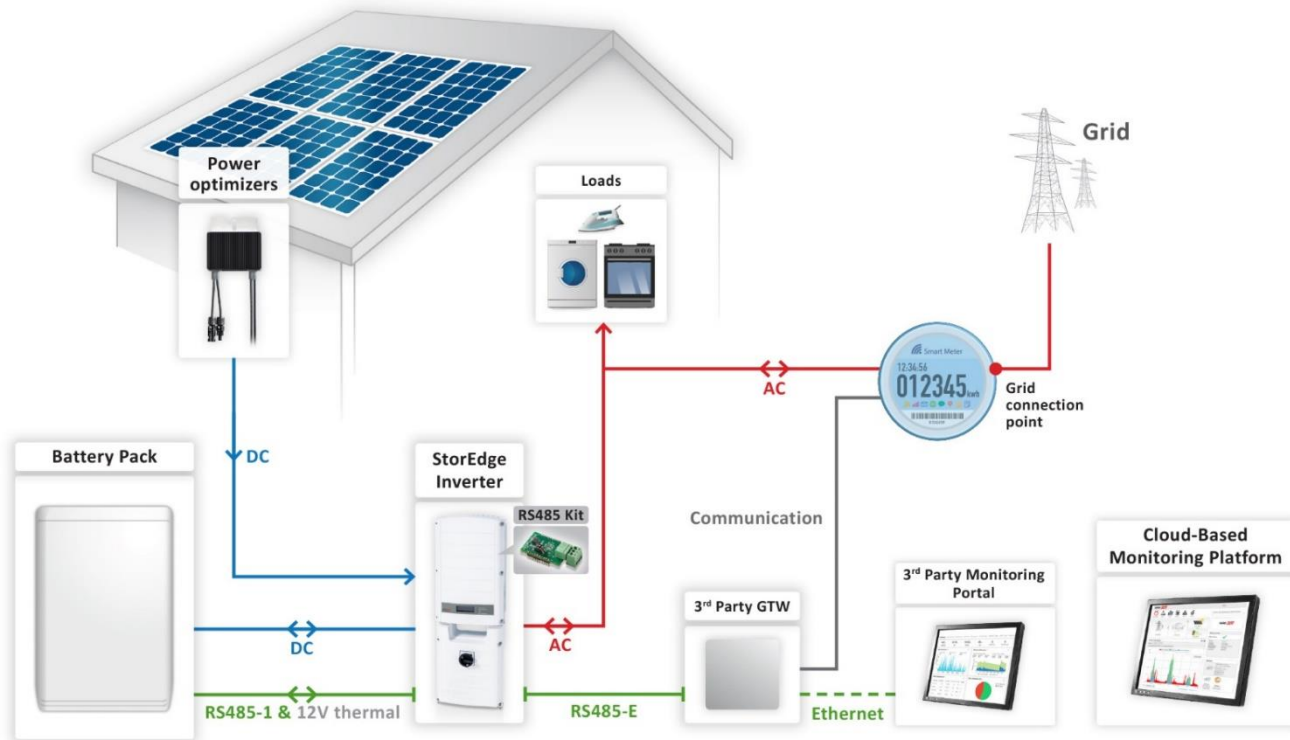

Figure 7: RS485-based monitoring and control solution

► To install and configure a RS485-based monitoring and control solution:

1 Install the StorEdge system as described in the document relevant to your location:

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa:
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf

- StorEdge Solution Applications – Connection and Configuration Guide – for North America:
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 In case a meter is configured on StorEdge inverter, remove the meter setup configuration:

- Select: **Communication → RS485-1 Conf → Device Type → Multi-devices.**
- Select: **Meter2 → Meter Type → None.**

3 Install the RS485 Expansion Kit in the StorEdge Inverter, and connect the kit to the 3rd Party Gateway.

4 Connect the StorEdge Inverter RS485 Expansion port to the 3rd Party Gateway RS485 port using an RS485 twisted pair cable.

5 Perform the following steps on the LCD screen of the StorEdge Inverter:

- Select: **Communication → RS485-E Conf → Enable**. Press **Enter** to continue.
- Select: **Device Type → Non SE Logger**
- Select: **Protocol → Sunspec**
- Select: **Device ID.** Set the required MODBUS ID (default is 1).

6 Refer to the following documents for monitoring and control information:

![solaredge logo]

- Technical Note – SunSpec Logging in SolarEdge Inverters:
  http://www.solaredge.com/sites/default/files/sunspec-implementation-technical-note.pdf.
- Technical Note – Power Control Protocol for SolarEdge Inverters (contact SolarEdge support)

Modbus over RS485 (RTU) – AC coupled

In this use case, an AC-coupled StorEdge system with a non-SolarEdge inverter is controlled and monitored by a third-party gateway. A StorEdge Inverter and the third-party gateway are connected via Modbus over RS485.
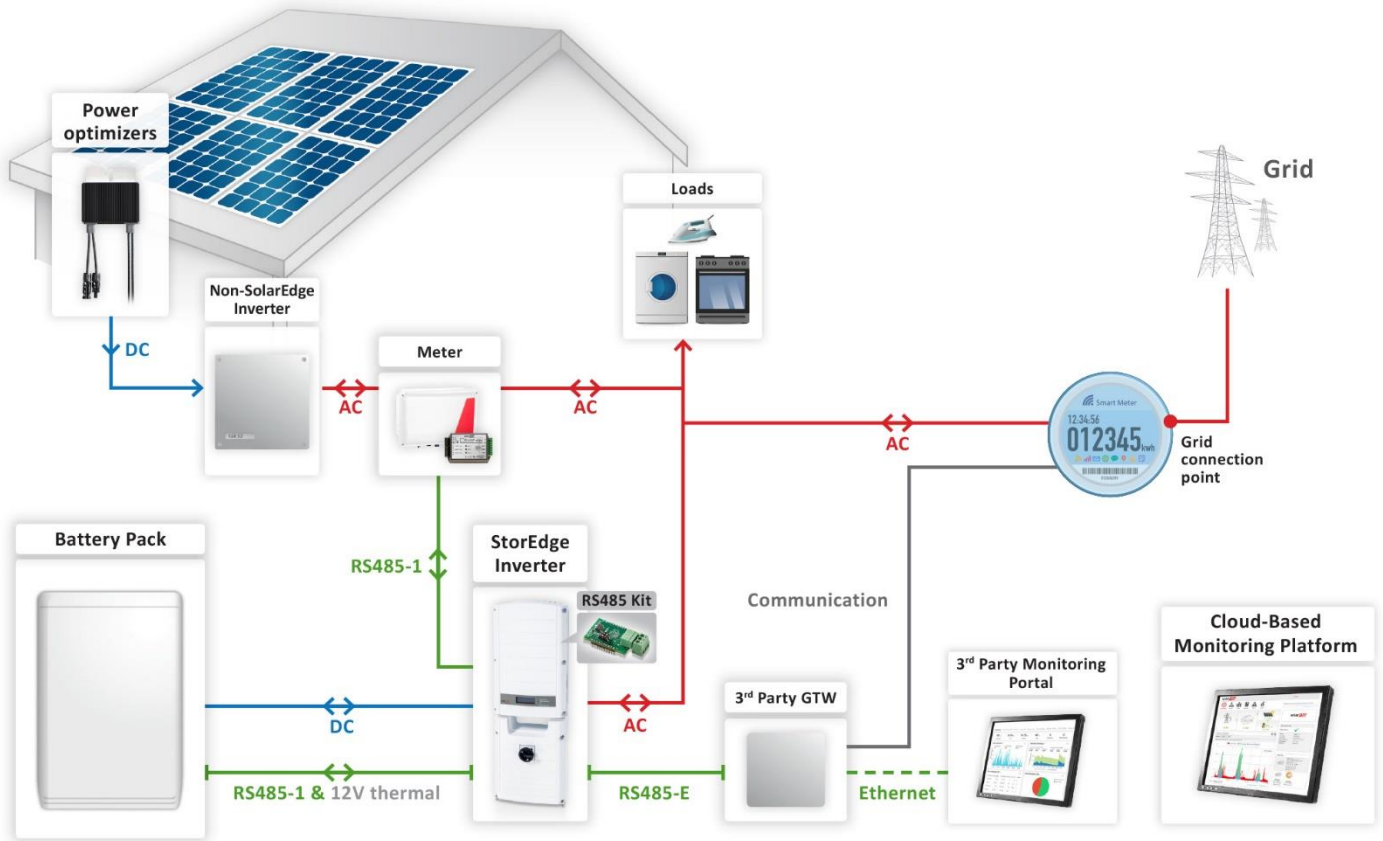

Figure 8: RS485-based monitoring and control solution for an AC-coupled system

► To install and configure a RS485-based monitoring and control solution for an AC-coupled system:

1 Install the StorEdge system as described in the *AC Coupling using a non-SolarEdge Inverter* section of the document relevant to your location:

- StorEdge Solution Applications – Connection and Configuration Guide – for Europe, APAC, South Africa
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- StorEdge Solution Applications – Connection and Configuration Guide – for North America
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 In case a meter is configured on StorEdge inverter, remove the meter setup configuration:

- Select: **Communication → RS485-1 Conf → Device Type → Multi-devices**.
- Select: **Meter2 → Meter Type → None**.

3 Install the RS485 Expansion Kit in the StorEdge Inverter, and connect the kit to the 3rd Party Gateway.

4 Connect the StorEdge Inverter RS485 Expansion port to the 3rd Party Gateway RS485 port using an RS485 twisted pair cable.

5 Perform the following steps on the LCD screen of the StorEdge Inverter:

- Select: **Communication → RS485-E Conf → Enable**. Press **Enter** to continue.
- Select: **Device Type → Non SE Logger**
- Select: **Protocol → Sunspec**
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TCP-Based Monitoring and Control

Modbus over Ethernet (TCP)

In this use case, a StorEdge system is controlled and monitored by a third-party gateway. An Ethernet switch connects a StorEdge inverter and the third-party gateway to a 3rd Party monitoring portal.
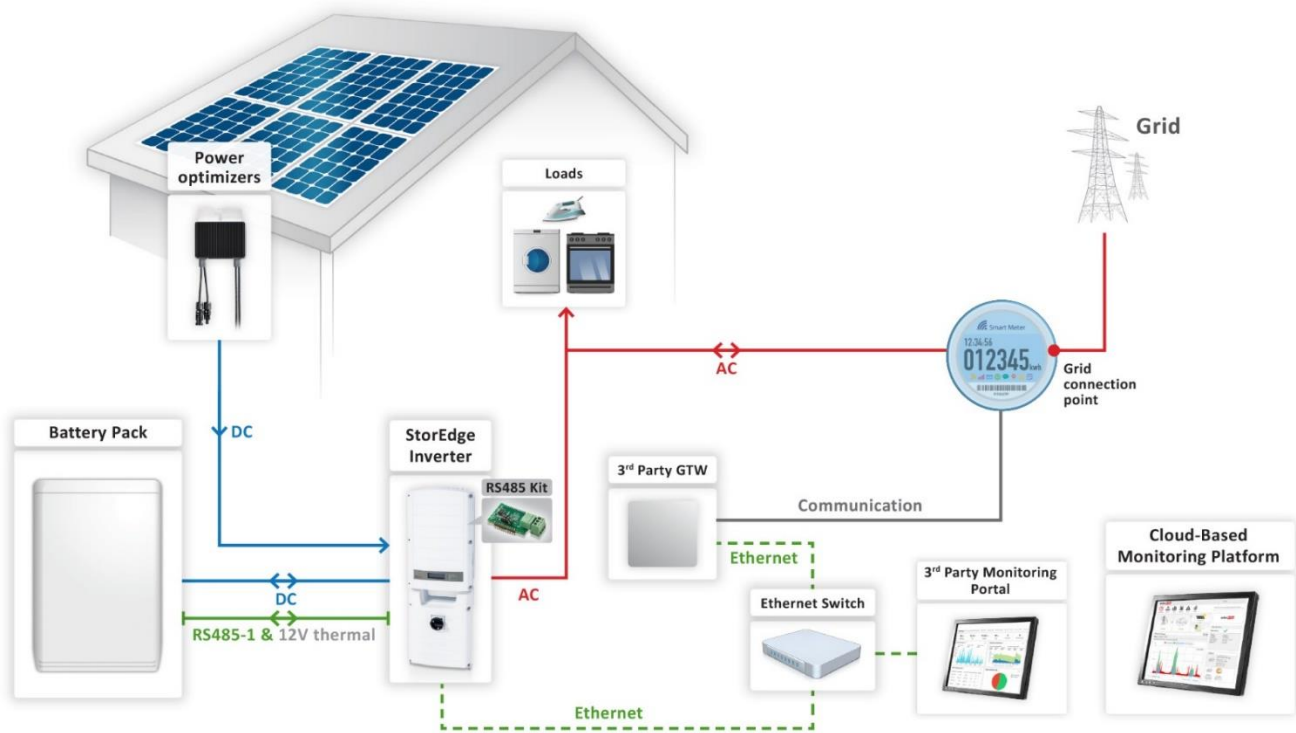

Figure 9: Ethernet-based monitoring and control solution

► **To install and configure an Ethernet-based monitoring and control solution:**

1 Install the StorEdge system as described in the document relevant to your location:

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- StorEdge Solution Applications – Connection and Configuration Guide – for North America
  http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 In case a meter is configured on StorEdge inverter, remove the meter setup configuration:

- Select: **Communication → RS485-1 Conf → Device Type → Multi-devices.**
- Select: **Meter2 → Meter Type → None.**

3 Connect the Inverter to the Ethernet switch using an Ethernet cable.

4 Connect the 3rd Party Gateway to the Ethernet switch using an Ethernet cable.

5 Configure Modbus TCP as described in the Technical Note – SunSpec Logging in SolarEdge Inverters:
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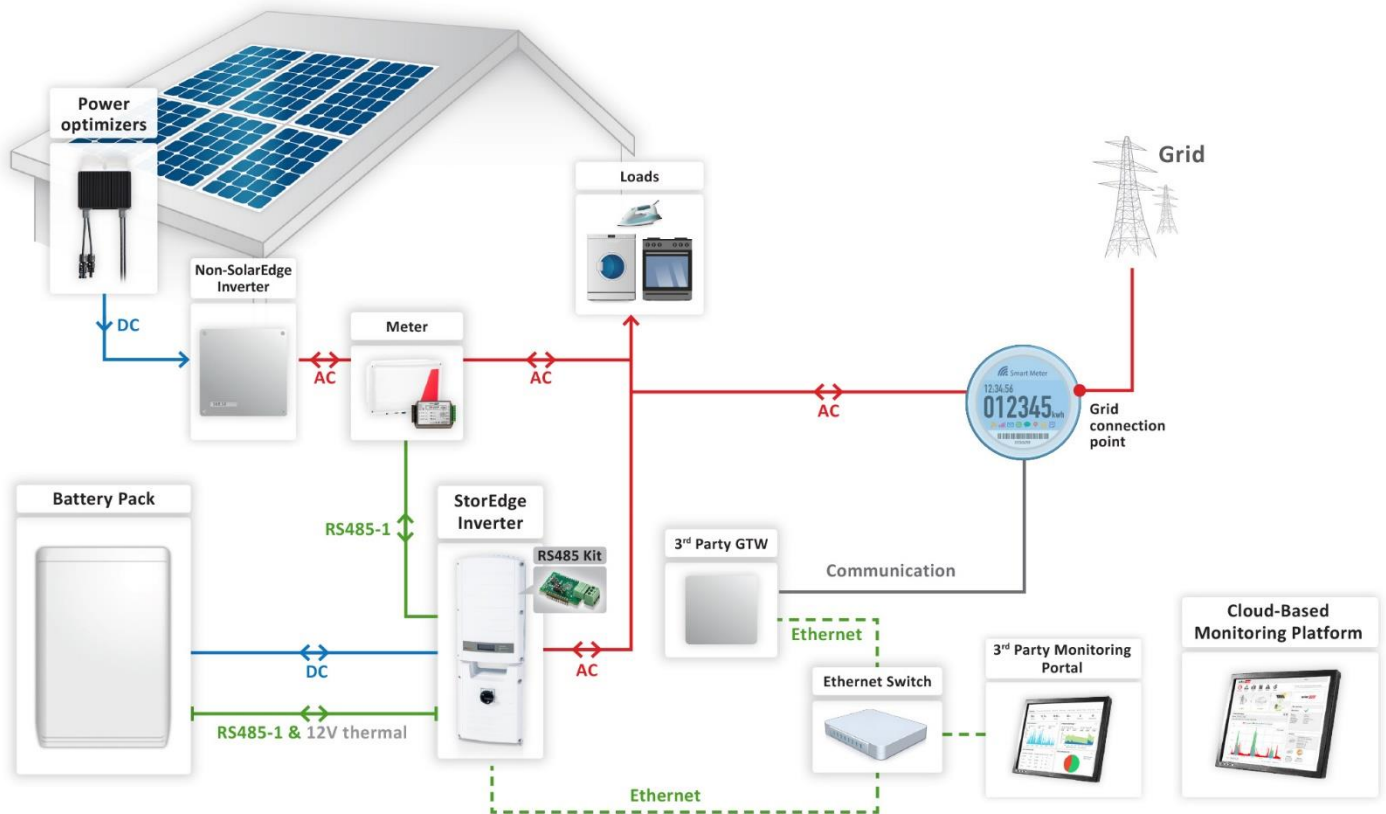

Figure 10: Ethernet-based monitoring and control solution for an AC-coupled system

► **To install and configure an Ethernet-based monitoring and control solution for an AC-coupled system:**

1 Install the StorEdge system as described in the document relevant to your location:

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- StorEdge Solution Applications – Connection and Configuration Guide – for North America:
http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf

2 In case a meter is configured on StorEdge inverter, remove the meter setup configuration:

- Select: **Communication → RS485-1 Conf → Device Type → Multi-devices.**
- Select: **Meter2 → Meter Type → None.**

3 Connect the Inverter to the Ethernet switch using an Ethernet cable.

4 Connect the 3rd Party Gateway to the Ethernet switch using an Ethernet cable.

5 Configure Modbus TCP as described in the Technical Note – SunSpec Logging in SolarEdge Inverters:
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In this use case, a StorEdge system with multiple StorEdge inverters is controlled and monitored by a third-party gateway. An Ethernet switch connects the StorEdge master inverter and the third-party gateway to a 3rd Party monitoring portal.
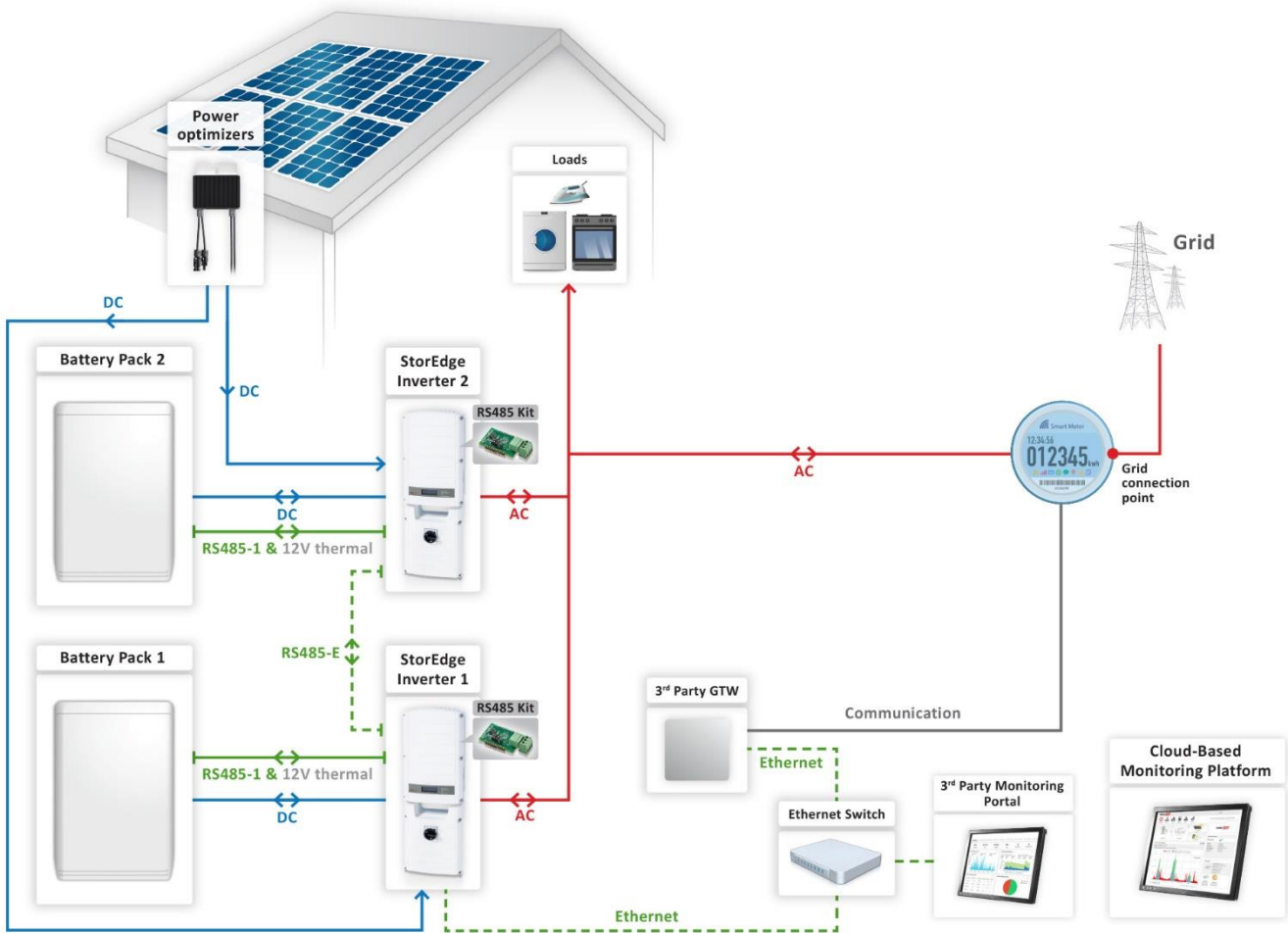

Figure 11: Ethernet-based monitoring and control solution for a high-capacity, high-power system

► **To install and configure an Ethernet-based monitoring and control solution for a high-capacity, high-power system:**

1 Install the StorEdge system as described in the Additional Capacity and Power section of document relevant to your location:

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http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf.

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- Select: **Communication → RS485-1 Conf → Device Type → Multi-devices.**
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3 Connect the Inverter to the Ethernet switch using an Ethernet cable.

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5 Configure Modbus TCP as described in the Technical Note – SunSpec Logging in SolarEdge Inverters:
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- Technical Note – Power Control Protocol for SolarEdge Inverters (contact SolarEdge support)