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Installation Guide

Smart Energy Switch

Version 1.3

Disclaimers

Important Notice

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The images contained in this document are for illustrative purposes only and may vary depending on product models.

Emission Compliance

This equipment has been tested and found to comply with the limits applied by the local regulations.

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, you are 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 the receiver.

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- 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.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

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HANDLING AND SAFETY INSTRUCTIONS

During installation, testing and inspection, adherence to all the handling and safety instructions is mandatory. **Failure to do so may result in injury or loss of life and damage to the equipment.**

Safety Symbols Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

	WARNING!
	Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
	CAUTION!
	Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the product**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
	NOTE Denotes additional information about the current subject.
	IMPORTANT SAFETY FEATURE Denotes information about safety issues.

Disposal requirements under the Waste Electrical and Electronic Equipment (WEEE) regulations:

	NOTE Discard this product according to local regulations or send it back to SolarEdge.

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Revision History

Version 1.3 (December 2019)

SetApp configuration updated

Version 1.2 (August 2019)

SetApp configuration added

Version 1.1 (May 2018)

Terminology and product name updated

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Overview

The SolarEdge Smart Energy solutions allow increasing the self-consumption of a site. One method used for this purpose is controlling the usage (consumption) of loads using Smart Energy products.

The Smart Energy devices divert power to an appliance (load) according to pre-configured schedules, using the following modes:

- **Schedule** - The device turns on and off at times set by the user for the user's convenience, regardless of available PV power.
- **Smart Save** - The device (typically a boiler or water pump) is controlled automatically to maximize self-consumption. Grid power is used only if PV power is insufficient to meet the user's "Ready by" time. For example, to heat water for 2 hours and have hot water by 18:00, set the **Duration** to 2 hours and **Ready-by** to 18:00. The boiler may work before 16:00 if there is available PV power, but in any case you are guaranteed to have hot water by 18:00.

Refer to *Figure 2* for examples of the device modes of operation.

You can re-configure the schedules at any time and manually switch appliances on and off.

You can configure the Smart Energy products locally through the inverter, or remotely via the monitoring platform (or monitoring smartphone app).

The SolarEdge Smart Energy Switch with meter (referred to as "the device") is a ZigBee wireless AC switch with a built-in energy and power-consumption meter that provides power measurements up to 2.5kW. Based on these measurements and on the system configuration it switches the loads on and off.

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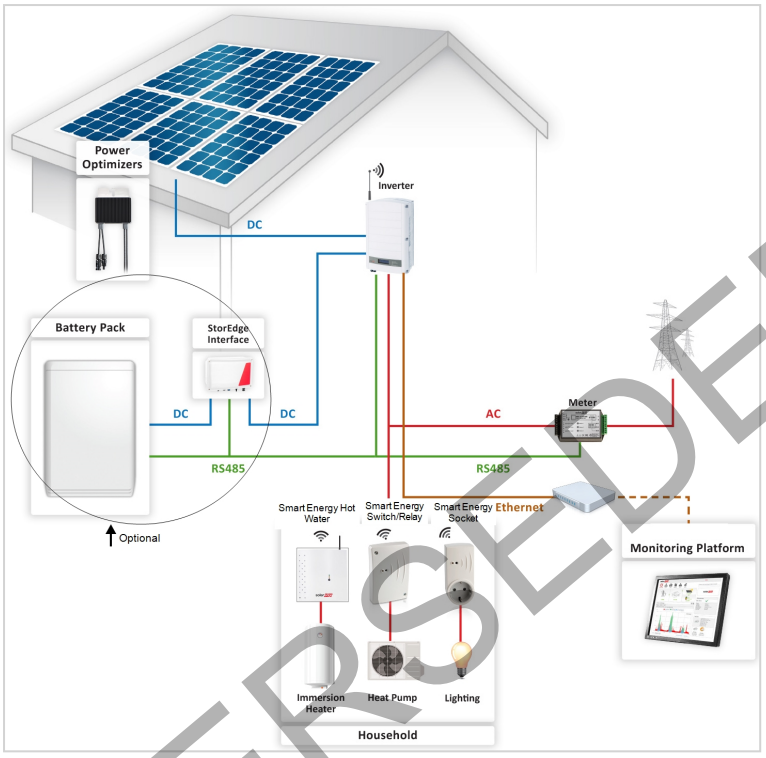


Figure 1: SolarEdge System with Device Control

The following figure illustrates a typical example of device operation with Smart Save and Schedule modes. Note that in Smart Save mode, the consumption is reduced by taking advantage of excess PV earlier in the day.

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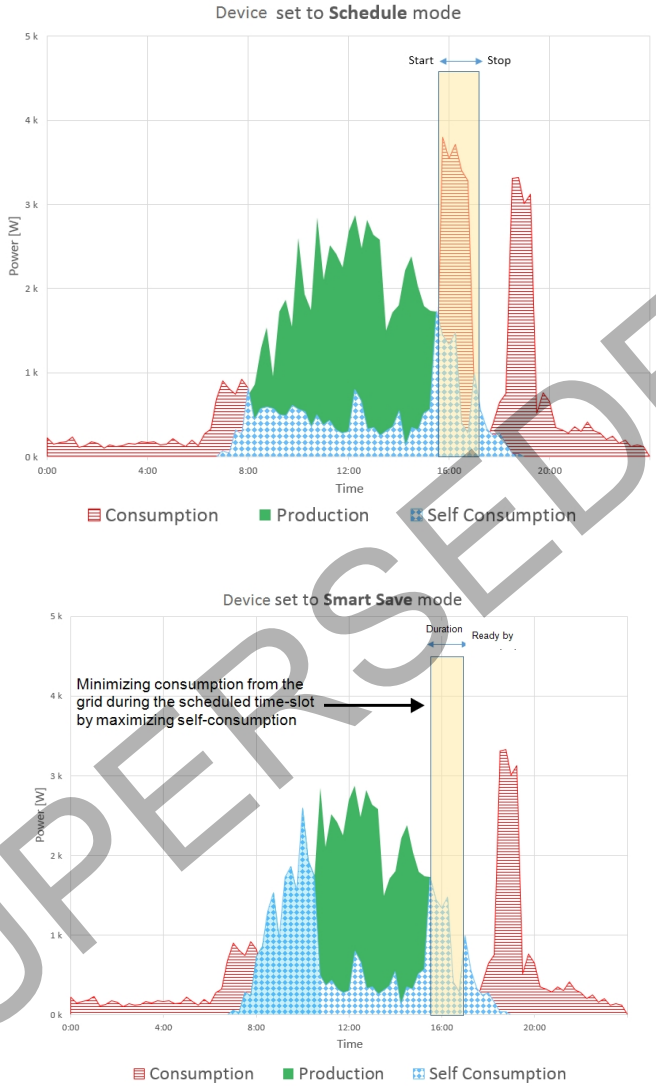


Figure 2: Examples of device operation

To enable the Smart Energy Switch functionality, the following supporting devices must be installed:

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- Energy Meter:
  - Energy Meter with Modbus Connection. Refer to: http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide.pdf or

    http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide-na.pdf

  - Energy Meter with Cellular Connection. Refer to https://www.solaredge.com/sites/default/files/se_energy_meter_cellular_na.pdf

- ZigBee Plug-in for Smart Energy. Refer to: https://www.solaredge.com/sites/default/files/se-device-control-zigbee-module-installation-guide.pdf

  https://www.solaredge.com/sites/default/files/se-zigbee-plug-in-for-setapp-installation-guide.pdf

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Installation

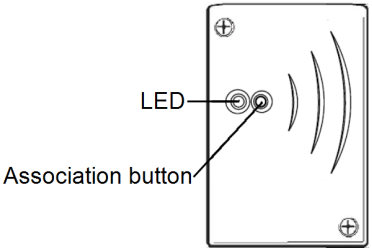


Figure 3: Smart Energy Switch

CAUTION!

- This product must be operated under the specified operating specifications, as described in the latest technical specification datasheet.
- Configure the product so that the load connected is not switched on or off more frequently than specified by the load manufacturer.
- Do not connect loads that require a continuous current supply (e.g. fridge, freezer).
- Do not use the product if it is damaged or malfunctioning.
- Never connect loads that can cause injuries or fire if they are switched on unintentionally (e.g. an iron).
- Do not let the product come into contact with water or other liquids.
- The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and observe all instructions contained therein.

1. Release the two screws of the device front cover and remove the cover.
2. Position the device against the wall and mark the drilling hole locations, at a maximum distance of 50 m from the inverter. Do not use the device as a drilling template as it may damage the enclosure.
3. Drill the holes and mount the device using screws and nuts. Fasten the unit to the wall.
4. Release the three internal screws at the bottom of the device, and remove the cable bracket.

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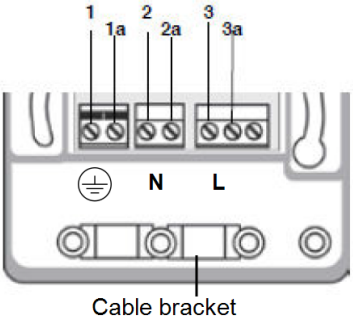


Figure 4: Smart Energy Switch connections

5. Connect the load wires to the terminal blocks (see *Figure 4* and *Figure 5*).

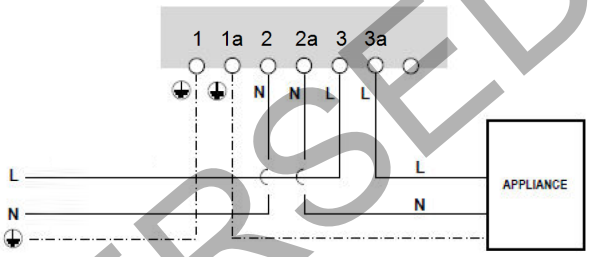


Figure 5: Connecting to appliance

6. Place the cable bracket over the cables and fasten using the screws.
7. Attach the cover to the device and fasten the screws.

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Configuration

Smart Energy devices are configured using the following inverter types:

- Inverters with an LCD - from firmware version 3.25xx.
- Inverters with SetApp configuration - from firmware version 4.7.xx.

For detailed information about various use cases, refer to https://www.solaredge.com/sites/default/files/home_energy_management_immersion_heater_controller_use_cases_app_note.pdf.

NOTE

Verify that the inverter has a ZigBee Plug-in installed and is connected to the monitoring platform (refer to the *Inverter Installation Guide* for details on setting up communication).

Configuration with Inverters with an LCD

Required inverter Firmware CPU version : v3.25xx and later.

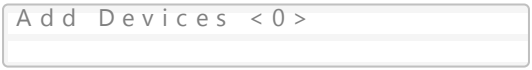
→ To associate the device with the inverter using the inverter LCD user buttons:

1. Enter the inverter Setup mode as described in the *Inverter Installation Guide*.
2. Select **Communication ➔ ZigBee Conf.**.
3. Select:
   - **Device Type ➔ HA** (Home Automation)
   - **Protocol ➔ HAM** (Home Automation)

   When HA Device Type is selected, a **Device Manager** menu item will appear in the main configuration menu:



4. From the main menu select **Device Manager**. The Device Manager screen is displayed:



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5. Select **Add Devices** to start the device association with the inverter.
6. Press the association button on the Smart Energy Switch.

   The Device Manager LCD screen should display a new line for each discovered device, including the 3 last digits of its serial number, operating mode and operating state. Discovery time may take up to 3 minutes. You can press the inverter LCD light button or the internal ESC button to exit the discovery process when all devices are discovered.

   ```
   Add Devices <3>
   SE-REG xxx <Auto,OFF>
   SE-REG-36xx<Auto,OFF>
   SE-SW xxx <Man, OFF>
   SE-S-PLGxxx <Man OFF>
   Remove All
   ```

   Device types:

   - **SE-SW** - Smart Energy Relay
   - **SE-S-PLG** - Smart Energy Socket
   - **SE-S-SW** - Smart Energy Switch

7. Select the device. The device configuration screen is displayed:

   ```
   Mode<Manual>
   State<OFF>
   Device Info
   Remove Device
   ```

   For the following device configuration steps, you can use either the inverter LCD buttons or the monitoring platform/ app. The steps herein show configuration using the inverter LCD.

   For configuring using the monitoring platform, refer to https://www.solaredge.com/sites/default/files/configuring_device_control_with_the_monitoring_app.pdf

8. Select **Mode**. The mode configuration screen is displayed:

   ```
   Manual
   Auto
   ```

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- **Manual** - turns the device to ON or OFF, as described below
- **Auto** - allows setting two types of schedules for Home Energy Management, as described in the next sections:
  - **Smart Save** - set the device operation requirements (ReadyBy and Duration values). This mode is useful for maximizing self-consumption using excess PV power: the device operates autonomously based on configured settings.
  - **Schedule** - set the device start and stop times regardless of available excess PV power.

→ To set Manual mode:

1. Select **Mode ➔ Manual**
2. Select **ON** or **OFF** to turn the device on or off.

→ To set Auto mode:

1. Select **Auto**. The following screen is displayed, showing options for setting the device parameters:

```
Mode <Auto>
Use Excess PV <Y>
Add Schedule
Device Properties
Device Info
Remove Device
```

2. Select **Device Properties** and set the following properties:

```
Load Rating <x.xKW>
Export TH <xxxxW>
Import TH <xxxxW>
Min On Time <xxx>
```

- **Load Rating** - the rated power (in kW) of the appliance
- **Export TH** (threshold) - optional; the minimum power (in W) above which the excess PV power will be diverted to the appliance. This value can be lower than the load rating. The default value is 5% above the Load Rating.
- **Import TH** (threshold) - optional; the maximum power (in W) purchased from the grid and diverted to the appliance. The default value is 5% of the Load Rating.

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NOTE

If changing the Export TH and Import TH default values, make sure they sum up to a value that equals or greater than the appliance Load Rating value. Otherwise, the device will turn off when there is insufficient power to divert to the appliance.

- **Min ON Time** - (optional); the minimum duration (in minutes) the appliance should remain ON once switched on, even when no excess PV power is available. The default value is 5 minutes.

3. Select **Use Excess PV**. The following screen is displayed:

```
Set <Yes>
Week Days <1234567>
```

- **Set** <Yes/ No> - automatically divert the excess PV to the device (default: Yes).
- **Week Days** <optional> - days to repeat the settings (default: every day).

4. Select **Add Schedule**. The following screen is displayed, showing schedule setting options. You can configure up to four different schedules.

```
Smart Save
Schedule
Disable
Remove Schedule
```

Use **Disable** to deactivate a schedule or **Remove Schedule** to delete it.

5. Select and set one of the scheduling options:

- **Smart Save**:

```
Set<Smart>
Ready by <00:00>
Duration <00>
```

- **Ready by** - requested energy must be diverted to the load by this time (default: 00:00; format: hours:minutes).
- **Duration** - minimum accumulated time the load must remain on (in minutes; default: 00).
- **Schedule**:

```
Set <Schedule>
Start Time <00:00>
End Time <00:00>
Week Days <1234567>
```

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- **Start/End Time** - the time of day by which the Smart Energy Switch must start/ complete its task of delivering energy to the load (default: 00:00; format: hours:minutes). If these values are not set, only the excess PV power is used.
- **Week Days** (optional) - days to repeat the settings (default: every day).

NOTE

In Auto mode , if you configure overlapping time-frames between Schedule and Smart Save options, Schedule mode takes precedence over the Smart Save mode.

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Configuration with Inverters with SetApp

Required inverter Firmware CPU version : v4.7xx and later.

→ To associate the Smart Energy device with the inverter using SetApp:

1. Access SetApp as described in the *Inverter Installation Guide*.
2. Select **Commissioning** > **Communication** > **ZigBee** > **Protocol** > **Home Automation**.
3. Return to the **Commissioning** screen.
4. Select **Device Manager**. The **Smart Energy Manager** screen is displayed.
5. Select **Add Devices** to start device association with the inverter. A 3 minute countdown starts.
6. Within the 3-minute time, press and hold the association button for 2 seconds. SetApp indicates that the device has been associated.
7. After all required devices have been associated, tap **Stop** in the Smart Energy Manager to exit.

→ To configure the Smart Energy device:

1. Go to the monitoring platform web-site on your computer, or open the monitoring platform application on your mobile device.
2. Click/tap the **Smart Energy** icon.
3. Select a device and go to **Details and Settings**.
4. Complete the following information:
   - Rated power
   - Min active time
   - Device icon
   - Device name
5. Return to the device screen and configure:
   - Schedules
   - Ready-by timers
   - Excess Solar Power mode (requires a SolarEdge Energy Meter)
   - Device state

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Modifying the Device Operation Mode and Schedules

You can re-configure the device operation mode and schedules at any time, using the monitoring platform.

To	Do this
Manually turn the load on or off	Select the device from the Device Manager screen. Select **Mode ➔ Manual** and set the device to either **ON** or **OFF**.
Disconnect the device(s) from the network	Select **Remove Device** or **Remove All** from the device screen.
Modify the schedule configuration (only for inverters with an LCD)	Select the device from the Device Manager screen. Select **Mode ➔ Auto** and set the parameters of any menu: **Smart Save/Schedule**.
Disable or delete a schedule (only for inverters with an LCD)	Select **Disable** or **Remove Schedule** from the Schedule screen.

Verifying the Connection

1. Check the status screens:
   - *HA devices* status, showing the device name and state: ON, OFF, or an asterisk (*), which indicates no communication with the device:

     ```
     HA Devices State:
     SE-S-PLG 011 <ON>
     ```

   - *Communication* status, showing the number of communicating HA devices (under Prot) and the number of detected devices (under ##):

     ```
     www Dev Prot ##
     RS485-1 <---><--><-
     >
     ZigBee <HA> <
     1><1>
     ```

2. To check the device details, from the device configuration screen, select **Device Info**. The following screen is displayed:

   ```
   MAC: xxxxxxxxxxx
   Last seen:<DD:HH>
   MFG: SolarEdge
   Model: SE-S-PLG
   Power [W]: 0
   ```

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- **MAC**: the full MAC address of the device
- **Last seen**: The date and time when the device communicated with the inverter
- **MFG**: The device manufacturer
- **Model**: The device model type
- **Power [W]**: The energy delivered to the load

LED Indications

The device has a bi-color LED (red/ green) that provides information about its operation status:

LED function	Indication
Solid green (2 seconds), flashing green (2 seconds)	Reset
Flashing red	No ZigBee association with the inverter
Flashing green	ZigBee association in process
Solid green	ZigBee association completed and the relay is closed
Solid red	ZigBee association completed and the relay is open

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Button Functionality

The following table describes the device button functions depending on the network association state:

Network state	Pressing duration	Result
No ZigBee association with the inverter	Any	Attempt to associate with the network
ZigBee associated with the inverter	Up to 3 seconds (short press)	Manually toggle ON/OFF state (manual mode). To return to Auto/Scheduled states, configure the device using the mobile application or monitoring platform.
	More than 10 seconds (long press)	Disconnect from the network (the LED turns red and the device resets).
	3 - 10 seconds	Start a discovery search for nearby devices. The discovery may take up to 3 minutes during which the device is not functional. Not required for normal operation.

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Troubleshooting

Symptom / Error	Possible cause	Troubleshooting
• An asterisk (*) is displayed next to the Device type in the device manager screen indicating that the device is not communicating. • In the Communication status screen, the number of detected devices does not match the number of communicating devices. • The device is powered on but the green LED is OFF	The device is not associated with the inverter	Try to solve using these options. If problem is not solved, proceed with the next option: • Turn the device OFF and ON. Recheck communication. • Reset the device by pressing the button for more than 10 seconds and then repeat the association process. Reconfiguration is *not* required. • From the Device Manager screen select **Remove Device** and repeat the discovery process. Reconfiguration is required in this case. • Contact SolarEdge support.
The device is powered on and the green LED is ON	The device is Associated with the inverter but is not communicating.	
All the devices are not communicating	**No ZigBee** error is displayed on the inverter LCD - The inverter has not detected the installed ZigBee Plug-in.	• Turn OFF the AC to the inverter. • Check that the ZigBee Plug-in is inserted correctly inside the inverter. • Turn ON the AC to the inverter.

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Symptom / Error	Possible cause	Troubleshooting
	Network problems	Try to solve using these options. If problem is not solved, proceed with the next option: • Check the ZigBee status screen: Verify that PAN has been established and Channel is not 0: PAN:XXXXX CH:XX/XXXX RSSI:<L> MID:XXXX XX • Turn the inverter OFF and ON (power cycle). • Reset all the devices using the association button and begin the discovery process again for all devices. • From the Device Manager screen select **Remove All** and repeat the discovery process for all the devices. • Contact SolarEdge support.
Error message **Device limit reached. Remove devices from the device list** is displayed in the LCD.	You are attempting to associate more than 10 devices to the load managemnt network.	Remove an unused device from the device list before attempting to add another device.

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Specifications

ELECTRICAL SERVICE	SEHAZB-SWITCH-MTR	Units
Operating Voltage Range - Line to Neutral	90 - 250	Vac
AC Frequency	50/60	Hz
Maximum Active Power Measurement	2.5	kW
Maximum Load Current	13	A
COMMUNICATION		
Supported Communication Protocol	ZigBee Home Automation	
Nominal Transmit Power	3	dBm
Operating Frequency Range	2.4 - 2.5	GHz
Outdoor (LOS) Range	100	m
Indoor Range(1)	50	m
STANDARD COMPLIANCE		
Radio	ETSI EN 300 328 V 1.8.1, ETSI EN 301 489-1, ETSI EN 301 489-17	
Safety	EN 60335-1, EN 60335-2-30, EN 50371	
Immunity	EN 55014-2	
Emissions	EN 55014-1, EN 61000-3-2, EN 61000-3-3	
INSTALLATION SPECIFICATIONS		
Operating Temperature Range	0 to +50	°C
Protection Rating	IP30	
Dimensions (H x W x D)	110 x 70 x 25	mm
Mounting Type	Wall mount	

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(1)Approximate values. May differ depending on specific installation conditions.

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