CS1030 Wall Receptacle Outlet

User Guide

Long-range, switchable, wall receptacle outlet supporting LoRaWAN or Coralink wireless protocols. Ideal for applications in smart-building, home automation, and smart city lighting and control.

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Contents

Getting Started

The CS1030 is a long-range, switchable, wall receptacle outlet supporting LoRaWAN or Coralink wireless protocols. The 120V, 15-amp rated unit also provides a 2.4 Amp USB Type A output. One device outlet can be controlled remotely or configured to turn on/off automatically with built-in scheduler, while the other outlet is always on. The CS1030 supports advanced scheduling capabilities including dynamic sunrise or sunset alarms, repetitive alarms, and advanced programmable schedule triggers that can be initiated by LoRaWAN.

Ideal for smart home / smart building / smart city applications the device improves efficient energy management and enhanced safety and security. Control lighting and equipment from very long distances supporting a wide variety of public and private LoRa networks.

The outlet can be configured to monitor temperature supporting real-time measurements, statistics, and threshold notifications.

What's In the Box

The standard CS1030 single wall outlet package includes:

A. In-wall receptacle LoRaWAN compatible outlet: U.S. standard AC output rated for 100-120VAC
B. Cross Head Screw (M3)(2)
C. Slotted Head Screw (M3)(2)

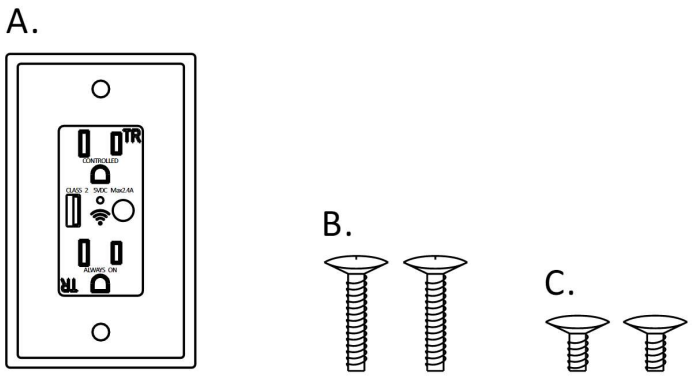


Figure 1 - Items included in the C1030 package

Registering / Claiming the Device

The outlet is easily registered or claimed by scanning the QR claim key found on the side of the outlet or on a removable sticker adhered to the front. Please consult your IoT application provider for details on scanning the claim key and registering the device with your account.

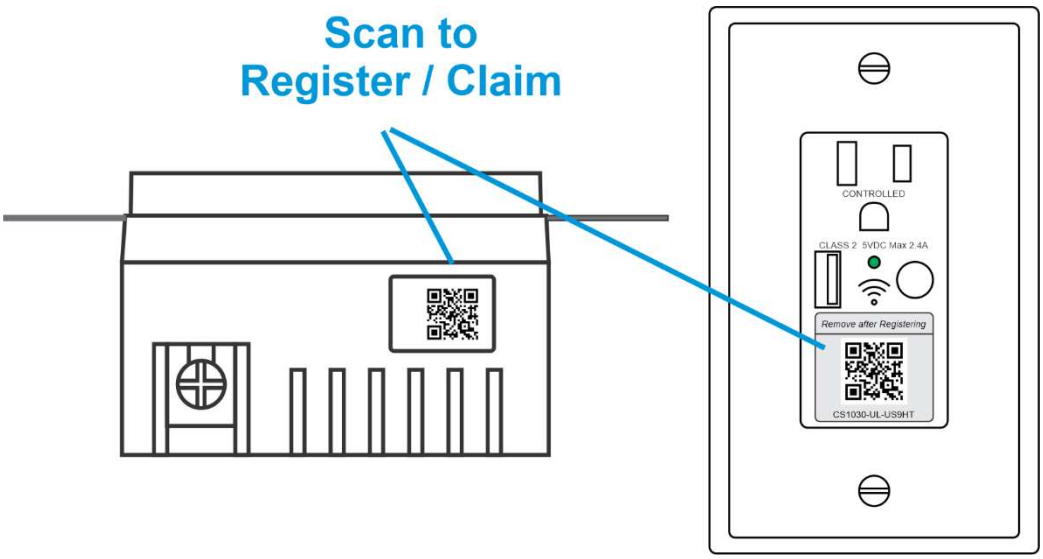


Figure 2 – CS1030 QR claim key simplifies device registration and activation.

Once the device is registered or claim. The application provider will have secure access to the device identity information, which will allow provisioning the device on any supported LoRaWAN network.

User Interface

The CS1030 user interface is shown in the figure below.

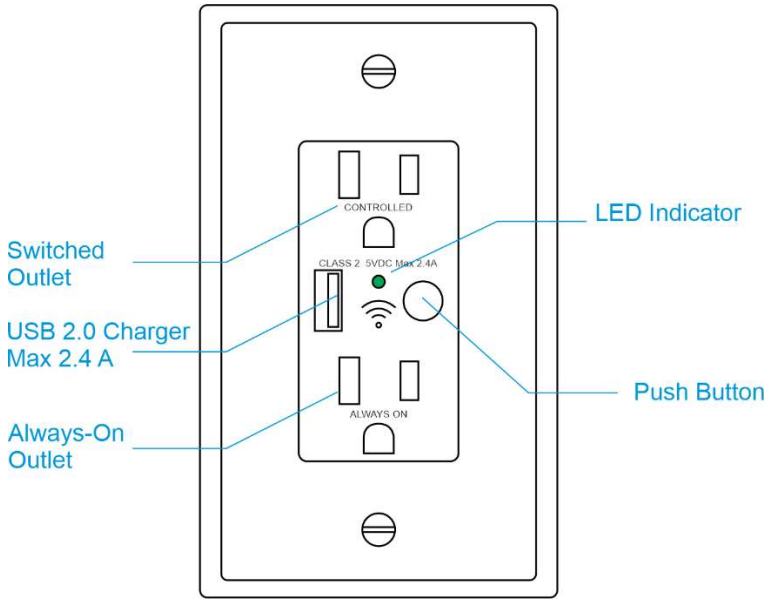


Figure 3 – Performing Network or Factory Reset on the Wall Outlet

The device provides one switched outlet and one always-on outlet, a 2.4A (5V) USB charger, an LED Indicator, and a push button.

Push Button

The Status LED on the front of the CS-1030 indicates the following status:

Action	Description
One (1) quick press	Default toggles the switched outlet on/off.
Two (2) quick presses	Default turns on switched outlet for three minutes
Press and hold > 10 seconds	**Network Reset** Press and hold the SET button for 10 seconds, but less than 25, then release. The device will reset all LoRaWAN Settings, which does not affect device operation or configuration.
Press and hold > 25 seconds	**Factory Reset** Press and hold the SET button for > 25 seconds, then release. The device will reset all parameters to factory defaults. Following reboot, a Factory Reset event uplink (confirmed) will be sent upon rejoining the LoRaWAN network.

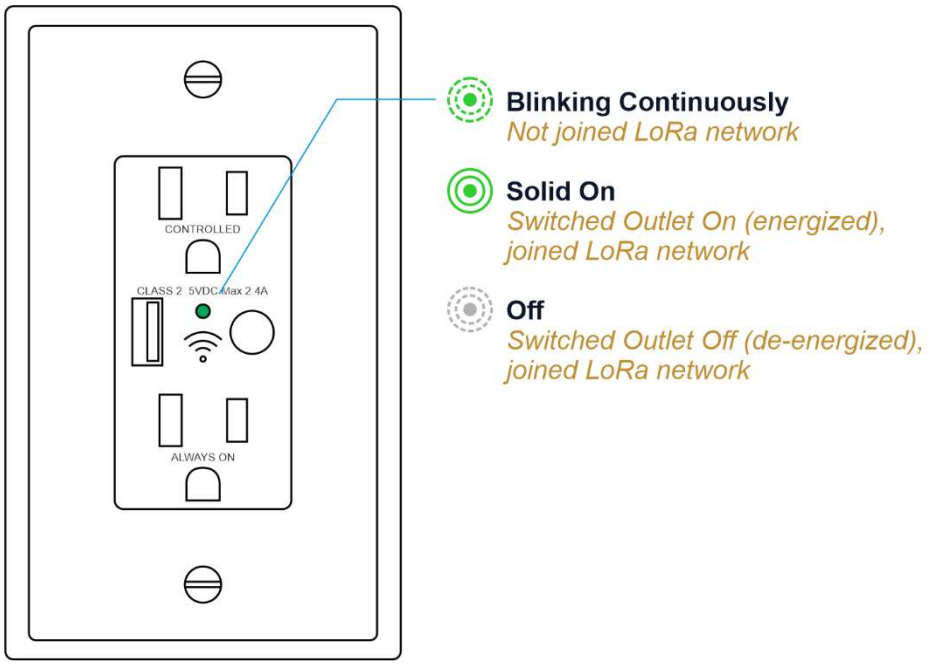


Figure 4 – CS1030 LED Status Indicators

Status Indicators

The Status LED on the front of the CS-1030 indicates the following status:

LED	Status
Blinking on/off (1sec interval)	Not Joined to LoRa Network
On	Switchable Outlet On (energized)
Off	Switchable Outlet Off (de-energized)

Attaching to the Network

Once AC Power is connected, the CS1030 will automatically attempt to join the LoRaWAN network automatically and the Status LED will blink continuously. After a while, the join schedule will become less aggressive and up to 12 hours will elapse between join attempts. To immediately force the CS1030 to join, perform a Network Reset operation.

To learn more about the capabilities of the CS1030, see *Configuration and Integration*.

About LoRaWAN

LoRaWAN is a low-power, secure, wide area (LPWAN) networking protocol designed to wirelessly connect devices to the internet in regional, national, or global networks. To use the CS1030 Wall Outlet, wireless connectivity to an internet connected LoRaWAN gateway is required.

For more information about LoRa and LoRaWAN visit the LoRa Alliance webpage: https://lora-alliance.org/.

Terminology

- Message sent from the Wall Outlet to the network are referred to as “uplink messages” or “uplinks”.
- Messages sent to the Wall Outlet from the network are referred to as “downlink messages” or “downlinks”.
- Both uplink and downlink messages may be of either “confirmed” or “unconfirmed” type. Confirmed messages are guaranteed to be delivered but will consume extra wireless bandwidth and battery life. These mechanisms are analogous to TCP (confirmed) vs UDP (unconfirmed) protocols used for IP networks.
- Before a device, such as the CS1030 Wall Outlet can transmit messages using LoRaWAN it must go through a “join” process. The Join process involves key-exchange with the cloud-hosted network provider (The Things Network, Helium, etc.) and is defined in the LoRaWAN protocol standard. If connectivity is lost due to RF interference, power loss or other temporary internet outages, the device will need to rejoin the network prior to being able to transmit messages. This process happens automatically but is managed in a power-efficient manner and may take significant time depending upon network congestion and availability.

Installation

Important Safety Notice

If you are not comfortable working with 120V electrical wiring, please consult or hire a qualified electrician. Turn off circuit(s) at the breaker or fuse panel and confirm there is no voltage in the box before starting the installation (there may be multiple live circuits within the switch box). Failure to use best electrical safety practices can result in injury or death! All wiring connections must be made after the power is turned off to avoid personal injury and/or damage to the outlet.

- In-wall Outlet is designed and intended for indoor use only!
- Total 15-amp maximum current. (Refer to the equipment or light bulb/fixture specifications if in doubt).
- Outlet is designed and intended only for permanently installed fixtures, and in accordance with the national and local electrical codes and regulations of the United States or Canada, as applicable

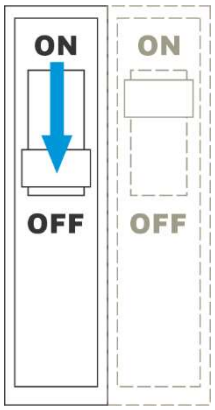
Getting Ready

Please ensure that the following equipment and electrical requirements are met before installing the outlet.

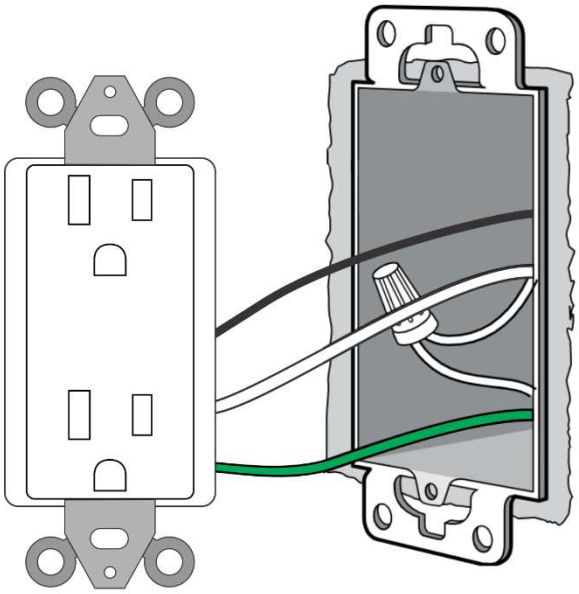
- Existing wall outlet replacement or new box with wiring ready has three wires: line (black), neutral (white), ground (green).
- At least two (2) inches of box depth is required (2 1/8” deep electrical boxes are typical).
- Tools: you will need a Phillips screwdriver, flat-head screwdriver, wire strippers, and voltage tester.

Outlet Installation

- Turn off Circuit(s) at the breaker or fuse panel and confirm there is no voltage in the electrical box before starting installation (there may be multiple live circuits within the switch box).
- Unscrew and remove the outlet plate; then use a voltage tester to confirm the circuit is dead



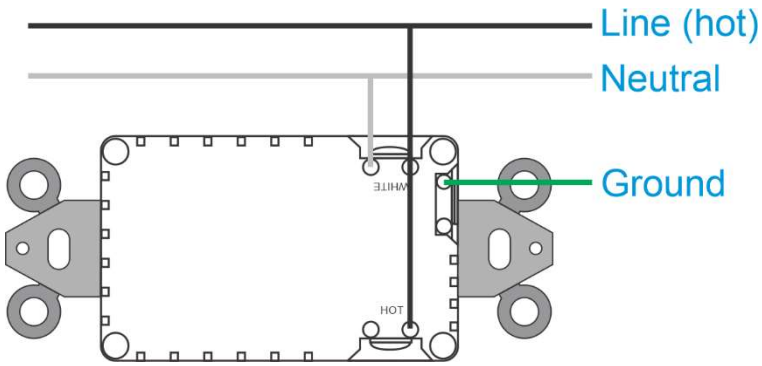
- Unscrew the outlet from the electrical box and pull it out with the wires still attached.



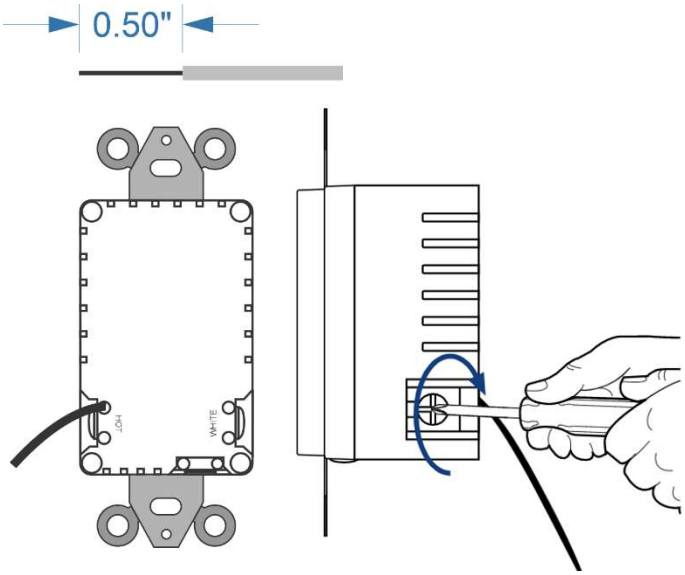
- Three wires will be attached to the outlet: an incoming line (hot) wire, which is black; a neutral wire, which is white; and a grounding wire, which is green or bare typically copper. There may be other wires in the box, but you should only be working with the wires connected directly to the outlet

- Compare your new outlet with the one you are replacing to find the corresponding locations for the electrical screw connectors.

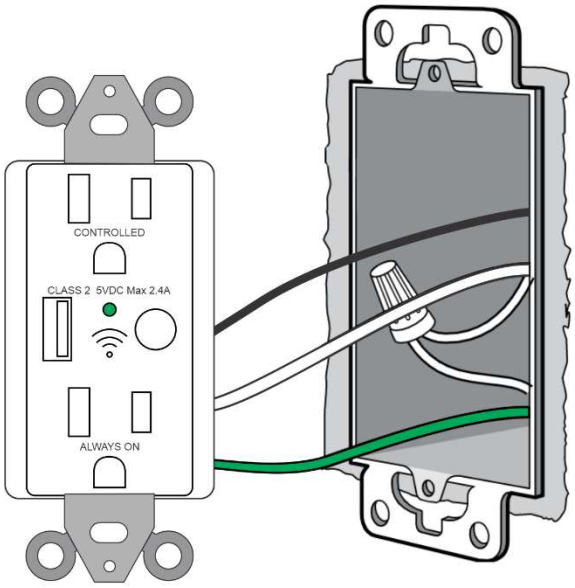
- With the power off, transfer the wires one at a time, matching the same color to the appropriate locations on the new outlet.



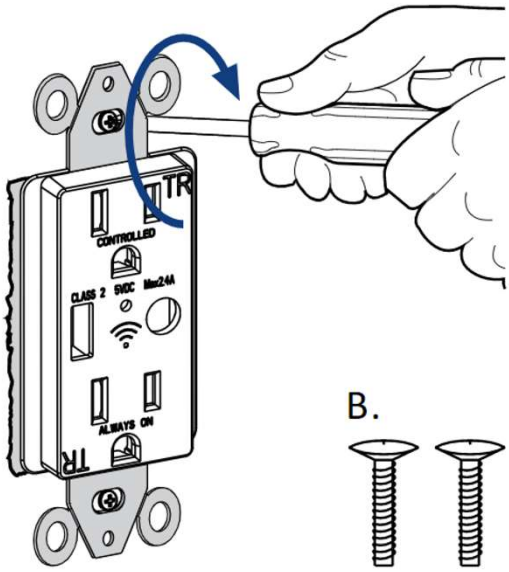
- Connect the first wire, unscrew the associated screw terminal on the In-Wall Outlet
  - Before Connecting, ensure about ½ inch of the wire is exposed. Strip off excess shielding as necessary
  - Insert the wire into the terminal
  - Tighten the screw terminal
  - Gently tug on the wire to ensure a tight connection



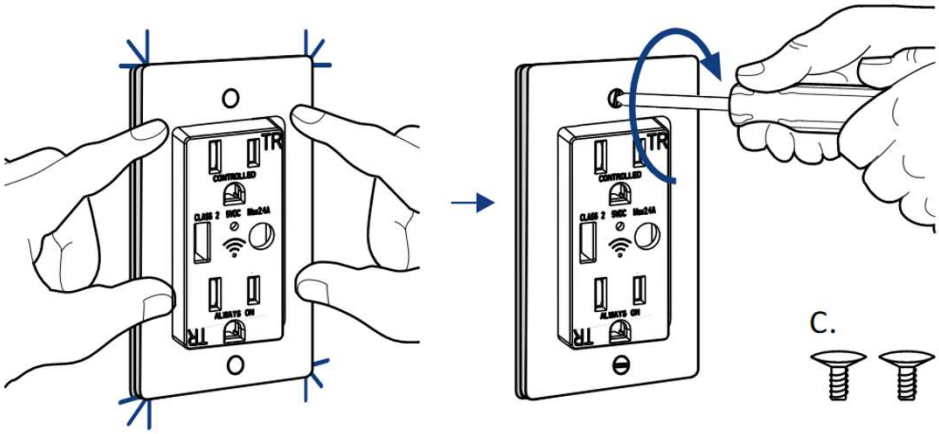
- Gently push the new, wired outlet back into the electrical box and screw it in place.



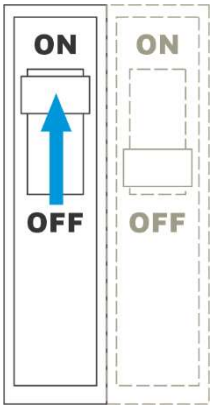
- Secure the outlet to the box with the two screws.



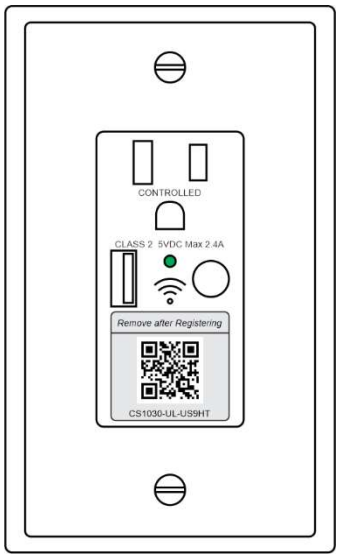
- Snap on the plate and affix with the provided screws.



- Turn on the power.



- If installed correctly, the outlet LED indicator should be blinking slowly indicating that it has not joined. If the device is not yet registered. Follow the procedures discussed in Section *Registering / Claiming the Device.*
- If the outlet was previously registered, press the push button quickly to activate the switched outlet. The status indicator should be green.
- Press the push button again to turn off the switched outlet.
- CS1030 Wall Outlet installation is complete and is now ready for use and/or additional configuration.



Event Notifications and Reports

The CS1030 Wall Outlet has the following event notifications:

Outlet Socket Notifications:

- Outlet ON (energized) – The outlet is powered on (***default enabled***)
- Outlet OFF (de-energized) – The outlet is powered off (***default enabled***)

Additionally, statistics can be enabled to report aggregate outlet socket event activity:

- ON Counter (how many times socket has been switched on)
- OFF Counter
- Current ON or OFF time duration (current state of the switch)
- Min/Max ON Duration
- Min/Max OFF Duration

This device includes temperature measurement capabilities. If your application supports the Temperature API, the following events & statistics are available:

Temperature Event Notifications:

- Temperature value greater than or less than specified value
- Temperature relative change (positive or negative or both) exceed specified threshold

Temperature Statistics:

- Min Temperature
- Max Temperature
- Average Temperature
- Temperature Variance (take square root to get standard deviation)
- Samples takes in last period

All Statistics are stored in non-volatile memory and will persist through a power outage. Both the statistic reporting and alarms can be configured remotely by sending downlink messages.

The device has a periodic Heartbeat status message that is sent to maintain LoRaWAN network connectivity. The default period for this message is 60 minutes and may be configured between two (2) minutes minimum and 48 hours maximum.

Reset Notifications

FACTORY RESET uplink messages will be sent after rebooting.

Firmware Version

The firmware information can be retrieved via sending a downlink command. See *Configuration and Integration* for details.

Configuration and Integration

The CS1030 supports the following settings and features, which are configured via downlink messages.

Configuration	Description	Units	Default
Set/Get State	Turn the switch on/off	N/A	N/A
Set/Get Time	Set the device current time and location	N/A	N/A
Weekly Schedule	Set one or more repeating weekly schedules to turn the device on/off	N/A	N/A
Timers	Set one or more timers that can be triggered using a variety of events.	N/A	N/A
Heartbeat Interval	Specifies the heartbeat message uplink interval	minutes	60
Statistics Interval	How often the statistics are uplinked.	minutes	0: disabled
Clear Statistics	Downlink this message to clear the stored statistics	N/A	N/A
LED Mode	• LED ON (Telemetry Only) • LED ON (Sensor and Telemetry)	N/A	LED ON (Device and Telemetry)
Notification Confirm / Unconfirmed Setting	If set to true, notifications are confirmed uplink messages. Set to false to uplink without confirmation.	N/A	CONFIRMED MESSAGES
Notification Enable	Enable or Disable notifications. If disabled, the device operates as a counter / statistic only device.	N/A	enabled
Firmware Version	Downlink this message to retrieve the firmware information	N/A	N/A

For information on decoding and encoding the outlet messages please visit the product page at Cora CS1030 Wall Outlet - Technologies.

Specifications

- LoRa Protocols: Coralink Class C, LoRaWAN Class C
- LoRa Frequencies: US (915 MHz)
- ETL-Listed, FCC Approved
- Color: White
- One Power (on/off) control button
- Green status Indicator LED
- USB output: 5 Volts DC, 2.4 Amps Maximum
- AC Input Power: 100-120VAC, 60Hz
- AC Output Rating: 100-120VAC, 15 Amps Max. (Resistive)
- Environmental:
  - Operating Temperature Range: 14°F – 104°F (-10°C – 40°C)
  - Operating Humidity Range: < 95% non-condensing
- Intended for indoor use only

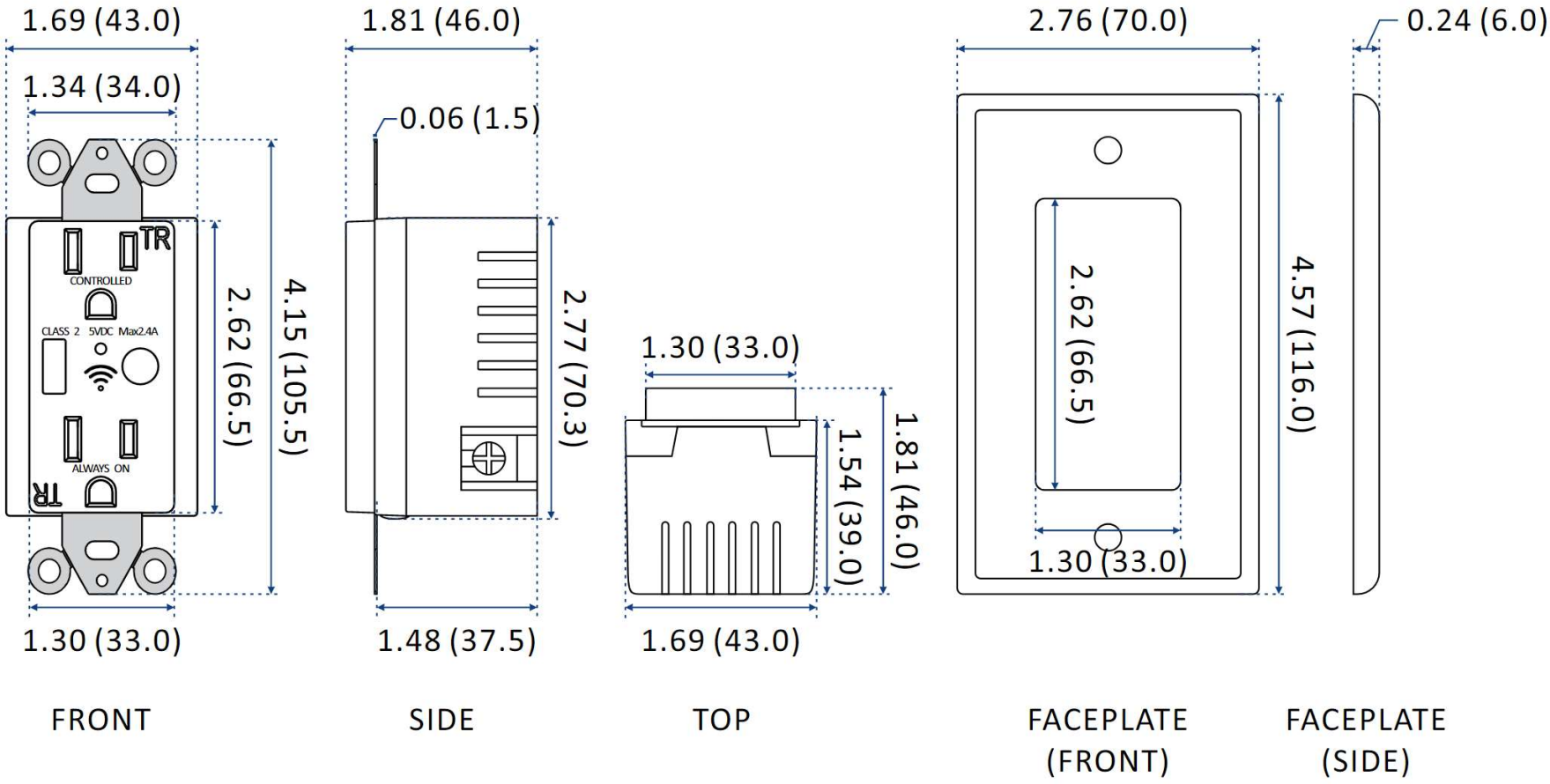
Temperature Measurements and Thermal Heating

All wall sockets can experience a minor thermal heating effect localized to the socket housing due to impedance at the socket-to-plug connection and minimal airflow inside the fixture box. This minor heating effect is normal in the operation of all electrical sockets and is not a safety concern. The magnitude of localized heating increases as the current draw of the connected load increases.

The temperature sensor of the CS1030 is located inside the socket-housing. Therefore, the temperature measurements obtained from the CS1030 should be considered a rough estimate of ambient temperature around the unit. Especially when installed indoors, the CS1030 temperature readings may often be higher than expected due to localized thermal effects from connected loads on either the always on-socket or the LoRaWAN controlled socket.

Dimensions

Unit: inches (millimeters)



Ordering Information

Communication Options

Prior to ordering, determine the communication requirements:

- **Application Protocol**: Untethered XMF or CP-Flex OCM
- **Network Protocol**: LoRaWAN or Coralink
- **Operating Region and Frequency**: US915, EU868, CN470 (others available upon request)
- **Network Provider**: TTN, Helium, Chirp stack, etc.

Product SKU

When placing an order use the following SKU structure to determine the specific version, profile, hardware revision, and packaging needed for the application.

The specification below details the SKU fields and character length.

[id: 6]-[version:2]-[Profile:5]-[Packaging:2]

The fields are defined as follows.

Field name	Character Length	Description
ID	6	Device six (6) character identification code, Available options: CS1030 – Revision A Cora Wall Receptacle Outlet
Version	2	Device version specification identifying one or key variations that differentiate this version of the component relative to others. Available options: UL – Untethered XMF Application / LoRaWAN protocols CL – Cora OCM / LoRaWAN protocols CC – Cora OCM / Coralink protocols
Profile	5	Profile code specifies a configuration that may be unique for an implementation. Available options: US9HT – U.S. 915 MHz Region supporting Helium, TTN sub-band 2. EU8ST – Europe 868 MHz region standard configuration CN4EZ – China 470 MHz region Easylinkin (Link ware) network configuration

		Other profiles are available upon request.
Packaging	2	Packaging configuration. This code determines the packaging format for the device. Available standard options: 00 – Standard reseller packaging. 0X – Custom packaging option. Contact Codepoint for further information.

Example SKUs:

- **CS1030-UL-US9HT-00** – Wall Outlet for U.S. region, untethered, supporting Helium and TTN sub-band 2.
- **CS1030-UL-EU8ST-00** – Wall Outlet for Europe region, untethered, standard configuration.
- **CS1030-CL-US9HT-00** – Wall Outlet configured for Cora OCM and CP-Flex cloud stack integration, Supports OCM V2 protocol specifications.

FCC Statement

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
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Increase the separation between the equipment and receiver
- Consult the dealer or an experienced radio / TV technician for help

- 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
  2. This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

FCC RF radiation exposure statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter. "To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."