
R1 & R1HP Wireless Power Transmitter Datasheet

1. Introduction



Figure 1 – R1 Transmitter

The R1 is a long-range wireless power transmitter that delivers 100mW of usable power at 10m/33ft. The R1-High Power delivers 300mW at 5m/16ft. Providing more average power than batteries and more portability than wired connections, it allows manufacturers to free users from power cords, battery recharging and battery replacement.

1.1. Features

- Delivers 100mW or 300mW of power to multiple devices 10 meters or 5 meters away.
- Plug-and-play operation. No configuration required.
- Small form-factor; suitable for commercial, industrial, and residential environments.
- Based on IR light. Does not interfere with Wi-Fi, cellular or other communications.
- Safe. Complies with US and international safety standards for consumer devices.
- Wi-Fi connectivity enables remote data collection and control.

1.2. Applications



Figure 2 – Receiver

Touchless Appliances
Security & Access Control
Retail
Motorized Blinds

Digital Signage
Gaming Peripherals
Industrial IOT
Medical Devices

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2. Overview

2.1. Part Identification

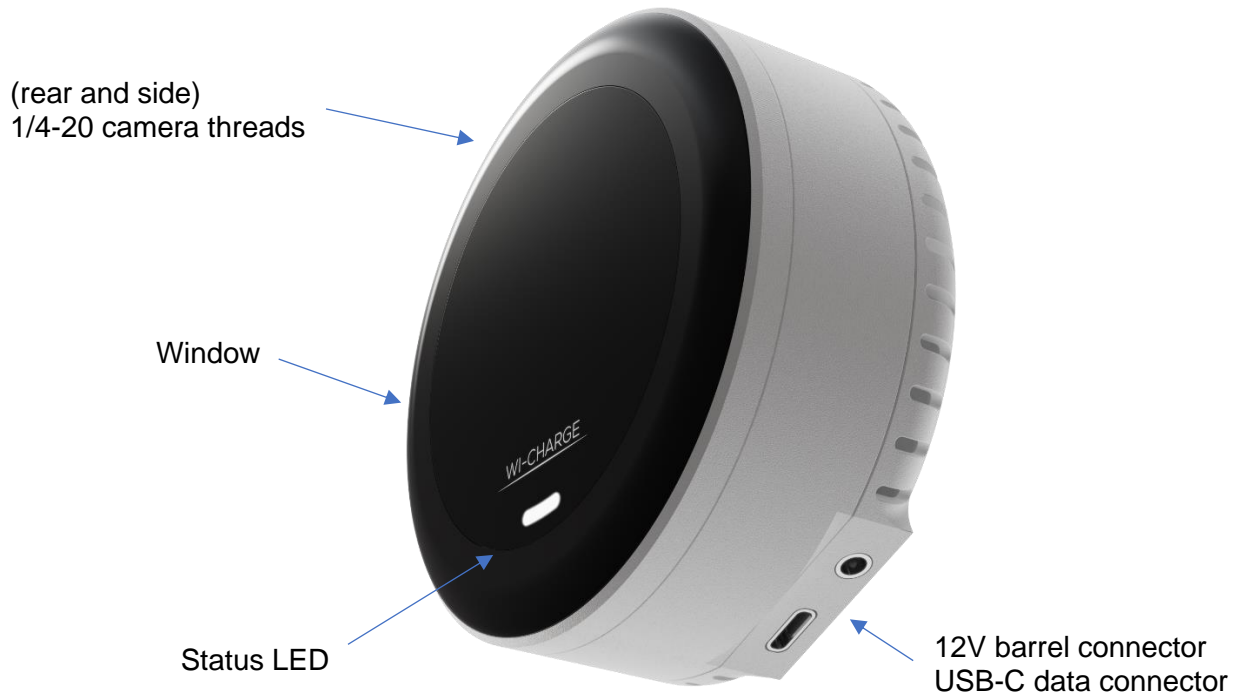


Figure 3 – R1 Parts

2.2. Method of Operation

Power delivery will pause if an object blocks the line of sight between the transmitter and the receiver (see section 2.3). Power delivery will resume once the interruption is removed.

A transmitter can support any number of receivers. However, at any given moment it is capable of powering only one receiver. The average power delivered to each receiver is therefore a part of the total power delivered.

For example, powering 4 separate devices using an R1 transmitter delivers an average of 25mW for each device, for a total of 100mW.

2.3. Field of View, Distance & Line of Sight

The following conditions must be met for the transmitter to find or power the receiver:

- 1) The distance between the transmitter and the receiver must be above the minimum and below the maximum specified distances (see Table 1 – Geometrical Specifications below).
- 2) The orientations of both transmitter and receiver should be such that each is in the other's field of view (see Figure 4 below). Precise alignment is not required.
- 3) There should be a clear line of sight between the transmitter and receiver. Any foreign object will pause the power delivery until removed.

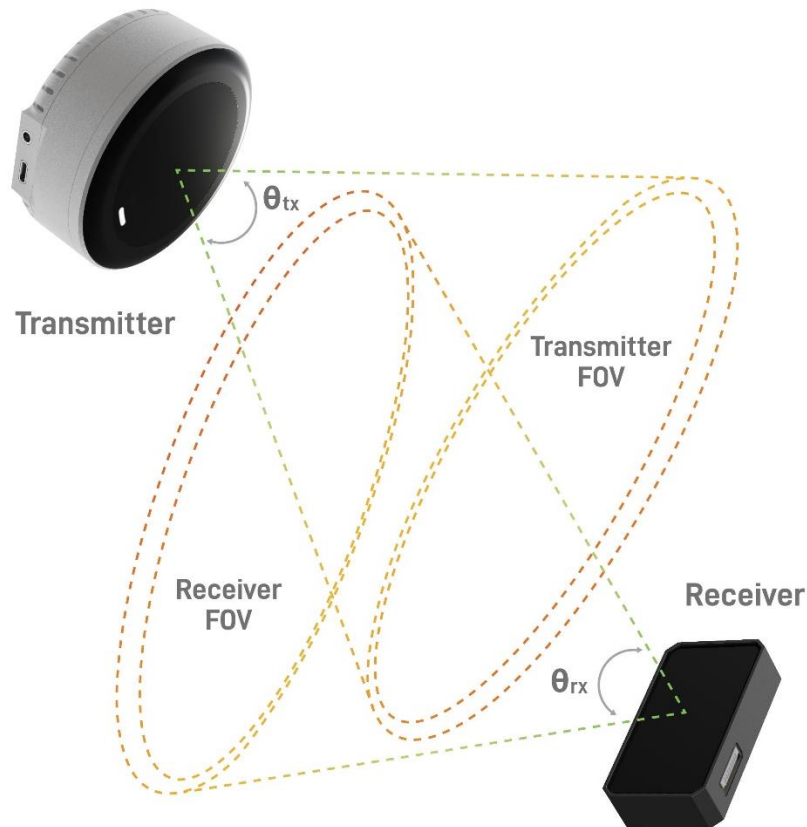


Figure 4 – Transmitter/Receiver Fields of View (FOV)

2.4. Status LED

The Status LED color code:

- **Blue** – Delivering Power
- **Green** – Looking for receivers
- **Red** – Error
- When delivering power, the blue LED will blink once a minute. The number of blinks is the number of receivers identified during the mapping phase.

3. Specifications

3.1. Geometrical

Parameter	R1	R1HP
Transmitter Field of View (θ_{tx})	80° ($\pm 40^\circ$)	
Receiver Field of View (θ_{rx})	80° ($\pm 40^\circ$)	
Power Delivery Range	1-10m	1-5m

Table 1 – Geometrical Specifications

3.2. Acquisition

Parameter	R1	R1HP
Time to Acquire or Re-Acquire a Receiver	<10sec	

Table 2 – Acquisition Specifications

3.3. Electrical

Parameter	R1	R1HP
Receiver Output Power	100mW	300mW
Power Variance over Distance and Field of View	$\pm 10\%$	
Receiver Output Voltage	2.5-9.0V	
Transmitter Input Voltage	12V $\pm 5\%$	
Transmitter Power Consumption (max)	4.5W	7-13W

Table 3 – Electrical Specifications

3.4. Mechanical

Parameter	R1	R1HP
Transmitter Dimensions – Diameter	94 mm (3.7 in)	
Transmitter Dimensions – Height	40mm (1.57 in)	46mm (1.81 in)
Receiver Dimensions ⁽¹⁾	37.3 x 20.8 x 8.5mm (1.47 x 0.82 x 0.33 in)	
Transmitter Mechanical Interface ⁽¹⁾	1/4-20 UNC (rear and side)	
Receiver Mechanical Interface ⁽¹⁾	Customizable	
Transmitter Weight	315gr	350gr
Receiver Weight	12gr	

Table 4 – Mechanical Specifications

3.5. Environmental

Parameter	R1	R1HP
Transmitter Operating Temperature	5-55°C (40-130°F)	5-45°C (40-110°F)
Transmitter Storage Temperature	-10-70°C (15-160°F)	
Receiver Operating Temperature	5-55°C (40-130°F)	
Receiver Storage Temperature	-10-70°C (15-160°F)	
Relative Humidity	Non-Condensing	

Table 5 – Environmental Specifications

¹ Contact Wi-Charge for form factor and mechanical interface customization options.

4. Mechanical Drawings

4.1. R1 Transmitter Mechanical Drawings

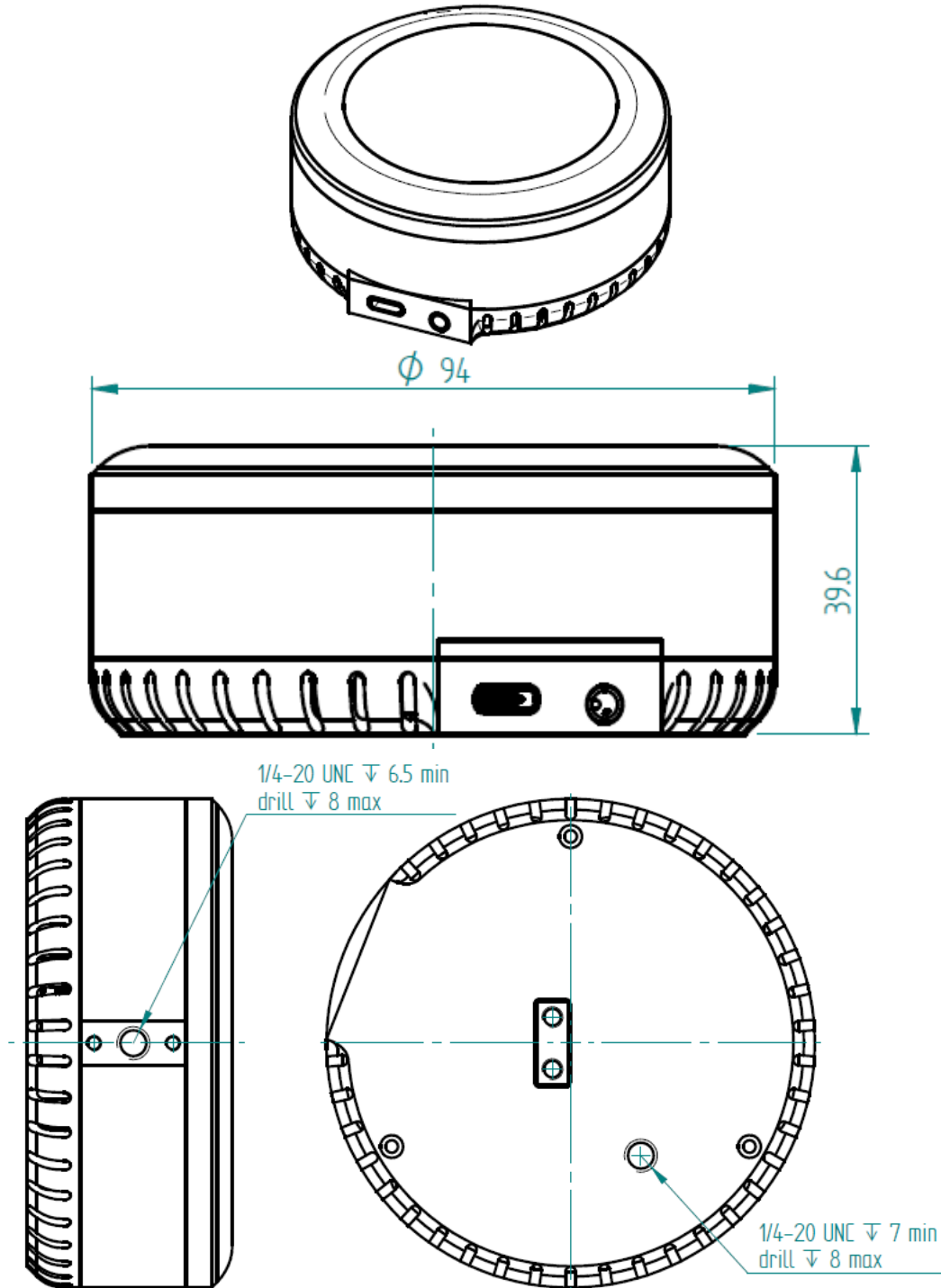


Figure 5 – R1 Transmitter Mechanical Drawings

4.1. R1HP Transmitter Mechanical Drawings

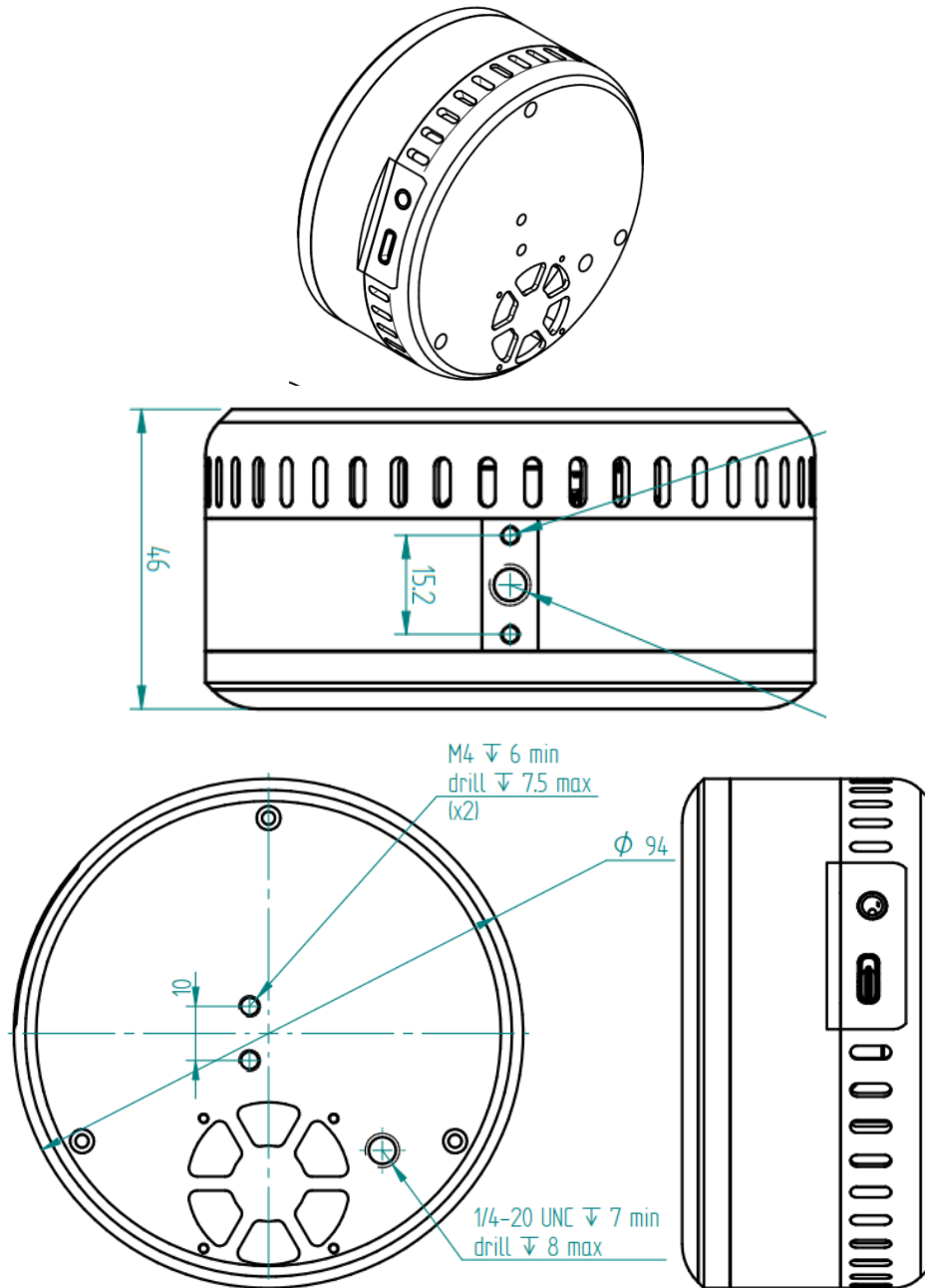


Figure 6 – R1HP Transmitter Mechanical Drawings

4.2. Receiver Mechanical Drawings

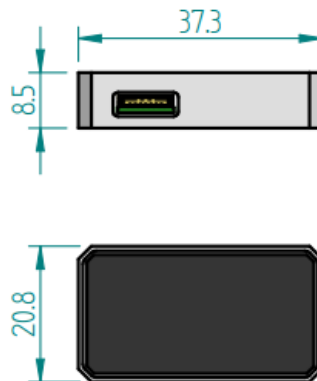


Figure 7 – Receiver Mechanical Drawings

4.1. Transmitter Connectors

12V power connector: 1.3mm inner diameter, 3.5mm outer diameter, 9.5mm minimal barrel length.
Data connector: USB-C.

4.2. Receiver Connector

Connector on receiver: [Amphenol 10144041-08011LF](#) or [JST SM08B-SURS-TF\(LF\)\(SN\)](#)
Mate cable connector: [Amphenol 10145492-08LF](#) or [JST SUHR-08V-S-B](#)

4.3. Transmitter Materials

Housing: Plastic, Aluminium
Finish: Anodized Black
Color: Black

4.4. Receiver Materials

Housing material: Plastic, Aluminium
Finish: Anodized Black
Color: Black

5. Communication Interfaces

Both transmitter and receiver have communication interfaces. Below is an overview of their capabilities. Contact Wi-Charge for software tools, detailed APIs and documentation.

5.1. Transmitter Wi-Fi Interface

Once configured to connect to a network, the transmitter automatically connects to the Wi-Charge cloud. This allows remote control and uploading of usage and technical data.

This data is accessible to the user and includes:

- 1) Charging distribution over time and between multiple receivers
- 2) Charging quality metrics
- 3) Transmitter and receiver health metrics
- 4) End device health metrics (battery capacity, current delivered, and more)
- 5) Wi-Fi connectivity stability and signal strength

5.2. Transmitter USB Interface

The USB interface can be used with a Wi-Charge software tool. Alternatively, a Wi-Charge driver can be embedded in the end user application.

The USB interface allows:

- 1) Real time monitoring of transmitter operation – which receivers were mapped, which are being charged, how much power each gets, and more
- 2) Sending commands to the transmitter, including updating its firmware
- 3) Configuring the Wi-Fi network credentials

5.3. Receiver I²C Interface

The receiver I²C interface allows:

- 1) Setting the receiver operating mode – toggling the battery charger and voltage converter features
- 2) Setting the voltage converter output voltage
- 3) Sending information from the receiver to the transmitter, such as a notification that the device's battery is full. This allows the transmitter to direct charging to another receiver as needed
- 4) Reading receiver health metrics

6. Ordering Information

Transmitter

Transmitter Type	Wi-Fi	Part Number
R1	Yes	TX02-F-01-01
R1	No	TX02-A-01-01
R1-High Power	Yes	TX03-F-01-01
R1-High Power	No	TX03-A-01-01

Receiver

Receiver Type	Part Number
Receiver	RX03-XX-01-01

XX – output voltage configuration. 25 to 90 for 2.5V to 9.0V output voltage.

Accessories

Accessory	Part Number
Transmitter Gimbal	WK-G-TX-01
Receiver Gimbal	WK-G-RX-01
US power supply	WK-PS-R-US-01
Europe power supply	WK-PS-R-EU-01
Stand for R1	WK-MNT-R1-01
Stand for R1HP	WK-MNT-R1HP-01
Battery charger evaluation kit	WK-BAT-RX-01

7. Legal Notice

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