

TrackMan™ Radar unit Installation and Safety Instruction

TrackMan Baseball Field Radar
Type: TMC3G



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1 Introduction

This document provides instructions and warning in order to safely install and operate the TrackMan Baseball Stadium Radar TMC3G Radar unit

This document does not describe the TrackMan™ application software and how to operate it. This is provided in separate document.

All electrical installation shall be made in accordance with the local electrical standards or local regulations.

2 Safety Instructions

2.1 Regulatory Notice

Regulatory Notices

Installation must be performed by qualified personnel only and must conform to all local codes.

FCC/ISED Notices

This device complies with the FCC and ISED Canada radiation exposure limits. This equipment should be installed and operated with minimum distance 20 cm between the device and your body.

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.

NOTE: This device has been tested and found to comply with the limits for a Class A 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 device 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. This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

-This Class A digital device complies with Canadian ICES-003 (A)/NMB-3(A)

-This device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

- 1) this device may not cause interference, and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device.

-Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTICE

Never try to open or repair the device yourself. Any changes or modifications not expressly approved by TrackMan A/S could void the user's authority to operate the device.

Changes or modifications made to this equipment not expressly approved by (manufacturer name) may void the FCC authorization to operate this equipment.

2.2 Warning: Radiation Hazard

Radiation Safety Warning.

This device radiates a low level of microwave electromagnetic radiation from the front window and top when in use. The radiated power is significantly lower the international safety standards for microwave frequencies. However, the user should maintain a minimum distance of 20 cm from this device during operation.

2.3 Caution: Safety precautions

Use the following safety instructions to ensure your own personal safety and to help protect the TrackMan™ Radar unit.

General

- Do not attempt to service the device yourself. Always follow installation instructions closely.
- Only use cables and accessories approved by TrackMan A/S together with your TrackMan™ Radar unit.
- The Radar may become hot during normal operation of the TrackMan™ system. Use care when handling the Radar during or immediately after operation.

Power

- Only use the Mains connection Boxes supplied with the TrackMan™ Radar unit.
- Before you connect the TrackMan™ Radar unit to an electrical outlet, check the AC voltage rating to ensure that the required voltage and frequency match the available power source.
- To help prevent electric shock ensure a properly grounded power source.
- Do not cover the AC connectionboxes as this will reduce cooling.
- Be sure that nothing rests on your AC connection boxes power cable and that the cable is not located where it can be tripped over or stepped on.
- Both USB Ext Connection box and Backfield Connection box can be used outdoor. It can be used in **Overvoltage Category II facilities** and **Pollution Degree 2 environments**.
- When connecting to The USB Ext Connection box or Backfield Connection box, a readily accessible disconnect device shall be incorporated external.

TrackMan A/S accepts no liability for failure to comply with these requirements.

3 Installation instructions

3.1 System description

The TrackMan™ Radar system is a standalone measurement system for the detection and measurement of baseball movements.

The system consists of:

- TrackMan™ Radar unit model TMC3G
- USB Ext Connection Box
- Backfield Connection box
- TrackMan™ software

The following diagrams depicts the TrackMan™ system:

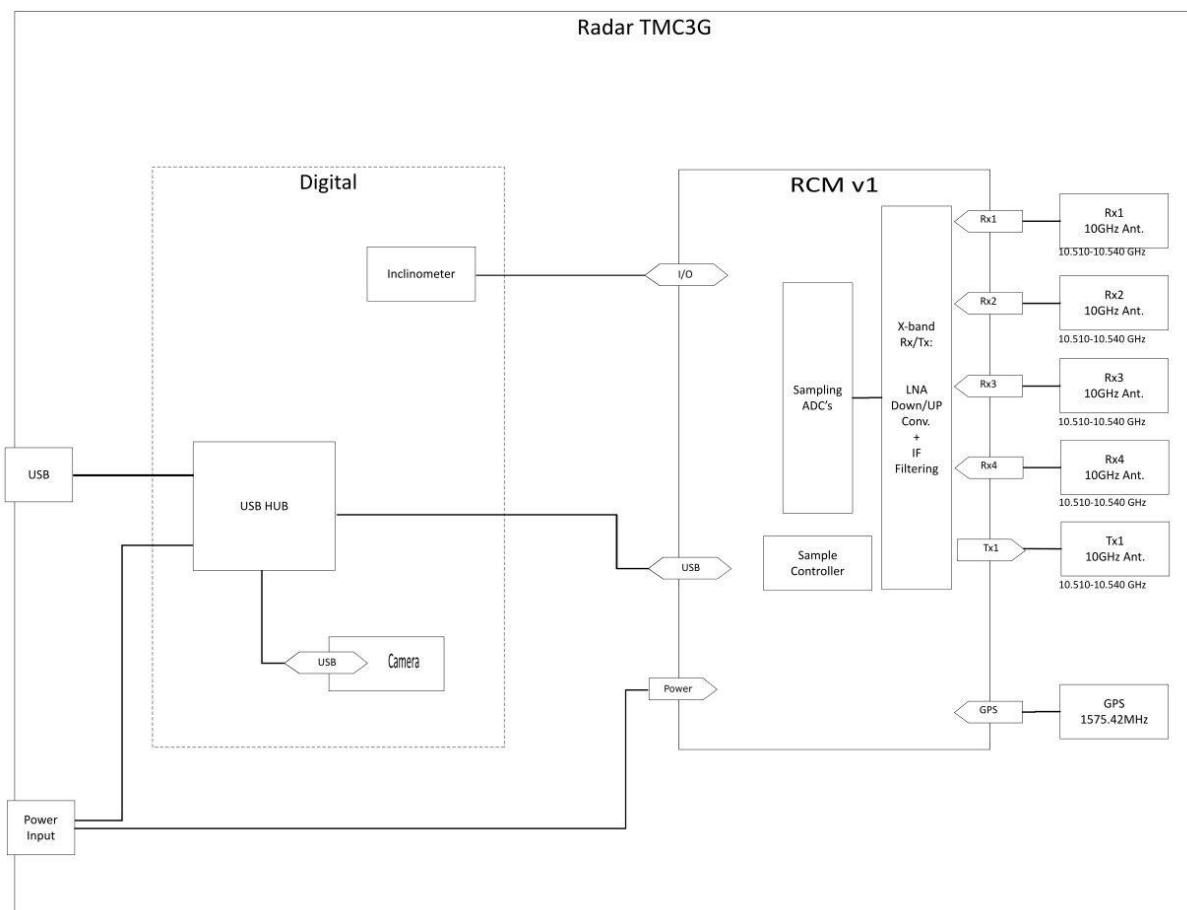


Figure 1: TrackMan™ Radar block diagram

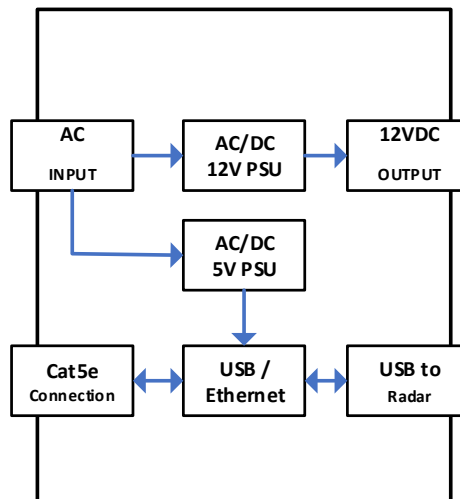


Figure 2: TrackMan™ USB Ext Connection box block diagram

For normal operation, the Radar is connected to a Laptop/Server via a Connection box. The Connection box delivers power, and an extended USB connection for the Radar.

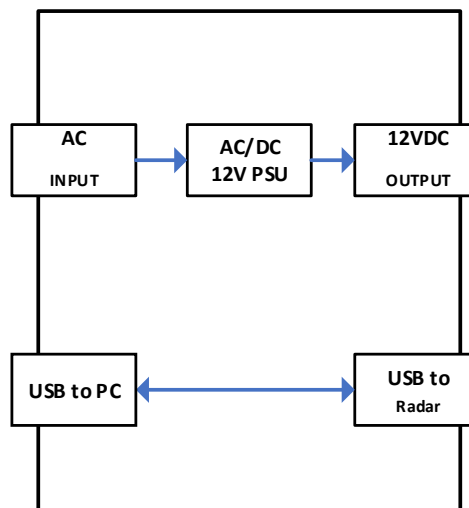


Figure 3: TrackMan™ Backfield Connection box block diagram

For normal operation, the Radar is connected to a Laptop via a Backfield Connection box. The Connection box delivers power, and USB connection for the Radar.

3.2 System specifications.

3.2.1 Radar.

The TrackMan™ Radar unit is a robust construction, with chassis made of metal back. The front of the TrackMan™ is black plastic from where behind the microwave radiation is transmitted and received.

The TrackMan™ Radar unit also has a built-in digital camera, which looks out through a window in the front.

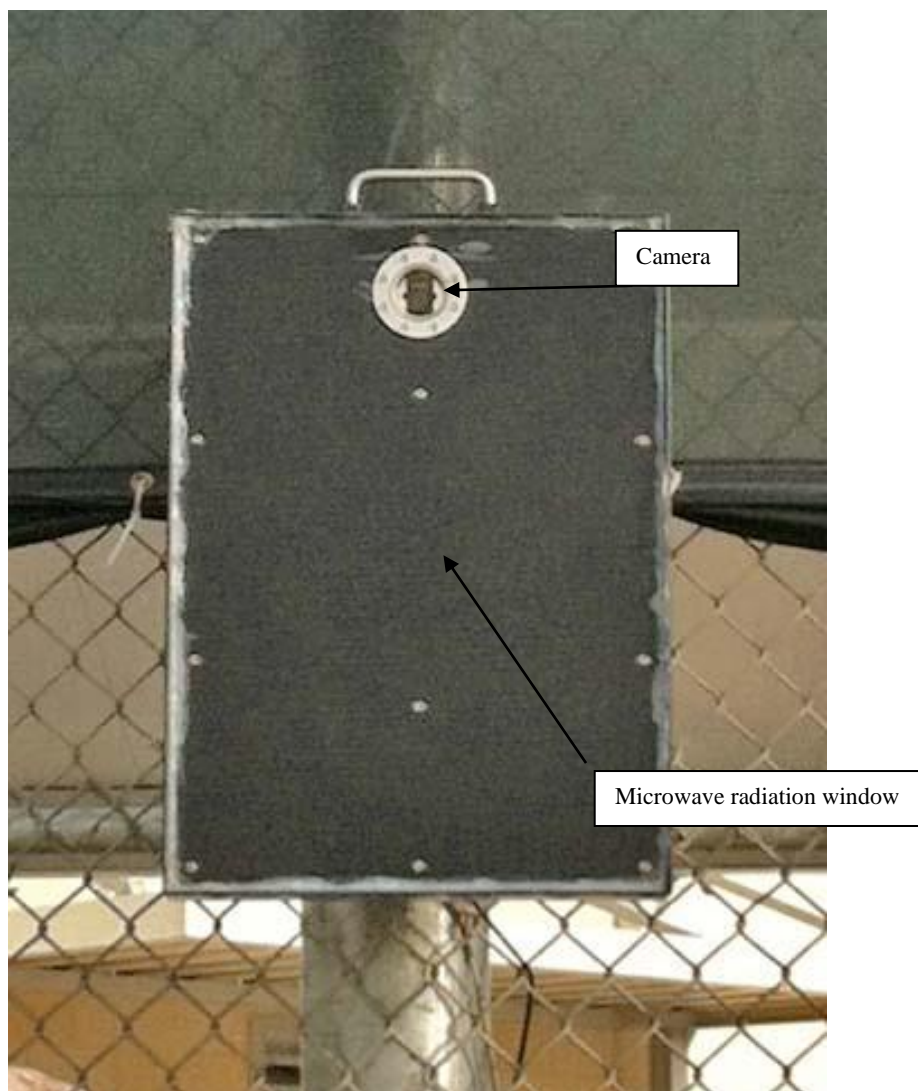


Figure 4: TrackMan™ Installed Radar unit

3.2.2 USB Extension Connection Box

The TrackMan™ USB Extension Connection box is an industrial installation plastic box, and it includes power supplies and Extend the USB connection to Ethernet.

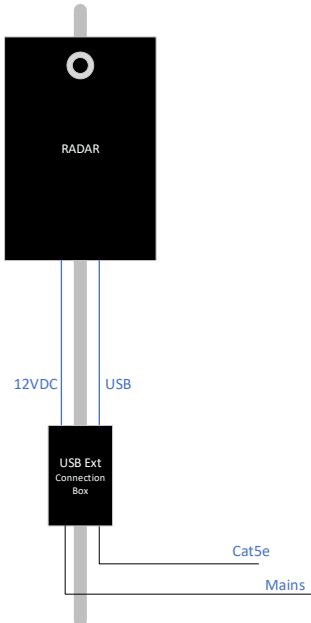


Figure 5: TrackMan™ example of Installed USB extension connection box

3.2.3 Backfield Connection Box.

The TrackMan™ Backfield connection box is an industrial installation plastic box, and it includes power supplies and USB connection.

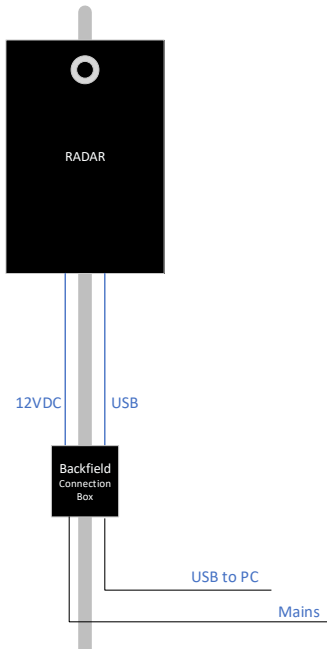


Figure 6: TrackMan™ example of Installed Backfield connection box

3.3 TrackMan™ Radar unit, model TMC3G.

Type	TMC3G radar
Operating Frequency	US Market: 10.500 – 10.550GHz Operating frequency is fixed during manufacture
Transmitter power	+16dBm
Antenna gain	16 dB
Horizontal beam	65°
Vertical beam	30°
Dimensions	Width: 430 mm Depth: 80 mm Height: 602 mm
Mass	~10 kg
Main power supply	12VDC, 1.7A maximum
Environmental, operating	-15°C to + 45°C (+5°F to +113°F) ambient 95% humidity
Environmental, storage	-20°C to + 60°C (-4°F to +140°F) ambient <95% humidity
Ingress Protection	IP44
Data interface	USB2.0 high speed out of the Radar.

The TrackMan™ Radar unit consists of the following sub-assemblies and/or printed circuit board assemblies:

- Radar analog signal processing
- Antennas for transmitting and receiving
- Digital camera
- GPS receiver

3.4 TrackMan™ USB Extension Connection Box.

Type	USB Extension Connection box
Size	11,02x7,48x5,51inch. / 280x190x140mm (hxwxd)
Weight	<3kgs/6,61lbs
Input	100-120Vac, 50/60Hz, 0,8A
Over Voltage Protection (OVP)	2.5kV
Output	12Vdc, 3,75A
Interface	USB2.0
Environmental, operating	-15°C to + 45°C (+5°F to +113°F) ambient 95% humidity
Environmental, storage	-20°C to + 60°C (-4°F to +140°F) ambient <95% humidity
Ingress Protection	IP54

3.5 TrackMan™ Backfield Connection Box.

Type	Backfield Connection box
Size	6,3x6,3x3,52inch. / 160x160x89,4mm (hxwxd)
Weight	<2kgs/4,4lbs
Input	100-120Vac, 50/60Hz, 0,67A
Over Voltage Protection (OVP)	2.5kV
Output	12Vdc, 3,75A
Interface	USB2.0
Environmental, operating	-15°C to + 45°C (+5°F to +113°F) ambient 95% humidity
Environmental, storage	-20°C to + 60°C (-4°F to +140°F) ambient <95% humidity
Ingress Protection	IP54

3.6 Setting up the system.

Setting up the system must only be done by TrackMan™ personnel, 3rd party personnel educated by TrackMan™ personnel or qualified electrician.

All electrical installation shall be made in accordance with the local electrical standards or local regulations.

Setup the System as shown on figures in section 3.2.2 & 3.2.3. The setup can be either indoors or outdoors. The Radar and Connection boxes can be mounted on poles and on a wall.

3.6.1 PLUGGABLE EQUIPMENT.

The system can be used in both pluggable equipment type A and Type B. In both situations the socket-outlet shall be installed near the equipment, shall be easily accessible and must always include a Grounded connection.

For Pluggable Equipment Type A and Type B, the protection in the installation must be max 20A (USA, Canada, Japan).

3.6.2 PERMANENTLY CONNECTED EQUIPMENT.

The system can be used as PERMANENTLY CONNECTED EQUIPMENT. When connecting to The USB Ext Connection box or Backfield Connection box, a readily accessible disconnect device shall be incorporated external and must always include a Grounded connection.

For Permanently Connected Equipment, the disconnect device shall have a contact separation of at least 3mm and shall disconnect both poles simultaneously. If a single pole disconnect device is used, that device shall disconnect the Line conductor.

For Permanently connected equipment, the protection in the installation must be max 20A (USA, Canada, Japan).

3.6.3 Grounding.

WARNING: Improper connection of the equipment-grounding conductor may result in a risk of electric shock. Check with a qualified electrician or Trackman service personal if you are in doubt as to whether the product is properly grounded.

WARNING FOR HARDWIRE (PERMANENTLY CONNECTED) PRODUCTS:

GROUNDING INSTRUCTIONS This product must be connected to a grounded, permanent wiring system, or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the product. See section, 3.6.4 & 3.6.5.

3.6.4 Connecting mains cable inside the USB Extension Connection Box.

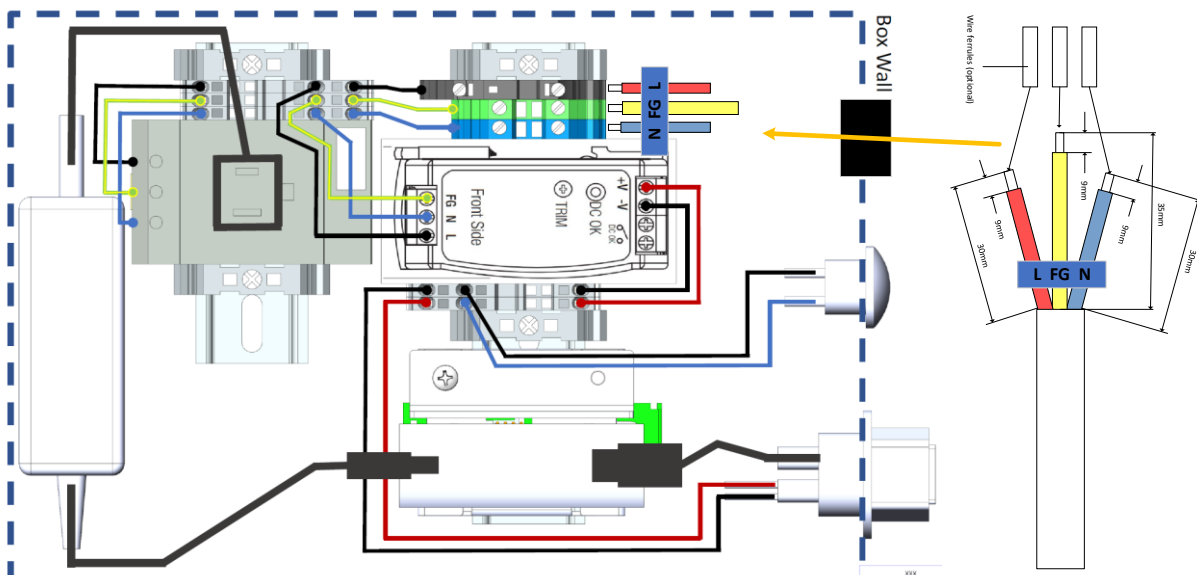


Figure 7: USB Extension Connection Box Mounting instruction

Cut wires as describes in Figure 7, Pass the cable through the Cable Gland.

Connect the wires to the terminal blocks and tighten screws.

Make sure to tighten the Cable gland so the cable will be secured.



Figure 8: USB Extension Connection Box. Secure of top cover.

Close the top cover and lock with the hinges. Secure the top cover with the screw and Nut as described. Size of Screw: M2.5*16, Nut: M2.5.

3.6.5 Connecting mains cable inside the Backfield connection box.

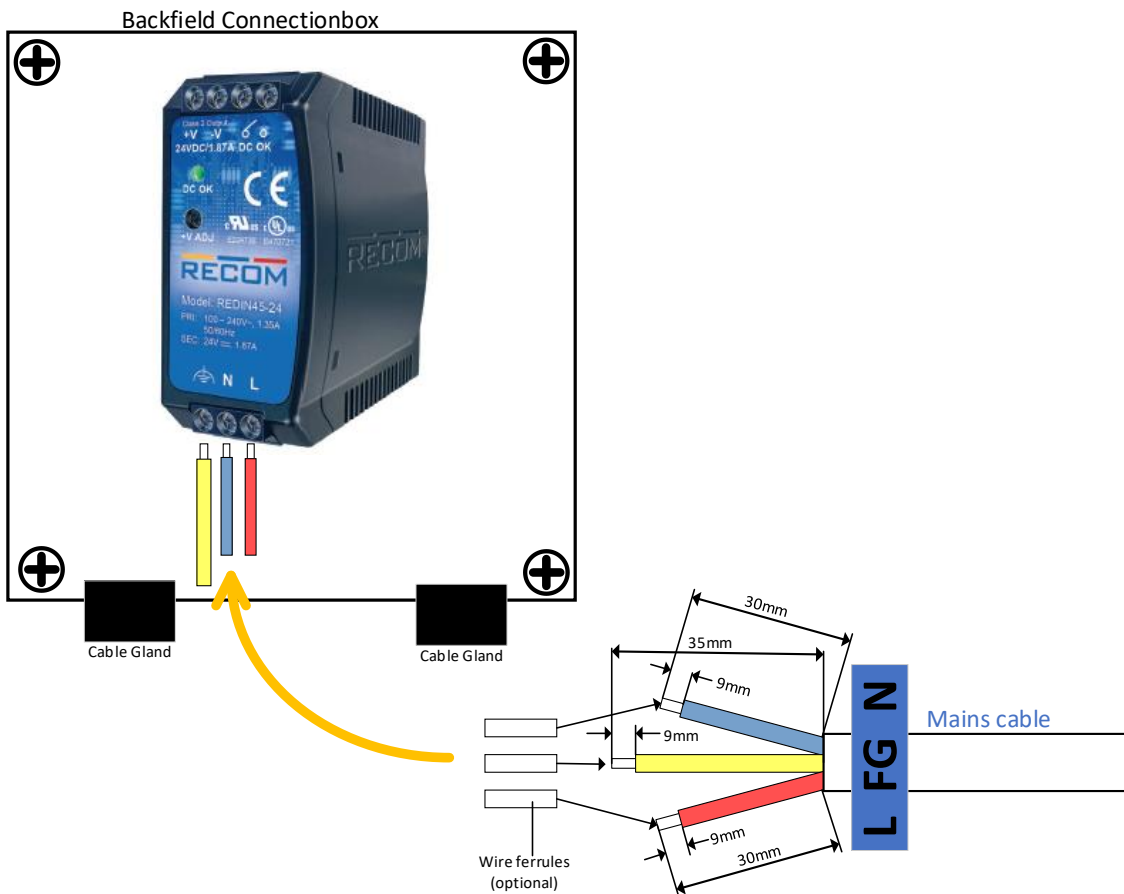


Figure 9: Backfield Connection Box Mounting instruction.

Unscrew the 4pcs screws in each corner(RED Marked) and unmount the top cover.



Cut wires as describes in Figure 9, Pass the cable through the gable gland.

Connect the wires to the terminal blocks and tighten screws. Make sure to tighten the cable gland so the cable will be secured. Mount the top cover and tighten the 4pcs. Screws.

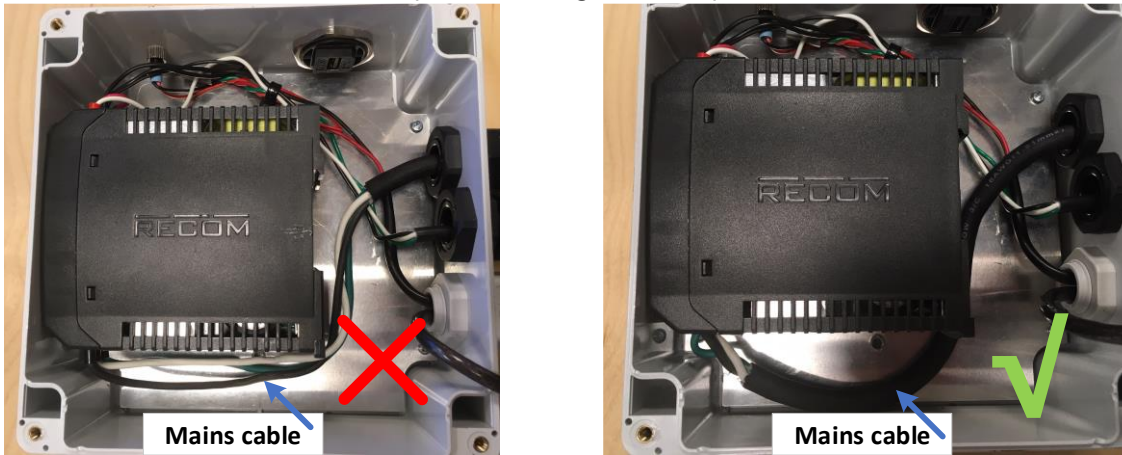


Figure 10: Backfield Connection Box. Correct mounting of mains wire.

3.6.6 Mains Cable

Use a mains cable with below dimensions.

Type	Outer diameter	Environment
3x18AWG or 3x16AWG	6-12 mm	Outdoor use

3.6.7 Setting up the system

Setting up the system Must only be done by TrackMan™ personnel or 3rd party personnel educated by TrackMan™ personnel.

3.6.8 Pole mount of the Radar

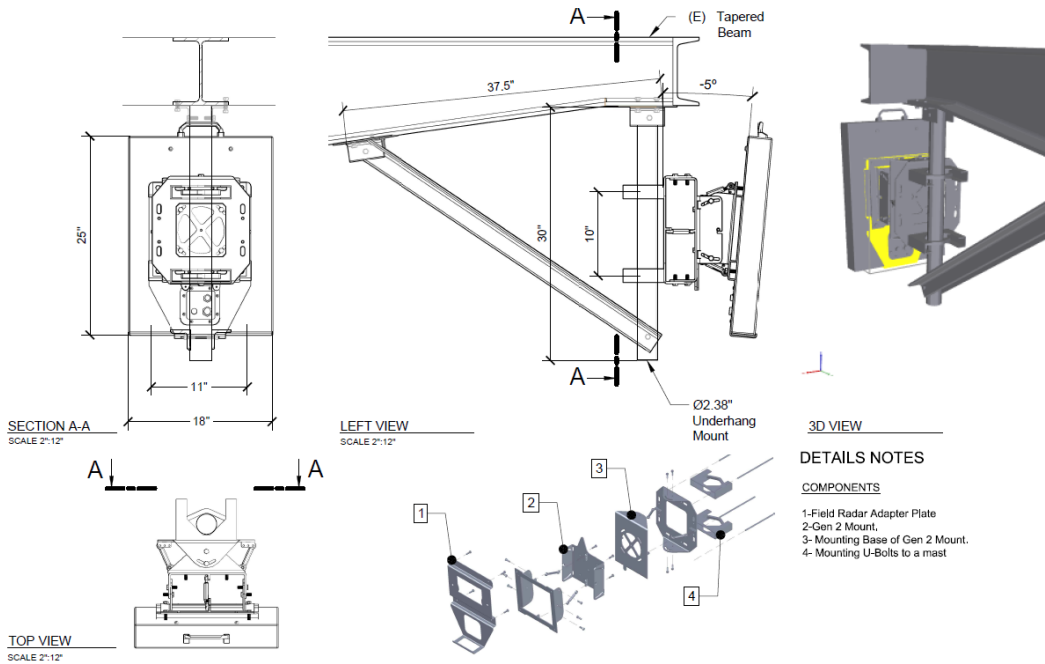


Figure 11 Example of pole mount in a ceiling

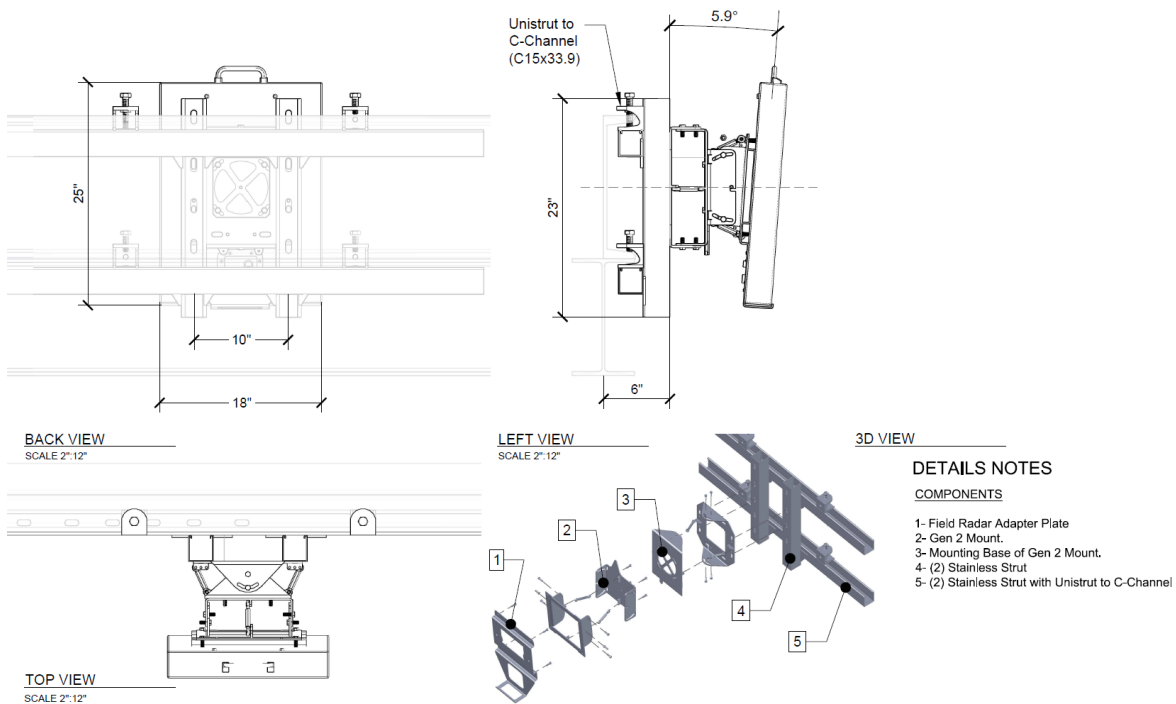


Figure 12 Example of a stadium mount.

For mounting use following

Type	Diameter	Lenght	Environment
Screws	12 mm	Depending on where to be mounted	Outdoor use (Stainless steel)
Lock Nut	12 mm	Depending on where to be mounted	Outdoor use (Stainless steel)

3.6.9 Pole mount of the backfield connection box



Figure 13 Typical setup of Backfield Connection box

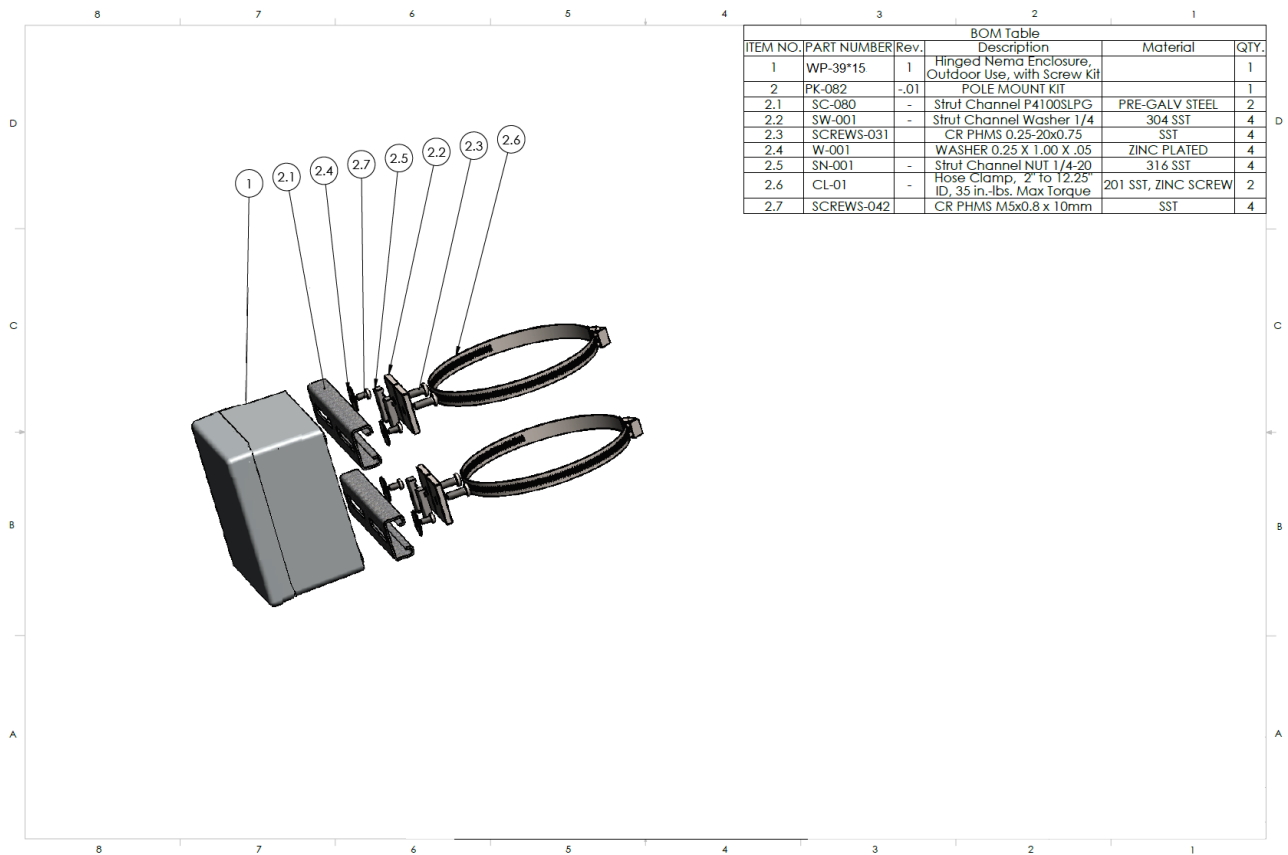


Figure 14 Setup for mount of Backfield connectin box

3.6.10 Pole mount of the USB Extension connection box



Figure 15 Typical setup of Radar and USB Ext Connection box

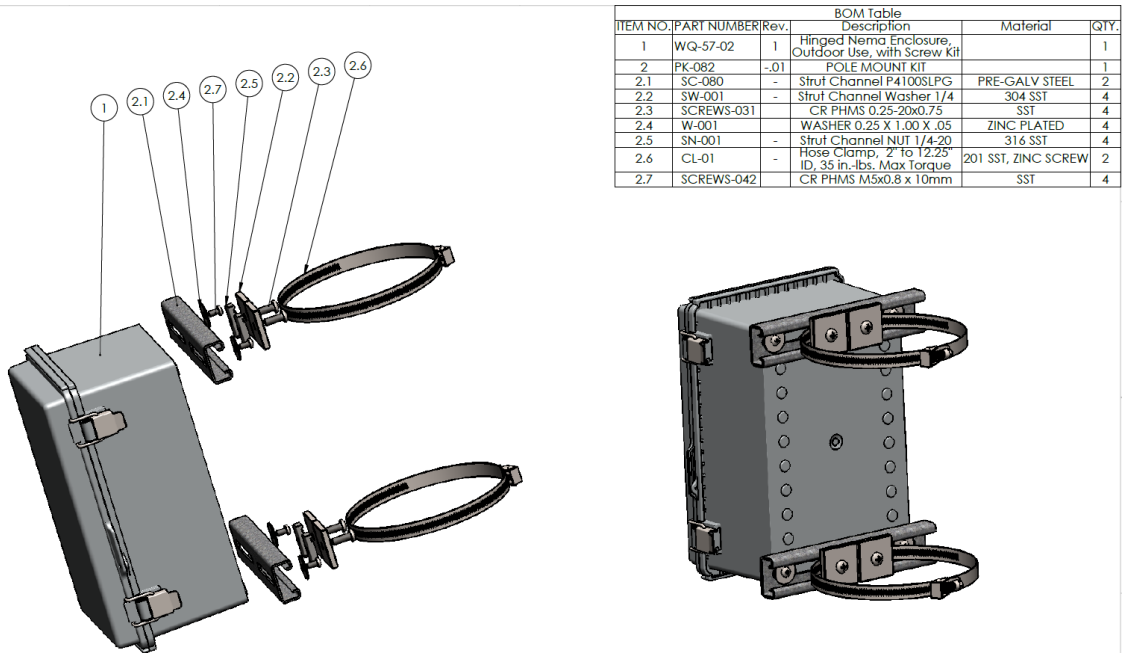


Figure 16 Set up for mount of USB ext Connection Box