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Radar Sensor

EA-XRN-9400 series

User Manual and

Installation Instructions

CONTENTS

The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

Federal Communications Commission (FCC)

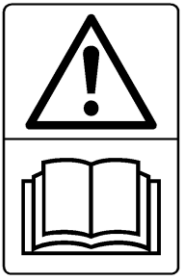
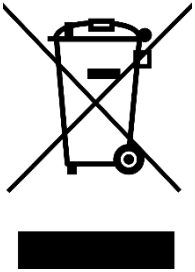
FCC ID: 2AO3F-EA-XRN-9400

This device complies with Part 15 of the FCC rules. Operation is subject to the following 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.

This equipment 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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 72 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.

1. SYMBOLS

	Read the manual before installing or working near sensor.
	Only for EU countries: Do not dispose of electric equipment in household waste.
	Warning for hazardous situations with regards to life and property.

2. GENERAL INFORMATION

The radar sensor EA-XRN-9400 is a golf ball tracking radar. Each sensor is installed as part of a system designed to cover a specific volume at a golf facility, and provide trajectory data of all ball flights within its field of view. The user of the sensor is assumed to be the owner/operator of the facility. The sensors are installed in fixed locations that are accessible only by qualified personnel, and not by the general public.

Control and monitoring of the sensors are provided via manufacturer supplied software from a central server that is set up and configured by trained and qualified personnel. Once configured, the operator only has access to basic commands to activate or deactivate sensors but cannot modify or alter the configuration or mode of operation of the sensors.

The figure below shows the connections to the sensor. The M6 mounting holes are located at the back of the sensor.

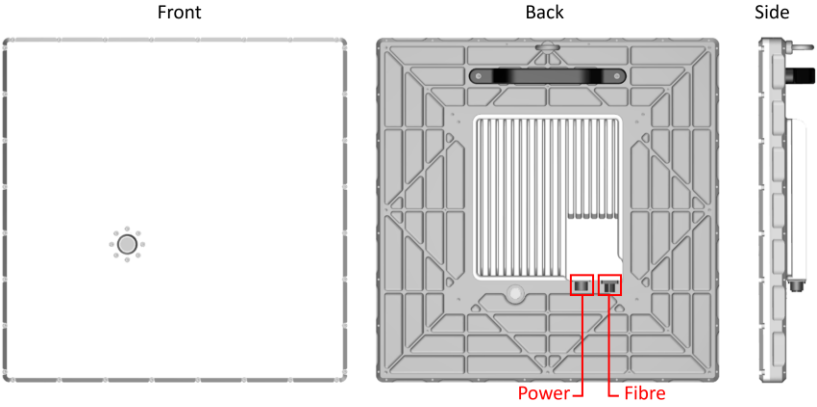


Figure 1: Drawing of the radar sensor indicating the power and fibre connections.

Table 1: Product Specification

Specification	Value
Device Type	FMCW 3D Tracking Radar
Frequency Range	10.0 to 10.5 GHz
Channel Bandwidth	100 MHz linear sweep
Antenna Type	Patch antenna array
Antenna Gain	10.5 dBi peak
Transmit Power	31.65 dBm (42.15 dBm EIRP)
Supply voltage	48 V DC ±10%
Power Consumption	< 40 W
Dimensions	500 × 500 × 85 mm
Weight	9 kg

3. SAFETY INFORMATION

The guidelines in this section needs to be followed to ensure proper and safe operation of the equipment. Changes or modifications to the sensor that are not expressly approved by the manufacturer, and implemented by suitably qualified personnel, could void the user's authorisation to operate the equipment.

When installed according to the instructions in this manual, operation of this radio device results in user exposure below the FCC recommended limits. See the appendix for more information.

Only trained personnel are allowed to install or replace this equipment. The equipment can only be serviced at the factory by qualified personnel. Do not attempt to open the unit.

Device installation may require the installer to work at heights. Take all necessary precautions to ensure safety and provide fall arrest equipment where required. Plan the installation carefully before proceeding. Be aware of hazards such as power lines or other electrical circuits, e.g. lighting fixtures.

Do not approach within 72 cm of the sensor when it is operating.

The manufacturer or a trained installation technician shall install the sensor and perform all necessary actions to set it up and verify the correct operation thereof. After installation, the user must not modify the connections or alter the installation, without the approval of the installers. The device does not contain any user-serviceable parts and the user should not attempt to remove the device or disassemble it.

4. INSTALLATION INSTRUCTIONS

4.1 Installation guidelines

Prior to installation, please check that the (factory installed) radome is in place on the radar sensor and that all its fasteners are present. The location of each installed sensor location must be known precisely to ensure correct system operation. During installation, the location of each device shall be surveyed and recorded along with the serial number. To prevent blockage and interference, the device needs be installed in a location where it is not possible for people (other than trained personnel) to get within 72 cm of the sensor during normal operation.

4.2 Mechanical Mounting

All mounting methods must be approved by the manufacturer prior to installation. Sensor attachment is by means of M6 stainless steel bolts, screwed 10 – 12 mm deep into the metal back of the sensor with the appropriate washers, and fastened tightly. See Figure 2 for hole locations. A typical mounting method would be on a steel pole, as shown in Figure 3.

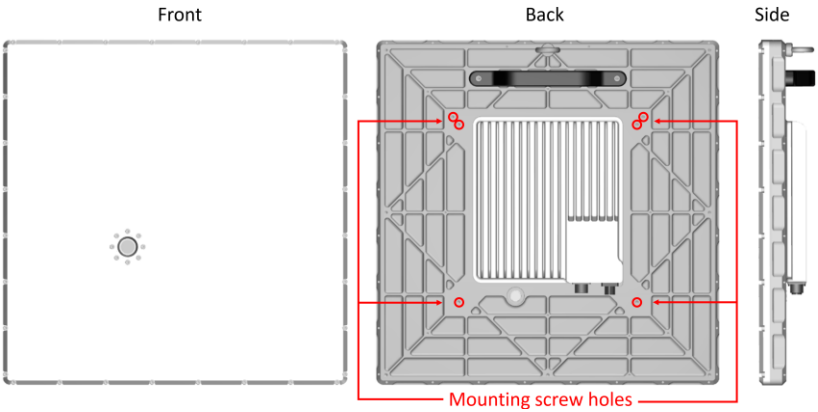


Figure 2: Location of threaded mounting holes.

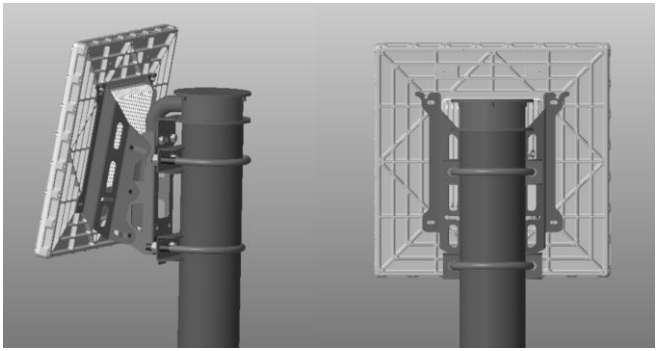


Figure 3: Typical sensor mounting method.

The sensor has a shaped radiation pattern and must be installed in an upright orientation, with the power and fibre connectors at the bottom of the device. Use a precision level and the manufacturer supplied orientation jig to ensure that the sensor is installed upright.

The horizontal sensor pointing direction is determined prior to installation by the manufacturer or approved installer. This needs to be adhered to to ensure proper system operation and coverage.

The equipment must not be installed where it is accessible by the general public. Install the device such that no member of the public can approach within 72 cm of the sensor, or ensure that access to area where the sensor is installed is controlled.

4.3 Connections and Grounding

Clean the fibre connectors on the sensor (using an appropriate ODC fibre cleaner) and the fibre cable (using an appropriate LC fibre cleaner) before connection. Remove dust caps on connectors.

Verify that the external shield of the power cable is correctly grounded. Verify that the voltage supplied to the sensor is 48 VDC ±10%.

Only use manufacturer supplied cabling to make the power and fibre connections to the device.

5. MAINTENANCE AND SERVICE

Switch off the sensor before performing maintenance and adhere to the safety instructions in Section 3.

5.1 Inspection

Visually inspect the radar sensor for accumulation of material and substances on or in front of the radar sensor or its enclosure, including bird droppings, insect or bird nests etc.

5.2 Cleaning

Remove build-up of accumulated materials & substances with a soft brush. Low pressure water spray may be used to soften or rinse off residue.

6. DISPOSAL

Only for EU countries

This device must not be disposed of with household waste. Please take this product to a designated collection point for proper treatment, recovery and recycling.

Appendix A: RF EXPOSURE COMPLIANCE

FCC Rules and Regulations Part 1.1307, 2.1091, 90.223:

In order to pass the ERP exemption threshold of $19.2R^2$, with the output power being 31.65 dBm and the antenna gain being 10.5 dBi, the prediction distance needs to be at least 72.1 cm. Rf exposure evaluation for this device is exempted given this minimum separation distance.

The manufacturer recommends that the sensor be installed such that no member of the public can approach within 72 cm of the sensor to ensure that exposure limits are not exceeded at any time.

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