Annex acc. to FCC Title 47 CFR Part 95 M
relating to
Hexagon Geosystems Services AG, Zweigniederlassung Hexagon Mining
QR4000

Annex no. 4
User Manual
Functional Description

Title 47 - Telecommunication
Part 95 - Personal Radio Services
Subpart M – The 76 – 81 GHz Band Radar Service
Measurement Procedure:
ANSI C63.26-2015

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Version	Applied changes	Date of release
00	Initial release	2024-07-31
01	RF Frequency and Out Power Info Added	2024-08-30

User manual/ Functional description of the test equipment (EUT)

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HxGN 4D-Radar QR4000

User Manual

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English

Do Not Distribute

HEXAGON

HxGN 4D-Radar QR4000 User Manual

This document is optimized for printing on A4 paper.

Revision History

Date	Document Version	Software Version	Author	Revision
3 Apr 2023	1		D. Hess Ishita Jha	Initial Issue
23. October 2023	1.1		Ishita Jha D.Hess	Added D.o.C.
28. August .2024	1.2		D.Hess	Addec FCC and ISED compliance statements
30. August 2024	1.3		D.Hess	Added package Label and RF Output Power

TABLE OF CONTENTS

1 Document Introduction

The Hexagon 4D-Radar QR4000 User Manual is part of the Hexagon Mining reference manual suite. The manual provides information about the 4D-Radar module and its basic usage. The manual provides an overview of the module together with the care and transport, technical data, and safety directions.

It is assumed an operator using this manual is familiar with:

- Site-specific safety procedures, Safe Work Procedures (SWPs) and Standard Operating Procedures (SOPs).

> **NOTE**
> The document uses generic images to show general layout and generic information for various procedures. The site-specific screen layout, menu, and procedure information may vary from what is displayed in the manual.

1.1 Contacting Support

For all Hexagon Mining product support:

Contact Method	Details
Web portal	https://community.hexagonmining.com/

1.2 Document Conventions

This document uses basic conventions to indicate actions:

Convention Example	Description
Select **File** > **Print**	Menu selections, buttons, and icons appear in bold text. In this case, select the **File** menu and the **Print** option. Location and capitalization of menu items may vary by mine site.
Ctrl+P	Keyboard shortcut keys. The example indicates to select and hold down the Ctrl key and select the P key.
See xxx Refer to	"See" indicates a reference to another section of this document. "Refer to" indicates reference to another document.

WARNING
Warnings alert the user to dangerous procedures which could cause injury or death.

CAUTION
Cautions alert the user to dangerous procedures which could cause damage to equipment.

NOTE
Notes supply important information about a procedure which is not covered in the procedure text.

2 Product Introduction

2.1 Overview

The 4D-Radar module comprises a radar sensor and its housing cover. The housing cover includes a back plate attached with mounting brackets and a cable. The radar sensor sends relative coordinates of obstacles as data points over its automotive ethernet interface. The 4D-Radar is a rugged, industrial solution offering improved mechanical robustness and adapted mounting options.

> **NOTE**
> The images used in this manual are for reference purposes only. This product is intended for professional use only.

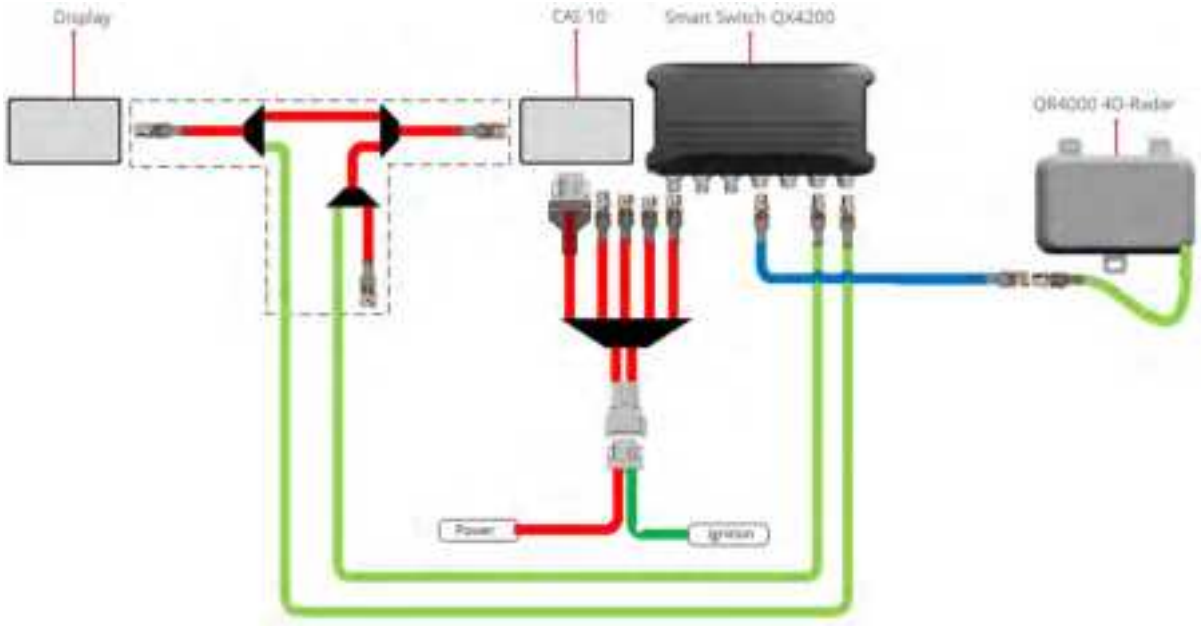
Key Features of Radar Sensor

Features	Long Range Mode	Medium Range Mode
Range	0.9 to 180 m	0.33 to 66 m
Separation	≤ 1.8 m	≤ 0.66 m
Sensitivity on Passenger	180 m	66 m
Accuracy	≤ 0.45 m	≤ 0.16 m
Speed	-400 to +200 km/h	-400 to +200 km/h
Speed Accuracy	≤ 0.07 m/s	≤ 0.07 m/s
Angle Azimuth	-50 to 50°	-50 to 50°
Angle Elevation	-10 to 10°	-10 to 10°
Accuracy Azimuth	≤ 0.25°	≤ 0.25°
Accuracy Elevation	≤ 0.5°	≤ 0.5°
Operating Voltage	7–35 V	7–35V
Power Consumption	< 6 W	< 6 W
Operating Temperature Range		
Pressure or Transport Altitude	0 to 1000 m	0 to 1000 m

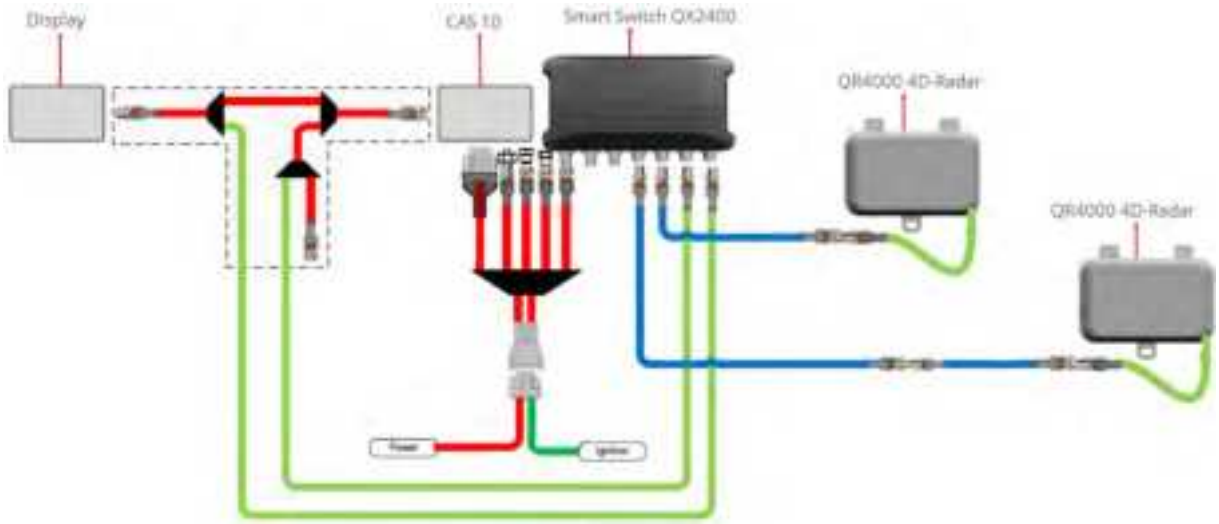
2.2 System Information

The 4D-Radar module comprises a radar sensor, housing cover that includes a back plate attached with mounting brackets, and cable. The cable is undetachable. The Smart Switch QX4200 supplies power to and controls the module.

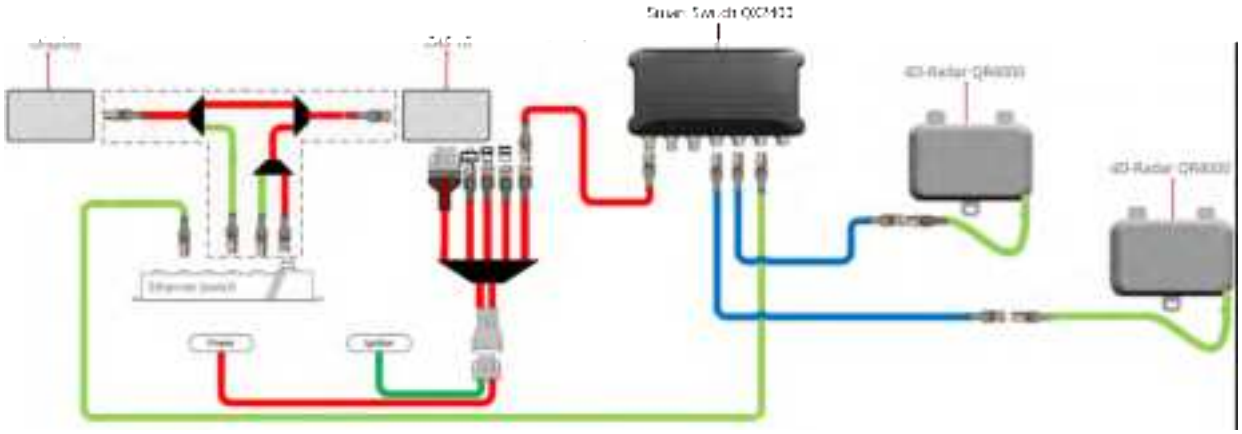
4D-Radar System Diagram: One Front Module, One Smart Switch



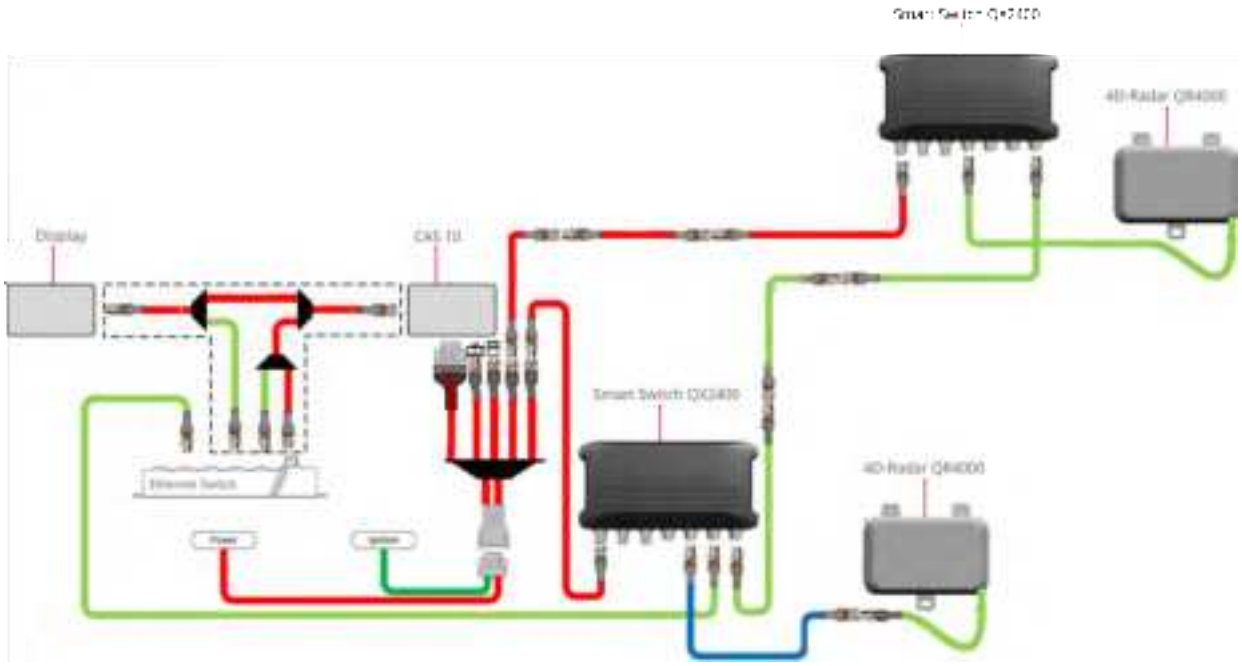
4D-Radar System Diagram: Two Front Modules, One Smart Switch



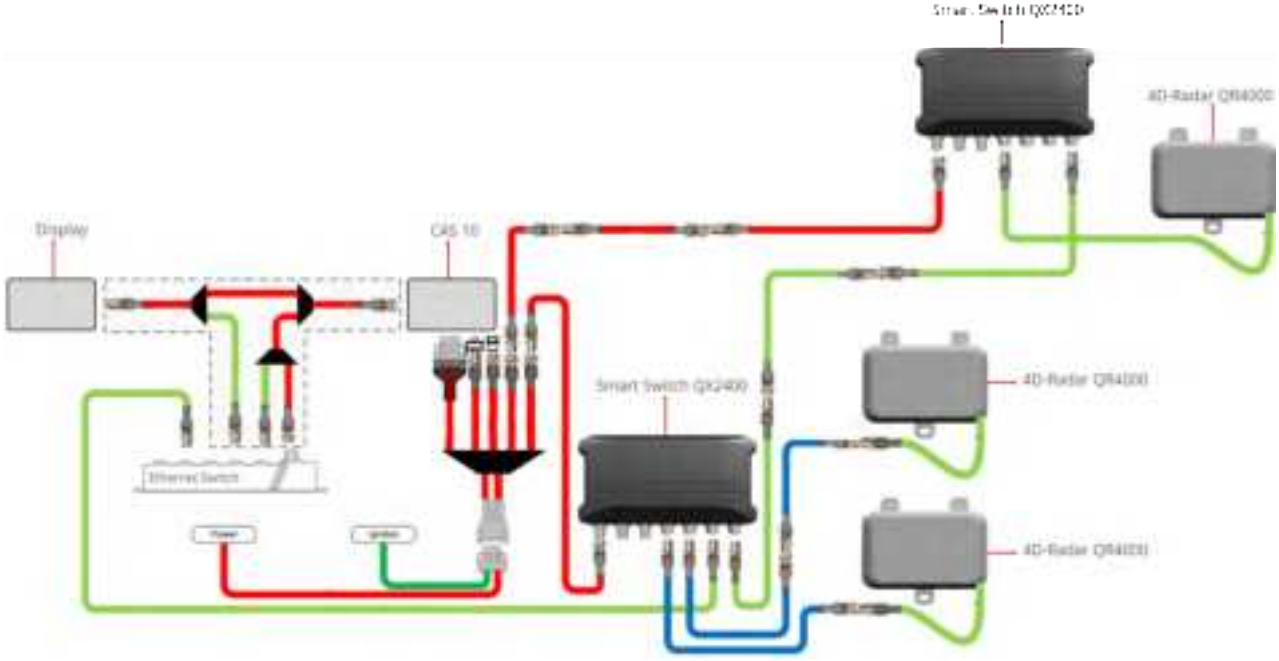
4D-Radar System Diagram: Two Front Modules, One Smart Switch, Ethernet Switch



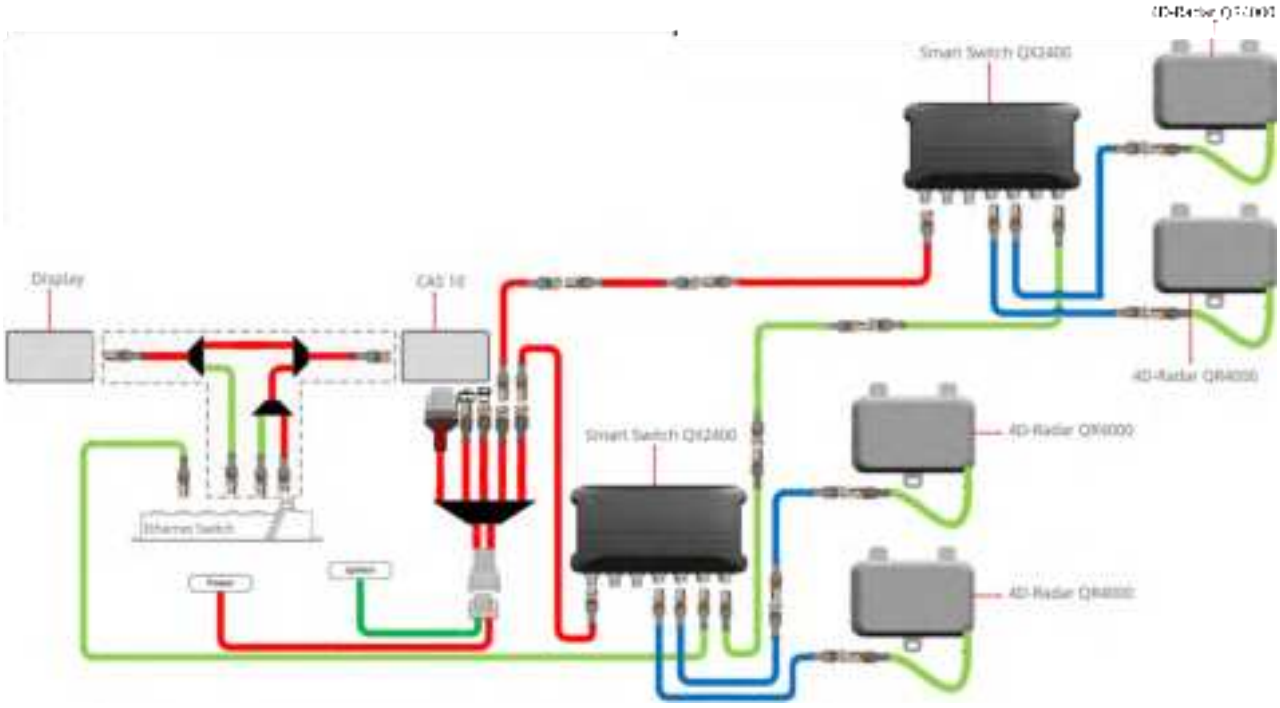
4D-Radar System Diagram: One Front and One Back Module, Two Smart Switches, Ethernet Switch



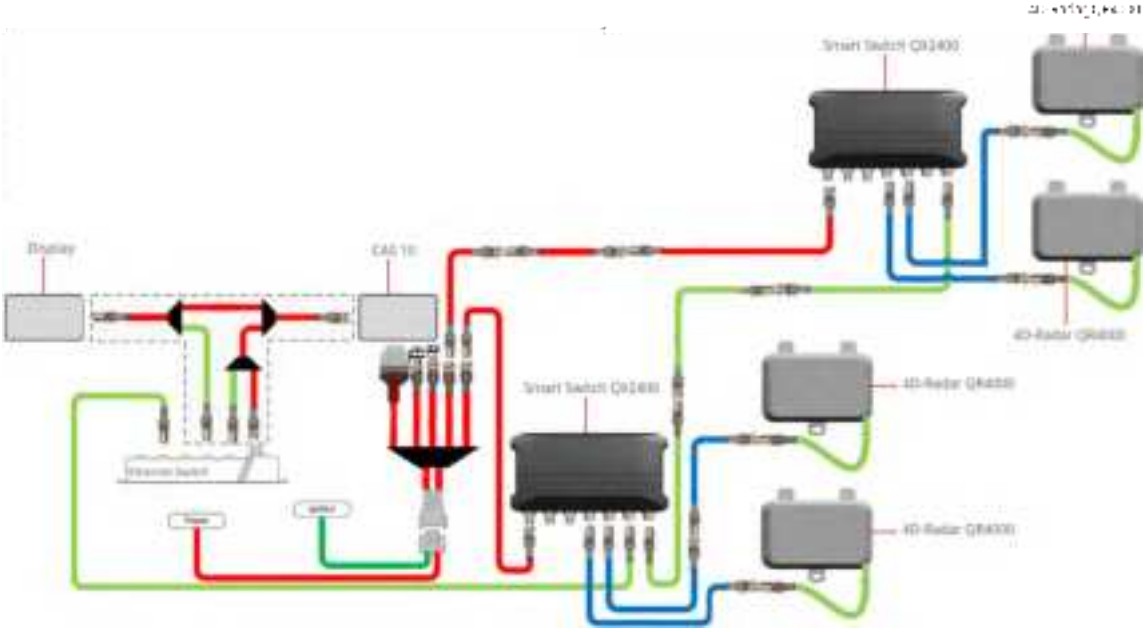
4D-Radar System Diagram: Two Front and One Back Module, Two Smart Switches, Ethernet Switch



4D-Radar System Diagram: Two Front and Two Back Module, Two Smart Switches, Ethernet Switch



4D-Radar System Diagram: Six Modules, Three Smart Switches, Ethernet Switch



2.3 4D-Radar Front Side

The UP orientation label indicates which side of the module must be facing up. The 100-degree label indicates the radar's detection angle.

2.4 4D-Radar Base

The base included the mounting holes, equipment label, and warranty sticker.

> ⚠ **CAUTION**
> Warranty is void if seal is broken.

2.5 Connector Description

2.5.1 Power and Automotive Ethernet

4D-Radar has a M12 4-pole male connector for power and automotive ethernet connection.

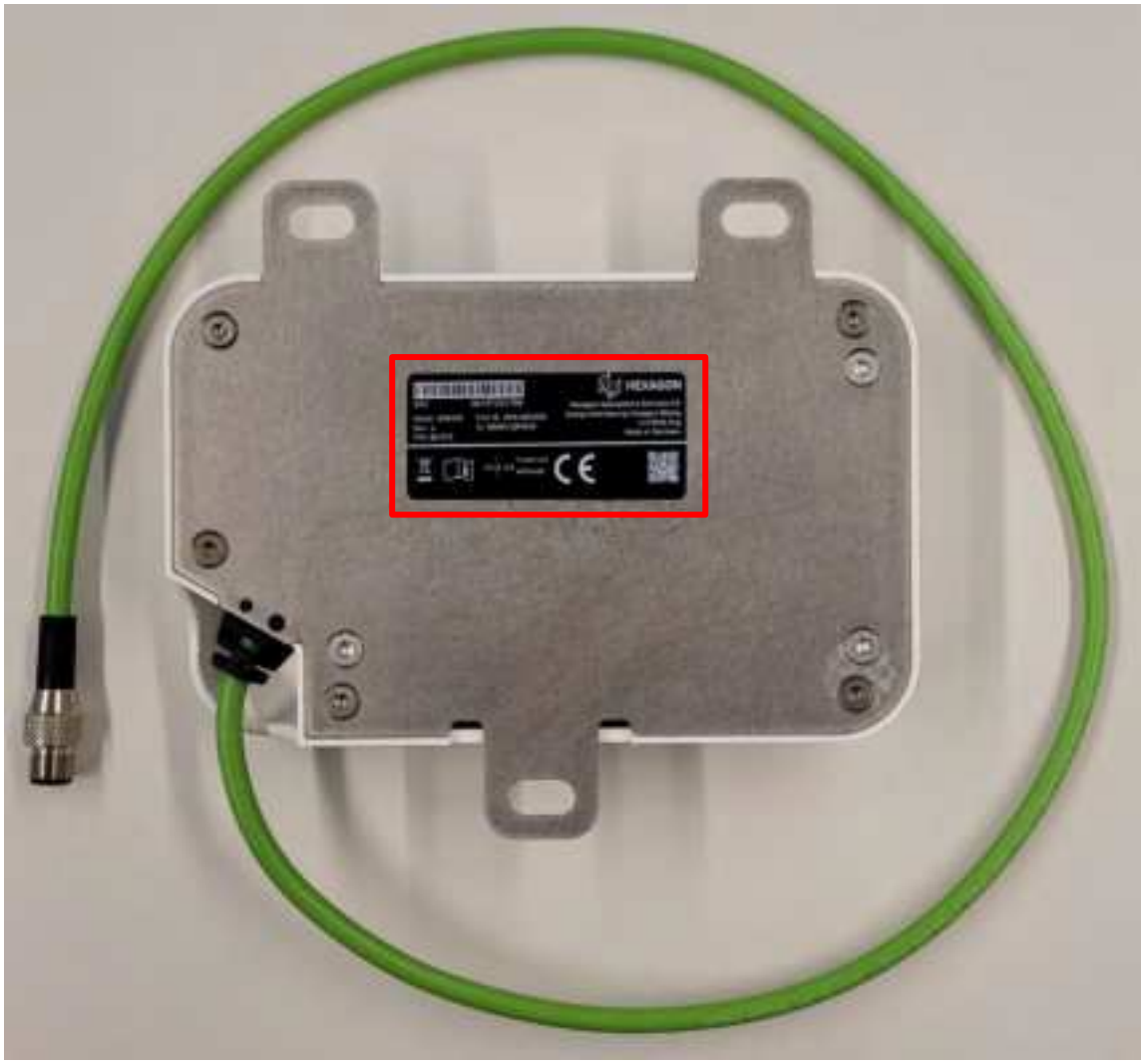
2.6 Labels

2.6.1 Serial Number Label

The Serial Number label is located on the base of the module. The label on the base lists: Compliance, Description, Article Number, Power Requirement, Serial Number, and Where Manufactured.

Serial Number Label

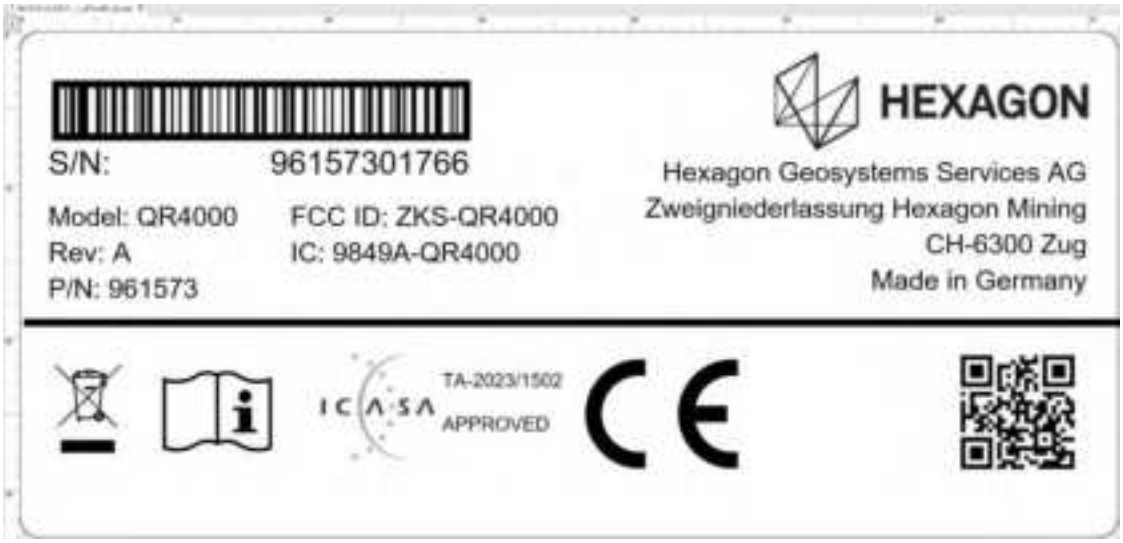
2.6.2 Base Label Location



2.6.2.1 Serial Number Photograph

2.6.3 Certification Labels

CE, FCC, IC, ICASA Certification Product Label Example



2.6.4 Package Label

CE, FCC, IC, ICASA Certification Package Label Example

2.6.4.1 Package label Location

2.6.4.2 Package label Photograph

3 Hardware Installation

Installation requires specialized knowledge, and the 4D-Radar module must be installed by a Hexagon Mining Authorized Installer. Hexagon Mining recommends that installation of the module must be performed by a Hexagon Mining qualified technician.

The average installation time varies; the time of installation is dependent on equipment type and options purchased.

> ⚠ **CAUTION**
> All Hexagon Mining Equipment must be installed by qualified installation personnel.

> ⚠ **CAUTION**
> During any welding on the machine, disconnect the Smart Switch from the power source so that the 4D-Radar module is completely isolated from the machine. Welding can cause large ground currents, which may damage internal electronic components of the module. The module is not warranted for damage when connected during welding activities.
>
> - Install the module in a clean and dry workshop environment. Failure to do so may cause the module to short or promote product malfunction.
> - All cables and wiring must be routed and secured to ensure that they do not rub, causing premature failure.

3.1 Module Installation

Install the 4D-Radar in such a way that is considered safe and does not expose any unnecessary stress to the module. In this section, some recommendations are made regarding installation.

3.1.1 Environmental Considerations

- Use caps on any connectors that do not have attached cables.
- To enable sufficient cooling, the module must be installed so that air is able to circulate around it. Avoid installing the device near hot air vents or similar heat sources.
- There must be at least 50 mm free distance around the module.
- Loose mounting bolts are the most common reason for excessive vibration. Mounting bolts may become loose due to improper techniques, for example, missing lock washers, over-tightening, or under-tightening. Proper tightening requires clean dry bolts, and a torque wrench.
- When the 4D-Radar or any device is installed in a vehicle environment, it is important that the installation is traffic-safe. Hexagon Mining does not recommend that the module or its accessories are used actively by the driver or operator when a risk of injury to people, or damage to property, is present.

3.1.2 Mounting

> ⚠ **WARNING**
> **Do not mount the module where it may obscure the driver's view of the road.**
> **Do not mount the module where it may be struck by a deploying airbag.**

Mounting Plate specifications:

- To mount the module, fasten the mounting bracket using the M8 screw.

3.1.3 Cable Installation

Cable must be installed in such a way that it doesn't run any risk of being damaged, pinched, or worn.

- Avoid bending and twisting cable.
- Strain-relief on cables near the connection to the respective module.
- Properly screw the connectors to give good contact and avoid unnecessary strain.
- Shielded cables are recommended, and in some cases necessary, to ensure reliable communication and compliance with industrial EMC standards.

3.1.4 Power Cable Installation

> ⚠ **WARNING**
> **Always ensure the power supply cable is connected at the power supply source through a fuse rated no higher than 5 A. Failure to do so may result in damage to the equipment or fire causing injury.**

> ⚠ **CAUTION**
> The 4D-Radar module is a 12-V or 24-V DC (negative-to-earth) system only. Connecting to a positive-to-earth system causes system damage, which is not covered by warranty.

1. Plug in the round Ethernet M12 connector to the Smart Switch.
2. Tighten the nut on the connector.

4 Care and Transport

4.1 Transport

When transporting the product by rail, air, or sea, always use the complete original Hexagon Mining packaging, in order to protect the product against shock and vibration.

4.2 Storage

Ensure the temperature limits are followed when storing the equipment, particularly in summer if the equipment is inside a vehicle. For information about temperature limits, see 7 Technical Data on page 25.

4.3 Care

- During welding or other service on the machine, the Smart Switch must be disconnected from the power source.
- Services must only be made by authorized personnel. If the 4D-Radar module is opened by unauthorized personnel, the warranty ceases to be valid.
- Scratches or, in the worst-case, damages, to the radar may occur if it comes in contact with a sharp edge or hard material. In order to increase the longevity of the product, this must be avoided.
- If the module becomes too hot, it operates at a limited speed and can also be damaged. Therefore, don't cover the module, for example, by hanging a jacket or other clothes on it.
- Consider traffic safety when the module is installed and whenever it is used. Hexagon Mining does not recommend that the module or its accessories is used actively by the driver when a risk of injury to people, or damage to property, is present.

4.4 Cleaning and Drying

4.4.1 Product and Accessories

To ensure proper and reliable functionality over time, the 4D-Radar must be wiped to remove dirt and dust. Use only a clean, soft, lint-free cloth for cleaning. Use a suitable light, damp rag to clean the module.

Never use alkaline, alcoholic, or other chemicals for cleaning which can damage the module.

4.4.2 Connectors and Plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

5 Basic Operations

The Smart Switch supplies power to the 4D-Radar module. See 2.2 System Information on page 4. The module is switched on when the vehicle is running.

6 Safety Directions

6.1 General Introduction

> **WARNING**
> **This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.**

The directions in this chapter should enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards. The person responsible for the product must ensure that all users understand these directions and adhere to them.

6.2 Intended Use

6.2.1 Permitted Uses

- Module is intended for Mining use only.
- Module is intended to be fitted to Mining assets only.
- Data communication with external appliances as part of a Hexagon Mining Solution.

6.2.2 Adverse Use

> **WARNING**
> **Unauthorized modification of Mining machinery by mounting or installing the product may alter the function and safety of that mining machinery.**

> ⚠ **WARNING**
> **Follow the instructions of the machinery manufacturer. If no appropriate instruction is available, ask the machinery manufacturer for instructions prior to mounting or installing the product.**

Adverse use can lead to injury, malfunction, and damage. It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product must not be operated until the user has been instructed on how to work with it.

The following items result in adverse use:

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example a screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Hexagon Mining.
- Inadequate safeguards at the working site, for example when using on the intended site.

6.3 Limits of Use

6.3.1 Environment and Environmental Tolerance

> **WARNING**
> Must not be used on planes or any aircraft

> **WARNING**
> Local safety authorities and safety experts must be contacted before working in hazardous areas, in close proximity to electrical installations, or similar situations by the person in charge of the product.

This product is suitable for use in an atmosphere appropriate for permanent human habitation. The 4D-Radar module has been designed to cope with tough environmental demands. Strict tests have been conducted on the module in order to ensure that it fulfils the expectations of a rugged module.

Place the module in a way that it is mounted securely on the vehicle to inhibit the module from moving and thereby becoming damaged, damaging the vehicle and people during, for example, a traffic accident.

6.4 Responsibilities

6.4.1 Manufacturer of the Product

Hexagon Mining is responsible for supplying the product, including the User Manual and original accessories, in a completely safe condition.

6.4.2 Manufacturers of Non-Hexagon Mining Accessories

The manufacturers of non-Hexagon Mining accessories for the product are responsible for developing, implementing, and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Hexagon Mining product.

6.4.3 Persons in Charge of the Product

> ⚠ **WARNING**
> **The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.**

Duties of the person in charge of the product:

- To understand the safety instructions on the product and the instruction in the User Manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Hexagon Mining immediately if the product and the application becomes unsafe.

6.5 Hazards of Use

6.5.1 General Hazards

- The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial, and environmental consequences.
- All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.
- Only Hexagon Mining authorized service workshops are entitled to repair these products.
- Inadequate securing of the working site can lead to dangerous situations, for example, in traffic, on building sites, and at industrial installations.
- Always ensure that the working site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.

- The operator assures that the machine is operated, guided, and monitored by a qualified user (for example, a licensed driver). The user has been able to take emergency measures, for example, an emergency stop.
- While providing information to the operator of the machine, accidents may occur due to:
    - The operator not paying attention to the surroundings (for example, people, ditches, and traffic).
    - Malfunctions (of a system component interface, etc.).

6.5.2 Mechanical Hazards

- Incorrect fastening of the equipment to vehicles or transporters poses the risk of the equipment being broken by mechanical influence, vibration, or airstream. This may result in accident and injury.
- Periodically carry out test measurements and perform the field adjustments, particularly after the product has been subjected to abnormal use, and before and after important measurements.
- When setting up the product, ensure that the accessories are correctly adapted, fitted, secured, and locked in position. Avoid subjecting the product to mechanical stress.
- Deflect the mechanically moving machine components as far as possible and define a safe installation zone.
- If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example, by blows or falling objects, the product may be damaged, or people may sustain injury.

6.5.3 Disposal

If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced, which may impair health.
- By disposing of the product irresponsibly, unauthorized persons may use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.

CAUTION

The product must not be disposed of with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country.

CAUTION

Always prevent access to the product by unauthorized personnel. Product Specific treatment and waste management information can be obtained from your Hexagon Mining dealer.

6.6 Electromagnetic Compatibility (EMC)

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

- Electromagnetic radiation can cause disturbances in other equipment. Although the product meets the strict regulations and standards that are enforced in this respect, Hexagon Mining cannot completely exclude the possibility that other equipment may be disturbed.
- There is risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, non-standard cables, or external batteries.
- Use only the equipment and accessories recommended by Hexagon Mining. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

- Disturbances caused by electromagnetic radiation can result in erroneous measurements. Although the product meets the strict regulations and standards which are enforced in this respect, Hexagon Mining cannot completely exclude the possibility that the product may be disturbed by very intense electromagnetic radiation produced by, for example, nearby transmitters, two-way radios, or diesel generators.
- Check the plausibility of results obtained under these conditions.
- If the product is operated with connecting cables attached at only one of their two ends, the permitted level of electromagnetic radiation may be exceeded, and the correct functioning of other products may be impaired.
- While the product is in use, connecting cables must be connected at both ends.

7 Technical Data

Radar Sensor Features

Feature	Description
Field of View (FOV)	• 100° horizontal FOV • 15° vertical FOV.
Range	Up to 180 m.
Bandwidth	76–77 GHz, <1000 MHz bandwidth, <35 dBm.

Radar Output Power

Center Frequency	Waveform	Measured EIRP [mW]
76.402 GHz	Waveform 0	3090.3 [1)]
76.642 Ghz	Waveform 0	2454.7 [1)]
76.057 Ghz	Waveform 1	5011.9 [1)]
76.950 Ghz	Waveform 1	3019.9 [1)]

[1)] According EN 62311 test report 24013197_Rev.01 TÜV Nord Germany with +-4dB uncernaity

Power

Power	Specification
Power Supply	12 V or 24 V DC nominal voltage, range 7–32 V DC. Standoff Voltage: 33 V. Includes overvoltage protection.
Power Consumption	< 188 mA at 32 V, < 250 mA at 24 V, < 500 mA at 12 V and < 857 mA at 7 V.

Interface

Interface	Description
Power and Automotive Ethernet	100BASE-T1, 1 port.
Connector	M12 T-coded on 80 cm cable.

Environment

Parameter	Description
Ingress Protection (IP) Class	IP67, EN 60529.
EMC Conformity	RCM, FCC, CE.
Constant Vibrations	10 Sweeps per axis in 2 h. IEC 60068-2-6 Test Fc; 5-500 Hz; 5 g; ±15 mm; 10 cycles.
Random Vibration	MIL-STD-810H Fig. 514.8E-1; Category.24 20-2000 Hz; 7.7 g_{rms} 1.0 h/axis.
Shock	IEC 60068-2-27 Test Ea, half sine; 60 g; 6 ms; ± 3 x 4000 (special).
Temperature Range (°C)	Storage: -40°C to +85°C Operating: -40°C to +85°C
Humidity	0 to 95% RH (non condensing)
Impact Strength	Dropped from 1.2 m at room temperature

Enclosure

Enclosure	Description
Housing Material	Polycarbonate EXL9330 and stainless steel. See 9 Appendix A – Standard 4D-Radar Housing Cover on page 28.
Mechanical Installation	M8 screws.
Cable	1 x Cable. Not detachable.

Size and Weight

Size and Weight	Dimensions
W x H x D (mm)	189 x 165.8 x 37.3 mm
Weight (g)	1061 g

Compatibility

HxGN World Perception

8 Connector

> ⚠ **CAUTION**
> Always replace a damaged cable. If the pins become bent or damaged, they may not function correctly, or in the worst case, the onboard computer or other equipment may be damaged.

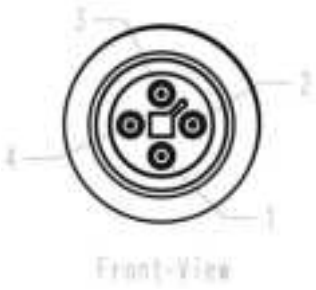
> ⚠ **CAUTION**
> Use caution and avoid plugging or unplugging of connectors when the computer is on.

In order to give the module its high environmental classification, the module is equipped with DIN M12 connector.

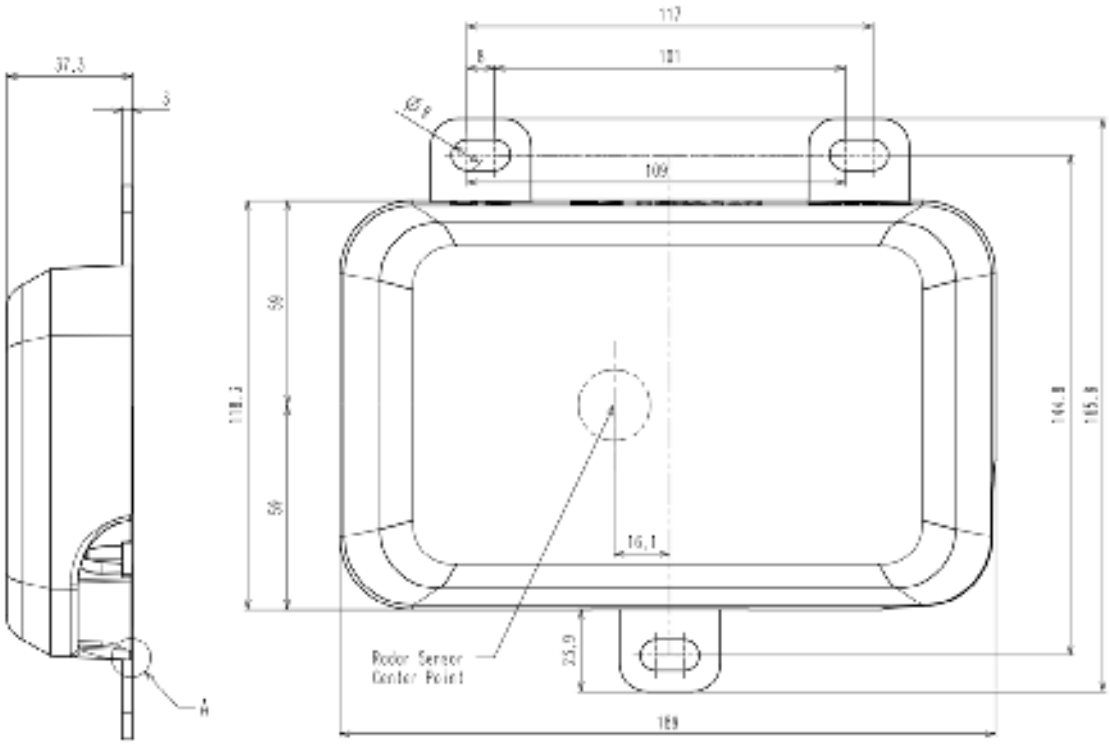
8.1 Connector layout

> ⚠ **CAUTION**
> The connector descriptions are for the connectors which are located on the module cable.

8.1.1 Gigabit Ethernet Connector

Pin #	Signal	Comments	DIN M12 x male, 4-pole, T-coded
1	TX-P	Automotive Ethernet Tx Positive	
2	TX-N	Automotive Ethernet Tx Negative	
3	VSUPPLY	Pos. Supply Voltage	
4	GND	Ground	

9 Appendix A – Standard 4D-Radar Housing Cover



10 Glossary

Term	Definition
g_{rms}	Unit of measure of force or acceleration due to gravity, where g is a unit of force (g = gravity) and rms is root mean square.
EMC	Electromagnetic Compatibility
FCC	Federal Communications Commission (FCC) is the certification mark employed on electronic products manufactured or sold in the United States of America, which certifies that the electromagnetic interference from the device is under limits approved by the Federal Communications Commission.
FOV	Field of View
SOPs	Standard Operating Procedures
SWPs	Safe Work Procedures

11 Annex 1: Compliance

EU

Hereby, Hexagon Geosystems Services AG declares that the radio equipment type QR4000 is compliance with Directive 2014/53/EU.

Hexagon Geosystems Services AG
Zweigniederlassung Hexagon Mining
Baarerstrasse 133, CH-6300 Zug
Switzerland

EU Declaration of Conformity

We, the undersigned,

Manufacturer: Hexagon Geosystems Services AG, Zweigniederlassung Hexagon Mining
Address: Baarerstrasse 133, CH-6300 Zug, Switzerland
Phone number: +41 41-760-8563
Fax number: +41 41-760-8565

Certify and declare under our sole responsibility that the following apparatus:

Description: HxGN Mine Discover 4D-Radar
Identification Model: QR4000
Brand: Hexagon

Conforms to the essential requirements of the Directives and Standards below:

Radio Equipment Directive 2014/53/EU	**Standards**
Safety & Health (RED Article 3.1a)	EN 62311: 2008 EN 62368-1: 2014 + AC.2015
EMC (RED Article 3.1b)	EN 301 489-1 V2.2.3 EN 301 489-51 V2.1.1
Radio Spectrum Usage (RED Article 3.2)	EN 301 091-1 V2.1.1 (2017-01)
RoHS Directive	2011/65/EU
WEEE REACH	1907/2006/EU

Notified Body:

Kiwa Nederland B.V. 0063

Name: Daniel Hess
Position: Electronics Design Engineer
Place: Zug, Switzerland
Date: 28/August /2024

FCC Compliance Statement

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.

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, it may cause harmful interference to radio communications.
However, there is no guarantee that interference does 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.
- Increase the separation between the equipment and the receiver.
- 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.

ISED Compliance Statement

IC compliance statement:

(See: https://ised-isde.canada.ca/site/spectrum-management-telecommunications/en/devices-and-equipment/radio-equipment-standards/radio-standards-specifications-rss/rss-gen-general-requirements-compliance-radio-apparatus#s8.4)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(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.

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un

environnement non contrôlé.

Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas etre place au meme endroit ou utilise simultanement avec un autre transmetteur ou antenne.

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About Hexagon Mining

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

Hexagon's Mining division solves surface and underground mine challenges with proven technologies for planning, operations and safety.

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