

Q-Global QRSSK Series Sensor

DATASHEET

Radar-based Dual-Zone Narrow-Beam Sensors for Detection of Moving and Stationary Targets



FMCW radar, operating frequency 77-81G, detect static objects, can detect the distance, angle and speed of the target.

Maximum beam width 120 degrees.

Maximum detection range up to 60 meters for small car.

Multiple antenna configuration to detect target
CAN\UART\4IO, The program CAN be upgraded through CAN

Fast startup time of less than 100s.

Operating temperature: -40-85°C

Power short circuit, positive and negative connection protection

Name	Sensing Range	Connection	Supply Voltage	Output
QRSSK	1 to 60 meters	8-pin Waterproof terminal	12V/24V DC	CAN/UART DATA

CAUTION: Make No Modifications to this product

Any modifications to this product not expressly approved by Q-Globe could void the user's authority to operate the product. **Contact Q-Globe for more information.**



WARNING: Not to Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.



Overview

The Q-Global sensor emits a well-defined beam of high-frequency radio waves from an internal antenna. Some of this emitted energy is reflected back to the receiving antenna. Signal

processing electronics determine the distance from the sensor to the object based on the time delay of the return signal. The sensor can be configured to two independent sensing zones. The two sensing zones are factory pre-set to default distance; The sensor is plug-in ready for immediate operation. The sensitivity is precalibrated at the factory, assuming that the sensing field will be clear of obstacles.

Specifications

Range

The sensor is able to detect a proper object(see Detectable Objects) from 1 to 60m, depending on target

Detectable Objects

Static objects, Moving objects.

Operating Principle

Frequency modulated continuous-wave (FMCW) radar

Operating Frequency

77-81GHz

Supply voltage

12V/24V DC

Supply Protection Circuitry

Protected against reverse polarity

Delay at Power-up

Less than 100 seconds

Output Protection

Protected against short circuit conditions

Construction

Front Housing: PPO

Rear Housing: Aluminium Alloy

Access Cap: PVC

Operating Temperature

-40-85°C

Environmental Rating

IP67

Connections

8-pin Waterproof terminal

Certifications

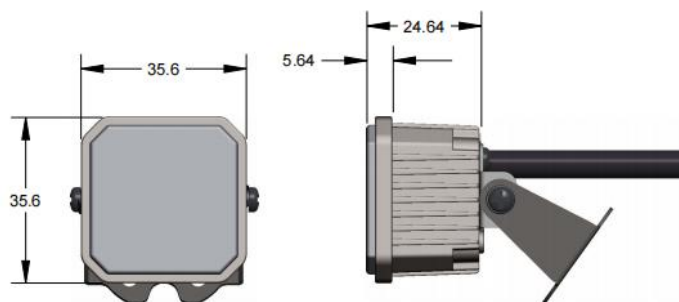
CE FCC E-MARK

Beam Angles

Long distance mode: azimuth 120°,elevation 50°.

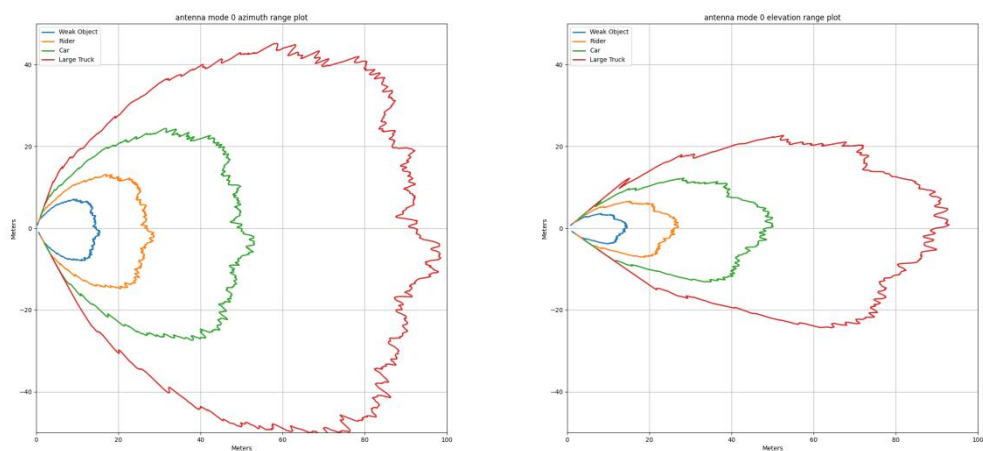
Short distance mode: azimuth 80°,elevation 90°.

Dimensions

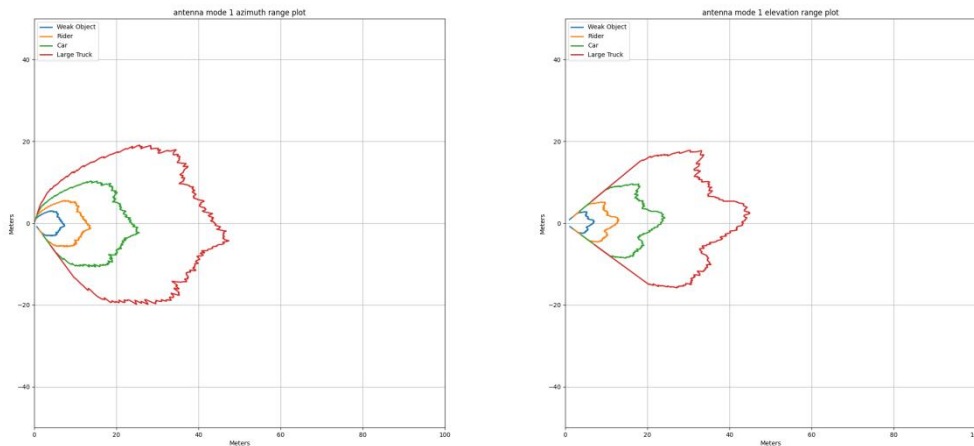


All measurements are listed in millimeters, unless noted otherwise.

Beam Patterns



Antenna configuration 0 mainly detects dynamic targets



Antenna configuration 1 mainly detects static targets

- 1:Weak Object(RCS = -10)
- 2:Rider (RCS = 0)
- 3:Car(RCS = 10)
- 4:Larger Truck(RCS = 20)

Windows

The Q-Global sensor can be placed behind a glass or a plastic window, but the configuration must be tested and the distance from the sensor to the window must be determined and controlled prior to installation. There is typically a 20% signal reduction when the sensor is placed behind a window.

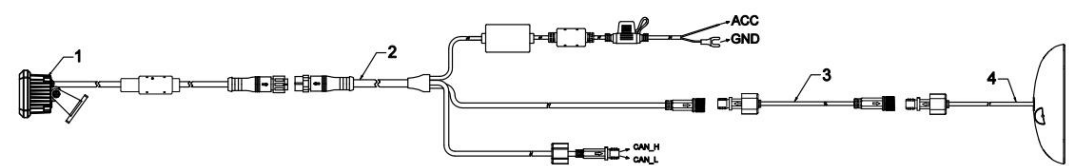
Polycarbonate at 2mm thickness performs well in most situations, but the performance depends on filler materials. Thinner (0 to 1.5mm) windows have high reflection. The amount of reflection depends on the material, thickness, and distance from the sensor to the window.

Locate the sensor in a position of minimum reflection from the window, which will repeat every 1.9 mm of distance between the sensor and the window. The position of maximum reflection from the window repeat between the minimums, and decrease in effect until the window is approximately 150mm away. Consult the factory for pre-tested window materials which can be used at any distance without issue.

Additionally, the face of the window should be protected from flowing water and ice by use of a flow diverter or hood directly above the window. Falling rain or snow in the air in front of the window, light water mist, or small beads on the face of the window are typically not an issue. However, a thick, continuous surface of water or ice directly on the face of the window can be detected as a dielectric boundary.

(Front radar)

Wiring Diagram



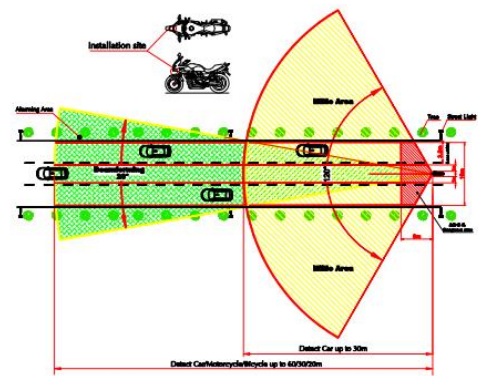
System components

NO.	Parts	Count
1	Radar	1
2	Main Cable	1
3	Display Extension Cable 2M	1
4	LED-Display	1
5	Accessories bag	1

Accessories bag:
Adjustable bracket x 1 set;
Spring washer x 10;
M3 screw x 7;
M3 Self-tapping screw x 3;
3M glue x 1;
Cable tie x 8;
Fuse X 1;
Alcohol swab X 1;
Silicone Case X 1;
Rubber X 1.

System funtion

- 2.1 Left green light: the left lane length is detected: $20 + \text{vehicle_speed}/25\text{m}$, width: 2m-6m that detected moving objects. (Fox example, the radar detect 20m forward when the vehicle speed is 0 km/h, the detect distance will be 24m when vehiclespeed is 100($100/25\text{m}=4\text{m}$)).
- 2.2 Right green light: the right lane length is detected: $20 + \text{vehicle_speed}/25\text{m}$, and the width is 2m-6m that detected moving objects.
- 2.3 Middle digital tube: the distance to the nearest object in the middle lane the width $\pm 2\text{m}$, and the length is 2m-90m.
- 2.4 Simultaneous yellow lights on both sides : safe following distance warning ($\text{vehicle_speed}/3$)m.
- 2.5 Simultaneous red lights on both sides : collision warning (collision time <3s, vehicle speed >20KM/H).
- 2.6(The current version 1.0 is recommended to be used at speed of 20KM/H or above, and the recognition rate of static object collision detection is not high).



(Rear radar)

Wiring Diagram

The diagram illustrates the electrical connections for the rear radar system. A radar unit (1) is connected to a main cable (2). This cable then branches into several lines: one for ACC, one for GND, one for CAN_H, one for CAN_L, and two lines for LED lights (3).

System components

NO.	Parts	Count
1	Radar	1
2	Main Cable	1
3	LED light	2
4	Accessories bag	1

Accessories bag:
Adjustable bracket x 1 set;
Spring washer x 10;
M3 screw x 7;
M3 Self-tapping screw x 3;
3M glue x 1;
Cable tie x 8;
Fuse X 1;
Alcohol swab X 1;
Silicone Case X 1;
Rubber X 1.

Product funtion

Product Triggering Condition	Blind Spot Detect -BSD	Lane Change Asslet -LCA	Rear Collision Warning -RCW
System Starting Speed	$V \geq 15 \text{ Km/h}$		
Lateral warning range	Left, right lane	Left, right lane	Home lane
Longitudinal warning range	$1\text{m} < Y < 9\text{m}$ According to speed	$1\text{m} < Y < 90\text{m}$	$1\text{m} < Y < 90\text{m}$
The Warning Mstrategy	Alarm of moving target in alarm area,including passive overtaking and samespeed following.	Alarm of moving target in alarm area,including passive overtaking and samespeed following.	There is a vehicle approaching fast in the lane directly behind the vehicle,there are moving objectswithin 6m.
Alarm Trigger Condition	There are targets in the warning range, and the corresponding direction of the warning light is on for a long time to remind the driver.	If there is a target vehicle within the warning range and TTC time $\leq 3\text{s}$, the alarm light is on.	If there is a target vehicle within the warning range and TTC time $\leq 3\text{s}$, the bidirectional alarm light flashes.

The diagram illustrates the radar detect range. It shows a vehicle with a radar sensor pointing forward. The detect range is divided into three zones: BSD (Blind Spot Detect) for 0.7m to 9m, LCA (Lane Change Asslet) for 0.7m to 90m, and RCW (Rear Collision Warning) for 0.7m to 90m. The diagram also shows the lane width of 1.4m and the lane position offset of 0.7m.

Note:
The radar is centered on the left and right, and the area extending 0.7m outward is the current motorcycle lane; the 0.7m on both sides of the radar is the left and right adjacent lanes.
The lane width defined by radar detection is 1.4m, the lane position may be offset when the vehicle body is not parallel to the actual lane line on the road surface.

Warranty

Q-Global warrants its product to be free from defects in material and workmanship for one year following the date of shipment. Q-Globle will repair or replace, free of charge, any product of its

manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Q-Global product.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This warranty is exclusive and limited to repair or, at the discretion of Q-Global replacement. IN NO EVENT SHALL Q-GLOBAL BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.

R-Global reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Q-Global. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Q-Global will void the product warranties. All specifications published in this document are subject to change; Q-Global reserves the right to modify product specifications or update documentation at any time. For the most recent version of any documentation, refer to: www.q-solutions.com.cn

FCC Warning

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. 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.
- Increase the separation between the equipment and 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.

FCC Radiation Exposure Statement

This equipment 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 equipment should be installed and operated with minimum distance 25cm between the radiator& your body.