



RADARXENSE

RXS-TR-10

Multilane
Traffic
Radar



- Measures velocity and the position coordinates of multiple targets **simultaneously**
- Outputs an object list of targets
- Dynamic telegram output ensures optimum performance

The RXS-TR-10 is a radar using Radarxense Broadway technology. The RXS-TR-10 is optimised for use in traffic monitoring. This allows the user to measure multiple objects with a single radar. The unit is designed in such a way that it can be used with a minimum of installation and back-end processing requirements.

General Description

The RXS-Broadway radar module uses phase comparison monopulse radar technology to measure velocity, range and angle of arrival. This allows the user to monitor multiple objects simultaneously. It consists of one box containing the RF-frontend and the Digital Signal Processing. Installation is relatively easy and straightforward. The system works in the license free 24 GHz ISM-band. For each detected target, the radar will give a single telegram, consisting of speed, X- and Y-position (relative to the installation position). This allows an easy interfacing to the data collection system and makes this radar a perfect solution for counting and traffic monitoring applications.

Application

With angle information of the measured targets, a distinction can be made between different targets at the same radial distance. This capability is a necessity to distinguish vehicles on different lanes. The radar can be installed on a gantry or on the roadside. For optimal results, the radar should be installed at a height of at least 4 meters.

General Technical Data

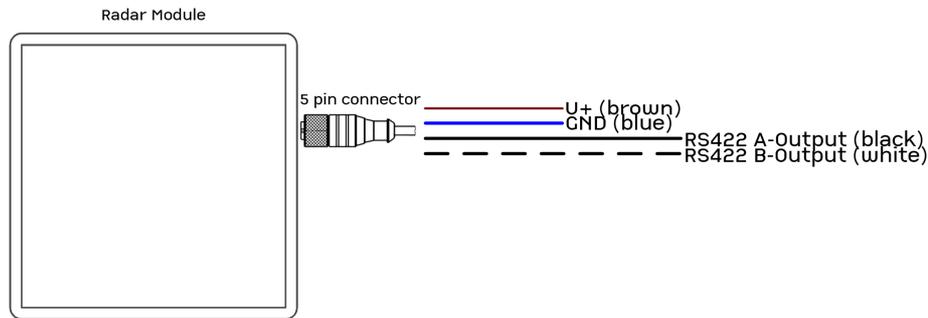
Supply voltage:	9 to 30V (secured against false polarity)
Supply current:	140mA (typical)
Transmit frequency:	24.000 – 24.250GHz
Maximum transmit power:	20dBm (EIRP)
FCC and ETSI 300 / 440 compliant with	50MHz bandwidth
Antenna beam:	
horizontal:	70° (+/-35°) (typical)
vertical:	11° (+/-5,5°) (typical)
Modulation:	FMCW
Detection range:	>70m
Velocity range:	-86 to +86m/s
Installation height:	4 to 6m
Output resistance (RS422):	1360hm
Output voltage (RS422):	5V (diff.)
The RS422 outputs are short circuit proof.	
Dimensions (lxwxh):	100 x 100 x 42 (mm)
Mounting:	
• 4x M4 holes at the back side	
• 82 x 82 mm in square	
Environmental:	
IP rating:	: IP67
Operating temperature:	-20° to +60°
Storage temperature:	-30° to +100°



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Module Interface

The circular connectors used are industrial standard, rated IP68. The four pin connector type is the GS04M12X1,5VA.



The radar system has the following interfaces:

- Power supply +6 to 16V (brown wire) and GND (ground, blue wire)
- RS422 serial interface; A-output (black wire) and B-output (white wire)

Readout Description

The RS422 communication interface output has the following specification:

- Interface specification: 19200, 8, N, 1

After switching on the radar, the telegram readout will start.

When the radar is switched on, an auto calibration routine is started automatically. This procedure lasts until the radar has defined the driving direction of the traffic.

During this calibration the readout telegram will be:

Byte 1:	7eh
Byte 2:	8eh
Byte 3:	9eh
Byte 4:	1eh
Byte 5:	lower byte counter for auto calibration
Byte 6:	higher byte counter for auto calibration
Byte 7:	CRC lower byte
Byte 8:	CRC higher byte

The counter will count up to 15001; after this, the readout telegram starts running. The counter is based on an internal number derived from useful reflections. The complete calibration procedure takes roughly a minute in a normal traffic situation

The readout telegram consists of:

Byte 1:	7eh
Byte 2:	3eh
Byte 3:	4eh
Byte 4:	6eh.
Byte 5:	X in cm where the car has been counted (lower byte)
Byte 6:	X in cm where the car has been counted (higher byte)
Byte 7:	Y in cm where the car has been counted (important for lane) (lower byte)
Byte 8:	Y in cm where the car has been counted (important for lane) (higher byte)
Byte 9:	speed in cm/s (can be positive or negative depends on direction)(lower byte)
Byte 10:	speed in cm/s (can be positive or negative; depends on direction)(higher byte)
Byte 11:	lower byte 1. (available for future expansion)
Byte 12:	higher byte 1. (available for future expansion)
Byte 13:	lower byte 2. (available for future expansion)
Byte 14:	higher byte 2. (available for future expansion)
Byte 15:	CRC lower byte
Byte 16:	CRC higher byte



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Road side Installation

The optimum installation height is between 4 – 7 m

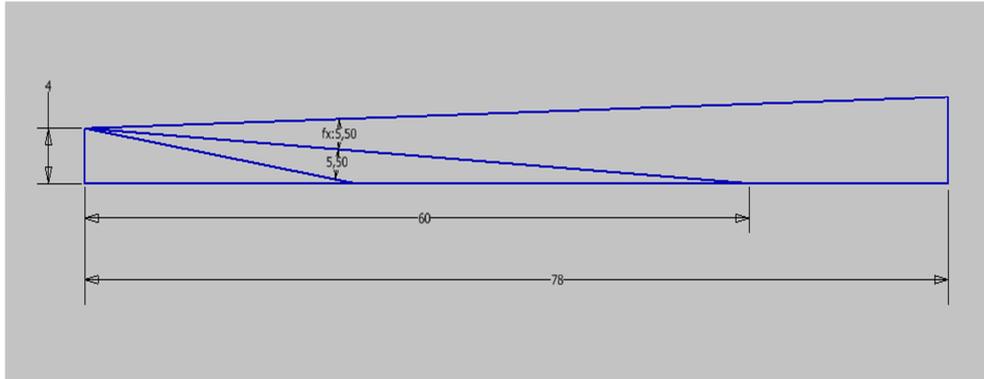


Figure 1. Side view on an installation with a height of 4 m

The middle of the antenna beam should touch the ground at 60 m in order to cover up to 78 m. The install pitch should be chosen in such a way that the tracked targets are seen up to 62 m.

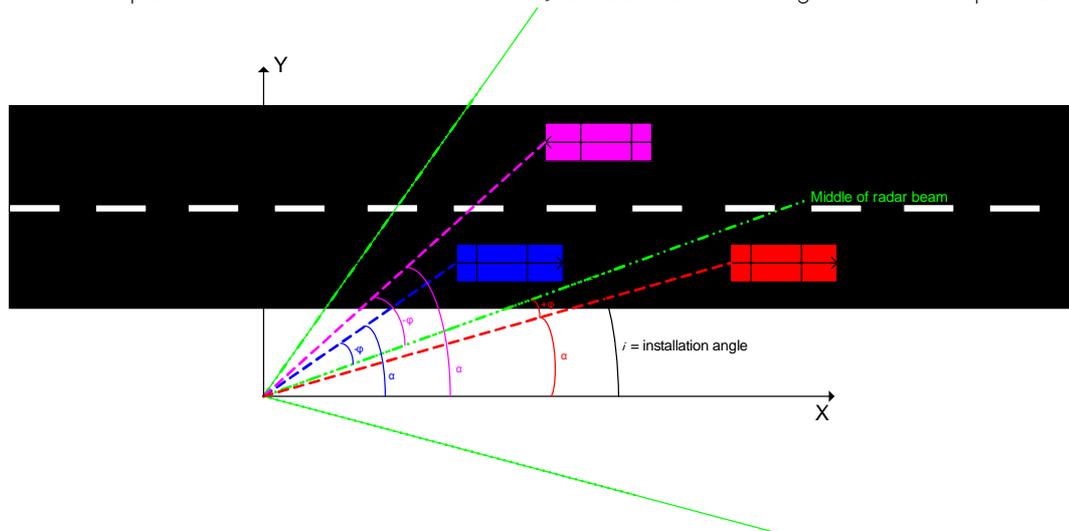


Figure 2. Top view on the installation

The installation angle, i , is the sum of Phi and α : $i = \varphi + \alpha$

Phi is positive on the right side of the centre line of the radar beam and negative on the left side of the centre of the radar beam.

X: along driving direction

Y: width of the road

i : Installation angle. This is the angle between the middle of the radar beam towards the driving direction.

The advised installation angle should be between:

$15^\circ < \text{angle} < 28^\circ$

However, in highway installations it is recommended not to install the radar with an angle of more than 22 degrees to the road. For urban installations, an installation angle of not more than 28 degrees is recommended.



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Drawing and dimensions of the housing in mm

