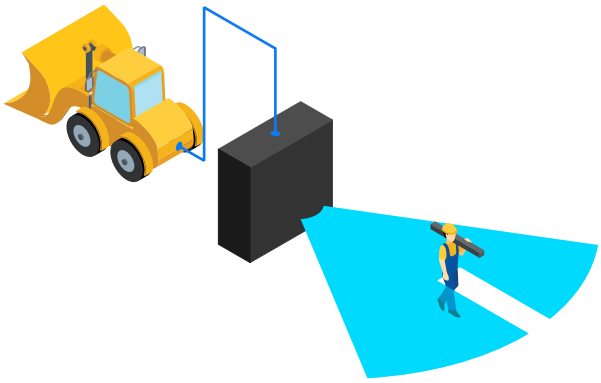
Attingimus Radar Sensors

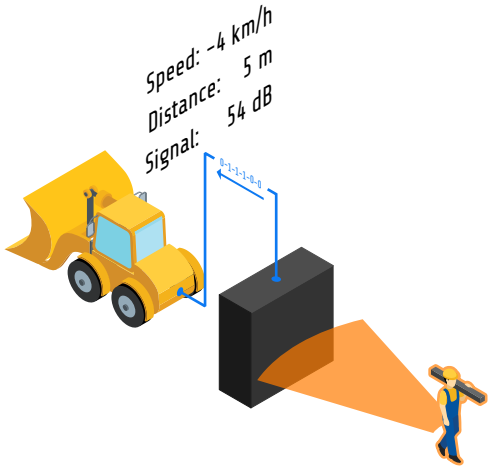
- General Information -

Radar Sensors

The basic principle of any active Radar sensor is the emission and re-absorption of Radar waves. Radar waves are electromagnetic waves which propagate at the speed of light.



The Radar emits a specific signal, which gets reflected by an object in the observed area. The reflected signal is again received and analyzed by the Radar sensor. Physical properties of the reflecting target, like distance and speed, can be obtained.



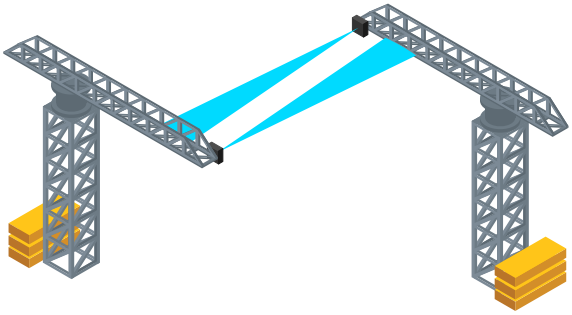
Restrictions and Advantages of Radar Sensors at 24 GHz

Radar sensors do not have the same spatial image resolution as modern video cameras which operate in the visible light spectrum with frequencies of 400 – 800 THz (a factor of ~ 20.000 larger than the 24 GHz ISM-Band).

Alone by physical constraints, a Radar sensor with a similar resolution as a common video camera would have to be ~20.000 times its size. Besides the size of the sensor however, at 24 GHz, electromagnetic waves behave much more “wave-like” than their optical “ray-like” relatives in the visible light spectrum. A reflection of Radar waves will therefore never be as “sharp” as an optical picture and can behave in counterintuitive ways.

The advantage from this tradeoff is, that due to its greater wavelength, Radar waves go almost unhindered through obstacles like rain, fog, dirt or dust. Radar sensors are therefore well suited to operate in difficult environments, where visible light is obstructed and optical or ultrasonic sensors would have trouble performing.

Another benefit from a smaller frequency is the reduced loss in signal strength by transmission over long distances. The commercially usable 24 GHz ISM-Band has a greater reach than comparable higher frequency signals, making Radar sensors optimal for monitoring distant targets or large areas.



Sensors from Attingimus Radar

Attingimus Radar offers a wide range of different Radar sensors. Starting with basic measurement tasks like speed and distance measurements to the closest object, we have solutions for complex Collision Avoidance Applications, Sharp Detection Zones, High Accuracy Traffic Enforcement, and Tracking Applications.

Our basic Radars usually detect the closest target and provide speed and distance information. For specific tasks however, we also employ very advanced filtering techniques for separating and tracking multiple objects or gain an accurate angular resolution.

If you have a certain task in mind, for which you would like to use a Radar sensor, please contact us. We are happy to advise you on possible Radar solutions.

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Attingimus Radar Sensors
- Traffic Monitoring -

Basics of Traffic Monitoring

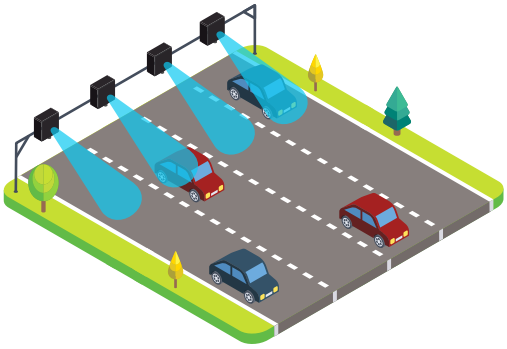
Traffic monitoring is becoming increasingly important in both rural and urban areas. Only with the help of good statistics on traffic volume and composition can it be managed from the point of view of efficiency, environmental friendliness and safety.

Advantages of 24GHz Radar for Statistics

Nowadays, personal data is a sensitive issue that must be handled with caution. Our sensors collect traffic data 100% anonymously and with no possibility to draw conclusions about personal information. We work in the free 24GHz ISM band, which allows us to see through rain, fog and snow and filter out disturbing factors such as nearby trees or similar.

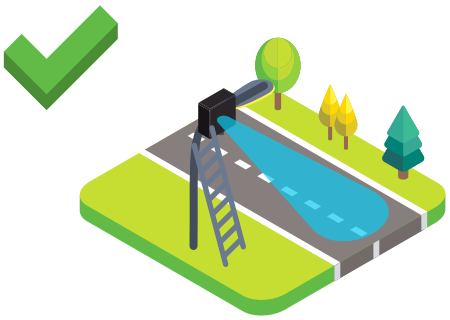
Installation

The best results can be achieved if the Radar is mounted straight above the road to be monitored and a separate Radar is used for each lane. Depending on the application, a single Radar can also detect both approaching and receding vehicles.



Non-intrusive Loop Replacement

Our Radars can reliably collect data on passing traffic in all weather conditions. The collection of data from above allows an uncomplicated and cost-effective installation of the device, for example on existing lanterns, gantries or specially installed poles. Maintenance and updates can be carried out without any problems due to the free above-ground access.



Counting & Classification

Our Radar can count and classify vehicles. This is possible on motorways, country roads or in the city. Bicycles, cars or larger vehicles can be detected. Speed measurements are also possible.

Digital Output

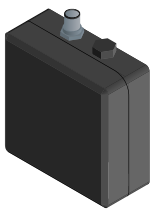
The Radar sends data in the form of a telegram. Every 10 milliseconds a telegram is sent. In addition to technical information, it contains the measured values such as distance or speed in metric values. The data is formatted in 8- or 16-bit integers. The fast response time provides real-time vehicle speed information and additional status information.

Sample Telegram:

Byte Nr.	Data	
0	0x7E	Header bytes
1	0x7E	
2	0x7E	
3	0x7E	
4	distance in cm - lower byte	Data bytes
5	distance in cm - higher byte	
6	speed in cm/s - lower byte	
8	speed in cm/s - higher byte	
9	signalstrength in dB	

Housing Properties

All our Radars have an IP67 / IP69k certified housing made of POM and an anodized aluminum alloy. It is designed for best performance with maximum protection and maximum compactness.



Due to our focus on longevity and durability, our Radar systems have been under harshest conditions for more than 10 years, for example in port areas or on construction sites.

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Attingimus Radar Sensors
- Traffic Enforcement -

Basics of Traffic Enforcement

Applications in the field of traffic enforcement place high demands on the hardware used. The acquired data must be absolutely accurate, reliable and assignable. Our various solutions in the field of traffic monitoring have already been tested many times and are able to meet these high requirements.

Advantages of 24GHz Radar for Enforcement

We work in the free 24GHz ISM band, which allows us to see through rain, fog and snow and filter out disturbing factors such as nearby trees or similar. The Radar works reliably under all conditions.

Permanent or Portable Stations

To detect speeding violations, we offer different solutions. The Radar can be installed at the roadside to set up a permanent measuring station. However, it is also possible to integrate our Radar into a temporary station which can be set up and dismantled as required.

In-Car Solutions

Measurements from a stationary or moving car are also possible. In this case the own speed relative to the ground is measured and at the same time the speed of another vehicle is recorded. This way the absolute speed of the other vehicle can be determined and it can be determined if there is a speeding violation.

Please also have a look at our information material about Speed Over Ground measurements!

Trigger Radar for non-intrusive Loop Replacement

Our Radar can also act as a trigger for cameras to detect red light violations, for example. For this our Radars can reliably collect data on passing traffic in all weather conditions. The collection of data from above allows an uncomplicated and cost-effective installation of the device, for example on existing lanterns, gantries or specially installed poles. Maintenance and updates can be carried out without any problems due to the free above-ground access.

Digital Output

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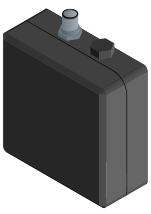

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Attingimus Radar Sensors
- Speed over Ground -

Basics of Speed over Ground

Speed over Ground Radar sensors are high-precision speed sensors that measure the absolute speed of an attached vehicle.

Advantages of SoG Radars

Unlike others, e.g. mechanical speed sensors, Radar sensors are characterized by high precision and an unbiased measurement, since the speed is measured directly relative to the ground. Measuring errors due to slipping on wet or uneven terrain do not occur.

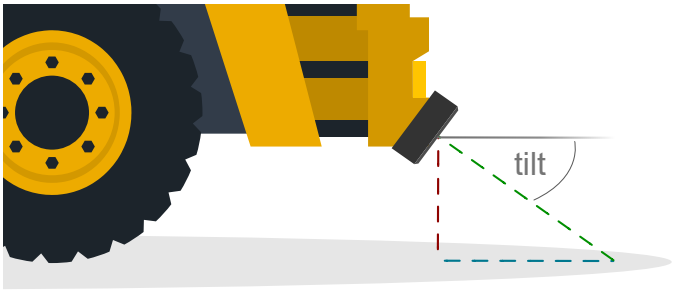
Due to the non-contact measurement by Radar waves, the sensor also suffers from less material abrasion than contact-based speed sensors.

Positioning and Orientation

When mounting a speed Radar, pay close attention to the correct orientation of the sensors.

Radar speed sensors measure the speed of the ground relative to the sensor. When a speed sensor is mounted on a vehicle, care must be taken that it has a clear view of the ground.

To measure the correct speed of a vehicle, a Radar sensor with a certain slope to the ground must be installed.



Measuring Range

Depending on the product variant, we can cover speed ranges from 1 km / h up to more than 1000 km / h with very high precision.

With more than 15 years experience in the supply of speed sensors to European authorities and other customers with the highest standards, we can advise which SoG Radar best suits your needs.

Applications

Our Radars are used for highly precise measurements of a vehicle's speed. Application examples are speed enforcement or machines such as spreaders, sprayers or road rollers, which require a constant speed for an adjustment of the material output to the vehicle speed.

Digital Output

The Radar sends data in the form of a telegram. Every 10 milliseconds a telegram is sent. In addition to technical information, it contains the measured values such as distance or speed in metric values. The data is formatted in 8- or 16-bit integers. The fast response time provides real-time vehicle speed information and additional status information.

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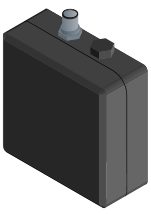

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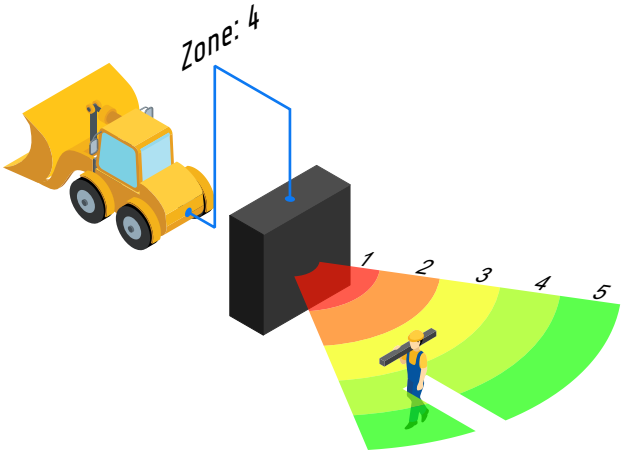
Attingimus Radar Sensors

- Collision Avoidance -

Basics of Collision Avoidance

Collision Avoidance Radars are distance measurement sensors using Radar waves to probe their field of view with the ability to trigger a warning if an object is detected at a specified distance or within a predefined distance-zone.



Specifying Targets

The common Collision Avoidance Radar is designed to detect a single obstacle closest to the Radar sensor.

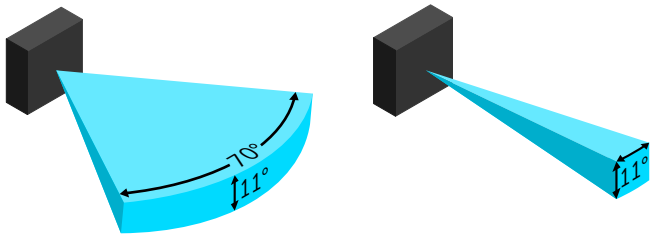
Among other features our Collision Avoidance Radars can be programmed to trigger warning messages at specific distant-zones for easier processing and a quick and clear overview of the situation.

For most Collision Avoidance applications it is important to see any obstacle too close to the sensor, to avoid a collision. In some cases, however, objects such as small plants can be safely ignored. For this reason, the sensitivity of our Radars can be optimally adapted to your application.

Choosing the right field of view

We offer a variety of different fields of view for our Radar sensors, depending on your needs. The field of view of a single Radar sensor can be visualized by a cone with a fixed vertical and horizontal opening angle (elevation and azimuth).

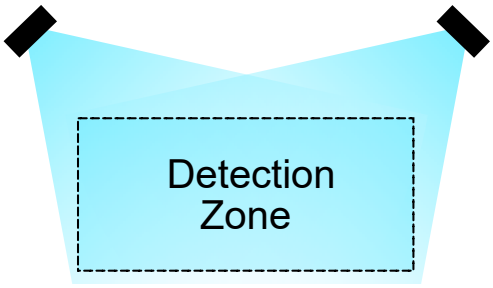
Common configurations of vertical x horizontal opening angles include: 7°x7°, 11°x11°, 11°x70° and 40°x150° .



Examples of 11°x70° and 11°x11° Radar cones

Due to the modular design of our products we are able to offer sensors with a wide range of different detection zones in terms of size and shape.

We can provide a wide horizontal angle of up to 180 °, as well as provide a well-defined rectangular detection area by combining multiple Radar sensors in a single system.



The minimum detection distance from our sensors starts at 1 m for static objects, for moving targets even at several centimeters. The maximum range for detecting human sized objects is up to 40 m. For bigger objects like trucks, the detection range is up to 200 m.

The right combination of measuring range and angular field of view will be set to suit the individual application.

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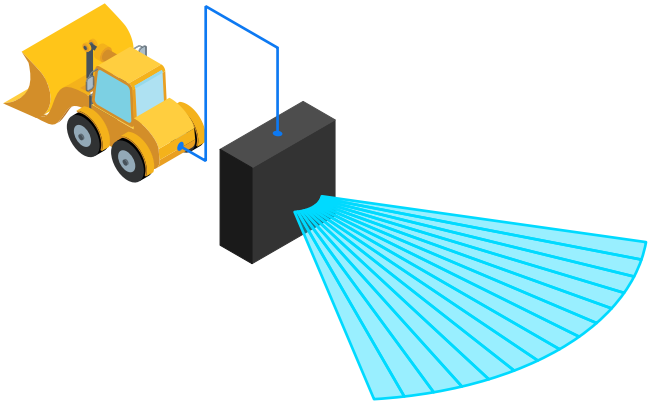
Attingimus Radar Sensors

- Collision Avoidance -

Angular Resolution

Our basic Collision Avoidance Radars will provide information in terms of its speed and distance about the closest object.



If required we also provide sensors with additional angle information. Our products start from a simple indication of direction (left, middle right) to Radars with 2 degree accuracy in angular resolution and multi target ability.

Output Interface

Our Radars come with a stainless steel M12 connector for power supply and data transmission. There are currently 3 interface options available for data transfer:

1. Serial Interface

Using RS-422 / RS-485, our Radar can easily be connected to your system or personal computer. The communication takes place through sending and receiving the appropriate message telegrams, as specified in the Radars data sheet. This is the most simple way to communicate with the Radar.

2. CAN bus interface

If there is already a Controller Area Network available, only the CAN ID needs to be adjusted for the Radar and connected to the existing network. Our Radars are fully compliant with CAN 2.0B specification, allowing for an easy integration in existing systems. It is also possible to connect multiple Radars in a bus system.

3. Open collector

If a simple high / low signal is required for previously defined situations, we offer systems with multiple open collector interfaces. This method can be used to trigger visual or audible signals, based on different zone detections. An additional serial interface for configuration is provided.

Digital Output

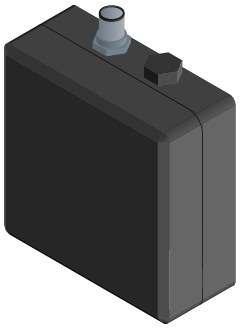
The Radar transmits data in the form of a telegram. A telegram is sent up to every 10 milliseconds. It contains, besides technical information, the measured values such as distance, speed or angle in metric values. The data format is an 8 or 16 bit integer. The quick reaction time provides real-time information about the monitored area.

Sample Telegram:

Byte Nr.	Data	
0	0x18	Header bytes
1	0xFF	
2	0x02	
3	0x0B	
4	status byte	Data bytes
5	distance in dm	
6	angle indicator	
8	distance zone	
9	sensor type	

Housing Properties

All our Radars have an IP67 / IP69k certified housing, made of POM and anodized aluminum alloy. It is designed for best performance while providing maximum protection and staying as compact as possible.



Due to our focus on durability our Radars are in use for more than 10 years under the most difficult conditions, such as in harbor areas or construction sites.

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ATTINGIMUS RADAR

RADAR SENSORS

Precise and fast Measurement of Speed and Distance, Object Detection and Classification

- **Superior Filtering Technique**
- **Reliable in any Environment**

- **Compact Housing**
- **IP67 Rated**

- **24GHz ISM Band**
- **ETSI & FCC Compliant**

- **Modular System**

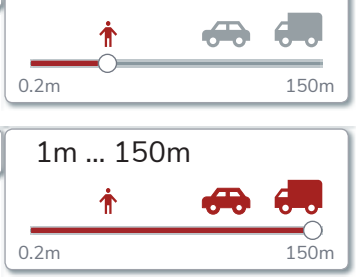
BUILD YOUR PERFECT RADAR, CHOOSE YOUR SPECIFICATIONS:

FUNCTION

Distance ▶	Collision Avoidance
Speed ▶	Stationary
	Speed Over Ground
Detection ▶	Vehicles
	People
Classification ▶	Vehicles

RANGE

Close Range ▶	0.2m ... 40m
Long Range ▶	1m ... 150m



FIELD OF VIEW

Narrow ▶	7° × 7°
	11° × 11°
Wide ▶	11° × 70°
	40° × 150°
Special ▶	5° × 14°
	Angle of Arrival

INTERFACE

Serial ▶	RS422
CAN ▶	Single
	Master / Slave
Open Collector	

ATTINGIMUS RADAR – INTELLIGENT RADAR SOLUTIONS.

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