

Company Profile

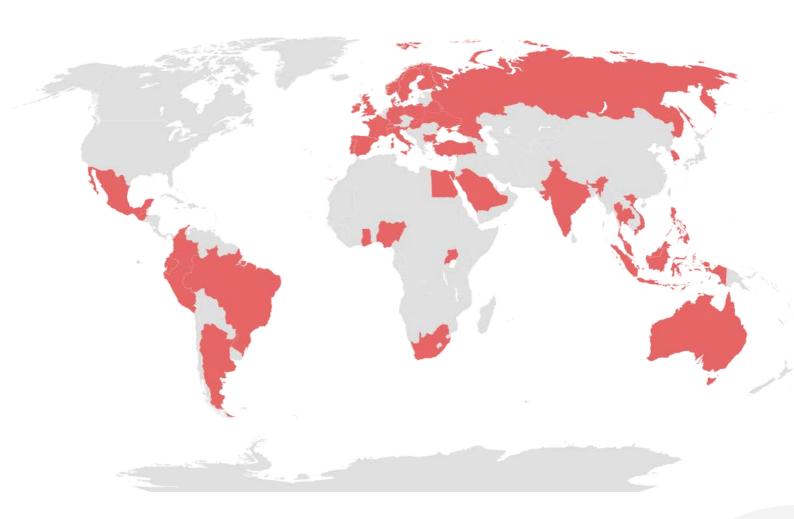
Founded in 1994, Comark is a company specialized in the field of traffic monitoring and parking systems. We take care of the design, development and manufacturing of products for the road traffic, parking areas and cycling lanes market.

To meet the highest standards of quality, Comark is certified ISO9001.



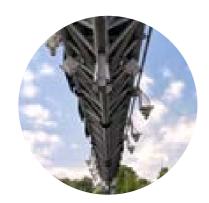
Global Presence

Nowadays Comark is present in over 45 countries, across 6 continents with a well-developed sales network.





Portfolio



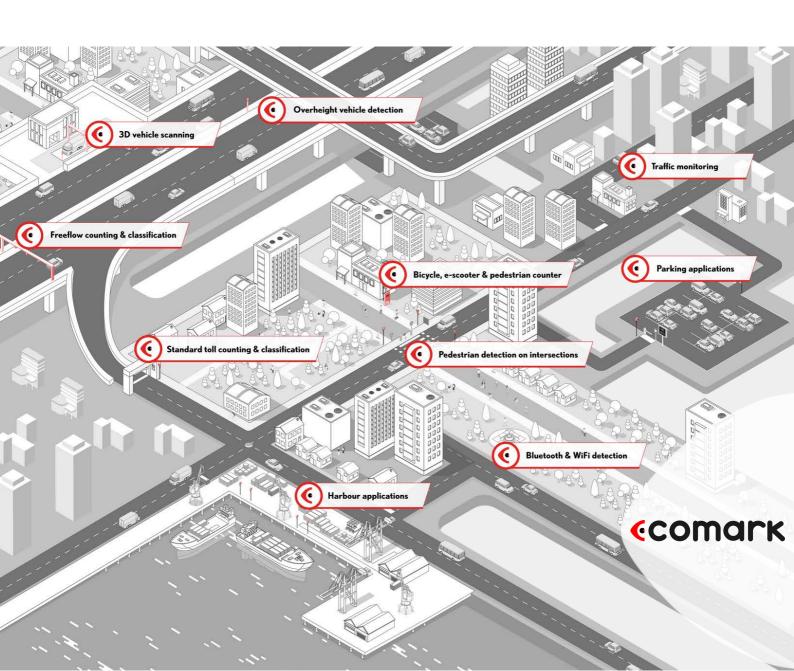
Traffic



Smart City



Parking



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LSR2001 Laser Scanner



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Smart City



Parking



Software





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OMNIVIEW Control Software

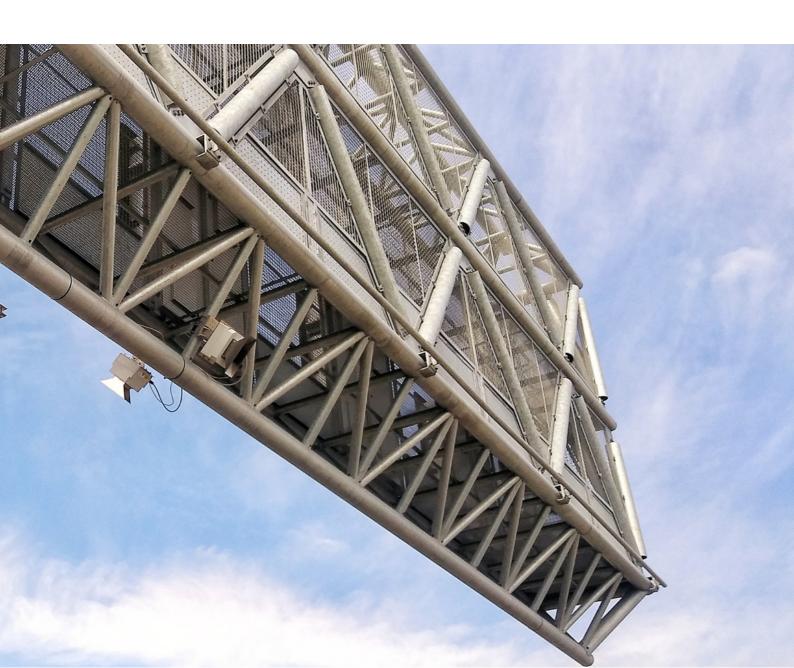
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Traffic

Traffic Monitoring
Couting & Classification
3D Profiling
Axle Counting
Over Height Vehicle Detection
Wrong Way Traffic Detection





LSR2001 is a sensor for vehicle detection based on the laser scanner technology. Compared to other technologies, this sensor is able to detect vehicles with high precision and resolution. LSR2001 is able to accurately measure vehicle profiles and is therefore the ideal tool for applications where precise vehicle classification is required. It is able to distinguish more than 20 classes of vehicles including:

- Motorcycles
- Cars
- Vans
- Trucks
- Lorries
- Articulated lorries
- Buses

The sensor has been designed, in both the mechanical and firmware side, to operate outdoor, even in adverse weather conditions. The firmware has in fact filters for rain and snow.

The scanner optic is different from other products on the market, because it consists of two physically distinct areas for laser transmission and reception, making it particularly immune to the opacity produced by dust, water and pollution.

The sensor is equipped with a CPU that processes the signals received from the scanner to obtain all the data related to the transited vehicle. The communication with the sensor takes place via Ethernet line and it can be configured through simple and intuitive web pages.





Transversal installation





Technology Laser scanner **Emitted Light** 905 nm not visible

Laser class Class 1 96° Scan angle Scan period 16 ms Transmission power 16 dB Communication line Ethernet Power consumption < 5 W Power supply 12 ÷ 28 Vdc

Protection IP65

LSR2001: -20°C ÷ +50°C Temperature range

Oblique

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LSR2001T: -40°C ÷ +60°C



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APPLICATIONS

- Toll
- Traffic monitoring (ITS)
- Vehicle profiling
- Maximum height relief
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit

Counting

Speed

Height

Length

Headway

Gap

Vehicle class

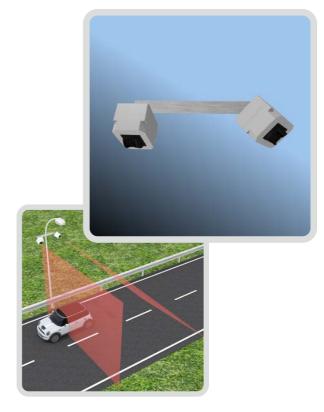


The LSR2001-DOUBLE sensor uses two lasers scanners to detect vehicles. Installed at the side of the road, its unique configuration permits to detect also the vehicle speed and lenght in 2 lanes. LSR2001-DOUBLE is able to accurately measure vehicle profiles and is therefore the ideal tool for applications where precise vehicle classification is required. It is able to distinguish more than 20 classes of vehicles including:

- Motorcycles
- Cars
- Vans
- Trucks
- Lorries
- Articulated lorries
- Buses

The LSR2001-DOUBLE is composed by a master and a slave sensor. The master, which contains the CPU, gets the data from the slave and combines it with its own data. The master sensor makes vertical scans and is mainly encharged of counting, classification and triggering. The slave is rotated to detect the vehicle at a certain distance from the master and it may be used, for example, to trigger a camera installed on the same pole. The orientation of the slave detector depends on the installation height of the detector.

Being a laser scanner, the detector can measure the vehicle's profile and their presence. For the said reasons it is very precise on classifying and counting vehicles even in "heavy" traffic conditions, stop & go and in queue presence.







Technology Double Laser scanner

Emitted Light 905 nm not visible

Laser class Class 1 Max. detection range 20 m Scan angle 96° Scan period 16 ms

Transmission power 16 dB each sensor

Communication line Ethernet Power consumption < 8 W

Power supply 12 ÷ 28 Vdc

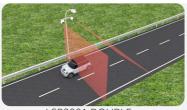
Protection **IP65**

LSR2001: -20°C ÷ +50°C Temperature range

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LSR2001T: -40°C ÷ +60°C





LSR2001 DOUBLE

Counting Speed \bigcirc Height Vehicle class Length \bigcirc Gap Headway $\langle \rangle$ Traffic status \bigcirc

APPLICATIONS

- Toll
- Traffic monitoring (ITS)
- Vehicle profiling
- Maximum height relief
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit

Trigger for cameras







The LSR-2001-AXLES sensor uses laser technology to detect vehicles and infrared photocells to detect axles. The emitted laser beam is used to scan on 1 plane on a 96° angle.

Along the plane the sensor detects 274 points and is able to precisely identify the profile of the vehicle.

The maximum sensing distance is 30 m and the emitted beam is on the infrared field, thus it is not visible.

The photocells couple consist of an emitter and a receiver and work on the infrared range. They are able to accurately detect the presence of axles thanks to the interruption of the emitted beam.

LSR-2001-AXLES is able to provide the speed and the length of the vehicle. Thanks to its laser scanner, the detector can measure the vehicles profiles and their presence. For this reason, it is very accurate in classifying and counting vehicles even in "heavy" traffic conditions, stop & go and in queue situations.

In order to create a complete set of data about the transit, the CPU collects the information both from the laser sensor and from the photocells.

LSR-2001-AXLES should be installed at toll stations or in places where there is a physical separation between adjacent lanes to install the photocells on the ground.

The detector has been designed both from the mechanical and firmware point of view to work outdoor with bad weather conditions.

The firmware has specific rain and snow filters.







Technology Laser scanner, time of flight

measurement

Emitted Light 905 nm not visible

Laser class Class 1 Max. Detection range 30 m 96° Scan angle Scan period 16 ms Transmission power 16 dB Communication line Ethernet Power consumption < 5 W

Power supply 12 ÷ 28 Vdc Photocells Infrared

Protection IP65 Laser, IP69 photocells LSR2001: -20°C ÷ +50°C Temperature range

LSR2001T: -40°C ÷ +60°C





APPLICATIONS

- Toll
- Traffic monitoring (ITS)
- Axle detection
- Maximum height relief
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless steel Casing
- Router
- CO1010 Control Unit







The LSR100 sensor uses laser technology to detect presence of vehicles in the detection area. The emitted laser beam is used to scan 4 planes at an angle of 96 °. The sensor detects 240 points along the plane and is able to accurately identify the vehicle profile. The maximum detection distance is 25 m. and the wave frequency of the beam is placed on the infrared and is therefore not visible.

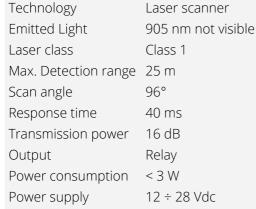
The laser has two dry relays contacts that can be configured to be activated when an object is inside the detection area.

The configuration of the LSR100 can be done through a remote controller.

Depending on the place of installation, the laser can be supplied with a detection distance of 5, 10 or 25 m.

The sensor is very easy to install and is light and small. The IP65 degree of protection allows its use outdoors.





Protection IP65

-20°C ÷ +50°C Temperature range

APPLICATIONS

- Vehicle presence detection
- People presence detection







LSR LASER Summary

	Transversal	Oblique	Double	Axle	LSR100
	Ja /				
Counting	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Vehicle class	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Speed		\bigcirc	\bigcirc	\bigcirc	
Height	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Length		\bigcirc	\bigcirc	\bigcirc	
Gap	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Headway	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Axle detection				\bigcirc	
Traffic status	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Trigger	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Direction of travel		\bigcirc	\bigcirc	\bigcirc	
2 lanes detection	\bigcirc		\bigcirc		
Roadside installation	\bigcirc		\bigcirc	\bigcirc	\bigcirc
Above lane installation		\bigcirc			\bigcirc



Comark's LP10 is a very versatile, non intrusive and low power consumption sensor; capable of performing a large variety of task such as: permanent or temporary people counter, permanent or temporary traffic counter, pedestrian detector at traffic intersections, event trigger, etc.

LP10 is very easy to install, and its reduced weight and dimensions allows to fitting it into existing infrastructure (for example guardrails, light poles, traffic lights, etc.).

LP10 is based on a single beam laser, with a high detection frequency (up to 1KHz) and a narrow angle to detect small objects. The light emitted (infrared light pulses) is reflected in order to be recognized by the receiver filtering the environmental light noises.

The sensor is equipped with a micro controller unit which process and analyze the information received form the laser. The configuration is set up through Bluetooth connection by downloading an application from your smartphone (Android & PC). The detector is capable to create aggregated data (1 min to 1 day package) with time, traffic counts and lane occupation rate. It is possible to configure 2 lanes or zones, and transit activation / deactivation time. The sensor detects traffic on 1 lane with high precision, and on 2 lanes with possible obscuring traffic on the second lane. To mitigate the effect of bad weather, the detector is equipped with a mid-intensity rain filter.

LP10 has to be installed at the side of the road at 80/100 cm height.

For temporary applications, LP10 may work for 1 week with a 15 Ah battery; or up to 55 days with a 100 Ah battery.



Laser type Lidar Technology
Technology Single beam Laser
Emitted Light 905 nm not visible
Laser class Class 1

Scan angle 3°
Scan period 1 ms
Power supply 12 Vdc
Detection range 15 mt
Power consumption 0.7 W
Protection IP65

Output Bluetooth, relay Temperature range $-10^{\circ}\text{C} \div +40^{\circ}\text{C}$





The LP20 detector is the perfect solution for those applications in which a compact yet powerful detector is needed. LP20 is small and easy to install on a pole for permanent or temporary applications.

The detector is able to count and classify pedestrians, bicycles and e-scooters if installed on cycle lanes; and to detect motorcycles, cars, vans and trucks if installed on a traffic road.

LP20 detector is based on n. 2 single-beam lasers, with a high detection frequency (up to 1KHz) and a narrow angle to detect small objects. The light emitted (infrared light pulses) is reflected in order to be recognized by the receiver filtering the environmental light noises.

The detector is equipped with an embedded CPU, and its classification method is based on the analysis of the shape of the object passing by the detection area.

The detector is capable to create aggregated data (1 min to 1 day package) with the following information:

- Time;
- Traffic Count;
- Classification;
- Speed;
- Sense of travelling.

It is possible to configure 2 lanes or zones, and transit activation / deactivation time. The sensor detects traffic on 1 lane with high precision, and on 2 lanes with possible obscuring traffic on the second lane. To mitigate the effect of bad weather, the detector is equipped with a mid-intensity rain filter.

LP20 is very easy to set up through web configuration and it can deliver alarms throughout the following outputs: n.2 D/O, n. 2 relays.



Laser type Lidar Technology
Technology Single beam Laser
Emitted Light 905 nm not visible
Laser class Class 1

Scan angle 3°
Scan period 1 ms
Power supply 12 Vdc
Detection range 15 mt
Power consumption 3.5 W
Protection IP65

Output D/O, relay
Temperature range -10°C ÷ +40°C



The 3D profiling system can provide a high resolution 3D file of the vehicles and measure them in height, width and length.

The system is composed of 3 LSR2001 laser scanners: two are installed on the left and right sides of a gantry, the third one is installed on a side pole (or on a second

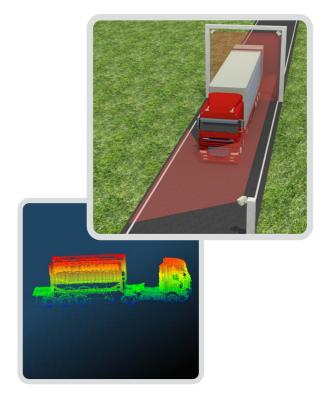
The first two lasers scan continuously both sides and the top of the vehicle, while the third one detects the position and movement. The result is a very accurate detection of: length, 3D shape, height, width, speed, profile and vehicle class.

The system is based on LSR2001 laser scanner, which has a scan angle of 96° with high definition. (274 measurements in 96° with an angular resolution of 0.35°).

One of the three LSR2001 sensors used in the profiling system acts as a master unit and combines the information given by the other two to create an accurate 3D profile of the vehicle.

The system provides a fully detailed "point cloud" 3D image, which can be used for further vehicle analysis. Thanks to the use of 3 laser scanners it is possible to have the complete profile of both sides and top of each vehicle.

The front laser scanner provides the vehicle position in real time, permitting a high precision lenght measuring, even in stop & go condition.







Technology Laser scanner (Lidar) **Emitted Light** 905 nm not visible

Laser class Class 1 96° Scan angle Scan period 16 ms

Transmission power 16 dB each sensor

Communication line Ethernet Power consumption < 18 W Power supply 12 ÷ 28 Vdc

3 Number of Lasers IP65 Protection

Temperature range LSR2001: -20°C ÷ +50°C

LSR2001T: -40°C ÷ +60°C



 \bigcirc 3D Vehicle profile Single gantry \bigcirc Both vehicle sides \bigcirc Counting \bigcirc Speed \bigcirc Lenght Height \bigcirc Width Stop & Go



- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit



APPLICATIONS

- Harbour trucks' analysis
- Custom borders vehicle analysis
- Traffic monitoring (ITS)
- Vehicle profiling
- Toll
- Vehicle classification
- Trigger for cameras



Trigger for cameras

Free Flow



The 3D profiling system can provide a high resolution 3D file of the vehicles and measure them in height, width and length.

The system is composed of 2 LSR2001 laser scanners which has a scan angle of 96° with high definition. (274 measurements in 96° with an angular resolution of 0.35°), installed on a single gantry, and it can be delivered in 2 different versions:

- TT (transversal transversal)
- LT (longitudinal transversal)

PROFILER TT version is composed by 2 LSR2001 Laser scanners, installed on the left and right top sides of the lane. The system is able to deliver a high accuracy width and height measurement of each vehicle.

PROFILER LT version is also composed by 2 LSR2001 Laser scanners, installed one on the side (left or right) of the lane, and the second LSR2001 above the lane in central position. The system is able to deliver a high accuracy height and lenght measurement of each vehicle.

The system provides a fully detailed "point cloud" 3D image, which can be used for further vehicle analysis.

Both versions can be easily placed on a single gantry, making it ideal for those applications in which a reduced infrastructure installation is required. They are also suitable for applications with free flow traffic condition.



PROFILER TT





PROFILER LT



Technology Laser scanner **Emitted Light** 905 nm not visible

Laser class Class 1 Scan angle 96° Scan period 16 ms

Transmission power 16 dB each sensor

Communication line Ethernet Power consumption < 15 W Power supply 12 ÷ 28 Vdc

Number of Lasers 2 IP65 Protection

LSR2001: -20°C ÷ +50°C Temperature range

LSR2001T: -40°C ÷ +60°C





PROFILER LT

PROFILER TT

PROFILER TT

PROFILER LT





3D Vehicle profile	\bigcirc	\bigcirc
Single gantry	\bigcirc	\bigcirc
Both vehicle sides	\bigcirc	\bigcirc
Counting	\bigcirc	\bigcirc
Speed	\bigcirc	\bigcirc
Lenght	\bigcirc	\bigcirc
Height	\bigcirc	\bigcirc
Width	\bigcirc	\bigcirc
Stop & Go	\bigcirc	\bigcirc
Free Flow	\bigcirc	\bigcirc
Trigger for cameras	\bigcirc	\bigcirc

ACCESSORIES

- Mounting Brackets
- Environmental Protections
- Stainless Steel Casing
- Router
- CO1010 Control Unit

APPLICATIONS

- Harbour trucks' analysis
- Custom borders vehicle analysis
- Traffic monitoring (ITS)
- Vehicle profiling
- Toll
- WIM
- Vehicle classification
- Trigger for cameras

Feasible

O Not Feasible



Feasible with limitations





The 3D profiling system can provide a high resolution 3D file of the vehicles and measure them in height, width and length.

The system is composed of 3 LSR2001 laser scanners installed on the same gantry, two of them on the left and right sides, and the third one above the lane in center position.

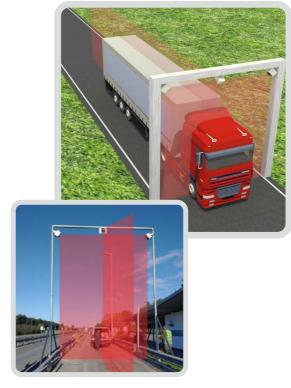
The first two lasers continuously scan both sides and the top of the vehicle, while the third one detects the position and movement. The result is a very accurate detection of: length, 3D shape, height, width, speed, profile and vehicle class.

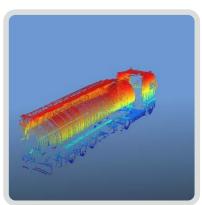
The LSR2001 laser scanner has a scan angle of 96° with high definition. (274 measurements in 96° with an angular resolution of 0.35°).

One of the three LSR2001 sensors used in the profiling system acts as a master unit and combines the information given by the other two to create an accurate 3D profile of the vehicle.

The system provides a fully detailed "point cloud" 3D image, which can be used for further vehicle analysis. Thanks to the use of 3 laser scanners it is possible to have the complete profile of both sides and top of each vehicle.

The front laser scanner provides the vehicle position in real time, permitting a high precision lenght measuring, even in stop & go condition.







Technology Laser scanner **Emitted Light** 905 nm not visible

Laser class Class 1 Scan angle 96° Scan period 16 ms

Transmission power 16 dB each sensor

Communication line Ethernet Power consumption < 18 W Power supply 12 ÷ 28 Vdc

Number of planes 3 IP65 Protection

Temperature range LSR2001: -20°C ÷ +50°C

LSR2001T: -40°C ÷ +60°C



3D Vehicle profile \bigcirc Single gantry Both vehicle sides \bigcirc \bigcirc Counting \bigcirc Speed

Lenght \bigcirc Height

Width

Stop & Go \bigcirc Free Flow

Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit

Feasible





APPLICATIONS

- Harbour trucks' analysis
- Custom borders vehicle analysis
- Traffic monitoring (ITS)
- Vehicle profiling
- Toll
- WIM
- Vehicle classification
- Trigger for cameras

Feasible with limitations



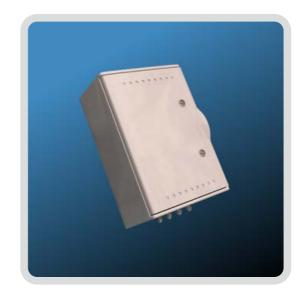


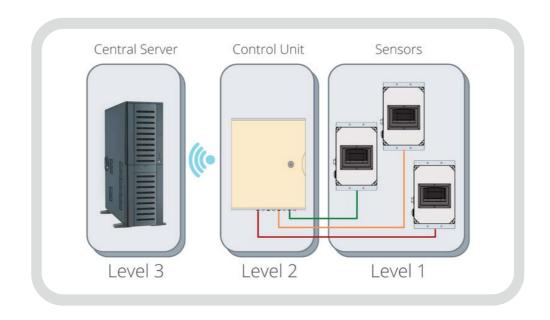


PROFILER-CO Control unit has been specifically designed to house the power supply and power line protection hardware for each PROFILER system.

PROFILER-CO is composed by:

- External cabinet
- Power supply
- Power line protection
- 3G/4G Router (optional)





PROFILER Summary

3D Vehicle profile Single gantry	3 LASERS	2 LASERS TT	2 LASERS LT	3 LASERS LTT
Both vehicle sides	\bigcirc	\bigcirc		\bigcirc
Counting	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Speed	\bigcirc	0	\bigotimes	\bigcirc
Lenght	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Height	\bigotimes	\bigotimes	\bigcirc	\bigcirc
Width	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Stop & Go	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Multiple vehicles		\bigcirc	\bigcirc	\bigcirc
Trigger for cameras	\bigcirc	\bigcirc	\otimes	\bigcirc





The MD01 microwave sensor is a last generation radar doppler with digital signal processing. It is a very versatile sensor that can be installed both above the lane and at the side of the road to detect speed, count vehicles and classify them.

The "patch" may have different opening angles, depending on the application, in order to cover the entire width of the lane.

For an optimal performance and a good accuracy of the data it is recommended to install one MD01 per lane, but the sensor is able to detect vehicles even on two lanes (only for side installation) and to determine the direction of travel.

The antenna signals are analyzed by the internal microcontroller which, through digital signal processing techniques, provides the following transit data:

- Counting
- Length
- Classification in length
- Speed
- Gap
- Headway

Microwave technology, using the Doppler effect, is very accurate in detecting speed.

MD01 has two serial lines: one RS232 for connections up to 10-15 meters and one RS485 for long distance connections. It also has a "digital output" for a possible synchronization with cameras.











Technology Radar doppler microwave

24,15Ghz - K Band Frequency

Transmission power 16 dB 12°x25° Opening angle

9°x18°

Data line RS232 & RS485 External dimensions 120x122 mm. Weight 600/900 g. Power consumption 120 mA max.

Power supply 12 Vdc

Temperature range -20°C ÷ +50°C







Counting

Speed \bigcirc

Vehicle class \bigcirc

 \bigcirc Length

Gap

Trigger for cameras

APPLICATIONS

- Speed monitoring
- Traffic monitoring (ITS)
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- CO1010 Control Unit





RSR4001 - RL4001 Laser scanner + Radar Laser + radar technologies combined, for counting, classification, speed & length data

RSR4001 and RL4001 are both vehicle detectors based on laser scanner and radar doppler technologies. The radar uses microwave technology and, in particular, the Doppler effect to measure the speed of vehicles with extreme precision. The laser scanner measures the profile of the vehicles allowing a precise classification of the transits.

RSR4001 is mounted in a single enclosure, while RL4001 is composed by the laser scanner and radar doppler in 2 different enclosures for a better orientation of each technology.

RSR4001 and RL4001 are able to distinguish up to 20 classes of vehicles including motorcycles, cars, vans, trucks, lorries, articulated lorries and, buses. The merge of two different technologies, enables the sensor to be very accurate and to measure all data about transit.

The sensor has been built both from the mechanical and firmware point of view to work outdoors even in adverse weather conditions. The firmware implements filters for rain and snow.

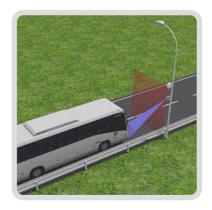
The scanner optics are made of two physically distinct areas for laser transmission and reception, making it particularly immune to the opacity produced by dust, water and pollution.

The microwave technology with the "patch" antenna and an opening angle of 9°x18° is very precise in the detection of speed.

The sensor is equipped with a CPU that processes the signals received from the scanner and the radar to obtain all the data related to the transited vehicle. Communication with the sensor takes place via an Ethernet line and the configuration can be performed using simple and intuitive web pages.



RSR4001



RL4001









RSR4001 - RL4001

Technology 1 Laser scanner Technology 2 Microwave radar Emitted light 905 nm - not visible

Laser class Class 1 Scan angle of laser 96°

Radar Frequency 24.15 Ghz - K Band

Communication line Ethernet Power consumption < 6 W 12 ÷ 28 Vdc Power supply

IP65 Protection

-20°C ÷ +60°C

Temperature range



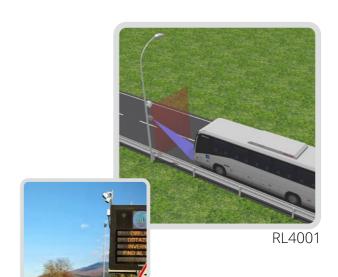
RSR4001

APPLICATIONS

- Toll
- Traffic monitoring (ITS)
- Vehicle profiling
- Maximum height relief
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit









RRL4001 is a vehicle detector based on laser scanner and radar doppler technologies. Each unit is composed by n.1 Laser Scanner and n. 2 Radar doppler. Its unique configuration allows the RRL4001 to detect up to 2 lanes with high accuracy.

The radar uses microwave technology and, in particular, the Doppler effect to measure the speed of vehicles with extreme precision. The laser scanner measures the profile of the vehicles allowing a precise classification of the transits.

RRL4001 is composed by the laser scanner and 2 radar doppler, each one mounted on single enclosures for a better orientation of each technology.

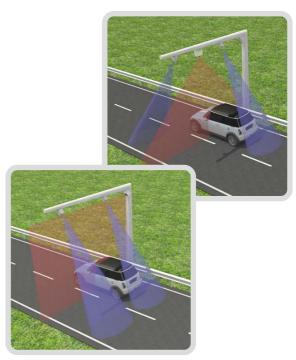
RRL4001 is able to distinguish up to 20 classes of vehicles including motorcycles, cars, vans, trucks, lorries, articulated lorries and, buses. The use of two different technologies, enables the sensor to be very accurate and to measure all data about transit.

The sensor has been built both from the mechanical and firmware point of view to work outdoors even in adverse weather conditions. The firmware implements filters for rain and snow.

The scanner optics are made of two physically distinct areas for laser transmission and reception, making it particularly immune to the opacity produced by dust, water and pollution.

The microwave technology with the "patch" antenna is very precise in the detection of speed.

The sensor is equipped with a CPU that processes the signals received from the scanner and the radar to obtain all the data related to the transited vehicle. Communication with the sensor takes place via an Ethernet line and the configuration can be performed using simple and intuitive web pages.







Technology 1 Laser scanner Technology 2 Microwave radar 905 nm - not visible Emitted light

Laser class Class 1 Scan angle of laser 96°

Radar Frequency 24.15 Ghz - K Band

Radar angle 9° x 18° Communication line Ethernet Power consumption < 7 W

12 ÷ 28 Vdc Power supply

Protection **IP65**

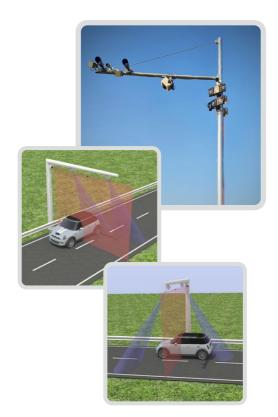
Temperature range -20°C ÷ +60°C

APPLICATIONS

- Toll
- Traffic monitoring (ITS)
- Vehicle profiling
- Maximum height relief
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit











LT3001 is a vehicle detector based on 2 laser scanners. One scanner is installed on the middle of the lane and has the detection area parallel to the lane; the other is installed on the side of the lane and detects perpendicularly to the road.

The longitudinal laser tracks the vehicle as it moves along the lane and measures its position, speed and length.

The transversal scanner measures the width, height and profile of the vehicles providing an accurate classification of the transits.

LT3001 is able to distinguish more than 20 classes of vehicles including motorcycles, cars, vans, trucks, lorries, articulated lorries, buses.

The sensor has been built both from the mechanical and firmware point of view, to work outdoors even in adverse weather conditions. The firmware implements filters for rain and snow.

The scanner optic is made of two physically distinct areas for laser transmission and reception, making it particularly immune to the opacity produced by dust, water and pollution.

Each sensor is equipped with a CPU that processes the signals received from the scanner to obtain all the data related to the transited vehicle. One laser is configured as master and the other as slave and both work together as a single detector. Communication with the master sensor takes place via an Ethernet line and the configuration can be performed using simple and intuitive web pages.

In addition to the transit data, the LT3001 sensor also provides a file in 3D format to see the image of the transit from different perspectives.







Technology Laser scanner **Emitted Light** 905 nm not visible

Laser class Class 1 96° Scan angle Scan period 16 ms Transmission power 16 dB Communication line Ethernet Power consumption < 5 W

12 ÷ 28 Vdc Power supply

Protection IP65

LSR2001: -20°C ÷ +50°C Temperature range

LSR2001T: -40°C ÷ +60°C

APPLICATIONS

- Toll
- Traffic monitoring (ITS)
- Vehicle profiling
- Vehicle classification
- Trigger for cameras

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit









LTR5001 is a vehicle detector based on 2 laser scanners and 1 Mircowave Radar. One Laser scanner is installed along with the radar on the middle of the lane, and has the detection area parallel to the lane; the other Laser scanner is installed on the side of the lane and detects perpendicularly to the road.

The longitudinal laser tracks the vehicle as it moves along the lane and measures its position, speed and length; and is able to trigger an alarm when a vehicle reaches a distance from 0 up to 15 meters distance from the sensor. The radar Doppler is able to measure the speed of vehicles with extreme precision.

The transversal scanner measures the width, height and profile of the vehicles providing an accurate classification of the transits.

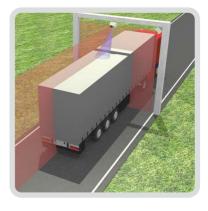
LTR5001 is able to distinguish more than 20 classes of vehicles including motorcycles, cars, vans, trucks, lorries, articulated lorries, buses.

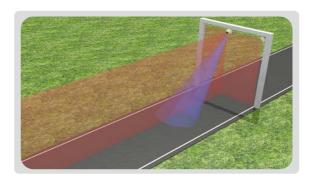
The sensor has been built both from the mechanical and firmware point of view, to work outdoors even in adverse weather conditions. The firmware implements filters for rain and snow.

The scanner optic is made of two physically distinct areas for laser transmission and reception, making it particularly immune to the opacity produced by dust, water and pollution.

The sensor is equipped with a CPU that processes the signals received to obtain all the data related to the transited vehicle. Communication with the master sensor takes place via an Ethernet line and the configuration can be performed using simple and intuitive web pages.









Technology 1 Laser scanner Technology 2 Microwave radar 905 nm - not visible Emitted light

Laser class Class 1 Scan angle of laser 96°

Radar Frequency 24.15 Ghz - K Band

Radar angle 9° x 18° Communication line Ethernet Power consumption < 11 W 12 ÷ 28 Vdc Power supply

Protection **IP65**

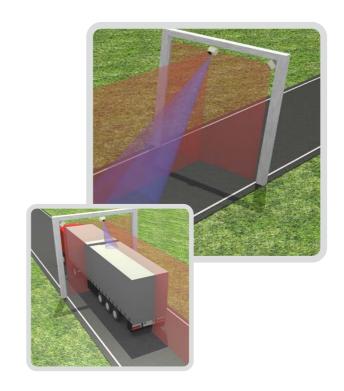
-20°C ÷ +60°C Temperature range

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit

APPLICATIONS

- Freeflow
- Toll
- Traffic monitoring (ITS)
- Vehicle profiling
- Maximum height relief
- Vehicle classification
- Trigger for cameras











Infrastructure strikes are costly to both highway and road network operators; creating hours of delay and disruption and of course risking the lives of anyone directly or indirectly involved. Therefore, it is mandatory to have an accurate system that warns drivers in advance if their vehicles exceed the maximum height approaching overhead structure.

The RAM Series have been developed to prevent infrastructures strikes and collisions and therefore consequences to the drivers.

RAM01 is the entry level product of the RAM series, suitable mainly for indoor applications or simple outdoor applications.

RAM01 is based on a single beam laser, with a high detection frequency (up to 1KHz) and a narrow angle to detect small objects. The light emitted (infrared light pulses) is reflected in order to be recognized by the receiver filtering the environmental light noises.

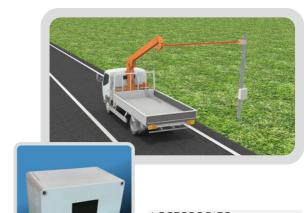
RAM01 is installed on the road's side and detect overheight vehicles on 3-4 lanes.

The over height detector is capable of operating during night and day and at temperature ranging from: –25°C to +60°C.

Compared to systems based on photocells with transmitter and receiver, the RAM series have the advantage of easy installation as they are placed at the road's side; and they don't need to collimate transmitter and receiver.

ALARM

RAM01 provides alarms in different ways when an over height vehicle is detected: relay contact; digital output.



ACCESSORIES

- Mounting Brackets
- Environmental Protections
- Stainless Steel Casing
- RAMCO Control Unit

Technology Laser
Laser class Class 1
Opening angle 0,5°

Detection Range 20 mt (15cm object)

Minimum width of

object 15 cm

Maximum vehicle speed 100 km/h.

Data line Ethernet

Alarm Relay, D/O

Power supply 12 ÷ 28 Vdc

Protection IP65

Temperature range -25°C ÷ +60°C





The RAM Series have been developed to prevent strikes and collisions against roads infrastructures such as bridges, tunnels, underpasses, etc. In fact, Infrastructure strikes are costly to both highway and road network operators; creating hours of delay and disruption. Therefore, it is mandatory to have an accurate system that warns drivers in advance if their vehicles exceed the maximum height approaching overhead structure.

RAM 11 is based on two single beam lasers, with a high detection frequency (up to 1KHz) and a narrow angle to detect small objects.

The light emitted (infrared light pulses) is reflected in order to be recognized by the receiver filtering the environmental light noises. The lasers are positioned horizontally in order to detect the vehicle travel's direction. It is important to highlight that RAM11, compared to RAM01, strongly reduces false alarms. RAM 11 is installed on the road's side and can detects overheight vehicle on 3-4 lanes.

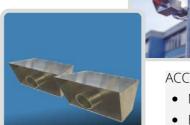
Compared to systems based on photocells with transmitter and receiver, the RAM series have the advantage of easy installation as they are placed at the road's side; and they don't need to collimate transmitter and receiver.

The RAM11 is also able to provide the lane in which the overheight vehicle has travelled and operates under night and day conditions.

ALARM

RAM11 provides alarms in different ways when an over height vehicle is detected: relay contact; digital output.





ACCESSORIES

- Mounting Brackets
- Environmental Protections
- RAMCO Control Unit

Technology Laser Laser class Class 1 Opening angle 0.5°

Detection Range 20 mt (10 cm object) 40 mt (15 cm object)

Minimum width of object 10 cm Maximum vehicle speed 150 km/h. Data line Ethernet Relay, D/O Alarm 12 ÷ 28 Vdc Power supply

Protection **IP65**

-25°C ÷ +60°C Temperature range







RAM20 is an accurate sensor that has been developed to detect overheight vehicles.

RAM20 is based on a laser scanner with 4 planes of detection, creating a wide detection area which helps avoiding false alarms; and an internal CPU that processes the signals received by the laser head to obtain all the data related to the overheight vehicle. The laser scanner has an internal heating system to avoid the moisture condensation on the optical lens. The light emitted (infrared light pulses) is reflected in order to be recognized by the receiver filtering the environmental light noises.

The RAM20 is also able to provide the lane in which the overheight vehicle is travelling and operates under night and day conditions. RAM20 can detect overheight vehicles on 2 lanes. In case of a 4 lanes road, it is possible to install two RAM20 systems, one on each side of the road.

Compared to systems based on photocells with transmitter and receiver, the RAM series have the advantage of easy installation as they are placed at the road's side; and they don't need to collimate transmitter and receiver.

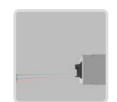
VARIABLE MESSAGE SIGN

It is also possible to combine the laser detection with a variable message sign (VMS) to alert the driver about the potential danger.

AI ARM

RAM20 provides alarms in different ways when an over height vehicle is detected: relay contact; digital output; software event (protocol).







ACCESSORIES

- Mounting Brackets
- Environmental Protections
- Stainless Steel Casing
- Router
- RAMCO Control Unit

Technology Laser scanner

Laser class Class 1
Scan angle 96°

Detection Range 20 mt Minimum width of object 10 cm

Maximum vehicle speed 150 km/h.

Data line Ethernet

Alarm Relay, D/O, software Power supply 12 ÷ 28 Vdc

Protection IP65

Temperature range RAM20: -20°C ÷ +50°C

RAM20T: -40°C ÷ +60°C



RAM110 is the highest level sensor for overheight vehicle detection, based on a laser scanner and a single beam laser. The RAM110 emitted light is reflected in order to be recognized by the receiver filtering the environmental light noises. The laser scanner is very accurate in measuring the height and detect the presence of a vehicle; while the single beam laser has a very high frequency and a narrow angle allowing the detection of objects of small dimensions even at 20 m. An internal CPU works in real time combining the data of both lasers and thus providing very accurate data. The algorithms are designed to detect small objects over the allowed height but to trigger the alarm only when the presence of a vehicle is detected, reducing the false alarm rate. Moreover, the system is also able to inform on which lane the vehicle is traveling. RAM110, installed on the side of the road, can detect over-height vehicles on 3 lanes. Compared to systems based on photocells with transmitter and receiver, the RAM series have the advantage of easy installation as they are placed at the road's side; and they don't need to collimate transmitter and receiver.

VARIABLE MESSAGE SIGN

It is also possible to combine the laser detection with a variable message sign (VMS) to alert the driver about the potential danger.

ALARM

RAM110 provides alarms in different ways when an over height vehicle is detected: relay contact; digital output; software event (protocol).

ACCESSORIES

- Mounting Brackets
- Environmental Protections
- Stainless Steel Casing
- Router
- RAMCO Control Unit



Technology Laser Scanner + Single

Beam Laser

Laser class (both) Class 1

Opening angle Laser scanner 96°

Sinlge Beam Laser 0,5°

Detection Range Laser Scanner 25-35 mt

Single Beam Laser 50 mt

Frequency Laser Scanner 60Hz

Single Beam 500-2000Hz

Minimum width of object 50-100 mm Maximum vehicle speed 150 km/h.

Data line Ethernet

Alarm Relay, D/O, software

Power supply $12 \div 28 \text{ Vdc}$

Protection IP65

Temperature range RAM110: -20°C ÷ +50°C

RAM110T: -40°C ÷ +60°C





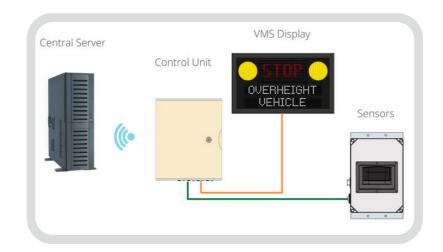


Control unit RAM-CO has been specifically designed to be connected to the RAM series sensors and to process, archive and send the data received from them.

RAM-CO is composed by:

- External cabinet
- Power supply
- Power line protection
- Additional Power relay board (optional)
- 3G/4G Router (optional)
- Heating system (optional)





Over Height Vehicle Summary

	RAM01	RAM11	RAM20	RAM110
			•	
Over height detection	\bigcirc	\bigcirc	\bigcirc	\bigcirc
One side installation	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Object distance	\bigcirc	\bigcirc	\bigcirc	\bigcirc
Laser Scanner			\bigcirc	\bigcirc
Single Beam Laser	\bigcirc	\bigcirc		\bigcirc
Counting				\bigcirc
All vehicles measuring				\bigcirc
Double height zones				\bigcirc
Vehicle class				\bigcirc
Direction of travel		\bigcirc	\bigcirc	



The BT100 sensor is able to detect Bluetooth signals of the devices nearby, while BT200 sensor is able to detect Bluetooth and Wifi signals. In detail, it detects the unique code that identifies the device's bluetooth. The complete system must be equipped with several BT100 or BT200 devices so that, on detection of the same code by two different units, the travel time is calculated. Knowing the distance between two units, the system is then able to calculate the average speed.

BT sensor series are based on a CPU, Bluetooth, and WiFi (only avaliable on BT200) transceivers to which it is possible to connect antennas with different features depending on the installation position.

BT sensor series are suitable for:

- Evaluation of the average travel time between two points of the network
- Evaluation of the average speed between two points of the network
- Creation of origin and destination matrix
- Detection of traffic status

SOFTWARE

The BT sensor series communicates with a central software through wired or wireless (3G/4G) line. BlueView is the Comark recommended software and it is able to provide:

- Units diagnostics
- Reports on travel time and average speed
- Report of Origin and Destination
- User management
- Map



BT100 sensor



BT200 sensor







Technology Bluetooth (BT100, BT200)

WiFi (BT200)

Bluetooth 2,4 GHz Transmission frequency

Wifi 2.4 GHz

Dimensions 105 x 89 x 48 mm

Communication line Ethernet Power consumption < 5 W

8 or 28 Vdc Power supply -20°C ÷ +50°C Temperature range

APPLICATIONS

- Traffic monitoring (ITS)
- Data matrix creation
- Traffic status

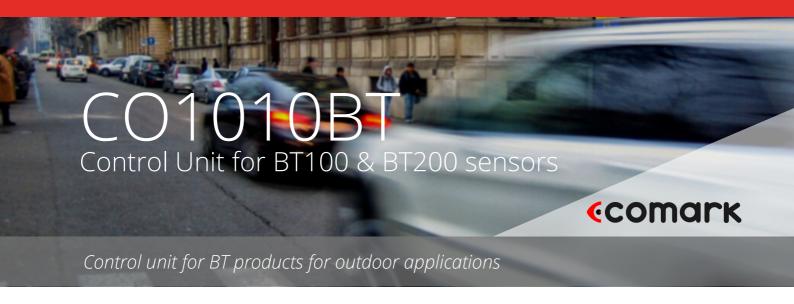
ACCESSORIES

- CO1010BT Control Unit
- BLUEVIEW Software
- External antenna









Control unit CO1010BT has been designed to house the BT series sensors for outdoor applications.

CO1010BT is composed by:

- External cabinet dimensions 430x325x185 mm or Internal cabinet dimensions 316x236x128 mm
- Power supply
- External antenna (optional)
- 3G/4G Router (optional)

With the addition of a 3G/4G router, CO1010BT can communicate with Comark's Blueview dedicated software or with other servers trough MQTT or NTCIP protocol.

In case of anomalies, a reset is automatically done.







USMI9610 sensor detects vehicles using a combination of microwave radar, ultrasound and infrared technologies. The radar provides the system with the ability to accurately measure the length and speed of the vehicle using the "doppler" effect. Other functionalities, among which the counting of vehicles at low speed and the detection of vehicle's height are entrusted to the ultrasonic and infrared sensors.

The set of data collected allows, by using appropriate algorithms, to obtain an accurate classification of vehicles.

INSTALLATION

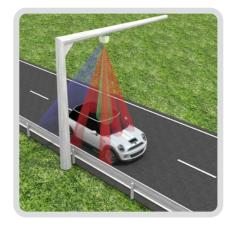
The triple technology sensors must be installed above the center of each lane and provide the following data:

- Counting
- Classification (8+1 classes)
- Height
- Length
- Speed
- Traffic status



ACCESSORIES

- Mounting Brackets
- CO1010 Control Unit



Technology 1 Microwave radar Technology 2 Ultrasound Technology 3 Infrared Ultrasound Frequency 50 Khz

Radar Frequency 24.165Ghz - K Band

Data line RS485 Weight 3,4 Kg. Power consumption < 2,5 W. Power supply 12 Vdc

-15°C ÷ +50°C Temperature range



USM9001 detects vehicles using the combination of microwave-radar and ultrasound technologies. The radar provides the system with the ability to accurately measure the length and speed of the vehicle using the "doppler" effect. Other features as vehicle counting at low speed and vehicle's height detection are also performed by the ultrasound sensor.

The set of data collected allows, by using appropriate algorithms, to obtain an accurate classification of vehicles.

INSTALLATION

Double technology sensors must be installed above each lane and the data provided are:

- Counting
- Classification (8+1 classes)
- Height
- Length
- Speed
- Traffic status





ACCESSORIES

- Mounting Brackets
- CO1010 Control Unit

Technology 1 Microwave radar Technology 2 Ultrasound

Ultrasound Frequency 50 Khz

24.165Ghz - K Band Radar Frequency

Data line RS485 Weight 3,4 Kg. Power consumption < 2,5 W. Power supply 12 Vdc

-15°C ÷ +50°C Temperature range







Control unit CO1010 has been designed to be connected to the sensors and to process, archive and send the data received from them.

FUNCTIONS

- Polling the sensors to receive the transit data
- Analysis of congruity on the data received
- Local data storage
- Data aggregation according to configurable periods
- Traffic status processing (stopped, slowed down, regular)
- Configuration of the unit and of the sensor through a web interface
- Sensor diagnostics
- Data communication with the Control Center trough Ethernet line or wireless 4G/5G

The connection to the central server is continuously monitored and, in case of transmition fault, the data is stored locally to be subsequently transmitted when the communication is restored.

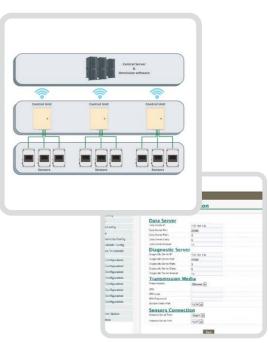
The heart of the control unit consists of an embedded CPU with Linux Embedded operating system and the COMARK Trafficlink software.

The CPU, the router and the sensors are controlled by a watchdog card that monitors the correct functioning of the equipment and in case of anomalies it makes a reset.

CO1010 is composed by:

- CPU
- Power supply
- Power switch and line Protection
- Sensors power distribution
- Communication distribution (ethernet switch or 485 multidrop)





ACCESSORIES

- Mounting Brackets
- 4G/5G Router
- Heating System





1/10 1VISI(

Optical visibility sensors



System optimization by sensing the environment

VISIO 1 and VISIO+ are suitable for applications where accurate atmospheric measurements are required. By using the backward scattering principle, VISIO 1 measures the horizontal visibility, while VISIO+ measures both precipitation and visibility.

Both VISIO 1 and VISIO+ may deliver a signal alarm when certain climate elements exceed a desired threshold, through RSR232 or RS485, providing a very felixible solution to connect to a wide range of systems.

Combined with ITS sensors, VISIO 1 and VISIO+ are the perfect match for those applications where the performance of traffic sensors may be influenced by severe weather conditions, such as heavy rain, snow, or fog.

Main characteristic:

VISIO 1

- Horizontal visibility range: 10m 5Km (resolution
- Communication line: RS232, RS485;
- Data update interval: 30 seconds.

VISIO+

- Horizontal visibility range: 10m 20Km (resolution 10m, accuracy 10%);
- Observed precipitation: clear, drizzle, rain, shower, mixture of rain and snow, hail, snow;
- Communication line: RS232, RS485;
- Data update interval: 1 minute (precipitation data is of last 5 min).

ACCESSORIES

• Mounting Brackets



Technology

VISIO 1 Infrared VISIO+ Laser

Emitted light

VISIO 1 850 nm - not visible VISIO+ 980 nm - not visible

Communication line Serial output Power consumption < 0.5 W9 ÷ 15 Vdc Power supply

Protection **IP65** -20°C ÷ +50°C Temperature range



Smart City

Bicycle, e-scooter & Pedestrian data collection Bike counter Totem People Counter





The LSR2001BC detector uses the laser technology to detect bicycles, e-scooters and pedestrians. The emitted laser beam is used to scan on 4 parallel planes at an angle of 96 °. For each plane the sensor detects 274 points and is able to accurately identify the profile of the bicycle, e-scooter or person.

The laser detector is able to:

- Count bicycles, e-scooters, pedestrians
- Discriminate between Bicycles, e-scooter and pedestrians
- Detect the transit direction

Opposed to other simpler counting systems, the sensor LSR2001BC is very accurate in detecting bicycles, e-scooters and pedestrians; even in case of groups. The sensor performs continuous scans across the width of the cycle path and is able to discriminate individual bicycle even if very close to each other.

Another important feature is the ability to distinguish between pedestrians, e-scooters and cyclists analyzing the

The sensor must be installed on a pole at the side of the cycle path at a height between 2 to 5 meters. The sensor is equipped with an adjustable bracket which allows the precise orientation.

The detector has been designed by both the mechanical and the firmware point of view to work outdoors even with adverse weather conditions. The firmware implements filters for rain and snow

The sensor is equipped with a CPU that processes the signals received from the scanner to obtain all the data related to transit. The communication with the sensor can be done through Ethernet line. The configuration through the Ethernet line can be carried through the use of simple and intuitive web pages.











Technology Laser scanner

Number of planes 4 Points per plane 274

Emitted Light 905 nm not visible

Laser class Class 1 Range 30 mt 96° Scan angle

Scan frequency 16 m sec Power supply 12 ÷ 28 Vdc

IP65 Protection

LSR2001: -20°C ÷ +50°C Temperature range

LSR2001T: -40°C ÷ +60°C

Counting \bigcirc Classification bicycle/e-scooter/pedestrian \bigcirc Multiple lanes detection \bigcirc Detection of groups \bigcirc Transit direction \bigcirc



Occupancy time

ACCESSORIES

- Mounting Brackets
- Environmental **Protections**
- Stainless Steel Casing
- Router
- CO1010 Control Unit









The BIKECOUNT200 displays the data collected by the LSR2001BC detector.

The BIKECOUNT200 is available in 2 different models:

- BIKECOUNT200 totem
- **BIKECOUNT Display**

On both models, the structural part consists of a frame in powder-coated extruded aluminum and polycarbonate surfaces on which the reflective film with screen printing is applied, equipped with a variable message area with white LED technology capable of displaying two lines of data (for example, annual transits and daily transits).

The electronic parts for managing the display, the CPU for communicating with the sensor and the control center, are placed inside.

At the control center it will be possible to check the statistical data on the transits and the diagnostics of the various BIKECOUNT200 installed.

Customizable layout

It is possible to customize the layout of BIKECOUNT200 both on the screen printing part, with specific writings and images, and on the the display part. It is in fact possible to add additional variable message areas where to write, for example, information to users.

Furthermore, the BIKECOUNT200 totem model can be produced in both single-sided and double-sided versions, that is, with screen printing and variable message area visible from both directions.

ACCESSORIES

- Additional 2 LED data lines
- Router
- Double-sided display





BIKECOUNT200 Display



BIKECOUNT200 Totem





Bicycling is a healthy and environmentally conscious way to travel. However, it is not without risks. It is demonstrated that cyclists' serious injury crashes and accidents occur at intersections. Even drivers who are diligent about watching their surroundings on the road can have a difficult time seeing bikes and pedestrians at intersections. When a car is sitting in the middle of a crossing, it can be very easy to miss a bike on the other side with the right-of-way.

Thinking at those events, Comark has developed a new system - SENTINEL 10 - to be installed at the intersections or cycle paths to prevent injuries, decreasing and prevent the risk of accidents in favor of safety.

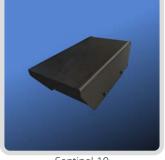
The sensor should be installed at the side of the cycle lane and will emit a laser ray that detects the transit of bikes or pedestrians. It is easy to install, and the configuration is set up by downloading an application from your smartphone.

There are several versions of SENTINEL10 - in case you need to install more than one sensor, the laser scanners interact with all other SENTINEL 10 systems, the central unit and flashing light by wire or wireless system.

The system has been designed to have a low-power consumption and to be powered by a solar panel and a control unit with battery. Riders, pedestrians and drivers will all benefit of SENTINEL 10 at intersections preventing them from accidents.







Flashing Light

Sentinel-10



Technology Laser scanner **Emitted Light** 905 nm not visible

Laser class Class 1 Scan angle Scan period 40 ms

Flashing Light

Technology High Brightness Led

2.5Klux Brightness

Sensor and Flashing

Light

Power supply 12 Vdc **IP65** Protection

-10°C ÷ +60°C Temperature range







LSR-PEOPLE is a higly precise laser-based people counter. Independent of light variations and weather conditions, its laser time-of-light technology guarantees an accurate counting system, whatever the environement or size of the audience.

High precision & reliability

It generates high resolution detection field with more than 11250 laser beams per second. Our people counter offers a reliable counting solution that accurately classifies adults and children. The algorithm inside LSR-PEOPLE is able to efficiently filter a vaste amount of objects like manual and automatic doors, shopping carts and strollers.

Day or night, light or dark, thanks to its laser time-of-flight technology, the counting is totally independent of light variations and weather conditions. You can now also count with high accuracy in dark or bright places.

Counting, anonymously

Its laser time of flight counting technology is 100% anonymous. It analyses scatterplots of laser beams to identify the unique pattern of a person while filtering objects. The built-in validation camera can be masked for sensitive applications without affecting the counting performances.





Technology Laser scanner, time-of-light

Emitted Light 905 nm not visible

Laser class Class 1

Detection area width 1,6 mt (at 2mt height)

7,5 mt (at 5,5mt height)

Dimensions 200x142x61 mm

Data transfer 3G/2G, Ethernet (cable cat.

5/6)

Power consumption 6W (max 12W/peak)

Power supply PoE or 24 Vdc

Protection IP53

Installation height 2mt or 5,5 mt Temperature range -25°C $\div +55$ °C

Pag. 55







The MAXPEOPLE control unit allows to manage several LSRPEOPLE detectors.

It collects the data about people counting from every sensor, aggregates the data, stores them locally and send them to the server.

It is thus possible to know the total people who entered and exited from different doors.

The data collected can be sent to the Control center by using an Ethernet or wireless (4G) connection.

It is also possible to configure the MAXPEOPLE to control the number of people inside public or private places such as shops, supermarkets, gyms, etc.

Once the maximum number of people, who can access the place has been set, the system will automatically count the entrances and exits of people and allow the entry of people until reaching the maximum capacity. A display with customizable graphics can show the number of people inside or write text such as "Go - Wait" (supplied as an optional).

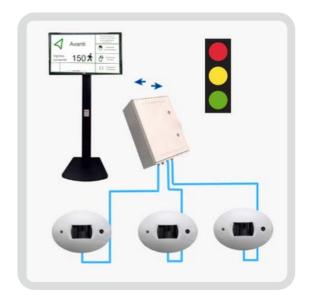


- Electrical cabinet
- Power supply
- CPU
- Switch / router (optional)

The MAXPEOPLE control unit can be configured by using a web browser.









Parking

LSR2001 PARK Laser Scanner Detector LOMAG-01 Wireless Magnetic Detector LOGAT-01 Wireless Gateway NORA Wireless Magnetic Detector





The LSR2001PARK detector uses the laser technology to detect vehicles that enter and/or exit a parking area. The emitted laser beam is used to scan on 4 parallel planes at an angle of 96°. For each plane the sensor detects 274 points and is able to accurately identify the profile of vehicles.

The laser detector is able to:

- Count vehicles
- Detect the transit direction
- Trigger an alarm when a vehicle is detected

Opposed to other simpler counting systems, the sensor LSR2001PARK is very accurate in detecting vehicles. The sensor performs continuous scans across the width of the parking entrance or exit.

The sensor must be installed on a pole at the side of the parking entrance or exit at a height between 2 to 5 meters. The sensor is equipped with an adjustable bracket which allows the precise orientation.

Technology Laser scanner

Number of planes Points per plane 274

Emitted Light 905 nm not visible

Laser class Class 1 Range 30 mt Scan angle 96°

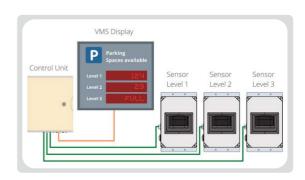
Scan frequency 16 m sec Power supply 12 or 24 Vdc

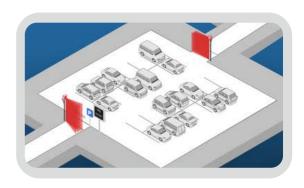
IP65 Protection

LSR2001: -20°C ÷ +50°C Temperature range

LSR2001T: -40°C ÷ +60°C









Comark PSP10 is a remote controlled system that differs from other solutions due to its strength and fully automatic mechanism.

Comark has two models available: with or without solar pannel and both models are powered with long life buffer batteries.

The PSP10 can be supplied with a remote control or, for bigger areas such as private hotel's parking, the system can be supplied with an app and related software that allows the end user booking in advance a parking area.

What is the perfect way to ensure that your spaces are reserved for those who should be parking?

The PSP10 can be installed in the parking areas of hotels, restaurants, or of any kind of private area. The system is user friendly and easy to install. It does not require any special tool.

The PSP10 can be installed for example in a hotel parking area and as soon as the guest arrives, the parking slot will be immediately available. The operator using a special software is able to send a message to the customer. The customer just needs to download the application (iOS or Android) and when close to the parking, he will just need to activate the Parking Space.

The customers will enjoy the journey, without having to worry about remembering or entering a registration number.

The system has been designed to keep the power consumption very low but with very high autonomy.

The device is in stainless steel and reinforced alluminium, therefore it is resistant to any weather condition.



Version with remote control



Dimensions 470x750x620 mm

Dimensions when

the arch is down 470x750x 94 mm

Power solar Pannel 5 W Weight 23 kg Protection IP 54

Temperature range -20° to +55°

Power supply 12 Vdc
Battery 12 Vdc
Time of operation 8 s



Version with solar power



NORA

The Nora sensor is a magnetoresistive sensor that detects the variation of the earth's magnetic field on three axes as vehicles pass. The substantial and innovative difference compared to the LOMAG sensor is that the NORA sensor communicates with the gateway through Lorawan wireless technology. LoRaWAN has a very low battery consumption and a decidedly high communication range compared to traditional wireless communication technologies which are instead a short distance away.

Being a multiband sensor, its operation is guaranteed in almost all countries of the world and is able to communicate with any LoraWan gateway configured on the same band.

Unlike the Lora system which uses a proprietary communication protocol between sensor and gateway, the NORA sensor uses Lorawan standard technology and protocols for communication with gateways.



Transmission Frequency EU868; AS923; AU915-928;

CN_470_510; EU863-870;

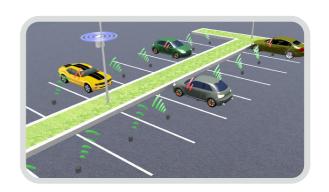
IN_865_867; KR_920_923

Battery life 5 - 6 years Weight 320 g.

Power supply 1 or 2 lithium batteries

Communication distance 100 mt. Protection **IP68**

Dimension 50 (h) x80 x 90 mm. Operating temperature -20°C ÷ +50°C









LOMAG-01

The LOMAG sensor is based on the earth magnetic field detection which is modified when a vehicle passes by. It can be used to count and detect the vehicle's presence in roads and parking lots. The detectors have to be installed under the ground at a maximum depth of 15 cm.

People and other objects (that don't interfere with the magnetic field) are not detected. The detector is equipped with Lithium batteries and can achieve 5-8 years autonomy depending on the number of transmissions to be done.

A unique feature of the LOMAG sensor is given by the possibility of setting the sensitivity of each of the three axes allowing the detection area to be adapted to the parking's space (dimension) area. The algorithms of the sensor are designed to continuously detect the presence of vehicles and to filter magnetic interference of any kind.



LOGAT-01

The configuration of the sensor can be done through the LOGAT Lora gateway. It is possible to configure the sensor output (digital presence or analog magnetic value on the three axes), sensitivity and communication period.

Wireless networks are formed around a Gateway, which acts as the wireless network master device, and one or more Nodes (magnetic detectors). The communication between gateway and magnetic detectors is based on the Lora technology which is long range and low power. The gateway communicates with a maximum of 80 wireless detectors (depending of the parking layout). The data received from the detectors can be retrieved on the gateway using Modbus protocol on a RS485 line. The LOGAT gateway has also several digital outputs that can be used to show the status of some detectors.





LOMAG-01

Axes number

Transmission frequency 868,5 Mhz Power autonomy 5-8 years Weight 1 Kg.

Power supply 1 or 2 Lithium batteries

Communication distance 100 mt IP68 Protection

Dimensions 50(h) x80x90 mm -20°C ÷ +50°C Temperature range



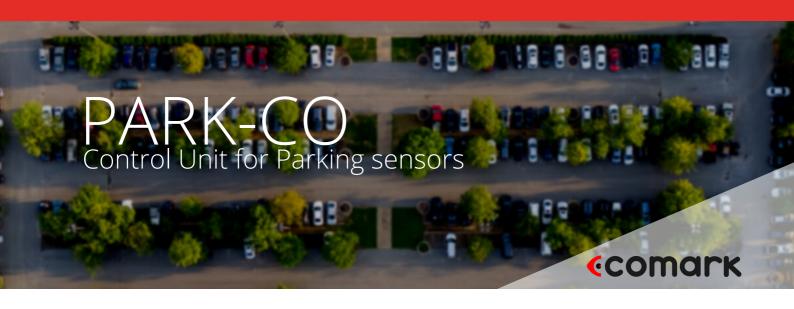


LOGAT-01

Antenna connection SMA, 50 Ohms Transmission frequency 868,5 Mhz Radio power 14 dBm Weight 0,5 Kg. 12V Power supply Communication distance 100 mt. RS485 Communication bus Connector 19 pins

Dimension 106 x 96 41 mm. Interface Display, buttons Operating temperature -20°C ÷ +50°C





Control unit PARK-CO has been specifically designed to be connected to the Parking series sensors and to process, archive and send the data received from them.

It can be used with the wireless sensors (Lomag / Logat / Nora) or with the LSR2001 PARK.

If used with the wireless sensors it will embed the gateway that receives the data.

The PARK-CO is composed by:

- CPU
- Power supply
- Gateway or switch (depending on model)
- Router (Optional)

The PARK-CO functions are:

- Calculation of the free parking places
- Configuration of the gateway or sensors
- Configuration of the data regarding the data
- Diagnostics of the sensors
- Data sending to the server





Software

Data Analytics Diagnostics Reports





The Omniview software allows to manage and configure the control units and sensors in the field.

FUNCTIONS

- Configuration of sensors and control units
- Data acquisition from devices in the field
- Storing data on the database
- Device diagnostics
- Processing and aggregation of data
- Creation of reports with graphics and tables
- Map with location of the stations
- Users management

REPORT (*)

The software offers an extensive list of reports for displaying data in various forms. For each of them it is possible to filter the data according to the location, the period and the lanes of interest.

Some of the reports available are:

- Display aggregated data
- Display individual transit
- Average daily traffic
- Speed/flow report

(*): Report possibilities will depend of each sensor's capability of data collection. Comark suggest to check always with the Customer Service the feasibility of reporting.











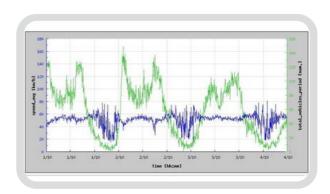


DIAGNOSTICS

TrafficView allows a real-time monitoring of the system status through the pages that show all devices with anomalies. In particular, it displays the status of the control units, sensors and communication.

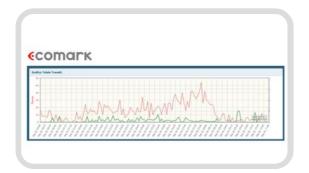
MAP

TrafficView also offers an interactive map view that allows to see the location of devices and monitor their status.



Depending of the application, Omniview software is composed by the following licenses:

- **Omniview Traffic**
- **Omniview Bluetooth**
- **Omniview Parking**
- **Omniview People**











Comark Worldwide



























Comark Worldwide



























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