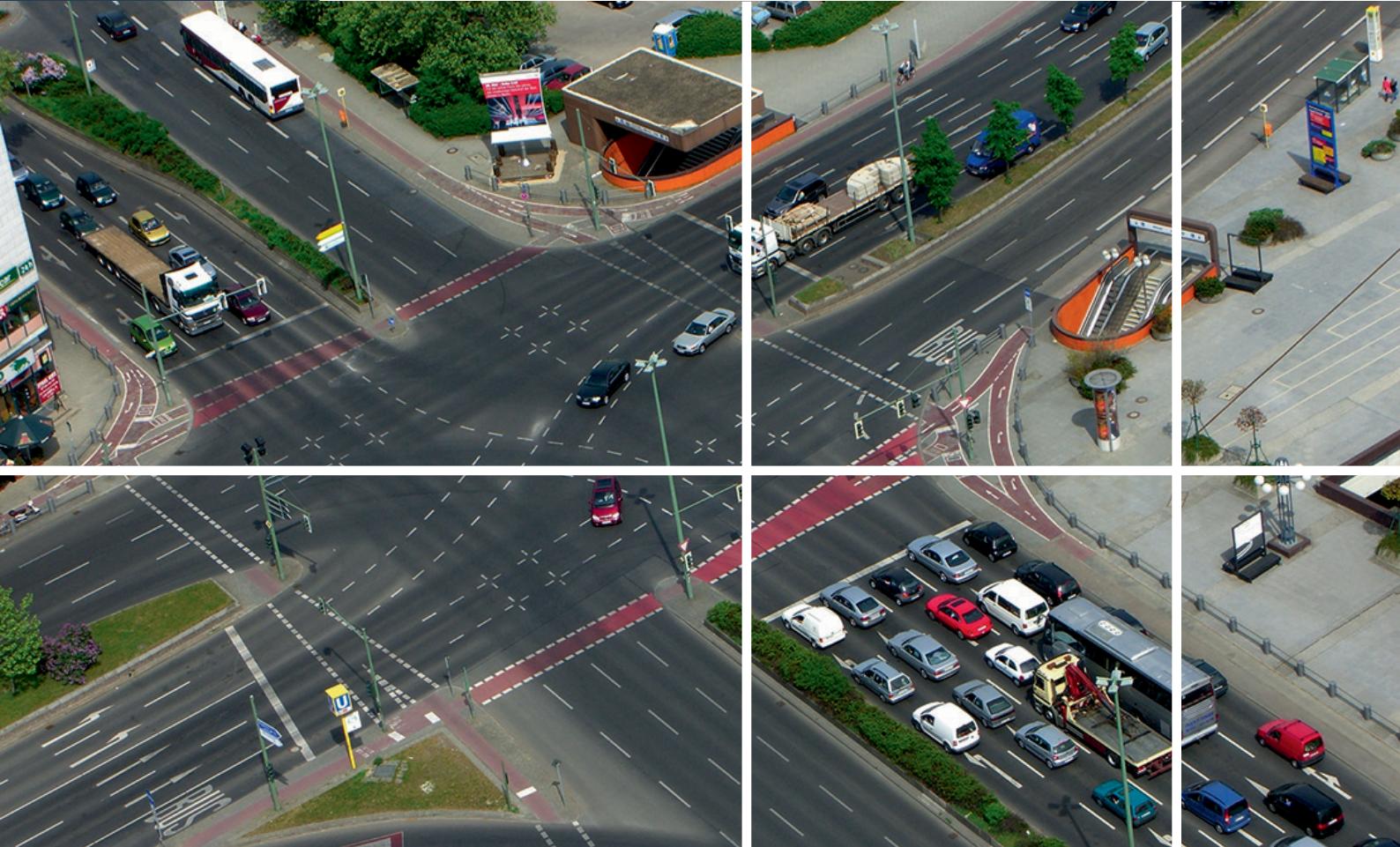


iSYS-3104

User Manual Rev 4.3



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iSYS-3104

Application data at a glance

24GHz Radar System with signalprocessing and application unit for Multi-lane Traffic Counting, Speed Measurement and Classification

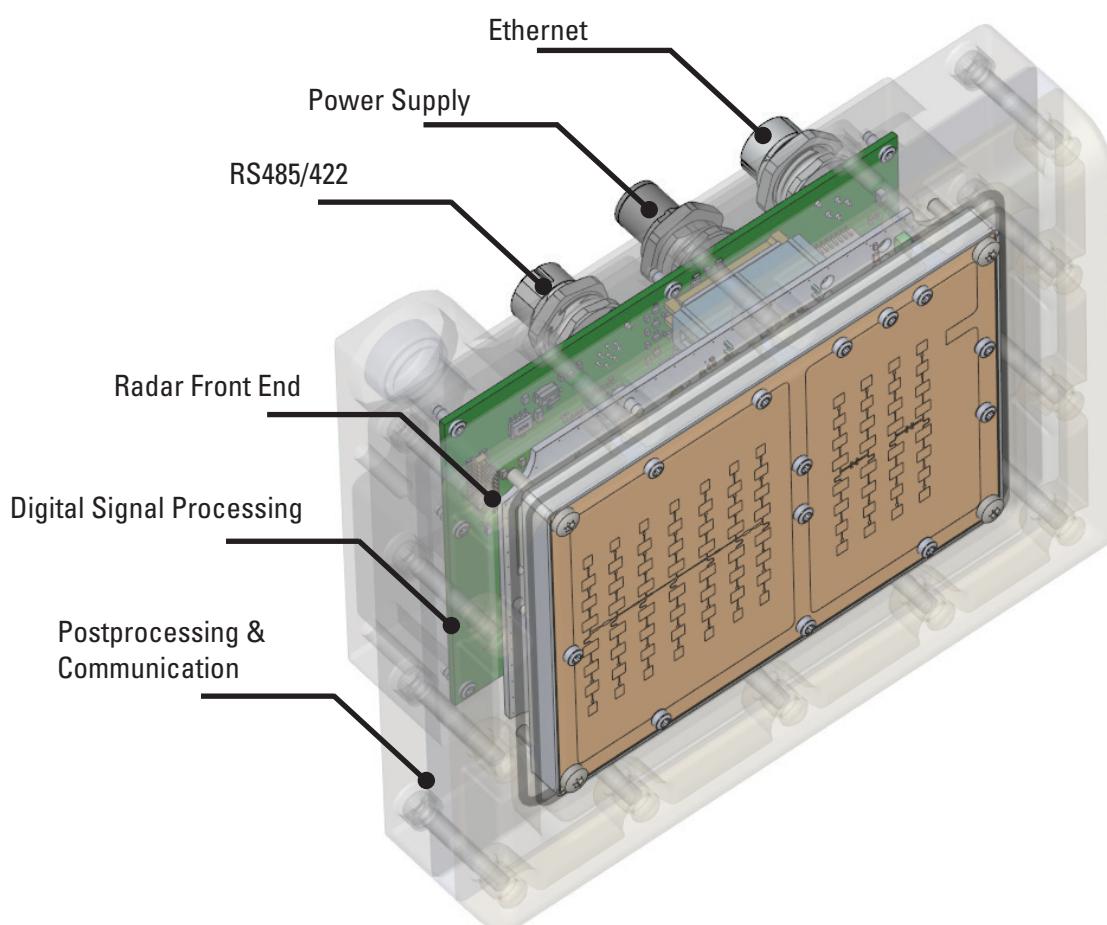


- Vehicle Counting with >90% precision (receding, approaching traffic)
- Vehicle Classification (2+1; car, truck, others) with >80% precision
- Velocity measurement in a speed range of 1...300km/h with an accuracy of 1km/h for velocities < 100km/h and 1% for velocities > 100km/h
- Field of View is 40° ($\pm 20^\circ$)
- Interface is 10/100 Mbit Ethernet (TCP/IP) and RS485/422 (both as a standard feature integrated in the iSYS-3104)
- Temperature range is -30°C up to 60°C
- Power Supply 12 – 24V, 9W maximum and Power over Ethernet (PoE) (both as a standard feature integrated in the iSYS-3104)
- Protection standard IP67

iSYS-3104

Technical Specifications

The goal was the design of a multifunctional radar system for the use in the wide area of traffic monitoring.
The result is the iSYS-3104 unit.



General

- radar module type: 24 GHz Narrow band, Phase Monopulse
- modulation type: FSK
- frequency band: 24,000..24,250 GHz
- Transmit power: < 20 dBm (adjustable by user)
- Interface: 10/100Mbit Ethernet (protocol: TCP/IP)
RS485/422

System Parameters

The system delivers an application message for each vehicle and an object list over an Ethernet Interface and RS485/422 Interface.

- Trigger area*: 20...80m (optimal area for counting and classification)
- Detection Range: 5m up to 300m (depends on RCS, installation, lane, etc.)
- Detection angle: $\pm 20^\circ$
- Radial velocity: 1..300km/h
- Max. velocity error: 1km/h for velocities < 100km/h
1% for velocities > 100km/h
- Direction: receding and approaching traffic
- Counting: >90% precision (receding and approaching traffic)
- Classification: >80% precision (receding and approaching traffic)
- Classes: 2+1 (passenger car, truck, others)
- Update time: 60 ms
- Protection class: IP67
- Temperature range: -30 ... +60°C (operating / storage)

*depends on lane, installation and traffic direction

Block diagram



RFE-3004 Radar-Front-End

- Transmit and Receive Antennas
- MMIC Receiver with LNA, Mixer Amplifier
- LF chain with programmable gain amplifier, analog low/ high pass filter
- MMIC VCO
- PLL for digital frequency generation

DSP-3004 Digital Signal Processing

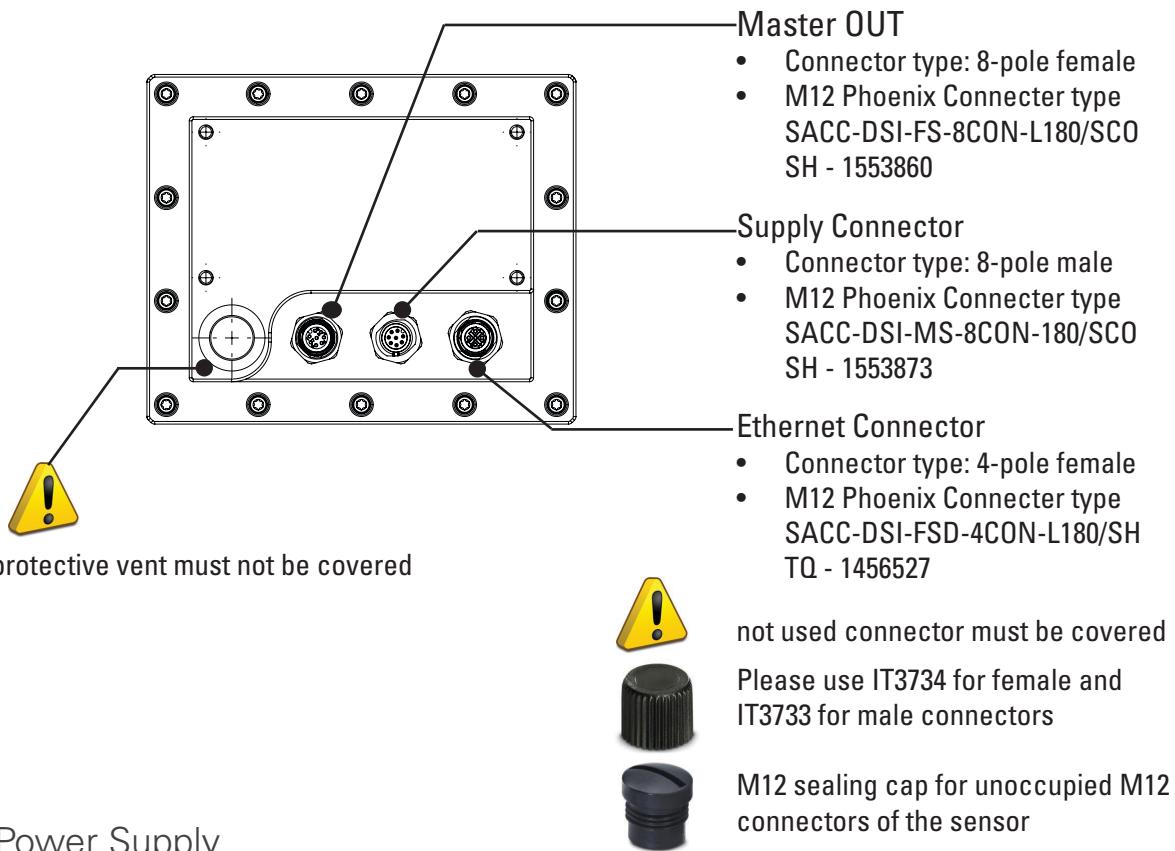
- DSP with integrated ADC
- Power Supply Unit for analog and digital supply

TRM-3004 Post processing & Communication

- Peripheral components for Interfaces incl. Connectors
- ARM9 Board for post processing and communication
- PoE (Power over Ethernet) unit on request

Interface

The system comes standard with Ethernet Interface. A RS485/422 Interface is available on request.



Power Supply

	Comment	Symbol	min.	typ.	max.	Unit
supply voltage		Vcc	11.4		26.4	V
power consumption	complete system	P		6	9	W
Connector type: 8-pole male		M12 Phoenix Connector type SACC-DSI-MS-8CON-180/SCO SH - 1553873				
PIN	Signal		Comment			
1	d.n.c.		do not connect			
2	d.n.c.		do not connect			
3	d.n.c.		do not connect			
4	d.n.c.		do not connect			
5	GND					
6	GND					
7	Supply					
8	Supply					

Ethernet Connector

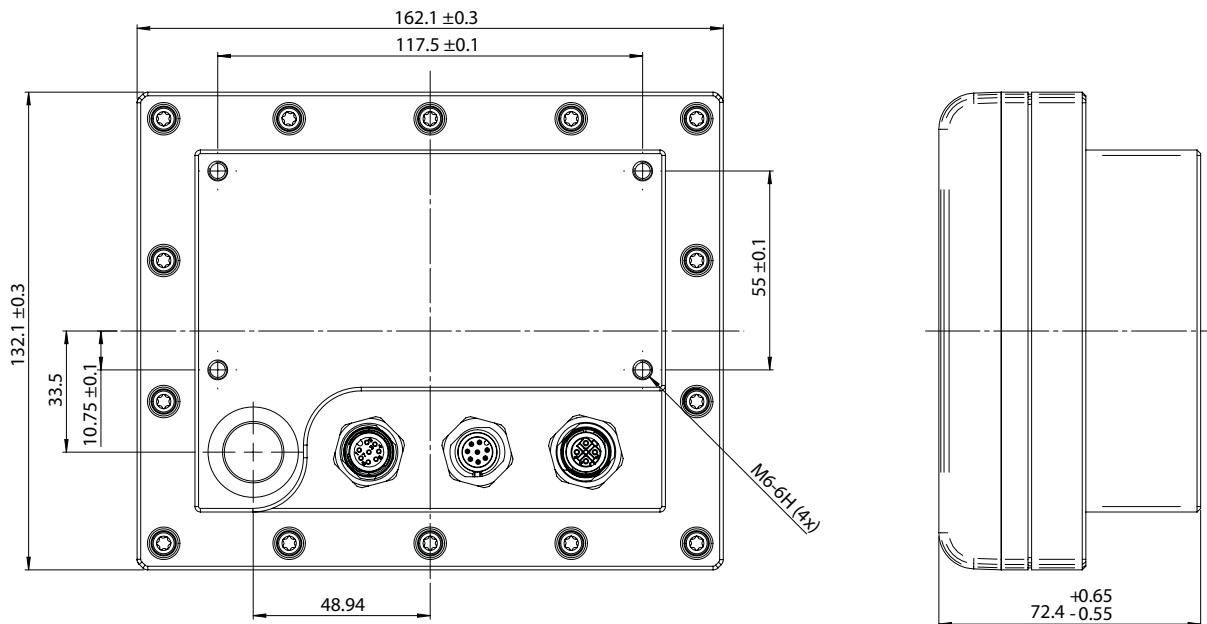
	Comment	min.	typ.	max.	Unit
speed				100	Mbit/s
cable length	CAT 5e or higher			100	m
Connector type: 4-pole female		M12 Phoenix Connecter type SACC-DSI-FSD-4CON-L180/SH TQ - 1456527			
PIN	Signal	Comment			
1	Tx+ & pos/neg VPD				
2	Tx- & pos/neg VPD				
3	Rx+ & neg/pos VPD				
4	Rx- & neg/pos VPD				

Master OUT (to connect additional module e.g. GSM/GPRS)

	Comment	min.	typ.	max.	Unit
speed			115200	250000	bit/s
cable length	CAT 5e or higher			100	m
Connector type: 4-pole female		M12 Phoenix Connecter type SACC-DSI-FS-8CON-L180/SCO SH - 1553860			
PIN	Signal	Comment			
1	RS485 B	2 wire RS485/422			
2	GND	Supply additional module			
3	RS485 A	2 wire RS485/422			
4	d.n.c.	do not connect			
5	d.n.c.	do not connect			
6	d.n.c.	do not connect			
7	Aux Supply	Supply additional module			
8	d.n.c.	do not connect			

Dimensions

For detailed dimensions compare to corresponding Datasheet.



iSYS-3104 Installation Parameters

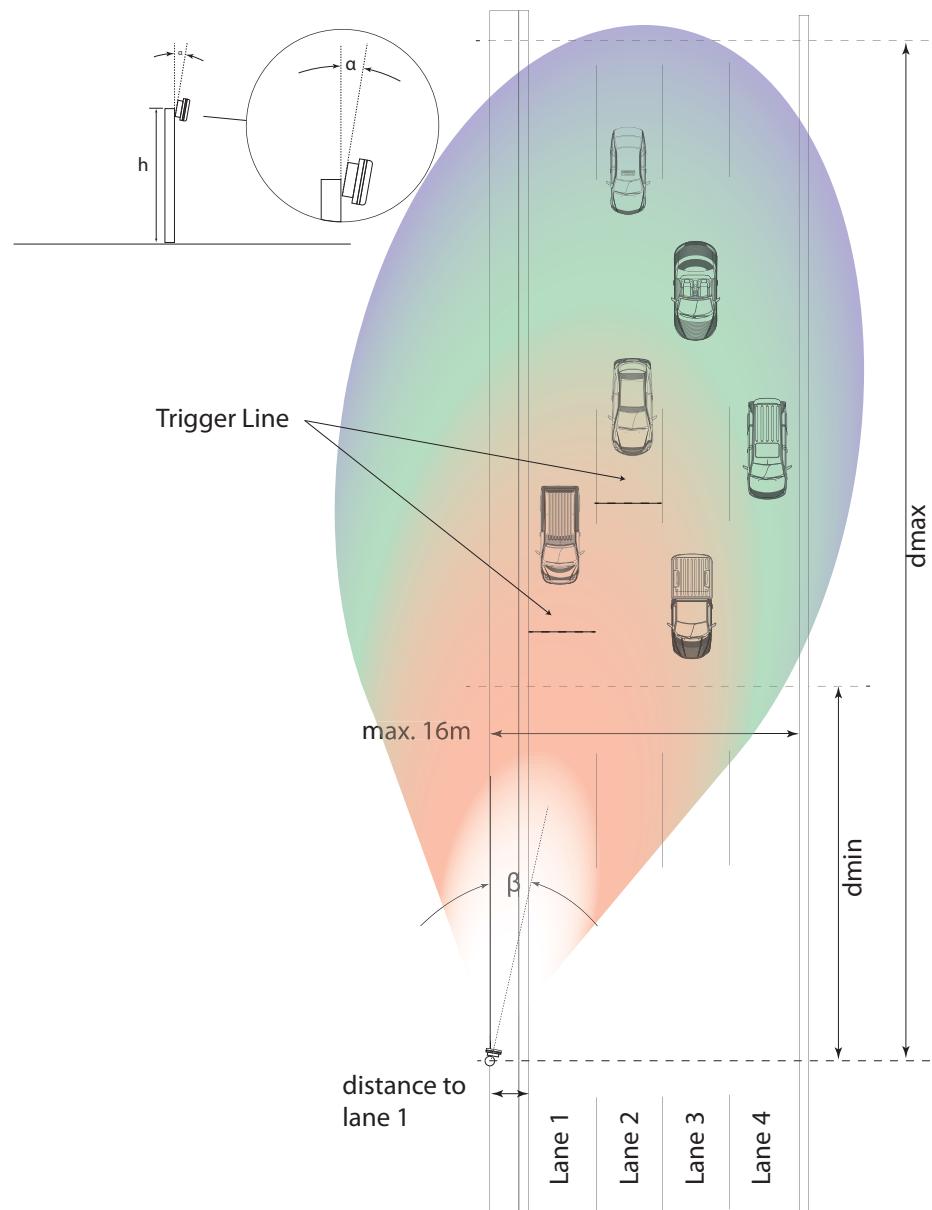
Easy installation - one of the smart features of the iSYS-3104
The iGUI-3104 (InnoSenT - Graphical User Interface) enables a
quick setting of all necessary parameters.

Within the specified trigger areas several trigger lines can be configured. In case that a vehicle passes this trigger line it will be counted as well as classified.

Left Side Installation

Installation	Comment	Symbol	min.	typ.	max.	Unit
height		h	6	7	8	m
elevation angle		α	9	10	11	°
azimuth angle		β	-8	-9	-10	°
distance to lane 1		d_{offset}		0		m
*trigger area lane 1	approaching	$d_{\text{trigger_line1}}$	20		60	m
*trigger area lane 2	approaching	$d_{\text{trigger_line2}}$	20		60	m
*trigger area lane 3	approaching	$d_{\text{trigger_line3}}$	30		60	m
*trigger area lane 4	approaching	$d_{\text{trigger_line4}}$	30		60	m

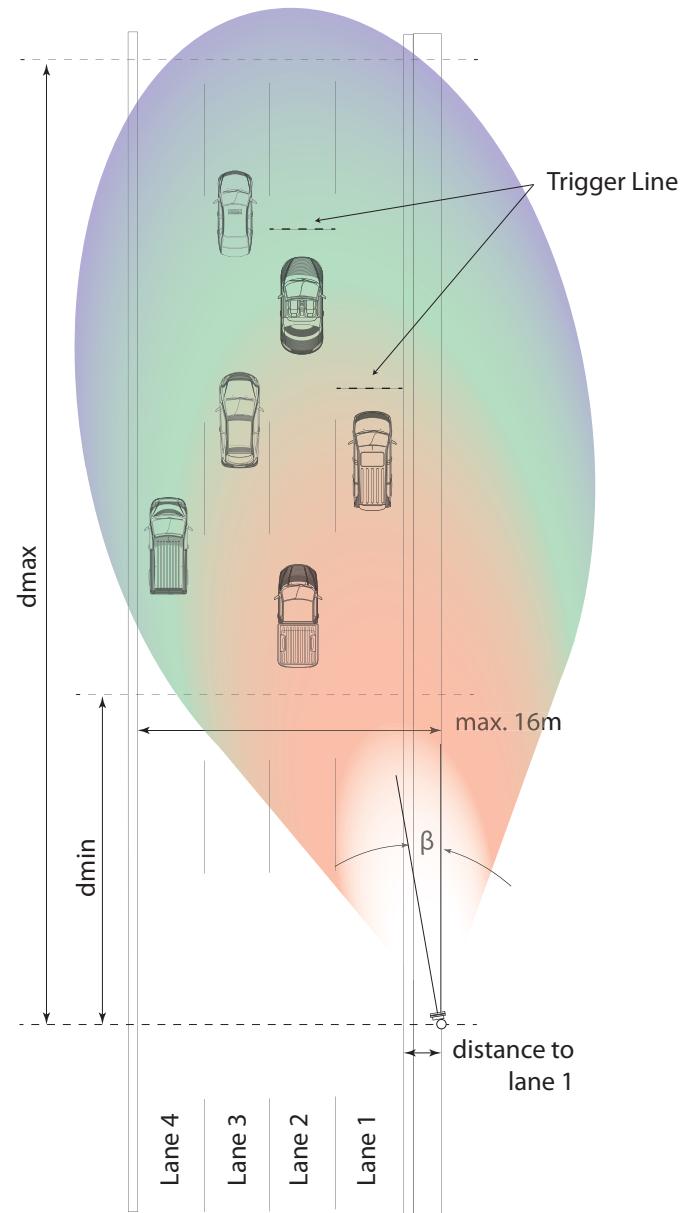
*valid for all weather conditions (rain etc.)



Right Side Installation

Installation	Comment	Symbol	min.	typ.	max.	Unit
height		h	6	7	8	m
elevation angle		α	9	10	11	°
azimuth angle		β	8	9	10	°
distance to lane 1		d_{offset}		0		m
*trigger area lane 1	receding	$d_{\text{trigger_line1}}$	40		80	m
*trigger area lane 2	receding	$d_{\text{trigger_line2}}$	40		80	m
*trigger area lane 3	receding	$d_{\text{trigger_line3}}$	50		80	m
*trigger area lane 4	receding	$d_{\text{trigger_line4}}$	60		80	m

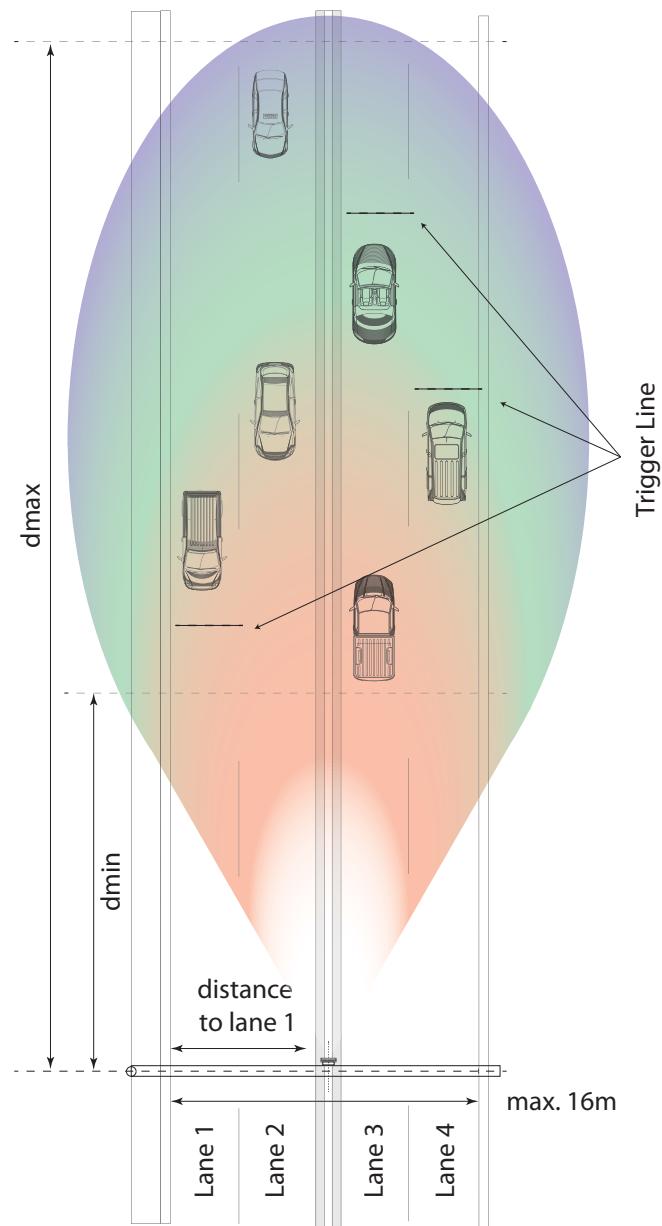
*valid for all weather conditions (rain etc.)



Gantry Installation

Installation	Comment	Symbol	min.	typ.	max.	Unit
height		h	6	7	8	m
elevation angle		α	9	10	11	°
azimuth angle		β	-1	0	1	°
distance to lane 1		d_{offset}		7		m
*trigger area	approaching	$d_{\text{trigger line}}$	20		60	m
*trigger area	receding	$d_{\text{trigger line}}$	40		80	m

*valid for all weather conditions (rain etc.)



iSYS-3104 Software

The iSYS-3104 software performs radar detection, signal processing, tracking and application algorithms. The result is an application message for each vehicle and an object list, which will be send to the Ethernet interface (optional RS485/422).

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The application message contains the following information:

- Time stamp
- Lane
- Speed
- Class

The object list contains the following information:

- Object Id
- Time stamp
- Quality
- Position in x- and y-direction relative to pole (cartesian)
- Velocity in x- and y-direction relative to pole

The object list allows the implementation of own applications or system functions. The Object list will not be send out to RS485/422.

All software tools and documentation can be downloaded under

<http://www.innosent.de/services/downloads/downloads-software/>

Software Development Kit (SDK)

A Radar SDK is available, which offers an application programming interface (API) for sending commands to iSYS-3104 over Ethernet and receiving application messages and object lists.

For further information refer to document

iSYS-310x ethernet protocol revX.pdf

iSYS-310x serial interface protocol revX.pdf

iGUI-3104 Configuration Software

A Configuration Software allows to setup the iSYS-3104 system and guides through the complete process of installation:

- Setting the iSYS-3104 parameters e.g. IP address, interface, etc.
- Setting the installation parameters e.g. installation height, no. of lanes, direction of traffic, etc.
- Setting the application parameters e.g. detection zones etc.

For further information refer to document "iGUI-3104 user manual revX.pdf"

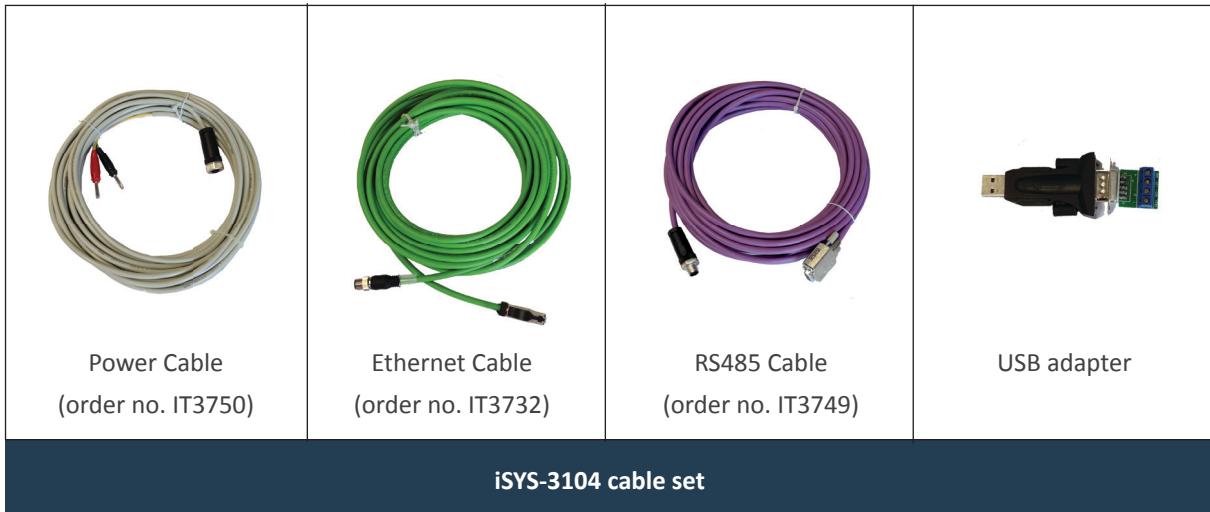
Serial Application Message Reader (iSAM)

The serial application message reader visualizes the Application Messages send over RS-485 interface. It can also import an iGUI-3104 configuration file and send it to the iSYS-3104 over RS-485 interface.

For further information refer to document: "iSAM-3104 user manual revX.pdf"

Accessories

The iSYS-3104 cable set includes all necessary cables for a quick start. The mounting bracket offers a safe and easy to use possibility to install the iSYS-3104 on a pole.



Contacts

Customer satisfaction - the most important goal here at InnoSenT. To achieve this InnoSenT offers direct support for our customers.



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