

Visionary-B CV

3D driver assistance system to enhance collision awareness

EN



Valid for the following part numbers:
1091804, 1091805, 1091806, 1091807, 1091808, 1091809, 1091810, 1091811, 1091812, 1091813, 1091814, 1091815



Australia Phone +61 (3) 9457 0600 1800 33 48 02 – tollfree	New Zealand Phone +64 9 415 0459 0800 222 278 – tollfree
Austria Phone +43 (0) 2236 62288-0	Norway Phone +47 67 81 50 00
Belgium/Luxembourg Phone +32 (0) 2 466 55 66	Poland Phone +48 22 539 41 00
Brazil Phone +55 11 3215-4900	Romania Phone +40 356-17 11 20
Canada Phone +1 905.771.1444	Russia Phone +7 495 283 09 90
Czech Republic Phone +420 234 719 500	Singapore Phone +65 6744 3732
Chile Phone +56 (2) 2274 7430	Slovakia Phone +421 482 901 201
China Phone +86 20 2882 3600	Slovenia Phone +386 591 78849
Denmark Phone +45 45 82 64 00	South Africa Phone +27 10 060 0550
Finland Phone +358-9-25 15 800	South Korea Phone +82 2 786 6321/4
France Phone +33 1 64 62 35 00	Spain Phone +34 93 480 31 00
Germany Phone +49 (0) 2 11 53 010	Sweden Phone +46 10 110 10 00
Greece Phone +30 210 6825100	Switzerland Phone +41 41 619 29 39
Hong Kong Phone +852 2153 6300	Taiwan Phone +886-2-2375-6288
Hungary Phone +36 1 371 2680	Thailand Phone +66 2 645 0009
India Phone +91-22-6119 8900	Turkey Phone +90 (216) 528 50 00
Israel Phone +972 97110 11	United Arab Emirates Phone +971 (0) 4 88 65 878
Italy Phone +39 02 27 43 41	United Kingdom Phone +44 (0)17278 31121
Japan Phone +81 3 5309 2112	USA Phone +1 800.325.7425
Malaysia Phone +603-8080 7425	Vietnam Phone +84 24 382 2225
Mexico Phone +52 (472) 748 9451	
Netherlands Phone +31 (0) 30 229 25 44	

Detailed addresses and further locations at www.sick.com

Exclusion from liability

SICK products meet industrial standards. The focus is on availability of products and services. SICK always assumes that the integrity and confidentiality of the data and rights affected by the use of the aforementioned products will be ensured by the customer.

General cybersecurity notice

Protection against cybersecurity threats requires a comprehensive and holistic cybersecurity concept that must be continuously monitored and maintained. Such a concept consists of organizational, technical, process-related, electronic and physical defense levels and sets up appropriate measures for the different types of risk. SICK's products and solutions must be regarded as an integral part of this concept.

Information on Cybersecurity can be found at: www.sick.com/psirt

Safety

- ▶ This product is not a safety component as defined in the Machinery Directive.
- ▶ The Visionary-B is a driver assistance system designed to enhance collision awareness. It assists drivers. Driver assistance systems are not a substitute for driving with due care and attention!
- ▶ The mounting, electrical installation, and configuration of the device must be carried out by professionally qualified and trained personnel only.
- ▶ Prior to mounting, it is imperative that you follow the machine manufacturer's operating instructions and agree on possible mounting positions with the manufacturer in advance, where appropriate.
- ▶ When mounting and electrical installation work is being carried out, always comply with standard operating procedures, health regulations, and environmental regulations in force.
- ▶ The assistance system must not be used in areas with flammable/explosive atmospheres!
- ▶ Be sure to observe electrical connection values during installation.
- ▶ Use only the cables provided to install the device.
- ▶ Replace faulty or damaged cables and male connectors immediately.
- ▶ Replace damaged or faulty components immediately and in consultation with SICK AG.
- ▶ When mounting the device, it is imperative that you use suitable mounting equipment and that you consider its specific tightening torques. The mounting equipment must be self-locking or secured appropriately.
- ▶ Ensure a constant voltage supply to the device within the prescribed parameters.
- ▶ Operate the assistance system only within the prescribed operating parameters.
- ▶ Regularly check that the assistance system is functioning properly, e.g., at the end of the working day.
- ▶ Do not cover the evaluation unit and ensure proper heat dissipation at the mounting position.
- ▶ Structural modifications to the system are not permitted!

Scope of delivery

▶ Detailed information on the scope of delivery of all kits (A, B and C) and variants can be found in the operating instructions of Visionary-B CV (8022960).

Necessary accessories

Part no.	Description
2098100	Cable for connecting the sensor head/ evaluation unit (3 m)
2098101 or	Cable for connecting the sensor head/ evaluation unit (5 m)
2098102 or	Cable for connecting the sensor head/ evaluation unit (10 m)
2098103 or	Cable for connecting the sensor head/ evaluation unit (15 m)
2098104 or	Cable for connecting the sensor head/ evaluation unit (20 m)
2086211	Alarm cable for two discrete outputs, 0/12 V (5 m)

Note: In order to correctly connect the system, one of these cables must be used! Two cables are required respectively for kit B and kit C.

Additional information

For additional information on the assistance system, please see the operating instructions or visit www.sick.com. Please contact your local sales office in the event of any support queries. The passwords required for configuration can also be obtained from the manufacturer service.

Product features

- ▶ Driver assistance to enhance collision awareness.
- ▶ Perfectly designed for off-road heavy trucks working outdoors.
- ▶ 2-in-1: active 3D sensor and 2D camera.
- ▶ Sensor head temperature range: -40 °C ... +75 °C.
- ▶ Very rugged housing for outdoor use: IP69K for the sensor head.
- ▶ Relevant objects are reliably recognized within a sensing range of up to 7 m, largely irrespective of environmental influences – even strong sunshine or rain.
- ▶ The 3D sensor provides a live 2D image with a visual and audible warning to enhance collision awareness.
- ▶ For optimal detection performance, the sensor head should be installed at a height of 1 m to 2.4 m.
- ▶ Configuration and data output directly via the monitor(s) provided.

Overview

Visionary-B is a 3D driver assistance system designed to avoid collisions in an outdoor environment. It is based on the stereoscopic principle and provides real time 3D data at up to 10 frames per second.

The assistance system is configured using the HMI and a USB keyboard/mouse (see note) and presents the setting on the monitor in real time.

Once configured, it runs in stand-alone operation and continuously provides results when the ignition is switched on. The live images appear on the display and the driver is notified of any breaches of the 3D detection area with visual and audible warnings.

In order to be able to use the assistance system, you must follow the operating steps below:

1. Completing the mechanical and electrical set-up
2. Configuring the HMI
3. Setting the detection areas

Note: System configuration requires a USB keyboard/mouse combination to be used. The connection is established via a USB port. Only trained personnel may carry out the configuration work. In normal operation, connecting a keyboard and mouse is forbidden.

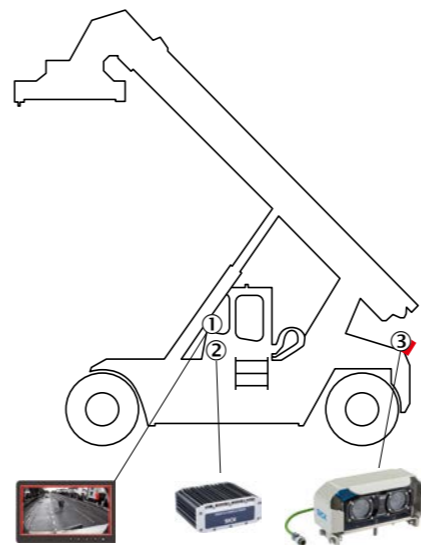
Preparing for mounting

Note: Kits B and C each have two sensor heads to mount – kit B has an additional switch box and kit C has an additional evaluation unit. Ensure that additional space is made available and that mounting steps are repeated when necessary.

1. Prepare the sensor head mounting position (3) by fixing a stable holding device. Pay attention to the values for the detection zone and the sensor head's permitted environmental parameters.
2. Install the connecting cable for the sensor head between the sensor head mounting position and the driver's cab (necessary accessories). Install it along protected areas of the vehicle as much as possible (e.g., recesses, grooves, etc.).
3. Prepare the mounting position for the evaluation unit (2) by getting the connection ready at the installation position inside the driver's cab. Use the most heavy-duty cable channels possible here as well or lay the cable under the inner lining.

Note: Ensure that the USB connection of the evaluation unit is accessible for maintenance purposes.

Completing the mechanical and electrical set-up

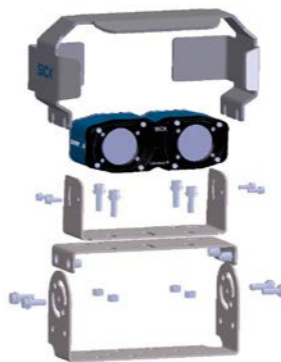


Note: With kit C, the mounting and electrical installation must be carried out for both evaluation units and sensor heads.

1. Mount the display using the bracket inside the driver's cab (1) so that the driver can easily see it at all times (e.g., on the dashboard).
2. Mount the evaluation unit at the designated installation position. To do so, use the mounting screws provided or other suitable fittings.

Note: The evaluation unit must be switched off when it is connected to the peripheral systems, otherwise the components may be damaged.

3. Connect the display and the evaluation unit.



4. Mount the bracket provided for the sensor head.
5. Mount the sensor head on the prepared bracket on the vehicle.
6. Set the sensor head bracket to the designated tilt angle.
7. Connect the connecting cable to the sensor head(s) and the evaluation unit.
8. Switch off the vehicle's ignition.

Note: Please be aware that the cables and the fuse box of your machine may still be energized.

9. Press the main battery switch and interrupt the power supply to the connections for the vehicle's electrical system.

Note: Protect the evaluation unit against electrical overstress. To do this, you can use the supplied fuses. Please note that failure to observe this measure will invalidate any warranty claims.

10. Connect the evaluation unit(s) to the prepared connections of the vehicle's electrical system.

11. Connect the USB keyboard and mouse to the evaluation unit in order to carry out initial commissioning.

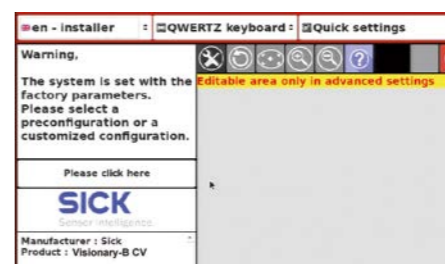
▶ With kit C, this process must be carried out on both evaluation units.

Configuring the HMI

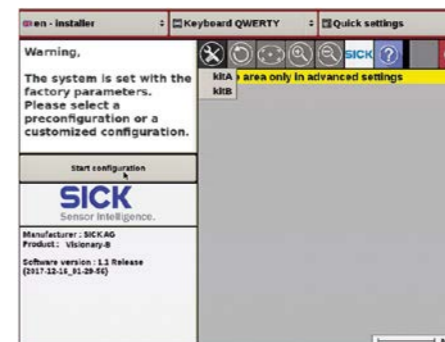
1. Switch on the vehicle's ignition and wait for a warning sign to appear.
2. Press the ESC button.

Note: The keyboard layout QWERTY will be activated as standard. This can be changed in the Configuration menu.

3. Enter the password. The Configuration screen is displayed.



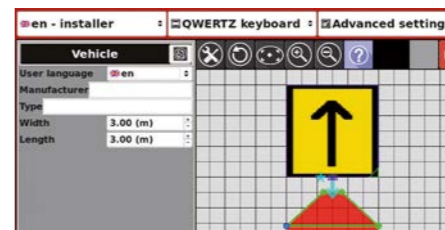
6. Acknowledge the note on the left-hand side by clicking the **Please click here** button.
7. Select the language using the drop-down menu in the top left-hand corner.



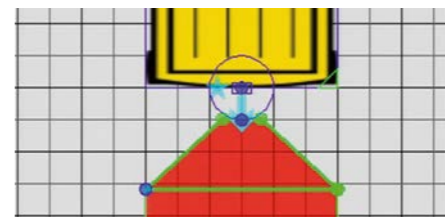
8. Using the drop-down menu item **Quick settings**, choose from the pre-configurations (**harsh**: recommended for outdoor use; **moderate**: not recommended for use under real-life conditions, surroundings with optimum environmental conditions).

Note: With kit B, this setting enables access to the second alarm zone.

9. Enter the sensor head's height and installation angle.
- ▶ Other parameters can be set using the drop-down menu item **Advanced settings**.



10. Enter the vehicle's dimensions.
11. Click the orange vehicle symbol (standard: box with arrow) to access a choice of vehicle models to be able to visualize the settings better.
12. Select one of the vehicle's visualizations (aerial view).



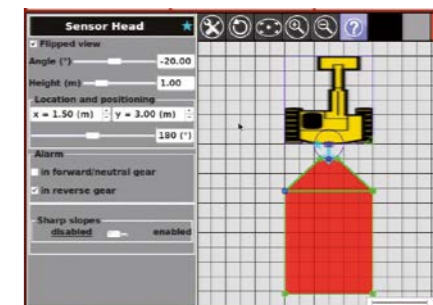
13. Click on the sensor head (blue) in the graphic in order to access the sensor head's settings.

Move one of the two points in order to move or rotate the position of the sensor head in relation to the vehicle.

14. Enter the values relating to the position and alignment of the sensor. The coordinates can be found in the top left-hand corner on the vehicle.

Configuring the HMI

Parameter	Description
Flipped view	Provides mirror image of sensor head information on the HMI display
Angle	Installation angle of the sensor head in relation to the horizontal
Height	Mounting height of the sensor head (in relation to the center of the lenses)
Location and positioning	X/Y – Distance to the left-hand side/front of the vehicle Slide control – Alignment of the sensor head in degrees (0°: forwards, 90°: left)
Alarm	Alarm performance dependent on the gear selected. Active: An alarm will be triggered if the detection zone is breached when this gear is selected.
Sharp slopes	Alarm performance dependent on sharp slopes. Active: Improves detection if the territory is hilly.



15. Click on one of the red areas in order to set the values for the alarm zones (see **B**). The values are set relative to the position of the sensor. Pay attention to the general conditions such as height, distance, etc., in the technical data (see **D**). For additional configuration options, see the HMI and operating instructions.

▶ For kit B, select the sensor head to be configured using the **★** and **◆** symbols.

16. Click on the red cross symbol in the top right-hand corner in order to quit the configuration process.

Checking the configuration

1. Switch the system on at the ignition if this has not been done already.
2. Wait until the camera image appears on the display.
3. Check the alignment of the camera image (normal/flipped).
4. Press the "i" button. The values displayed for Height and Angle for the configured and detected lines should be similar.

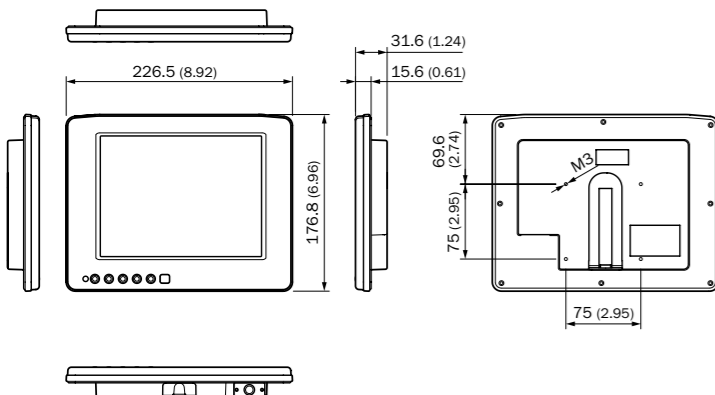
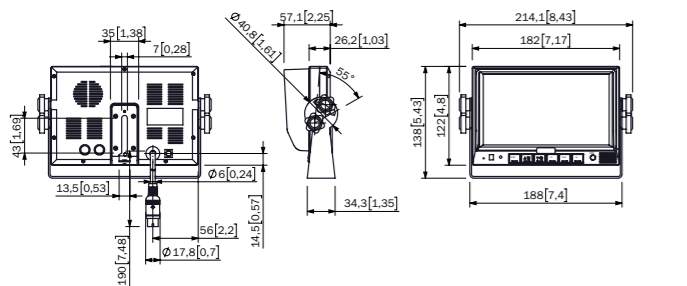
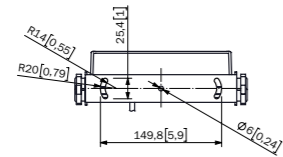
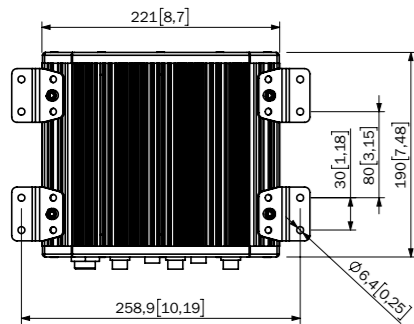
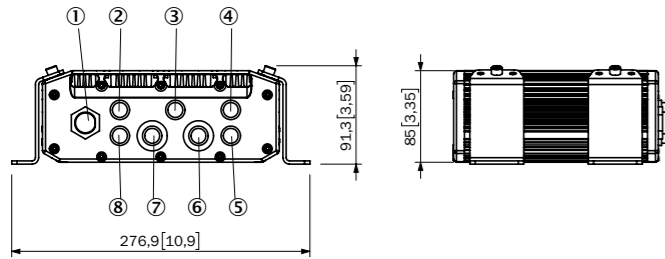
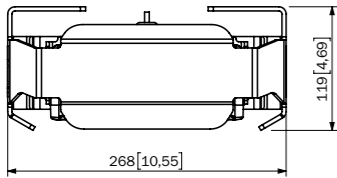
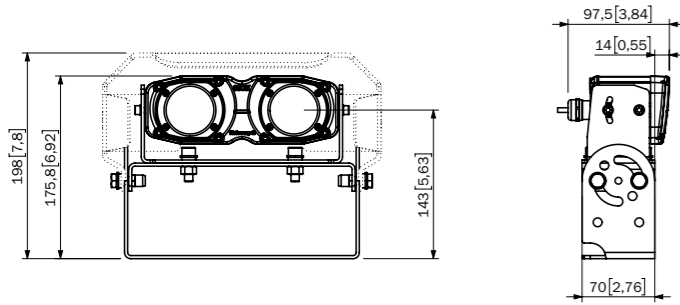
Note: The values for Estimated and Initial Height/Angle must be at least slightly different. If these two values are identical, the sensor head has not been correctly installed and no reliable alarm will be triggered if the alarm zone is breached!

5. Check whether the vehicle illustration, sensor head position, and detection area (shown on the right-hand side of the display) match the entered settings. With kit B, switch between the two sensor heads with the "g" button.
6. Check whether the alarm is triggered when the detection area is breached.

If one of the thorough checks is negative (also see note), you must repeat the configuration process.

You can find additional information about the button assignments in the operating instructions at www.sick.com/Visionary-B

A Dimensional drawings in mm [inch]



B Detection zone

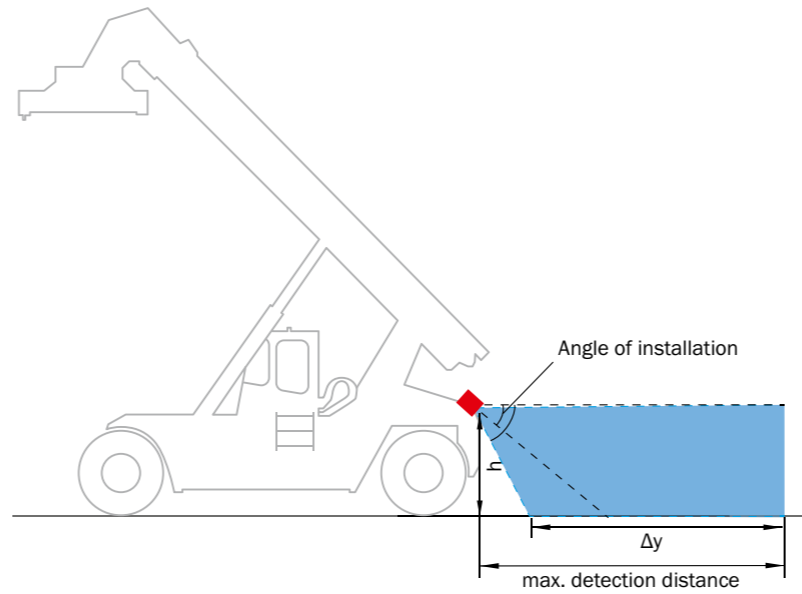
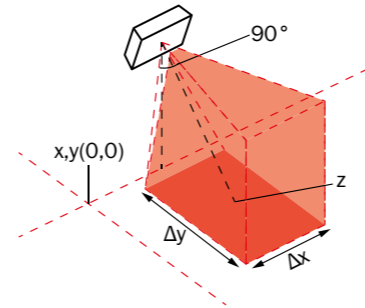
The detection performance depends on:

- ▶ the distance to a flat boundary surface, such as the ground, ceiling, wall, etc.
- ▶ the mounting bracket in relation to the ground.
- ▶ the ambient conditions.

The maximum detection range is pre-set to 7 m. This value may differ or be physically delimited due to environmental influences or mounting parameters.

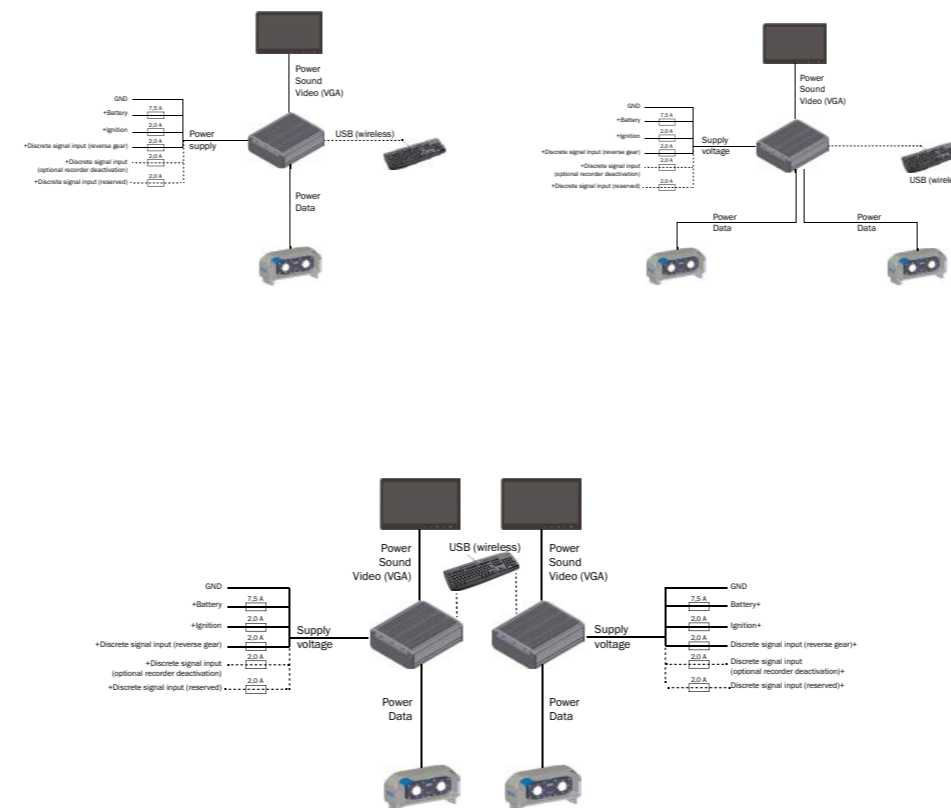
The maximum definable alarm zone depends on the object class in question; ideally it should be set to 6 m x 7 m ($\Delta x \times \Delta y$, 3D projection on the ground). Greater values can be set but can only be detected with a lower level of reliability. For additional information, see the HMI and operating instructions.

Detection zone



Mounting height (m)	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4
Mounting angle (°)	0	-6	-11	-17	-23	-29	-31	-33

C Connection diagram



D Technical data

	Visionary-B
Working distance	0.5 m ... 7 m
Definable detection zone ($\Delta x \times \Delta y$)	6 m x 7 m
Maximum detection angle	120° x 75°
Maximum installation angle (in relation to the horizontal)	See table on detection zone
Detectable object shape	See the HMI and operating instructions
Response time	< 200 ms typical
Switch-on delay	< 50 s
Mounting	1 m ... 2.4 m
Mounting position	According to the detection zone (must be delimited by the ground)
Weight of sensor head	1.3 kg
Weight of evaluation unit	3.8 kg
Dimensions	See dimensional drawings
Protection class	IP69K (sensor head), IP67 (evaluation unit)
Supply voltage	12 V DC -10% 24 V DC +40% ¹⁾
Connections (evaluation unit)	1 x USB (mouse and keyboard) 2 x sensor heads Monitor (foreground suppression/sound) Additional alarm output, two discrete outputs Machine-machine interface (reserved) Evaluation unit supply Ethernet (reserved)
Power consumption	≤ 30 W max. (kit A) ≤ 35 W max. (kit B) ≤ 60 W max. (kit C) 1 W ignition 0.8 mA at 24 V in standby
Output voltage	12 V output voltage 100 mA output current (overcurrent protection max. 430 mA)
Light sensitivity	200 lux ... 80,000 lux
Ambient temperature (operation)	-40 °C ... +75 °C (sensor head), -40 °C ... +50 °C (evaluation unit)
Ambient temperature (storage)	-40 °C ... +75 °C (sensor head), -20 °C ... +75 °C (evaluation unit)
Impact load (short-term)	EN 60068-2-29:1994-01 (50 g / 6 ms)
Vibration load	EN 60068-2-64:2008-11 (5.9 g / 10 Hz - 2 kHz)
Electromagnetic compatibility (EMC)	EN 55016-2-3:2010+ A1:2011 + A2:2014 (interference immunity) EN 55012:2008-06 + A1:2009 (radiated emission)
Further standards	ISO 13766:2006-05 (earth-moving machinery), EN 12895+A1:2019-08 (industrial trucks), EN 13766-1:2018-06 (construction machinery), ISO 14982:2009-02 (agricultural and forestry machinery), ISO 7637-2:2011-03, ISO 16750-2:2012-11, ISO 16001:2017 FCC PART 15:2006-08

¹⁾ Ensure harmonic-free supply voltage

E Connection for voltage supply (evaluation unit)

Pin	Color	Description
1	White	GND
2	Brown	+Battery
3	Gray	+Ignition
4	Green	+Discrete signal input (reverse gear)
5	Yellow	+Discrete signal input (optional recorder deactivation)
6	Pink	+Discrete signal input (reserved)

The connections on the vehicle and evaluation unit side must be connected identically. Protect the evaluation unit against overstress, e.g., using the fuses supplied.

Service and maintenance

The assistance system does not have any internal parts which require servicing by the user.

- ▶ Check screw connections and terminals regularly.

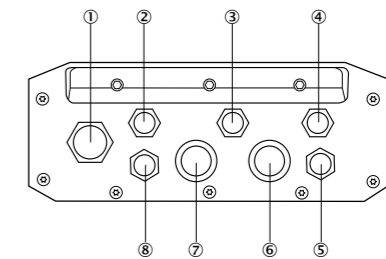
- ▶ Clean the optical areas of the sensor head daily and in the event of contamination.



- ▶ Clean the housing using a soft cloth. Either use a dry cloth, or dampen it with lukewarm water and a small amount of mild cleaning agent.

- ▶ Clean the areas between the cooling ribs of the evaluation unit in the event of contamination.

F Connections (evaluation unit)



1	M20	USB
2	M14, 6-pin	Evaluation unit voltage supply, 12/24 V
3	M14, 4-pin	Dual discrete alarm output, 0 V/12 V
4	M14, 5-pin	Ethernet (reserved)

Item	Connection/pins	Description
5	M14, 5-pin	Machine-machine interface (reserved)
6	M18, 10-pin	Sensor head
7	M18, 10-pin	Sensor head
8	M14, 9-pin	VGA/sound