



# Mobile Vicinity Scout (MVS)

Operating instruction

# Mobile Vicinity Scout (MVS)

## Operating instruction

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Translation of original instruction

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## About this instruction

Thank you for your trust in Motec products!

- We develop and produce our products with the greatest care.
  - Our products are subject to continuous development. Therefore, Motec GmbH reserves the right to make changes to system components without prior notification.
  - If operated in terms with the product's intended use, these operating instructions help you to use the product safely.
  - These operating instructions apply only to the product indicated on the cover sheet.
  - We reserve the right to make changes to these operating instructions based on technical advancements.
  - This operating manual is part of the scope of delivery.
  - These operating instructions are valid starting from the date of transport to final disposal. Compliance is mandatory.
  - Therefore, always keep the operating instructions in a legible condition and store it in the cockpit. If the product is sold, the document must remain with the product.
- The operating company must ensure that the operating instructions are read and understood by all persons before starting to work on the product.
  - The Safety chapter provides an overview of all important safety aspects. It provides a summary for the optimum protection of the personnel as well as for the safe and trouble-free operation of the product.
  - The manufacturer cannot be held liable for damage resulting from non-compliance with these operating instructions.

## Contact

If you have questions about product, the initial set-up or the operation, or should the product not meet your expectations, please contact us and we will be happy to assist you.

### Motec GmbH

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## Design features

Various elements of the operating instructions are provided with specified design features:

|   |   |
|---|---|
| Text  | Normal flow text  |
| •   | Lists   |
| 1.  | Steps of action   |
|  | This is the general hazard indicator. It warns of dangers to life and limb. |

### **NOTE**

---

The signal word **NOTE** identifies additional information about the device or how to use device.

---

## Target group of these instructions

These operating instructions are intended only for trained and authorized drivers / operators.

Only qualified personnel shall be permitted to proceed with the installation and the electrical connections!

## Applicable documentation

Compliance with the following applicable documentation is mandatory:

- Installation guidelines and applicable standards.
- Technical specifications of the vehicle and the builder of the vehicle body.
- Data sheets and operating instructions of the system components.
- Motec System Bus (MSB 2.0) specification for systems with CAN communication to the vehicle.

## Declaration of Conformity

- As European distributor, we have followed the EU Guidelines and legal rules & regulations and have implemented a conformity assessment for all our products. The assessment is compliant with the requirements of the "Harmonised Standards".
- The CE label can be found on the product as well as on the applicable product documentation.
- Upon request, we will gladly provide you the EU Declaration of Conformity.

## Warranty

- If a defect or error has been detected, a warranty claim must be submitted immediately to your supplier or service partner.
- The warranty expires also in all cases in which liability claims cannot be made.
- If the system is misused or used incorrectly, liability cannot be assumed for any damage that may occur.
- If the device is used outside of the EU, it is the responsibility of the owner to ensure compliance with the respective national rules and regulations.
- Any change to the system cannot guarantee compliance with the conformity, and thus all warranties shall be null and void.
- No liability can be assumed for damage and operational malfunctions, which are described below:
  - Non-compliance with the instructions.
  - Unauthorised changes to the system.
  - Operating mistake.
  - Neglected maintenance tasks.
- Only qualified and trained personnel in consultation with Motec shall be permitted to repair, maintain and adjust the system.
- In the event of a malfunction, and if you cannot repair the error, immediately contact the supplier or service partner.
- The information, illustrations and descriptions in this manual do not constitute any claims for the modification of systems and components already delivered.
- The information contained in this manual describes the features of the product without affirming such characteristics.
- The information, data and notes provided in this manual were up to date at the time of going to print.
- When using third-party components such as vehicle-side navigation devices or multifunctional displays, the liability claim shall become null and void.
- Motec assumes no liability for deviating aspect ratios, vehicle restrictions and related forms of representation. Detailed information can be found the relevant installation/operating instructions.

# Safety

## Introduction

This chapter provides an overview of all important safety aspects for the protection of the personnel, and for the safe and trouble-free use of the product from installation to disposal.

- Non-compliance with these directions and the safety instructions contained in this manual can lead to considerable hazards to the user and may damage the product.
- The product is designed and built according to the state-of-the-art technology and the recognized safety guidelines and standards. The operation of the product is safe.

## Intended use

- The Motec MVS System is a driver assistance system can only be operated with a its system limits.
- The device provides the driver with a 270°/360° all-round view from a bird's-eye perspective. Images provided by the wide-angle cameras that are installed on both sides, the front and rear of the vehicle/machinery capture the surroundings.

In order to obtain the desired images, the MVS System must be installed and operated compliant with these operating instructions.

The driver/operator shall be responsible for the safe operation of the vehicle at all times. This obligation applies in particular if personnel remain in the danger zone of the vehicle/machinery.

## Inappropriate use

Any use other than the application described in the Chapter "Intended use" on page 8 and any use going beyond the intended usage is considered an inappropriate use!

- The manufacturer is not liable for any damage resulting from inappropriate use. The risk is borne solely by the user/operating company.
- It is prohibited to change the system in any shape or form.
- It is prohibited to operate the system by bypassing the safety devices.
- It is prohibited to use components which are defect and therefore jeopardise the safety of the system!
- The Motec MVS is not suitable for the protection of persons in the sense of the applicable standards and guidelines for machines and vehicles (Machinery Directive 2006/42 / EU, DIN EN ISO 13849 and ISO 26262).

## Foreseeable misuse

The following aspects describe a foreseeable misuse of the system:

- Personnel who are not or who are insufficiently qualified shall not be permitted to proceed with any tasks or the operation of the system.
- Improper installation.
- Non-compliance with operating data and maintenance intervals.
- Operation without or with damaged components, which are intended for the safety of the persons and the system.

## Residual risks

Residual hazards may occur under the following circumstances:

- If the system is not used as intended, if the system is modified or altered improperly.
- If the system is operated improperly by untrained or unskilled personnel.
- If the system is cleaned, serviced or maintained improperly and/or if non-compliant with scheduled service intervals.

The following residual hazards must also be observed:

- Electrical currents during assembly or cleaning tasks may result in injury or death. Only trained specialist shall be permitted to work on the electrical system and only if all components are disconnected from the power supply!
- When working in narrow spaces, there is an inherent risk of crushing injuries as well as risk of cutting caused by sharp edges and corners.
- Improper handling can damage the vehicle body, components or cables.
- Any type of welding on tank components is prohibited!
- Non-compliance with the installation guidelines and the technical specifications of the vehicle manufacturer and the manufacturer of the vehicle body.

- Tree branches or other objects above the cameras are not recorded! In this case, the use of the rear-view mirrors or the assistance of a banksman is mandatory!
- The higher an object from the ground, the more this object is displayed on the monitor as bending outward. This representation, which is not true to scale, must be taken into account by the driver.
- The display in the monitor is **true to scale** only on the footprint of the vehicle and only in the **undistorted** mode.
- The image quality decreases with corresponding environmental conditions: In this case, a banksman must be available during the manoeuvring of the vehicle.
- However, the reality may slightly deviate from this composed image. Objects outside the image cones are not captured.

## Presentation of warning signs

Pictogram are used in these instructions to indicate warnings. The warnings are introduced by signal words that express the extent of the warning or hazard.

- The warnings must be observed in order to avoid accidents, personal injury and property damage.

The following signal words and symbols are used in these instructions:



This is the general hazard indicator.  
It warns of dangers to life and limb.

### **DANGER**

The signal word **DANGER** indicates an imminent risk. Non-compliance leads to serious injuries or death.

### **WARNING**

The signal word **WARNING** indicates a potential risk. Non-compliance may lead to serious injuries or death.

### **CAUTION**

The signal word **CAUTION** indicates a potential risk. Non-compliance may lead to minor or moderate injuries.

### **NOTICE**

The signal word **NOTICE** indicates the possibility of damage to property. Non-compliance may cause damage to product.

## **Safety and warning labels on the system components**

Information and symbols, such as safety labels and signs, attached to the system components must be observed. These safety labels and signs must not be removed and must be kept in legible at all times.

## **Obligations of the operating company and the target group**

- Never operate or continue to operate system components with safety-relevant faults.
- Prior to their use, check all system components for obvious damage and observe their functions in order to detect potential faults.
- Malfunctions that adversely affect the safety must be removed before continuing the operation. Otherwise, the system must not be used!
- The correct installation and proper operation of the system must be monitored by the operating company.
- The operating company must ensure that the technician, the electrician and the user have read and understood the instructions.
- Therefore, it is the responsibility of the operating company and the user to ascertain the correct utilisation of the product.

- Prior to driving, the driver must proceed with a visual inspection and a functional test before using the system.
- Before the installation of the system components and during their operation, compliance with the applicable manufacturer's information and safety instructions of the vehicle is mandatory.
- When using the system, compliance with the recommended installation guidelines and manufacturer's interface documentation is mandatory.

## **Personal protective equipment must be worn**

- When working on the system components or on the vehicle, the necessary personal protective equipment must be worn.
- Not wearing personal protective equipment can result in serious injury or death.
- Ensure all unauthorized persons have left and remain outside the danger zone.
- For further information, the operator provides the current, locally relevant guidelines for the occupational safety and accident prevention.

# System description

The Mobile Vicinity Scout (MVS) is a camera system designed especially for utility vehicles. It provides the driver with a clear, seamless 270° or 360° view around his vehicle.

The MVS system is used for heavy-duty and commercial vehicles, which are utilised in the construction industry, municipal transport and goods traffic, agricultural industry and logistics.



Fig. 1: Top view (example)

## Camera system

The system generates one image of one vehicle side, using 3 cameras (270° system) or 4 cameras (360° system). These individual images are processed to generate a top view. The top view provides a seamless panoramic view around the area close to the vehicle. This view increases the safety during manoeuvring.

- During calibration, the system crops the displayed image to the area near the vehicle.
- Objects in the detection area of the cameras and within the calibration area are displayed.
- Inserting a customer-specific vehicle image to ensure a display that is accurate to the contour of the vehicle.
- Display of individual static overlays for the representation of danger areas, swivel ranges or support points.
- The open interfaces allow a comprehensive integration into the vehicle's electronic system and interconnection with currently installed systems.

## Additional camera in the 270° system

An additional camera (e.g., a rear-view camera) can be connected to the 270° system. The camera image can be selected via the control inputs or the CAN bus.

### **Additional sensors**

As an option, up to 12 ultrasonic sensors can be connected to the system in conjunction with the MVCU1300-1 control unit.

Objects detected by the ultrasonic sensors are displayed as coloured dynamic overlays in the top view.

A (pre) warning of objects outside the field of view of the cameras is possible via the ultrasonic sensors if the detection range of the ultrasonic sensors is greater than the calibration range of the cameras shown.

## System overview

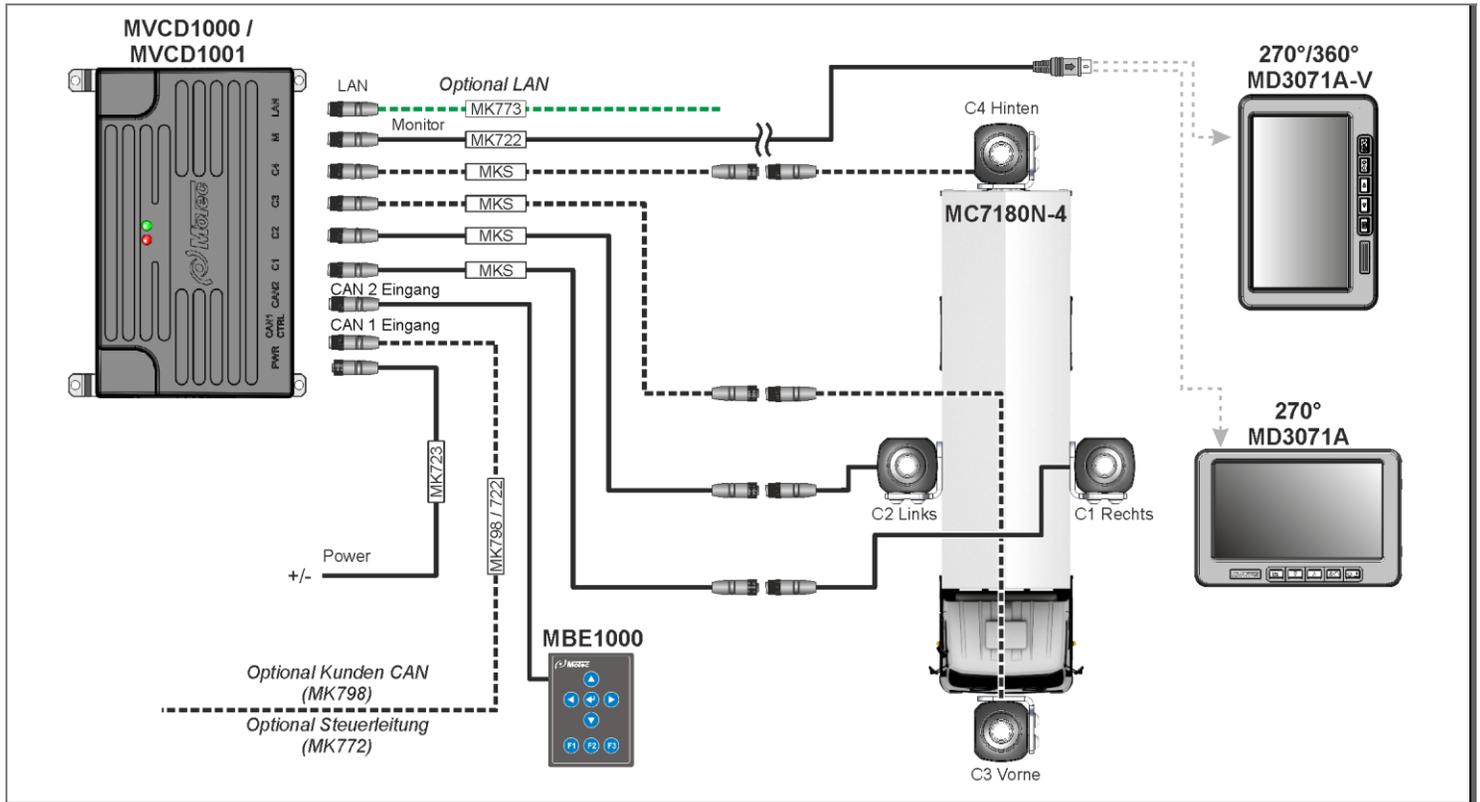


Fig. 2: System overview MVS

## Components

### Video control module



Fig. 3: MVCD1000-x / MVCD1001-x

The video control unit processes the images delivered by the cameras to a 360° or 270° panoramic view.

The video control unit is available in two versions depending on the vehicle connection:

#### **MVCD1000-x**

Analogue control signals are used to connect to the vehicle.

#### **MVCD1001-x**

A CAN bus is used to connect to the vehicle.

## Camera



Fig. 4: MC7180N

The MC7180N wide angle camera is used for the 270°/360° bird's eye view system.

The 180° angle of view and the small design enable adaptation to very different vehicle and visibility situations.

- 270° systems use three cameras.
- 360° systems use four cameras.

The cameras are connected to the video control unit via the MKS cable and are supplied with voltage by the video control unit.

## Monitor



Fig. 5: MD3071A



Fig. 6: MD3071A-V

The 7" monitor displays the image calculated by the video control unit.

Depending on the system configuration, the monitor is available in two models:

| System                     | Monitor   |
|----------------------------|---|
| <b>360° or 270° system</b> | <b>MD3071A-V</b><br>Vertical monitor alignment (portrait format)  |
| <b>270° system</b>         | <b>MD3071A</b><br>Horizontal monitor alignment (landscape format) |

## Type signs

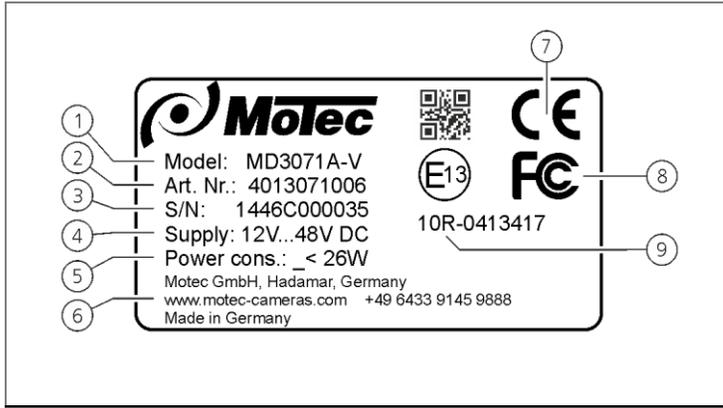


Fig. 7: System components type sign (example)

- |                     |                                      |
|---------------------|--------------------------------------|
| 1 Match code        | 6 Manufacturer's address             |
| 2 Article number    | 7 CE mark                            |
| 3 Serial number     | 8 FCC approval                       |
| 4 Voltage supply    | 9 ECE test mark with approval number |
| 5 Power consumption |                                      |

The type signs on the system components correspond to the example shown above. All information and symbols are not always available.

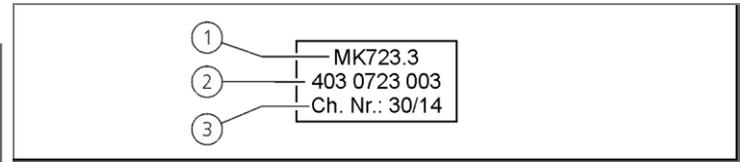


Fig. 8: Cable identification (example)

- 1 Match code
- 2 Article number
- 3 Batch identification (week of production/year)

A shrink tube is used to attach the cable identification to ensure, it cannot be lost.

## Operation

- The driver is always responsible for the vehicle and the system.
- Prior to driving, the driver must proceed with a visual inspection and a functional test before using the system.
- The display of objects on the monitor can be restricted in poor light conditions or strong sunlight. In this case, the driver must use the rear-view mirrors, or must use a banksman for assistance.

## Switching on the system

1. Turn on the ignition of the vehicle.  
The system will now boot up until the image is displayed.



Fig. 9:

The system is now ready for operation and can be used.

## Split screen views

The video control unit has four control inputs that can be configured at random.

A particular display mode can be assigned to each control input. In addition to the top view, individual cameras can also be displayed in a split screen view or as a full screen.

For this purpose, the control inputs are connected to the corresponding signals from the vehicle's electrical system (e.g., reverse gear, indicators, etc.).

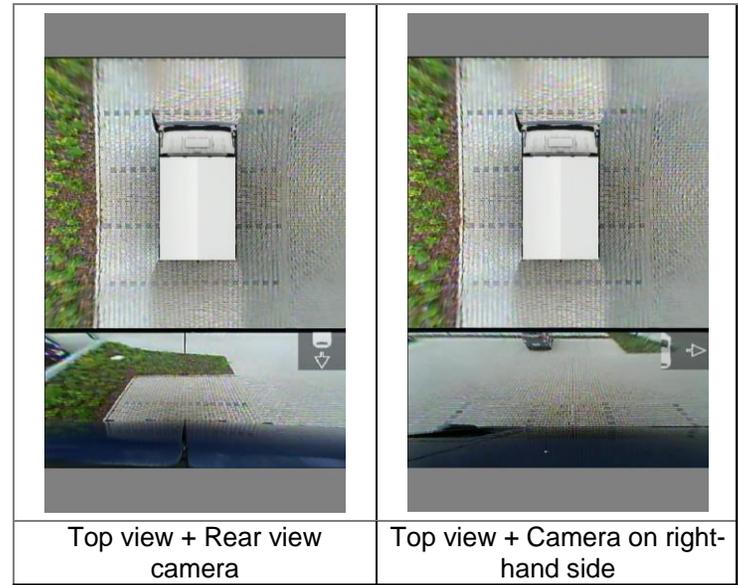


Fig. 10: Split screen view (examples)

If the relevant inputs are subsequently activated by engaging the reverse gear or turning on the indicator, the video control unit automatically switches to the corresponding image.

## Ultrasound sensors

As an option, the MVS system can be supplemented with 12 ultrasonic sensors.

This way, the system will receive a warning if objects are in the field of view of the cameras.

If the detection range of the ultrasonic sensors is larger than the calibration range of the cameras, the system can also warn of objects outside the field of view of the cameras.

The display is done, using dynamic graphical overlays in the top view. An acoustic warning is also signalled (if a buzzer is connected).

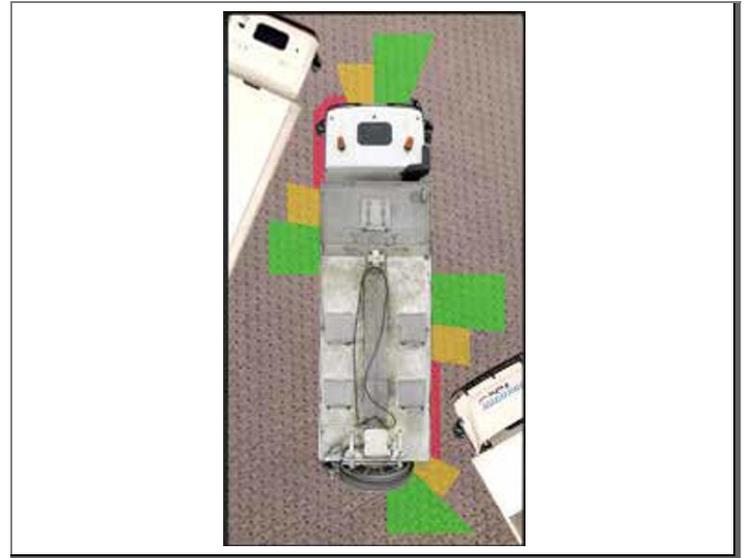


Fig. 11: Ultrasound sensors in the top view

# Troubleshooting

## Hardware

| Behaviour/malfunction  | Possible cause                             | Corrective action  |
|--|--|--|
| <b>System not starting.</b>  | Power supply not available.                | Turn on power supply.<br>Check fuse, replace as required.      |
|  | Power supply cable defective.              | Replace cable.   |
|  | Video control unit defective.              | Replace video control unit.                                    |
| <b>Monitor display not available</b><br>The green LEDs on the video control unit are not lit | Video control unit is not activated.       | Activate the power supply.                                     |
| <b>Monitor display not available</b><br>The green LEDs on the video control unit are lit     | Loose connectors, monitor cable defective. | Check the monitor cable and connector for damage or tight fit. |
|  | Monitor defective.                         | Check monitor for function, replace if necessary.              |
|  | Video control unit defective.              | Replace video control unit.                                    |

## Malfunctions during operation

| Behaviour/malfunction                      | Possible cause  | Corrective action   |
|--|---|---|
| <b>Blue monitor screen</b>                 | No video signal on monitor, loose connector, monitor cable defective.           | Check cable connection between video control unit and monitor, replace defective cables.<br>Check the connector for tight fit, tighten the union nuts of the connector on the video control unit hand-tight, and latch flap into place on the side of the monitor |
|  | Video control unit defective.   | Replace video control unit.   |
| <b>Entire image disappears temporarily</b> | Loose contact or defective cable.   | Check cable connection between video control unit and monitor, replace defective cables.<br>Check the connector for tight fit, tighten the union nuts of the connector on the video control unit hand-tight, and latch flap into place on the side of the monitor |
| <b>Part of the image is blue</b>           | Video signal of the affected camera is not available on the video control unit. | Check cable connection between video control unit and camera, replace defective cables.<br>Check plug connector for tight fit.  |
|  | Camera defective.   | Replace camera.   |

| <b>Behaviour/malfunction</b>                          | <b>Possible cause</b>   | <b>Corrective action</b>  |
|---|---|---|
| <b>Part of the image is shaking in the top view</b>   | Attachment of the affected camera is loose.   | Check camera bracket for tight fit.<br>Ask a certified service partner to check the settings. If necessary, recalibrate the system. |
| <b>Image is blurred</b>                               | Protective film on monitor and/or cameras has not been removed.   | Remove protective film.   |
|   | Cameras are dirty.  | Carefully clean the cameras (Caution: risk of scratching) with plenty of water and clean with a soft cloth.                         |
| <b>The top view has partially shifted</b>             | Camera(s) is/are not correctly aligned or adjustment is off.  | Re-align the camera(s) and recalibrate the system.  |
| <b>Blind areas in the top view</b>                    |   |   |
| <b>Objects close to the vehicle are not displayed</b> | The camera's alignment is not optimally adapted to the vehicle's limitation.  | Ask a certified service partner to check the settings. If necessary, recalibrate the system.  |
|   | The markers were not placed correct (too far from the vehicle) during the calibration and image areas were truncated. | Ask a certified service partner to check the settings. If necessary, recalibrate the system.  |

| Behaviour/malfunction                                  | Possible cause                    | Corrective action  |
|--|-----------------------------------|--|
| <b>The desired partial image mode is not displayed</b> | System settings not correct.      | Ask a certified service partner to check the settings. If necessary, recalibrate the system.   |
|  | Switch-over signal not available. | Check the external signals (CAN/control leads) of the vehicle.<br>Ask a certified service partner to check the settings. If necessary, recalibrate the system. |

## Ultrasound sensors

| Behaviour/malfunction   | Possible cause   | Corrective action  |
|---|--|--|
| <b>Objects in the detection range of the ultrasonic sensors are not shown</b> | Incorrect alignment of the sensors.                        | Check and correct alignment.   |
|   | Evaluation unit of MVCU1300 defective.                     | Ask a certified service partner to check the system, and if necessary, have it repaired.                     |
|   | Cable connection or sensor defective.                      | Check cable connection and plug connector.<br>Check sensors, replace defective sensors with identical types. |
|   | No CAN connection between MVCU1300 and video control unit. | Ask a certified service partner to check the system, and if necessary, have it repaired.                     |

| Behaviour/malfunction  | Possible cause   | Corrective action   |
|--|--|---|
| <b>A permanent warning of the ultrasonic sensors is displayed in the overlay</b> | Permanently installed objects in the detection area of the sensors | Remove objects. If this is not possible, adjust the dead range of the sensor.<br><br>Ask a certified service partner to check the system, and if necessary, have it repaired. |
|  | Sensor, cable connection or control unit MVCU1300 defective.       | Ask a certified service partner to check the system, and if necessary, have it repaired.  |

# Maintenance

## DANGER

### High voltage! Risk of fatal injuries!

High currents in battery-powered systems can lead to serious injuries or death.

- Never use a wet cloth or hold the system components under running water for cleaning purposes.
- Always switch off the power supply before cleaning.

## NOTICE

### Damage to components!

Improper handling and incorrect cleaning can damage the components.

- Do not use scouring pads, abrasive powders and/or solvents such as alcohol or benzine for cleaning.
- Use a moist, soft towel or sponge to clean the camera lenses.

## Cleaning the monitor

- Use a clean, dry cloth to wipe off fingerprints and dust.
- Do not use cleaning fluids, antistatic spray or solvents such as benzine, paint thinner or other commercially available chemicals.
- Stubborn stains can be removed with a damp window leather.

## Cleaning the camera lenses

Dirty camera lenses provide a poor image quality. Large adhesions on the lens create zones that cannot be observed and blind spots.

- Use a moist, soft towel or sponge to clean the camera lenses.

# Disposal and environmental protection

## Disposal of the packaging

- Packaging was used to protect the product during the transport. All materials used are environmentally friendly and recyclable.
- Dispose of the packaging in an environmentally friendly manner.
- Ask the dealer or the municipal waste disposal authority for possible disposal of the packaging in an environmentally friendly and appropriate way.

## Disposal of the product

- Old products are not worthless waste. Environmentally sound disposal methods mean that valuable raw materials can be recovered.

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