



Motec Camera Monitor Systems
for logistics and tactical vehicles
With safety and protection

Motec: Heavy-duty camera monitor systems

Motec specialises in the development and production of camera-based Advanced Driver Assistance Systems (ADAS) for commercial vehicles and mobile machinery. We protect lives by making mobile machinery and their surroundings safer. We make the operator's work easier by reducing stress and uncomfortable body postures. And we help companies become more successful by accelerating processes and avoiding damage.

We are a German owner-managed company with 25 years of experience in the design and manufacture of robust, reliable cameras and mobile electronic systems. Our product range includes robust cameras, displays, advanced video control units, mobile DVRs, custom-made cable harnesses and wireless video transmission solutions.

Our customers are leading OEMs of commercial vehicles and mobile machinery for various industry sectors. These vehicles operate in harsh ambient conditions and they typically are off-road vehicles, municipal vehicles, agricultural machines, construction machines and cranes, forklifts and military transport vehicles.

In our Motec *Entwicklungszentrum für Nutzfahrzeug-Assistenzsysteme* (MENAS – Centre for Commercial Vehicle Assistance Systems), we develop, test and validate software algorithms for customer-specific driver assistance systems. Our algorithm suite software includes solutions for real-time image processing, top view projection, sensor fusion (e.g., cameras, ultrasound sensors, radar sensors, lasers), stereo vision, image processing, and driver assistance systems.



Motec camera monitor systems for logistics and tactical vehicles

Motec camera monitor systems provide support to the driver, commander and crew in logistics and tactical vehicles allowing them to execute their missions both safely and efficiently. Robust heavy-duty camera monitor systems help the driver to precisely monitor the routes they are taking and the vehicle's immediate surroundings. Obstacles or dangers in the vehicle's vicinity are recognised early. In this way, Motec systems help save lives, facilitate working conditions, and save costs.

All our developments are based on the most stringent of requirements in both industry and defence. The mechanical and electrical structure of our systems is extremely resistant to shock, vibration, dust and moisture.

In parts our systems are compliant to the following norms: MIL-STD-461F; MIL-STD-1275D; EN 61000-4-4:2012; EN 61000-4-2:201209.

Technical service – guaranteed fast support

Top quality means also top service. Do you have technical questions or face challenges? We will assist you. Our sales and engineering departments work hand in hand. Your benefit: Efficient communication and short paths. Our service staff knows your requirements, understands your processes and finds solutions quickly.



Robust modular hardware and intelligent software

- . High housing protection class
- . Shock and vibration resistant
- . High temperature range
- . Modular components
- . In-house cable production
- . Digital technology for superior image quality
- . Development, validation and integration of algorithms
- . Real-time image processing
- . Top view projections (270°/360°)
- . Sensor fusion (ultrasonic/radar)
- . Stereo cameras (object detection)
- . Driver assistance systems (collision warning)

Contents	
Motec Heavy-duty camera monitor systems	2-3
Rear view monitoring	4-5
Operating area monitoring	6-7
Driver assistance	8-9
Situational awareness	10-11
MVS system with 360° top view	12-13
Rear view monitoring with combined sensor systems	14-15
Driver training	16-17
Motec cameras	18-19
Motec video control units	
Motec monitors	20-21
Motec cables and cable harnesses	22
Legal notice	23

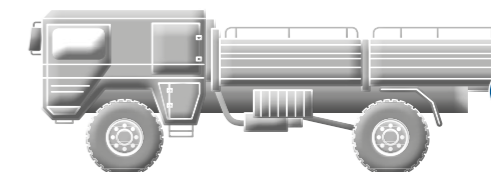
Rear view monitoring

Motec camera monitor systems protect persons in areas behind the vehicle that cannot be observed and allow the driver to manoeuvre the vehicle safely. A further advantage is that the area behind the vehicle can be observed prior to any persons dismounting of or loads being unloaded from the vehicle.

Motec camera systems can be provided including a TFT colour monitor or for direct connection to a driver information terminal and thus offer the greatest possible flexibility for initial equipping as well as retrofitting the vehicle.



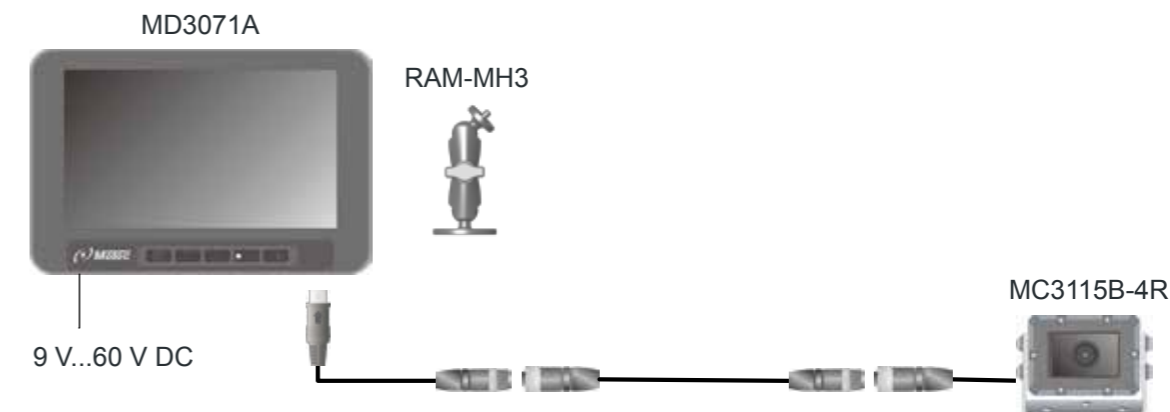
Heavy-duty camera for rear view monitoring.



EXAMPLE: Logistics vehicle

MD3071A
Heavy-duty monitor

MC3000B
Heavy-duty camera



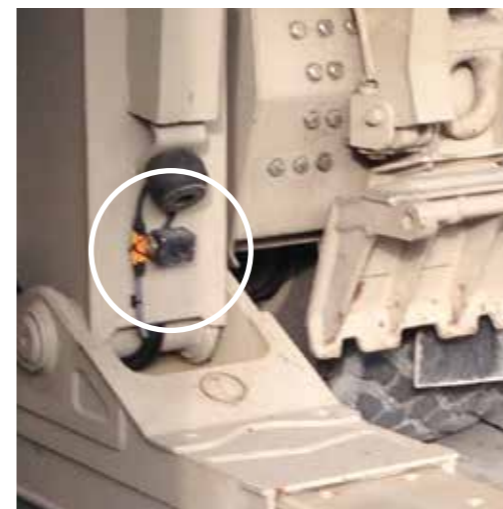
Operating area monitoring

Reversing, manoeuvring or working with add-on equipment are potentially dangerous situations. This applies in particular during deployment when stress levels are elevated. Camera monitoring systems support the vehicle crew by showing them obstacles or persons in the danger zones around the vehicle. The systems enable the crew to carry out their tasks while remaining protected inside the vehicle. This effectively prevents accidents, increases the safety of the crew, and accelerates the work sequences.

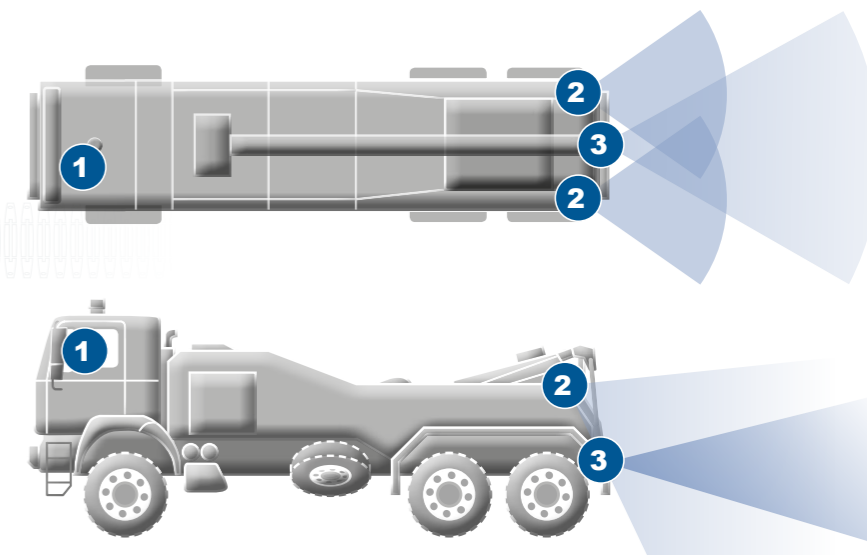
Camera systems increase the safety when machines and vehicles are operating in obscure situations. When mounted on manned and unmanned vehicles or equipment carriers, the camera systems make it possible to steer precisely and enable the operator to use the equipment in safety. In addition to this, the camera systems for operating area monitoring also make a more efficient and faster work deployment possible.



Heavy-duty camera on a recovery vehicle for supporting operation and monitoring of the underlift fork.



With the help of superimposed overlays, the driver can better position the underlift fork in order to attach the vehicle that requires towing.

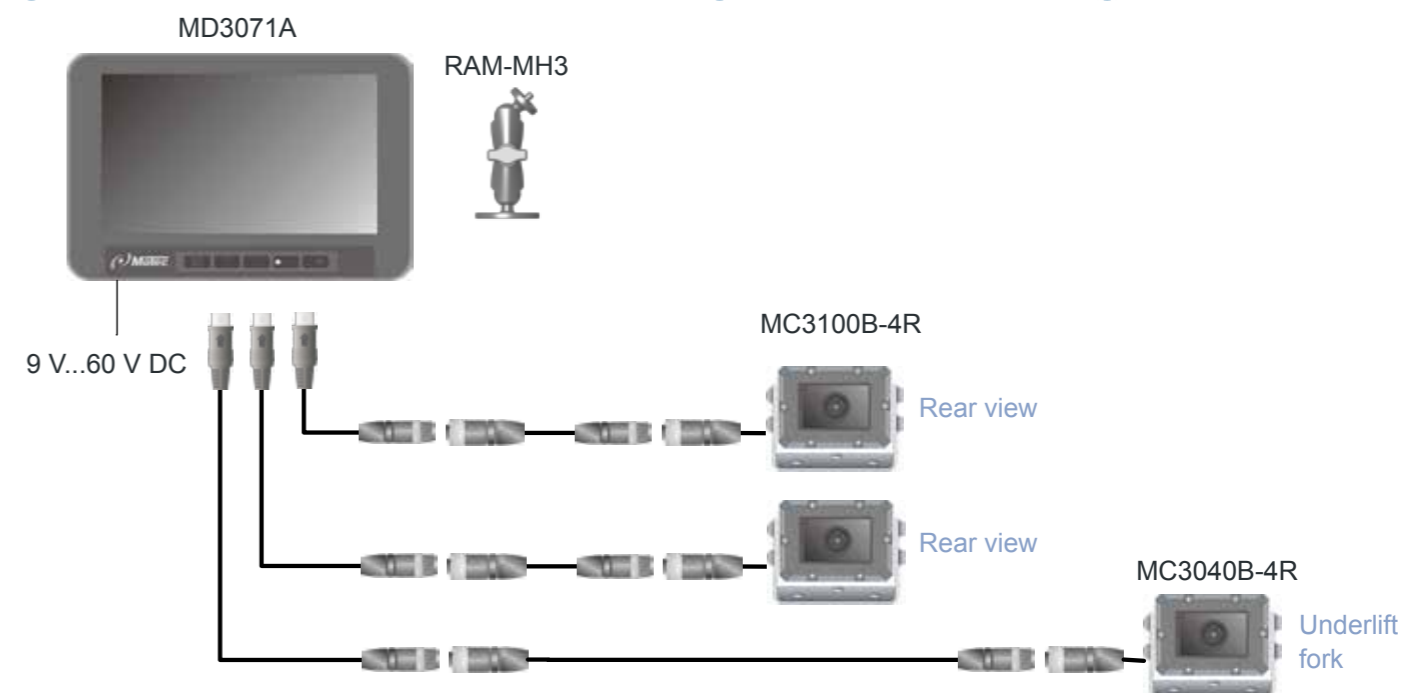


EXAMPLE: Recovery vehicle

1 MD3071A
Heavy-duty monitor

2 MC3000B
Heavy-duty camera

3 MC3000B
Heavy-duty camera



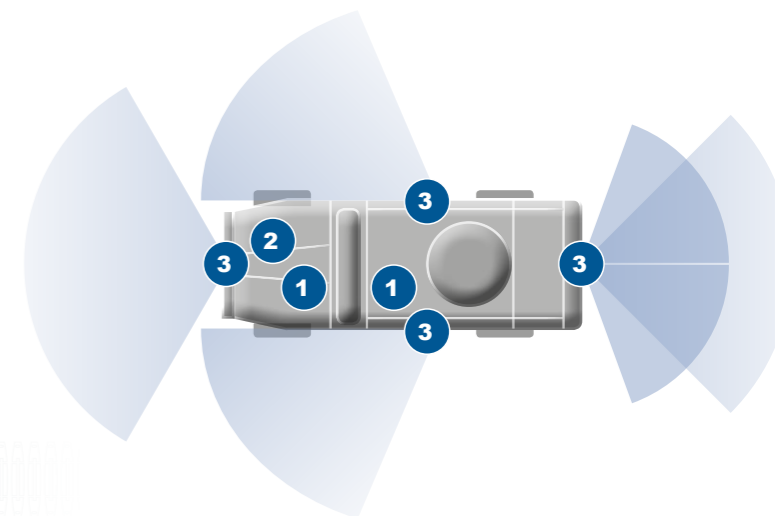
Driver assistance

The safe and secure moving of vehicles is one of the basic requirements in order to fulfil the mission and ensure the health of the crew. Motec camera systems make an important contribution to this by allowing the areas around the vehicle to be observed, which would otherwise not be possible with the visual means available. In the case of patrol vehicles, for example, the rear area, as well as the front and the areas at the side of the vehicle and at the doors can be observed.

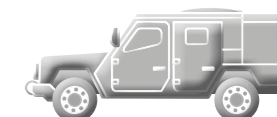
On the one hand, this support allows the driver to safely manoeuvre in challenging situations, for example, in narrow roads, narrow bridges or on difficult terrain. On the other hand, the camera systems in conjunction with the other visual means available such as mirrors, allows the crew to monitor the complete proximity of the vehicle and thus contribute to increasing safety and security.



Motec Heavy-duty camera for rear view monitoring.



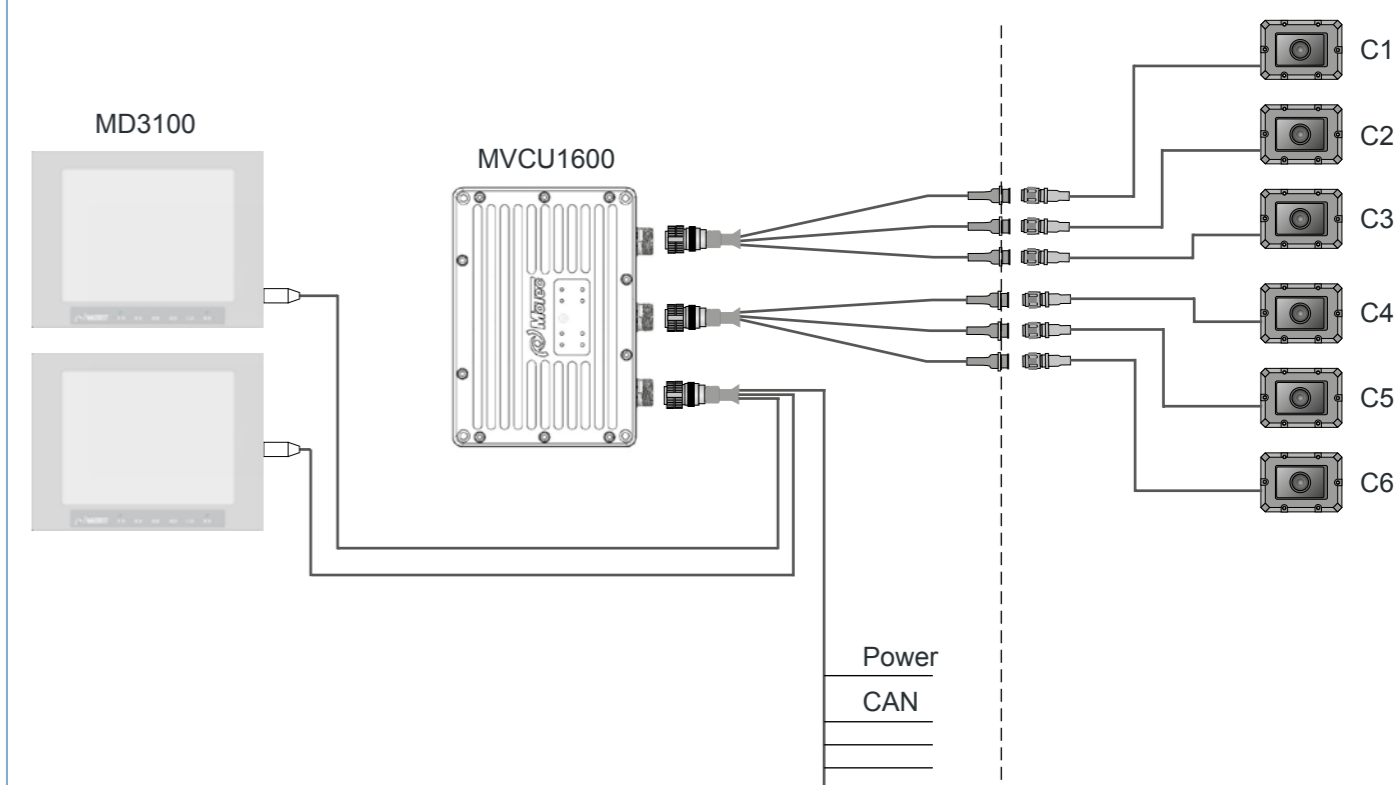
EXAMPLE: Protected patrol vehicle



1 MD3100
Heavy-duty monitor

2 MVCU1600
Video control unit

3 MC4000A
Heavy-duty camera



Situational awareness

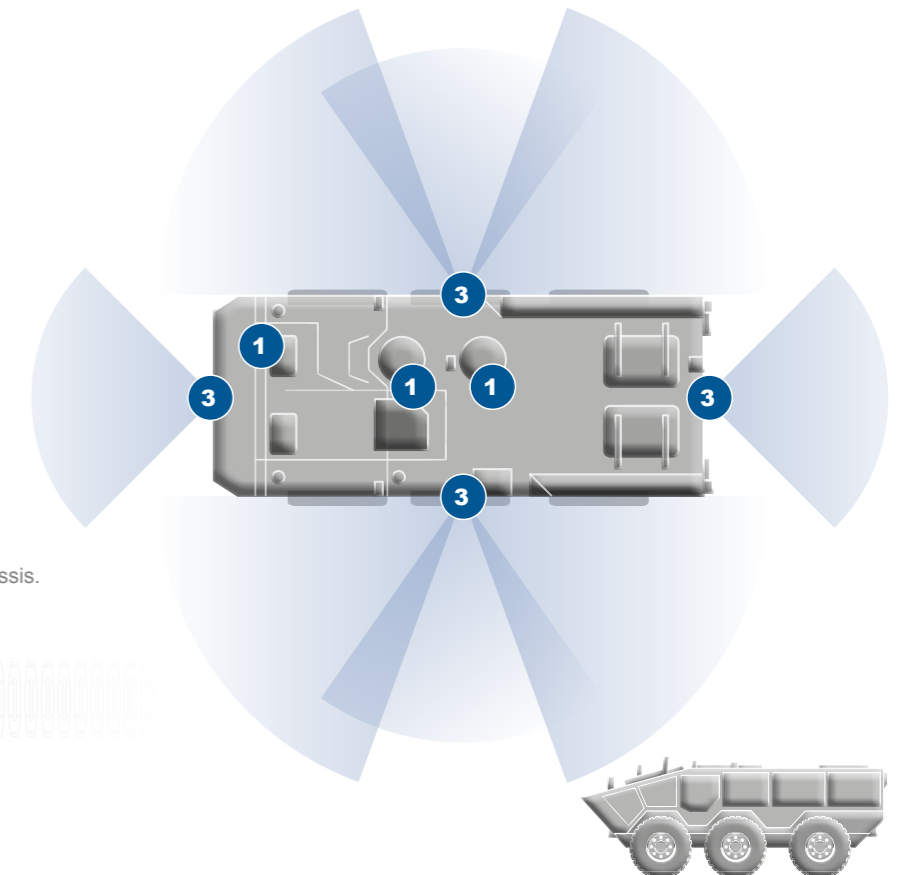
Particularly in obscure deployment situations, information on the situation around the vehicle is of very significant importance. Situational awareness systems offer the driver, the commander and other crew members an overview of the surrounding proximity of the vehicle. These systems allow for a better assessment of the situation and the potential dangers.

The systems can consist of up to 8 cameras and 5 monitors. The arrangement of the cameras and the camera variations are flexibly adapted to the vehicle and the viewing requirements of the users.

On the connected monitors, whether they be from Motec or another manufacturer, the video control unit MVCU1600 allows to display independent and individually selectable contents. These can be specifically pre-configured for various work stations or positions within the vehicle.



Top: Heavy-duty cameras integrated into the vehicle's chassis.
Bottom: MD3100 in quad-image mode.

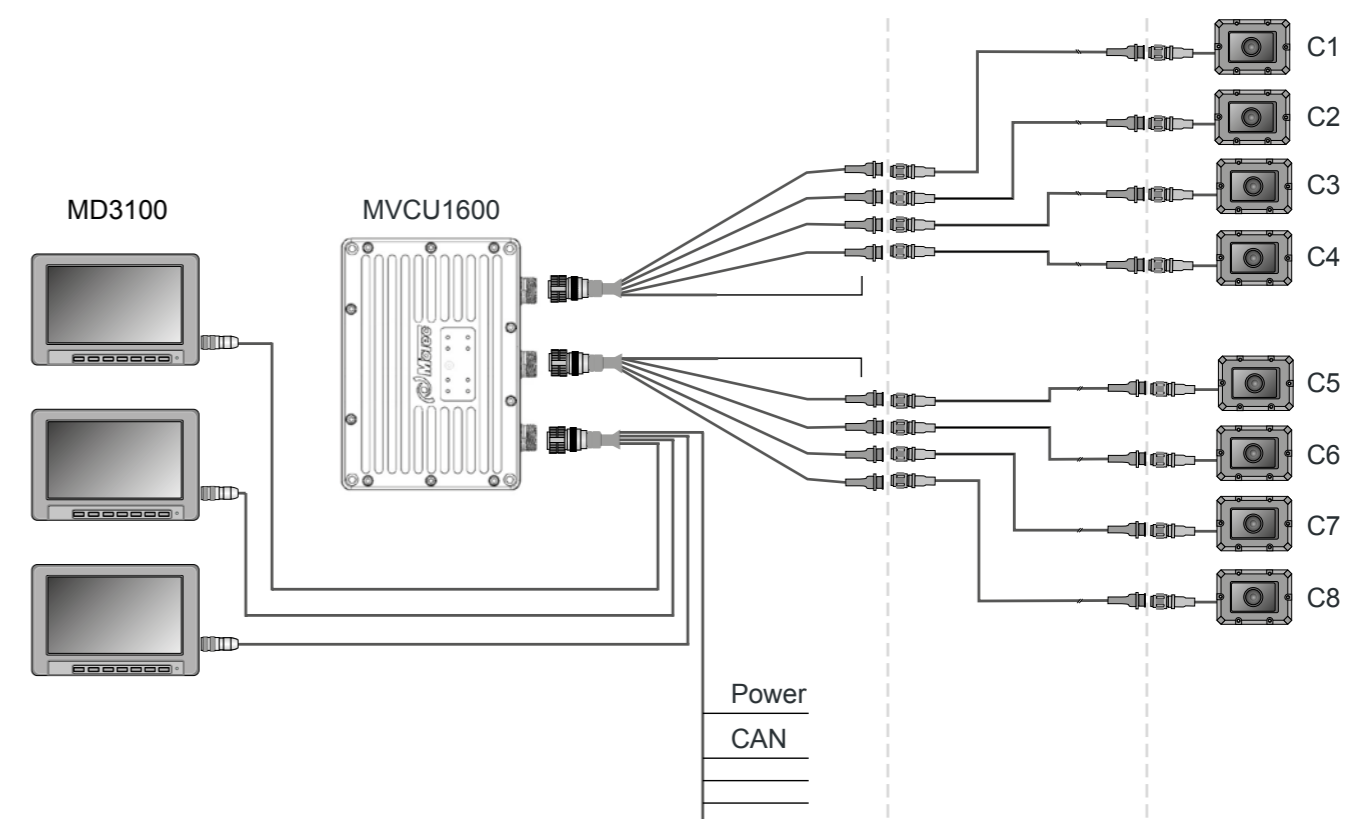


EXAMPLE: Armoured personnel carrier

MD3100
Heavy-duty monitor

MVCU1600
Video control unit

MC4000A
Heavy-duty camera



MVS system 360° top view

The Motec Mobile Vicinity Scout (MVS) is a camera monitor system that provides the driver and the commander with different and seamless views of the immediate proximity of the vehicle. 4 wide-angle cameras (each with a 180° field of view), one on each side of the vehicle, monitor the vehicle and provide a full view of the areas at the sides, front and rear. Depending on the particular application, the viewing range around the vehicle can be up to 7 metres.

The MVS system makes an optimal close-range monitoring possible, while remaining protected. This increases the security of dismounted personnel and uninvolved persons thanks to the all-round visibility right up to the vehicle.

An overview of the advantages

- Flexible adaptations to all vehicle geometries and viewing requirements
- A wide variety of display modes and overlays
- Vertical or horizontal alignment of the monitor
- Compatible to integrated video capable third party monitors
- Simple on-board calibration without a laptop or time in the workshop being required
- Robust hardware and software
- "Made in Germany"



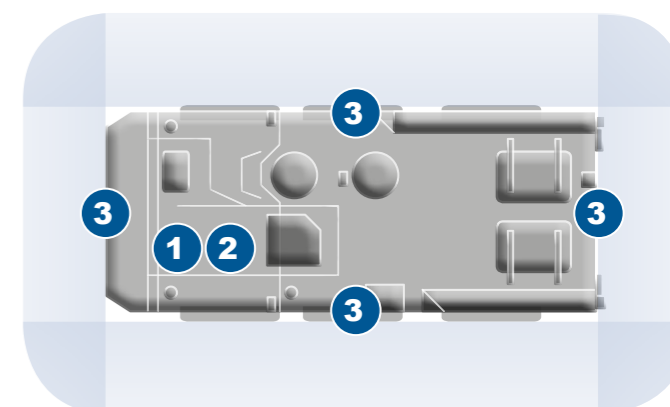
The MD3071A offers a wide variety of application possibilities in deployment thanks to its 2 designs (horizontal and vertical).



Video control unit MVCD1000 with 4 video inputs (PAL/NTSC).



MC7180N-4 wide-angle camera is a robust 180° camera.



EXAMPLE:

Armoured personnel carrier

MD3071A-V
Heavy-duty monitor

1

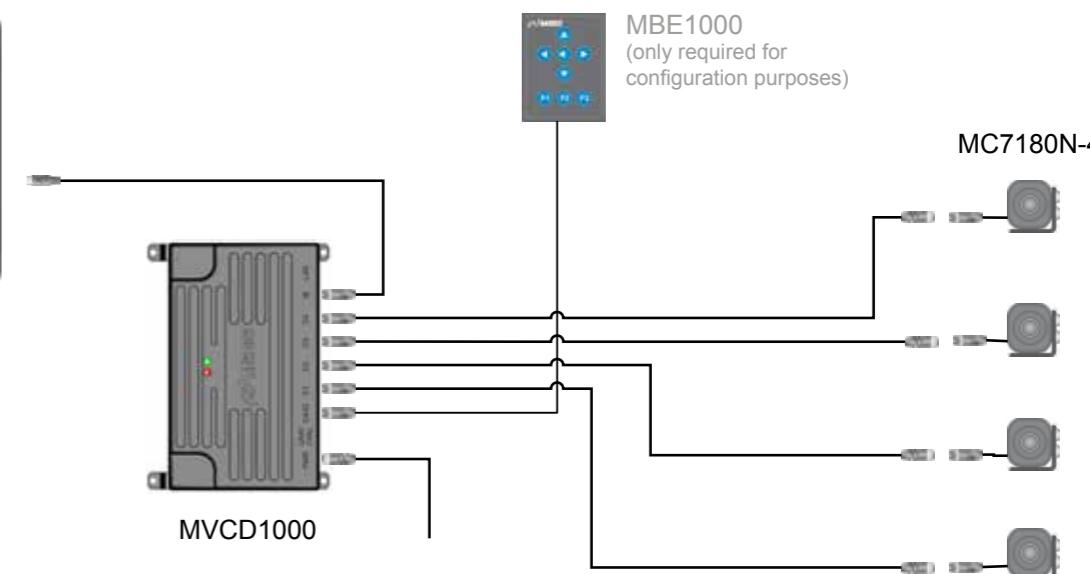
MCDE1000
Video control unit

2

MC7180N
Heavy-duty camera

3

MD3071A-V

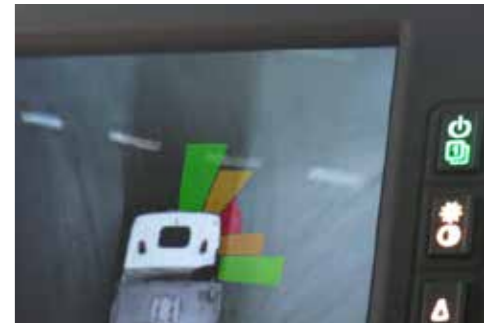


Rear view monitoring with combined sensor systems

Motec solutions combine the advantages of imaging systems, for example MVS, with ultrasonic or radar sensors. By integrating these sensors, the driver is actively assisted in monitoring the surroundings. Active acoustic warnings can be provided both inside and outside the vehicle.

The distance to detected persons or obstacles is visually depicted on the monitor as a coloured warning area/overlay image. Information received from cameras and sensors are displayed on one monitor.

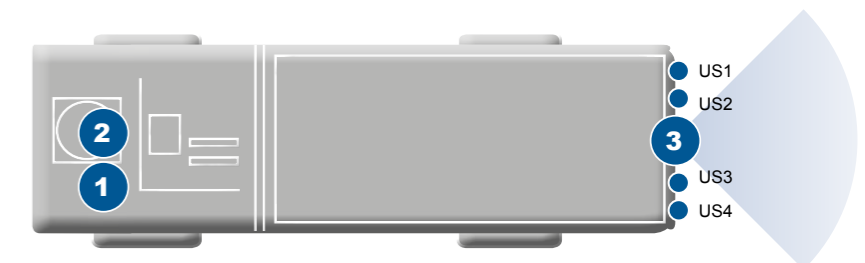
To monitor the close proximity area around the vehicle (up to 3 metres) using a video-control unit, 12 ultrasonic sensors are connected.



Installation positions of the ultrasonic sensors in the front and rear of the vehicle.



EXAMPLE: Logistics vehicle

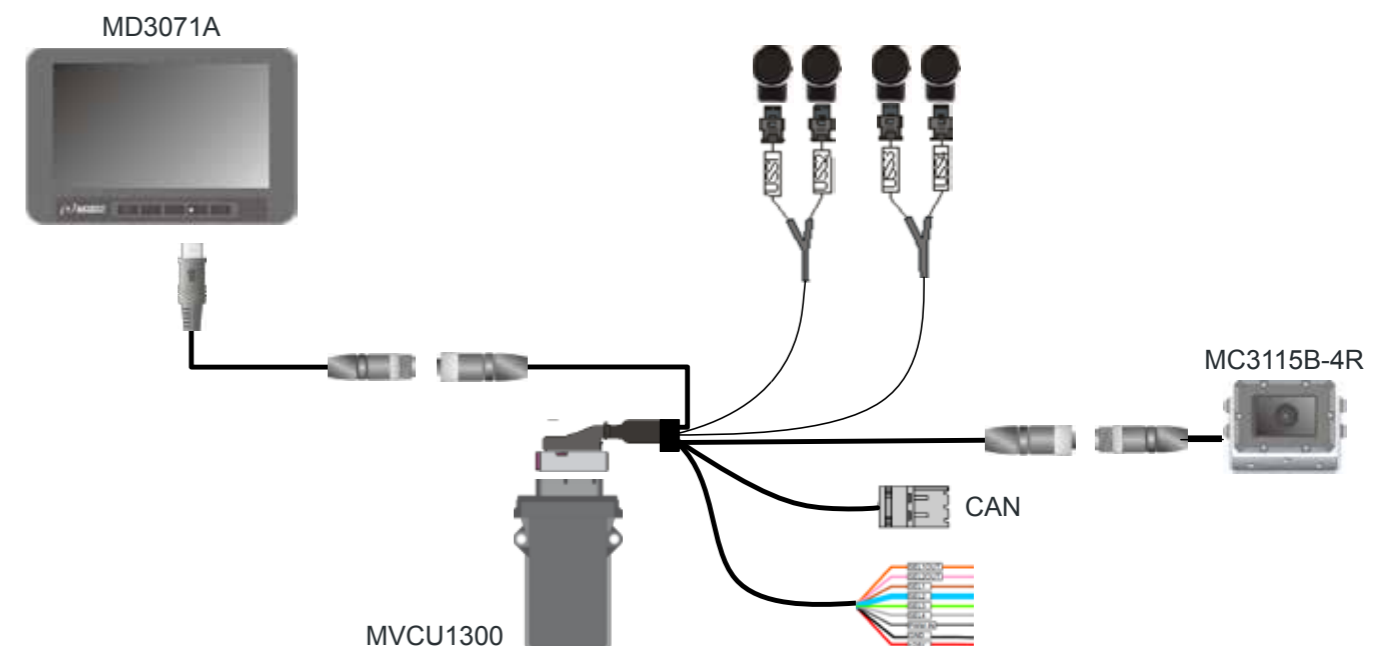


MD3071A
Heavy-duty monitor

MVCU1300
Video control unit

Ultrasonic sensors

MC3000B
Heavy-duty camera



Driver training

The driver training in a variety of different vehicles and machines often takes place in civilian road traffic. To minimise the potential dangers for persons within the framework of the driver training, camera systems provide a unobstructed view of difficult to see areas at the rear, front and at the sides of the vehicle and increase the level of safety in road traffic.

The system is able to provide 2 different views for different users, e.g. a view of the rear area of the vehicle for the learner and a view of the front and left side for the driving instructor. This allows the instructor to optimally judge and monitor the quality of the driving performance.

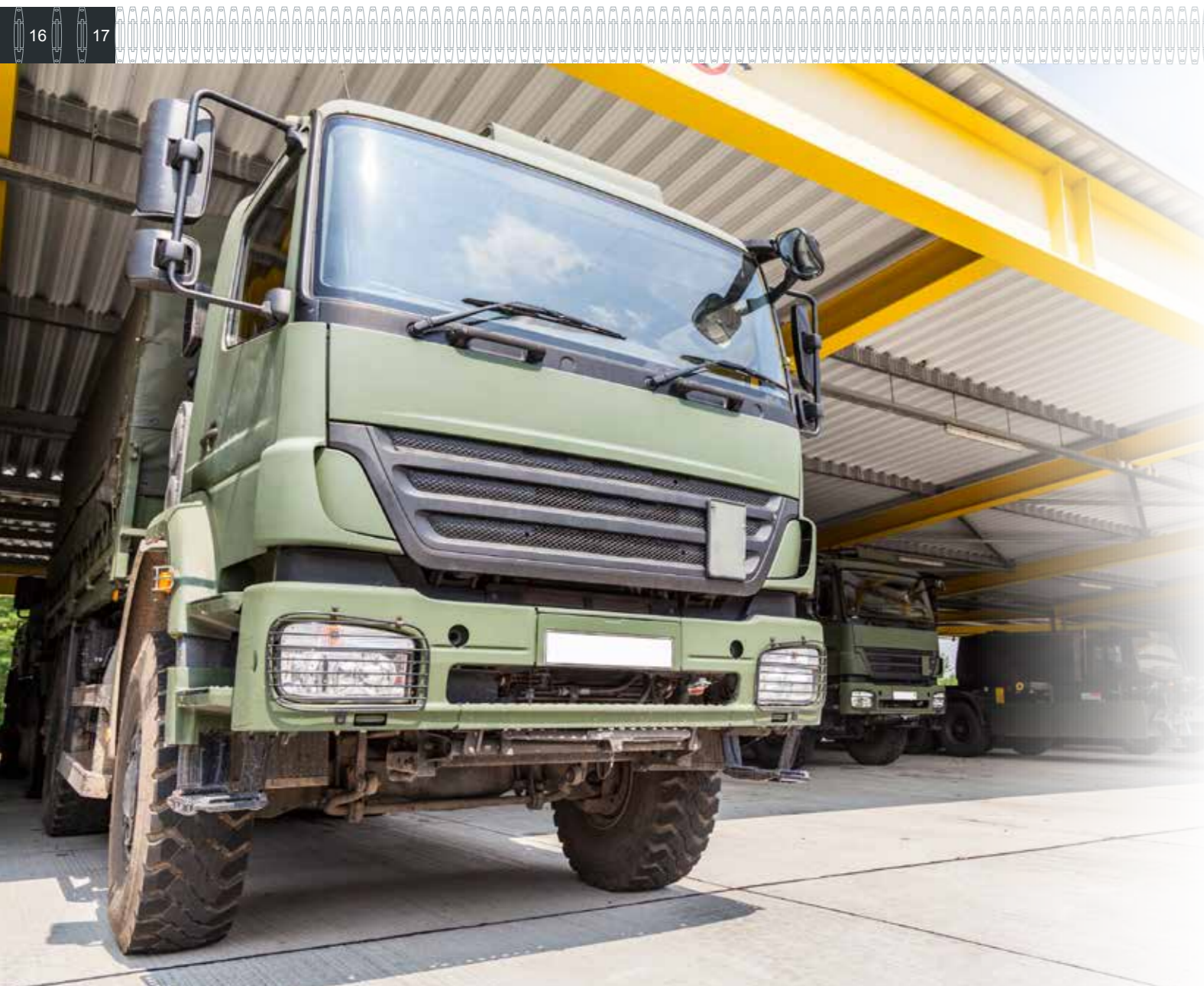
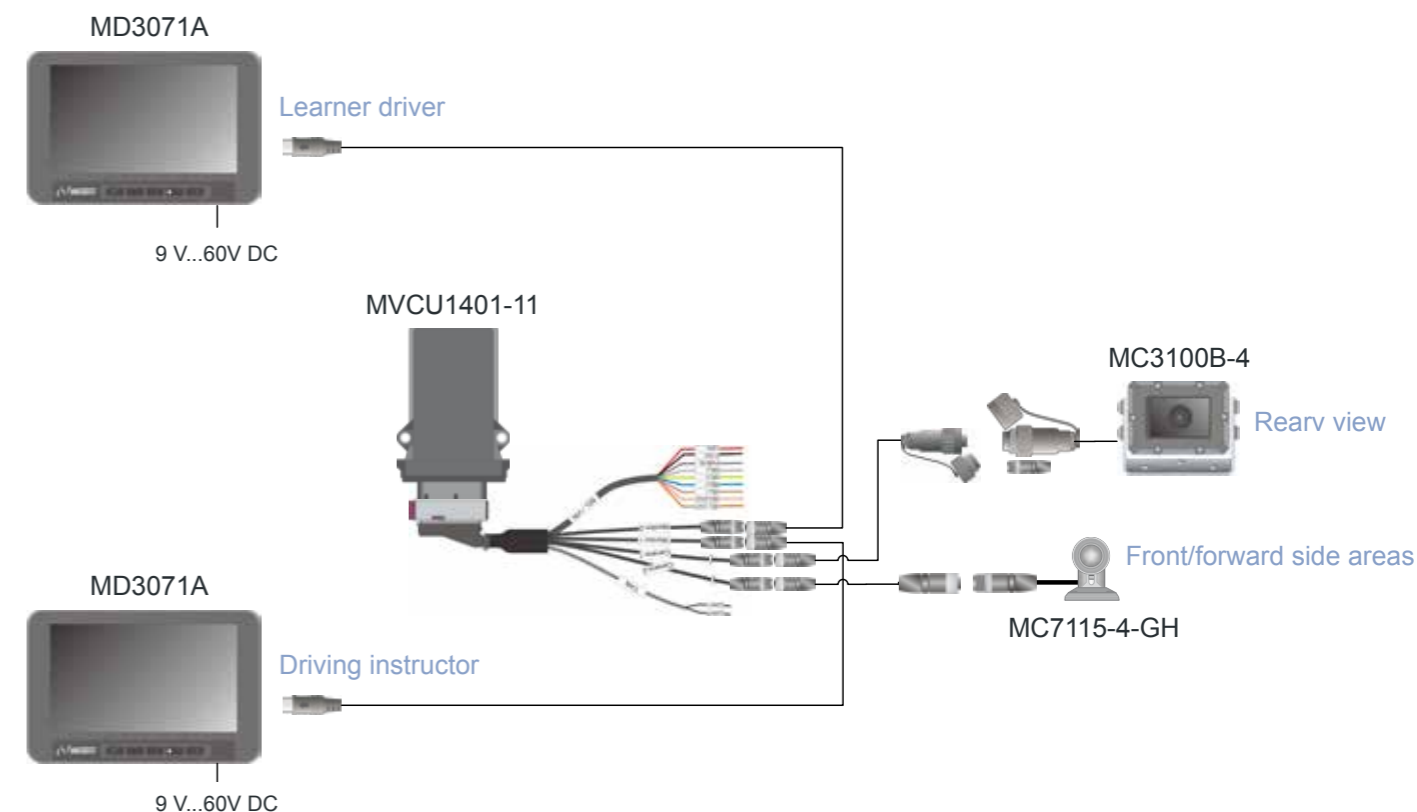


The Motec MC7115P for the driving instructor to monitor the front and side areas of the vehicle.



EXAMPLE: Driving school truck

- | | | | |
|---|--|--|--|
| 1
MD3071A
Heavy-duty monitor | 2
MVCU1400
Video control unit | 3
MC7115-GH
Heavy-duty camera | 4
MC3000B
Heavy-duty camera |
|---|--|--|--|



Cameras

Video control unit



MC4000A Heavy-duty camera

The MC4000A is a heavy-duty camera with a high degree of electromagnetic compatibility (EMC). The development is based on the most stringent of requirements in both industry and defence. The mechanical and electric structure means that they can deal with the highest possible stresses with respect to shock, vibration, dust and moisture.

Features:

- . 40°, 70°, 90° and 100° angles of view, others available upon request
- . Video signal CVBS/PAL
- . Scratch-resistant front windscreen (MIL-STD-810G, Method 510.6 Procedure II, Blowing Sand Test)
- . Overlays can be programmed
- . Prepared for future requirements thanks to software updates
- . Quality "Made in Germany"

MC4000A-IR Heavy-duty camera

The MC4000A-IR is a robust night-vision capable heavy-duty camera with integrated 940 nm IR illumination. The development is based on the most stringent of requirements in both industry and defence. The mechanical and electric structure means that they can deal with the highest possible stresses with respect to shock, vibration, dust and moisture.

Features:

- . Infrared lighting with a wave length of 940 nm
- . High electromagnetic compatibility (EMC)
- . Special front glass heating ensures clear views, can melt ice up to 3 mm thick
- . 40° and 90° angles of view, others available upon request
- . Scratch-resistant front glass (MIL-STD-810G, Method 510.6 Procedure II, Blowing Sand Test)
- . Overlays can be programmed
- . Prepared for future requirements thanks to software updates
- . Quality "Made in Germany"

MC3000B Heavy-duty camera

Thanks to its design and equipment, the MC3000B is a **heavy-duty camera** that can be used in a wide range of applications. Multiple angles of view and the robust aluminium housing make this design the optimum camera for large view-obstructing mobile machines that are subject to extreme weather and environmental conditions.

Features:

- . Housing made of machined aluminium
- . Automatically controlled window heating
- . Automatic brightness adjustment
- . Energy-efficient automotive CMOS sensor
- . Permafrost-capable to -60 °C
- . Salt mist resistant
- . High degree of shock and vibration resistance
- . Waterproof if submerged in water or if subjected to high-pressure cleaners (IP68 and IP69K)
- . 20°, 40°, 70°, 90°, 100° and 115° horizontal field of view (other angles upon request)

MVCU1600 Video control unit

The MVCU1600 is an intelligent, CAN-controlled, **high-end and heavy-duty multi-camera video control unit**. It can process as many as 8 camera images and display these images on up to 5 monitors in a variety of modes and with individual overlays.

Features:

- . Connection of up to 8 heavy-duty cameras
- . Display on up to 5 monitors
- . Monitor output with flexible display options
- . Optionally bit maps (symbols, logos, images etc.) can be displayed
- . High electromagnetic compatibility (EMC)
- . Quality "Made in Germany"

Monitors



MD3071A Heavy-duty monitor

Owing to its design and accessories, the MD3071A is a **heavy-duty monitor** that can be used in all industry sectors. The images of the display are crystal clear, even under difficult environmental conditions. The software update option helps ensure that the MD3071A is up-to-date and thus prepared for future requirements. The vertical design is available as MD3071A-V.

Features:

- . 7" monitor (17.8 cm, measured diagonally)
- . PAL/NTSC video system
- . Supply voltage: 9 V...60 V DC
- . Up to 2 cameras and an additional external video controller (for up to 4 additional cameras) can be connected
- . Auto dimmer function
- . Illuminated keyboard
- . Deep, light-weight protection cover (impact-protected) as standard
- . Quality "Made in Germany"

MD3073 Heavy-duty monitor

The water-proof and dust-tight MD3073 has been specially developed for mobile machines and applications where moisture, cold and dust are involved, for example at construction sites or in cold rooms. The displayed images are crystal clear, even under difficult environmental conditions.

Features:

- . 7" monitor (17.8 cm, measured diagonally)
- . Up to 2 cameras and an additional external video controller (for up to 4 additional cameras) can be connected
- . Water and dust-proof
- . Horizontal and vertical image mirroring
- . PAL-480 representation (no image distortion)
- . Automatic brightness adjustment
- . Administrator and user rights
- . Advanced expert settings function
- . Housing protection class IP67

MD3072B Quad Heavy-duty monitor

The MD3072B-Quad is designed especially for mobile machines, fitted with several cameras. When using the **integrated video monitoring module**, 4 camera images can be simultaneously displayed on the monitor. The integrated menu function and control lines for the automatic control system of the cameras ensure quick screen changes.

Features:

- . 7" monitor (17.8 cm, measured diagonally)
- . Instant connection of up to 4 cameras
- . Split screen (up to 4 video sources simultaneously)
- . Manual or automatic camera selection
- . Image mirroring (by camera)
- . High shock and vibration resistance
- . Integrated video control module

MD3100 Heavy-duty monitor

The MD3100 is a 10" LCD Monitor with a powder-coated metal housing for industrial use. The front panel of the monitor meets IP54 protection class requirements for dust protection and splash resistance.

Features:

- . 10" monitor (25.9 cm, measured diagonally)
- . Picture-in-Picture display (PiP)
- . Robust metal housing
- . Front panel meets IP54 protection class requirements
- . For ultra-severe environmental conditions
- . Power supply via MVCU

Cables and cable harnesses

Tailor-made solutions

Motec GmbH has more than 25 years of experience in the production of high-quality customised cables in Germany. We are currently producing roughly 1,000 different cables of various lengths and designs.

Customised solutions are our speciality: We use all standard connectors and we can produce even complex cable harnesses and cable sets.

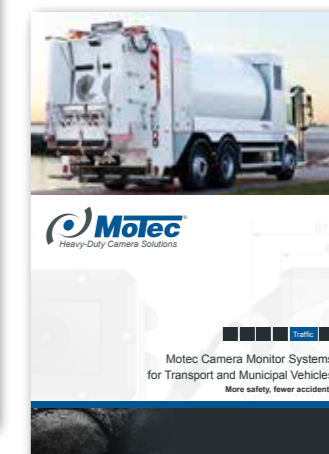
We process all types of wires and cables with diameters from 0.013 mm² (AWG36) up to 107.2 mm² (AWG 4/0), and without limitations as to the number of wires.

Certified quality for the most sophisticated requirements

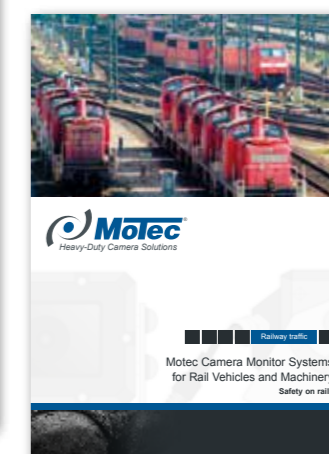
- Pull testing
- Micrograph laboratory
- Crimp height measuring
- Automatic crimping force monitoring
- 100% semi-automatic, logged final test for correct functioning
- EDP-supported merchandise management and production planning and control system
- Operational data recorded via bar code
- 100% traceability (via batch and serial numbers)

System solutions

Customised solutions for numerous other industries



- Product program
- Construction machines
- Traffic/Transport
- Forklift truck
- Agricultural machines
- Railways
- Defence
- Maritime



Connectors

for military requirements

To be able to meet the demanding requirements for use by the military, the connectors at interfaces for military use are produced using tried and tested components. This allows us to meet the stringent demands with respect to electromagnetic compatibility, shock resistance, vibration resistance and a large number of plug-in cycles.

Motec connectors and cables stand for:

- High number of mating cycles
- Holistic EMC concept
- High resistance against shock and vibration loads
- Individual manufacturing according to application specifications
- 100% functional final test



Legal notice

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