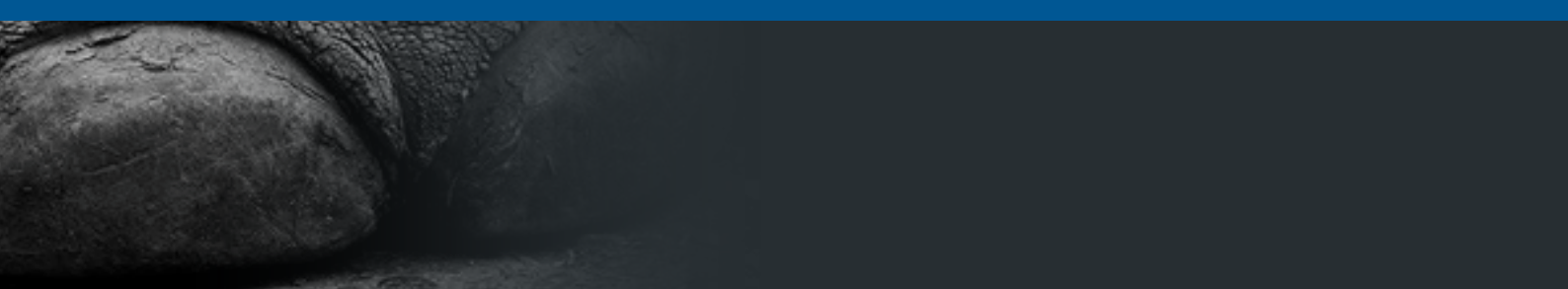


Motec camera system for construction equipment
More safety, fewer accidents



MOTEC HEAVY-DUTY CAMERA SOLUTIONS

Motec specializes in the development and production of camera-based driver assistance systems for utility vehicles and mobile machinery.

Motec protects lives by making mobile machinery and their surroundings safer. Its cameras make operators' work easier by reducing stress and uncomfortable physical movements. And, it helps companies become more successful by accelerating processes and avoiding damage.

Motec has over 25 years of experience in the construction and manufacture of robust, reliable mobile cameras, including the associated electronics.

Its product range includes reversing cameras, industrial cameras, displays, advanced video controllers, DVRs, customer-specific wiring looms, and wireless video transmission solutions.

Motec's customers are leading OEMs of utility vehicles and mobile machinery for industries working in tough environments.

At its development center for utility vehicle assistance systems (MENAS) Motec develops, tests and validates software algorithms for customized driver assistance systems. Its suite of algorithms incorporates solutions for real-time image processing, aerial view projection, sensor fusion (e.g. cameras, ultrasound sensors, radar sensors, lasers), stereo view, image processing and driver assistance systems.

Motec is a unit of AMETEK Inc. a leading global manufacturer of electronic instruments and electromechanical products.



Content

Motec camera monitoring system for construction machines

Motec camera monitoring systems ensure that the operators of large and complex construction machines and vehicles are able to move them safely and more efficiently. Thanks to the ultra-rugged and strong heavy-duty cameras, the operator can early detect people and objects in the machine's danger zone. Thus, Motec camera systems do their part in complying with the requirements of the Machinery Directive 2006/97/EC. For excavator and front-end loaders in particular, the Motec camera monitoring systems meet the visibility requirements defined in ISO 5006 and ISO 16001 – protecting lives, avoiding accidents, and saving money.

This brochure contains a presentation of our selection of possible system solutions for your applications.

Technical service – guaranteed fast support

Top quality means also top service. When faced with difficult technical challenges or questions that need answers, Motec can assist. Its sales and engineering departments work hand in hand. Customers benefit from efficient communication with no red tape. Motec engineers understand customers processes, know what they need and can find a solution quickly.

Hotline

Phone +49 6433 9145-9888
 Fax: +49 6433 9145-9877
 motec.service@ametek.com



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 (ultrasound/radar)
- . Stereo cameras (object detection)
- . Driver assistance system (collision warning)

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Front-end loaders

Rear-space monitoring in loading mode

Reversing front-end loaders is dangerous due to the size of the vehicle and the very limited visual range of rear mirrors. Mirrors vibrate during movement, become dirty in poor weather and distort the real picture. Hence, the risk of "driving blind". Camera monitoring systems assist the driver by displaying crystal clear images of the blind areas on the monitor and enabling him to survey the entire working area at one glance.

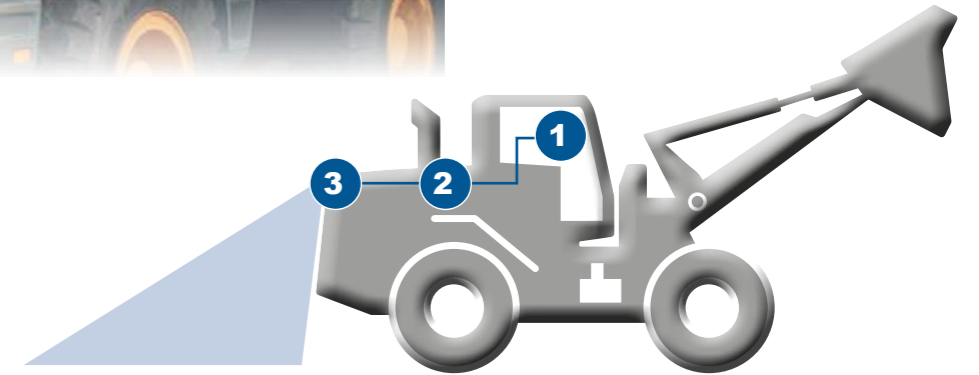
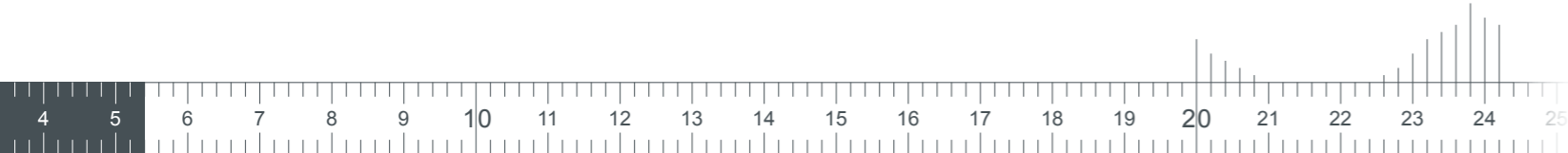
Ergonomic, efficient, and cost-saving working is ensured; that is, no twisting the upper body; fluid and fast working and no damages to people, material, or the machine.



Front-end loader with the MD3071A heavy-duty monitor for rear-space monitoring. The display provides a crystal clear representation of the camera images.



Front-end loader with MC3000B heavy-duty monitor at the rear for rear-space monitoring.

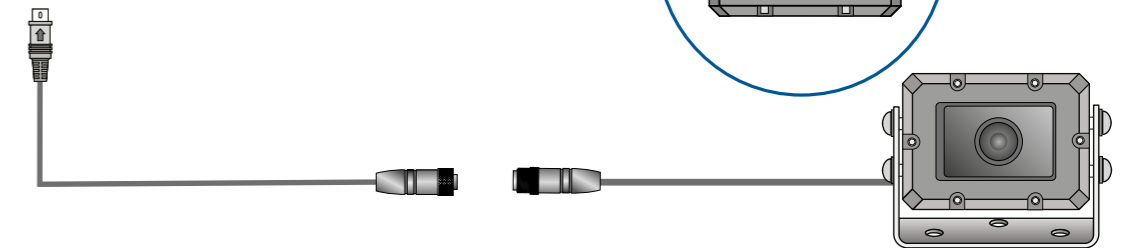


EXAMPLE:
Front-end loader

- | | | |
|-------------------------------|-----------------------------|------------------------------|
| 1 | 2 | 3 |
| MD3071A
Heavy-duty monitor | MK496.x
Cable connection | MC3000B
Heavy-duty camera |



9 V...60 V DC



Crushers and riddles

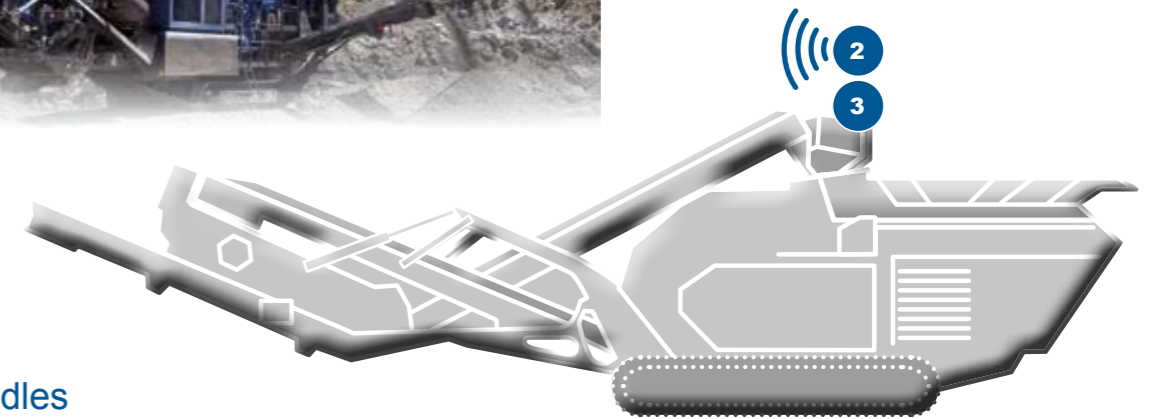
Controlling the filling level and avoiding material build-ups

Efficiency is the keyword for complex crusher systems. Overload due to material build-up interrupt the crushing operation and cause delays and, ultimately, higher costs. Camera monitoring systems combined with digital radio prevent an overload of the machines.

Up to 10 parallel-running systems allow high flexibility, in particular in the adaptation of crusher systems switched in sequence. The robust MVRD1000 sender/receiver system provides the drivers of front-end loaders and excavators with a simultaneous camera image of the situation at the crusher or riddle. Material build-ups of foreign matter in the feed hopper are detected early.



Timely intervention before material build-ups ensures smooth operation.

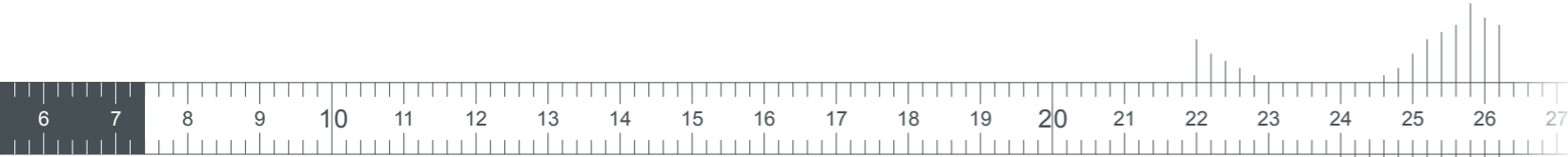
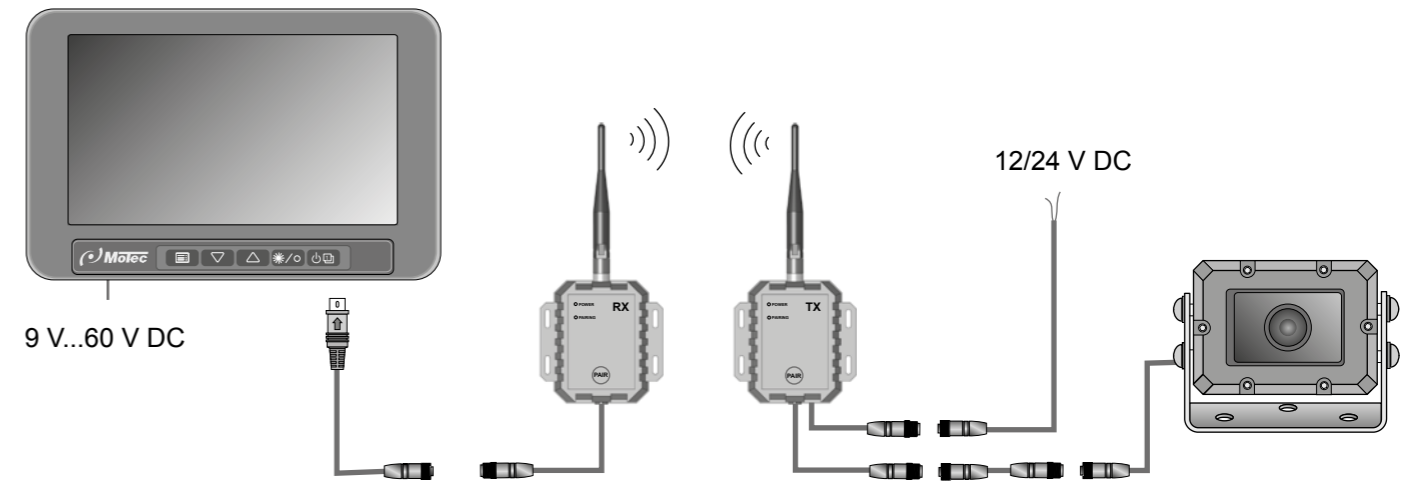


EXAMPLE: Crushers and riddles

MD3071A
Heavy-duty monitor

MVRD1000
Digital radio link

MC3000B
Heavy-duty camera



Excavator

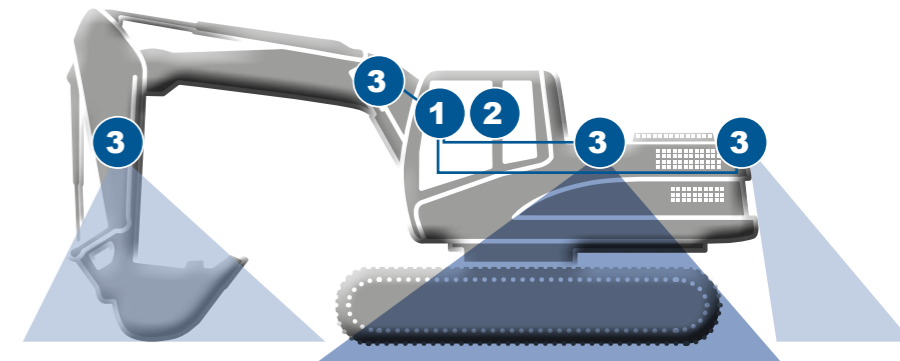
MVS 270° Visibility and load monitoring

Knocked-down markings, material damage and injuries are regrettably very common at construction sites due to the limited visibility in excavator cabins. The MVS 270° system provides the operator with unrestricted view of the sides and the space behind his machine. A further camera at the excavator arm monitors the equipment and the collected load.

Ergonomic, efficient, and cost-saving working is ensured; that is, no twisting the upper body; fluid and fast working and no damages to people, material, or the machine.



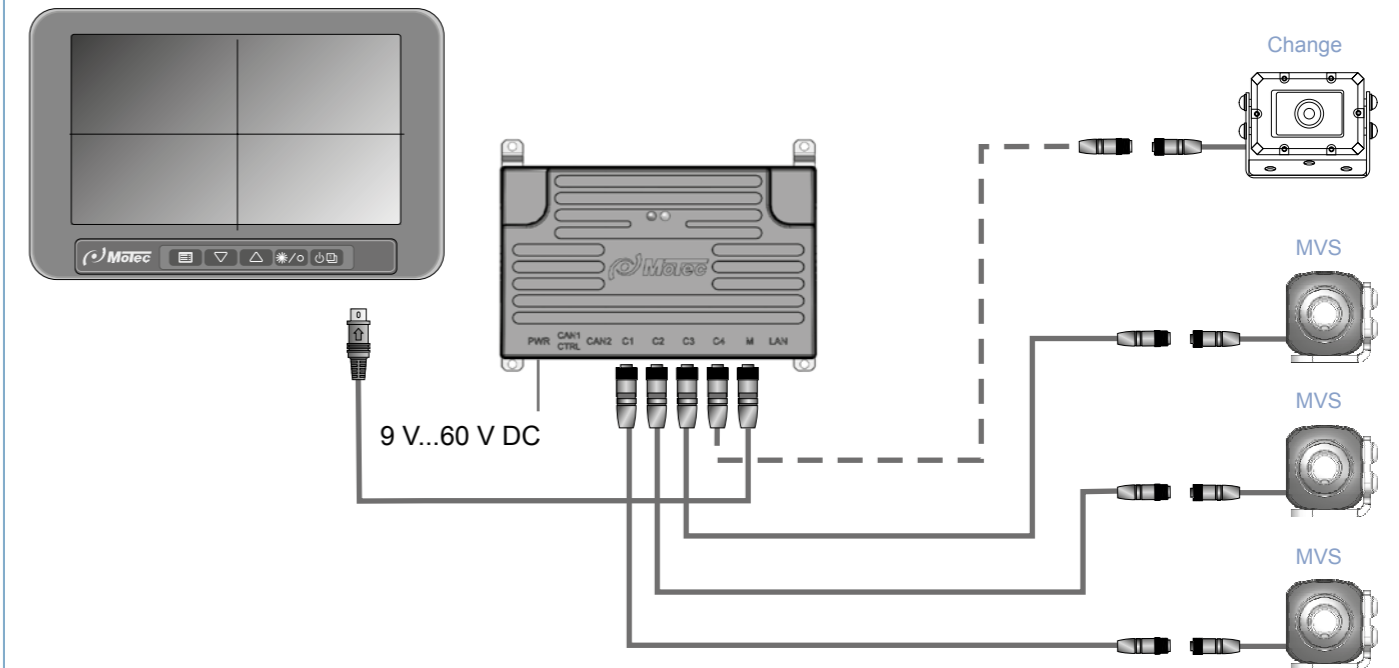
Load monitoring with the MC7180 heavy-duty camera.



Top: Camera in the jib for work space monitoring.
Centre: Camera for side monitoring.
Bottom: Camera for rear space monitoring.



EXAMPLE: Excavator



Excavators and material handling equipment

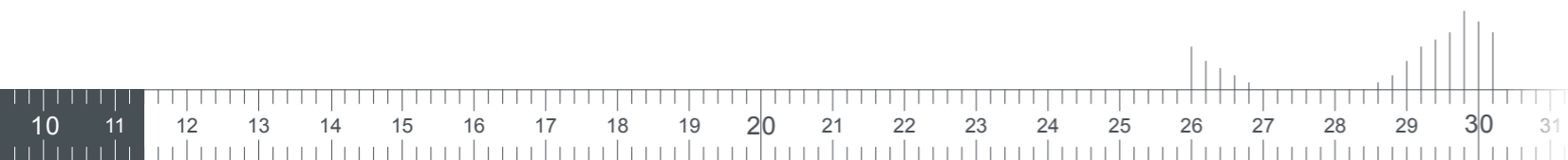
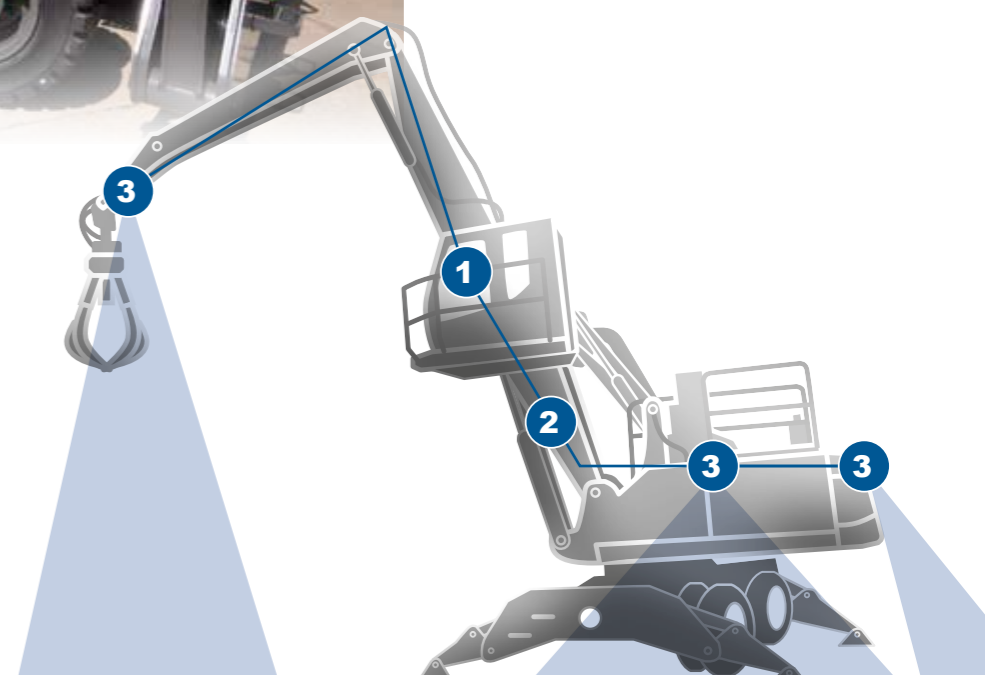
Rear, work space and side space monitoring

Excavators and material handling equipment are large and view-obstructing vehicles requiring the unconditional attention of the operator when moving in the work area. Thanks to a flexible camera and monitor system, blind areas are captured and made visible for the operator. The operator can see up to 4 images on one monitor at a glance – without taking his eyes off the mirrors.

Ergonomic, efficient, and cost-saving working is ensured; that is, no twisting the upper body; fluid and fast working and no damages to people, material, or the machine.



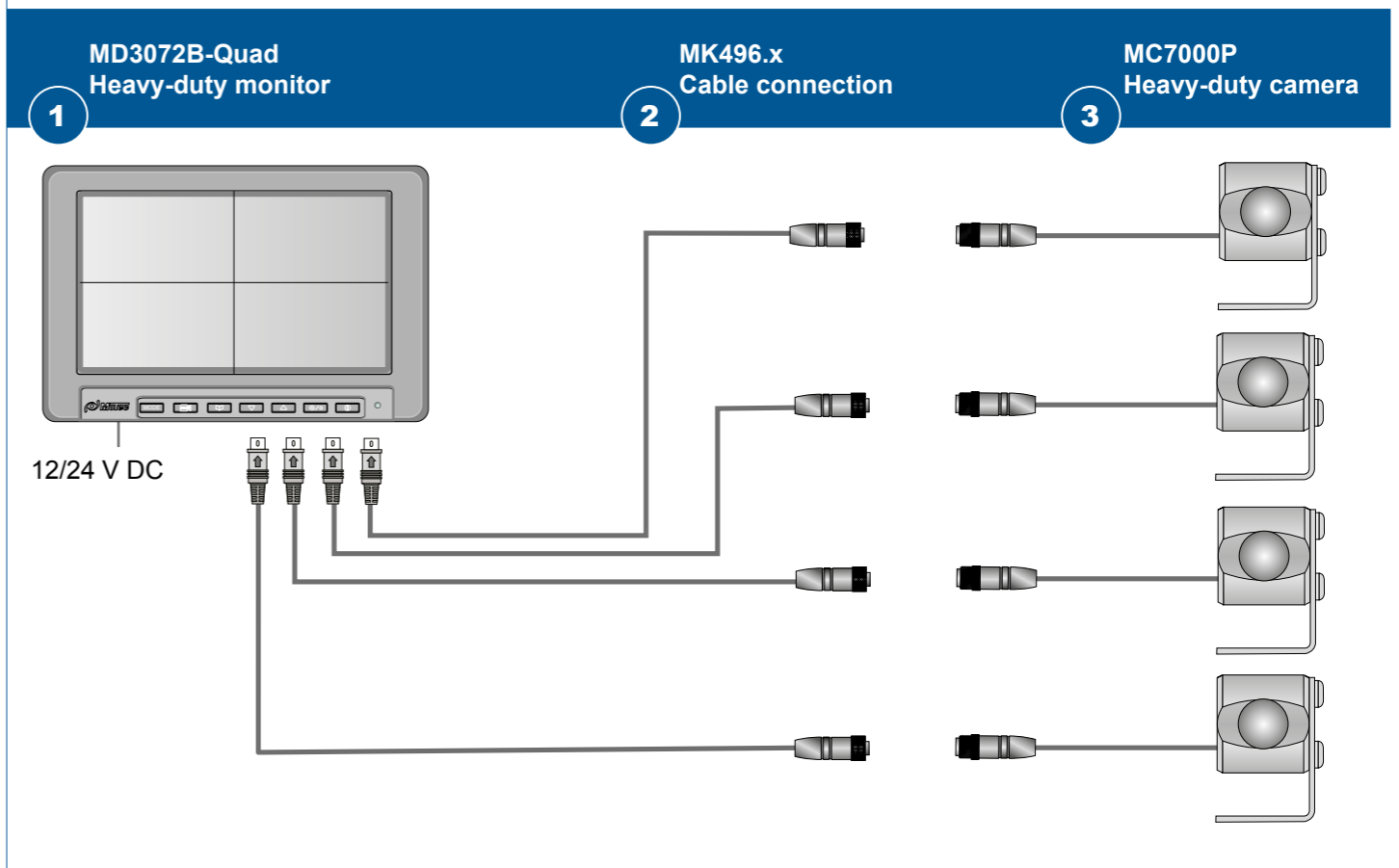
Mobile material handling excavator, fitted with a complete Motec camera and monitor system.



Top: Camera in the jib for load monitoring.
Centre: Camera for side monitoring.
Bottom: Camera for rear space monitoring.



EXAMPLE: Material handling equipment



Concrete pumps

Rear space monitoring during operation

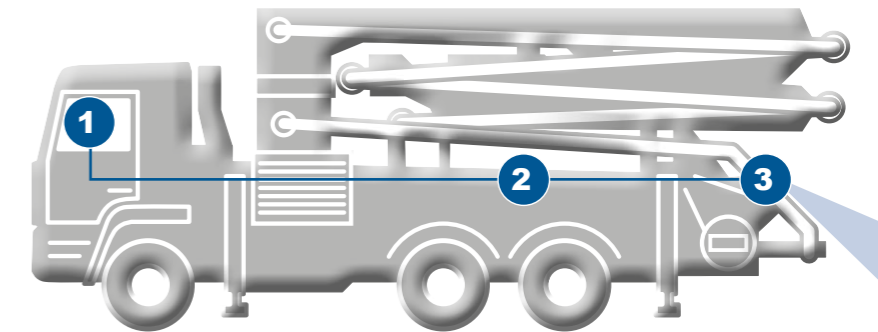
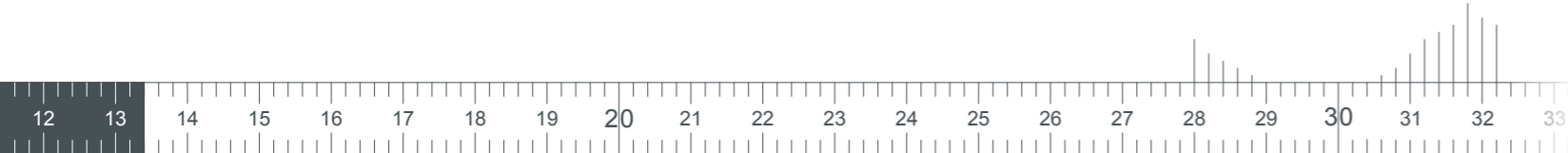
The arrival, manoeuvring and precise placement of concrete pumps on a construction site has many hazards. Dangers and costs can be avoided by using a camera and monitor system.

Thanks to the 7" monitor, the operator can always observe the rear manoeuvring space without losing sight of the two outside mirrors. No twisting of the upper body or an additional signaller required.



Fast and precise placement of the concrete pump.

Motec MC3000B camera at the rear of a concrete-mixing truck.

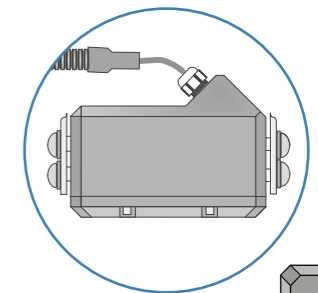
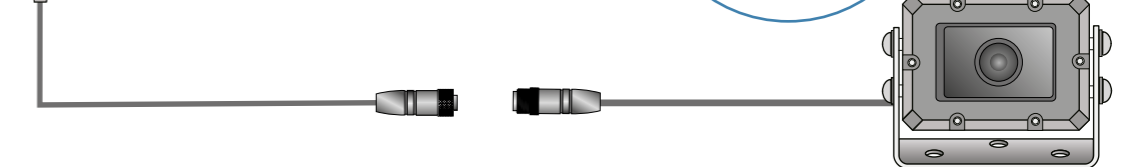


EXAMPLE:
Concrete pump

- | | | |
|-------------------------------|-----------------------------|------------------------------|
| 1 | 2 | 3 |
| MD3071A
Heavy-duty monitor | MK496.x
Cable connection | MC3000B
Heavy-duty camera |



9 V...60 V DC



Concrete pumps 360° panoramic surveillance

The movement of large concrete pumps is not just dangerous on construction sites but also on public roads. Thanks to 360° panoramic surveillance system, the operator must only focus on his 7" monitor when manoeuvring the vehicle. At one glance, he can see the entire vicinity of his vehicle.

Using visual and acoustic signals, connected ultrasound sensors actively alert the driver of obstacles and hazards, in particular during right turns in public traffic. Sketched-in overlays simplify the placement of supports.

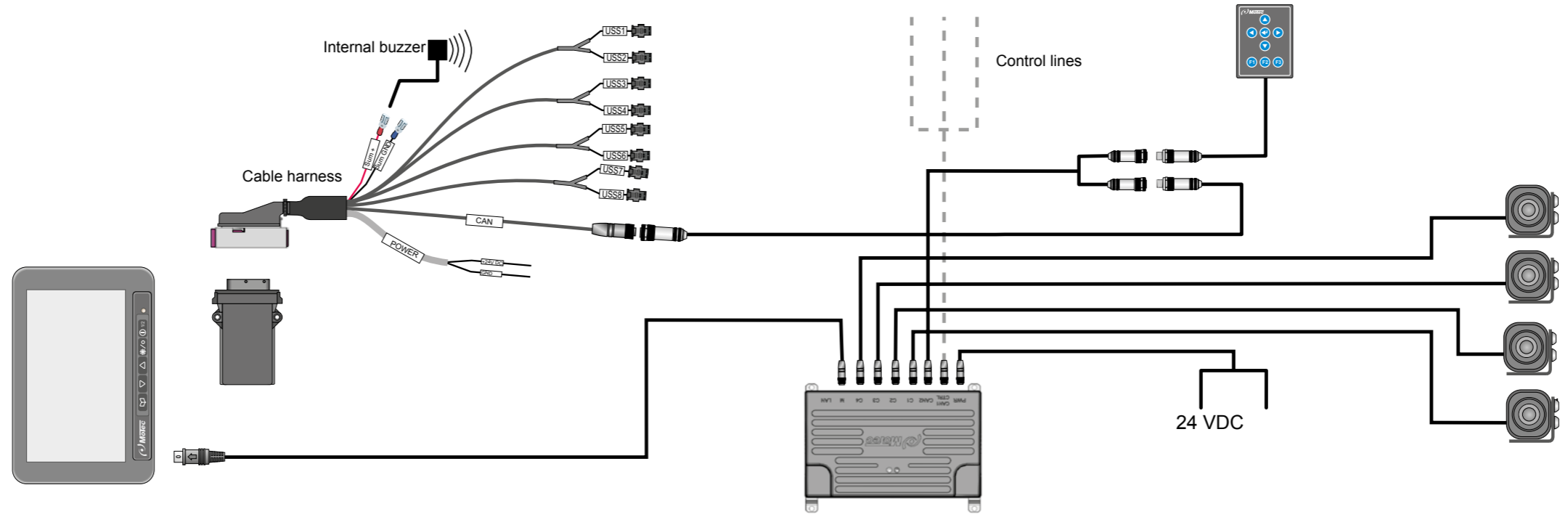


Putzmeister concrete pump truck with front camera, ultrasound and radar sensor, side monitoring and rear space monitoring.

EXAMPLE: Putzmeister concrete pump



View of overlays:
1. Cone-shaped overlays of ultrasound sensors.
2. End point of telescopic supports.



Agitating lorry

Secure and fast approach of the filling hopper

Reversing agitating lorries is dangerous as the driver is unable to see the rear space – not even with mirrors. Camera and monitor systems display blind spaces and allow the driver to fully observe the space in the rear.

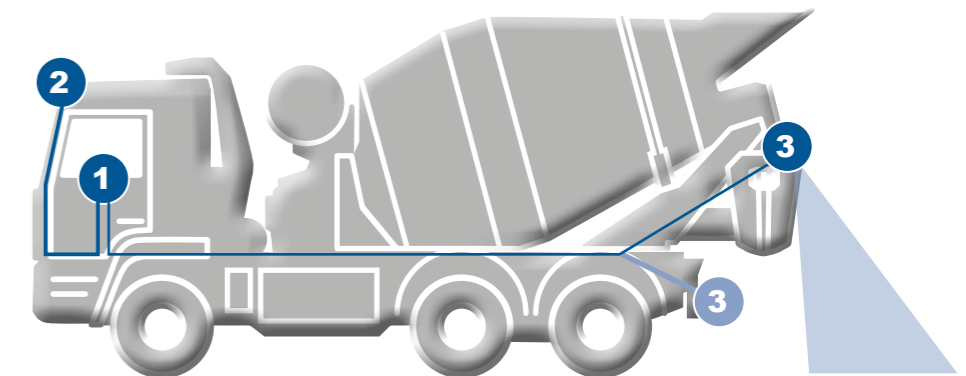
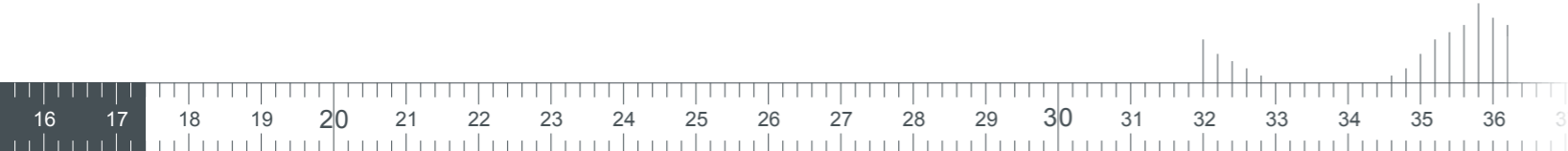
Thanks to the 7" monitor, the operator can always observe the rear manoeuvring space without losing sight of the two outside mirrors. No twisting of the upper body or an additional signaller required.



Precise approach of the filling hopper.



Motec MC7000P-E heavy-duty camera for monitoring the filling unit.



EXAMPLE:
Agitating lorry

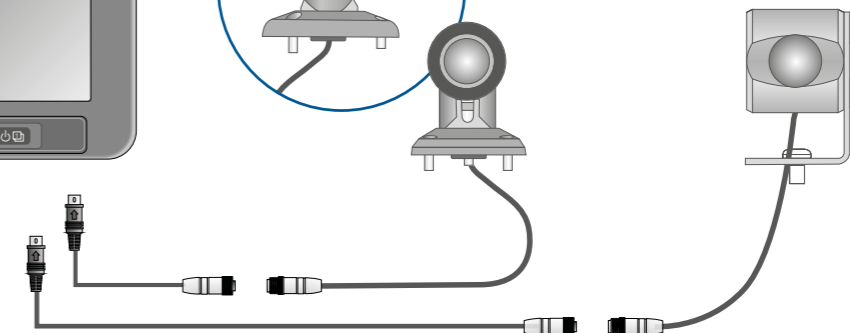
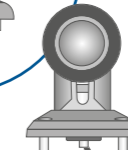
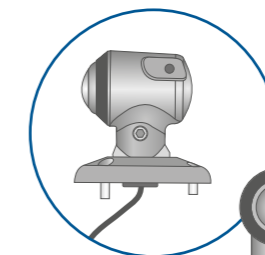
1 MD3071A
Heavy-duty monitor

2 MC7000P
Heavy-duty camera

3 MC7000P-E
Heavy-duty camera



9 V...60 V DC



Tunnelling machines

Pressure lock and material transport in sight

Camera and monitor systems are particularly suitable to survey blind and dangerous areas and instruments. Cameras are used at many locations in large drilling machines, for example, at pressure locks, milling and drilling tools or when removing material.

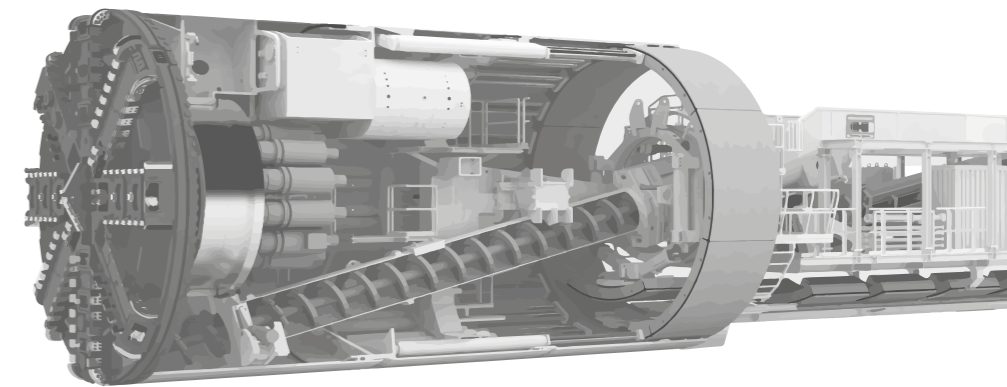
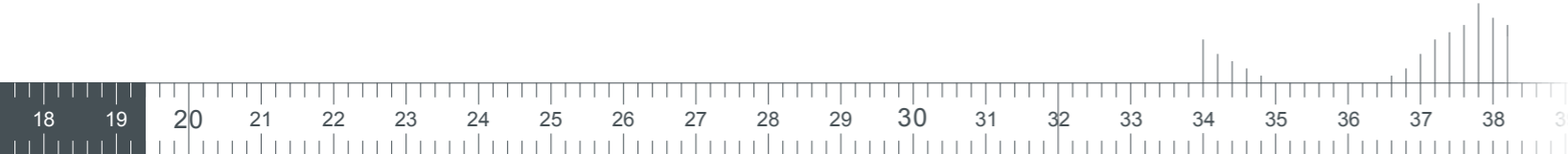
Thanks to a video signal amplifier, crystal clear images are transmitted from deep down in the earth. Potential problems in the process are signalled in a timely manner.



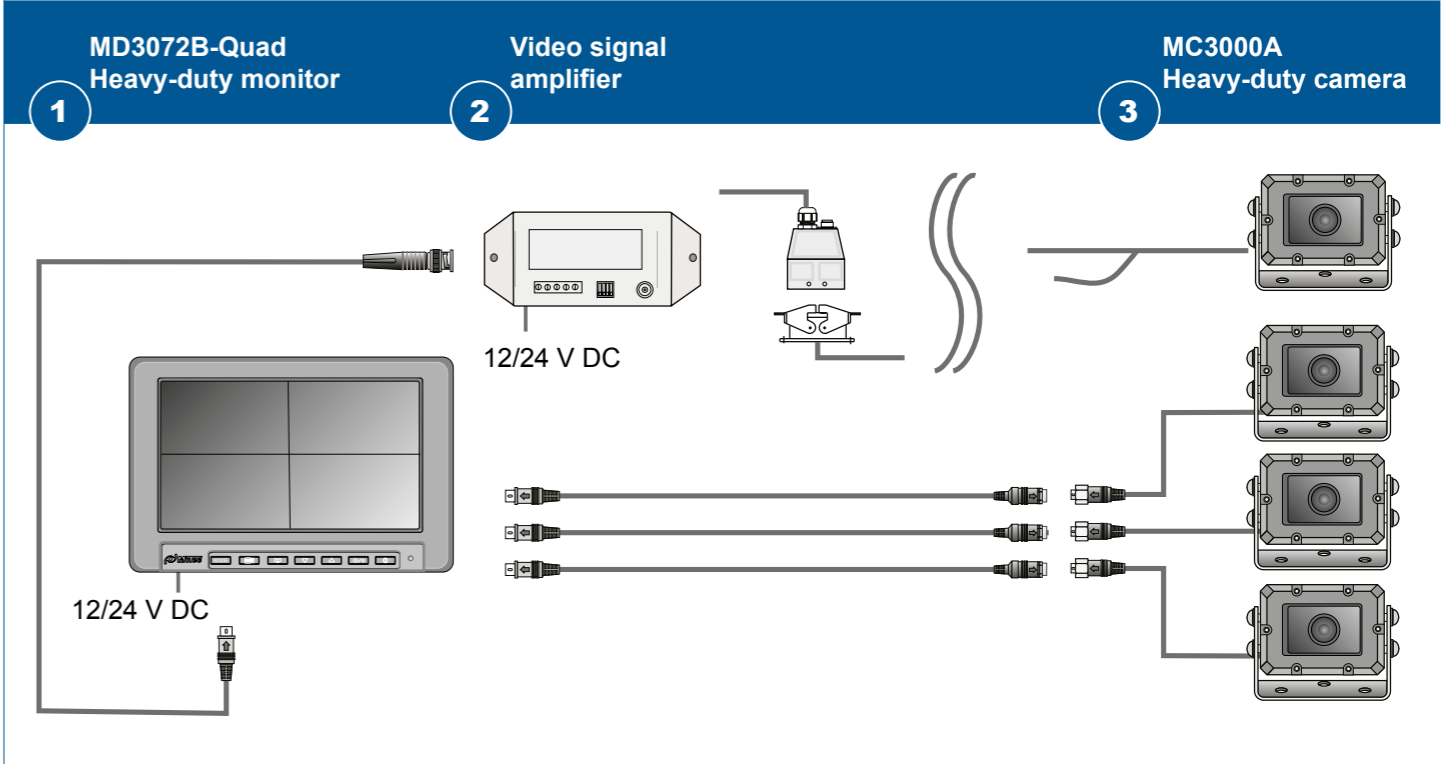
Tunnelling machine at work:
Break-through of the drilling head with its rotating bits.



Motec camera monitoring systems can be flexibly applied, in microtunneling for example.



EXAMPLE: Tunnelling machine



Horizontal boring machines

View of thread support and receiving pit

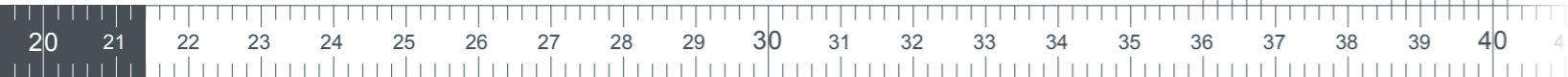
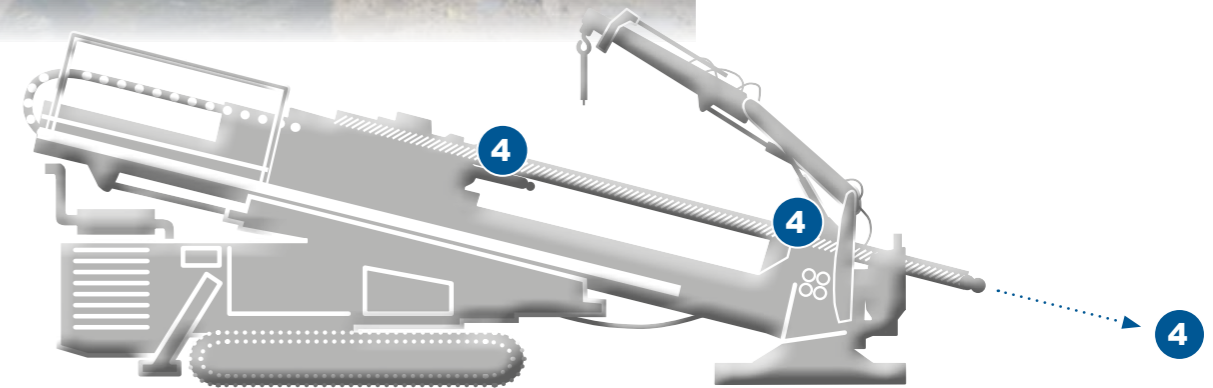
Camera and monitor systems at horizontal boring machines are specifically used in areas with poor visibility or none at all as the bores may be several hundreds of metres long with the receiving pit being quite distant.

By using camera and monitor systems, the operators of horizontal boring machines can remotely observe the boring tools and the receiving pit. Any disturbances of the work sequence and in the boring process itself are noted in good time.



A new horizontal boring machine fitted with a Motec heavy-duty camera system.

The drill head is composed of screwed boring tool segments. This design ensures the required flexibility for the entire drill string.



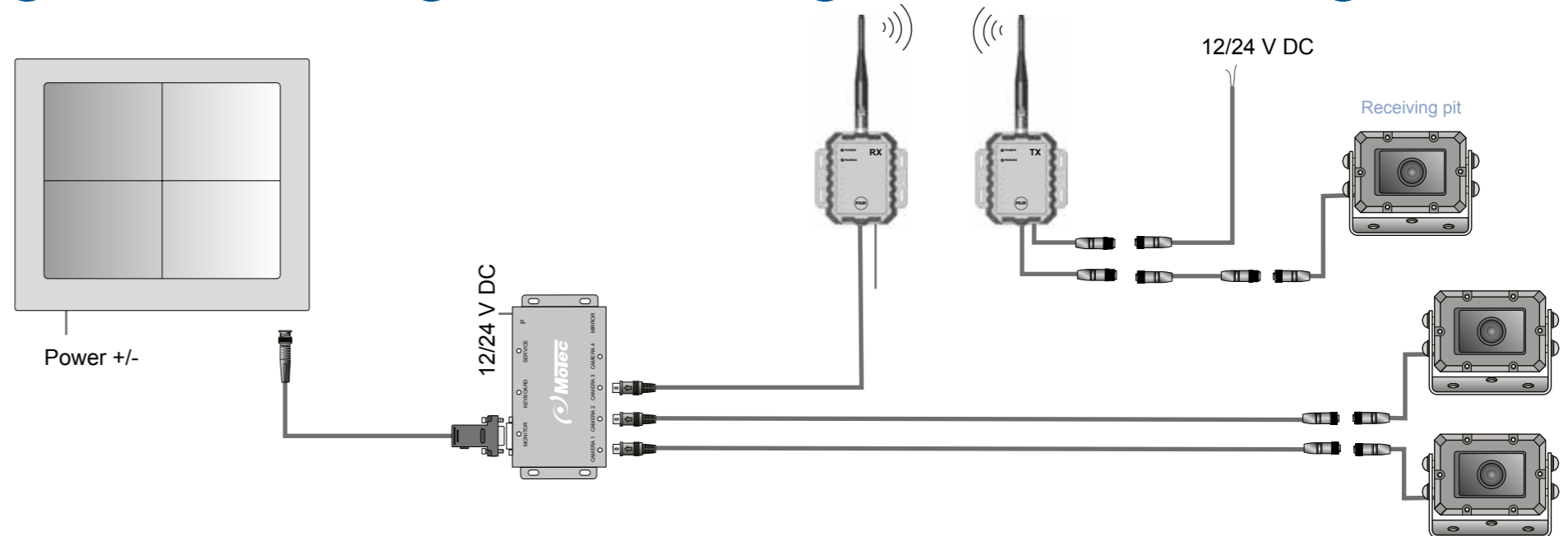
EXAMPLE: Horizontal boring machine

1 17"/19" Metal housing monitor

2 MB1405-Quad Video controller

3 MVRD1000 Wireless system

4 MC3000B Heavy-duty camera

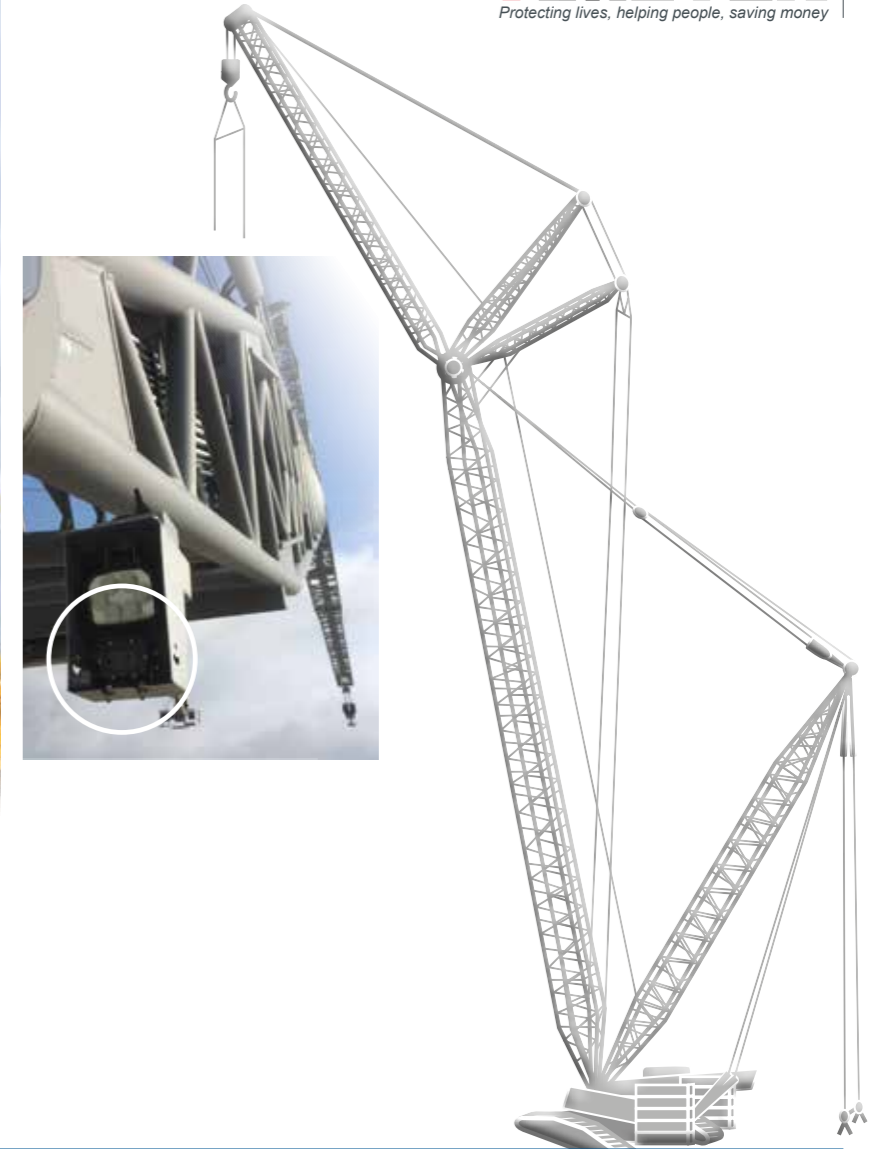


Lattice boom crawler cranes

Load hook, winch and route monitoring

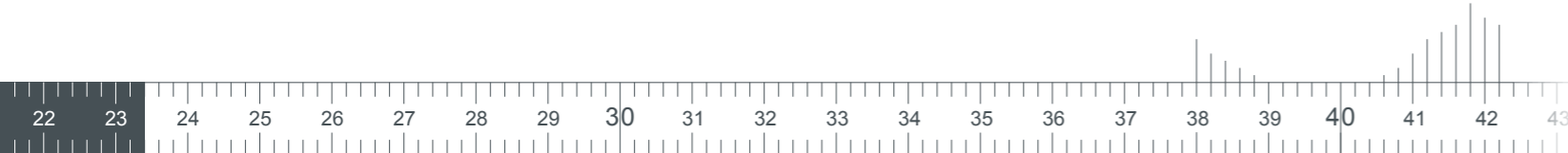
Machine downtimes due to collision or slack cable formation cause unnecessary expenditures in time and money. Camera and monitor systems boost efficiency and reliability of the work processes and reduce costs.

The operator can remotely observe the load hook, the route and the winch. The quad monitor displays all images simultaneously, enabling the driver to see all danger zones at any given time.



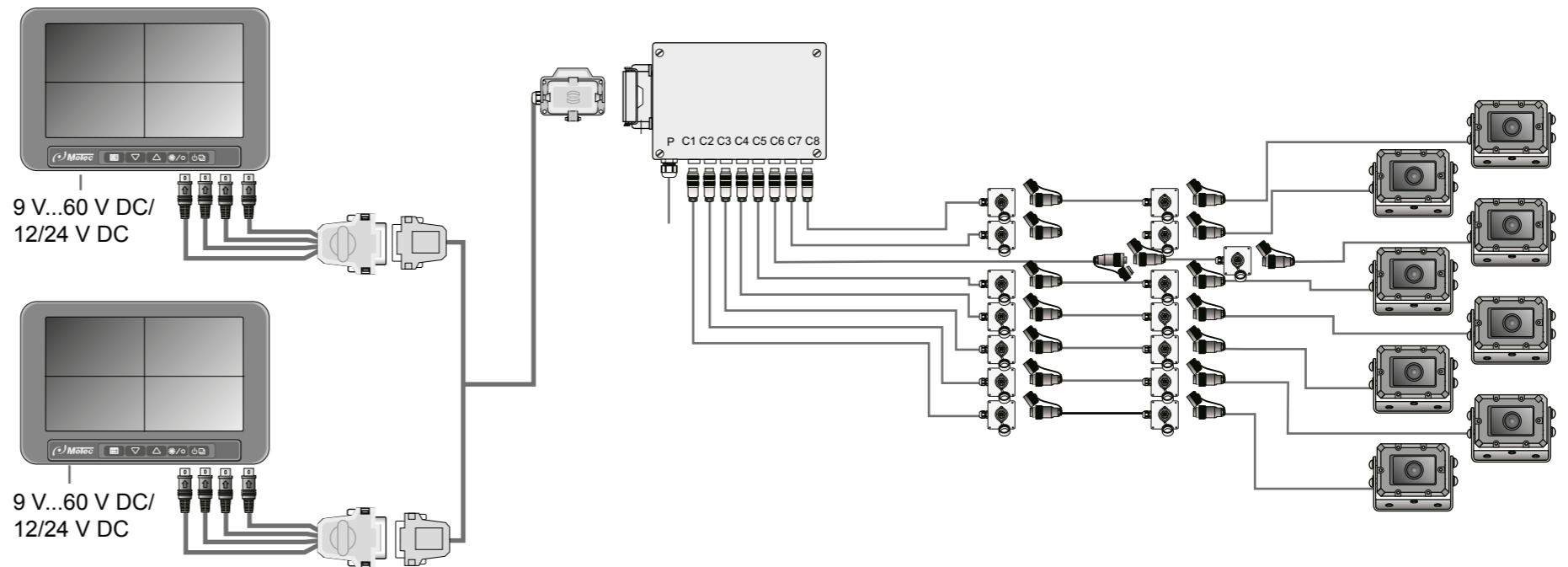
Top: Lattice boom crawler crane deployed in the installation of a wind power station.

Right: Mounted MC3000B for winch monitoring.



EXAMPLE: Crawler crane

- 1**
MD3071A/MD3072B-Quad
Heavy-duty monitor
- 2**
MB618A
Video distributor
- 3**
MC3000B
Heavy-duty camera

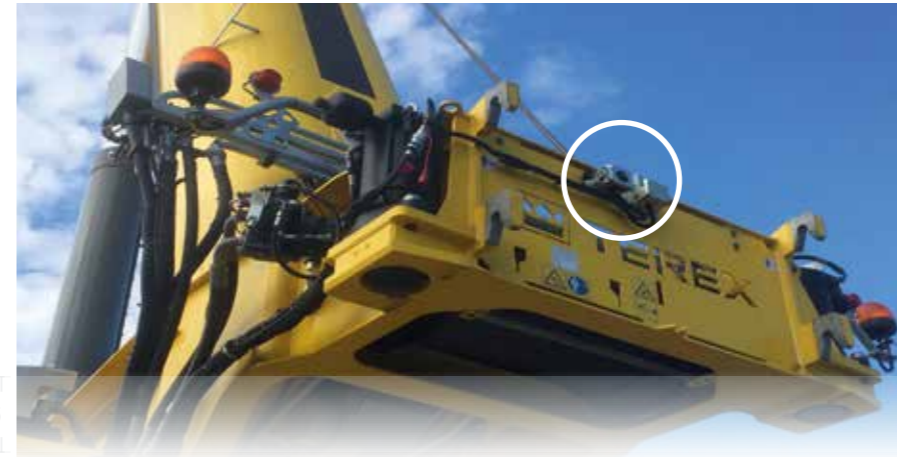


Telescopic cranes

Safely moving loads

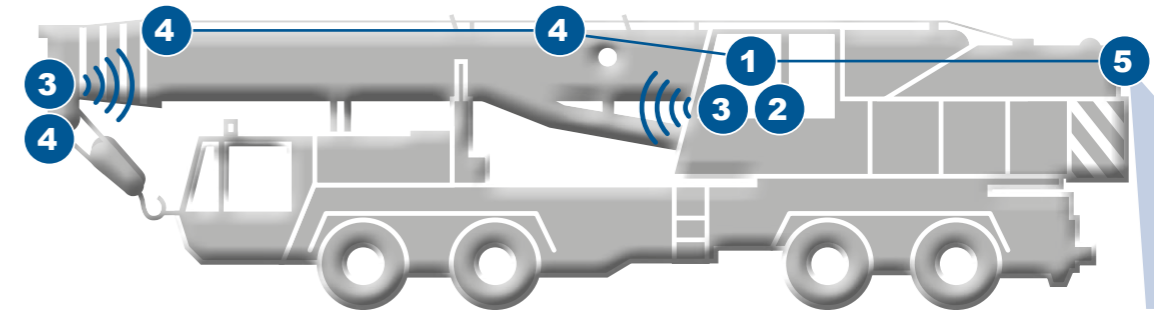
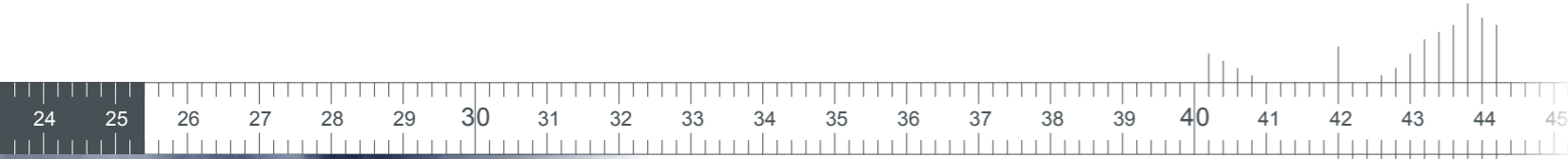
Telescopic cranes frequently operate beyond one's field of vision, making the operator dependent on signals by colleagues. By using a camera and monitor system and a special motor zoom camera with pendulum mounting at the telescopic boom, the operator can act without needing a signaller and, furthermore, has an unrestricted and constant view of the load.

One or two additional heavy-duty cameras increase safety when starting or manoeuvring the equipment.



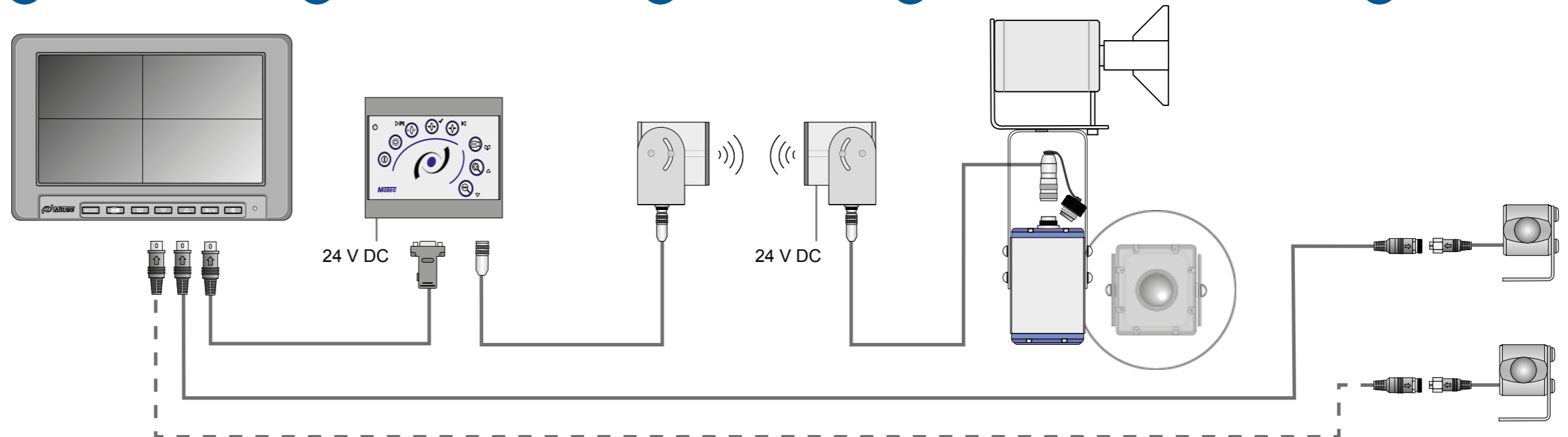
An all-terrain telescopic crane fitted with a Motec camera and monitor system.

MC7000P-E rear view camera.



EXAMPLE:
Telescopic crane

- 1
MD3072B-Quad
Heavy-duty monitor
- 2
MBE5200-1
Operator control module
- 3
MRV5200-1
Wireless system
- 4
MC5200-1
Heavy-duty motor zoom camera
- 5
MC7000P-E
Heavy-duty camera



Slewing tower cranes

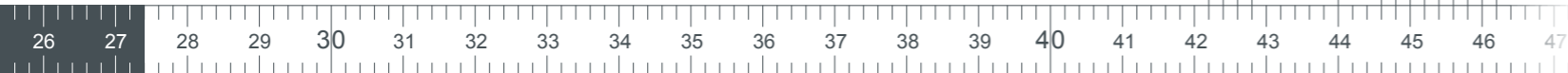
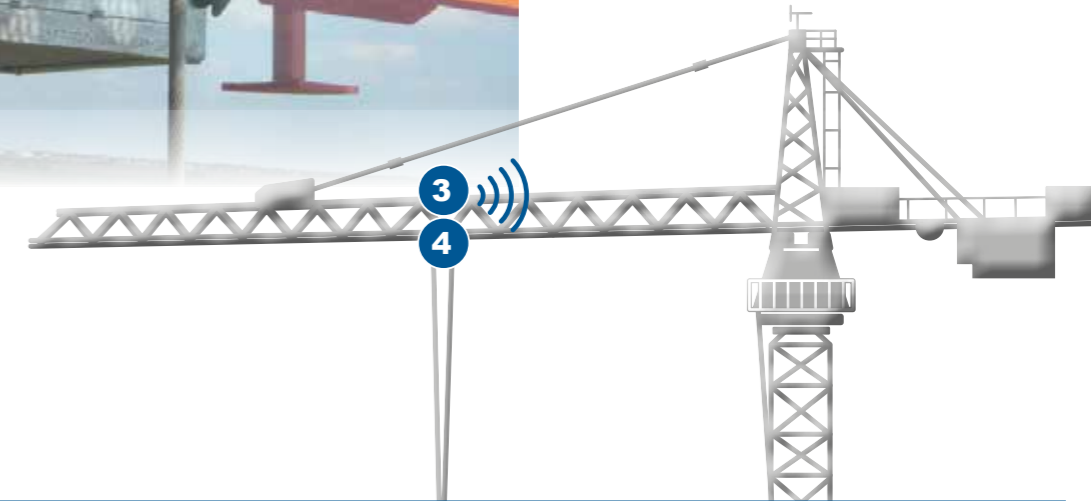
Moving loads – safely and without damage

Operators of slewing tower cranes frequently work at extreme heights and depend on radio or special signals to safely control the boom.

By using a camera and monitor system and a special motor zoom camera with pendulum mounting at the telescopic boom, the operator can act without needing a signaller and, furthermore, has an unrestricted and constant view of the load, the steel rope and colleagues working within the slewing zone of the boom.

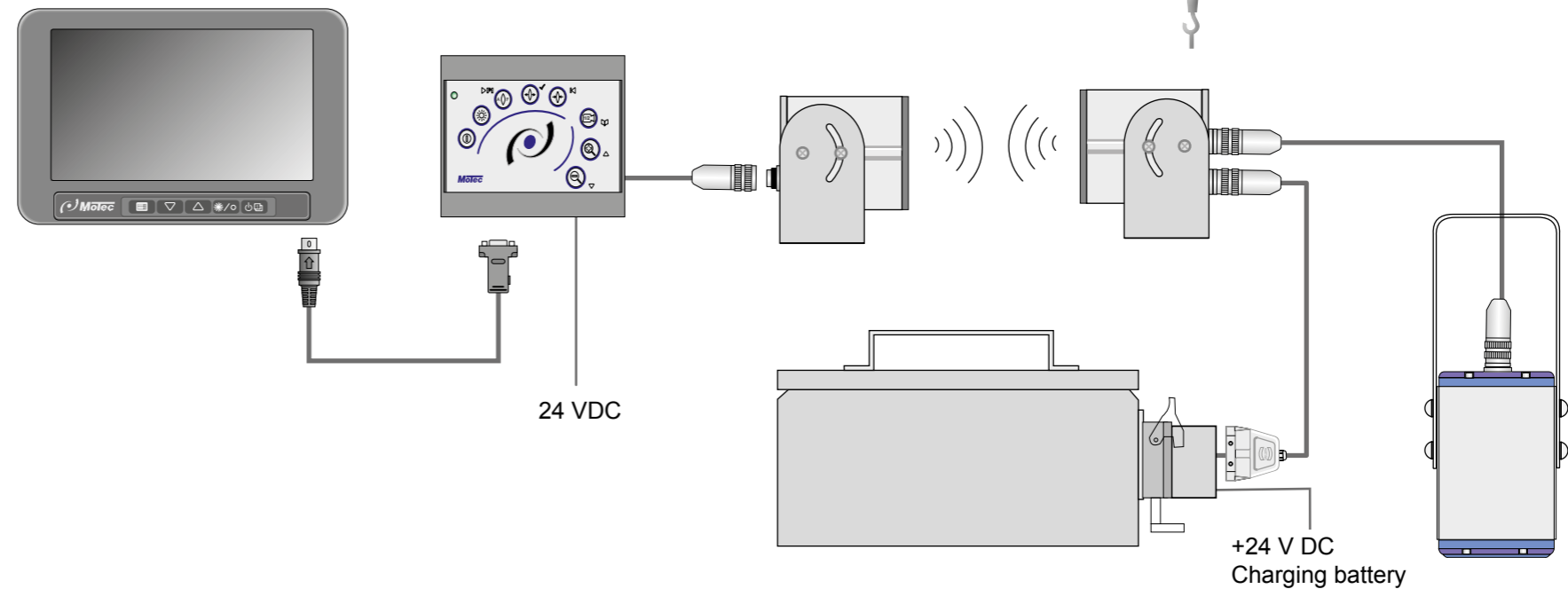


Detail view of a top-slewing tower crane with cabin. The motor zoom camera and the radio transmitter are mounted at the crane carriage.



EXAMPLE: Slewing tower crane

- 1
MD3071A
Heavy-duty monitor
- 2
MBE5200-1
Control system
- 3
MVR5200-1
Wireless system
- 4
MC5200-1
Heavy-duty motor zoom camera



Derricking jib cranes

The load always in sight

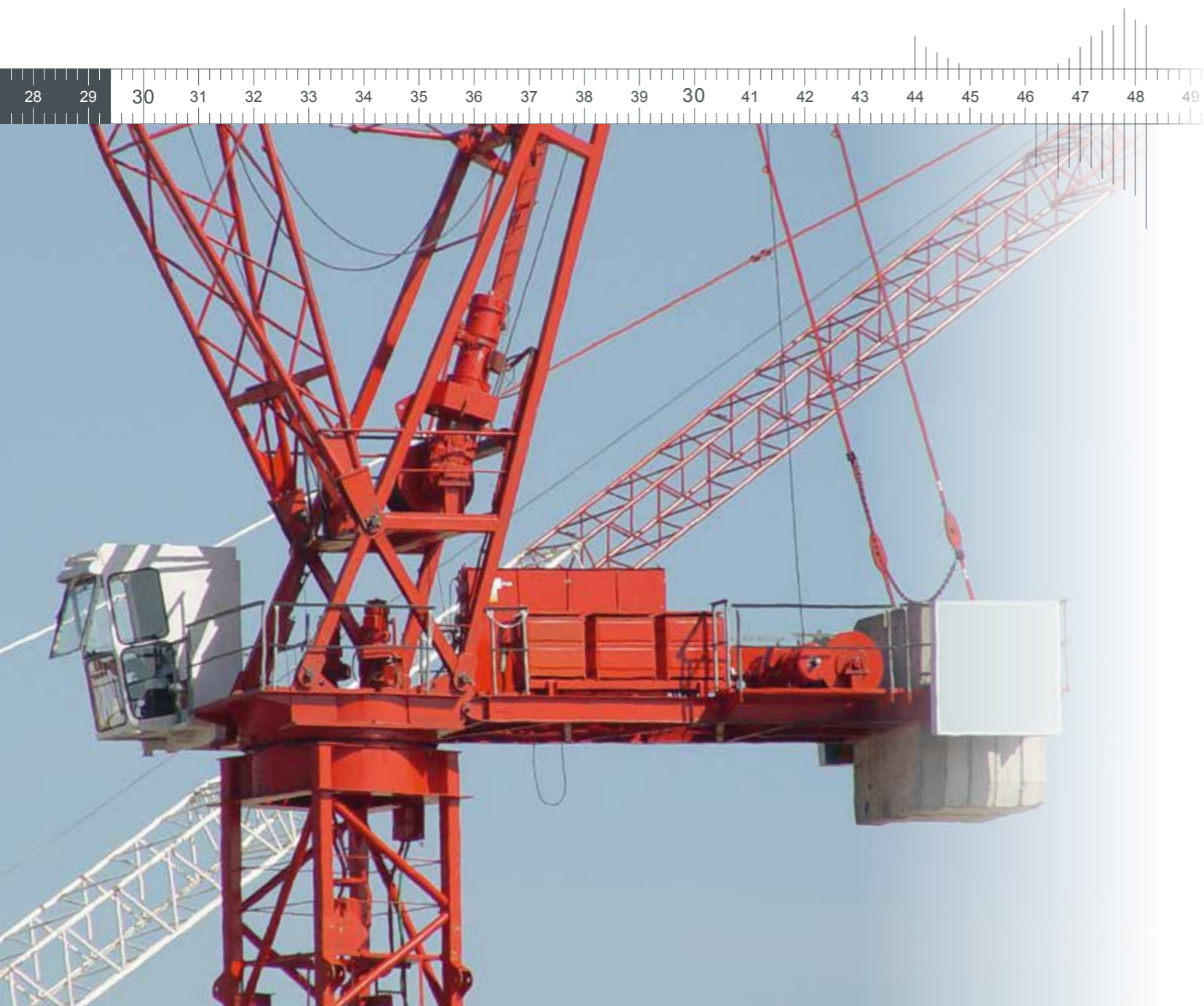
Operators of of slewing tower cranes are far removed from the load they move and are dependent on signals by colleagues.

By using a camera and monitor system and a special motor zoom camera, the operator can act without needing a signaller and, furthermore, has an unrestricted and constant view of load and destination.

Due to the adjustable setting angle of the jib, the crane requires that the holder be flexible. Thanks to a pendulum mounting concept, the camera will always be vertical.



Motor zoom camera at a jib. The pendulum mounting allows the camera to adapt to the jib's tilt angle.



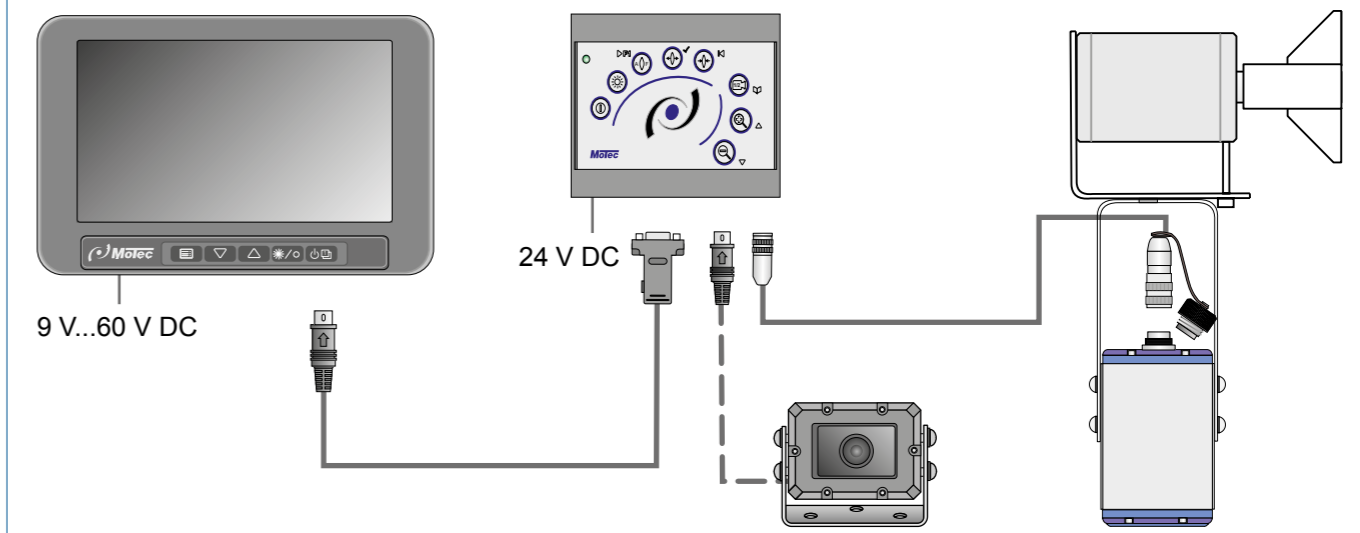
EXAMPLE: Derricking jib crane

- 1

MD3071A
Heavy-duty monitor
- 2

MBE5200-1
Operator control module
- 3

MC5200-1
Heavy-duty motor zoom camera



Mobile harbour cranes and material handling equipment

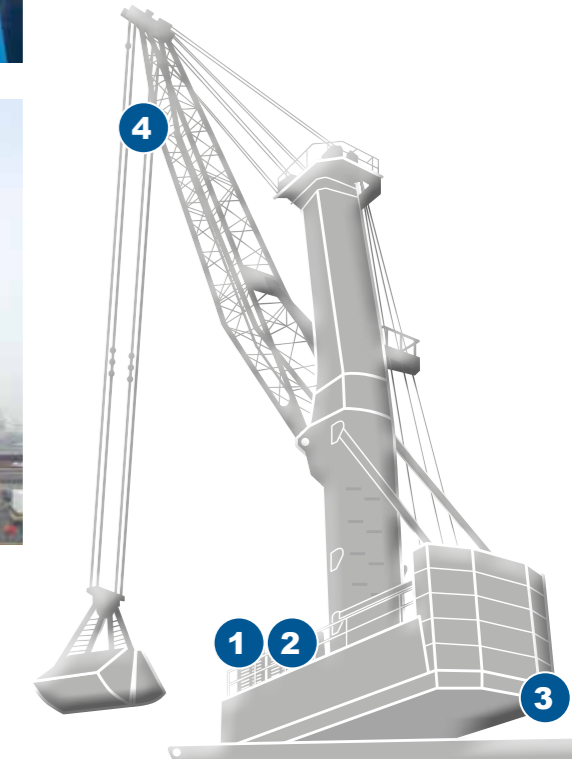
CAN bus-controlled MVCU1500 video control unit

The demands on mobile harbour cranes and material handling equipment are very high. They must work quickly and without causing damage, despite poor visibility and, sometimes, with little space to manoeuvre. Under such conditions, the crane operator must not lose sight of the hooked load, distances to the ship's hull, the position of other containers and objects and, where required, the rear space.

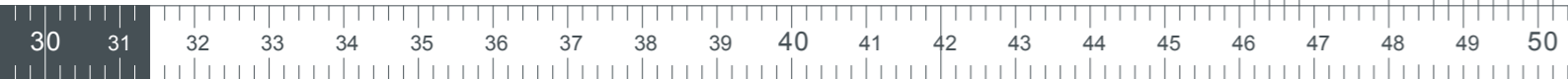
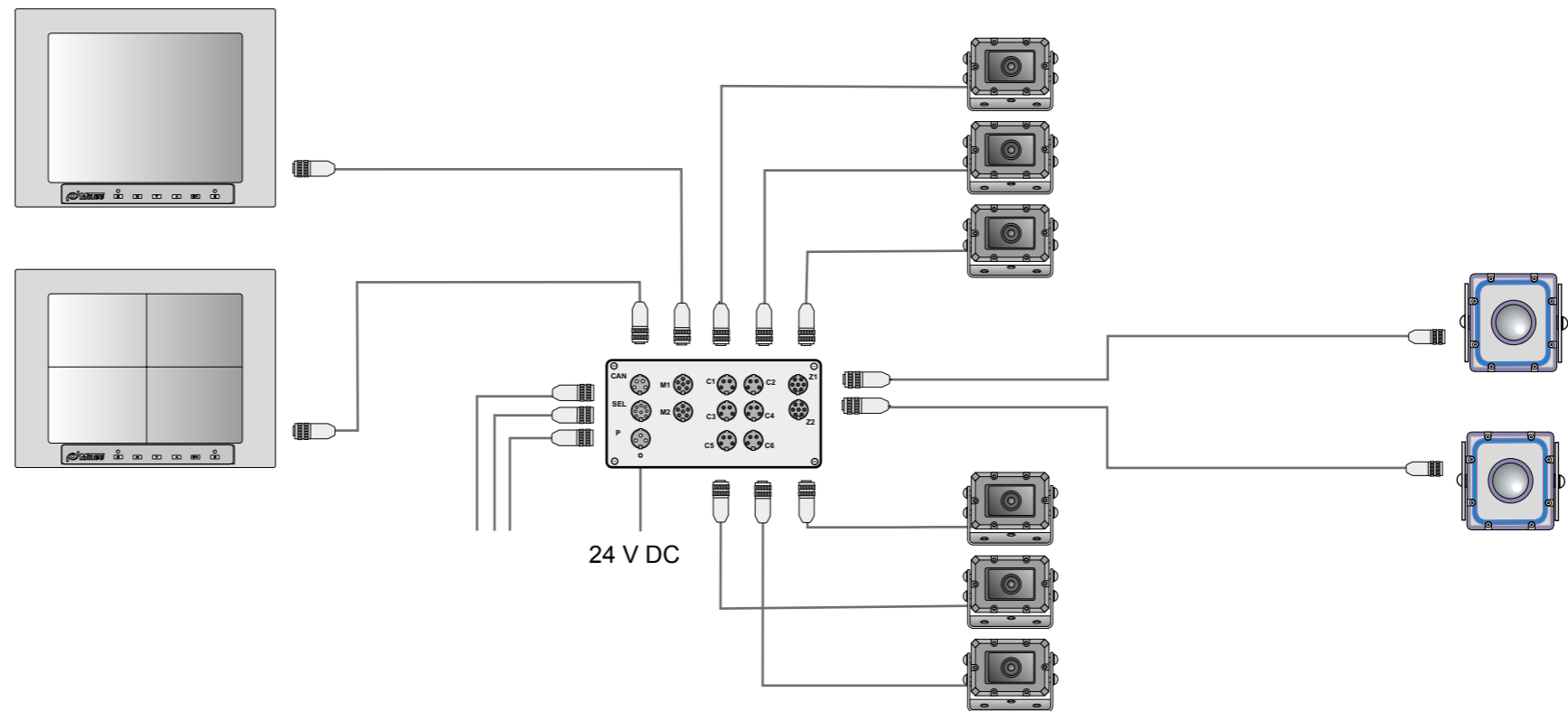
An intelligent and expandable camera and monitor system optimally supports the crane operator in these issues and thus ensures efficient and cost-saving operations.



Motec camera and monitor systems used in load monitoring in container, general cargo and bulk handling.



EXAMPLE: Mobile harbour crane



Container and ship-to-shore cranes

View on the travel path during container handling

The restricted field of sight of a crane operator for container and ship-to-shore handling equipment greatly raises the risk of a collision with people, lorries or other objects. An intelligent camera and monitor system with video control unit surveys the travel path in both directions and simultaneously displays up to 4 camera images on a single monitor.

The crane operator sees the travel path area and load in one direction of view. Dangerous situations can be seen early without twisting the upper body ensuring an ergonomic, efficient and cost-saving operation.



Rail-bound mobile harbour crane handling containers.

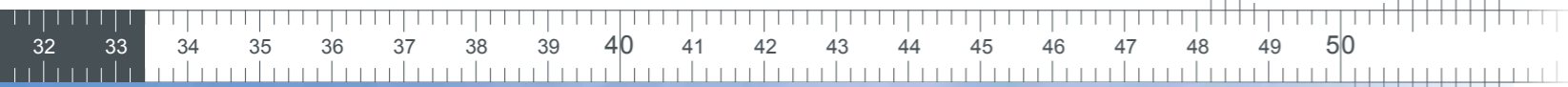
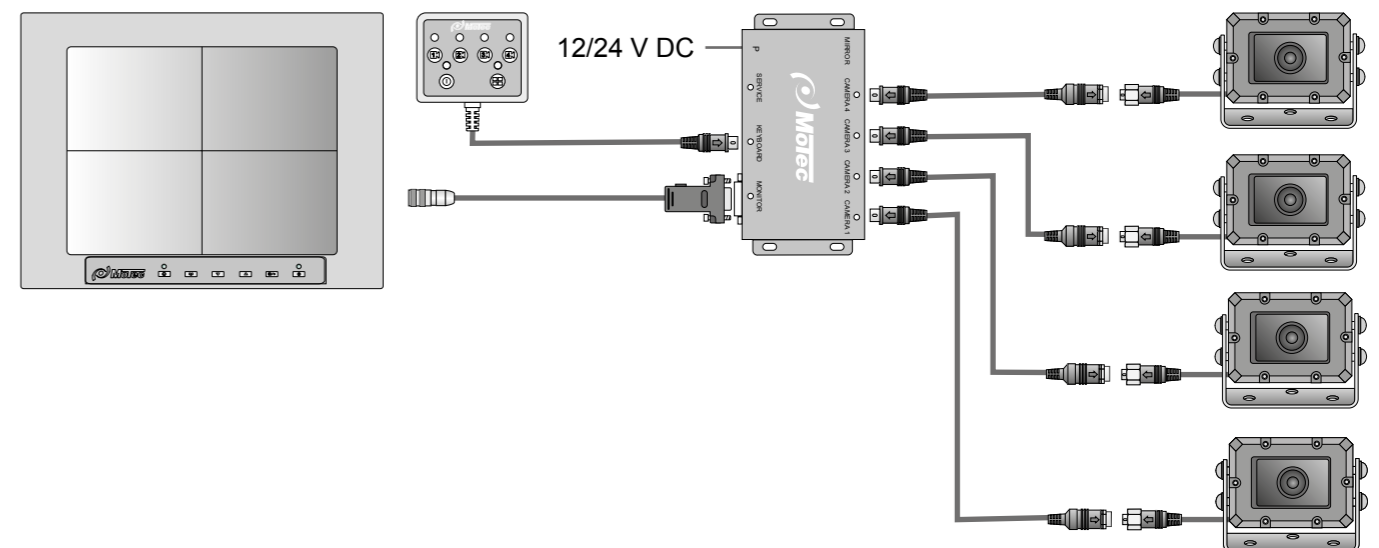


EXAMPLE: Container crane

1 MD3100
Heavy-duty monitor

2 MB1405-Quad
Video controller

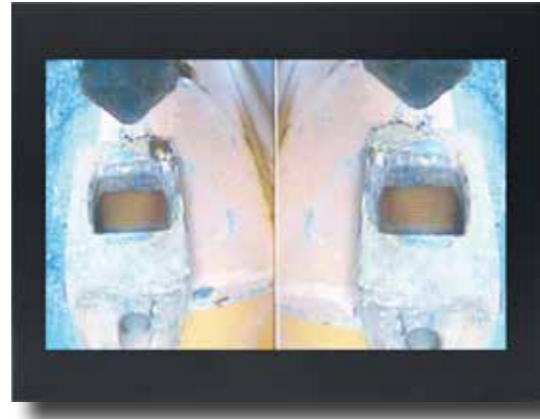
3 MC3000B
Heavy-duty camera



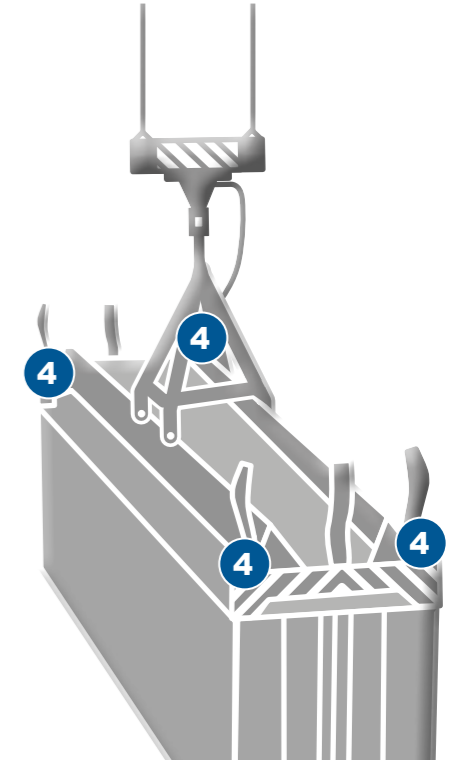
Spreaders

View on the load during container handling

Dock charges in the harbour are very high, making time a key factor in container handling. A camera and monitor system support efficient operation. Thanks to the rugged cameras at the spreader, the containers are securely and quickly picked.

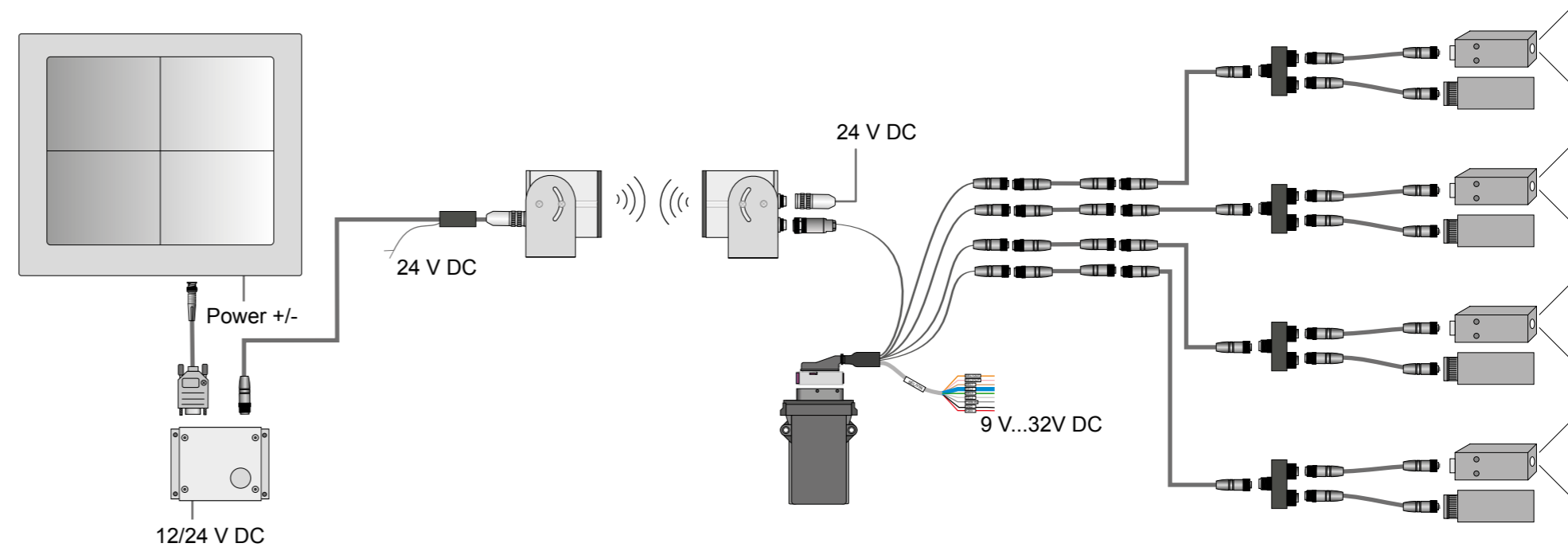


Container bridge with spreader. Twistlock cameras help in centring the spreader during positioning on the container.



EXAMPLE: Spreader

- 1 17"/19"
Metal housing monitor
- 2 MVR5200-1
Wireless system
- 3 MVCU1401
Video controller
- 4 MC9150P+MPL
Heavy-duty camera



Reach stackers

Twistlock monitoring and manoeuvring aid during container handling

Dock charges in the harbour are very high. Hence, the key factor in container handling is time. A camera and monitor system for twistlock monitoring supports efficient working processes and secure container positioning. An additional camera in the vehicle rear allows for a view of the rear space.

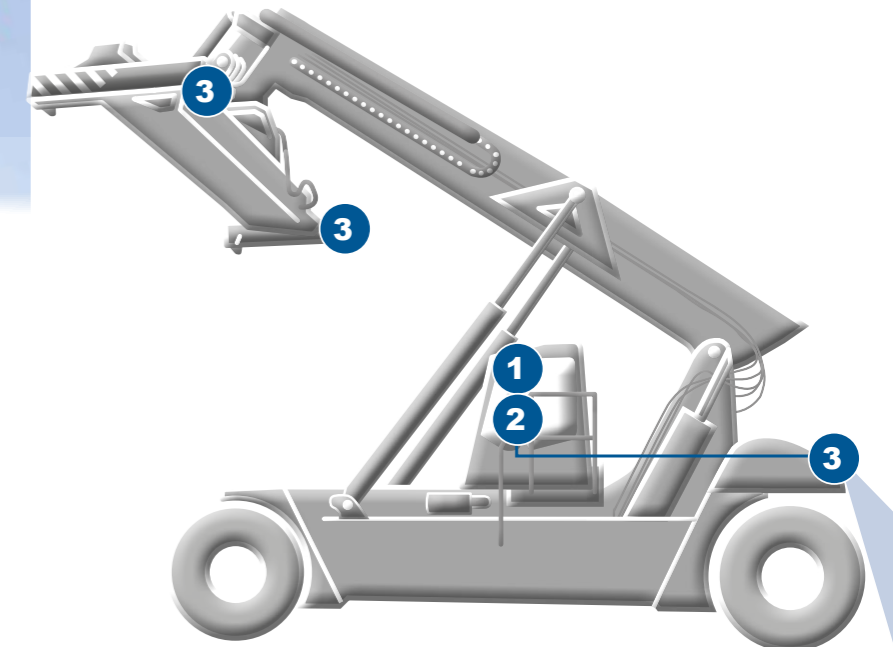
If required, all images are displayed on one monitor. Twistlocks, load and rear space are in the operator's direction of view ensuring an ergonomic, efficient and cost-saving operation.



Motec rear camera – very important for the highly agile reach stackers.



Twistlock camera.

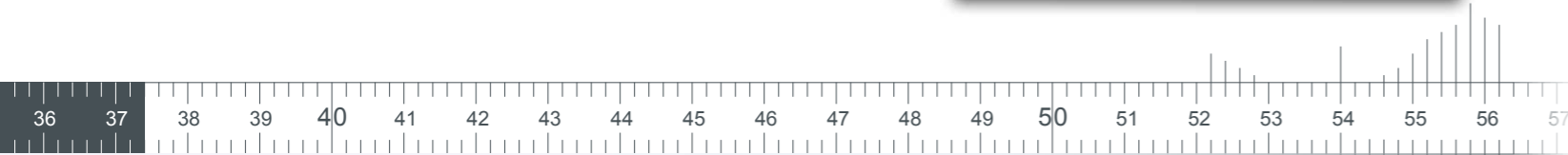
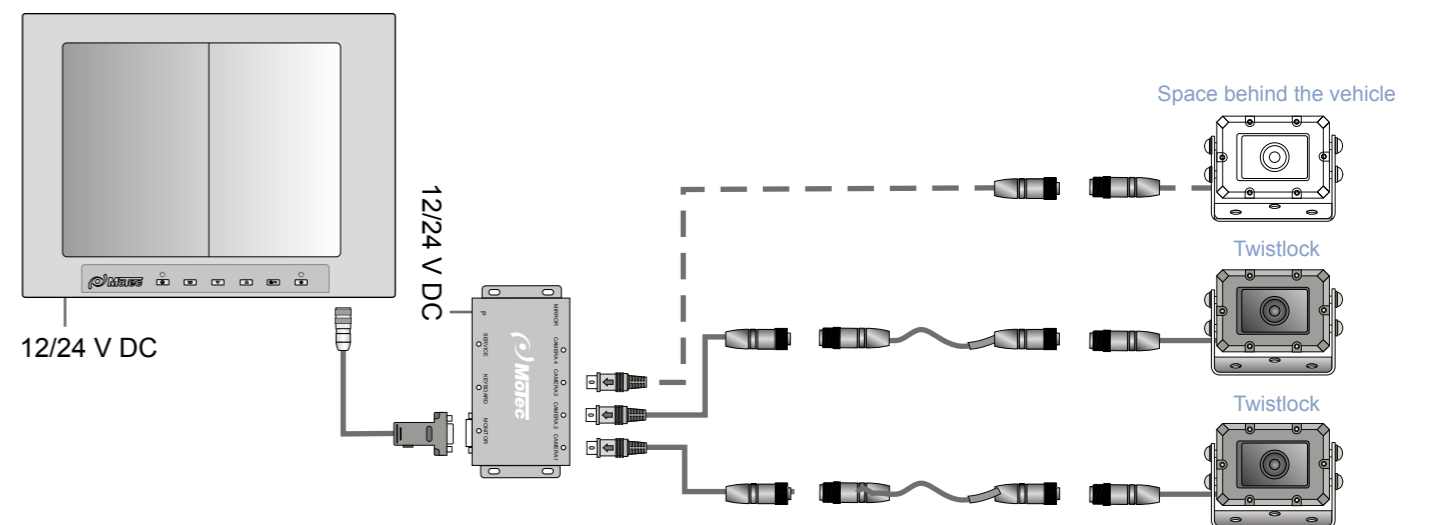


EXAMPLE: Reach stacker

1 MD3100
Heavy-duty monitor

2 MB1405-Quad
Video controller

3 MC3000B
Heavy-duty camera



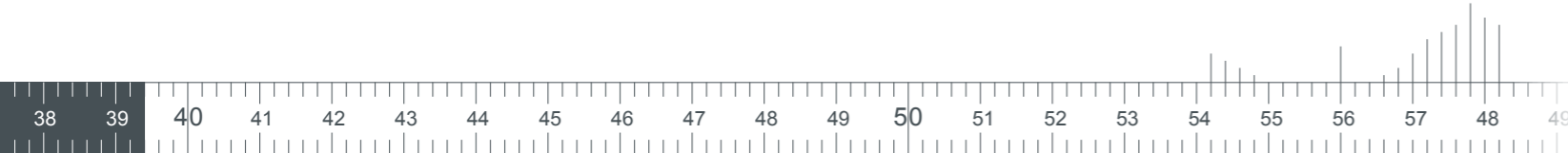
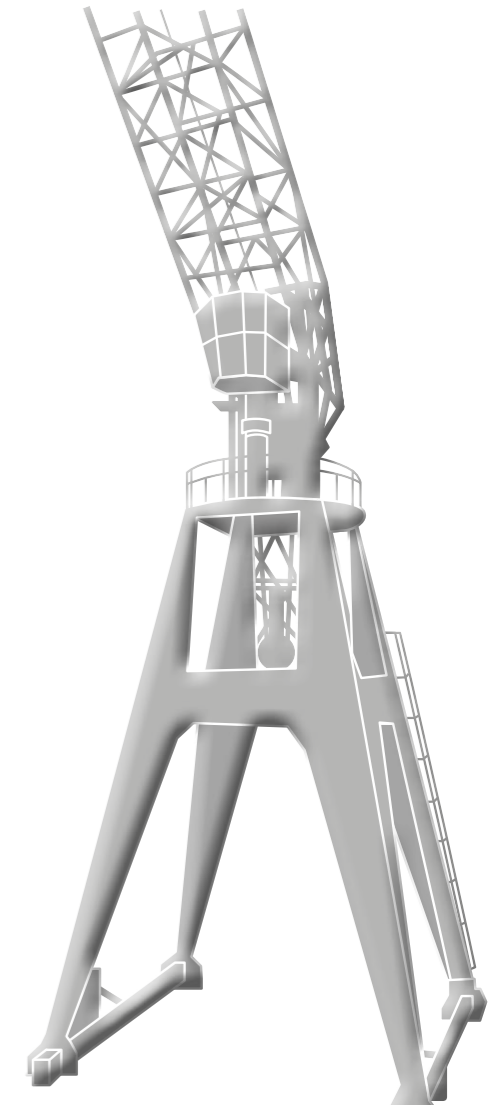
Ship cranes

Quick and safe material handling

Dock charges in the harbour are very high. Hence, the key factor in material handling is time. Camera and monitor systems support efficient working processes. Thanks to a motor zoom camera, the crane operator can constantly observe the loads even when they are placed in the hull. The zoom feature allows monitoring the danger zone during slewing.



Container handling with twistlock cameras increases the efficiency of ship cranes.

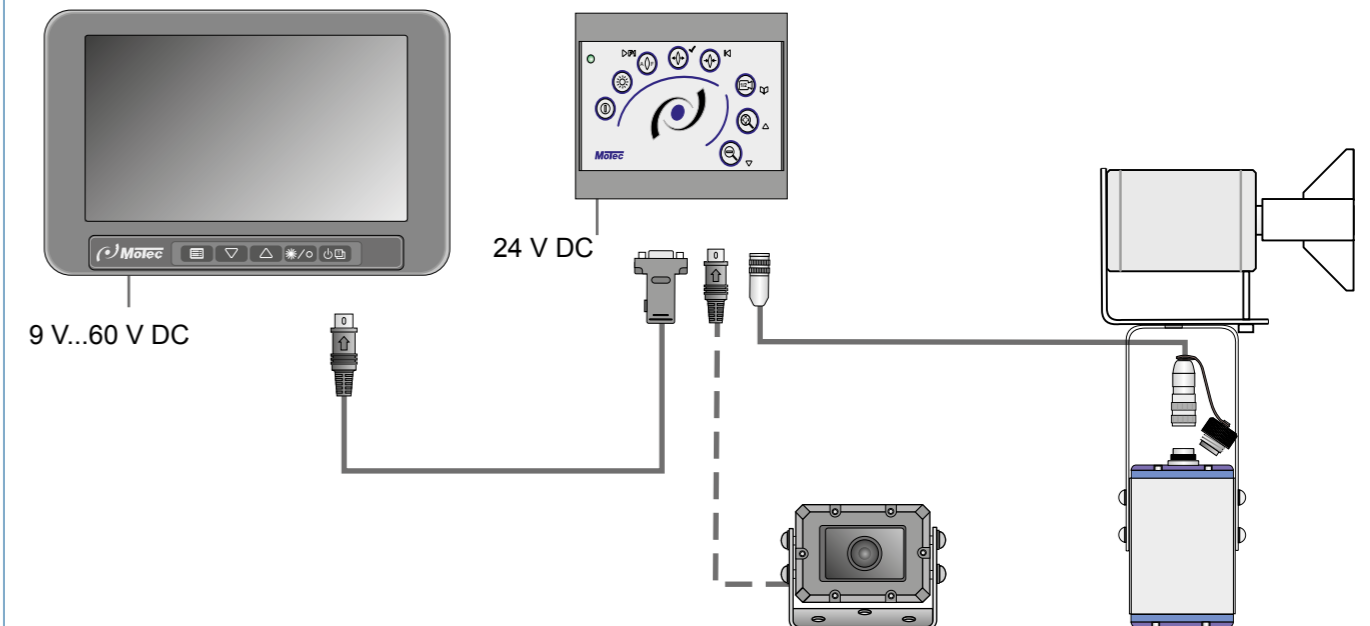


EXAMPLE: Ship crane

1 MD3071A
Heavy-duty monitor

2 MBE5200-1
Operator control module

3 MC5200-1
Heavy-duty motor zoom camera



Offshore cranes

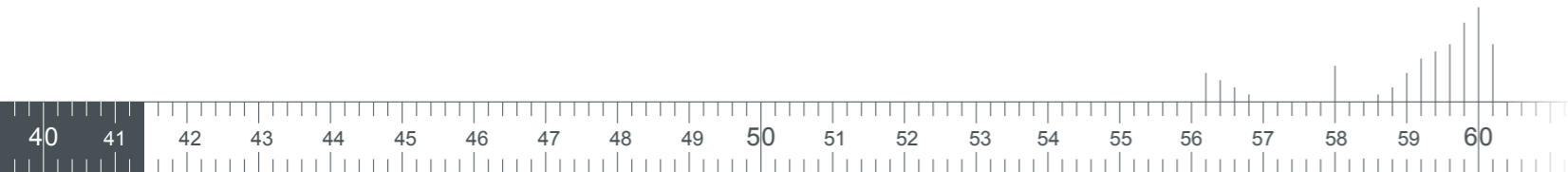
Safe material handling in explosion-protected areas

Offshore cranes are often subject to particular safety requirements. For them to efficiently and safely operate on high seas, they must be fitted with suitable equipment such as an EX-protected heavy-duty camera.

Expensive downtimes due to incorrect reeling in and out, slack cable formation or diagonal tension of the cable can thus be avoided.

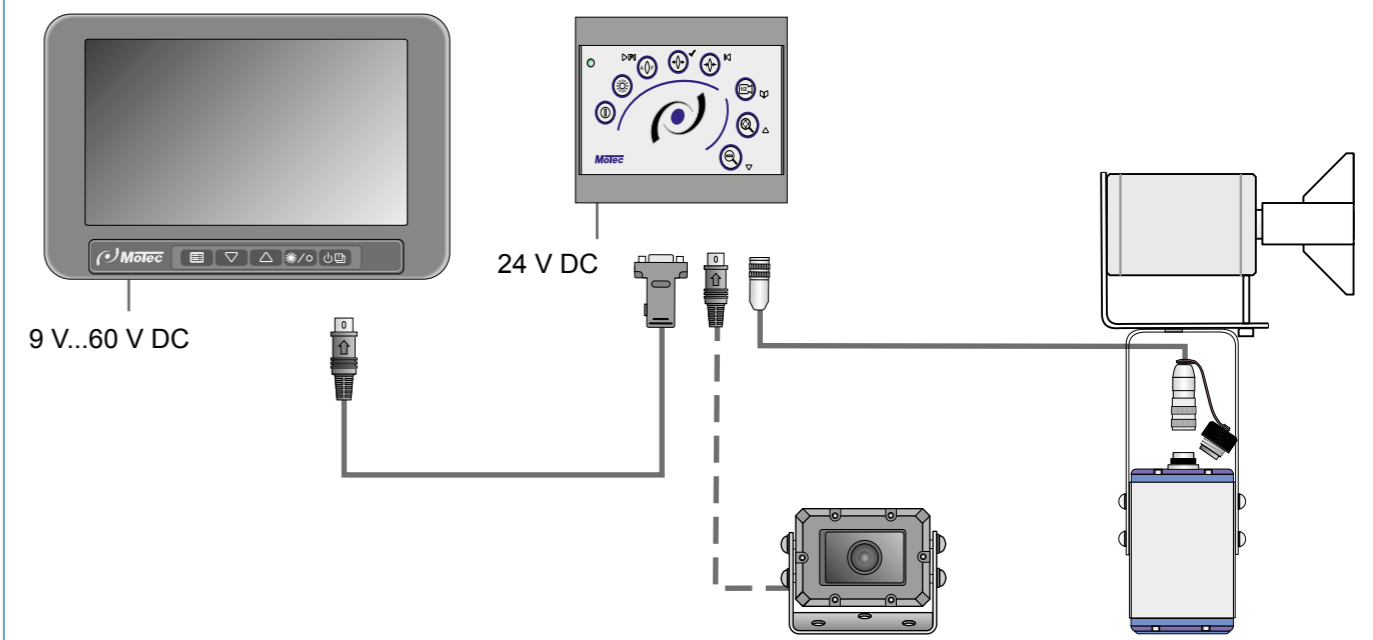


Offshore structure on open sea. Camera and monitor systems provide more precision in crane movements.



EXAMPLE: Offshore crane

- 1**
MD3071A
Heavy-duty monitor
- 2**
MBE5200-1
Operator control module
- 3**
MC5200-1
Heavy-duty motor zoom camera

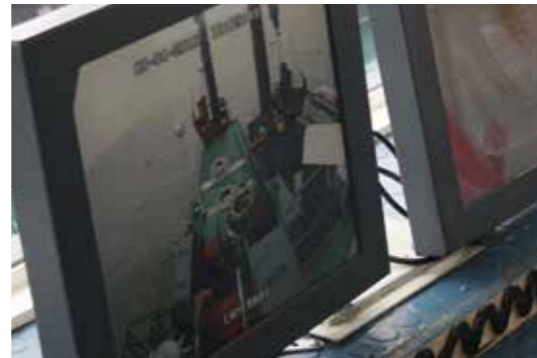


Floating dredgers

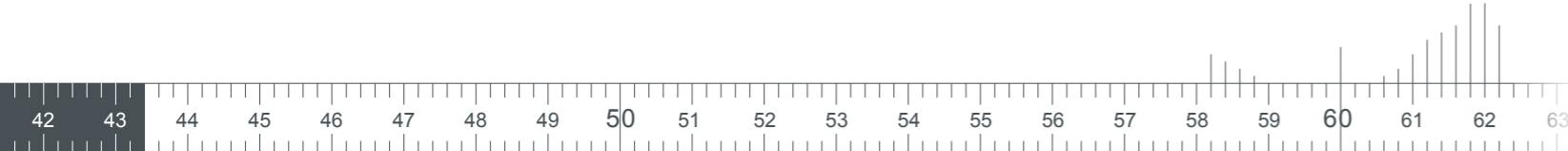
Special solutions for offshore applications

The demands of floating dredgers on a camera and monitor system are high with regard to system complexity and material strength. All system components are individually adapted and matched for the specific requirement.

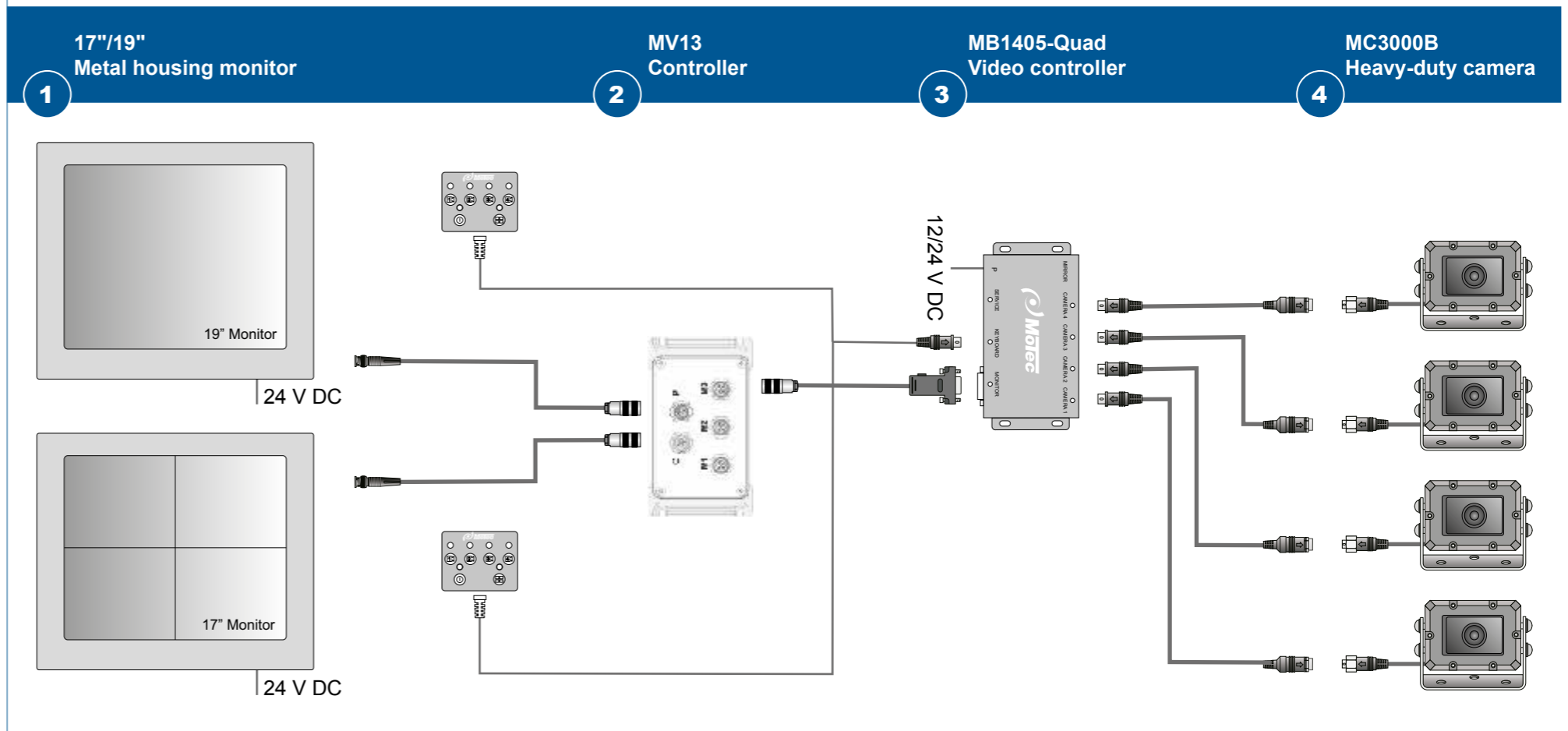
Special cables are used to send the images monitoring the lifting unit, the spiral drill, the engine chamber and the anchoring to one or several monitors. Safe and efficient operation is thus assured.



Stationary "Pirate X" cutter suction dredger off the coast of Lower Saxony. Fitted with a Motec camera and monitor system for monitoring cable winch winding, for example.



EXAMPLE: Floating dredgers



Cameras for construction equipment and vehicles

Overview



MC3000B Heavy-duty camera

The robust MC3000B reliably deals with visibility issues in daily heavy-duty operation. Thanks to its anodised and varnished aluminium housing, it defies even extreme weather and ambient conditions. The numerous available angles of view and plug-in connections offer a wide spectrum of applications in utility vehicles and mobile machinery.

Features:

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

MC5200 Heavy-duty camera

The MC5200 heavy-duty **motor zoom camera** has been developed specifically for load monitoring on cranes. Modern video module technology returns sharp, high-contrast images and allows zooming to 216x. Operation of the camera is simple, thanks to the Motec system bus (MSB).

Features:

- . Housing made of machined aluminium
- . Supreme shock- and vibration-resistance
- . Sharp, high-contrast images
- . Automatic brightness adjustment
- . 18x optical zoom, 12x digital zoom
- . Horizontal angles of view from 1.6° to 47.5° degrees
- . Automatically-controlled camera heating
- . Motec system bus (MSB)
- . Highest protection class IP69K

MC7000P Heavy-duty camera

The MC7000P has been developed specifically for lateral space, mirror-replacement and the surveillance of work areas. The compact design enables a multitude of applications.

The rugged and weather-proof housing from plastic or aluminium allows its use in extremely severe environments.

Features:

- . State-of-the-art image electronics (CMOS image sensor)
- . High shock- and vibration-resistance
- . Fast adaptation to ambient lighting
- . Sharp, high-contrast images
- . Highest protection class IP69K

MC7180N-4 Heavy-duty camera

The MC7180N-4 **panorama camera** is the ideal camera for heavy-duty 270°-/360° viewing systems.

The 180° angle of view and the small design enable adaptation to very different vehicle and visibility situations. But as a single camera, the MC7180N-4 is also suitable for heavy-duty applications requiring housings resistant to high-pressure cleaners.

Features:

- . Resistant to high-pressure cleaners (IP69K)
- . Operating and storage temperature -40 °C to +85 °C
- . CMOS 1/3.6" image sensor with sensor resolution H 672 x V 492 pixels
- . 180° horizontal viewing angle

MC9150P Heavy-duty camera

The design of the MC9150P has been specifically developed for use as **reach stacker or stacker camera**. Thanks to its rugged design and pinhole lens, it is protected from impact and lens damage.

Mounting the camera on the fork back and its 50° angle of view allow direct sight on both fork tines.

Features:

- . State-of-the-art image electronics (CMOS image sensor)
- . High shock- and vibration-resistance
- . Optimal images even at low light
- . Pinhole lens (3 mm)
- . Highest protection class IP69K

Monitors for construction equipment and vehicles

Overview



MD3071A Heavy-duty monitor

The design and the integrated functions of the robust heavy-duty MD3071A monitor allow for a multitude of applications such as vertical and horizontal versions in an MVS system. The display returns crystal-clear images even under severe environmental conditions. Software updates ensure that the monitor is always state-of-the-art and thus perfect for future needs.

Features:

- . 7" monitor (17.8 cm diagonal)
- . PAL/NTSC video system
- . Supply voltage 9 V to 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 protection cover (impact-protected) as standard
- . Made in Germany

MD3072B-Quad Heavy-duty monitor

Up to 4 camera images can be simultaneously displayed on the MD3072B-Quad with built-in video control unit. The integrated menu function and control cable for the automatic control of the connected cameras allow fast image changes.

Features:

- . 7" monitor (17.8 cm diagonal)
- . Instant connection of up to 4 cameras
- . Split screen (display of up to 4 video sources at the same time)
- . Manual or automatic camera selection
- . Image mirroring (by camera)
- . High shock- and vibration-resistance
- . Built-in video control unit

MD3074A-Quad Heavy-duty monitor

The MD3074A-Quad is a rugged heavy-duty monitor with degree of protection IP65 (proof against water splash). Simultaneous display of 4 camera images, including interval-controlled image-feed change.

Features:

- . 7" monitor (17.8 cm diagonal)
- . Instant connection of up to 4 cameras
- . Image mirroring
- . Water-tight and suitable for cold storage monitoring
- . Split screen (display of up to 4 video sources at the same time)
- . Horizontal image mirroring can be configured separately
- . Interval-controlled image feed change possible
- . Heated panel – smooth image display event at low temperatures

MD3100 Heavy-duty monitor

The MD3100-20 is fitted with a 10" display and is thus suitable for the simultaneous display of multiple camera images. A powder-coated metal housing with the front meeting the requirements of IP54 allows industrial applications.

Features:

- . 10.2" monitor (25.9 cm diagonal)
- . Picture-in-picture (PIP) display
- . Sturdy metal housing
- . Front side degree of protection IP54
- . For ultra-severe environmental conditions
- . Power supply via MVCU

17" Metal housing monitor

Thanks to its large diagonal, the TFT17 monitor permits the representation of complex image combinations as they frequently occur in industrial and stationary applications. Because of its high resolution, this 17" monitor with front-side degree of protection IP65 returns detailed and sharp images.

Features:

- . 17" monitor (43.2 cm diagonal)
- . Industrial and stationary applications
- . Rugged and strong metal housing
- . Front side degree of protection IP54

Control and operating units for construction machinery and vehicles

Overview



MB1405-Quad Video controller

The MB1405-Quad operating unit enables the simultaneous display of up to 4 camera images in the so-called quad-split mode.

The supplied remote control is used to manually switch between the different camera images. Automatic control of all cameras and the image-splitting function is also possible.

Features:

- . Integrated split & quad function: Display of up to 4 camera images
- . Selection of the camera to be activated via control leads or operator control module
- . Power supply of TFT monitor and 4 heavy-duty cameras
- . Separate setting of image mirroring
- . Automatic trailer detection of articulated trains

MBE5200-1 Operator control module

All functions of the MC5200-1 motor zoom camera can be conveniently operated with the MBE5200-1 operator control module.

The module also offers an expansion option for connecting an additional fixed focal length camera.

Features:

- . Digital control of the motor zoom camera and the crane wireless system
- . Heavy-duty camera via input 2
- . Functions may be controlled via external signals
- . Connection of a second monitor possible

MVCU1500 Video controller

Whether split, quad or picture-in-picture (PIP) – the operator can individually select the required representation. Every camera may be controlled via freely programmable control leads or CAN bus.

Features:

- . Connection of up to 6 heavy-duty cameras, 2 motor zoom cameras and 2 monitors
- . Freely programmable image representation
- . Integrated power supply
- . Diagnostic and fault memory
- . Individual OSD output

MVCU1300 Video controller

The MVCU1300 is an intelligent, CAN-controlled heavy-duty video control unit, capable of combining video and additional sensor information (such as ultrasound distance data) and outputting on up to 2 monitors.

Features:

- . Connection of up to 12 analogue or digital single-wire sensors
- . Connection of up to 10 sensors on CAN bus
- . Connection of one LASER (I/O) per control lead
- . Control via CAN bus (MSB 2.0) and/or 4 control leads
- . Output of imported sensor data via
- . MVCU acts as power supply

MVCU1400 Video controller

The MVCU1400 is an intelligent, CAN-controlled heavy-duty multi-camera video control unit, capable of processing up to 4 camera images and displaying them on up to 2 monitors in various modes.

Features:

- . Connection of up to 4 heavy-duty cameras or 3 heavy-duty cameras plus one motor zoom camera
- . Control via CAN bus (MSB 2.0), a monitor toggle lead and/or 4 control leads
- . Main monitor output as single, split, triple or PiP (freely configurable),
- . Quad and OSD in 4 colours
- . Monitor output 2 (single, split, quad)

MVCD1000 Video controller

The MVCD1000 is a digital heavy-duty multi-camera video control unit for the parallel processing of up to 4 camera images, merging them with other sensor data and outputting via monitor output or Ethernet video stream.

Features:

- . Integration in vehicle electronic via bidirectional control lead, CAN interface or Ethernet connection
- . System expandable with active sensors such as radar or ultrasound (sensor fusion will soon be available)
- . Altera FPGA (SoC) with 925 MHz dual-core ARM Cortex-A9 MP Core processor, 1GB RAM, 4 GB Flash (expandable)
- . Video input up to 4 cameras (PAL/NTSC)
- . Video output via analogue monitor output (FBAS) and video streaming via Ethernet (soon available)
- . Prepared for future requirements thanks to software updates

Wireless systems for construction machinery and vehicles

Overview



MVR5200-1

Video data wireless system

The MVR5200-1 video data wireless system enables the interference-free transmission of the images sent by a MC5200-1 motor zoom camera.

In addition to the image transmission to the video receiver, the signals required for camera control are also sent to the camera via integrated data radio transmission.

Features:

- . Interference-free image transmission
- . Range approx. 300 metres
- . Up to 5 video channels – automatic selection of the optimal channel
- . ISM band
- . Integrated data radio transmission for camera control

MVRD1000

Digital wireless system

The MVRD1000 digital wireless system is a robust sender/receiver system for wireless image transmission. Using the compact wireless units, digital camera signals are quickly and without delay sent over long distances to the monitor.

Features:

- . Large range (up to 120 m)
- . Digital radio
- . Up to 10 parallel equipment pairs
- . Robust metal housing
- . Operation and status display
- . Small, compact design
- . Water- and dust-tight (IP69K)
- . Rugged plug-in connectors
- . Low power consumption

In-house cable and cable harness assembly

High flexibility – Certified quality



52 53

Cables and cable harnesses, accessories and cable protection systems as well as customised solutions

Motec GmbH has more than 25 years of expertise in assembling high-quality, customised cable systems in Germany. At this point in time, we produce approximately 1.000 different cables in various lengths and designs.

Individually-customised solutions are our specialty: We use all standard plug-in connectors and can produce complex cable harnesses and cable sets.

We process any type of wire or conductor, with diameters from 0.013 mm² (AWG36) to 107.2 mm² (AWG 4/0), without any limits in the number of conductors.



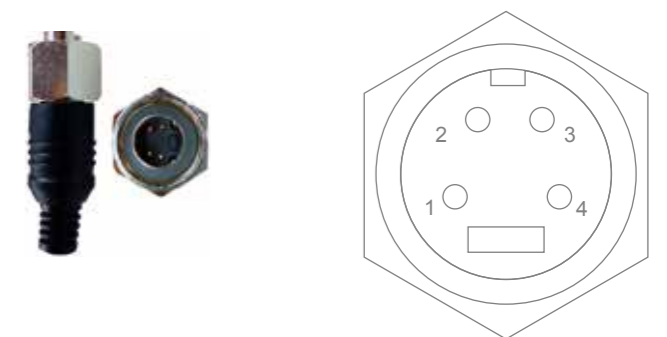
Certified quality for highest demands

- . Pull testing
- . Micrograph laboratory
- . Crimp height measuring
- . Automatic crimping force monitoring
- . 100 % semi-automatic, logged and functional end testing
- . EDP-supported merchandise management and production planning and control systems
- . Operational data recording via bar code
- . 100 % traceability (via batch and serial numbers)

M12 plug MKS10 cabel



Mini DIN plug MKW10 cabel



KSB693 plug MK35 cabel

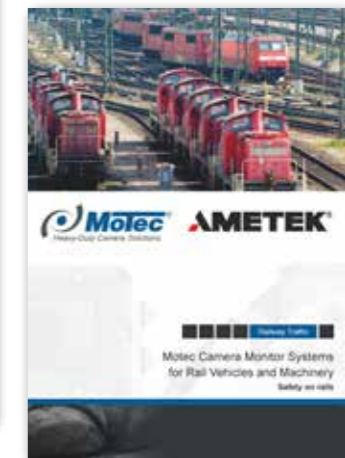
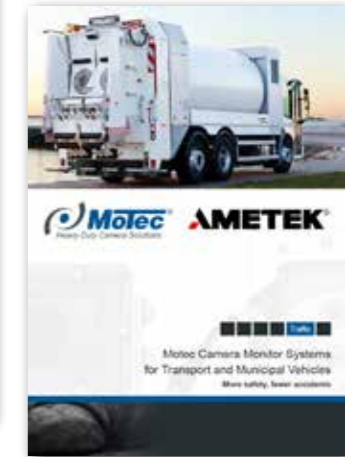


KSB423 plug MK24 cabel



System solutions

Customised solutions for numerous other industries



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

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