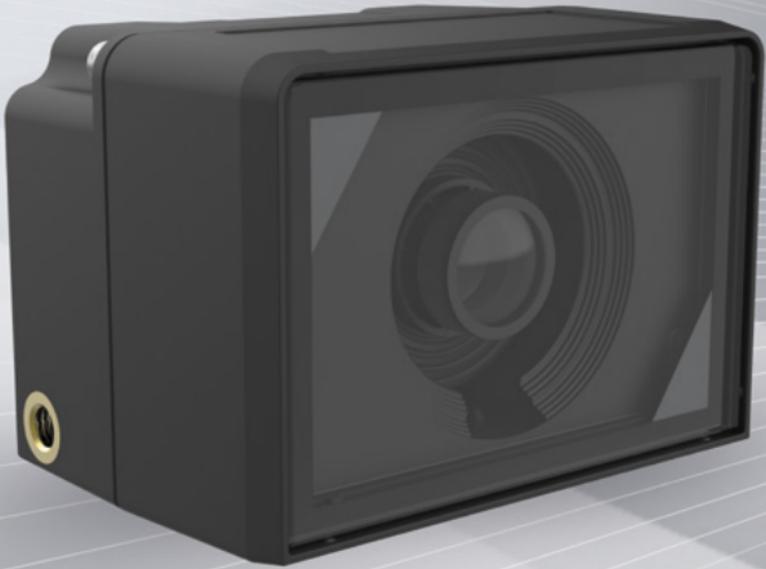


The ideal answer to all lighting conditions

## **MDC3 Digital Smart Camera**

Image quality in HD resolution



# **LIEBHERR**

## Multi-talented in third generation



### **The solution for mobile machinery**

The smart camera MDC3 provides digital images in HD quality with a resolution of 1280 x 960 pixels. Due to its robustness and adaptability to constantly changing lighting conditions, the camera is the ideal solution for mobile applications.

### **Best image quality in any lighting situation**

The smart algorithm ensures rapid readjustment for light-dark transitions without flutter. The integrated high-performance imager also ensures good visibility in very dark environments with an illuminance level of 1 millilux.

### **Important image details**

Thanks to High Dynamic Range (HDR) the MDC3 can take several pictures simultaneously at different brightness levels and combine them into the ideal image. The camera can then deliver up to 40 perfectly-presented high-contrast images per second.

What is more, the MDC3 has a very high contrast range of 132 dB, offering you lots of important image details on the monitor, for greater efficiency and work safety.

### **Proven robustness**

In third-generation: thanks to the IP6K9K rating and its fibreglass-reinforced housing the MDC3 takes even the harshest operating conditions in stride.

# Integrated smart features

## Relieve your control system

The smart camera can be configured to process the image in the camera itself. The image is then sent as desired to the display unit without any additional computing power required.

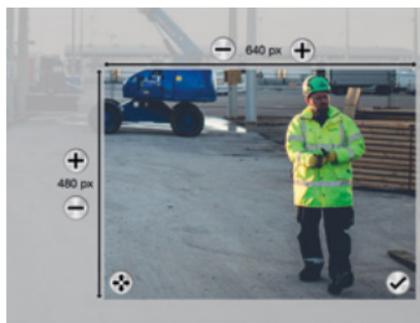
## Smart features in detail

- Mirroring and flipping
- Live indicator: signals the camera's activity status
- Manual or automatic image configuration: such as brightness, contrast
- Multicast: sending a picture stream to several displays simultaneously
- Network configuration: either static or dynamic via DHCP

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### Lens correction

This feature eliminates the fish-eye effect, offering the driver far easier image interpretation, for greater comfort and work safety.



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### Digital zoom

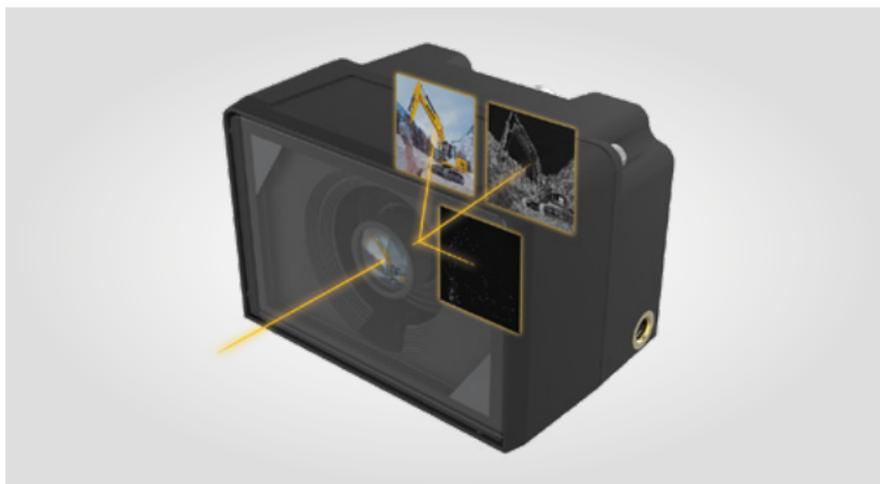
The integrated digital zoom makes it possible to focus on a specific zone, for example, a work process. The zoom is individually adjustable.

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### Clear vision under extreme conditions

Anti-ice and anti-fog function: The MDC3 is equipped with an integrated glass heater. As a result, the camera provides clear images even at extreme temperatures – very shortly after machine start-up.

## Image sensor



### **Embedded image processing features**

Integrated sensor technology: The camera recognises movements in the field of view and can determine movement vectors. Based on this optical flow, it is possible to predict the direction in which objects are moving and their speed. Additionally the digital camera allows for edge detection.

These sensor functions make the MDC3 ideally suited as a reliable image sensor in environment recognition systems, thus enhancing the operational safety of mobile machinery.

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### **Easier system architecture**

Second Ethernet connection thanks to integrated switch: Link up any number of cameras in series (daisy chain) and via just one connection to the control system of your machine. That saves a cost-intensive additional switch and simplifies wiring layout.



# Technical data



## Rapid image preparation

The MDC3 digital smart camera has a very short latency time. Within less than 75 milliseconds it transmits the acquired image to the interface. This enables the implementation of a safe Camera-Monitor-System as per ISO 16001, for example together with Liebherr's DC5 display controller.

## Technical data

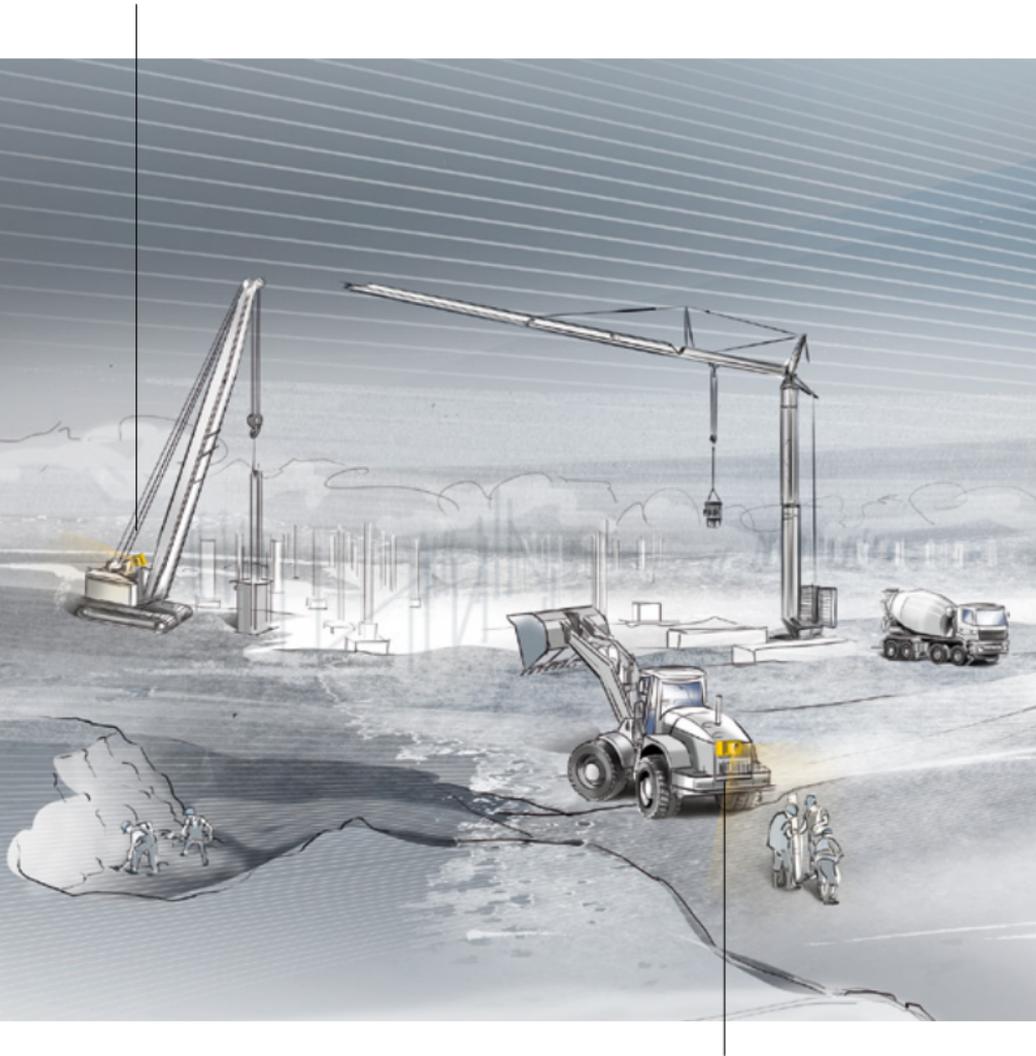
Image resolution	320 x 176 to max. 1,280 x 960
Colour resolution	24-bit HDR
Field of view	HFOV: 30°, 60°, 90°, 120° <sup>1)</sup>
Latency	≤ 75 ms (image to interface)
Frame rate	Max. 40 fps
Video format	MJPEG/H.264
Ethernet	2 x 100BASE-TX in accordance with IEEE 802.3
Operating voltage	9 V to 32 V
Power rating	6 W to 24 W
Dimensions (L/W/H)	77 x 60 x 55 mm
Weight	Approx. 160 g
Housing	PA66 GF50
Connector type	2 x M12-8A (male/female, incl. 4 pins PWR)
Operating temperature	-40 °C to +85 °C
IP rating	IP6K7, IP6K9K in accordance with ISO 20653

<sup>1)</sup> Further horizontal field of view angles upon request

## Application examples

### **Winch camera**

On a crane, serious damage can be caused by the incorrect winding of a rope. The MDC3 can provide an optimum view of the winch in real time. Through monitoring of the winch, costly damage to the rope can be avoided and downtimes reduced.



### **Obstacle recognition**

Obstacles in the work environment can lead to workplace accidents if not spotted in good time. The MDC3 makes prompt image acquisition possible thanks to edge image and optical flow technology. The reliable detection of the edges and movement vectors of an object is an important component for implementing environment recognition systems. This enhances both safety at work and efficiency.

## Monitoring the work environment

When the driver moves a machine backwards or sideways, a reliable depiction of the work environment is all the more important. Thanks to the horizontal and vertical mirror function of the MDC3, the camera is suitable for virtually any kind of position. Thus, the driver can operate the machine safely and comfortably.



## Worksite monitoring

The smart camera is perfectly suited to the monitoring of critical areas. Thanks to the digital image acquisition, a digital image logger can be easily implemented. The comprehensive sensor functions of the MDC3 open up many more additional application possibilities.

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