



Construction Machines

Product Catalog for Camera, Monitor and Mirror Systems

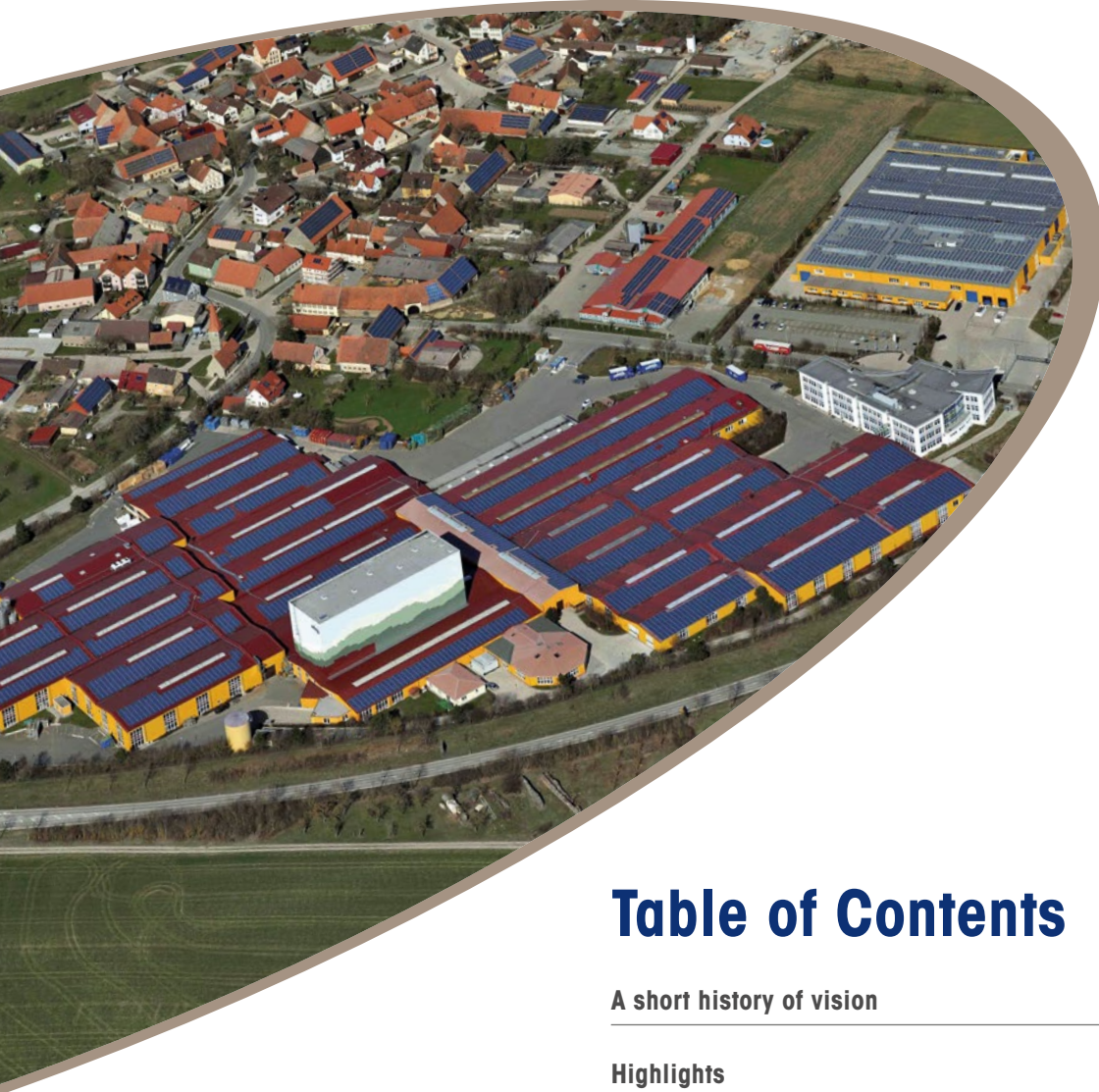


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Editorial

Dear Readers,

We are delighted to provide you with our brand new construction machines catalog.

As a supplier of robust and high-quality indirect vision systems, we offer standard solutions as well as vehicle-specific adaptations and customized products based on your own designs.

Our standardized concepts and related modules enable us to provide optimized mirror and/or camera monitor systems for any type of vehicle.

We would be honored to partner with you in developing flexible and cost effective value-added solutions, and we look forward to your inquiry.

This catalog is designed to provide useful information on the subject of indirect vision as well as a comprehensive idea of Mekra Lang's standard portfolio. As a next step, we would be happy to discuss your specific needs in this area and offer you highly customized systems perfectly tailored to your requirements.

This catalog contains numerous innovations that are based on our long-standing expertise and commitment to the development of pragmatic solutions in the field of indirect vision.

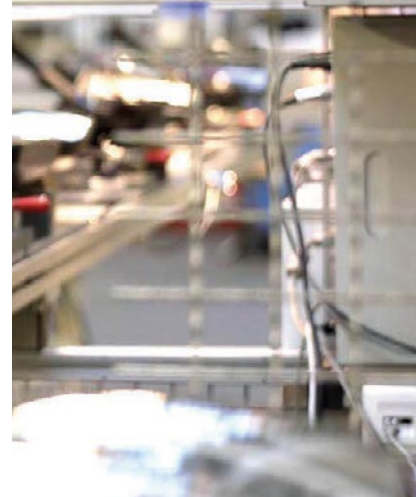
As you will see, our reliable products do not only provide considerable added value but also fundamental benefits for your daily operations.

We look forward to assisting you as you meet your present and future challenges.

With kind regards,



Michael Heckel
Sales Director OFF ROAD



A short history of vision

Toward a new dimension

VISION 1.0

Direct vision

Daily construction work in the 19th century was characterized by hard physical labor. Just about every task was performed



by hand and the use of any kind of machinery was a rarity. Some of the work was facilitated by using horses and horse-drawn carts, and the visibility requirements, both on the construction sites and on the the road, were still sufficiently met by direct vision.

VISION 2.0

Emergence of mechanization

During the 20th century, farm life changed dramatically. Little by little, manpower and horsepower were replaced by machines. The introduction of the excavator and crane, which would quickly prove to be indispensable to the construction industry community, sparked the invention of a range of additional useful construction machines. These developments had a significant impact on the vision requirements for construction vehicles. Rather than



using direct vision, as had been adequate for centuries, mirrors were now employed to monitor the areas around vehicles indirectly.



VISION 3.0

Increase in machine complexity

In the late 1960s, based on decades of experience in the area of mirror production, MEKRA Lang took up manufacturing rear-view and exterior mirrors for the commercial vehicle industry. As construction machines became ever larger and more complex, obstructed vision presented more and more of a problem, placing an extreme burden on drivers and raising safety concerns for machine operators.

New solutions were needed to ensure adequate visibility in construction settings. MEKRA Lang answered the call by initiating its in-house development of camera monitor systems while continuing to optimize its mirror portfolio. This added a critical element to indirect vision solutions, ensuring true 360° visibility around machines. By optimizing the visualization of hazardous areas, MEKRA Lang camera monitor systems enable operators to work safely and much more efficiently. 80 years of development expertise and commitment to the con-



tinuous optimization of machine operations through improved visibility have led us into a new dimension of visualizing the work space.



 **CAB**
Concept Cluster

VISION 4.0

Entering a new dimension

Vision 4.0 is a mirror replacement system for vehicles that uses HDR cameras and monitors exclusively for the first time. All viewing areas are combined and displayed on just one monitor on each side of the cab. By providing the driver with considerable assistance in operating the vehicle, the new system offers important additional safety benefits, such as faster detection of environmental conditions, better assessment of hazardous situations, and significantly improved night vision thanks to the use of particularly sensitive cameras. Additionally, the system's flexibility in terms of camera placement adds a new dimension to vehicle design. A specifically agricultural application of our Vision 4.0 concept can be experienced first-hand in the Genius CAB which was developed as part of the CAB Concept Cluster initiative.

Highlights

Mirror and mounting systems

Modular mirror 1009



- Continuous field-of-vision from close proximity to horizon
- Obstacles and persons are detectable in close proximity
- Reduces risk of injuries and property damage
- Compatible with tube diameters between 18 mm and 22 mm
- Expandable modular mirror system
- Tool-free mirror glass replacement

For a detailed description, please see page 40

Mirror mounting system 1045



- Integrated cable mounting
- Rugged, corrosion-resistant design
- Easy assembly
- Identical mounting hole layout telescop mirror arm 1017
- Horizontal and vertical tube connection
- Long projection to fulfil ISO 5721

For a detailed description, please see page 58

Highlights

Camera monitor systems

Basicline 1038



- Telescopic mirror arm: plastic mounting block instead of pressure-molded aluminium mounting block, one notched operating position
- Mirror head: tool-free mirror glass replacement possible, vertical and horizontal attachment options in a single model
- Integrated cable mounting
- Rugged, corrosion-resistant design
- Easy assembly
- Identical mounting hole layout telescopic mirror arm 1017
- Horizontal and vertical tube connection
- Long projection to fulfil ISO 5721

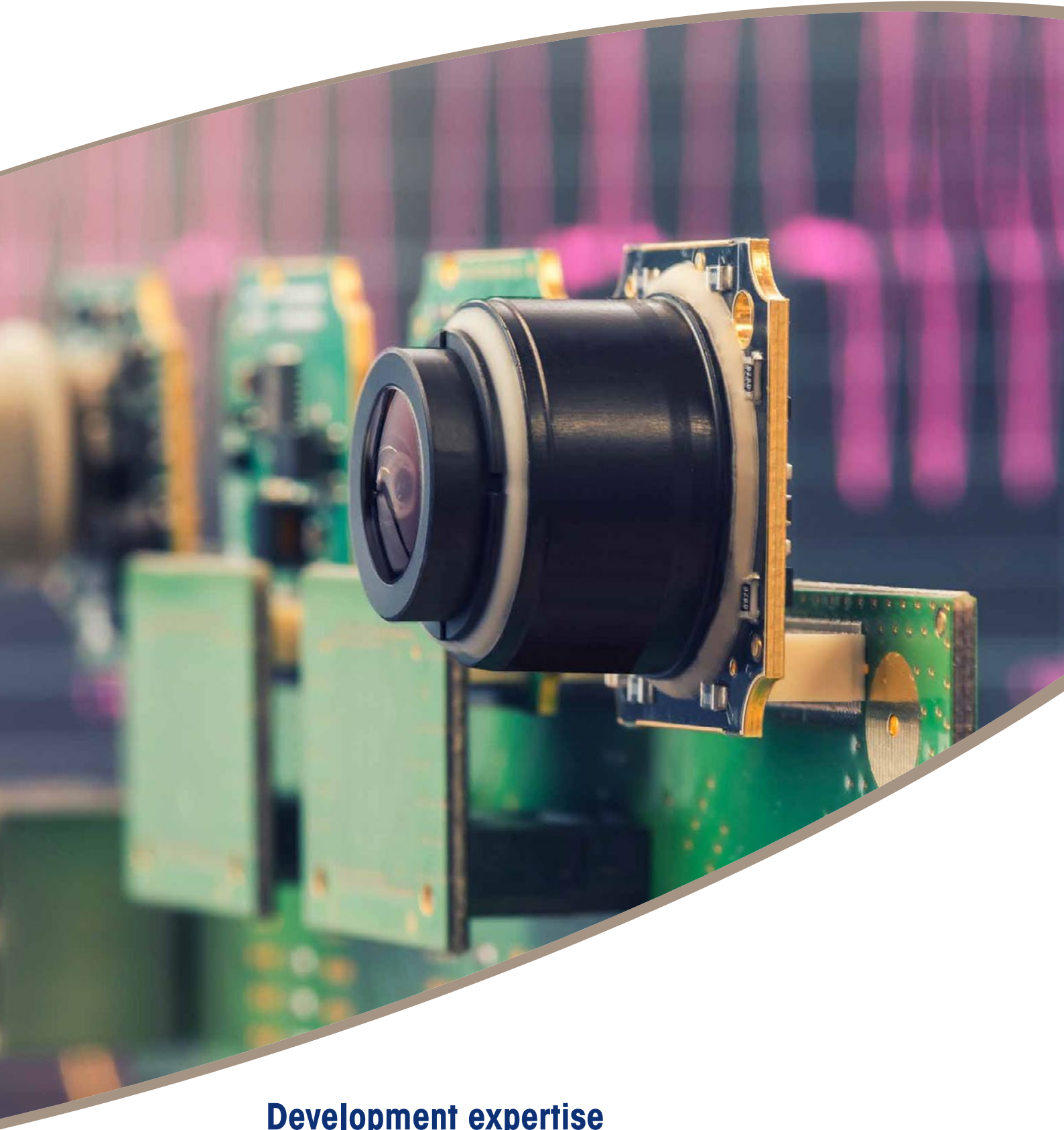
[For a detailed description, please see page 43](#)

Platform camera



- Modular assembly kit, customized solutions to accommodate individual customer requests
- Time and cost efficient adaptability to each camera type
- Discrete and extremely rugged camera components
- Image resolution from standard VGA to 1.2 megapixels
- Analog and digital transmission standards supported
- Various aperture angles can be combined with platform components
- High-performance integrated heating system

[For a detailed description, please see page 64](#)



Development expertise



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Development expertise

Overview of current regulations

Surround vision regulations for construction machinery

The revised Machinery Directive 2006/42/EC forms the legal basis for visibility requirements concerning construction machinery. In this context, compliance with the internationally applicable standards

- ISO 5006
- ISO 14401

is of particular importance because it is directly mandated by the harmonized European Standard EN 474. This means that a surround vision configuration for construction machinery that is in compliance with the provisions of ISO 5006 and ISO 14401 ensures that the general

"visibility" provisions of Machinery Directive 2006/42/EC are also properly met.

ISO 5006

ISO 5006 defines minimum surround vision requirements for construction machinery addressing seven different areas:

- RB: Rectangular boundary drawn around the machine at a 1 m distance. The height of the objects that are located

on the rectangular boundary (Objects of Immediate proximity), and that must be seen by the operator, is depending on the type of machinery according to size (mass).

- A-F: 6 sectors of a 12 m circle drawn on the ground, with the eye position of the

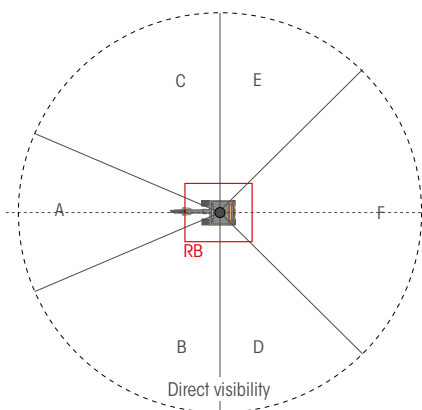
machine operator as the center (relates to objects in indirect close proximity). Objects must be visible in each of these six sectors.

ISO 5006 details the exact visibility requirements for each of the machine types in question (see illustration below).

Visibility areas around a construction machine according to ISO 5006

For each of the seven visibility areas (RB, A-F), subsectors of a certain maximum permissible size are defined, which are allowed to be invisible to the machine operator. The individual measurements depend on specific machine types and weight classifications:

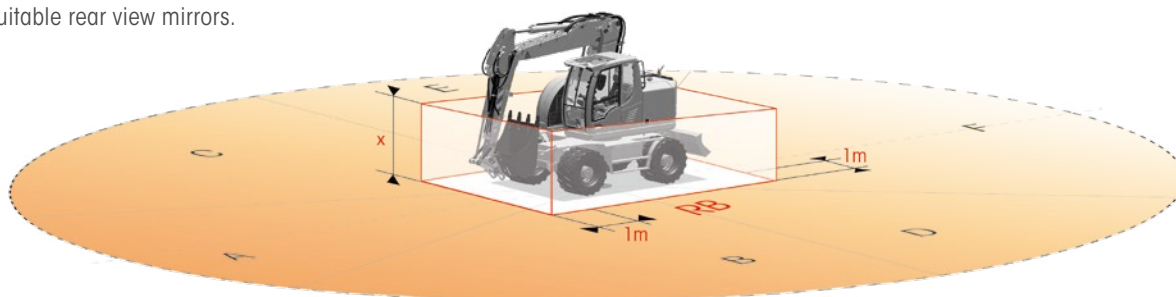
For example, in visibility area A a wheel loader with a total mass under 10 tons is allowed to have a maximum of two concealed areas extending by no more than 700 mm each. For this machine type, concealed areas on the rectangular boundary (RB) may not be wider than 300 mm.



ISO 14401

ISO 14401 contains provisions concerning fields of vision in the rear of construction machinery which need to be made visible by using suitable rear view mirrors.

The fields of vision to be implemented are specified for various types of machinery.

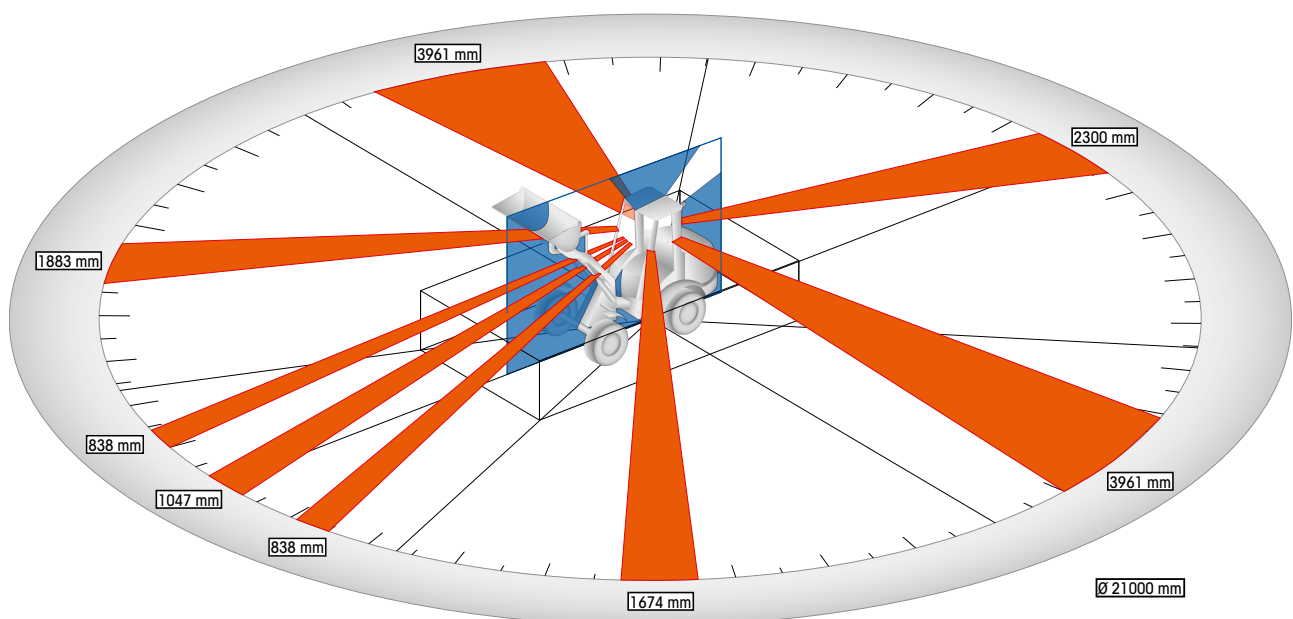
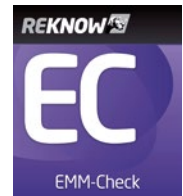


Field of vision study

Using virtual vehicle models, MEKRA Lang conducts realistic field-of-vision studies in-house, ensuring the development of optimized vision systems adapted to individual, vehicle-specific characteristics, such as body shape and cab layout, providing proven safety benefits for everyday applications.

We work with systems that can help you identify potential field-of-vision obstructions early in the development process and show you ways to offset these problems using mirror and camera systems.

www.reknow.de/emm-check/emm-check



MEKRA Lang surround vision systems

The development of surround vision systems is our key competency, and it is our goal to increase work and traffic safety as well as to improve efficiency and performance.

To this end, MEKRA Lang offers a product portfolio that is as diverse and versatile as its many areas of application.

In individual cases, the components must be selected based on the special characteristics of the respective construction machines.

Our highly qualified customer service representatives will help you select a surround vision system that is a perfect match for your construction machine requirements as well as the most efficient solution for you.

Call on us – we love a challenge!



Visibility
increased efficiency
safe operation

Electronics expertise

Modular vision solution for analog and digital applications

The platform concept

Aperture angle selection

We will consult with you to determine the field of vision and the corresponding aperture angle required for your application.



Image processing

Image processing parameters vary depending on the intended purpose of the application. The platform concept makes customization easy and cost efficient.



Transmission set-up

Whether digital or analog, each transmission type has its specific advantages and each application requires the appropriate connection set-up. Our platform concept allows us to accommodate these factors quickly and efficiently.



The benefits of modularity

The MEKRA Lang platform camera and its high quality components are characterized by a high degree of modularity which enables us to offer customized camera solutions perfectly adapted to our customers' preferences.

The camera is particularly well suited for machine applications in the agriculture and construction sectors. Thanks to its modular design, the camera can be **adapted** to any vehicle type quickly and in a cost efficient way.

The individual camera components are extremely **robust** and compact in size (35 x 35 mm). The length of the camera varies with the individual models. The minimum length of every model, however, is 34 mm which makes it easy to **integrate** and attach almost anywhere in or on the vehicle. The modular design allows for a

customized low-cost combination of various image sensors and image processing and transmission techniques optimizing our **adaptation** efforts for each individual customer.

The available image sensors are automotive-grade and offer image resolution from standard VGA up to **1.2 megapixels**. The image processor is matched to the performance characteristics of the specific image sensor. Transmission technology options include analog PAL or NTSC based video transmission as well as digital transmission standards, such as **Fast Ethernet**, BroadR-Reach and LVDS.

It is also possible to combine various lenses with different horizontal aperture angles within the platform components. **Aperture angles** for analog options include 70°, 100° and 120°, and for digi-

tal options 100°, 120°, and 180° (wider aperture angles are also supported).

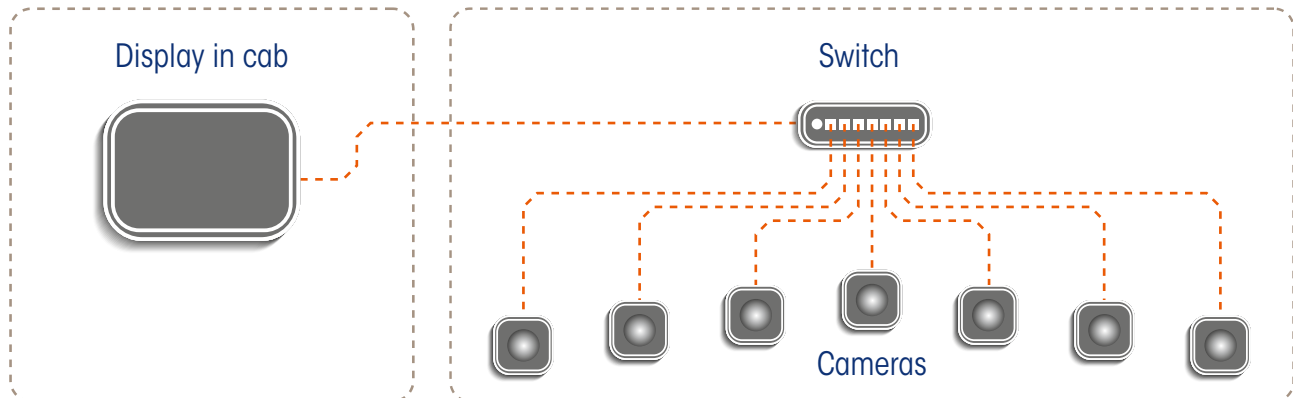
The MEKRA platform camera features an especially rugged **housing** perfectly suitable for rough environmental conditions. And thanks to its high-performance integrated heating system, the camera can be operated under all weather conditions.

Digitization enables new types of application

Digital data transmission allows for significantly higher image resolution. Several cameras connected to a vehicle network share one single data connection between switch and display, which

reduces wiring requirements significantly. This connection supports the transmission not only of image data but also of various other camera control signals, e.g. for activating the cleaning system.

In the future, added value will be created by supporting new systems based on the analysis of digital data collected from the camera's sensor chip.



Specifications overview

Digital ethernet camera

Dimensions	35 x 35 x 49 mm (W x H x D)
Ingress protection	IP 69 K
Operating temperature	-40 °C to +85 °C
Operating voltage	9 - 36 V
Aperture angle (hor.)	100°, 120° or 180°
Image sensor	1.2 megapixels
Image resolution	1280 x 720 pixels
Video transmission	UDP or RTP
Video compression	MJPEG or H.264



Analog camera

Dimensions	35 x 35 x 34 mm (W x H x D)
Ingress protection	IP 69 K
Operating temperature	-40 °C to +85 °C
Operating voltage	9 - 36 V
Aperture angle (hor.)	70°, 100° or 120°
Image sensor	VGA
Image resolution	640 x 480 pixels
Video transmission	PAL or NTSC



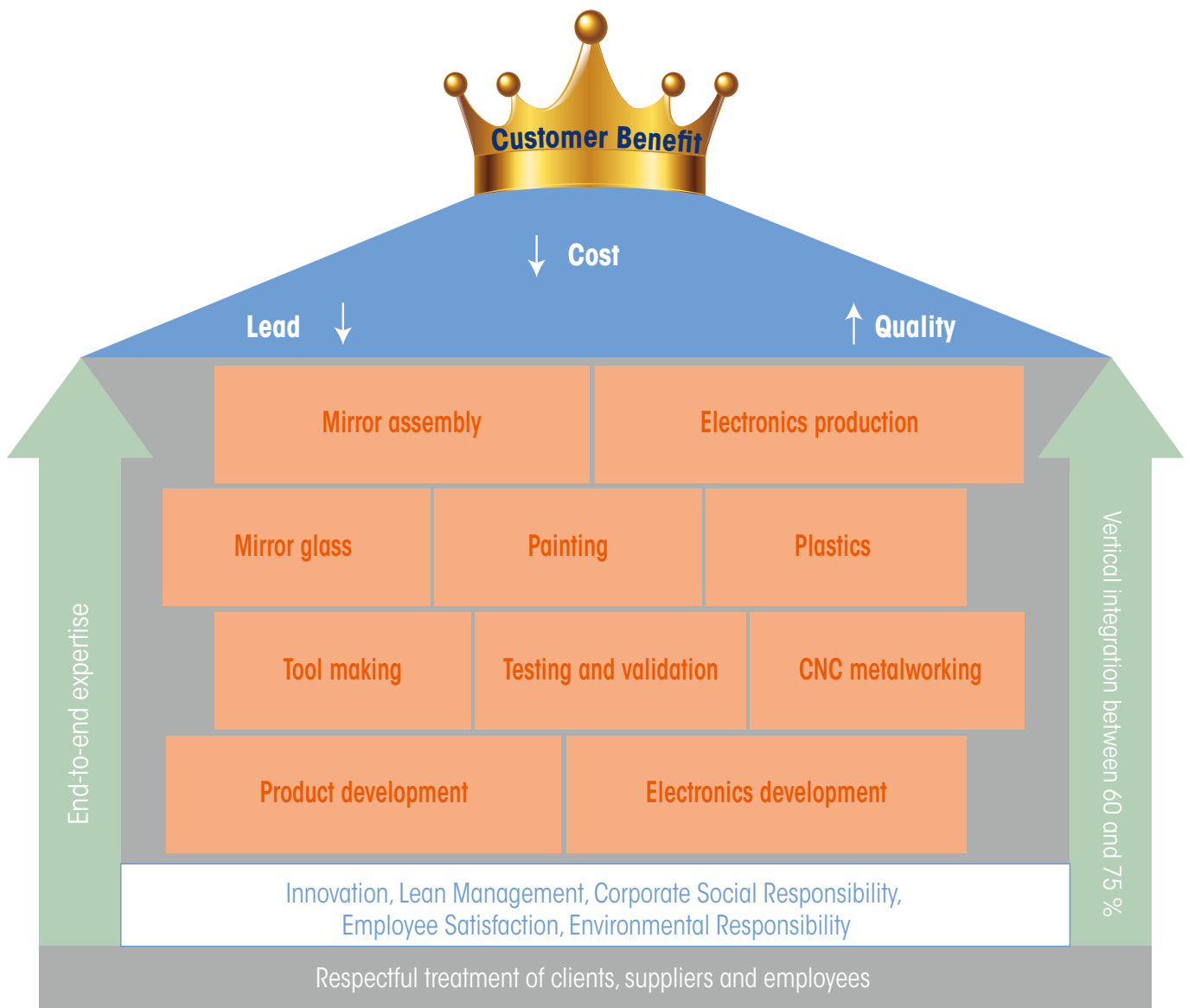
Production expertise

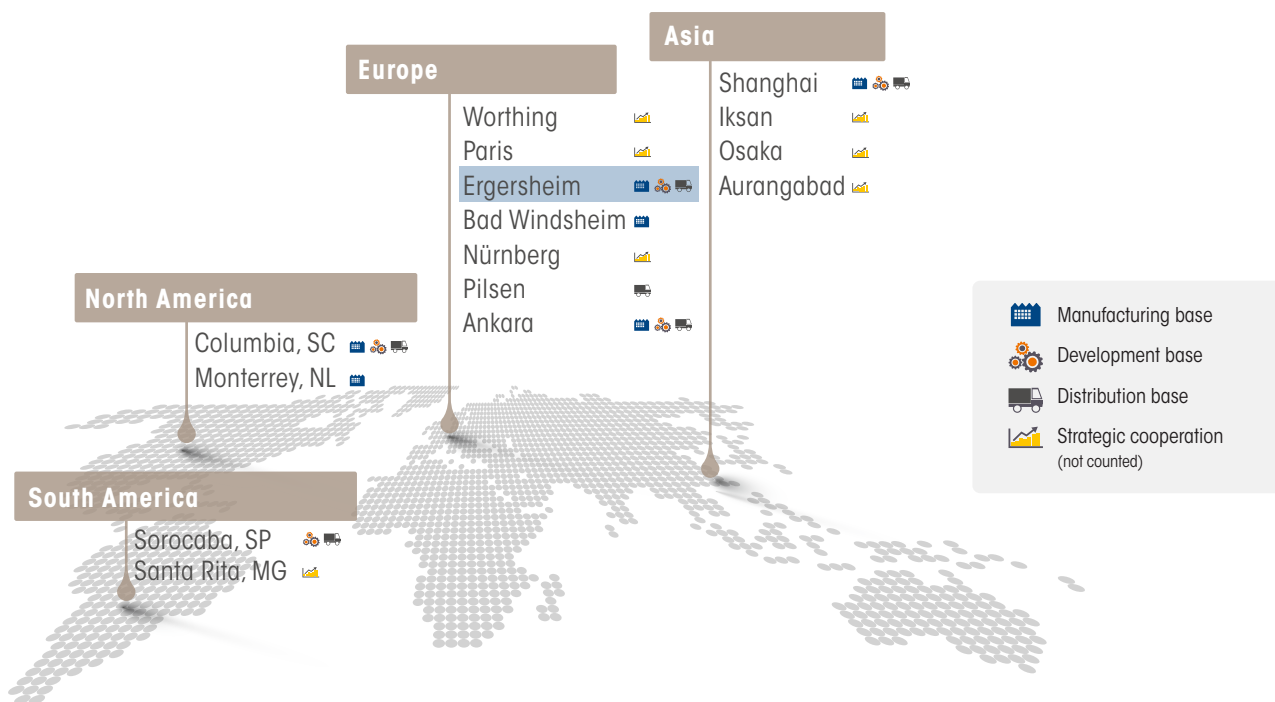
Customer satisfaction, vertical integration, and global footprint

All activities on MEKRA Lang shop floors are based on „Lean Thinking“ principles and the associated methods of value creation, focussing on error-free and customer-centric business process flows. It is our goal to raise our employees' awareness of these issues, both in Germany

and internationally. All of us working for the MEKRA Group are united in striving for continuous improvement of our workflows and processes with customer satisfaction at the center of everything we do. Thanks to the incremental improvement of our overall system based on cutting-edge insights

and technological advances, we are able to add value for the benefit of our customers and to offer high-quality, flawless „just in time“ delivery.





Bringing all departments to the table to collaborate on the development of new product and manufacturing concepts has always been very beneficial for us. It involves testing various product requirements and processes in a team setting early on in the development phase and clears the way for implementing our common goal. We can identify and leverage opportunities in a timely manner, thereby ensuring a smooth ramp-up to batch production.

Depending on the location of our production facilities and underlying conditions, we adapt our shop floor configuration to the specific task at hand. This enables us to optimize our assembly lines for the production of the durable and versatile products typically required for agricultural applications and gives us great flexibility to respond to customer requests, even with small production units. MEKRA Lang operates production facilities all around the

world, which means that we can use our expertise to implement almost all projects in close proximity to our customers.



**Field-of-vision solutions
for increased safety**



Mini Excavators

18

MEKRA Lang mirror system



Wheel Excavators

20

Combined MEKRA Lang mirror and camera monitor system



Crawler Excavators

22

Combined MEKRA Lang mirror and camera monitor system



Backhoe Loaders

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Combined MEKRA Lang mirror and camera monitor system



Wheel Loaders

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Combined MEKRA Lang mirror and camera monitor system



Crawler Dozers

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Combined MEKRA Lang mirror and camera monitor system



Telescopic Handlers

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Combined MEKRA Lang mirror and camera monitor system



Dump Trucks

32

Combined MEKRA Lang mirror and camera monitor system



Mobile Crane

34

Combined MEKRA Lang mirror and camera monitor system



Special Vehicles

36

Combined MEKRA Lang mirror and camera monitor system

Mini Excavators

MEKRA Lang mirror system



1

1016

Mirror mounting system



1038

Baseline



2

1016

Mirror mounting system

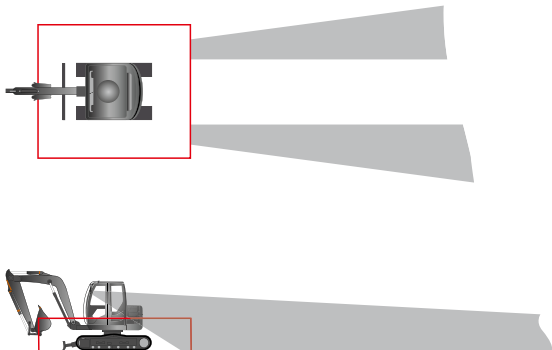


1038

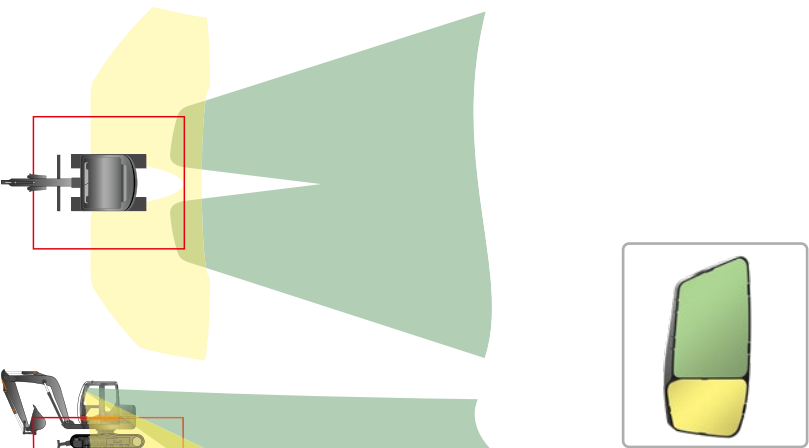
Baseline



Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation

MEKRA Lang mirror system

Item no.	Item description	Page
1038	Basic line mirror with close-proximity mirror left or right, 1200/200 mm radius of curvature, manual adjustment	43
1016	Mirror mounting system left side, ø 22 mm	55
1016	Mirror mounting system right side, ø 22 mm	55

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Wheel Excavators

Combined MEKRA Lang mirror and camera monitor systems



1

1016
Mirror mounting system

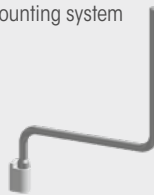


1009-240
Modular mirror



2

270-7
Mirror mounting system



1009
Modular mirror with close-proximity



3

MCM-Monitor



4

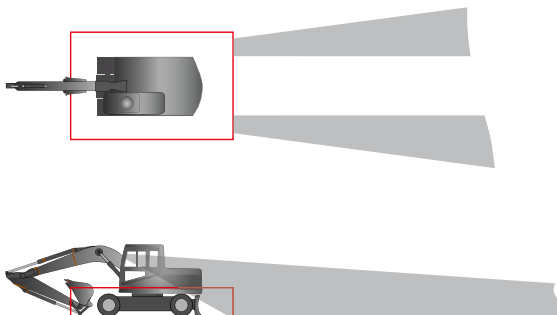
MCC-
Side camera



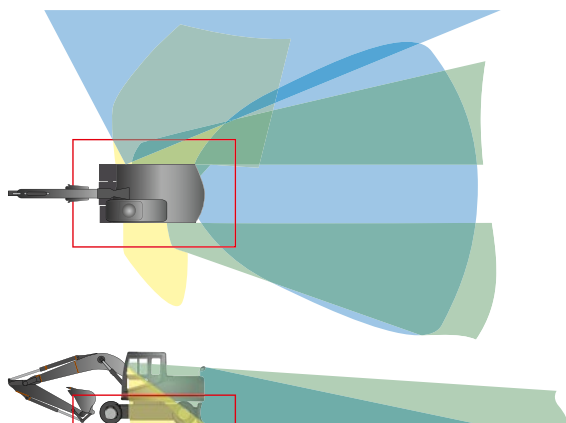
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MCC-
Rear camera

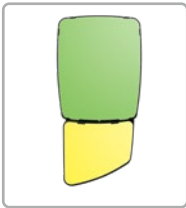
Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation



MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Page
1009-240	Modular mirror with close-proximity mirror, left side, 1200/240 mm radius of curvature, manuel adjustment, heated 12 V	40
1016	Main mirror system left side, ø 22 mm	55
1009	Modular mirror with close-proximity mirror, right side, 1200/300 mm radius of curvature, electrical adjustment, heated 12 V	40
270-7	Mirror mounting system right side, ø 28 mm	59

MEKRA Lang camera monitor systems

Item No.	Item description	Page
MCM	TFT-Monitor 7", 4 camera inputs	70
MCC	Rear camera, CMOS color camera 100° (platform base)	64
MCC	Fodder output camera, CMOS color camera 100°, low distortion (platform base)	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Crawler Excavators

Combined MEKRA Lang mirror and camera monitor systems



1

1016

Mirror mounting system



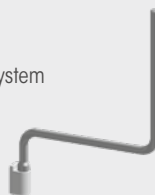
1009-240

Modular mirror

1

270-7

Mirror mounting system



572

Main mirror



573

Wide-angle mirror



3

MCM-Monitor



4

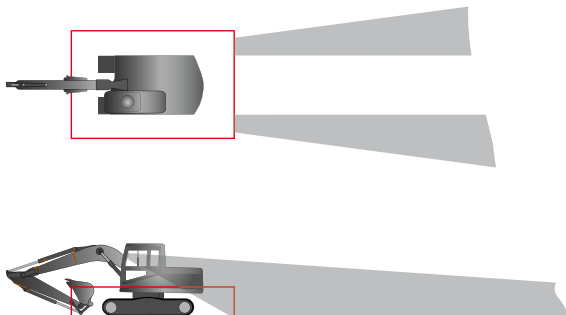
MCC-Side camera



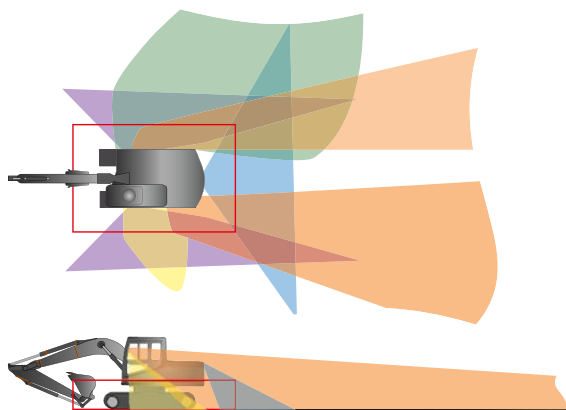
5

MCC-Rear camera

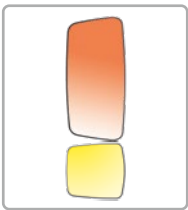
Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation



MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Page
572	Main mirror left and right side, 1200 mm radius of curvature, electrical adjustment, heated 12 V	46
573	Wide-angle mirror right side, 300 mm radius of curvature, electrical adjustment, heated 12 V	46
1016	Mirror mounting system left side, ø 22 mm	55
1009	Modular mirror with close-proximity mirror, right side, 1200/300 mm radius of curvature, electrical adjustment, heated 12 V	40
270-7	Mirror mounting system right side, ø 28 mm	59

MEKRA Lang camera monitor systems

Item No.	Item description	Page
MCM	TFT-Monitor 7", 4 camera inputs	70
MCC	Rear camera, CMOS color camera 100° (Platform base)	64
MCC	Side camera, CMOS color camera 100° (Platform base)	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Backhoe Loaders

Combined MEKRA Lang mirror and camera monitor systems



1

1016

Mirror mounting system



1038

Baseline



2

1016

Mirror mounting system



1038

Baseline



3

MCM-Monitor



4

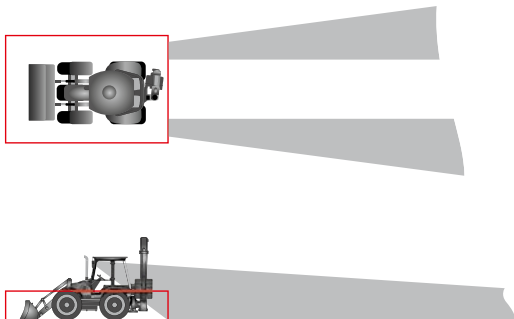
MCC-
Side camera



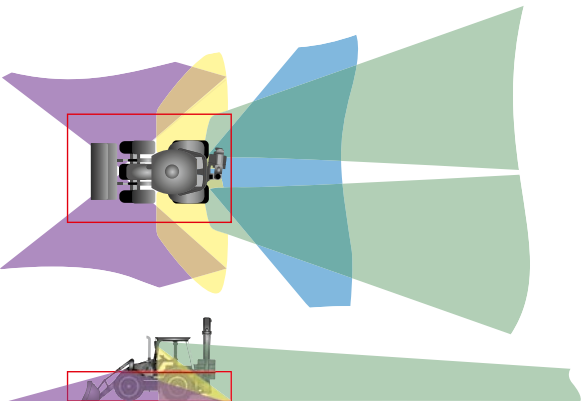
5

MCC-
Rear camera

Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation

MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Page
1038	Basic Line left and right, 1200 / 200 mm radius of curvature	43
1016	Mirror mounting system left side, ø 22 mm	55
1016	Mirror mounting system right side, ø 22 mm	55

MEKRA Lang camera system

Item No.	Item description	Page
MCM	TFT-Monitor 7", 4 camera inputs	70
MCC	Rear camera, CMOS color camera 100° (Platform base)	64
MCC	Side camera, CMOS color camera 100° (Platform base)	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Wheel Loaders

Combined MEKRA Lang mirror and camera monitor systems



1

270-7

Mirror mounting system



572

Main mirror



573

Wide-angle mirror



2

270-7

Mirror mounting system



572

Main mirror



573

Wide-angle mirror



3

MCM-Monitor

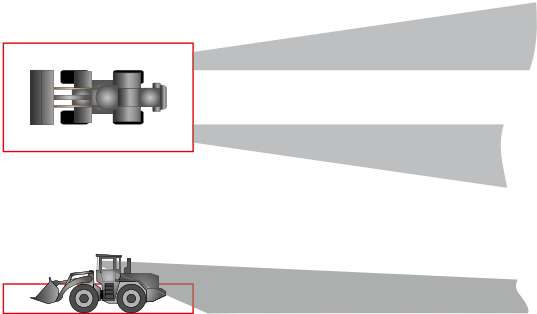


4

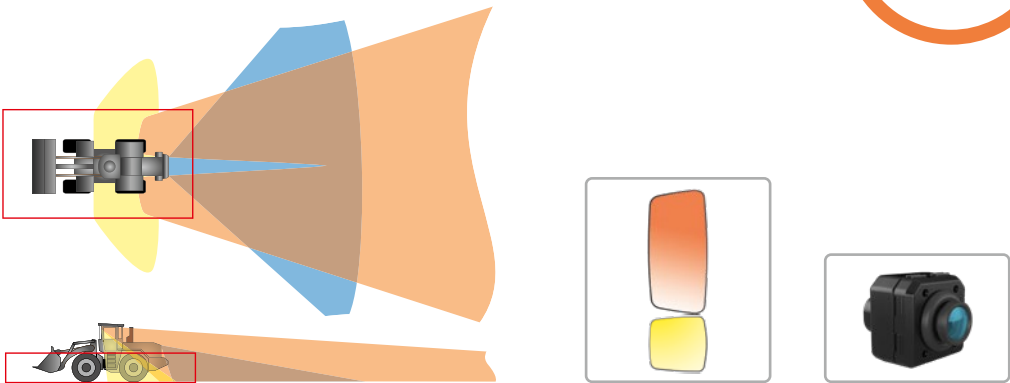
MCC-
Rear camera



Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation

MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Page
572	Main mirror left and right side, 1200 mm radius of curvature, electrical adjustment, heated 12 V	46
573	Wide-angle mirror left and right side, 300 mm radius of curvature, electrical adjustment, heated 12 V	46
270-7	Mirror mounting system left and right side, ø 28 mm	59

MEKRA Lang camera monitor systems

Item No.	Item description	Page
MCM	TFT-Monitor 7", 4 camera inputs	70
MCC	Rear camera, CMOS color camera 100° (Digital Platform base)	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Crawler-Dozers

Combined MEKRA Lang mirror and camera monitor systems



1

MCC Side camera



2

MCC Side camera



4

MCC Rear camera

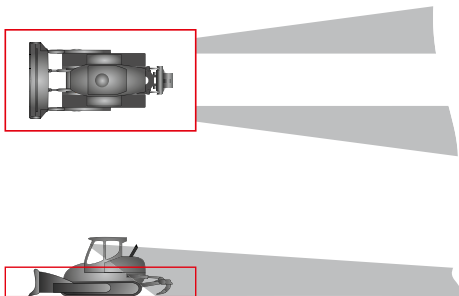


3

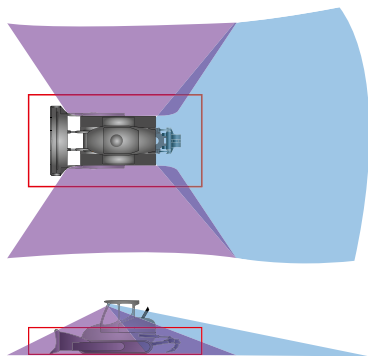
MCM-Monitor



Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation



MEKRA Lang mirror and camera monitor systems

MEKRA Lang camera monitor systems

Item No.	Item description	Page
MCM	TFT-Monitor 7", 4 camera inputs	70
MCC	Rear camera, CMOS color camera 120°	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Telescopic Handlers

Combined MEKRA Lang mirror and camera monitor systems



1

1016
Mirror mounting system



1038
Baseline

2

270-7
Mirror mounting system



1009
Modular mirror with close-proximity

3

MCM-Monitor



4

MCC-
Side camera



5

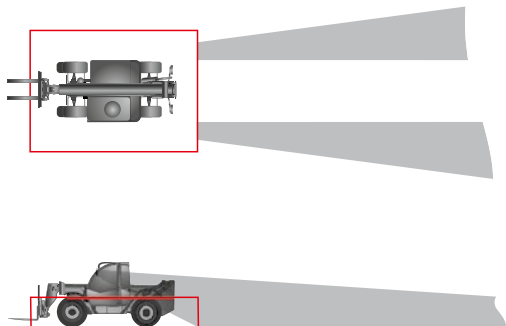
MCC-
Rear camera



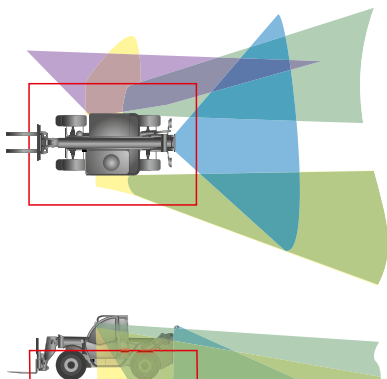
6

Digital wireless
system

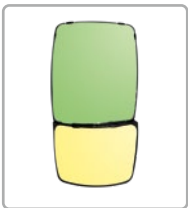
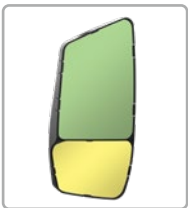
Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation



MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Seite
1038	Basic Line left and right, 1200 / 200 mm radius of curvature	43
1016	Mirror mounting system left side, ø 22 mm	5
1009	Modular mirror with close-proximity mirror, right side, 1200/300 mm radius of curvature, electrical adjustment, heated 12 V	40
270-7	Mirror mounting system right side, ø 28 mm	59

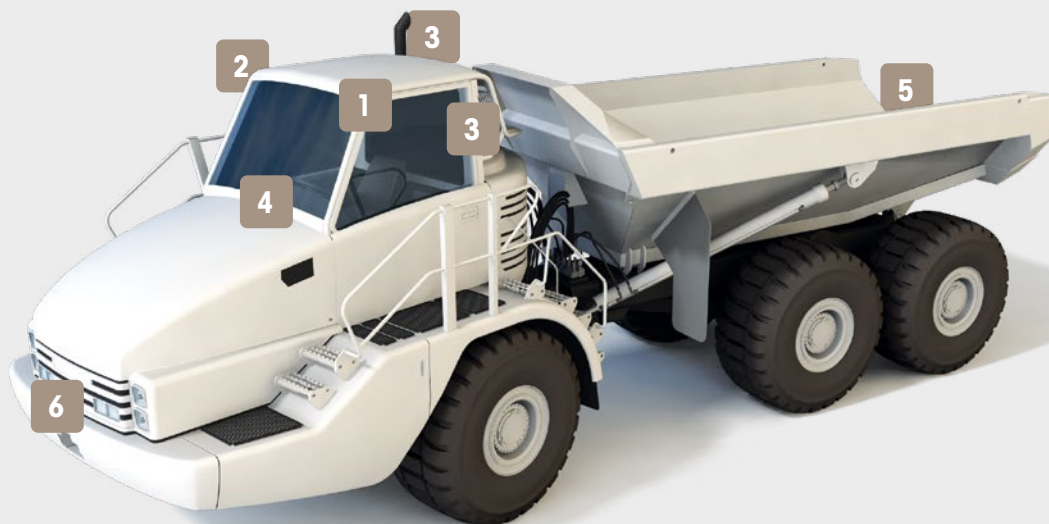
MEKRA Lang camera system

Item No.	Item description	Seite
MCM	TFT-Monitor 7", 4 camera inputs	70
MCC	Rear camera, CMOS color camera 100° (Platform base)	64
MCC	Side camera, CMOS color camera 100° (Platform base)	64
EWS-10	Digital wireless system	71

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Dump Trucks

Combined MEKRA Lang mirror and camera monitor systems



1

1011
Mirror mounting system
906
Wide-angle mirror
363
Main mirror



2

1011
Mirror mounting system
906
Wide-angle mirror
363
Main mirror



3

552
Close-proximity mirror



4

MCM-Monitor



5

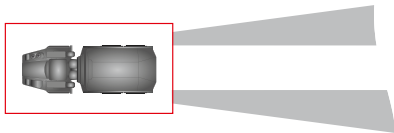
MCC-
Rear camera



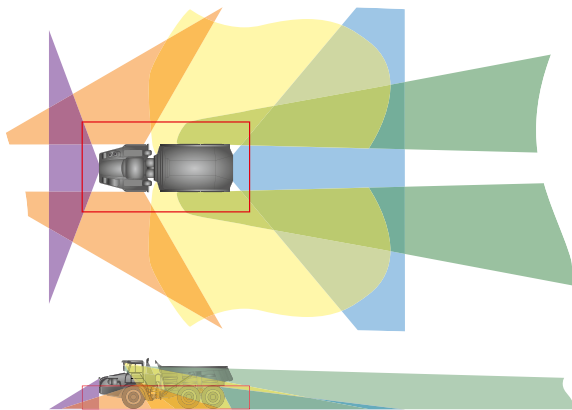
6

MCC-
Front camera

Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation



MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Seite
363	Main mirror left and right side, 1200 mm radius of curvature, electrical adjustment, heated 24 V	43
906	Wide-angle mirror left and right side, 300 mm radius of curvature, heated 24 V	45
1011	Main mirror system left and right side, ø 28 mm	60
552	Close-proximity mirror left and right side, 300 mm radius of curvature, heated 12 V	48

MEKRA Lang camera system

Item No.	Item description	Seite
MCM	TFT-Monitor 7", 4 camera input	70
MCC	Rear camera, CMOS color camera 100° (Platform base)	64
MCC	Front camera, CMOS color camera 100° (Platform base)	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Mobile Crane

Combined MEKRA Lang mirror and camera monitor systems



1

378

Mirror mounting system



363

Main mirror



906

Wide-angle mirror



2

1005

Close-proximity mirror



4

MCM-Monitor



3

389

Front mirror

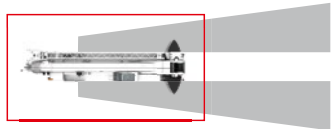


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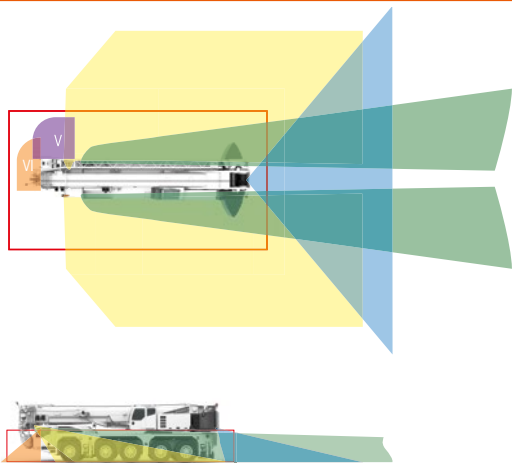
MCC-
Rear camera



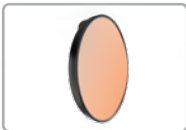
Standard solution



MEKRA Lang solution



Visibility
increased efficiency
safe operation



MEKRA Lang mirror and camera monitor systems

MEKRA Lang mirror system

Item No.	Item description	Seite
363	Main mirror left and right side, 1200 mm radius of curvature, electrical adjustment, heated 24 V	43
906	Wide-angle mirror left and right side, 300 mm radius of curvature, heated 24 V	45
378	Mirror mounting system right side, ø 28 mm	58
1005	Close-proximity mirror right side, 300 mm radius of curvature, heated 24 V	48
389	Front mirror left side, 300 mm radius of curvature, heated 24 V	50

MEKRA Lang camera system

Item No.	Item description	Seite
MCM	TFT-Monitor 7", 4 camera input	70
MCC	Rear camera, CMOS color camera 120° (Platform base)	64

The systems shown are recommended by MEKRA Lang. Beginning on page 39, you will find additional MEKRA lang product solutions and alternatives.

Special Vehicles

Further applications of combined MEKRA Lang mirror camera systems



Tandem Roller



Grader



Road Milling Machine



Compactor



Paver



Material Handler



Crusher



Dump Truck



Compact Loader



Scraper



Small Dumper Loader



Long Front Excavator



Mirror systems



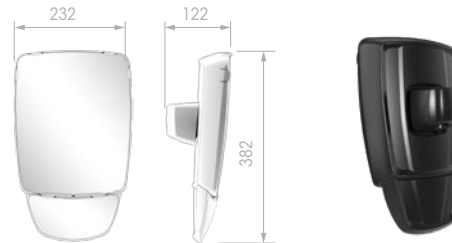
Modular mirror 1009	40
Compact mirror 1010	41
Combi mirror 1036	42
Basicline 1038	43
Main mirror 363	43
Main mirror 348	44
Wide-angle mirror 348	44
Wide-angle mirror 386	45
Wide-angle mirror 906	45
Main mirror 572	46
Wide-angle mirror 573	46
Main mirror 364	47
Wide-angle mirror 267	47
Close-proximity mirror 1005	48
Close-proximity mirror 552	48
Close-proximity mirror 558	49
Close-proximity mirror 559	49
Close-proximity mirror 389	50
Interior mirror 202	50
Close-proximity mirror 360	51

Mirror systems

Modular and compact mirrors

Modular mirror 1009, homologated for field-of-vision class II

Glass size (W x H)	Main mirror 225 x 286 mm, close-proximity mirror 178 x 91 mm
Radius of curvature	Main mirror 1200 mm, close-proximity mirror 240/300 mm
Mounting side	right and left
Heating system	unheated or heated 12 or 24V
Adjustment	manual or electrical 12 or 24V
Adjustment range	up/down: $\geq \pm 8^\circ$ – left/right: $\geq \pm 8^\circ$
Mirror mounting bracket interface	Clamp for 18-22 mm tube diameter 28 mm on request
On-board power supply connection	2- or 6-lead flange socket, direct contacting and additional options upon request
Material	shock-proof ABS plastic, black, UV resistant



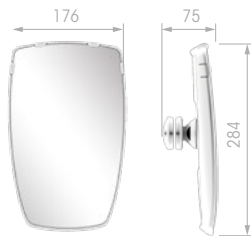
Item number	Mounting side	Adjustment	Heating system	Connection
Main mirror 1				
51.1009.001.001	right and left	manual	unheated	
51.1009.081.001	right and left	manual	heated 12 V	2-lead flange socket
51.1009.113.001	right and left	electrical	heated 12 V	6-lead flange socket
Combination main and close-proximity mirror 2				
51.1009.017.001	right and left	manual	unheated	
51.1009.049.001	right and left	manual	heated 12 V	2-lead flange socket
51.1009.097.001	right and left	electrical	heated 12 V	6-lead flange socket
Extra large close-proximity 3 (only right applicable)				
individual	right	manual	unheated	
individual	right	electrical	heated 12 / 24 V	
Extra large close-proximity 4 (right/ left applicable)				
individual	right or left	manual	unheated	2-lead flange socket
individual	right or left	electrical	heated 12 / 24 V	6-lead flange socket

Options (more on request)



Compact mirror 1010, homologated for field-of-vision class II

Glass size	169 x 277 mm (W x H)
Radius of curvature	1200 mm
Mounting side	right and left
Heating system	unheated or heated 12 V
Adjustment	manual
Adjustment range	up/down: $>\pm 9^\circ$ – left/right: $>\pm 9^\circ$
Mirror mounting bracket interface	Clamp for 14-20 mm or 18-22 mm tube diameter
On-board power supply connection	2-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
1: for tube diameter 14-20 mm				
51.1010.010.001	right and left	manual	unheated	spherical
2: for tube diameter 18-22 mm				
On request				

Options (more on request)



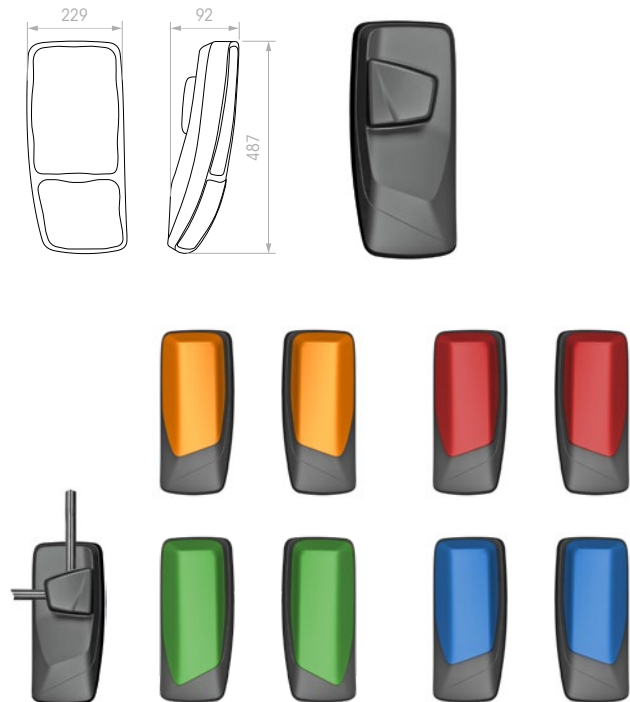
Mirror systems

Combi, Main and Wide-angle mirrors

Combi mirror 1036

Glass size	Main mirror 297 x 200 mm (W x H), close-proximity mirror 176 x 190 mm (W x H)
Radius of curvature	Main mirror 1200 mm, close-proximity mirror 300 mm
Mounting side	right or left
Heating system	unheated or heated 12 or 24V
Adjustment	manual or electrical 12 or 24V
Adjustment range	up/down: $\geq \pm 8^\circ$ – left/right: $\geq \pm 8^\circ$
Mirror mounting bracket interface	Clamp for 18-22 or 28 mm tube diameter
On-board power supply connection	2- or 6-lead flange socket, additional options upon request
Material	shock-proof ASA plastic, black, UV resistant

Options (more on request)

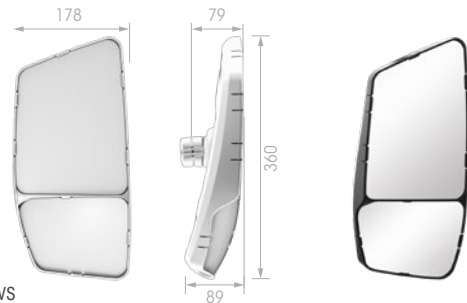


Item No.	Mount	Adjustment	Heating	Connection
51.1036.007.001	left side, horizontal	manual	unheated	
51.1036.008.001	right side, horizontal	manual	unheated	
51.1036.003.001	left side, vertical	manual	unheated	
51.1036.004.001	right side, vertical	manual	unheated	
51.1036.009.001	left side, horizontal	electrical	heated, 12 V	6-pin female socket
51.1036.010.001	right side, horizontal	electrical	heated, 12 V	6-pin female socket
51.1036.005.001	left side, vertical	electrical	heated, 12 V	6-pin female socket
51.1036.006.001	right side, vertical	electrical	heated, 12 V	6-pin female socket

Additional product options upon request

Basicline 1038

Glass size	Main mirror: 232 x 168 mm, Auxiliary mirror: 114 x 159mm
Radius of curvature	Main mirror: 1200 + 300 mm Auxiliary mirror: 200 + 25 mm
Mounting side	right or left
Heating system	optional, upon request
Adjustment	manual or electrical
Adjustment range	up/down: $\geq \pm 10^\circ$ – left/right: $\geq \pm 10^\circ$
Mirror mounting bracket interface	22mm pipe socket, mounted directly using two screws
Material	shock-proof ABS plastic, black, UV resistant

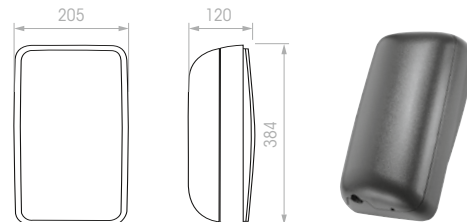


Item number	Mounting side	Adjustment	Heating system	Connection
51.1038.003.001	right and left	manual	unheated	
51.1038.004.001	right and left	manual	unheated	

Options (more on request)

Main mirror 363, homologated for field-of-vision class II

Glass size	185 x 363.5 mm (W x H)
Radius of curvature	1200 mm
Mounting side	right and left
Heating system	unheated or heated 12 or 24V
Adjustment	manual or electrical 12 or 24V
Adjustment range	up/down: $\geq \pm 7^\circ$ – left/right: $\geq \pm 13^\circ$
Mirror mounting bracket interface	Clamp for 18-28 mm tube diameter
On-board power supply connection	2- or 6-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
51.3635.201	left	manual	unheated	
51.3636.201	right	manual	unheated	
51.3635.204	left	manual	heated 24 V	2-lead flange socket
51.3636.204	right	manual	heated 24 V	2-lead flange socket
51.3635.206	left	electrical	heated 24 V	6-lead flange socket
51.3636.206	right	electrical	heated 24 V	6-lead flange socket

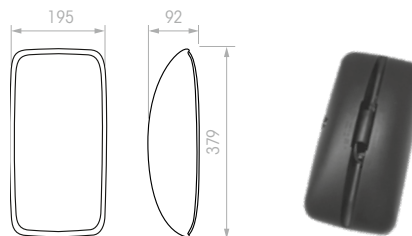
Options (more on request)

Mirror systems

Main and Wide-angle mirrors

Main mirror 348, homologated for field-of-vision class II

Glass size	190 x 375 mm (W x H)
Radius of curvature	1200 mm
Mounting side	right and left
Heating system	heated 24V, unheated on request
Adjustment	manual or electrical 24V
Adjustment range	up/down: $\geq \pm 10^\circ$ – left/right: $\geq \pm 10^\circ$
Mirror mounting bracket interface	Clamp for 22 mm tube diameter
On-board power supply connection	2- or 6-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant

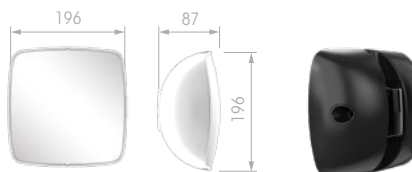


Item number	Mounting side	Adjustment	Heating system	Connection
61.3480.149 H	right and left	manual	heated 24 V	

Options (more on request)

Wide-angle mirror 348, homologated for field-of-vision class IV

Glass size	191.5 x 191.5 mm (W x H)
Radius of curvature	300 mm
Mounting side	right and left
Heating system	heated 24V, unheated on request
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$ – left/right: $\geq \pm 10^\circ$
Mirror mounting bracket interface	Clamp for 22 mm tube diameter
On-board power supply connection	contacts
Material	shock-proof ABS plastic, black, UV resistant

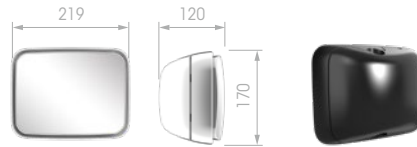


Item number	Mounting side	Adjustment	Heating system	Connection
61.3482.149 H	right and left	manual	heated 24 V	

Options (more on request)

Wide-angle mirror 386, homologated for field-of-vision class IV

Glass size	149 x 198 mm (W x H)
Radius of curvature	400 or 300 mm
Mounting side	right and left side / right or left side
Heating system	unheated or heated 12 or 24V
Adjustment	manual or electrical 12 or 24V
Adjustment range	up/down: $>\pm 6^\circ$ – left/right: $>\pm 8^\circ$
Mirror mounting bracket interface	Clamp for 18-28 mm tube diameter
On-board power supply connection	2- or 6-lead flange socket, direct contacting upon request
Material	shock-proof ABS plastic, black, UV resistant

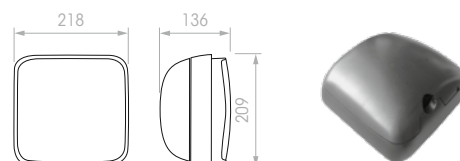


Item number	Mounting side	Adjustment	Heating system	Connection
56.3860.212	right and left	manual	unheated	
56.3860.214	right and left	manual	heated 24 V	2-lead flange socket
56.3861.116 H	left	electrical	heated 24 V	6-lead flange socket
56.3862.116 H	right	electrical	heated 24 V	6-lead flange socket

Options (more on request)

Wide-angle mirror 906, homologated for field-of-vision class IV

Glass size	198 x 189 mm (W x H)
Radius of curvature	300 mm
Mounting side	right and left
Heating system	unheated or heated 12 or 24V
Adjustment	manual
Adjustment range	up/down: $>\pm 10^\circ$ – left/right: $>\pm 10^\circ$
Mirror mounting bracket interface	Clamp for 20-28 mm tube diameter
On-board power supply connection	2-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
56.9065.132	right and left	manual	unheated	
56.9065.110	right and left	manual	heated 12 V	2-lead flange socket

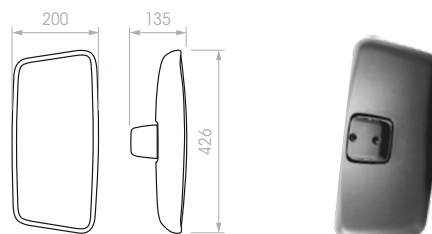
Options (more on request)

Mirror systems

Main and Wide-angle mirrors

Main mirror 572, homologated for field-of-vision class II

Glass size	179 x 405 mm (W x H)
Radius of curvature	1200 mm
Mounting side	right and left side / right or left side
Heating system	unheated or heated 12 or 24V
Adjustment	manual or electrical 12 or 24V
Adjustment range	up/down: $\geq \pm 10^\circ$ – left/right: $\geq \pm 10^\circ$
Mirror mounting bracket interface	Clamp for 22, 24 or 28 mm tube diameter
On-board power supply connection	2- or 6-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant

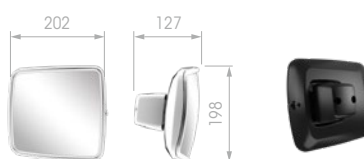


Item number	Mounting side	Adjustment	Heating system	Connection
for tube diameter 22 mm				
51.5720.120 H	right and left	manual	unheated	
51.5720.140 H	right and left	manual	heated 24 V	2-lead flange socket
51.5721.160 H	left	electrical	heated 24 V	6-lead flange socket
51.5722.160 H	right	electrical	heated 24 V	6-lead flange socket
for tube diameter 28 mm				
51.5720.127 H	right and left	manual	unheated	

Options (more on request)

Wide-angle mirror 573, homologated for field-of-vision class IV

Glass size	177 x 182 mm (W x H)
Radius of curvature	300 mm
Mounting side	right and left
Heating system	unheated or heated 24V
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$ – left/right: $\geq \pm 10^\circ$
Mirror mounting bracket interface	Clamp for 22, 24 or 28 mm tube diameter
On-board power supply connection	2-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant

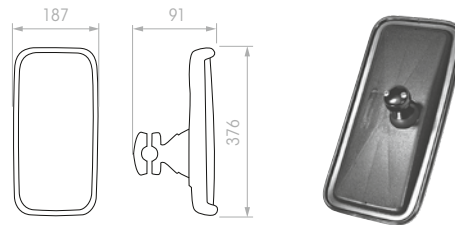


Item number	Mounting side	Adjustment	Heating system	Connection
for tube diameter 22 mm				
56.5730.120	right and left	manual	unheated	
56.5730.140	right and left	manual	heated 24 V	2-lead flange socket
for tube diameter 28 mm				
51.5733.001	right and left	manual	unheated	

Options (more on request)

Main mirror 364, homologated for field-of-vision class II

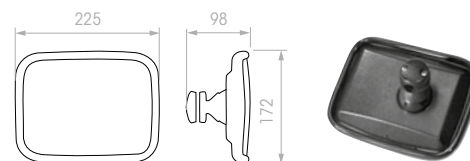
Glass size	175 x 355 mm (W x H)
Radius of curvature	1200 and 2200 mm
Mounting side	right and left
Heating system	unheated or heated 12 or 24V
Adjustment	manual
Adjustment range	up/down: $\geq \pm 15^\circ$ – left/right: $\geq \pm 15^\circ$
Mirror mounting bracket interface	Clamp for 14-20 mm tube diameter
On-board power supply connection	2-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
1200 mm radius of curvature				
51.3640.128.001	right and left	manual	unheated	
Radius of curvature 1800 mm				
51.3640.147 H	right and left	manual	heated 24 V	2-lead flange socket

Wide-angle mirror 267, homologated for field-of-vision class IV

Glass size	211 x 161 mm (W x H)
Radius of curvature	400 mm
Mounting side	right and left
Heating system	unheated or heated 24V
Adjustment	manual
Adjustment range	up/down: $\geq \pm 15^\circ$ – left/right: $\geq \pm 15^\circ$
Mirror mounting bracket interface	Clamp for 14-20 mm tube diameter
On-board power supply connection	2-lead flange socket
Material	shock-proof ABS plastic, black, UV resistant



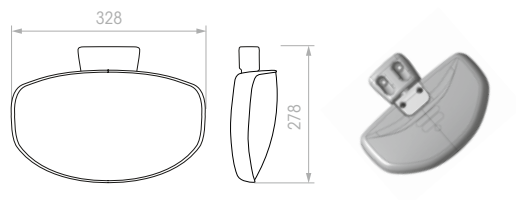
Item number	Mounting side	Adjustment	Heating system	Connection
Options				
56.2670.127 H	right and left	manual		
56.2670.147 H	right and left	manual	heated 24 V	2-lead flange socket

Mirror systems

Close-proximity mirrors

Close-proximity mirror 1005, homologated for field-of-vision class V

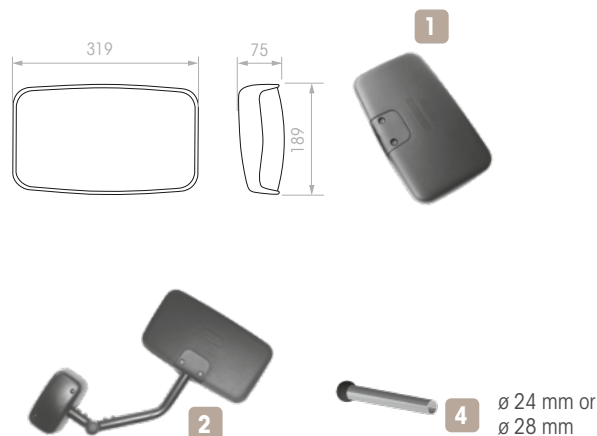
Glass size	322 x 190 mm (W x H)
Radius of curvature	300 mm
Mounting side	top
Heating system	unheated or heated 24V
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$
Mirror mounting bracket interface	holder
On-board power supply connection	contacts
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
Options				
59.1005.005.001	top	manual	unheated	
59.1005.004.001	top	manual	heated 24 V	

Close-proximity mirror 552, homologated for field-of-vision class V + VI

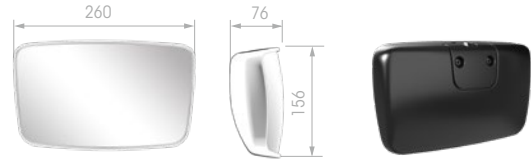
Glass size	310 x 180 mm (W x H)
Radius of curvature	300 or 400 mm
Mounting side	universal
Heating system	unheated or heated 24V
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$
Mirror mounting bracket interface	holder
Vehicle interface	2-lead flange socket, direct contacting and additional options upon request 4
On-board power supply connection	contacts
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
300 mm radius of curvature, for ball stud 1				
51.5524.930	universal	manual	unheated	
51.1009.113.001	right	electrical	heated 24 V	
300 mm radius of curvature, screwed with mounting base 2				
59.5524.530 H	right and left	manual	unheated	

Close-proximity mirror 558, homologated for field-of-vision class V + VI

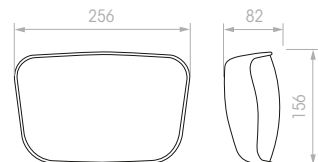
Glass size	257 x 154 mm (W x H)
Radius of curvature	300 mm
Mounting side	universal
Heating system	unheated
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$
Vehicle interface	2-lead flange socket, direct contacting and additional options upon request 1
Material	shock-proof ABS plastic, black, UV resistant



Item number	Mounting side	Adjustment	Heating system	Connection
Option				
51.5589.100	universal	manual	unheated	

Close-proximity mirror 559, homologated for field-of-vision class V + VI

Glass size	248 x 157 mm (W x H)
Radius of curvature	240 mm
Mounting side	universal
Heating system	unheated
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$
Vehicle interface	2-lead flange socket, direct contacting and additional options upon request 1
On-board power supply connection	-
Material	shock-proof ABS plastic, black, UV resistant



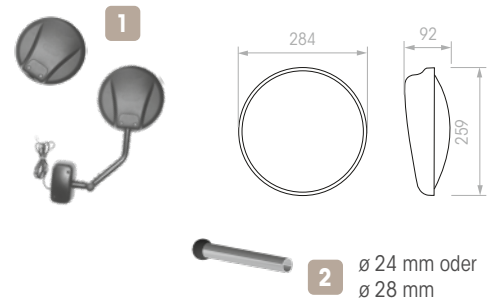
Item number	Mounting side	Adjustment	Heating system	Connection
Option				
51.5590.020	universal	manual	unheated	

Mirror systems

Main and Close-proximity mirrors

Close-proximity mirror 389, homologated for field-of-vision class II

Glass size	Main mirror 250 x 250 mm (W x H)
Radius of curvature	240 mm
Mounting side	universal
Heating system	unheated or heated 12 or 24V
Adjustment	manual
Adjustment range	up/down: $\geq \pm 10^\circ$
Mirror mounting bracket interface	Ball stud and tube connection, customized for vehicle or mounting system, additional options upon request
On-board power supply connection	contacts
Material	shock-proof ABS plastic, grey, UV resistant

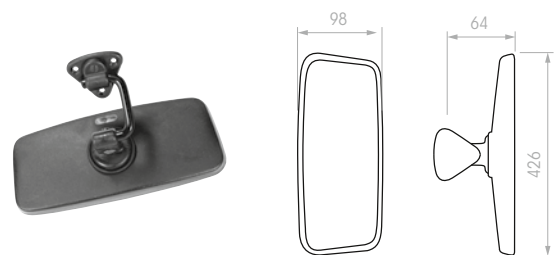


Item number	Mounting side	Adjustment	Heating system	Connection
Options				
51.3894.140	universal	manual	unheated	
51.3894.160	universal	manual	heated 24 V	
51.3894.140H	universal	manual	unheated	
51.3894.150H	universal	electrical	unheated	

Options (more on request)

Interior mirror 202, homologated for field-of-vision class I

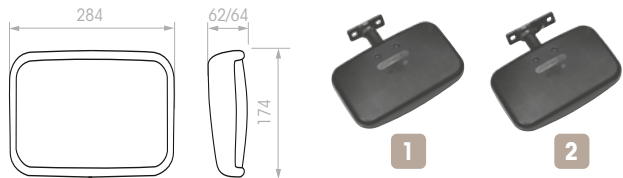
Glass size	217 x 88 mm (W x H)
Radius of curvature	flat glass
Mounting side	Cabin inside
Heating system	unheated
Adjustment	manual
Mirror mounting bracket interface	Screw connection with 3xM5 screws
Material	shock-proof ABS plastic, black matt



Item number	Mounting side	Adjustment	Heating system	Connection
Variante				
55.2020.177	universal	manual	unheated	

Close-proximity mirror 360, homologated for field-of-vision class V

Glass size	272 x 162 mm (W x H)
Radius of curvature	300 or 400 mm
Mounting side	universal
Heating system	unheated or heated 24V
Adjustment	manual
Adjustment range	up/down: $>\pm 15^\circ$
Vehicle interface	bolted, 2 x M8 through mounting bracket
On-board power supply connection	contacts
Material	shock-proof ABS plastic, black, UV resistant



Item number	hole spacing	Mounting side	Adjustment	Heating system	Connection
300 mm radius of curvature 1					
59.3601.178	100 mm	universal	manual	unheated	
59.3601.188	100 mm	universal	manual	heated 24 V	
59.3604.178	50 mm	universal	manual	unheated	
400 mm radius of curvature 2					
59.3601.128	100 mm	universal	manual	unheated	
59.3604.128	50 mm	universal	manual	unheated	



Mounting systems



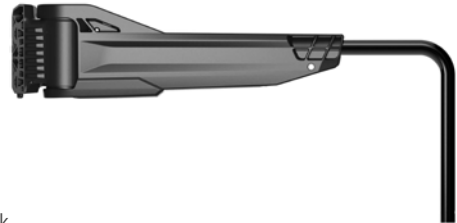
Mirror mounting system 1038	54
Mirror mounting system 1016	55
Mounting system 270A/ 271/ 248	56
Mirror mounting system 1017	57
Mirror mounting system 1045	58
Mirror mounting system 378	58
Wedge mounts for mirror mounting system 270A/ 271/ 248	59
Mounting system 270/7	59
Individual components	60
Mirror mounting system 1007 and 1011	60

Mounting systems

Universal solutions

Mounting System 1038

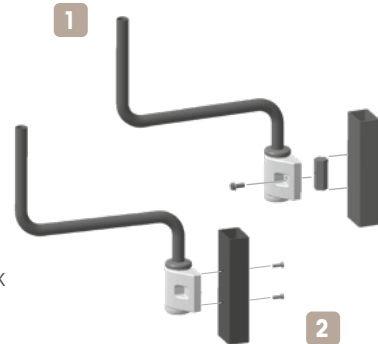
Radius	Manually adjustable: 425 to 675 mm
Tube diameter	22 mm
Mounting side	Right or left, bolted down
Adjustment	One working position, in the rest
Folding torque	56 Nm
Vehicle interface	Bolted, 2 x M8, through bracket
Wiring	Hidden wiring available, 2/6-pin female socket or open ends
Material	Plastic mounting base, powder-coated tubular steel, black



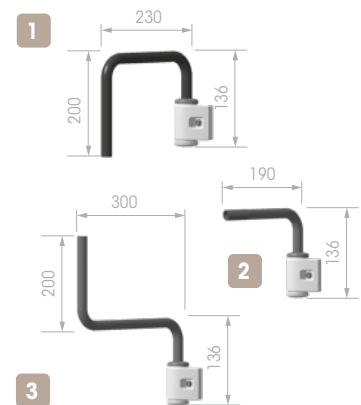
Item No.	Mount	Adjustment	Heating	Wiring
Manual rod adjustment				
58.1038.003.099	left	manual	unheated	no cable
58.1038.004.099	right	manuell	unheated	no cable

Mirror mounting system 1016

Maximum throat	500 mm
Tube diameter	22 mm
Mounting side	right or left side, mounting system bolted down
Adjustment	manual, bosh angle every 30°
Folding torque	25 Nm
Vehicle interface	Wedge mount
Wiring	choice of open and hidden cable guiding
Material	pressure-molded aluminium, powder-coated tubular steel, black

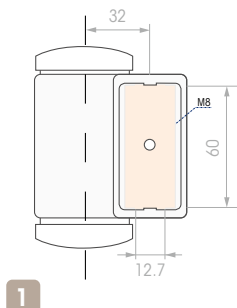


Item number	Mounting side	variants
U-shaped tubes 1		
58.1016.001.001	left	1
58.1016.002.001	right	1
58.1016.003.001	left	2
58.1016.004.001	right	2
L-shaped tubes 2		
58.1016.009.001	left	1
58.1016.010.001	right	1
Z-shaped tubes 3		
58.1016.005.001	left	1
58.1016.006.001	right	1

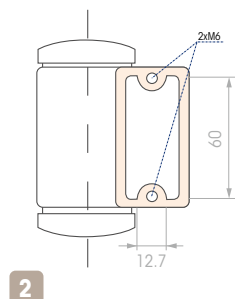


customizable tube design

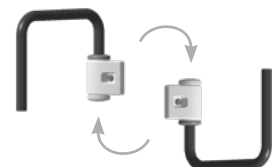
Mounting base bolted through hex attachment



Mounting base directly bolted



Mounting sides can be switched, tube orientation will change as shown below:



Mounting systems

Universal solutions

Mirror mounting system 270A/ 271/ 248

Maximum throat	700 mm
Tube diameter	28 mm
Mounting side	right or left side, mounting system removable
Adjustment	manual, bosh angle 52° or 60°
Folding torque	30-120 Nm
Vehicle interface	Wedge mount 248-2 A/271 A
Wiring	choice of open and hidden cable guiding
Material	powder-coated tubular steel, black



Dove tail guide

Item number	Mounting side	Adjustment	Heating system	Verkabelung
Dimensions: 256 x 450 mm (W x H), 90° bracket angle, including control cable and wedge mount 1				
58.2704.051 H	universal	manual	mirror heating	Connector contacting
Dimensions: 160 x 500 mm (W x H), 90° bracket angle, including heating cable and wedge mount 2				
58.2704.048	universal	manual	mirror heating	Connector contacting
Dimensions: 676 x 327 mm (W x H), 6° bracket angle, including control cable and wedge mount 3				
58.2704.093	universal	electrical	mirror heating	Direct contacting

1



2



3

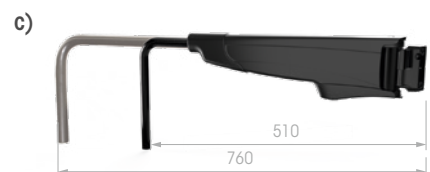
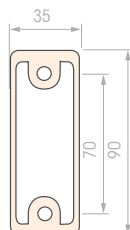
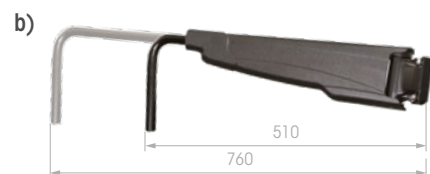


Mirror mounting system 1017

Radius	Opt. a: manually adjustable from 510 to 800 mm Opt. b: electrically adjustable from 510 to 760 mm
Tube diameter	22 mm
Mounting side	right and left side, folds bidirectionally
Adjustment	one operating position, folds bidirectionally
Folding torque	60 Nm
Vehicle interface	bolted, 2 x M8 through mounting bracket
Wiring	hidden cable routing
Material	pressure-molded aluminium, powder-coated tubular steel, black



Item number	Mounting side	Adjustment	Heating system	Wiring
manual mirror arm adjustment (Opt. a)				
58.1017.005.001	left	manual	unheated	without cable
58.1017.006.001	right	manual	unheated	without cable
58.1017.013.001	left	manual	heated	Connector contacting
58.1017.014.001	right	manual	heated	Connector contacting
58.1017.011.001	left	electrical	heated	Connector contacting
58.1017.012.001	right	electrical	heated	Connector contacting
electrical mirror arm adjustment (Opt. b)				
58.1017.015.001	left	electrical	heated	Connector contacting
58.1017.016.001	right	electrical	heated	Connector contacting
boarding light (Opt. c)				
individual	right	electrical	heated	Connector contacting



Mounting systems

Universal solutions

Mounting system 1045

Radius	505 mm
Tube diameter	22 mm
Mounting side	right and left side, folds bidirectionally
Adjustment	one operating position, folds bidirectionally
Folding torque	120 Nm
Vehicle interface	bolted, 2 x M8 through mounting bracket
Wiring	hidden cable routing
Material	pressure-molded aluminium, powder-coated tublar steel, black



Item number	Mounting side	Adjustment	Heating system	Wiring
Options				
individual	left	manual	unheated	without cable
individual	right	manual	unheated	without cable

Mounting system 378

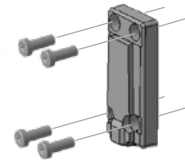
Radius	Variable
Tube diameter	28 mm
Mounting side	right and left side, folds bidirectionally
Adjustment	22°
Folding torque	≥30 Nm
Vehicle interface	378 holder, 378 bearing block
Wiring	hidden cable routing
Material	powder-coated tublar steel, black



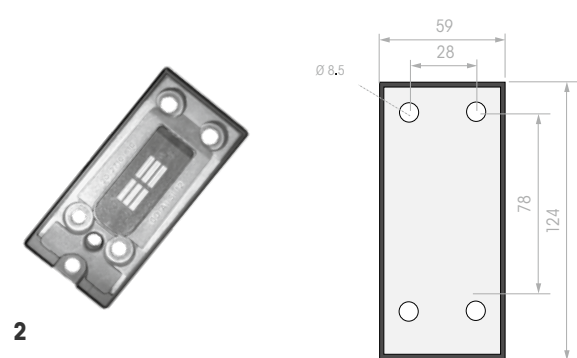
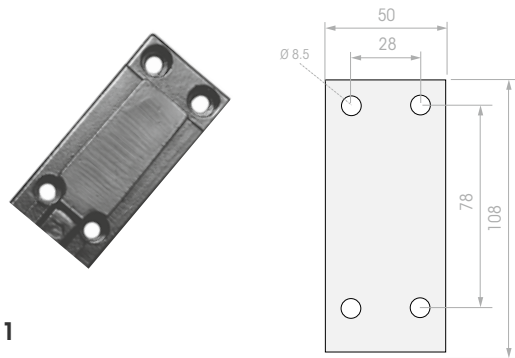
Item number	Mounting side	Adjustment	Heating system	Wiring
Options				
individual	left	manual		with or without cable
individual	right	manual		with or without cable

Wedge mounts for mirror mounting system 270A/ 271/ 248

Size	varying
Design	for plug or direct contacting
Installation	4 mounting points for M8 allen screws
Material	pressure-molded aluminium, powder-coated, black



Item number	Mounting side	Adjustment	Heating system	Wiring
Wedge mount 248-2A for connector contacting, 50 x 108 x 15 mm (W x H x D) 1				
20.2480.210	universal	manual	-	without cable
20.2480.221	universal	electrical	mirror heating	Plug/cable 2.5 m
Wedge mount 271 A for direct contacting, 59 x 124 x 21 mm (W x H x D) 2				
20.2710.640	universal	electrical	mirror heating	Standard wire/cable 0.15 m



Mirror mounting system 270-7

Maximum throat	600 mm
Tube diameter	28 mm
Mounting side	right and left side, mounting system bolted down
Adjustment	manual, bosh angle 51.4°
Folding torque	75 Nm
Vehicle interface	2 x M8 for bolting from inside of cabin
Wiring	choice of open and hidden cable guiding, for heated and/or electrically adjustable mirrors
Material	customizable tube design



customizable tube design



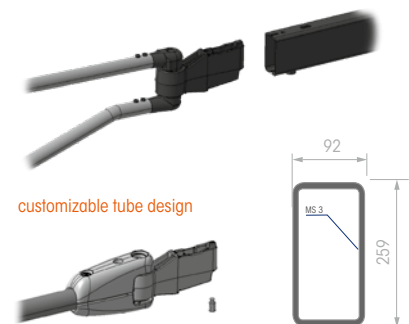
Individual components

Item number		Wiring	control
Heating cable with connector			
09.2070.101	1	2-lead oval right-angle connector - open end, length 2.07 m	-
09.2000.301	2	2-lead round right-angle connector - open end, length 2.0 m	-
Control cable with integrated heating lead			
09.3200.310	3	6-lead round right-angle connector - 2.8 crimp, length 2.0 m	One-mirror control
09.3200.320	4	6-lead round right-angle connector - 6.3 crimp, length 2.0 m	Two-mirror control
Power-supply line for mirror switch			
09.3200.210	5	open end - 2.8 crimp, length 1.0 m	One-mirror control
09.3200.220	6	open end - 6.3 crimp, length 1.0 m	Two-mirror control
Mirror switch			
08.3200.233	7	12 and 24 V on-board voltage, size: 42 x 42 x 54 mm (W x H x D)	Two-mirror control
Cable sets for remote controlled mirrors			
09.3200.420 H	6,4,4		



Mirror mounting system 1007 and 1011

Maximum throat	up to 700 mm
Tube diameter	28 mm / 40 mm
Mounting side	right and left side, mounting system bolted down
Adjustment	manual, bosh angle 52°
Folding torque	60 Nm
Vehicle interface	Insertion into rectangular tube
Wiring	choice of open and hidden cable guiding
Material	pressure-molded aluminium, powder-coated tubular steel, black







Electronics



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Electronics

Platform concept overview

Analog camera

Dimensions	35 x 35 x 34 mm (W x H x D)
Ingress protection	IP 69 K
Operating temperature	-40 °C to +85 °C
Operating voltage	9 - 36 V
Aperture angle (hor.)	70°, 100° or 120°
Image sensor	VGA
Image resolution	640 x 480 pixels
Video transmission	PAL oder NTSC



Ethernet camera

Dimensions	35 x 35 x 49 mm (W x H x D)
Ingress protection	IP 69 K
Operating temperature	-40 °C to +85 °C
Operating voltage	9 - 36 V
Aperture angle (hor.)	100°, 120° or 180°
Image sensor	1.2 megapixels
Image resolution	1280 x 720 pixels
Video transmission	UDP or RTP
Video compression	MJPEG or H.264



Easy integration

One of the critical advantages this camera offers is its easy and smooth integration into **any part** of the respective vehicle and at virtually any meaningful location. Thanks to its modular design, it is possible to generate **customized** solutions for individual customers without requiring a great deal of development work. The components are extremely robust and **compact** in size making the unit particularly easy to handle. The camera also features cutting-edge mounting bracket technology which further **facilitates** integration.

Integration example (current state of development)



Variable bracket options (current state of development)



Electronics

Analog and ethernet cameras

Analog camera 1307

Video system	NTSC or PAL
Image display	NTSC: 720 x 486 pixels (W x H), PAL: 720 x 576 (W x H)
Aperture angle	50°, 70°, 100° or 120°
Shock resistance	50 G
Min. illumination	Contrast ratio >1:50 at 0,5 lux
Video output	FBAS 1Vss at 75 Ω
Power consumption	< 1 W (< 3.5 W, with heating system ON)
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +90 °C
Ingress protection	IP 69 K
Operating voltage	9-36 V



Item No.	Aperture Angle	Mount
NTSC color camera		
28.1307.004.199	70°	horizontal
28.1307.005.199	100°	horizontal
28.1307.006.199	120°	horizontal
28.1307.011.199	100°	low distortion, horizontal
PAL color camera		
28.1307.001.199	70°	horizontal
28.1307.002.199	100°	horizontal
28.1307.003.199	120°	horizontal
28.1307.010.199	120°	low distortion, horizontal

Ethernet camera 1309

Video transmission	UDP or RTP
Video compression	MJPEG or H.264
Sensor resolution	1280 x 720 pixels (W x H)
Image display	45 Hz to 1280 x 960 pixels, 60 Hz to 1280 x 720 pixels
Image sensor	1.2 mega pixels
Aperture angle	50°-100°, 80°-176°
Shock resistance	50 G
Min. illumination	Contrast ratio >1:50 at 0,5 lux
Power consumption	< 1 W (< 3.5 W, with heating system ON)
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +90 °C
Ingress protection	IP 69 K
Operating voltage	9- 6 V



Item No.	Aperture Angle	Mount
Digital platform camera		
28.1309.040.199	50°-100°	horizontal
28.1309.041.199	80°-176°	horizontal

Electronics

Platform Camera Brackets

Platform camera brackets

Mounting bracket with protective hood

Dimensions	53 x 58 x 58 mm (W x H x D)
Material	Stainless steel

Item No.

11.1307.028.099



Ball bracket

Dimensions	80 x 71 x 42 mm (W x H x D)
Orientation	Fully adjustable as needed
Adjustment	Thanks to its swivel head design, the camera can be rotated 0°-360°
Material	ABS plastic

Item No.

11.1307.027.099



Shutter camera bracket, 24 V

Dimensions	113 x 97 x 107 mm (W x H x D)
Operating voltage	24V
Operating temp.	-40 °C bis +85 °C
Material	ABS plastic

Item No.

61.1307.014.099



Magnetic Base

Dimensions	66 x 66 x 19 mm (W x H x D)
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Item No.

20.5640.101





Electronics

Monitors / monitor brackets / wireless system transmitter

TFT color monitor

MEKRA Lang Surround View Monitor

Resolution	800 x 480 pixels
Temperatur range	-30 °C to +85 °C
Brightness	500 cd/m ²
Camera input	4
Screen	16:9
Contrast ratio	600:1
Operating voltage	9-36 V
Connector system	AMP



MEKRA 7" TFT-LCD Monitor Quad IP 65

Resolution	800 x 480 pixels
Temperatur range	-30 °C to +85 °C
Brightness	500 cd/m ²
Camera input	4
Screen	16:9
Contrast ratio	600:1
Operating voltage	9-36 V
Connector system	AMP



Monitor bracket

Individual monitor bracket (depending on requirements)

Different vehicles require different vision solutions. While our monitor is the ideal choice for any electronic vision solution, in-cab installation requirements can vary widely. We will put together a customized installation package based on various component options to meet your specific usage needs. Please see below for a small selection of these options:



Wireless video system

Digital wireless system – EWS-10

Operating frequency	2.408 GHz – 2.468 GHz
Transmission rate	4 Mbps maximum
Transmission distance	200 m (open terrain)
Frame rate	Up to 30 fps at 720 x 480 (NTSC)
Operating voltage	10 – 32 V DC
Power consumption	20 W maximum
Ingress protection	IP 69 K
Dimensions	65 x 65 x 33 mm (WxHxD)
Weight	app. 200g (2x)
Operating temperature	-40 °C to + 85 °C





Maximized adaptability...

MEKRA Lang cameras can be directly connected to existing vehicle displays, and MEKRA Lang camera systems are compatible with most third-party displays. Let us find out for you whether that is the case for your display. (Additional systems upon request.)

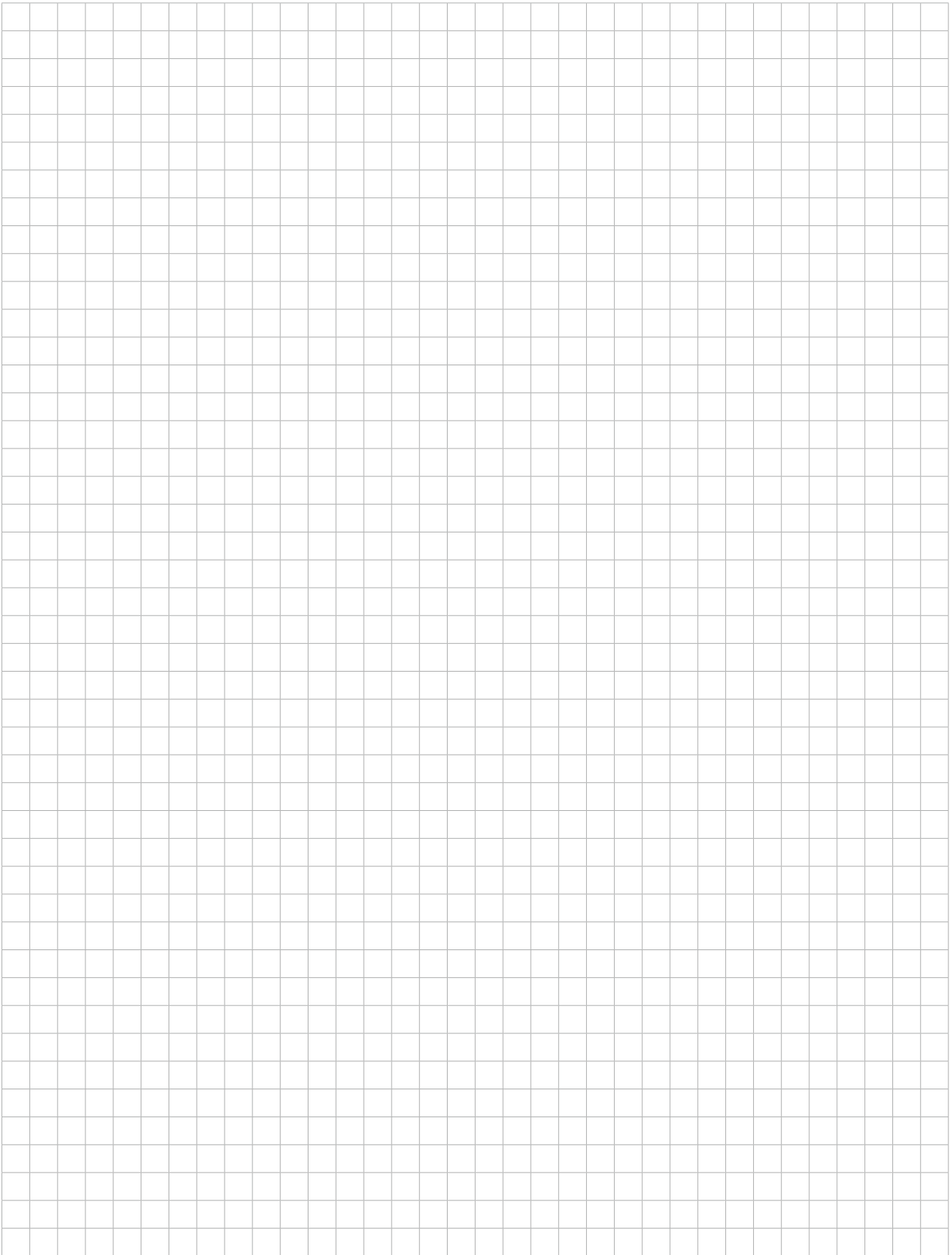
Multi Cable MEKRA - MEKRA (m-f)



Item number	Length
09.5610.111	5 m
09.5610.121	11 m
09.5610.131	16 m
09.5610.141	21 m

Appendix

Space for your creative ideas



General Terms and Conditions

Last Update: 06/2024

I. General Provisions

The contractual relationship between us, MEKRA Lang GmbH & Co. KG ("MEKRA Lang"), and our ordering parties ("Purchasers"), who are entrepreneurs as defined in § 14 BGB (German Civil Code), is solely governed by the General Terms and Conditions of Sale and Delivery (AGB) set out below. Dissenting terms and conditions of the Purchaser, even if known to us, shall not form part of the contract. Our offers shall be non-binding at all times. Our General Terms and Conditions of Sale and Delivery shall be regarded as accepted upon order placement, at the latest upon acceptance of the goods. In the case of an on-going business relationship, these General Terms and Conditions of Sale and Delivery shall also apply to all subsequent transactions. The invalidity of any provision of these general terms and conditions, in whole or in part, shall not affect the validity of the remaining provisions. In this case, MEKRA Lang and the Purchaser shall agree on provisions that shall be suitable to implement the economic purpose of the invalid provisions to the greatest extent possible. Until such time, the relevant legal provisions shall apply.

II. Contract Conclusion and Prices

1. By ordering goods the Purchaser bindingly states the wish to purchase the goods ordered. This statement shall remain binding for a period of two weeks. We shall be entitled to accept the submitted contract offer within a period of two weeks after receipt thereof. Acceptance may be declared in writing, electronically, or by delivery of the goods to the Purchaser.
2. The obligations pertaining to electronic commerce set forth in § 312e Sec. 1 sentence 1 Nos. 1 to 3 and sentence 2 BGB shall be excluded.
3. The conclusion of the contract shall be subject to orderly and timely receipt of goods from our own suppliers. This shall apply only, if we cannot be held responsible for the non-delivery, especially if we have entered into a congruent coverage transaction with our own suppliers. The Purchaser shall be informed of the non-availability of the goods or services without delay, and any compensation that has already been paid shall be reimbursed immediately.
4. All payments to be made hereunder shall be made in Euros.
5. All prices quoted shall be net ex works or distribution warehouse, respectively. Freight, packaging and import costs, as well as customs duties and other ancillary expenses shall be payable by the Purchaser.

III. Delivery Time and Delivery Obligation

1. Extent, type, and time of delivery shall be subject to our written or electronic order confirmation. Partial deliveries shall be permissible.
2. Any obligation to comply with delivery deadlines deemed as binding shall be conditional on the undisturbed flow of operations and distribution processes; particularly in cases of force majeure and other disruptive events at our facilities or those of our suppliers or carriers, including but not limited to operational or traffic disruptions, fire, flooding, labor, energy, or traffic shortages, strikes, lockouts, acts of public authorities as well as technical or technological conditions that considerably impede the execution of the contract, shall release us from the obligation to deliver on time or entitle us to suspend delivery without any obligation for subsequent delivery.
3. Unless otherwise agreed, we shall be entitled to deliver before a stated delivery date. Additionally, unless otherwise agreed, any delivery of up to two weeks past a stated delivery date shall not be regarded as delayed on our end.
4. When the goods have left the factory or distribution warehouse or the Purchaser has received notice of our readiness to deliver by the time the delivery dates expire, said delivery dates shall be regarded as met. Subsequent contract amendments shall provide for reasonable delivery date extensions.
5. Where the performance of a contract consists of multiple deliveries, the non-fulfillment, improper fulfillment or delayed fulfillment of one delivery shall not affect the other deliveries

pertaining to the contract.

6. Defaults in payment, declarations in lieu of an oath as per § 807 ZPO (German Code of Civil Procedure), emergent payment difficulties or signs of significant deterioration in the Purchaser's financial position shall entitle us, at our discretion, to demand advance payment for deliveries not yet completed, or to call off deliveries immediately and to refuse the fulfillment of current contracts. At the same time, we shall be entitled to make due and payable with immediate effect any accounts receivable from the Purchaser which are not due yet.

IV. Shipping, Transfer of Risk

1. Unless otherwise agreed by the contracting parties, packaging, shipping route and method of transportation remain at our discretion.
2. Upon hand-over, or in case of a sale by dispatch upon delivery of the goods to the forwarding agent, the carrier, or any other person or institution designated to execute the shipment, the risk of accidental loss and accidental deterioration of the goods shall be passed on to the Purchaser. If the Purchaser defaults on acceptance, this shall be deemed equivalent to hand-over.
3. Unless otherwise agreed, goods from call orders shall be accepted within 3 months upon order confirmation.
4. Insurance coverage for breakage and transportation risks shall be taken out upon special request only, and for a corresponding fee.
5. Customs duties and other expenses, including those for obtaining the required import documents for the country of destination, shall be payable by the Purchaser.

V. Payment, Payment Terms

1. Invoices shall be payable:
 - a) within 14 days from the date of invoice including a 2 % cash discount on the final invoice value;
 - b) within 30 days from the date of invoice without a cash discount on the final invoice value.
2. A cash discount shall be granted only, if all payment obligations arising from earlier deliveries have been fulfilled and the invoice amount has been submitted to us in cash or credited to our account in a timely fashion by the aforementioned due dates. As a result, the submission of a bill of exchange cannot lead to the granting of a cash discount. In case of a cashless payment, especially when a check is submitted, the time the amount is credited shall be the determining factor. A cash discount cannot be granted for amounts that are paid or credited conditionally or subject to other limitations. The Purchaser shall assume any and all risks in connection with the method of payment. Invoices for tools shall be payable immediately without cash discount.
3. Bills of exchange and cheques shall be accepted on account of performance only. The corresponding amounts shall be credited subject to receipt of the full amount due. We reserve the right to accept other or own acceptances. Expenses and discount charges shall be payable by the Purchaser. We shall assume no responsibility for submission and protest. If the Purchaser's own bills of exchange have been protested or if protested other bills of exchange not have not been covered immediately, we shall be entitled to return any and all pending bills of exchange. At the same time we shall be entitled to make immediately due and payable those accounts receivable from the Purchaser which are not due yet. Pre-dated checks shall not be accepted.
4. In case of missed payment dates, interest on defaulted payment of 9 % above the base rate of the German Central Bank according to § 247 BGB shall be payable, as well as damages due to late performance in the amount of € 40.00 according to § 288 Sec. 5 BGB. We shall continue to reserve the right of assertion of further damages due to late performance and other claims.
5. Advance and interim payments shall be non-interest bearing.
6. The Purchaser shall be entitled to offset or withhold payment only if the counterclaim is undisputed or has been determined

legally binding. The Purchaser may execute a right of retention only if his counter claim is based on the same contractual relationship.

7. When settling invoices, the Purchaser shall provide the respective customer and invoice numbers. Any costs due to delays or accounting errors resulting from a failure to do so, shall be borne by the Purchaser.

VI. Retention of Title, Factoring

1. We shall retain full title to the goods that have been delivered, until such time as any and all receivables arising from the business relationship with the Purchaser have been paid. The Purchaser shall be entitled to resell the goods to which we have retained title within the ordinary course of business; however, any pledging or security transfer shall not be permissible. Where the goods to which we have retained title are being resold on credit, the Purchaser must ensure that our rights are protected.
2. The Purchaser hereby assigns to us any of the Purchaser's receivables arising from the resale of the goods to which we have retained title in the amount invoiced; we hereby accept such assignment. Regardless of the assignment, the Purchaser shall retain the right to collect payment, provided that he fulfills his obligations owed to us according to the underlying contractual relationship and does not fall into financial decline. Otherwise the Purchaser shall, upon our request, provide any information about the assigned receivables that are required for collection, and shall notify his debtors of the assignment. In this case we shall reserve the right to collect the receivables on our own.
3. Any finishing or processing of the goods to which we have retained title by the Purchaser shall be performed on our behalf and by our order, however, without resulting in any obligations for us. If the goods to which we have retained title are processed with goods that are third-party property, then we shall acquire co-title to the new goods. The proportion of co-title shall follow from the proportion of the value of the goods to which we have retained title and the value of the other processed goods. Any references herein to the value of the goods to which we have retained title shall be based on our invoice value.
4. Should the Purchaser acquire sole ownership of the new goods according to § 947 Sec. 2 BGB, it is agreed that the Purchaser shall grant us co-title to the new goods in proportion of the value of the processed, combined, or mixed goods to which we have retained title, and shall remain custodian of the goods which shall be free of charge.
5. Where the goods to which we have retained title are resold together with other goods, regardless of whether or not they were processed, combined or mixed, the advance assignment agreed to above is valid only to the extent of the value of the goods to which we have retained title that were resold together with the other goods. If requested, we shall release the securities we are entitled to as provided above, insofar as the value exceeds the claims to be secured by 20 %.
6. The Purchaser shall immediately notify us of any third-party compulsory execution measures regarding the goods to which we have retained title or the receivables assigned in advance and shall provide us with any documents required for an intervention. Any related intervention costs shall be payable by the Purchaser.
7. The Purchaser shall take out adequate fire and burglary insurance for the goods to which we have retained title and shall provide us with corresponding proof, if requested.

VII. Warranty Claims

1. The period of limitation for warranty claims is 24 months from the delivery of the goods.
2. Initially, we shall remedy any defects in the products through either reworking or replacement (at our discretion). Where defects cannot be remedied through reworking or replacement, the Purchaser shall have the right to demand a cancellation of the contract or a reduction in compensation. However, the

Purchaser shall not be entitled to cancel, if the lack of conformity is minor, and particularly if the defects are minor.

3. The Purchaser must notify us in writing of any obvious defects without delay, at the latest within 7 days after receipt of the goods, suspending any processing immediately. Otherwise the assertion of any warranty claims shall be excluded. The timely dispatch of the notification shall be deemed sufficient for compliance with the notification period. The full burden of proof regarding all requirements for asserting claims shall be borne by the Purchaser, especially for the defect itself, for the time of the establishment of the defect, and for the timeliness of the complaint regarding the defect.
4. Defects which, despite careful inspection, cannot be ascertained within this time period are to be reported to us in writing immediately upon discovery. If, after a failed cure, the Purchaser opts for a withdrawal from the contract due to a legal or material defect, the Purchaser shall not also be entitled to seek damages based on the defect.
5. If, after a failed cure, the Purchaser opts for damages, the goods shall remain with the Purchaser, if this can be reasonably expected. Damages are limited to the difference between the purchase price and the value of the defective product. This shall not apply if we caused the contract violation maliciously.
6. Title to all goods for which we provided replacement, will pass to us and such goods shall be returned to us for a reimbursement of costs.
7. No claims may be asserted for damages which were negligently caused by the Purchaser through
 - a) improper handling or excessive use of the purchased item, or
 - b) unauthorized modification of the purchased item, or
 - c) non-compliance with the assembly or operating instructions, or
 - d) a breach of the complaint and delivery obligations according to para. 3 and 4 above, or
 - e) continued use of the purchased item after the defect has been ascertained. Ordinary wear and tear shall be excepted from the warranty.

VIII. Liability

1. In case of slightly negligent breaches of duty, our liability shall be limited to the average immediate damage that can be reasonably and typically expected for the respective contract type. The aforementioned shall also apply to slightly negligent breaches of duty by our legal representatives or agents. We shall not be held liable in case of a slightly negligent breach of nonessential contract obligations.
2. Any liability based on assumed warranties as well as product liability shall remain unaffected, including for bodily harm or health impairments attributable to us or loss of life of the Purchaser.
3. The period during which the Purchaser shall be entitled to claims for damages due to a defect is limited to one year from delivery of the goods. The aforementioned shall not apply, if we can be accused of willful intent or gross negligence, as well as bodily harm or health impairments attributable to us or loss of life of the Purchaser.
4. Notice Regarding Market Surveillance: As a distributor and importer, you play an important part in ensuring the compliance and safety of products in the market. As a distributor and importer of our products, you are required to comply with the applicable legal provisions and obligations regarding market surveillance, should there be any indications of discrepancies (e.g. in the form of complaints regarding non-compliance with ECE R46 or general, safety-related issues). Please adhere to the corresponding reporting requirements in connection with the above-mentioned anomalies. Any reports to us should be comprised of transparent and verifiable information. Please contact your sales team representative.

IX. Returns

As a rule, returns of goods that were properly ordered and delivered shall not be accepted. Returns that have been arranged with us shall be the exception. In addition, the following prerequisites must be met:

quisites must be met:

1. The products must have been purchased directly from us or from one of our factory warehouses.
2. The goods must be in flawless and unaltered condition.
3. As a rule, we shall accept returned goods or parts only if they are still part of our current product portfolio.
4. Returns must be shipped „free domicile“ to our plant in Ergersheim or to the appropriate factory warehouse and must include the respective delivery note dates and numbers. Value reduction for returns:
 - in the 1st year after delivery date ./ 10 % of the contract price
 - in the 2nd year after delivery date ./ 25 % of the contract price
 - between the 3rd and the 5th year after delivery date ./ 50 % of the contract price
 - Any goods older than 5 years may not be returned.
 Upon receipt of the parts, a technical inspection shall be performed and a credit slip completed, taking into account any applicable value reductions. The remaining value shall be reduced by any original shipping costs incurred by us.

X. Intellectual Property Rights

1. Regarding custom-made products, the Purchaser shall be liable to us for the exemption from third-party intellectual property rights in connection with the items ordered, shall indemnify us against any possible third-party claims and shall compensate us for any damages resulting from a breach of this obligation.
2. Our designs and design proposals shall be kept confidential and may not be passed on to third parties.
3. Any drawings, construction plans, and samples provided to the Purchaser shall remain our intellectual property.

XI. Place of Fulfillment, Jurisdiction, Other Agreements

1. As a rule, it shall be considered agreed that the condition of the goods is solely set forth in our product description. Any public statements, sales talks, or advertisements by us shall not represent a contractual description of the condition of the goods. Samples and specimens shall serve as approximate illustrative articles regarding product quality, dimensions and color and cannot serve as the basis for asserting any legal claims. We reserve the right to make reasonable technical changes as well as modifications in shape, color, and/or weight.
2. If the Purchaser receives inaccurate assembly instructions, we shall only be obliged to provide accurate assembly instructions, and only, if the inaccurate assembly instructions prevent proper assembly.
3. We shall not grant any warranties in the legal sense to the Purchaser; the aforementioned shall not affect any manufacturer's warranties.
4. The place of fulfillment for our deliveries ex works shall be the delivery plant; the place of fulfillment for our deliveries ex stock shall be the warehouse. The place of fulfillment for any payments shall be Ergersheim in Bavaria, Germany.
5. The exclusive place of jurisdiction for any disputes regarding this contract shall be Fürth in Bavaria, Germany. This shall also apply to lawsuits regarding checks or bills of exchange.
6. The law of the Federal Republic of Germany shall govern these provisions. The provisions of the UN United Nations Convention on Contracts for the International Sale of Goods shall not apply. The German-language version of these General Terms and Conditions of Sale and Delivery shall apply exclusively.
7. The special terms of our products published with the appropriate price lists shall apply as well.
8. The Purchaser shall be responsible for examining the suitability of the goods for their intended use.
9. In accordance with the provisions of the German Federal Data Protection Law (BDSG), we wish to note that all Purchaser data required for order processing will be stored electronically.

MEKRA Lang - **passion** for excellence.

Headquarters

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Contents are subject to change
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