



## Buses

Product Catalog for Mirror and Camera Monitor Systems



## Table of Contents

Directives	6
Coaches	12
City Buses	22
Motorhomes	34
Components	42
Electronics	56
Accessories	84
Service	90

## Editorial

Dear Readers,

We are delighted to present to you our new product catalog for mirror and camera monitor system for buses.

As a supplier of robust and high-quality indirect vision systems, we offer standard solutions as well as vehicle-specific adaptations and customized configurations 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 are looking forward to your inquiry.

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

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

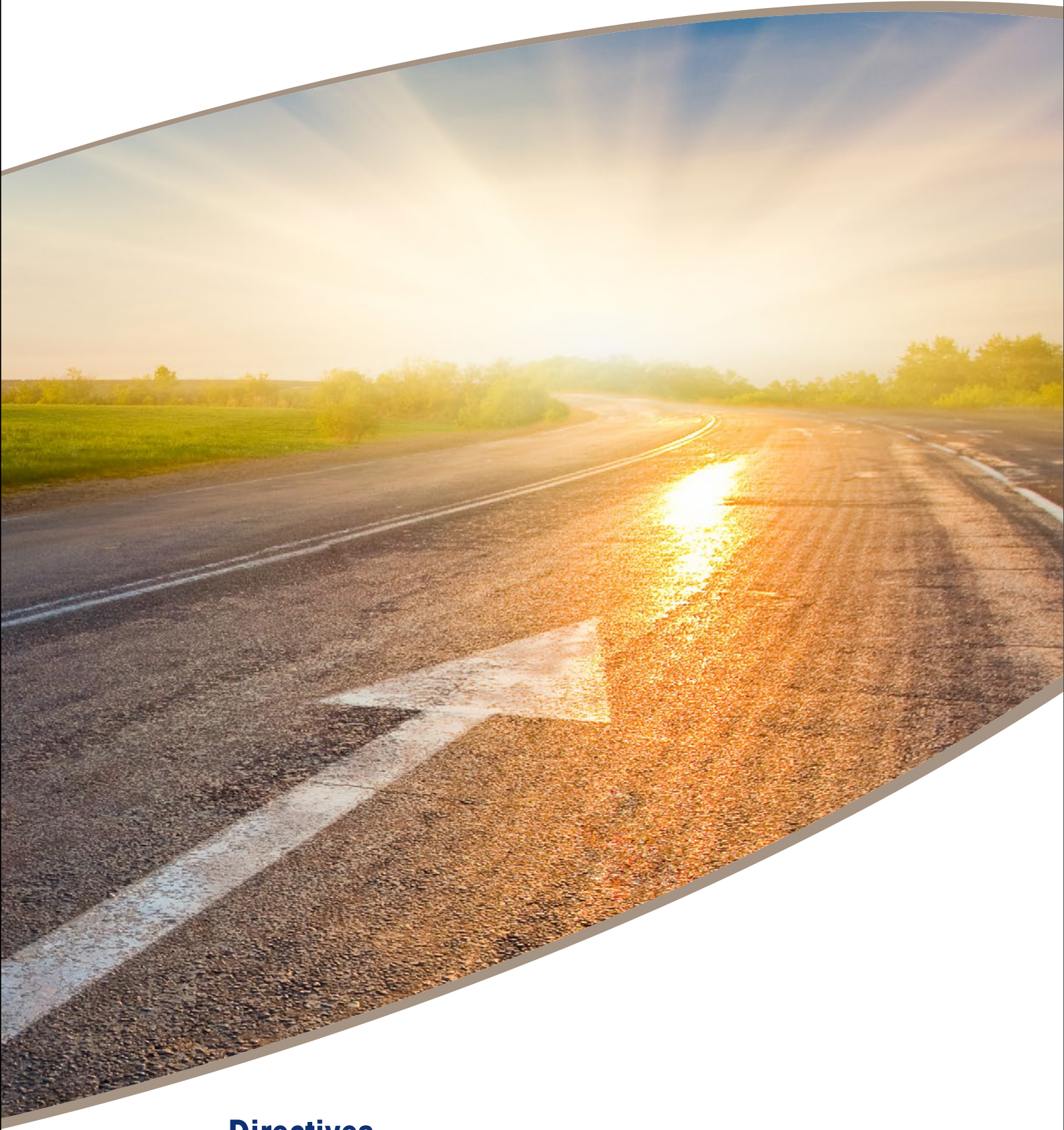
You will notice that our reliable products do not only provide considerable added value but also fundamental benefits for your daily operations.

We look forward to being by your side as you meet your present and future challenges.

With kind regards



Your Account Managers and Assistants in the Bus and Motorhome Division



## **Directives**



Vehicle Classes and Fields of Vision **8**

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European Regulations and Directives for Buses **10**

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# Directives

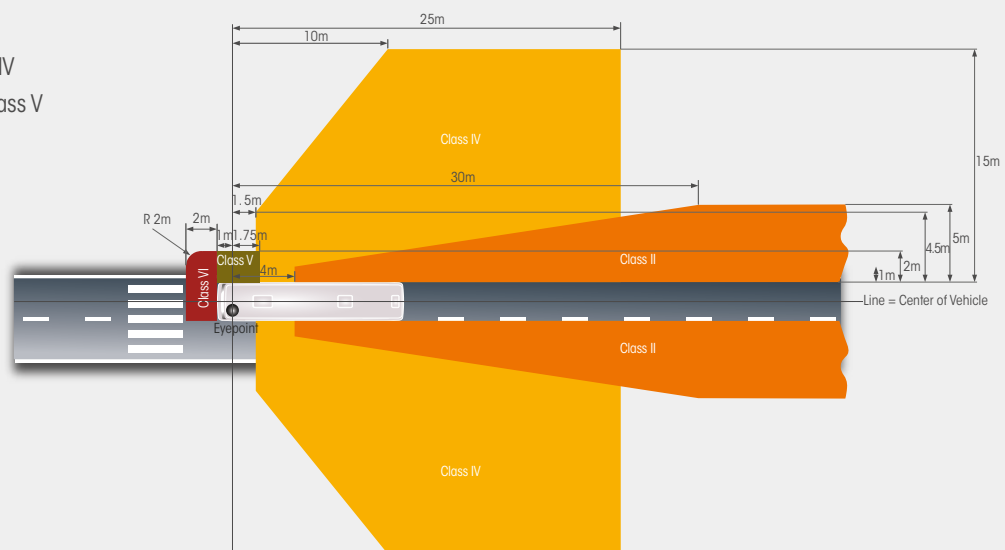
## Vehicle Classes and Fields of Vision

Vehicle Class	Interior mirror	Exterior mirror	
	Class I interior mirror	Class II main mirror (large)	Class III main mirror (small)
<b>M<sub>1</sub></b> up to 8 persons	<b>Compulsory</b> Unless in the field of vision required according to para. 15.2.4.1, the vehicle is equipped with something other than safety glazing material.	<b>Optional</b>	<b>Compulsory</b> 1 on the driver's side and 1 on the passenger's side Alternatively, class II mirrors may be installed.
<b>M<sub>2</sub></b> > 8 persons up to 5 tons	<b>Optional</b> (No field-of-vision requirements)	<b>Compulsory</b> 1 on the driver's side and 1 on the passenger's side	<b>Not permitted</b>
<b>M<sub>3</sub></b> > 8 persons > 5 tons	<b>Optional</b> (No field-of-vision requirements)	<b>Compulsory</b> 1 on the driver's side and 1 on the passenger's side	<b>Not permitted</b>

### European Directive for Trucks (2003/97/EC) ECE R46/04

Legend	<span style="color: orange;">■</span> HS = Main mirror	≅ Class II	<span style="color: green;">■</span> NBS = Close-proximity mirror	≅ Class V
	<span style="color: yellow;">■</span> WWS = Wide-angle mirror	≅ Class IV	<span style="color: red;">■</span> FS = Front mirror	≅ Class VI

- Main mirror Class II
- Wide-angle mirror Class IV
- Close-proximity mirror Class V
- Front mirror Class VI



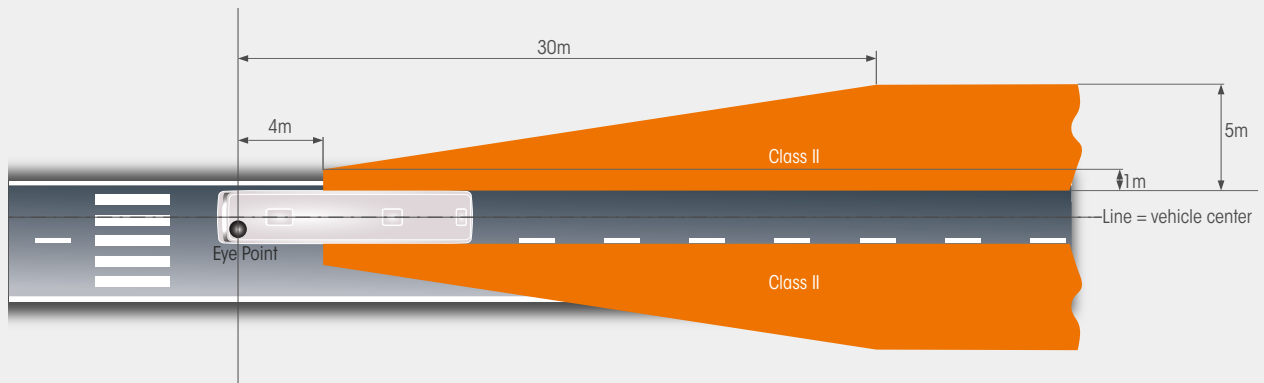
The statutory fields of view represent minimum requirements. The MEKRA fields of vision shown in ideal-typical representation may vary depending on vehicle size, shape, and mounting location. They do, however, always meet the legal minimum requirements.

Class IV wide-angle mirror	Class V close-proximity mirror	Class VI front mirror
<p><b>Optional</b> 1 on the driver's side and/ or 1 on the passenger's side</p>	<p><b>Optional</b> 1 on the driver's side and 1 on the passenger's side (must both be installed at least 2 m above the ground)</p>	<p><b>Optional</b> (must be installed at least 2 m above the ground)</p>
<p><b>Optional</b> 1 on the driver's side and/ or 1 on the passenger's side</p>	<p><b>Optional</b> 1 on the driver's side and 1 on the passenger's side (must both be installed at least 2 m above the ground)</p>	<p><b>Optional</b> (must be installed at least 2 m above the ground)</p>
<p><b>Optional</b> 1 on the driver's side and/ or 1 on the passenger's side</p>	<p><b>Optional</b> 1 on the driver's side and 1 on the passenger's side (must both be installed at least 2 m above the ground)</p>	<p><b>Optional</b> (must be installed at least 2 m above the ground)</p>

# Directives

European Regulations and Directives for Buses

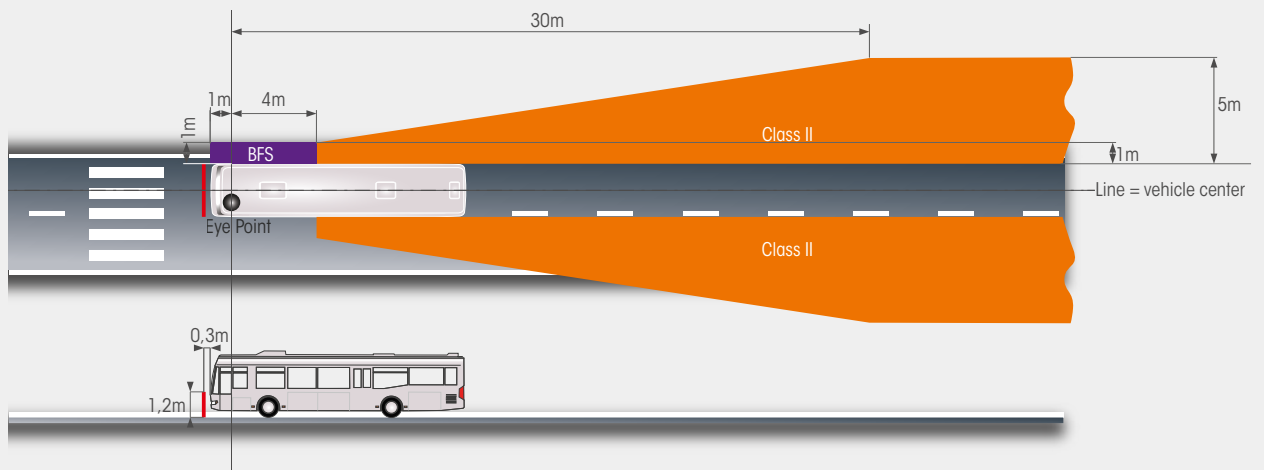
## Legally Required Field of Vision for Buses



- Class II main mirror on both sides
- Wide-angle mirror permitted – not compulsory

The statutory fields of view represent minimum requirements. The MEKRA fields of vision shown in ideal-typical representation may vary depending on vehicle size, shape, and mounting location. They do, however, always meet the legal minimum requirements.

## German School Bus Regulation



- Class II main mirror on both sides
- Passenger's side (BFS) with mirror, camera monitor system optional
- Direct front view of measuring stick or front mirror, camera monitor system optional

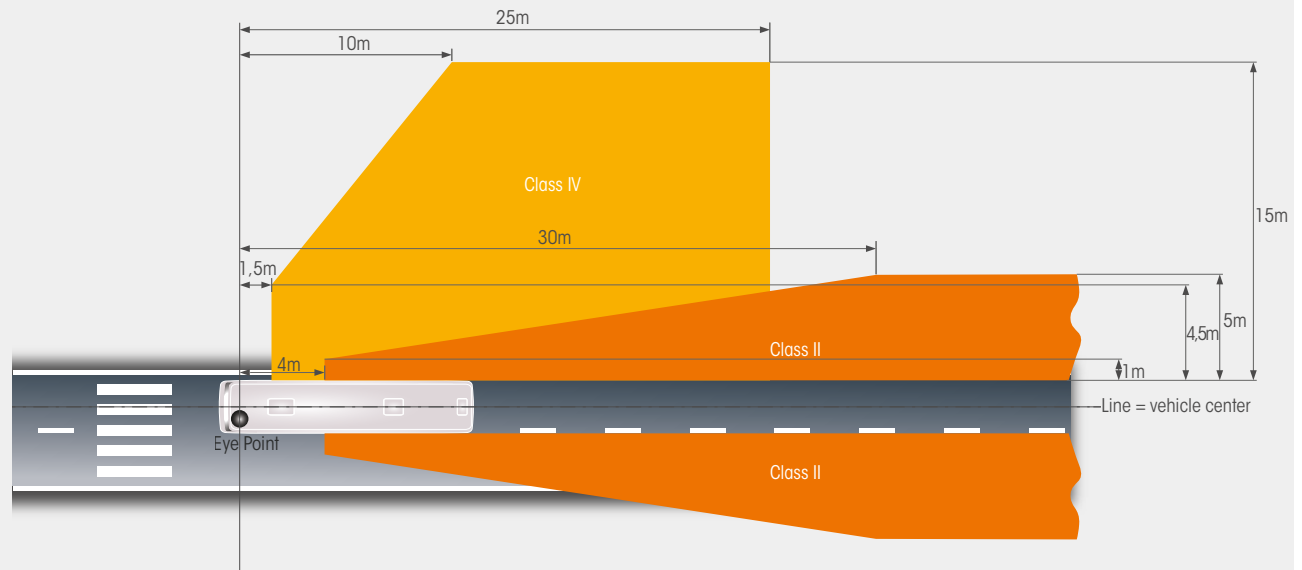
The statutory fields of view represent minimum requirements. The MEKRA fields of vision shown in ideal-typical representation may vary depending on vehicle size, shape, and mounting location. They do, however, always meet the legal minimum requirements.

## Legend

<span style="color: orange;">■</span> HS	= Main mirror	≅ Class II	<span style="color: green;">■</span> NBS	= Close-proximity mirror	≅ Class V
<span style="color: yellow;">■</span> WWS	= Wide-angle mirror	≅ Class IV	<span style="color: red;">■</span> FS	= Front mirror	≅ Class VI



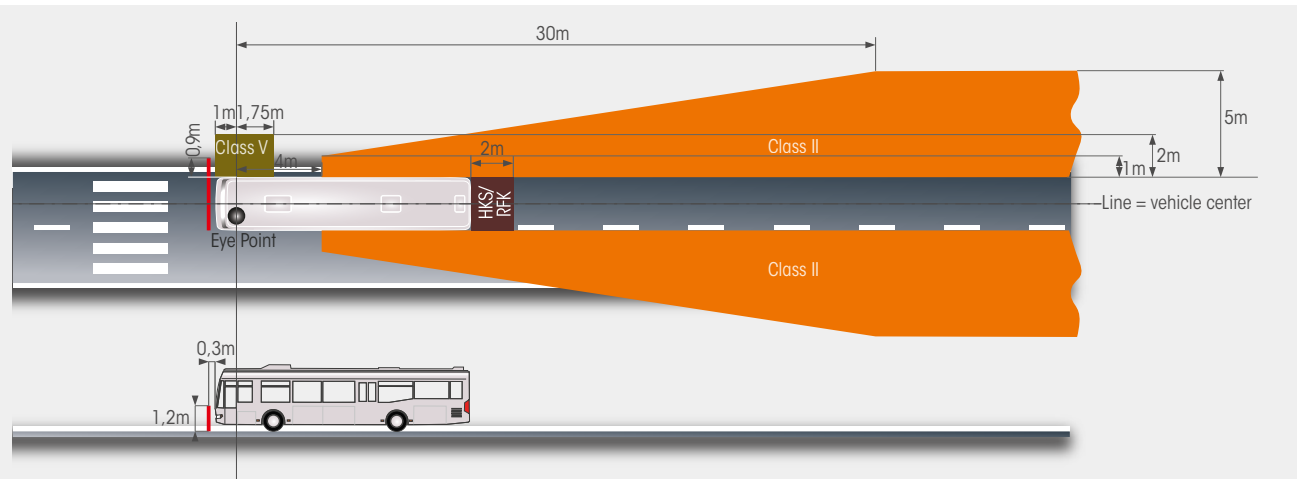
## Belgian Regulation



- Class II main mirror on both sides
- Class IV wide-angle mirror on the passenger's side
- Class IV wide-angle mirror on left side permitted – not compulsory

The statutory fields of view represent minimum requirements. The MEKRA fields of vision shown in ideal-typical representation may vary depending on vehicle size, shape, and mounting location. They do, however, always meet the legal minimum requirements.

## Spanish School Bus Regulation

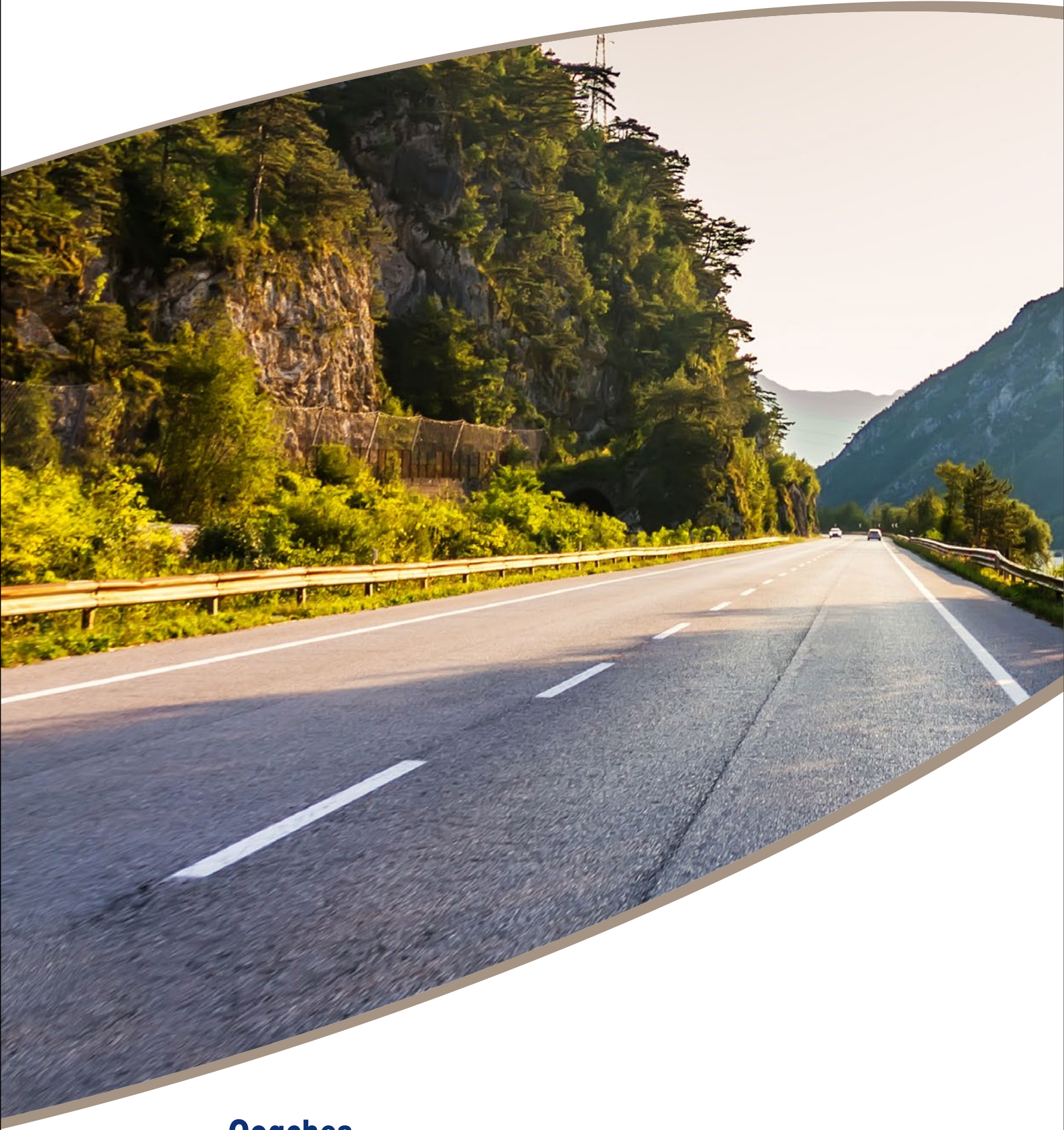


- Class II main mirror on both sides
- Class V close-proximity mirror right side, camera monitor system optional
- Direct front view of measuring stick or front mirror Class VI, camera monitor system optional
- Class V close-proximity mirror on right side not required, if the field of vision is ensured by a combination of Class IV wide-angle mirror and Class VI front mirror
- Rear camera, rear mirror optional

The statutory fields of view represent minimum requirements. The MEKRA fields of vision shown in ideal-typical representation may vary depending on vehicle size, shape, and mounting location. They do, however, always meet the legal minimum requirements.

- BFS = Passenger's side ≅ visible, legally required field of vision
- HKS/RFK = Rear mirror / rear-view camera

■ Measuring stick front view



## **Coaches**



Mirror System 291	14
Mirror System 274	18
Mirror System 271	20

# Mirror System 291

Coaches

Features

- ECE R46/02-compliant main and wide-angle mirrors
- Modular system
- Variable mounting lengths and angles
- Manual or power folding mirrors
- Manually or electrically adjustable mirror glasses, heated
- Optional configuration with wide-angle or front crossview mirror
- Paintable plastic (ABS) trim options with fine-grain texture
- LED entry light can be integrated
- Camera can be integrated
- Ultra-robust mounting arm construction, vibration-resistant
- Optional configurations for country-specific field-of-vision regulations
- Ample supply of spare parts
- Left-hand and right-hand drive options
- Easy to disassemble
- Tool-free glass replacement (snap-and-slide locking)
- Various 12 V options available



## Mirror configurations

### HS Main mirror II

R 1200 (II E1 021203)  
heated, 24 V  
electrically adjustable

### WWS Wide-angle mirror IV

R 300 (IV E1 021207)  
heated, 24 V  
manually adjustable

### BS Front crossview mirror

R 200  
heated, 24 V  
manually adjustable

### Folding feature manual or powered



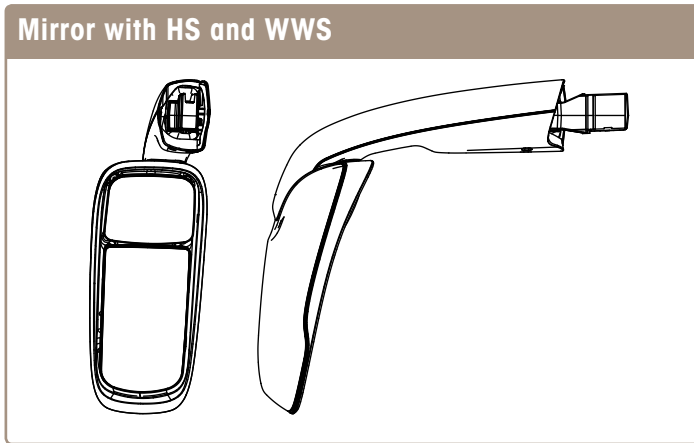
### Camera



### LED entry light

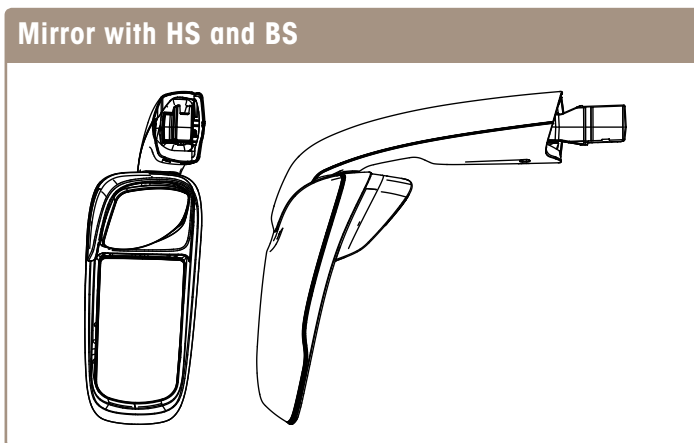


## System options



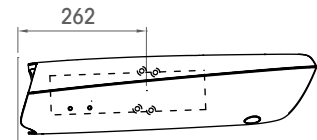
or

+

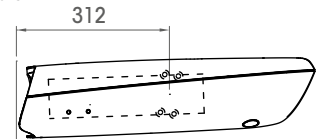


**Mounting arm** available in three mounting sizes

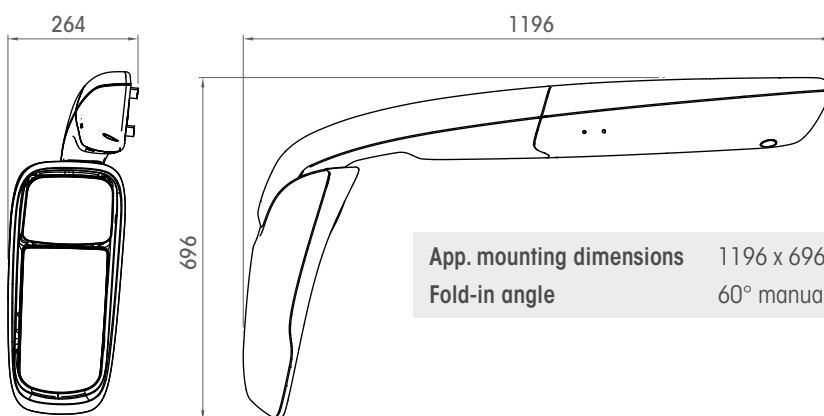
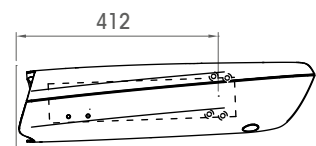
Short



Medium



Long



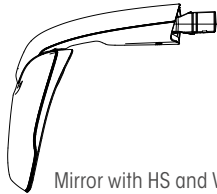
App. mounting dimensions 1196 x 696 x 264 mm (L x H x D)  
 Fold-in angle 60° manual operation

# Mirror System 291

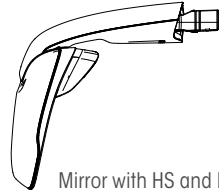
Coaches

## Mirror configurations

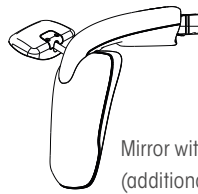
291



Mirror with HS and WWS

















Mirror with HS and BS



Mirror with HS, WWS and ZS  
(additional mirror)

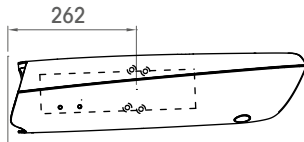


Mirror with HS,  
WWS and NBS  
(close proximity-mirror)

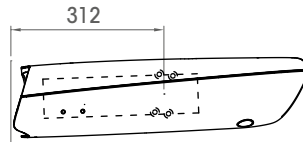
Item number	Assembly	Configuration				Directives
<b>Manual folding mirrors</b>						
<b>left-hand drive</b>						
59.2910.001.001	left side	HS	WWS			<b>ECE</b>  
59.2910.002.001	right side	HS	WWS			<b>ECE</b> 
59.2910.003.001	left side	HS		BS		<b>ECE</b>  
59.2910.004.001	right side	HS		BS		<b>ECE</b> 
59.2910.011.001	left side	HS	WWS		Camera	<b>ECE</b>   
59.2910.012.001	right side	HS	WWS		Camera	<b>ECE</b>   
59.2910.013.001	left side	HS	WWS	ZS	559	<b>ECE</b>   
59.2910.014.001	right side	HS	WWS	NBS	558	<b>ECE</b>   
<b>right-hand drive</b>						
59.2910.009.001	left side	HS	WWS			<b>ECE</b>
59.2910.010.001	right side	HS	WWS			<b>ECE</b>
59.2910.017.001	left side	HS		BS		<b>ECE</b>
59.2910.018.001	right side	HS		BS		<b>ECE</b>
<b>Power folding mirrors</b>						
<b>left-hand drive</b>						
59.2910.005.001	left side	HS	WWS			<b>ECE</b>  
59.2910.006.001	right side	HS	WWS			<b>ECE</b> 
59.2910.007.001	left side	HS		BS		<b>ECE</b>  
59.2910.008.001	right side	HS		BS		<b>ECE</b> 
59.2910.015.001	left side	HS	WWS		Camera	<b>ECE</b>   
59.2910.016.001	right side	HS	WWS		Camera	<b>ECE</b>   

Additional options upon request

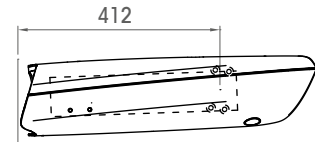
## 291



Short



Medium



Long

Item number	Assembly	Length	Equipment
<b>Mounting arm</b>			
61.2910.001.001	291-1	left side	Short
61.2910.002.001	291-1	right side	Short
61.2910.003.001	291-2	left side	Medium
61.2910.004.001	291-2	right side	Medium
61.2910.005.001	291-3	left side	Long
61.2910.006.001	291-3	right side	Long

Additional options upon request, including an integrated LED entry light. LED entry light retrofittable.

## Accessories

Item number	Length
<b>Connecting cable to vehicle</b>	
09.2910.002.099	for HS and WWS
09.2910.003.099	2-pin for entry light or folding feature
<b>Mirror adjustment switch</b>	
08.3200.233	for 2-mirror operation
<b>Other</b>	
08.3950.001.099	Controller for power folding mechanism
08.2910.001.002	Power LED entry light 9 - 32 V incl. mounting clips



retrofittable

# Mirror System 274

Coaches

## Features

- ECE R46/02-compliant main mirrors
- Heated, electrically adjustable main mirrors
- Can be used below 2 m, mirror head folds forward or backward in case of collision
- Folds in onto windshield, manual operation
- Direct contact connection 271/ hidden wiring
- Various mounting adapters for vehicle installation
- Paintable surfaces
- Tool-free glass replacement (snap-and-slide locking)
- Easy to disassemble/ remove
- Single design supports both right and left-side installation
- Variable mounting lengths and angles
- 12 V and 24 V options available



## Mirror configurations

### HS Main mirror II

R 1800  
(II E1 020910)  
heated, 24 V/ 12 V  
electrically adjustable



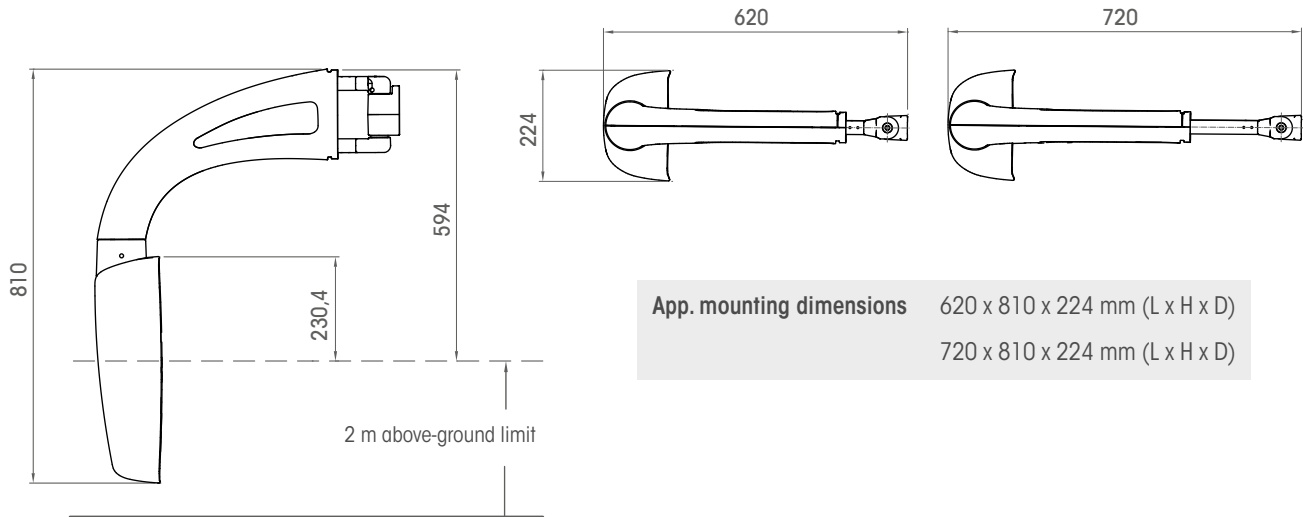
HS \_\_\_\_\_

### Mirror head with folding mechanism



2 m above-ground limit





**App. mounting dimensions** 620 x 810 x 224 mm (L x H x D)  
720 x 810 x 224 mm (L x H x D)

Item number	Configuration			Length	Directives
	left-hand/ right-hand mount	heated	Electrically adjustable (HS II)		
59.2743.322	HS	R 1800	12 V		<b>ECE</b>
59.2743.332	HS	R 1800	12 V	Overall length + 100 mm	<b>ECE</b>
59.2743.323	HS	R 1800	24 V		<b>ECE</b>
59.2743.333	HS	R 1800	24 V	Overall length + 100 mm	<b>ECE</b>



Adapter with rubber bellows

## Accessories

Item	
Wedge mounts	see Accessories - Wedge mounts – Direct Contact Connection 271, page 86
Adapters	see Accessories – Adapters, page 87
Rubber bellows	see Accessories – Rubber bellows, page 87
Mirror switch	see Accessories – Mirror switch, page 89

# Mirror System 271

Coaches

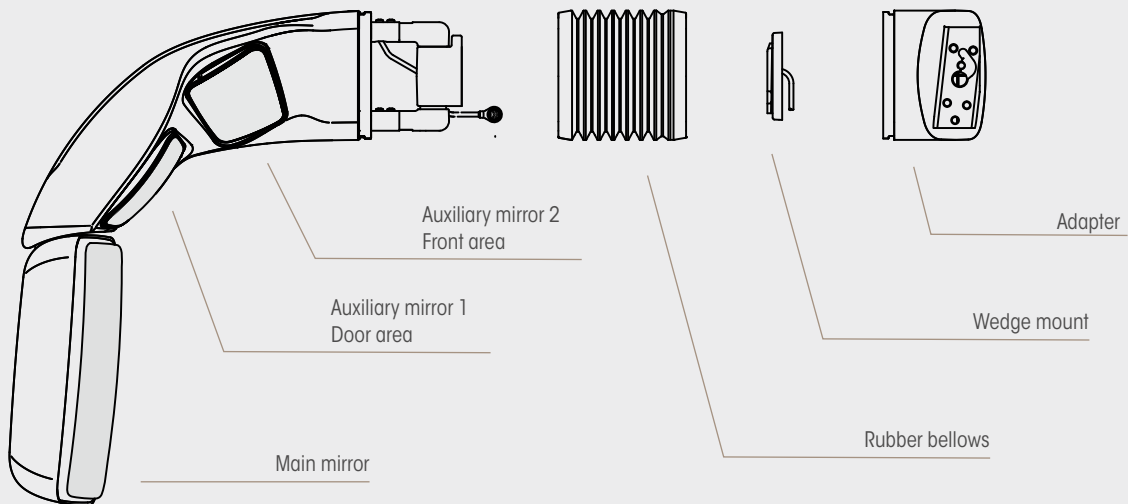
Features

- ECE R46/02-compliant main mirrors
- Heated, electrically adjustable main mirrors
- Two auxiliary mirrors (right side) for compliance with the field-of-vision requirements within the door and front area, heated, manually adjustable
- One auxiliary mirror (left side) for the lateral area
- Hard foam mirror arm on steel tubular bracket
- Folds in onto windshield, manual operation
- Hidden wiring in mounting tube
- Various mounting adapters for vehicle installation
- Paintable surfaces
- Tool-free glass replacement (snap-and-slide locking mechanism)
- Easy to disassemble/ remove
- Left-hand and right-hand drive options
- Variable mounting lengths and angles
- Various 12 V options available

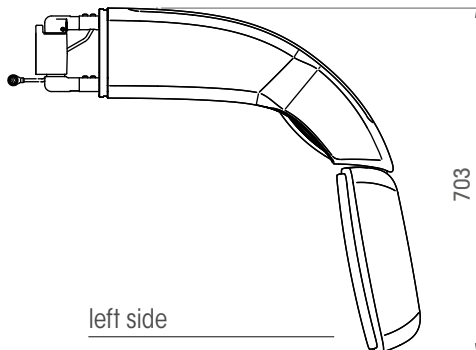


## Mirror configurations

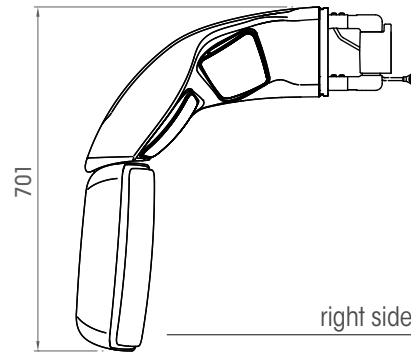
HS Main mirror II	ZS Auxiliary mirror 1	ZS 2 Auxiliary mirror 2
R 1800 (II E1 020923) heated, 24 V electrically adjustable	Door area R 200 heated, 24 V manually adjustable	Front area R 200 heated, 24 V manually adjustable



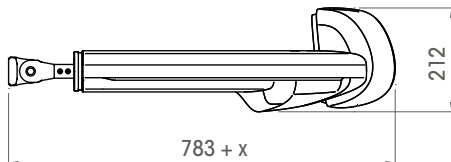
## 271



left side

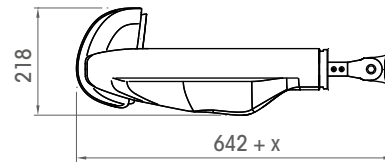


right side



783 + x

212



642 + x

218

**App. mounting dimensions** left side 783 (+x) x 703 x 212 mm (L x H x D)  
right side 642 (+x) x 701 x 218 mm (L x H x D)

**Fold-in angle** 60° manual operation

Item number	Assembly		Directives
For wedge mount direct contact connection 271, heated, 24 V, electrically adjustable (Class II)			
59.2710.411	left side	left-hand drive	
59.2710.412	right side	left-hand drive	



Direct contact connection 271

Item number	Assembly		Length	Directives
For wedge mount cable connection 248, heated, 24 V, electrically adjustable (Class II)				
59.2710.401	left side	left-hand drive		
59.2710.402	right side	left-hand drive		
59.2710.454	left side	right-hand drive		
59.2710.406	right side	left-hand/ right-hand drive	Overall length + (x) 100 mm	



Cable connection 248

## Accessories

### Item

Wedge mounts	see Accessories - Wedge mounts – Direct Contact Connection 271, page 86
Adapters	see Accessories – Adapters, page 87
Rubber bellows	see Accessories – Rubber bellows, page 87
Mirror switch	see Accessories – Mirror switch, page 89



## **City Buses**



Mirror System 277	24
Mirror System 278	26
Mirror System 1018 Bus	28
Mirror System 1041	30
Mirror System 1042	31
Mirror System 276	32

# Mirror System 277

City Buses

## Features

- ECE R46/02-compliant main mirror
- Auxiliary mirror complies with German School Bus Regulation (Deutsche Schulbusverordnung)
- Can be used below 2 m, folding mirror head
- Manually or electrically adjustable mirror glasses, heated
- Manual or power folding mirror arm
- Paintable plastic (ABS) trim options with fine-grain texture
- Tool-free glass replacement (snap-and-slide locking)
- Easy to disassemble
- Ample supply of spare parts
- Ultra-robust mounting arm construction, vibration-resistant
- LED entry light can be integrated



## Mirror configurations

### HS Main mirror II

R 1200 (II E1 02 0915)  
heated, 24 V  
electrically adjustable

### ZS Auxiliary mirror

R 200  
heated, 24 V  
manually or electrically  
adjustable



HS and ZS

### LED entry light

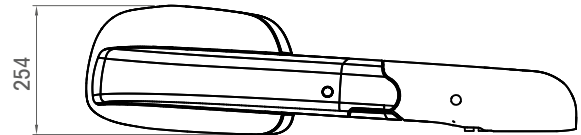
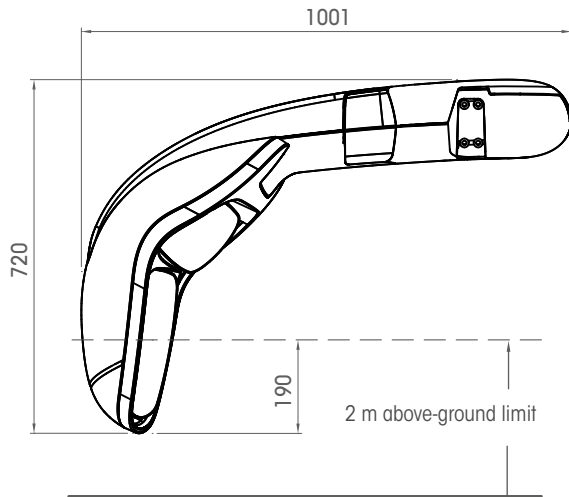


### Mirror head with folding mechanism



### Folding feature (manual or powered operation)





<b>App. mounting dimensions</b>	1001 x 720 x 254 mm (L x H x D)
<b>Fold-in angle</b>	60° manual operation 60° power operation, 24 V with safety shut-off

Item number	Configuration				Directives
right-hand mount, heated 24 V					
<b>Manual folding mirrors</b>					
59.2770.211.099	HS	electrically adjustable	ZS	electrically adjustable	
59.2770.210.099	HS	electrically adjustable	ZS	manually adjustable	
59.2770.110	HS	manually adjustable	ZS	manually adjustable	
<b>Power folding mirrors</b>					
59.2771.210 *	HS	electrically adjustable	ZS	manually adjustable	

\* Use is limited to European requirement profiles and exclusively in conjunction with the controller for power folding mechanism 08.3950.001.099

## Accessories

Item number		Length
<b>Connecting cables</b>		
09.2770.211 + 09.2770.210	for 59.2770.211.099	6.00 m
09.2770.210	for 59.2770.210.099	6.00 m
09.2770.230	for 59.2771.210	6.00 m
09.2770.220	for 59.2770.110	6.00 m
09.2910.003.099	2-pin for entry light	6.00 m
<b>Mirror switches</b>		
08.3200.233	Switch for 2-mirror operation	
08.2770.001.000	Switch for 3-mirror operation	
<b>Entry light/ Others</b>		
08.2910.001.002	Power LED entry light 9 - 32 V incl. mounting clips	
08.3950.001.099	Controller for power folding mechanism	

# Mirror System 278

City Buses

## Features

- ECE R46/02-compliant main and wide-angle mirrors
- Integrated wide-angle mirror
- Manual folding mirror
- Manually or electrically adjustable main mirror, heated
- Manually adjustable wide-angle mirror, heated
- Upright and overhang versions
- Paintable plastic (ABS) trim options with fine-grain texture
- Ultra-robust mounting arm construction, vibration-resistant
- Ample supply of spare parts
- Easily detachable, direct contact connection (spring clips)
- Tool-free glass replacement (snap-and-slide locking)
- Use below 2 m permitted



Overhang version



Upright version

## Mirror configurations

### HS Main mirror II

R 1200 (II E1 020951)  
heated, 24 V  
electrically adjustable

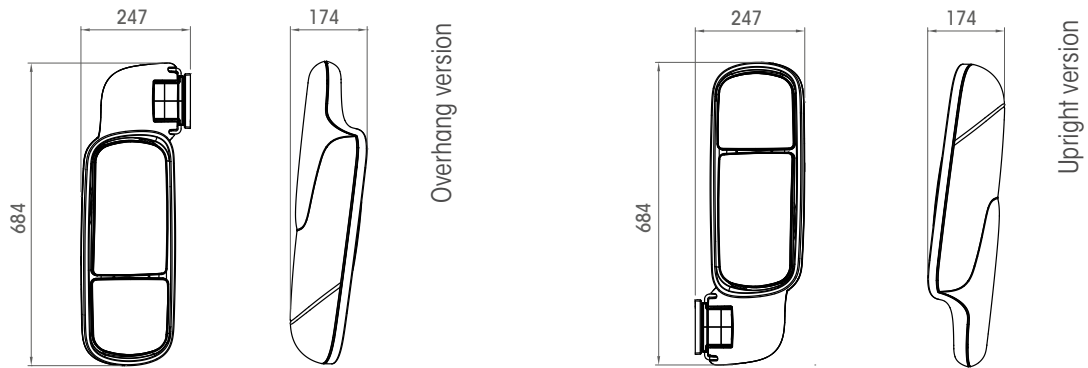
### WWS Wide-angle mirror IV

R 300 (IV E1 020952)  
heated, 24 V  
manually adjustable















HS and WWS





App. mounting dimensions 684 x 247 x 174 mm (L x W x D)

Item number	Assembly	Configuration			Directives
<b>Overhang version with direct contact connection 271, WWS manually adjustable</b>					
59.2780.130	left side	HS	electrically adjustable	heated, 12 V	 
59.2780.230	right side	HS	electrically adjustable	heated, 12 V	 
59.2780.120.099	left side	HS	electrically adjustable	heated, 24 V	 
59.2781.120	right side	HS	electrically adjustable	heated, 24 V	 
<b>Upright version with direct contact connection 271, WWS manually adjustable *</b>					
59.2780.150.001	left side	HS	electrically adjustable	heated, 24 V	 
59.2780.160.001	right side	HS	electrically adjustable	heated, 24 V	 

\* only in combination with wedge mount 278, item number 20.2780.630, and mirror adjustment switch, item number 08.2770.001.000

## Accessories

Item	
Wedge mounts	see Accessories - Wedge mounts – Direct Contact Connection 271, page 86
Mirror switch	see Accessories – Mirror switch, page 89

# Mirror System 1018 Bus

City Buses

## Features

- ECE R46/02-compliant main and wide-angle mirrors
- Folding mirror head for use below 2 m, collision protection and parking position
- Manually or electrically adjustable main mirror glasses, heated
- Manually adjustable wide-angle mirror glasses, heated
- Paintable plastic (ABS) trim options with fine-grain texture
- Ultra-robust mounting arm construction, vibration-resistant
- Tool-free glass replacement (snap-and-slide locking)



right side



left side

## Option Front mirror VI

VI E1 020937



## Mirror configurations

### HS Main mirror II

R 1200 (II E1 021281)  
heated, 24 V  
electrically adjustable

### WWS Wide-angle mirror IV

R 300 (IV E1 021282)  
heated, 24 V  
manually adjustable

## 1018 Bus

Item number	Assembly	Configuration				Directives
Mirror System 1018 Bus, heated 24 V						
59.1018.501.001	left side	HS	electrically adjustable	WWS	manually adjustable	<b>ECE</b>
59.1018.502.001	right side	HS	electrically adjustable	WWS	manually adjustable	<b>ECE</b>
59.1018.601.001	right side	HS	electrically adjustable	WWS	manually adjustable with front mirror 389	<b>ECE</b>

## Accessories

Item number		Length
<b>Connecting cables to vehicle</b>		
09.2910.002.099	for HS and WWS	6.00 m
09.2910.004.099	for HS and WWS	2.70 m
09.2910.005.099	for HS and WWS	3.50 m
<b>Mirror switch</b>		
08.3200.233	for 2-mirror operation	
<b>Paintable mirror head covers</b>		
12.1018.001.000	left side	
12.1018.002.000	right side	

# Mirror System 1041

City Buses

## Features

- ECE R46/04-compliant main mirrors
- Front crossview mirror
- Modern design
- Suitable for city buses and coaches
- Manually or electrically adjustable mirror glasses, heated
- Manual folding mirror arm
- Paintable plastic trim options with fine-grain texture
- Made from UV-resistant ASA
- Tool-free glass replacement (snap-and-slide locking)
- Ultra-robust mounting arm construction, vibration-resistant



## Mirror configurations

### HS Main mirror II

R1200 (II E1 041480)  
heated, 24 V  
electrically adjustable





### ZS Auxiliary mirror

R 200  
heated, 24 V  
manually or electrically  
adjustable



HS und ZS

## 1041

Item number	Assembly	Configuration				Directives
Mirror System 1041, heated 24 V, manually folding						
59.1041.001.001	right side	HS	electrically adjustable	BS	manually adjustable	 
59.1041.002.001	right side	HS	electrically adjustable	BS	electrically adjustable	 

## Accessories

Item number			Lengths
09.1041.002.001	Connecting cable for mirror 1041		2,4 m
09.1041.004.001	Connecting cable for mirror 1041/ 1042 electrical WWS/ BS		2,4 m

# Mirror System 1042

City Buses

## Features

- ECE R46/04-compliant main and wide-angle mirrors
- Modern design
- Suitable for city buses and coaches
- Use below 2 m permitted
- Manually or electrically adjustable mirror glasses, heated
- Manual folding mirror head
- Paintable plastic trim options with fine-grain texture
- Made from UV-resistant ASA
- Tool-free glass replacement (snap-and-slide locking)
- Ultra-robust mounting arm construction, vibration-resistant



## Mirror configurations

### HS Main mirror II

R 1200 (II E1 041481)  
heated, 24 V  
electrically adjustable

### WWS Wide-angle mirror IV

R 300 (IV E1 041482)  
heated, 24 V  
manually adjustable

## 1042

Item number	Assembly	Configuration	Directives
Mirror System 1042, heated 24 V, manually folding			
<b>Overhang Version</b>			
59.1042.001.001	left side	HS electrically adjustable WWS manually adjustable	ECE
59.1042.002.001	right side	HS electrically adjustable WWS manually adjustable door assembly	ECE
59.1042.004.001	right side	HS electrically adjustable WWS manually adjustable adapter a-pillar	ECE
59.1042.005.001	left side	HS electrically adjustable WWS electrically adjustable	ECE
<b>Upright Version</b>			
59.1042.003.001	left side	HS electrically adjustable WWS manually adjustable	ECE

## Accessories

Item number		Lengths
20.1042.002.001	Wedge mount with connecting cable for mirror 1042	2,1 m
20.1042.003.001	Wedge mount with connecting cable for mirror 1042	2,5 m
09.1041.004.001	Connecting cable for mirror 1041/ 1042 electrical WWS/ BS	2,4 m

# Mirror System 276

City Buses

## Features

- ECE R46/02-compliant main mirrors
- Manually or electrically adjustable main mirror, heated
- Manual folding feature
- Hidden wiring, direct contact connection
- Paintable surfaces
- Tool-free glass replacement (snap-and-slide locking)
- Easy to disassemble/ remove
- Overhang and upright versions
- 12 V and 24 V options available
- Use below 2 m permitted

Overhang version



Upright version



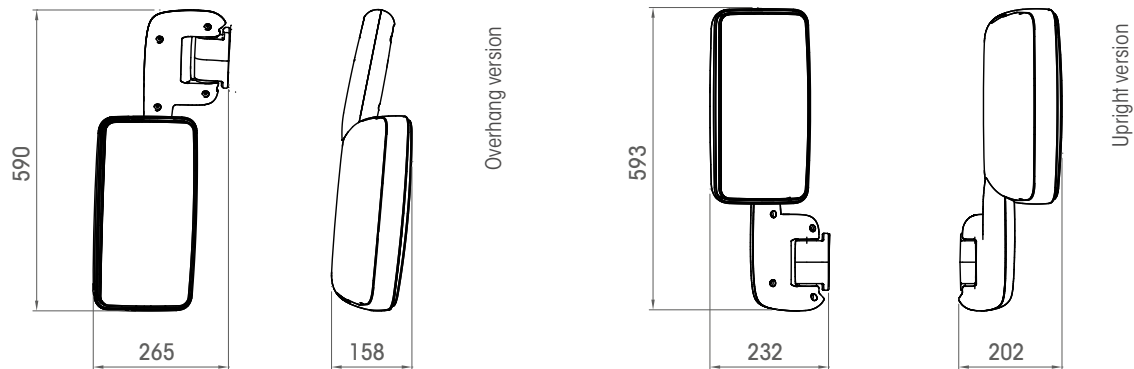
## Mirror configuration

### HS Main mirror II



R 1800/ R 1200  
(II E1 020923)  
heated, 24 V  
manually or  
electrically adjustable

HS



App. mounting dimensions 590 x 265 x 158 mm (L x W x D)

App. mounting dimensions 593 x 232 x 202 mm (L x W x D)

Item number	Assembly				Directives
Overhang version with direct contact connection 271, R 1800					
<b>manually adjustable</b>					
59.2760.112	left side	left-hand drive	no wedge mount	unheated	<b>ECE</b>
59.2760.212	right side	left-hand drive	no wedge mount	unheated	<b>ECE</b>
<b>electrically adjustable</b>					
59.2761.112	left side	left-hand drive	no wedge mount	heated, 12 V	<b>ECE</b>
59.2761.212	right side	left-hand drive	no wedge mount	heated, 12 V	<b>ECE</b>
59.2762.102	left side	left-hand drive	with wedge mount 271	heated, 24 V	<b>ECE</b>
59.2762.201	right side	right-hand drive	with wedge mount 271	heated, 24 V	<b>ECE</b>
59.2762.101	left side	left-hand drive	with wedge mount 271	heated, 24 V	<b>ECE</b>
59.2760.007.001	left side, R 1200	left-hand drive	no wedge mount	heated, 24 V	<b>ECE</b>

Item number	Assembly				Directives
Upright version with direct contact connection 271					
<b>manually adjustable, R 1800</b>					
59.2760.302	left side	left-hand drive	no wedge mount	unheated	<b>ECE</b>
59.2760.402	right side	left-hand drive	no wedge mount	unheated	<b>ECE</b>
<b>electrically adjustable, R 1800</b>					
59.2761.302	left side	left-hand drive	no wedge mount	heated, 12 V	<b>ECE</b>
59.2761.402	right side	left-hand drive	no wedge mount	heated, 12 V	<b>ECE</b>
<b>electrically adjustable, R 1200</b>					
59.2762.302	left side	left-hand drive	no wedge mount	heated, 24 V	<b>ECE</b>
59.2762.402	right side	left-hand drive	no wedge mount	heated, 24 V	<b>ECE</b>

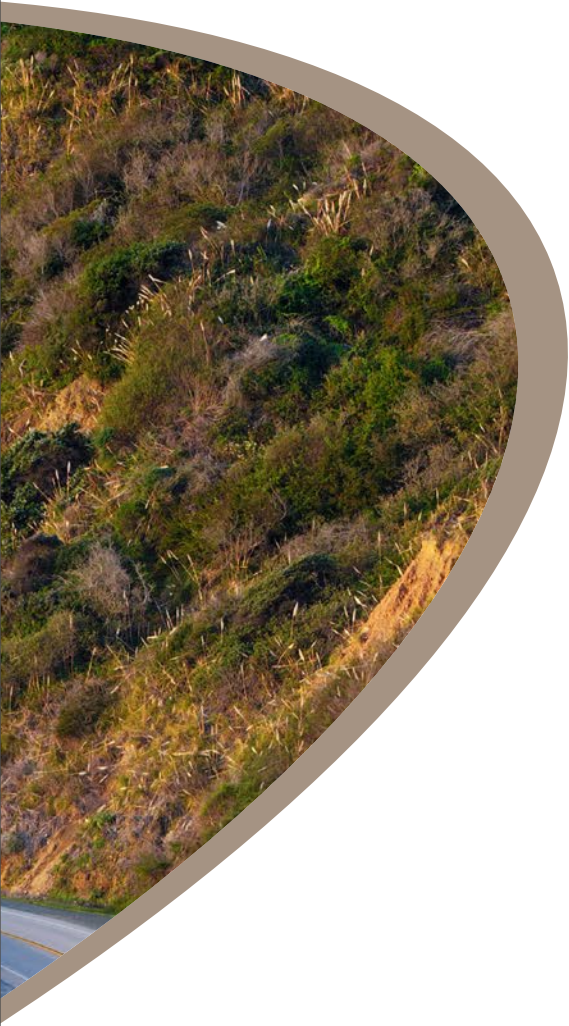
## Accessories

Item number	
Wedge mounts	see Accessories - Wedge mounts – Direct Contact Connection 271 , page 86
Mirror switch	see Accessories – Mirror switch, page 89



## Motorhomes





# Mirror System 1018

Motorhomes

Features

- ECE R46/02-compliant main and wide-angle mirrors
- Modular system
- Variable mounting lengths and angles
- Highly adaptable to customer needs (e. g. vehicle interface)
- Folding mirror head for use below 2 m, collision protection and parking position
- Manually or electrically adjustable main mirror glasses, heated
- Manually adjustable wide-angle mirror glasses, heated
- Paintable plastic (ABS) trim options with fine-grain texture
- Ultra-robust mounting arm construction, vibration-resistant
- Ample supply of spare parts
- Left-hand and right-hand drive options
- Optional: integrated film antenna
- Easy to disassemble
- Tool-free glass replacement (snap-and-slide locking)



## Mirror configurations

### HS Main mirror II

R 1200 (II E1 021281)  
heated, 12 V  
electrically adjustable

### WWS Wide-angle mirror IV

R 300 (IV E1 021282)  
heated, 12 V  
manually adjustable

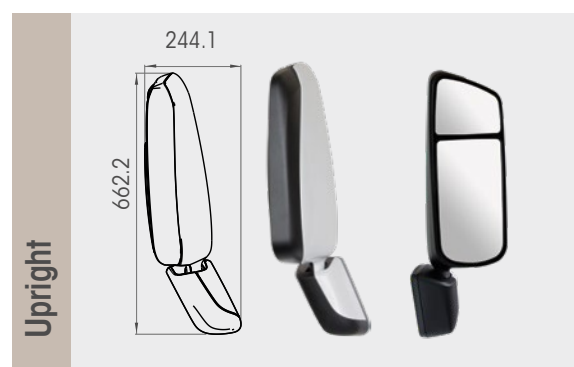
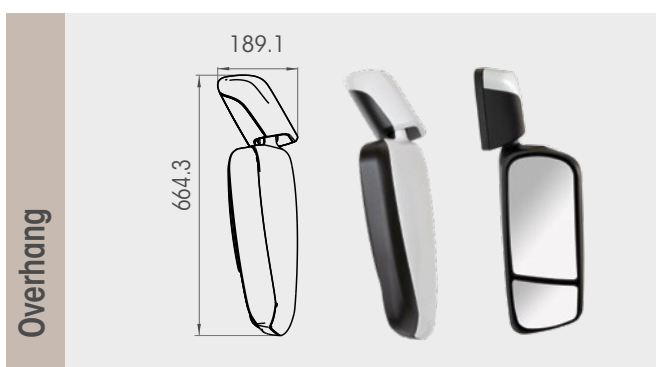
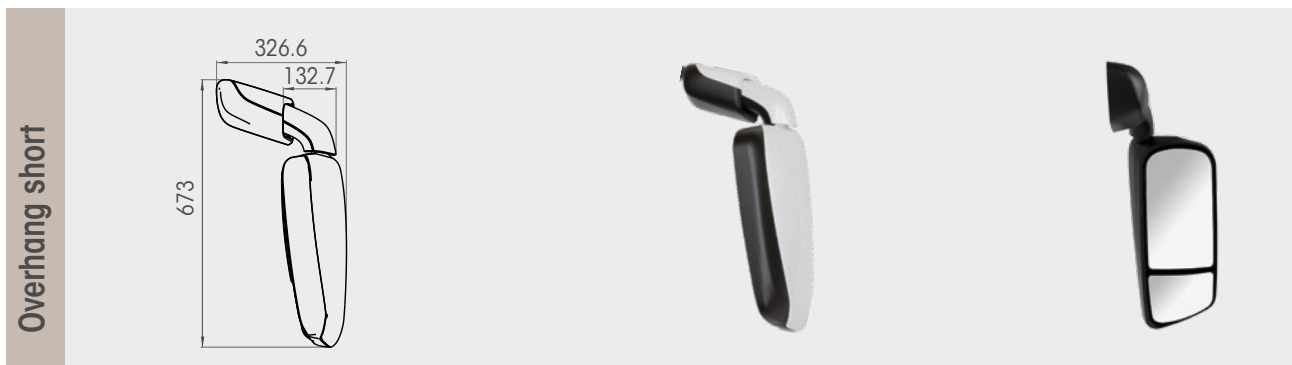
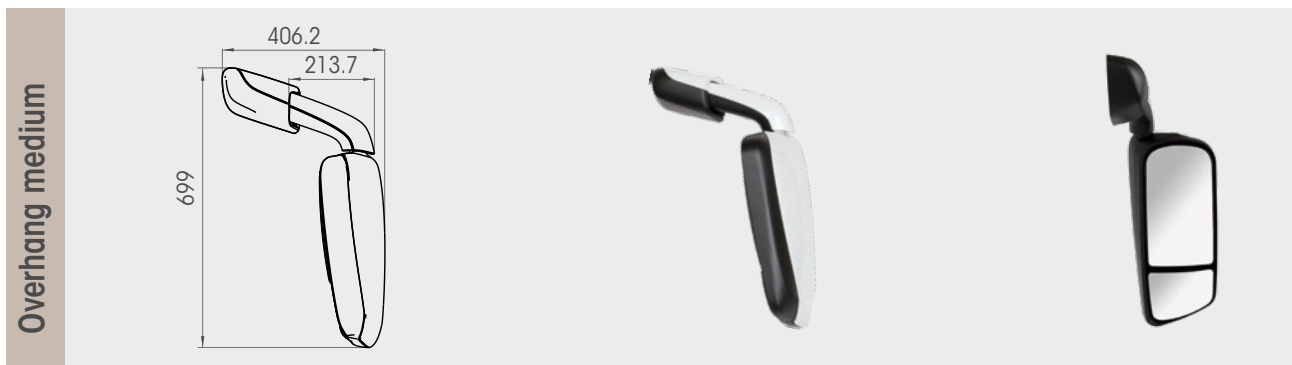
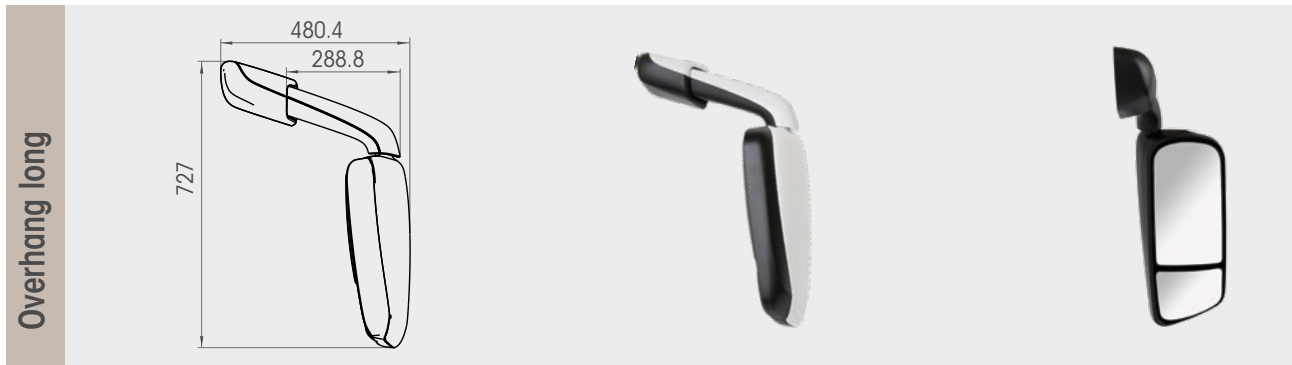


### Mirror head with folding mechanism manual

for use below 2 m, collision protection,  
parking position



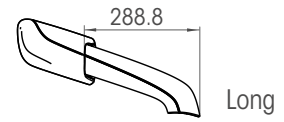
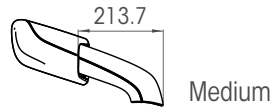
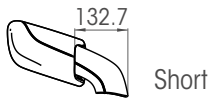
## System options



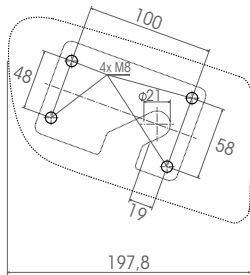
# Mirror System 1018

Motorhomes

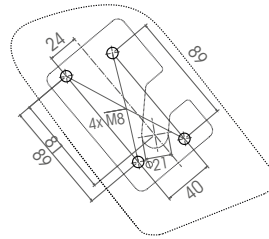
Mounting arm  
available in three lengths



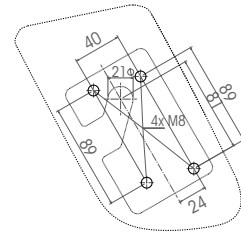
Mounting hole layout - overhang  
with mounting arm



Mounting hole layout - overhang  
without mounting arm



Mounting hole layout - upright  
without mounting arm



### Standard factory-supplied configuration



Lower mounting arm cover, adapter plate, mirror head attached to mounting arm:  
- without mounting base cover  
- without upper mounting arm cover  
- without mirror head cover



### Add-on: Paintable covers

Mounting base cover



Mirror head cover



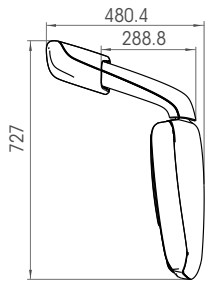
Upper mounting arm cover



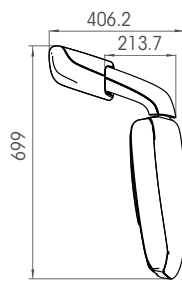
# Mirror System 1018

Motorhomes

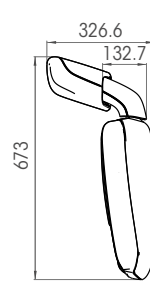
1018



Long



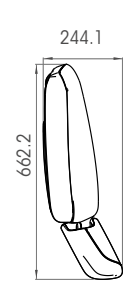
Medium



Short



Overhang



Upright

Item number	Assembly	Configuration		Directives
Standard factory-supplied configuration, see page 39				
<b>left-hand drive</b>				
59.1018.001.001	left side	HS	WWS	overhang long <b>ECE</b>
59.1018.002.001	right side	HS	WWS	overhang long <b>ECE</b>
59.1018.003.001	left side	HS	WWS	overhang short <b>ECE</b>
59.1018.004.001	right side	HS	WWS	overhang short <b>ECE</b>
59.1018.005.001	left side	HS	WWS	upright <b>ECE</b>
59.1018.006.001	right side	HS	WWS	upright <b>ECE</b>
59.1018.007.001	left side	HS	WWS	overhang medium <b>ECE</b>
59.1018.008.001	right side	HS	WWS	overhang medium <b>ECE</b>
59.1018.015.001	left side	HS	WWS	overhang <b>ECE</b>
59.1018.016.001	right side	HS	WWS	overhang <b>ECE</b>
59.1018.019.001	right side	HS	WWS	antenna overhang medium <b>ECE</b>
<b>right-hand drive</b>				
59.1018.017.001	left side	HS	WWS	overhang medium <b>ECE</b>
59.1018.018.001	right side	HS	WWS	overhang medium <b>ECE</b>
59.1018.020.001	right side	HS	WWS	antenna overhang medium <b>ECE</b>

24 V versions upon request, additional right-hand drive versions in standard lengths upon request

## Covers

Item number	Assembly	
Paintable covers included in standard factory-supplied configuration		
12.1018.004.000	left side/ right side	Lower mounting arm cover 1018, short
12.1018.006.000	left side/ right side	Lower mounting arm cover 1018, medium
12.1018.008.000	left side/ right side	Lower mounting arm cover 1018, long

Item number	Assembly	
Add-on: paintable covers to standard factory-supplied configuration, see page 39		
12.1018.001.000	left side	Mirror head cover 1018 left side
12.1018.002.000	right side	Mirror head cover 1018 right side
12.1018.012.001	right side	Mirror head cover 1018 right side with antenna
12.1018.003.000	left side/ right side	Upper mounting arm cover 1018, short
12.1018.005.000	left side/ right side	Upper mounting arm cover 1018, medium
12.1018.007.000	left side/ right side	Upper mounting arm cover 1018, long
12.1018.009.001	left side	Mouting base cover 1018 left side
12.1018.010.001	right side	Mounting base cover 1018 right side

(not included in standard factory-supplied configuration)

## Accessories

Item number	Length	
<b>Connecting cable to vehicle</b>		
09.2910.004.099	for HS and WWS	2.70 m
09.2910.005.099	for HS and WWS	3.50 m
09.2910.002.099	for HS and WWS	6.00 m
09.1018.004.001	for film antenna	4.50 m
<b>Mirror adjustment switch</b>		
08.3200.233	for 2-mirror operation	



**Components**





<b>Tubular Bracket System 270, left side</b>	<b>44</b>
<b>Tubular Bracket System 270, right side</b>	<b>45</b>
<b>Main Mirrors</b>	<b>46</b>
<b>Wide-Angle Mirrors</b>	<b>49</b>
<b>Interior Mirrors</b>	<b>51</b>
<b>Special Application Mirrors</b>	<b>55</b>

# Tubular Bracket System 270, left side

## Components

### Features

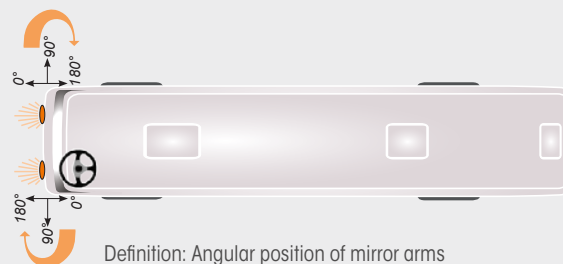
- Slip-on bracket system for city buses, coaches (low-cost version)
- Suitable for main mirrors 373/ 363 or additional main mirrors
- Foldable mounting base, angular position can be factory-set from 0° to 180°, field-adjustable by +/- 8°
- Cabling for heater and glass adjustment integrated in tubular bracket
- Pluggable connection via connecting cable 248 with female socket or via direct contact connection 271 (no plug), see page 86
- Tubular bracket can be mounted in overhang or upright configuration, may also be mounted below 2 m depending on the angular position
- Dimensions: 500 x 160 x Ø 28 mm
- Additional configurations on request



The mirror heads are represented schematically only.

Item number	Configuration		
Tubular Bracket System 270, left side			
<b>overhang</b>			
58.2704.071	Tubular bracket with heating cable	Cable connection 248	wedge included
58.2704.059	Tubular bracket with heating and control cable	Cable connection 248	wedge included
58.2704.090	Tubular bracket with heating and control cable	Direct contact connection 271	20.2710.620 *
<b>upright</b>			
58.2704.088	Tubular bracket with control cable	Direct contact connection 271	20.2710.620 *

\* additional wedges, see Accessories, page 86



# Tubular Bracket System 270, right side

## Components

### Features

- Slip-on bracket system for city buses, coaches (low-cost version)
- Suitable for main mirrors 373/363 or additional main mirrors
- Foldable mounting base for carwash, angular position can be factory set between 0° and 180°, field-adjustable by +/- 8°
- Wiring (heating or control cable) in tubular bracket
- Pluggable connection via connecting cable 248 with female socket or via direct contact connection 271 (no plug), see page 86
- Tubular bracket mounted in overhang configuration; if mounted below 2 m, folding hinge can be included (folding rod)
- Dimensions for rigid version: 732 x 327 x Ø 28 mm
- Dimensions for folding version: 668 x 350 x Ø 28 mm
- Additional configurations on request



Item number	Configuration		
Tubular Bracket System 270, right side			
<b>rigid version</b>			
58.2704.070	Tubular bracket with heating cable	Cable connection 248	wedge included
58.2704.086	Tubular bracket with heating and control cable	Cable connection 248	wedge included
58.2704.093	Tubular bracket with heating and control cable	Direct contact connection 271	20.2710.630 *
<b>foldable version</b>			
58.2705.001	Tubular bracket with brace, heating and control cable	Cable connection 248	wedge included
58.2705.003	Tubular bracket with brace, heating cable	Cable connection 248	wedge included
58.2705.002	Tubular bracket without brace, heating and control cable	Cable connection 248	wedge included
58.2705.008	Tubular bracket without brace, heating cable	Cable connection 248	wedge included

\* additional wedges, see Accessories, page 86

# Main Mirror

## Components

### Main Mirror 340/ 341 (II E1 020048)

<b>Material</b>	Plastic mirror housing with profile ring
<b>Housing</b>	377 x 189 x 100 mm
<b>Glass</b>	360 x 175 x 3 mm
<b>Heater</b>	24 V



Item number	Assembly	Configuration		
Mirror head 341, clamp Ø 20 - 30 mm				
51.3410.140	left side/ right side		heated, 24 V	R 1800
Mirror head 340, clamp Ø 20 - 30 mm				
51.3400.140	left side/ right side	electrically adjustable	heated, 24 V	R 1800
Spare parts				
40.3640.422	Replacement glass		heated, 24 V	R 1800

### Main Mirror 363 (II E1 020923)

<b>Material</b>	Plastic mirror housing (ABS)
<b>Housing</b>	384 x 205 x 120 mm
<b>Back cover</b>	Removable, paintable
<b>Clamp</b>	Ø 22 bis 28 mm
<b>Glass unit</b>	368 x 189 x 40 mm
<b>Heater</b>	24 V



Item number	Assembly	Configuration		
Mirror head				
51.3635.204	left side		heated, 24 V	R 1200
51.3636.204	right side		heated, 24 V	R 1200
51.3635.206	left side	electrically adjustable	heated, 24 V	R 1200
51.3636.206	right side	electrically adjustable	heated, 24 V	R 1200
Spare parts				
15.3802.840F	Glass unit		heated, 24 V	R 1200
11.3730.210	Cover			

## Main Mirror 373 (II E1 020923)

<b>Material</b>	Plastic mirror housing (ABS)
<b>Housing</b>	384 x 205 x 120 mm
<b>Back cover</b>	Removable, paintable
<b>Clamp</b>	Ø 22 bis 28 mm
<b>Glass unit</b>	368 x 189 x 40 mm
<b>Heater</b>	24 V



Item number	Assembly	Configuration		
<b>Mirror head</b>				
51.3731.324	left side		heated, 24 V	R 1800
51.3732.324	right side		heated, 24 V	R 1800
51.3731.326	left side	electrically adjustable	heated, 24 V	R 1800
51.3732.326	right side	electrically adjustable	heated, 24 V	R 1800

Item number				
<b>Spare parts</b>				
15.3731.470	Glass unit		heated, 24 V	R 1800
11.3730.210	Cover			

## Main Mirror 375 (II E1 020941)

<b>Material</b>	Plastic mirror housing (ABS)
<b>Housing</b>	388 x 168 x 68 mm
<b>Components</b>	Complete mirror assembly only available with three components
<b>Clamp</b>	Ø 28 mm
<b>Glass unit</b>	380 x 160 x 15 mm
<b>Heater</b>	24 V



Item number		Configuration		
<b>Components left-side/ right-side, please order mirror head, glass unit, mounting element separately</b>				
61.3752.147H	Mirror head		heated, 24 V	without glass unit
61.3752.167H	Mirror head	electrically adjustable	heated, 24 V	without glass unit
15.3752.470	Glass unit		heated, 24 V	R 1800
61.3780.100	Mounting element including cover			

# Main Mirror

## Components

### Main Mirror 378 (II e1 03\*0018)

<b>Material</b>	Plastic mirror housing (ABS)
<b>Housing</b>	433 x 188 x 85 mm
<b>Components</b>	Complete mirror assembly only available with three components
<b>Glass unit</b>	433 x 188 x 15 mm
<b>Clamp</b>	Ø 28 mm
<b>Heater</b>	24 V



Item number	Configuration			
Components left-side/ right-side, please order mirror head, glass unit, mounting element separately				
61.3782.147H	Mirror head		heated, 24 V	without glass unit
61.3782.167H	Mirror head	electrically adjustable	heated, 24 V	without glass unit
15.3784.470H	Glass unit		heated, 24 V	R 1800
61.3780.100	Mounting element including cover			

### Main Mirror 385 (II E1 021138)

<b>Material</b>	Plastic mirror housing with profile ring
<b>Housing</b>	314 x 228 x 65 mm
<b>Clamp</b>	Ø 20 bis 30 mm
<b>Glass</b>	300 x 214 x 3 mm
<b>Heater</b>	24 V



Item number	Assembly	Configuration		
Mirror head				
51.3850.247	left side/ right side		heated, 24 V	R 1800
51.3850.267	left side/ right side	electrically adjustable	heated, 24 V	R 1800
Spare parts				
40.2890.422H	Replacement glass		heated, 24 V	R 1800

# Wide-Angle Mirror

## Components

### Wide-Angle Mirrors 266 (IV/ V E1 0111008)

<b>Material</b>	Plastic mirror housing with profile ring
<b>Housing</b>	215 x 165 x 55 mm
<b>Glass</b>	200 x 150 x 3 mm
<b>Heater</b>	24 V



Item number	Assembly	Configuration	
with clamp Ø 14 - 20 mm			
56.2660.147	left side/ right side	heated, 24 V	R 400
with clamp Ø 20 - 30 mm			
56.2664.147	left side/ right side	heated, 24 V	R 400
<b>Item number</b>			
Spare parts			
40.2660.404	Replacement glass	heated, 24 V	R 400
09.2000.301	Heating cable, 2-pin, 2 m		

### Wide-Angle Mirrors 377 (IV e1 03\*0019)

<b>Material</b>	Plastic mirror housing (ABS)
<b>Housing</b>	200 x 200 x 68 mm
<b>Components</b>	Complete mirror assembly only available with three components
<b>Clamp</b>	Ø 28 mm
<b>Glass unit</b>	200 x 200 x 15 mm
<b>Heater</b>	24 V



Item number	Configuration		
Components left-side/ right-side, please order mirror head, glass unit, mounting element separately			
56.3772.127	Mirror head	heated, 24 V	without glass unit
15.3774.410	Glass unit	heated, 24 V	R 400
15.3771.174	Glass unit	heated, 24 V	R 300
61.3780.100	Mounting element including cover		

# Wide-Angle Mirror

## Components

### Wide-Angle Mirrors 386 (IV E1 021248)

<b>Material</b>	Plastic mirror housing
<b>Housing</b>	219 x 170 x 120 mm
<b>Back cover</b>	Removable, paintable
<b>Glass unit</b>	203 x 154 x 36 mm
<b>Clamp</b>	Ø 22 bis 28 mm
<b>Heater</b>	24 V



Item number	Assembly	Configuration	
<b>Mirror head</b>			
56.3860.214	left side/ right side	heated, 24 V	R 400
61.3865.124H	left side/ right side	heated, 24 V	R 300

Item number			
<b>Spare parts</b>			
15.3861.114H	Glass unit	heated, 24 V	R 400
11.3860.500	Cover 386		
09.2000.301	Heating cable, 2-pin, 2 m		
15.3862.174H	Glass unit	heated, 24 V	R 300

### Wide-Angle Mirror 906 (IV E1 020906)

<b>Material</b>	Plastic mirror housing
<b>Housing</b>	209 x 218 x 136 mm
<b>Back cover</b>	Removable, paintable
<b>Glass unit</b>	204 x 195 x 58 mm



Item number				
<b>Mirror head left side/ right side</b>				
<b>heated 24 V</b>				
56.9065.130	Mirror head	clamp Ø 20 - 28 mm	Female socket	R 300
56.9065.110	Mirror head	clamp Ø 28 mm	Female socket	R 300
56.9065.124	Mirror head	clamp Ø 28 mm	Heating cable	R 300
<b>unheated</b>				
56.9065.132	Mirror head	clamp Ø 20 - 28 mm		R 300
56.9065.112	Mirror head	clamp Ø 28 mm		R 300

Item number				
<b>Spare parts</b>				
15.9060.870H	Glass unit		heated, 24 V	R 300
15.9060.670F	Glass unit		unheated	R 300
11.9060.100	Cover 906			



# Interior Mirror

## Components

### Interior mirror 203

<b>Material</b>	Plastic coated sheet steel mirror housing
<b>Housing</b>	265 x 160 mm
<b>Mounting bracket</b>	Steel
<b>Glass</b>	260 x 150 mm



#### Item number

Mirror head **1** with bracket, mounting plate: 3 holes, plastic

55.2030.177	Mirror head	unheated	flat
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#### Item number

Spare parts

40.1520.700F	Replacement glass	unheated	flat
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<b>Material</b>	Plastic mirror housing
<b>Housing</b>	263 x 150 mm
<b>Mounting bracket</b>	Steel
<b>Glass</b>	250 x 140 mm



#### Item number

Mirror head **2** with bracket, mounting plate: universal metal plate, 2 mounting holes

55.2031.121	Mirror head	unheated	R 800
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#### Item number

Spare parts

40.1521.108	Replacement glass	unheated	R 800
-------------	-------------------	----------	-------

### Interior mirror 208

<b>Material</b>	Steel mirror housing
<b>Housing</b>	Ø 218 mm
<b>Mounting bracket</b>	Steel
<b>Glass</b>	Ø 208 mm



#### Item number

Mirror head with bracket, mounting plate: 3 holes

55.2082.178	Mirror head	unheated	flat
-------------	-------------	----------	------

#### Item number

Spare parts

40.2085.700F	Replacement glass	unheated	flat
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# Interior Mirror

## Components

### Interior mirror 208

<b>Material</b>	Steel mirror housing
<b>Housing</b>	Ø 218 mm
<b>Glass</b>	Ø 208 mm



#### Item number

##### Mirror head without bracket

55.2082.128	Mirror head	unheated	R 1400
-------------	-------------	----------	--------

#### Item number

##### Spare parts

40.2085.214F	Replacement glass	unheated	R 1400
--------------	-------------------	----------	--------

### Interior mirror 246 P

<b>Material</b>	Plastic-coated galvanized sheet steel mirror housing
<b>Housing</b>	420 x 220 mm
<b>Glass</b>	410 x 210 mm



#### Item number

##### Mirror head, mounting plate: 4 holes

55.2461.113	Mirror head	unheated	R 1400
-------------	-------------	----------	--------

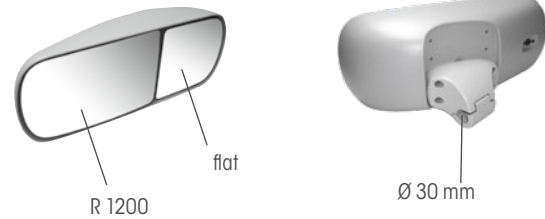
#### Item number

##### Spare parts

40.2460.214H	Replacement glass	unheated	R 1400
--------------	-------------------	----------	--------

## Interior mirror 256

<b>Material</b>	Plastic mirror housing
<b>Housing</b>	545 x 219 x 227 mm
<b>R 1200 glass unit</b>	324 x 201 x 17 mm
<b>Flat glass unit</b>	199 x 195 x 17 mm



### Item number

#### Mirror head, R 1200, flat

55.2561.110.002	Mirror head	electrically adjustable	MAN-Logic
55.2561.010	Mirror head	manually adjustable	
55.2561.111.001	Mirror head	electrically adjustable	MEKRA-Logic

#### Accessories – Connecting Cables

09.2560.200	Control line 256 exterior	7.00 m
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### Item number

#### Spare parts

15.2561.600	Glass unit	unheated	flat
15.2561.640	Glass unit	unheated	R 1200

## Interior mirror 300

<b>Material</b>	Mirror housing with profile ring
<b>Housing</b>	Ø 305 mm
<b>Glass</b>	Ø 300 mm



### Item number

#### Configuration

#### Mirror head

55.3000.001.001	Interior mirror with bracket and clamp	for Ø 30 mm	unheated	R 800
55.3000.003.001	Interior mirror with bracket and clamp	for Ø 35 mm	unheated	R 800
55.3000.002.001	Interior mirror with bracket and clamp	for Ø 30 mm	unheated	R 1800
55.3000.004.001	Interior mirror with bracket and clamp	for Ø 35 mm	unheated	R 1800

### Item number

#### Spare parts

51.3000.001.001	Mirror head		R 800
51.3000.002.001	Mirror head		R 1800
61.3000.001.001	Mounting bracket	for Ø 30 mm	
61.3000.002.001	Mounting bracket	for Ø 35 mm	



# Interior Mirror

## Components

### Interior mirror 364

**Material** Plastic mirror housing  
**Housing** 376 x 187 mm  
**Glass** 264 x 175 mm



**Item number**

**Mirror head**

51.3640.127	Mirror head	for tubular bracket Ø 14 - 20 mm	unheated	R 1800
-------------	-------------	----------------------------------	----------	--------

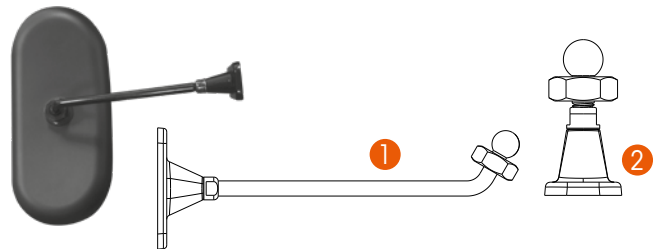
**Item number**

**Spare parts**

40.3640.222H	Replacement glass		unheated	R 1800
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### Interior mirror 750

**Material** Plastic mirror housing  
**Housing** 301 x 141 mm  
**Glass** 295 x 135 mm



**Item number**

**Configuration**

**Length**

**Mirror head**

51.7504.044.001	Mirror head	unheated	R 450
20.7504.044.001	Mounting bracket long ①		229.5 mm
20.7504.003.001	Mounting bracket short ②		70.7 mm

### Universal Bracket

**Material** Powder coated tubular steel mirror mounting bracket  
**Clamp** Ø 14 bis 20 mm



**Item number**

**Mounting bracket**

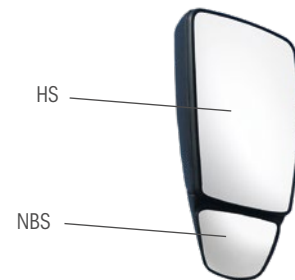
11.1523.212	Universal mounting bracket, black
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# Special Application Mirrors

## Components

### 1009

<b>Material</b>	Plastic mirror housing (ABS), black
<b>Clamp</b>	Ø 18 bis 22 mm
<b>Glass HS</b>	255 x 286 mm
<b>Glass NBS</b>	180 x 85 mm



Item number	Assembly	Configuration		
Main mirror, R 1200, housing 232 x 219 x 122 mm				
51.1009.000.001	left side/ right side	manually adjustable	unheated	
51.1009.081.001	left side/ right side	manually adjustable	heated, 12 V	2-pin female socket
on request	left side/ right side	manually adjustable	heated, 24 V	2-pin female socket
51.1009.113.001	left side/ right side	electrically adjustable	heated, 12 V	6-pin female socket
51.1009.009.001	left side/ right side	electrically adjustable	heated, 24 V	6-pin female socket
Combined HS and NBS, R 1200/ R300, housing 232 x 382 x 122 mm				
51.1009.017.001	left side/ right side	manually adjustable	unheated	
51.1009.049.001	left side/ right side	manually adjustable	heated, 12 V	2-pin female socket
on request	left side/ right side	manually adjustable	heated, 24 V	2-pin female socket
51.1009.097.001	left side/ right side	electrically adjustable	heated, 12 V	6-pin female socket
51.1009.025.001	left side/ right side	electrically adjustable	heated, 24 V	6-pin female socket

### 1010

<b>Material</b>	Plastic mirror housing (ABS), black
<b>Clamp</b>	Ø 14 bis 20 mm/ Ø 18 bis 22 mm
<b>Housing</b>	176 x 284 mm
<b>Glass</b>	145 x 277 mm (aspherical)



Item number	Assembly	Configuration		
Main mirror for 14 - 20 mm tubular diameter				
51.1010.000.001	left side/ right side	manually adjustable	unheated	R 1200
Main mirror for 18 - 22 mm tubular diameter				
51.1010.001.001	left side/ right side	manually adjustable	unheated	R 1200
51.1010.003.001	left side/ right side	manually adjustable	unheated	R 1200
51.1010.005.001	left side/ right side	manually adjustable	unheated	R 1200
51.1010.007.001	left side/ right side	manually adjustable	unheated	R 1200



**Electronics**

Camera Overview	58
Analog and Digital Platform Camera	60
Platform Camera Brackets	62
Shutter Camera Bracket with Integrated LED Lamp	64
CMOS Camera and CMOS Spherical Camera	66
Brackets and Accessories CMOS Camera	68
Monitor Overview	70
Digital Monitor	72
Cables	74
DVS Features/ Applications	78
GPS / CAN Turn Assist System	80
Turn Assist System with Side View Camera	82

## Camera Overview

Camera monitor systems

**Our new generation of cameras is based on a high-quality modular development platform allowing the implementation of customized solutions in a camera that is perfectly tailored to our customers' requirements.**

With installed dimensions of 35 x 35 mm, the extremely rugged camera components are highly compact. The length of the camera varies with the individual models, however, the minimum length of every model is 34 mm which makes it easy to integrate and attach almost anywhere in or on the vehicle. **The modular design allows for a wide variety of image sensors as well as image processing and transmission technologies to be combined, providing a customized and cost effective solution uniquely adapted to the individual needs of the customer.**

The available image sensors are automotive-grade and offer image resolutions from standard VGA up to 1.2 mega pixels. 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 or BroadR-Reach.

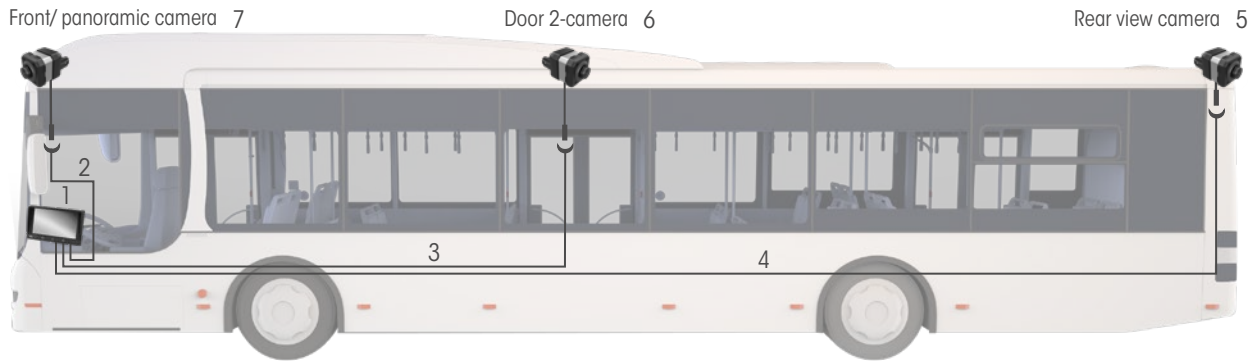
**It is also possible to combine the platform components with various lenses providing different horizontal aperture angles.** Aperture angles for analog options include 70°, 100°, and 120°, and for digital options 100°, 120°, 160°, and 176° (wider aperture angles are also supported).

The MEKRA Lang platform camera features a particularly rugged housing which makes it perfectly suited for rough environmental conditions. And thanks to its high-performance integrated heating system, which de-ices the lens within just a few minutes, the camera can be operated under all weather conditions.





## Sample application



Item number	No.	Item	Length
MEKRA Lang camera monitor system			
24.1301.002.099	1	MCM-5029	LED TFT color monitor 7"
09.1301.003.099	2	MAC-5052	Connecting cable
09.1301.005.099	3	MAC-5054	Connecting cable
09.1301.006.099	4	MAC-5055	Connecting cable
28.1307.011.099	5	MCC-5524	Rear view camera 100°
28.1307.006.099	6	MCC-5480	Side view camera 120°
28.1307.004.099	7	MCC-5478	Front view camera 70°



# Analog and Digital Platform Cameras

Camera monitor systems

## Analog camera 1307

<b>Video system</b>	NTSC or PAL
<b>Image resolution</b>	640 x 480 pixels (W x H)
<b>Image display</b>	NTSC: 720 x 486 pixels (W x H), PAL: 720 x 576 (B x H)
<b>Image sensor</b>	VGA
<b>Connector</b>	MEKRA, Ø < 18 mm, ADR tested, IP 69 K
<b>Aperture angle</b>	70°, 100° or 120°
<b>Cable</b>	ADR tested, oil and gasoline resistant, 0.3 m (only Pigtail)
<b>Shock resistance</b>	50 G
<b>Min. illumination</b>	Contrast ratio >1:50 at 0.5 lux
<b>Video output</b>	FBAS 1Vpp at 75 Ω
<b>Power consumption</b>	< 1 W (< 3.5 W, with heating system ON)
<b>Operating temperature</b>	-40 °C to +85 °C
<b>Storage temperature</b>	-40 °C to +90 °C
<b>Protection class</b>	IP 69 K
<b>Operating voltage</b>	9 - 36 V



Item number	Aperture angle		
<b>NTSC color camera</b>			
28.1307.004.099	70°		horizontal
28.1307.005.099	100°		horizontal
28.1307.006.099	120°		horizontal
28.1307.011.099	100°		horizontal low distortion
28.1307.016.099	70°	Pigtail	horizontal
28.1307.017.099	100°	Pigtail	horizontal
28.1307.018.099	100°	Pigtail	horizontal low distortion
28.1307.019.099	120°	Pigtail	horizontal
<b>PAL color camera</b>			
28.1307.002.099	100°		horizontal
28.1307.003.099	120°		horizontal
28.1307.010.099	100°		horizontal low distortion
28.1307.012.099	70°	Pigtail	horizontal
28.1307.013.099	100°	Pigtail	horizontal
28.1307.014.099	100°	Pigtail	horizontal low distortion
28.1307.015.099	120°	Pigtail	horizontal

## Ethernet camera 1308

<b>Video transmission</b>	UDP or RTP
<b>Video compression</b>	MJPEG or H.264
<b>Image resolution</b>	1280 x 720 pixels (W x H)
<b>Image display</b>	45 Hz to 1280 x 960 pixels, 60 Hz to 1280 x 720 pixels
<b>Image sensor</b>	1,2 MP
<b>Aperture angle</b>	100°, 120°, 160° or 176°
<b>Shock resistance</b>	50 G
<b>Min. illumination</b>	Contrast ratio >1:50 at 0.5 lux
<b>Power consumption</b>	< 1 W (< 3.5 W, with heating system ON)
<b>Operating temperature</b>	-40 °C to +85 °C
<b>Storage temperature</b>	-40 °C to +90 °C
<b>Protection class</b>	IP 69 K
<b>Operating voltage</b>	9 - 36 V



Item number	Aperture angle		
Digital platform camera			
28.1308.001.099	100°	24 V	horizontal
28.1308.003.099	120°, 160°	24 V	horizontal
28.1308.005.099	176°	24 V	horizontal

### Advantages of the platform camera

- Very compact - camera can be easily integrated in the vehicle body, roof, mirror, etc.
- Higher resolution - sharper image (digital camera)
- Each camera can be controlled separately (digital camera)
- Reduced network wiring requirements result in cost savings (digital camera)
- Digital signals may be used for additional information purposes (digital camera)
- Digital camera can control additional components, e.g. our shutter camera bracket
- Platform concept allows for quick and easy adjustments

# Brackets

Camera monitor systems

## Platform camera brackets

### Mounting bracket with roof

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



### Ball bracket

**Dimensions** 80 x 71 x 42 mm (W x H x D)  
**Orientation** flexible adjusted  
**Adjustment** Thanks to its swivel head design, the camera can be rotated 0° - 360°.  
**Material** ABS plastics



### Shutter camera bracket with integrated LED lamp

**Dimensions** 114 x 96 x 107 mm (W x H x D)  
**Adjustment** Camera is rigid within bracket; for shutter camera bracket mounting positions, see page 65  
**Material** ABS plastics



#### Item number

##### Brackets

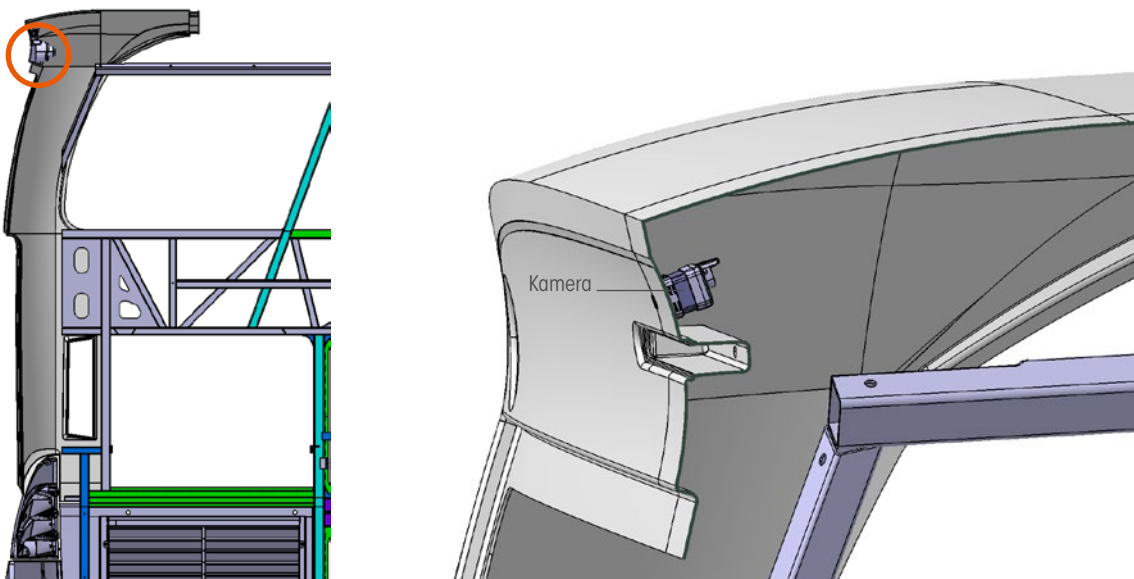
11.1307.028.099	Mounting bracket
11.1307.027.099	Ball bracket
11.1307.029.099	Shutter camera bracket

## Easy integration

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One of the critical advantages this camera offers is the fact that it can be effortlessly and seamlessly integrated into **any component** at virtually any appropriate vehicle location. For example, this camera can be perfectly placed and used inside buses. Thanks to its modular design, it is possible to generate **highly individualized** solutions for each customer with minimal development effort. The individual components are extremely robust and **compact** in size, making the camera particularly easy to handle.

### Example for integration in the back of a bus



## Digitization enables new types of application

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Digital data transmission allows for significantly higher image resolution. Several cameras connected to a vehicle network share one single data connection from switch to display. This results in signifi-

cantly reduced wiring requirements. The connection does not only support the transmission of image data but also of various other control signals for the camera, such as activation of the cleaning

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

# Shutter Camera Bracket with Integrated LED Lamp

Camera monitor systems



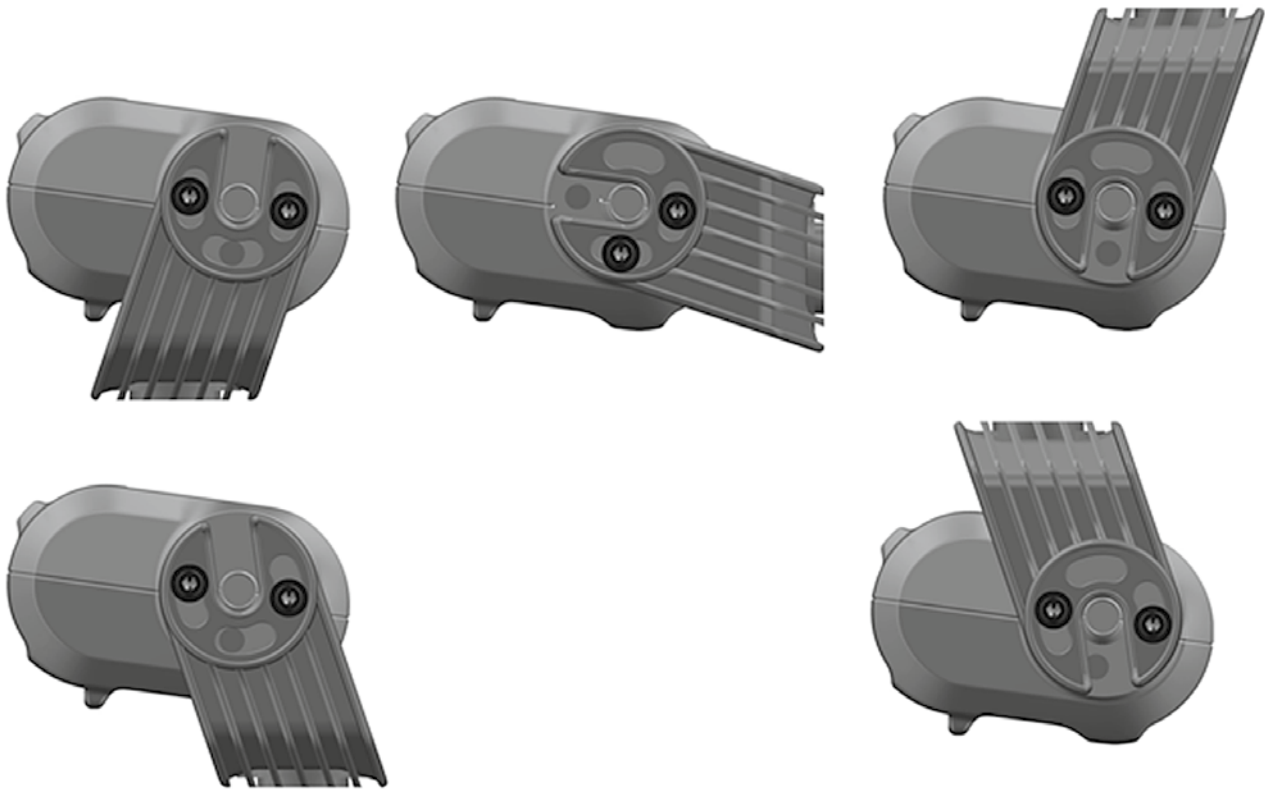
Shutter camera bracket with integrated LED lamp

## Advantages of the shutter camera bracket

- Camera protection
- Improved night vision
- Rugged design
- Shutter camera bracket and gears are decoupled from one another
- Very high IP rating (IP 67 = can be submerged in water for 30 minutes)
- Choice of various mounting positions (see next page)
- Shutter camera bracket can be used with both analog and digital cameras
- Lateral cable routing
- Temperature range from -40 °C to + 85 °C
- One second opening time and one second closing time
- 12 V and 24 V operating voltage

## Shutter camera bracket mounting positions

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### Advantages of the LED lamp

- **Optimized night vision:** In complete darkness, an 8 x 8 m area is illuminated uniformly. Only one LED is required.
- **No integrated filter:** Produces an image with high color fidelity. No black and white image.
- **IR range:** An IR range is used, within which the human eye cannot detect the red light of the LED. Consequently, ECE approval is not required and the LED can be installed anywhere on the vehicle.
- **Intelligent control:** The LED is controlled by a brightness sensor.

# CMOS Camera and CMOS Spherical Camera

Camera monitor systems

## CMOS camera

<b>Video system</b>	NTSC or PAL
<b>Image resolution</b>	640 x 480 pixels (W x H)
<b>Image display</b>	NTSC: 720 x 486 pixels (W x H), PAL: 720 x 576 (B x H)
<b>Connector</b>	MEKRA, Ø < 18 mm, ADR tested, IP 69 K
<b>Cable</b>	ADR tested, oil and gasoline resistant, 0.5 m
<b>Housing</b>	Pressure-molded aluminum, painted black, dust-proof and resistant to high-pressure cleaning (IP 69 K), heated and extra hardened front glass
<b>Shock resistance</b>	50 G
<b>Min. illumination</b>	Contrast ratio >1:50 at 0.5 lux
<b>Video output</b>	FBAS 1Vpp at 75 Ω
<b>Power consumption</b>	< 1 W (< 3.5 W, with heating system ON)
<b>Operating temperature</b>	-40 °C to +85 °C
<b>Storage temperature</b>	-40 °C to +90 °C
<b>Protection class</b>	IP 69 K
<b>Operating voltage</b>	9 - 36 V
<b>Outside dimensions, excluding bracket</b>	65 x 59 x 50 mm (W x H x D)



Item number	Aperture angle	
<b>NTSC color camera</b>		
28.1301.007.099	70°	horizontal
28.1301.001.099	100°	horizontal
28.1301.005.099	100°	horizontal low distortion
28.1301.003.099	120°	horizontal
28.1301.009.099	120°	horizontal low distortion
28.1301.050.099	130°	horizontal
<b>PAL color camera</b>		
28.1301.008.099	70°	horizontal
28.1301.002.099	100°	horizontal
28.1301.006.099	100°	horizontal low distortion
28.1301.004.099	120°	horizontal
28.1301.010.099	120°	horizontal low distortion
28.1301.051.099	130°	horizontal



## CMOS spherical camera

<b>Video system</b>	NTSC or PAL
<b>Image resolution</b>	640 x 480 pixels (W x H)
<b>Image display</b>	NTSC: 720 x 486 pixels (W x H), PAL: 720 x 576 (B x H)
<b>Connector</b>	MEKRA, Ø < 18 mm, ADR-geprüft, (IP 69 K)
<b>Cable</b>	ADR tested, oil and gasoline resistant, 0.5 m
<b>Housing</b>	Pressure-molded aluminum, painted black, dust-proof and resistant to high-pressure cleaning (IP 69 K), heated and extra hardened front glass
<b>Shock resistance</b>	50 G
<b>Min. illumination</b>	Contrast ratio >1:50 at 0.5 lux
<b>Video output</b>	FBAS 1Vpp at 75 Ω
<b>Power consumption</b>	< 1 W (< 3.5 W, with heating system ON)
<b>Operating temperature</b>	-40 °C to +85 °C
<b>Storage temperature</b>	-40 °C to +90 °C
<b>Protection class</b>	IP 69 K
<b>Operating voltage</b>	9 - 36 V
<b>Outside dimensions, excluding bracket</b>	55 x 47 mm (D x T)



Item number	Aperture angle	
NTSC color camera		
28.1301.011.099	70°	horizontal
28.1301.013.099	100°	horizontal
28.1301.017.099	100°	horizontal low distortion
28.1301.038.099	120°	horizontal
PAL color camera		
28.1301.012.099	70°	horizontal
28.1301.014.099	100°	horizontal
28.1301.018.099	100°	horizontal
28.1301.039.099	120°	horizontal

# Brackets and Accessories CMOS Camera

Camera accessories

Camera bracket made from shock-proof ABS plastics, black, UV resistant

## Standard bracket

Dimensions	90 x 100 x 73 mm (W x H x D)
Orientation	flexible adjusted
Adjustment	thanks to its swivel head design, the camera can be rotated 0° - 360°.
Material	ABS plastics



## Design bracket

Dimensions	125 x 102 x 73 mm (W x H x D)
Orientation	flexible adjusted
Adjustment	thanks to its swivel head design, the camera can be rotated 0° - 360°.
Material	ABS plastics



## Standard bracket for spherical camera

Dimensions	80 x 71 x 29 mm (W x H x D)
Orientation	flexible adjusted
Adjustment	thanks to its swivel head design, the camera can be rotated 0° - 360°.
Material	ABS plastics



### Item number

Brackets	
20.5630.400	Standard bracket
20.5631.400	Design bracket
20.5620.601	Standard bracket for spherical camera

## Camera bracket, stainless steel

### Mounting bracket

Dimensions	87 x 70 x 65 mm (W x H x D)
Orientation	flexible adjusted
Adjustment	the camera can be tilted 180° within the bracket and swiveled with the bracket
Material	Stainless steel



### Mounting bracket with roof

Dimensions	87 x 74 x 74 mm (W x H x D)
Orientation	flexible adjusted
Adjustment	the camera can be tilted 180° within the bracket and swiveled with the bracket
Material	Stainless steel



### Magnetic base

Dimensions	66 x 66 x 19 mm (W x H x D)
------------	-----------------------------



#### Item number

##### Brackets

11.1200.501.099	Mounting bracket
11.1200.502.099	Mounting bracket with roof
20.5640.101	Magnetic base

# Monitor Overview

Camera monitor systems

Our camera monitor systems will increase your efficiency and safety at work. A properly installed system with all components securely attached can help minimize property damage and prevent personal injuries. It also comes with significant ergonomic advantages and better comfort.

Its rugged design withstands even the most extreme conditions and its range of global applications is virtually unlimited.



## Various monitor brackets



## MEKRA Lang digital monitor

Brightness	850/ 1020 cd/m <sup>2</sup>
Display	Touchscreen
Video signal	2 x Ethernet, 2 x analog (PAL/ NTSC)
Operating temperature	-30 °C bis +85 °C
Operating voltage	9 - 36 V



Item number	Dimensions	Resolution
<b>MEKRA 7" digital Monitor</b>		
24.1311.001.099	190 x 135 x 45	800 x 480 pixels
<b>MEKRA 10" digital Monitor</b>		
24.1311.002.099	258 x 186 x 45	1280 x 800 pixels
<b>MEKRA 12" digital Monitor</b>		
24.1311.003.099	306 x 216 x 48	1280 x 800 pixels

## TFT color monitors

### MEKRA Lang 7" surround view monitor

- Dimensions: 189 x 119 x 44 mm (W x H x D)
- Images can be rotated 90°, 180°, and 270°
- Display modes are freely configurable
- Multiple trigger signals can be employed
- Up to 9 views are freely configurable
- Kit includes sun visor, bracket, and connecting cable (24.1301.512.099)



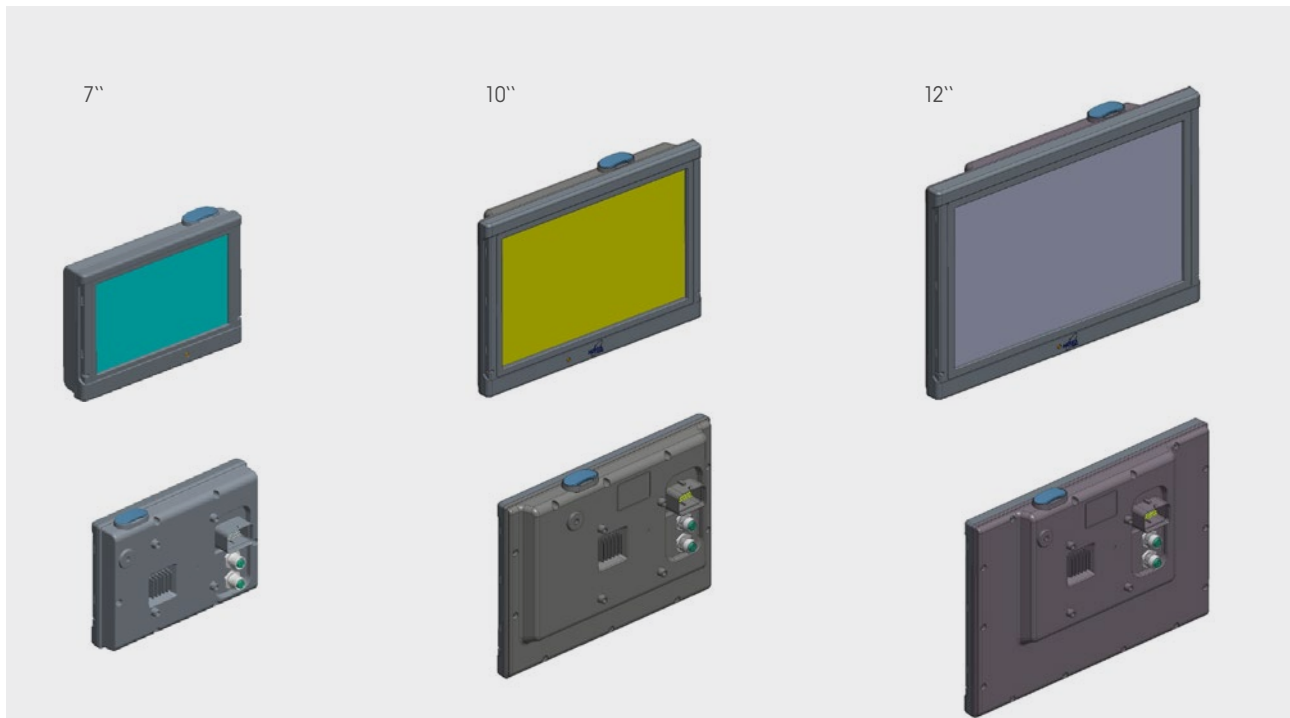
### MEKRA Lang 7" TFT-LCD quad monitor IP 65

- Dimensions: 189 x 119 x 44 mm (W x H x D)
- Picture-in-picture (PiP) display
- Up to 4 camera inputs can be selected
- Up to 4 trigger signals can be employed
- Kit includes sun visor, bracket, and connecting cable (24.1301.501.099)



# Digital Monitor

Camera monitor systems



## Advantages of the digital monitor

- Touchscreen
- Optically bonded
- IPS capability
- Display sizes: 7, 10, and 12 inches
- Can be operated with work gloves
- IP rating: IP 65
- 8 freely configurable views (single, split, triple, quad, H-view), as well as selectable views
- Recording function for one video stream at a time
- 2 analog cameras and 2 digital cameras can be connected directly to the display. Additional digital cameras can be connected, if an Ethernet switch is used.
- Zoom function for each video stream
- Automotive CAN J1939
- VESA mount location provided
- Micro SD card slot

## MEKRA Lang digital monitor

### 7"

<b>Resolution</b>	800 x 480 pixels
<b>Surface treatment</b>	Anti-reflective (Anti-Glare)
<b>Brightness</b>	850 cd/m <sup>2</sup>
<b>Operating temperature</b>	-30 °C to +85 °C
<b>Viewing angle</b>	85°, 85°, 85°, 85°
<b>Dimensions</b>	190 x 135 x 45 mm (W x H x D)
<b>Connector system</b> digitale Kamera	M12 D-coded, IP 67
<b>Stecksystem</b> analoge Kamera	MEKRA, Ø 18 mm, ADR tested, IP 69 K



### 10"

<b>Resolution</b>	1280 x 800 pixels
<b>Surface treatment</b>	Anti-reflective (Anti-Glare)
<b>Brightness</b>	850 cd/m <sup>2</sup>
<b>Operating temperature</b>	-30 °C bis +85 °C
<b>Viewing angle</b>	85°, 85°, 85°, 85°
<b>Dimensions</b>	258 x 186 x 45 mm (W x H x D)
<b>Connector system</b> digitale camera	M12 D-coded, IP 67
<b>Connector system</b> analoge camera	MEKRA, Ø 18 mm, ADR tested, IP 69 K



### 12"

<b>Resolution</b>	1280 x 800 pixels
<b>Surface treatment</b>	Anti-reflective (Anti-Glare)
<b>Brightness</b>	1020 cd/m <sup>2</sup>
<b>Operating temperature</b>	-30 °C bis +85 °C
<b>Viewing angle</b>	85°, 85°, 85°, 85°
<b>Dimensions</b>	306 x 216 x 48 mm (W x H x D)
<b>Connector system</b> digitale camera	M12 D-coded, IP 67
<b>Connector system</b> analoge camera	MEKRA, Ø 18 mm, ADR tested, IP 69 K



#### Item number

#### Digital monitor

24.1311.001.099	7"
24.1311.002.099	10"
24.1311.003.099	12"

# Cables

Camera monitor systems

## MEKRA Lang cables for analog camera system

### Mini-DIN - MEKRA (m-f)

**Item name** Adapter cable  
**Length** 0.5/ 5/ 11/ 16/ 21 m



Item number	Length
09.5610.352	0.5 m
09.1201.007.099	5 m
09.1201.006.099	11 m
09.1201.008.099	16 m
09.1201.009.099	21 m

### AMP - MEKRA (f-f)

**Item name** Adapter cable  
**Length** 0.5/ 5/ 11/ 16/ 21 m



Item number	Length
09.5610.360	0.5 m
09.1301.003.099	5 m
09.1301.004.099	11 m
09.1301.005.099	16 m
09.1301.006.099	21 m

### Multikabel MEKRA - MEKRA (m-f)

**Item name** Adapter cable  
**Length** 5/ 11/ 16/ 21 m



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



## MEKRA Lang cables for analog camera system

### MEKRA - ABS 7-pin (m-m)

Item name Adapter cable  
Length 0.5 m



Item number	Length
09.5610.320	0.5 m

### Adapter cable ABS 7-pin - MEKRA (f-f)

Item name Adapter cable  
Length 16 m



Item number	Length
09.1201.012.099	16 m

### MEKRA (m) - open end

Item name Repair kit  
Length 0.5 m



Item number	Length
09.5610.050	0.5 m

### MEKRA (f) - open end

Item name Repair kit  
Length 0.5 m



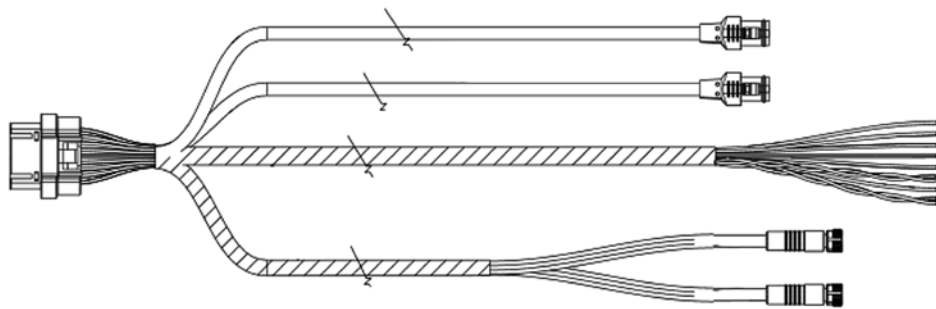
Item number	Length
09.5610.051	0.5 m

# Cables

Camera monitor systems

## MEKRA Lang cables for digital camera system

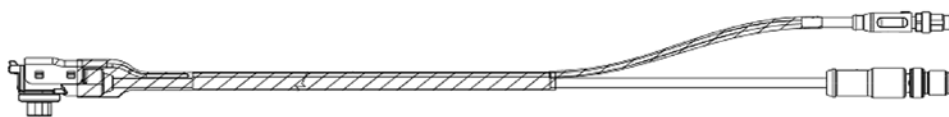
### ATAC 34-pin monitor connecting cable



Item number

09.1311.005.099

### MMC digital hybrid cable HSD+2/ M 12 (f-m)



Item number

Length

09.1308.001.000

5 m

09.1308.002.000

10 m

09.1308.003.000

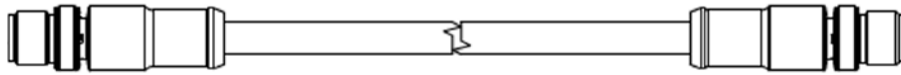
15 m

09.1308.004.000

20 m

## MEKRA Lang cables for digital camera system/ Ethernet switch

### Switch monitor-to-digital monitor connecting cable M12-M12 (m-m)



Item number	Length
09.1311.001.099	5 m (m-m)
09.1311.002.099	10 m (m-m)
09.1311.003.099	15 m (m-m)
09.1311.004.099	20 m (m-m)

### ECU-5488 Fast Ethernet switch



Item number
23.1311.001.099

# MEKRA Digital VisionSystem (DVS) Generation I

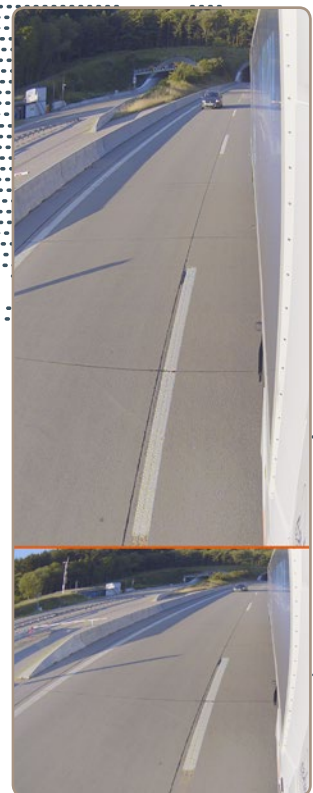
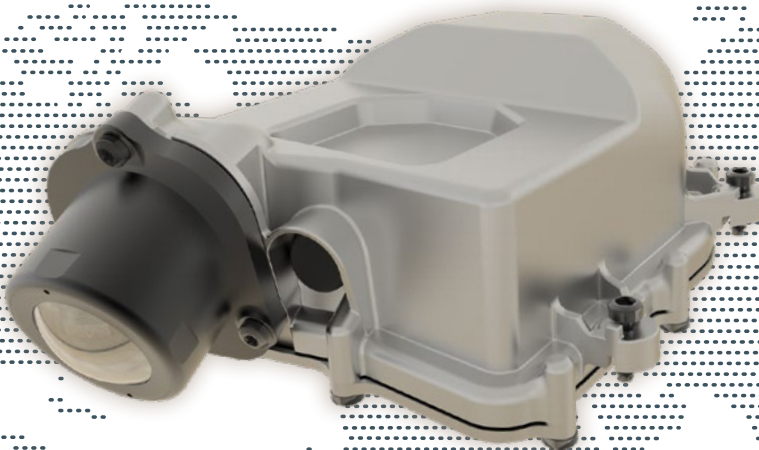
DVS Features/ Applications

## Ready for the road?

MEKRA Lang GmbH & Co. KG is a global player in the field of specialized vision systems for the commercial vehicle industry. Our success is based on our strong innovative spirit and our consistent willingness to embark on new ventures and production methods. Consequently, we are deeply committed to applying our long-standing expertise in the area of mirror system production to the development of electronic vision systems. Our MEKRA Digital Vision System sets a new standard for mirror replacement systems in the commercial vehicle industry.

It is the first mirror replacement system to have received Europe-wide TÜV approval and the first to be installed as a standard truck component in series production. Making the most of our innovative strength, we are taking reliability, form, and function to the next level. It is our mission to revolutionize the market and contribute to making road traffic safer for everyone.

Read on to find out what makes this system so unique and how partnering with us as specialists in the field of electronic vision systems could benefit the development of your future vehicles

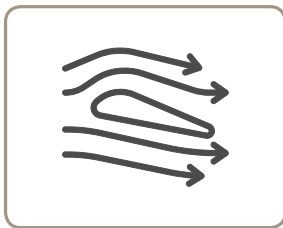


## Features

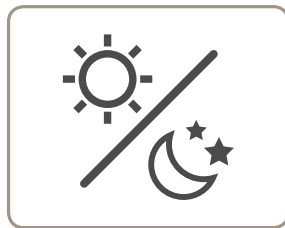
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The design of a vehicle's frontal area plays an important part in determining its air resistance. The lower the air resistance, the lower the vehicle's fuel consumption. At MEKRA Lang, we have made our mission to help reduce fuel consumption significantly. Our sleek single camera concept lives up to this goal while providing a uniquely innovative solution.

Our mirror replacement system combines fuel efficiency with perfect vision.



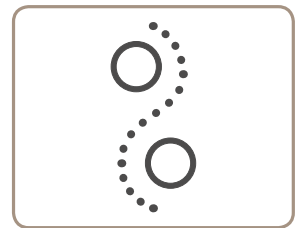
Improved aerodynamics



Perfect vision at day & night



Perfect vision at in rain

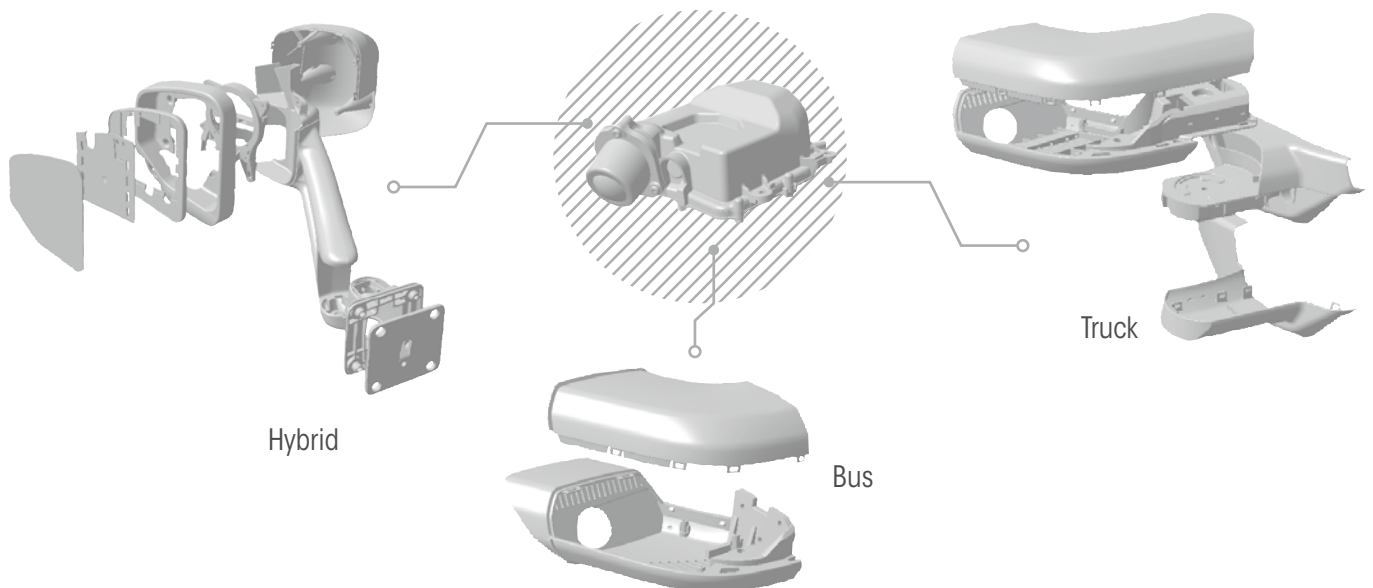


Improved ergonomics

## Sample applications

---

One camera unit - multiple applications



# Intelligent and tough

GPS/ CAN Turn Assist System

## AAS turn assist system

The AAS-GPS/ CAN turn assist system is based on the PRECO Preview Side Defender® II FMCW radar sensor. The object detection system alerts drivers of medium-size and heavy-duty commercial vehicles (>3.5 t) when other road users are in the danger zone next to the vehicle.

- Thanks to its intelligent operating modes, the AAS triggers alerts when bicyclists or other vehicles enter the detection zone. False alerts due to stationary objects are kept to a minimum.
- The radar sensor features a built-in self test (BIST) function.
- Specifically developed for this application, the wide horizontal field of vision (up to +/-85°) covers an area approximately 12 m long and 3 m wide next to the vehicle.
- The LED display on the A-pillar provides the driver with visual alerts.
- When the turn signal is activated, an additional audible alert is generated.
- The sensor can handle tough environmental conditions and works during the day and at night.

### Item number

#### Turn assist system

61.1312.001.099	AAS CAN system
61.1312.002.099	AAS GPS system



### Sensor

Frequency range	24 GHz
Operating voltage	9 - 33 V
Dimensions	103 x 124 x 33 mm (W x H x D)
Temperature range	-40 °C to +85 °C
Protection class	IP 69 K
Vibration resistance	25 G



### Display

Power supply	Via radar sensor
Dimensions	50 x 27 mm (DM x T)
Temperature range	-40 °C bis +85 °C
Protection class	IP 67
Vibration resistance	10 G
Housing	ABS plastics, black

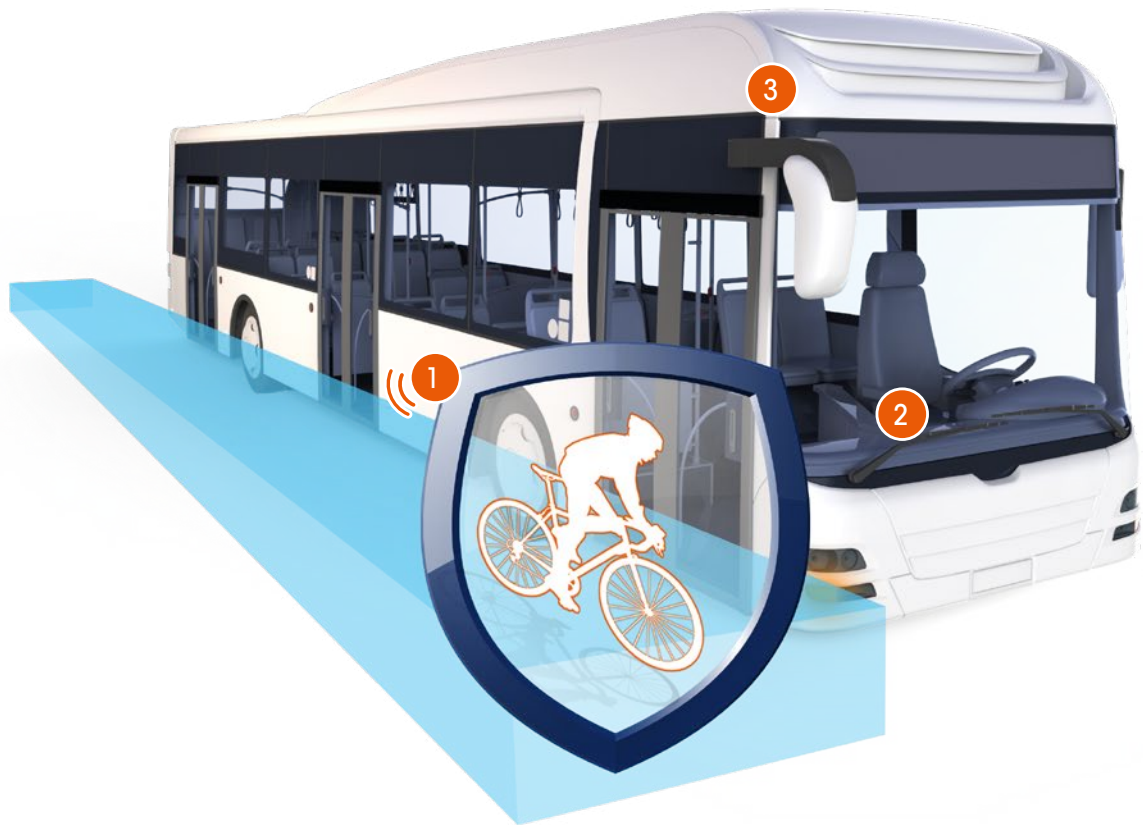


### Sensor

The rugged sensor holds up to tough environments and detects and categorizes multiple objects at the same time. Depending on the situation, it differentiates between stationary and moving objects. That is why the sensor can also be used as a lane-change assistant at higher speeds.

### Everything at a glance

The in-cab display on the A-pillar provides the driver with reliable visual and audible alerts when potential dangers arise next to the vehicle. Additionally, all system function status reports are displayed here.



### AAS CAN system



### AAS GPS system



**GPS antenna**  
 The vehicle speed is essential for the accurate assessment of a given traffic situation. It is provided in one of two ways: by an active GPS antenna or the vehicle's own CAN bus.

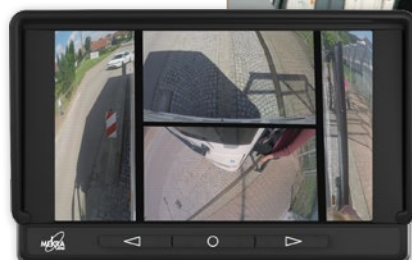
# Safety first

Turn Assist System with Side View Camera



Making a right turn at an intersection requires the bus driver's full attention. Bicyclists and pedestrians find themselves in dangerous situations, especially when making eye contact is impossible.

- Within just a few seconds, bus drivers have to process and evaluate large amounts of information.
- Mirrors alone cannot provide complete visibility of all areas around a bus.
- Poorly adjusted mirrors exacerbate the problem by reducing visibility even more.
- Bicyclists and pedestrians are often unaware of the dangerous situation.
- The risk of accidents is frequently increased by inattention and time pressure of those involved.







### Side view camera

Shock resistance	50 G
Operating voltage	10 - 36 V
Dimensions	Camera: 65 x 59 x 50 mm (W x H x D) Bracket: 80 x 71 x 28 mm (W x H x D)
Aperture angle	70°/100°/120°
Video format	PAL or NTSC
Temperature range	-40 °C bis +80 °C
Protection class	IP 69 K
Orientation	flexible adjusted
Bracket material	ABS plastics
Adjustment	Thanks to its ball shape, the camera can be rotated 360°

1

### 7" MEKRA LED monitor

Resolution	800 x 480 pixels
Operating voltage	9 - 36 V
Video format	PAL/NTSC (automatic)
Camera inputs	4, split screen available
Aspect ratio	7"/16:9
Day/ night switching	Automatic, sensor-based
Power consumption	app. 10 W
Protection class	IP 65

2

#### Side view camera

The side view camera covers the critical area on the right side of the vehicle, making it easier for the driver to assess the situation correctly. The image can be displayed on an additional monitor or the existing on-board information systems.

#### Surround view monitor

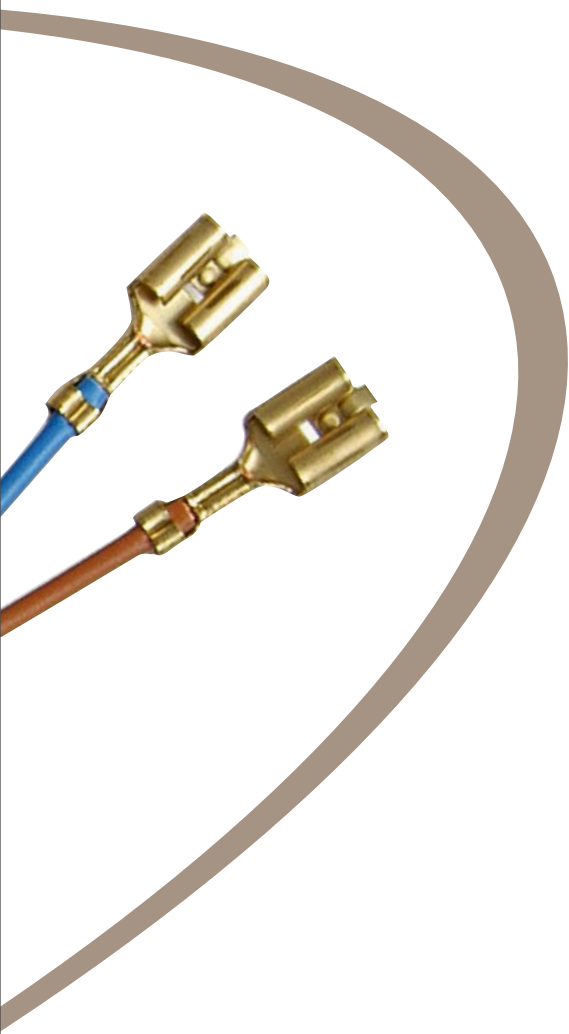
360° visibility can be achieved using the surround view monitor. When the vehicle makes a turn, the side view camera's image is displayed in full screen mode.

#### Everything at a glance

Both the control box and the monitor can be used to expand this system to include up to 4 cameras. For example, safety around the vehicle can be increased by employing the rear view camera. Turn signals, reverse gear or a variety of other vehicle signals can be used for activation.



## Accessories

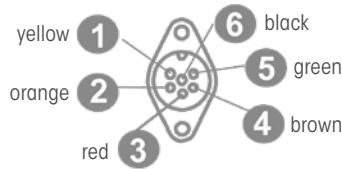
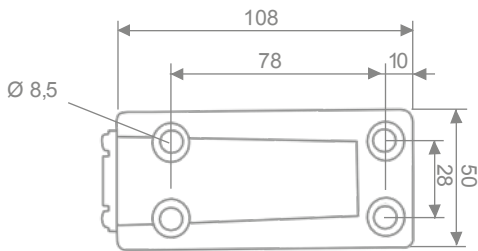


Wedge Mounts	86
Adapters/ Rubber Bellows	87
Cables	88
Switches/ Others	89

# Wedge Mounts

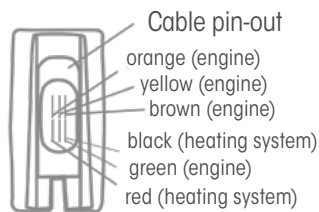
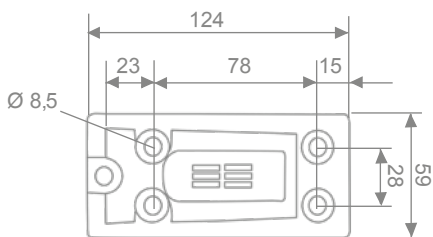
Accessories

## Cable connection 248



Item number	Configuration	Length	Blade Receptacle
20.2480.210	no cable	-	-
20.2480.211	with heating cable	2.50 m	-
20.2480.216	with control cable	2.00 m	5.0 x 6.3 mm
20.2480.217	with control cable	5.00 m	5.0 x 6.3 mm
20.2480.218	with control cable	9.00 m	5.0 x 6.3 mm
20.2480.219	with control cable	6.00 m	5.0 x 6.3 mm
20.2480.221	with control cable	2.50 m	5.0 x 6.3 mm
20.2480.222	with control cable	4.00 m	5.0 x 6.3 mm
20.2480.223	with control cable	0.15 m	plug housing
09.5000.300	cable with plug	5.00 m	receptacle housing

## Direct contact connection 271



Item number	Configuration	Length	Connection
20.2710.610	no cable	-	-
20.2710.620	with control cable	0.50 m	-
20.2710.630	with control cable	2.50 m	-
20.2710.001.001	with control cable, ZINK	2.50 m	-
20.2710.650	with control cable	3.50 m	-
20.2710.640	with control cable	0.15 m	plug housing
09.5000.300	cable with plug	5.00 m	receptacle housing

# Adapters/ Rubber Bellows

## Accessories

### Adapter 271

- Accepts wedge mounts cable connection 248 or direct contact connection 271 and can be mounted to the bus in various mounting and tilt angles
- Aluminum die-cast with plastic cover



Item number	Configuration	Mount	Tilt angle
Version 1			
20.2710.111	left side, complete	straight, with lid	3.4° / straight
20.2710.121	right side, complete	straight, with lid	3.4° / straight
Version 2			
20.2710.132 D	left side, complete	at an angle, with lid	3,4°/ 12°
20.2710.142 D	right side, complete	at an angle, with lid	3,4°/ 12°

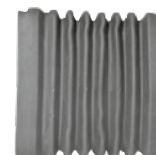
### Adapter 272

- Accepts wedge mounts cable connection 248 or direct contact connection 271 and can be mounted to the bus in various mounting and tilt angles
- Aluminum die-cast



Item number	Configuration	Mount	Tilt angle
20.2720.011	left side	at an angle, without lid	-
20.2720.021	right side	at an angle, without lid	-

### Rubber bellows



Item number	Configuration	Mount	Tilt angle
20.2710.200	left side, right side	black	

# Cables

Accessories

## Heating cable with plug



Item number	Configuration	Length
Version 1		
09.2070.101	2-pin, oval right-angle connector	2.00 m
Version 2		
09.2000.301	2-pin, round right-angle connector	2.00 m

## Control cable



Item number	Configuration	Length	Blade Receptacle
09.3200.310	6-pin for single mirror operation for driver's or passenger's side	2.00 m	3 x 2.8 mm 2 x 6.3 mm
09.3200.320	6-pin for dual mirror operation for driver's and passenger's side with mirror model 373/ 363, for passenger's side with mirror models 340 and 385	2.00 m	5 x 6.3 mm
09.3300.421	6-pin for dual mirror operation for driver's side with mirror models 340 and 385	2.00 m	5 x 6.3 mm

## Supply line



Item number	Configuration	Length	Blade Receptacle
09.3200.210	2-pin for single mirror operation	1.00 m	2 x 2.8 mm
09.3200.220	2-pin for dual mirror operation	1.00 m	2 x 6.3 mm

# Switches/ Others

Accessories

## Mirror switches



Item number	Configuration
Version 1	
08.3200.233	Switch for 2-mirror operation 12 V/ 24 V Blade connector, 6.3 mm
Version 2	
08.2770.001.000	Switch for 3-mirror operation Blade connector, 2.8 mm within compact connector

## Entry lights/ controller



Item number	Configuration
08.2910.001.002	Power LED entry light 9 - 32 V incl. mounting clips 3
08.3950.001.099	Controller for power folding mechanism 4

## Blind spot indicator

The in-mirror blind-spot indicator is ergonomically advantageous, because the color LED indicator provides additional information about the area behind the vehicle when the driver routinely checks the mirror during back-up maneuvers. An audible alarm option is available to warn the driver whenever a minimum distance is exceeded.



**Service**





**Maintenance and Contact Connections 271 and 248** **92**

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**Installation Information/ Glass Replacement** **93**

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# Maintenance and Contact Connections 271 and 248

Service

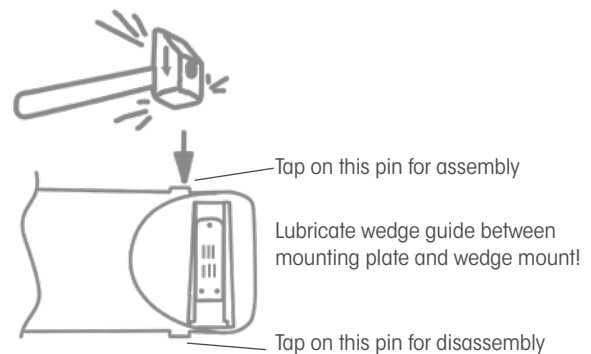
## Maintenance and contact connection

Although the installation and wedge mount systems as well as the electrical connectors are designed for convenient, tool-free removal and replacement of the mirror assemblies, it is not recommended to perform these activities on a daily basis.

### Maintenance information for direct contact connection 271 and cable connection 248

**Important:** The contact element which is attached to the vehicle must be kept clean and dry. If lubricate wedge guide between required, lubricate with contact grease.

**Caution:** Do not use graphite grease!



### Direct contact connection 271



The direct contact connection system 271 consists of two contact elements, one of which forms part of the mounting base, while the other forms part of the wedge mount. By dovetailing these two elements, the spring clips on the mounting base make a connection with the contact area in the wedge mount. The mounting base element is equipped with a rubber gasket to protect against water ingress. When the two elements are dovetailed, the rubber gasket also serves the function of cleaning the contact area on the wedge.

The contact elements must be kept clean and dry and should be lubricated with contact grease (no graphite grease!) if required. It is important to ensure that the mating dovetails are securely in place.

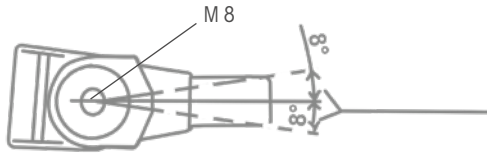
To facilitate assembly or disassembly, use a rubber mallet to lightly tap on the corresponding pins or the mounting base.

# Assembly Information/ Glass Replacement

Service

## Assembly information for mounting base system 270/ 271

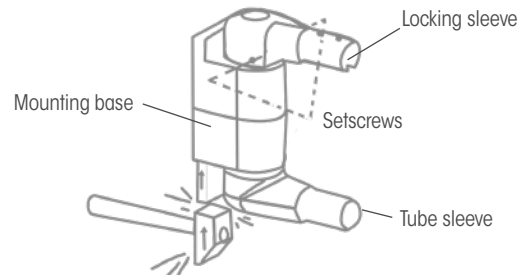
### Fine-tuning the tubular bracket angle at the mirror arm pivot point



Cross-section of the swivel joint (upper tube connector)

Adjust the two setscrews M8 x 16 to achieve the desired angle between travel direction and mirror arm. Once adjusted, tighten both screws to a torque of  $M = 8 + 1 \text{ Nm}$ . The maximum adjustability

### Disassemble the mirror arm directly at the mounting base



**Important:** Lubricate the dovetail between wedge mount and mounting base!

## Mirror head glass replacement

### Main mirror/ wide-angle mirror

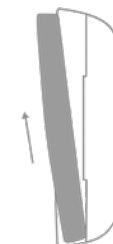
#### Removal:

1. Tilt glass unit down completely
2. Pull glass unit up and out
3. Disconnect heating cable



#### Installation:

1. Tilt adjustment unit (power/ manual) down
2. Connect heating cable
3. Slide glass unit top-down onto adjustment unit
4. Verify that unit is securely in place



### Auxiliary mirror 271

#### Removal:

1. Set glass in neutral position
2. Adjust glass sideways
3. Detach glass unit from locking hooks and remove from ball plate
4. Disconnect heating cable



#### Installation:

1. Connect heating cable
2. Align centering guides of glass unit with ball plate
3. Position glass unit and press down on its center until it locks into place
4. Verify that unit is securely in place



# General Terms and Conditions

As of: 06/ 2017

## I. General Provisions

The provisions of the contract between MEKRA Lang GmbH & Co. KG ("MEKRA Lang") and our orderers who are contractors as defined in para. 14 BGB are solely governed by these General Terms and Conditions. Our offers are exclusively meant for entrepreneurs as defined by Article 4 BGB (German Civil Code). Deviating business terms of the customer, even if they are known to us, shall not become a part of the contract. Our offers are always subject to change without notice. Our General Terms and Conditions of Sale and Delivery are considered accepted upon placement of order, at the latest upon receipt of goods. In the case of repeated business relations these General Terms and Conditions of Sale and Delivery also apply for all future transactions. Should individual provisions be or become completely or partially ineffective, then the validity of the other provisions shall thereby not be affected. MEKRA Lang and the customer shall agree upon a regulation the economic success of which shall be as close as possible to the ineffective one. Until such agreement the laws, administrative practice and judicature effective at the time of execution are to be applied.

## II. Conclusion of Contract and Prices

1. By ordering merchandise the customer bindingly declares that he wants to buy the merchandise ordered. He shall be bound to this statement for two weeks. We are entitled to accept the offer of a contract underlying the order within two weeks upon receipt of the latter by us. The acceptance may be declared in writing, electronically, or by delivery of the goods to the customer.
2. The obligations in electronic commerce according to Section 312e, par. 1 sentence 1, Nos. 1 to 3, and sentence 2 of BGB (German Civil Code) are excluded.
3. The conclusion of the contract takes place subject to the correct and timely delivery by our sub-suppliers to us. This applies only in case we are not responsible for the non-delivery, especially in case of the conclusion of a congruent hedging business transaction with our sub-suppliers. The customer shall be informed about the non-availability of the product without delay, and the equivalent, insofar as already paid, shall be reimbursed immediately.
4. All contractual financial obligations are to be fulfilled solely in EURO.
5. Prices are understood to be net as ex factory or supply depot. Freight, packaging and import costs, customs duties and other additional taxes are payable by the customer.

## III. Period of Delivery and Supply Commitment

1. Our written or electronic order confirmation shall be decisive for extent, type, and date of the delivery. Partial shipments shall be permitted.
2. A liability in meeting delivery deadlines determined as binding shall only be accepted under the condition of undisturbed flow of operations and distribution. In particular in cases of acts of God and other disruptive events at our facilities or those of our sub-suppliers or transport contractors, for example operational or traffic disruptions, fire, flooding, labour-, energy-, or traffic shortages, strikes, lockouts, official measures as well as technical or technological situations that considerably aggravate the execution of the contract, release us from liability in punctual delivery or give us the right to stop delivery without obligation for subsequent delivery.
3. If not agreed otherwise, we have the right to deliver earlier than the delivery deadline. Unless otherwise agreed upon, delivery effected by us one up to a maximum of two weeks after the stipulated delivery date shall not be considered as delayed.
4. Delivery deadlines shall be considered met when the goods have left the works or dispatch depot or the customer has received notice by expiration of the deadline of our

readiness to deliver. Subsequent alteration of contract shall be cause for a reasonable extension of delivery deadlines.

5. In the case of contracts whose performance consists of several deliveries, non-performance, defective or delayed performance of one delivery remains without influence upon the other deliveries of the contract.
6. Default of payments, handing in of a state meant in lieu of an oath of disclosure in accordance with § 807 ZPO (German Code of Civil Procedure), temporary shortage of liquid funds, or public knowledge of a considerable deterioration of the financial circumstances of the customer shall entitle us at our discretion to demand payment in advance for outstanding deliveries or to stop deliveries immediately and to deny performance of current contracts. At the same time we shall be entitled to make immediately due and payable those accounts receivable from the customer which are not due yet.

## IV. Shipment, Passage of Risk

1. Unless otherwise agreed by the Parties, the choice of packaging, shipping routes and method of transportation is subject to our discretion.
2. The risk of accidental loss and accidental deterioration of the merchandise shall pass over to the customer upon handing it over, in case of a mail order purchase upon delivery of the matter to the forwarding agent, the carrier, or another person or institution determined to execute the shipment. If the customer is overdue in accepting, this shall be equal to a handing over of the merchandise.
3. Merchandise out of call orders shall be accepted within 3 months after issuance of the acknowledgement of order, unless otherwise agreed.
4. Insurance against breakage and transportation risks shall only be taken out upon special request and shall be billed.
5. Customs duties and other expenses, also the costs for payment of the necessary papers for import into the country of destination, shall be payable by the customer.

## V. Payments, Terms of Payment

1. Invoices shall be payable:
  - a) within 14 days from date of invoice with 2 % cash discount of the accumulated invoice value;
  - b) within 30 days from date of invoice without cash discount of the accumulated invoice value.
2. Cash discount shall only be granted after all payment commitments out of earlier deliveries have been fulfilled and the invoice amount has been punctually paid to us in cash or has been credited to our account by the aforementioned due dates. The drawing of a bill of exchange can thus not lead to the granting of a cash discount. In case of cashless payment, especially when a cheque is submitted, the date of the credit entry shall be decisive. A cash discount cannot be granted in the case of payment or credit entry under reserve, with limiting conditions or any other restrictions. The customer shall assume all risks of method of payment. Invoices for tools are subject to immediate payment without cash discount.
3. Bills of exchange and checks shall only be accepted on account of payment. Corresponding credit entries are made only under the limiting condition of correct receipt of the complete amount due. We reserve the right to take in external or own acceptances. Costs and discount expenses are payable by the customer. We assume no responsibility for submission and protest. Protest imposed against the customer's own bills of exchange or non-immediate repayment of protested external bills of exchange shall entitle us to return all bills in circulation. At the same time we shall be entitled to make immediately due and payable those accounts receivable from the customer which are not yet due. Antedated checks shall not be accepted.
4. Interest on defaulted payment of 9%-points over the discount rate of the German Central Bank referred to in § 247

BGB (German Civil Law) as well as a liquidated damages of 40.00 Euro shall be charged in the case of missed payment dates. The right of assertion of further damages caused by delayed performance and other claims shall remain reserved.

5. Advance and part payments are not subject to interest payments.
6. The customer shall only be entitled to offset or withhold payment if his counterclaim is undisputed or has been determined legally binding. The customer may execute a right of retention only if his counter claim is based on the same contractual relationship.
7. Customer and invoice numbers are to be given by the customer when invoices are balanced. Delays or incorrect booking resulting from failure to do so shall be payable by the customer.

## VI. Retention of Ownership, Factoring

1. The delivered goods shall remain our property until payment of all claims has been received. The customer has the right to resell the proviso goods within the scope of proper and orderly course of business; however, a pledge or transfer by way of security is not permissible. The customer is required to ensure our rights in the case of resale of proviso goods on credit.
2. The accounts receivable by the customer based on the resale of the merchandise subject to reservation shall now already be transferred to us in the amount of the invoice. We hereby agree to accept this transfer. Regardless of the assignment, the customer shall retain the right to collect payment under the condition that he fulfils his responsibilities to us according to the underlying contractual relationship and does not fall into financial decline. Otherwise the customer must provide the information about the assignment necessary for collection upon our demand and notify his debtors of the respective assignment. In this case we reserve the right to collect the accounts receivable by ourselves.
3. A possible finishing or processing of the merchandise sold subject to reservation by the customer shall always take place on our behalf and by order of us, without any obligations resulting for us from this, however. In the case of processing of proviso goods with other goods not belonging to us, we are entitled to the co-owner portion of the resulting product corresponding to the value of the proviso goods in relation to the other processed goods. Insofar as here and in the following the value of the proviso goods is referred to, this value results from our invoice value.
4. Should the customer acquire sole ownership of the new product according to § 947 paragraph 2 BGB, it is agreed upon that the customer grants co-ownership in the proportion of the value of the processed, attached, or mixed proviso goods, and that he protects these free of charge.
5. In the case of resale of the proviso goods together with other goods, regardless of with or without processing, attachment or mixing, the assignment in advance agreed to above shall be valid only to the extent of the value of proviso goods that were resold together with the other goods. We shall be obligated to release on demand the securities entitled as provided above, if the value exceeds secured payments by 20 %.
6. The customer must immediately notify us and provide the material necessary for an intervention in the case of compulsory execution by third parties against the proviso goods or in case of claims assigned in advance. Any costs resulting from such intervention shall be payable by the customer.
7. The customer shall be obligated to adequately insure the merchandise sold subject to reservation against fire and burglary and has to prove such insurance to us on demand.

## VII. Warranty

1. The period of limitation for any warranty claim shall be 24 months as from handover of the goods.
2. First of all, we shall remedy a defect or make a substitute delivery at our discretion. In case of failure to rectify defects or to substitute delivery, the customer can demand rescission of the contract or reduction of the payment. In case there is only a minor contract violation, especially if there are only minor defects, the customer shall not have the right of contract cancellation, however.
3. The customer must notify us in writing of any obvious flaws immediately, at the latest within 7 days after receipt of the goods, and must refrain from any eventual working of protested goods. Otherwise claims based on defects are excluded. The timely dispatch shall suffice for the observance of the warranty deadline. The full burden of proof for all claim prerequisites rests with the customer, especially for the defect itself, for the date of the establishment of the defect, and for the timeliness of the complaint about the defect.
4. Defects which could not be ascertained within this time span despite careful inspection are to be reported to us in writing immediately upon discovery. If the customer opts for a withdrawal from the contract because of a legal imperfection or a physical defect after a failed subsequent fulfilment, then he shall not be additionally entitled to a claim for compensation because of the defect.
5. If, after a failed subsequent fulfilment, the customer opts for a compensation of the damage, then the merchandise shall remain with the customer if this can reasonably be considered acceptable. The compensation is restricted 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. Merchandise for which we have effected compensation shall become our property and is to be returned to us against reimbursement of costs.
7. Claims cannot be made for damages that resulted from the customer's culpably
  - a) improper handling or overstressing the purchased item or
  - b) altering the purchased item in a manner not agreed upon or
  - c) not following the instructions of the mounting or operating manual or
  - d) not observing the complaint and delivery responsibility according to points 3 and 4 above or
  - e) further using the purchased item after ascertaining the defect.Natural wear and tear is excepted from the warranty.

## VIII. Liability

1. In case of simply negligent violations of obligations our liability shall be restricted to an average damage predictable for the type of merchandise, typical for such a contract, and immediate. This also applies in case of simply negligent violations of our legal representatives or agents. We shall not be held liable in case of a simply negligent violation of nonessential contract obligations.
2. The liability by virtue of acceptance of a guarantee as well as due to product liability remains unaffected; the same applies in case of bodily harm or health impairment attributable to us or in the event of loss of life of the customer
3. Compensation claims of the customer because of a defect shall superannuate after one year from the delivery of the merchandise to the customer. This shall not apply if we can be charged with gross negligence as well as in case of bodily harm or health impairment attributable to us or in the event of loss of life of the customer.

## IX. Returns

Properly ordered and delivered goods shall in principle not be taken back. Returns that have been agreed upon with us shall remain the exception, which additionally require the

following pre-requisites to be met:

1. The products must have been acquired directly from us or from one of our works depots.
2. Flawless and unaltered condition of the goods.
3. In principle, return shall only be possible when the articles in question are still in our product range.
4. Return shipment must be „free domicile“ to our Ergersheim works or to the appropriate works depot with accompanying delivery note date and number. Value reduction for returns:
  - in the first year after delivery date ./ 10 % of the contract price
  - in the second year after delivery date ./ 25 % of the contract price
  - between the 3rd & the 5th year after deliv.date ./ 50 % of the contract price
  - merchandise over five years old – no return possibleTechnical inspection and completion of the credit slip shall be carried out under consideration of eventual value reduction upon receipt of the articles. Freight costs, insofar as any occurred to us for the original shipping, reduce the remaining value.

## X. Industrial Property Rights

1. The customer is held liable to us for the exemption from industrial protection rights of third parties on articles ordered, indemnifies us against any possible claims of third parties and has to reimburse any damage to us possibly resulting from a violation of this obligation.
2. Our designs and design proposals are to be kept confidential and may not be passed on to third parties.
3. All drawings, construction plans, and samples which the customer has received, shall remain our intellectual property.

## XI. Place of Fulfillment and Jurisdiction, Other Agreements

1. On principle, the product description of the manufacturer is understood to be decisive for the characteristics of the goods. Public statements, sales talks, or advertisements made apart from this do not represent a contractual description of the characteristics of the goods. Samples and specimens serve as approximate illustrative articles in terms of quality, measurements and colour. Legal claims cannot be inferred from this. Technical changes as well as alterations in shape, colour, and/or weight are reserved within reasonable scope.
2. If the customer receives a faulty assembly instruction, we shall only be obliged to furnish a faultless assembly instruction, and this only if the fault of the assembly instruction is in contradiction with a proper assembly.
3. The customer does not receive warranties in the legal sense of the word from us; warranties of the manufacturers, however, shall remain unaffected by this.
4. Place of fulfillment for our deliveries ex works shall be the delivery works, for delivery ex storage the warehouse. Place of fulfillment for all payments shall be Ergersheim/ Bavaria, Germany.
5. The exclusive place of jurisdiction for all litigations from this contract shall be Fuerth/ Bavaria, Germany. This also applies to lawsuits based on a cheque or bill of exchange.
6. These provisions shall be governed by the Law of the Federal Republic of Germany. The provisions of the UN Purchase Law shall not be applicable. The wording of the German language version of our „General Terms and Conditions of Sale and Delivery“ shall solely be decisive for these General Business Terms.
7. The special terms of our products published with the appropriate price lists shall additionally be applicable.
8. The customer itself shall be responsible to examine the suitability of the goods for the intended final usage.
9. German law (BDSG-Federal Data Protection Law) requires us to inform you that all data of our customers are electronically saved.

# MEKRA Lang - passion for excellence.

## Headquarters

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Contents are subject to change  
Last Update: Oktober 2019

