



Buses

Product Catalog for Mirror and Camera Monitor Systems



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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**

European Regulations and Directives for Buses **10**

Directives

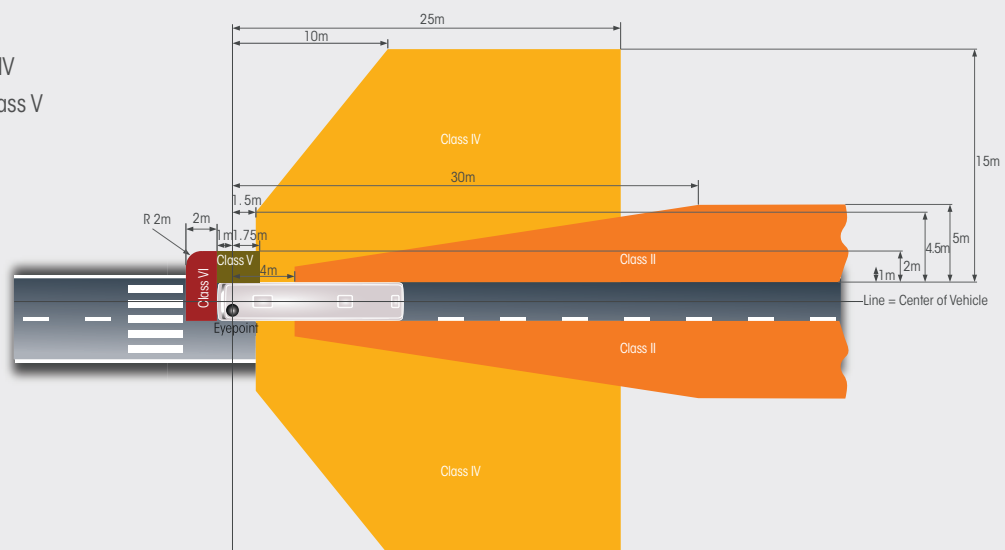
Vehicle Classes and Fields of Vision

Vehicle Class	Interior mirror	Exterior mirror	
	Class I interior mirror	Class II main mirror (large)	Class III main mirror (small)
M₁ up to 8 persons	Compulsory 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.	Optional	Compulsory 1 on the driver's side and 1 on the passenger's side Alternatively, class II mirrors may be installed.
M₂ > 8 persons up to 5 tons	Optional (No field-of-vision requirements)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted
M₃ > 8 persons > 5 tons	Optional (No field-of-vision requirements)	Compulsory 1 on the driver's side and 1 on the passenger's side	Not permitted

Relevant fields of vision for buses from the ECE

Legend	■ HS = Main mirror	≙ Class II	■ NBS = Close-proximity mirror	≙ Class V
	■ WWS = Wide-angle mirror	≙ Class IV	■ 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
Optional 1 on the driver's side and/ or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (must both be installed at least 2 m above the ground)	Optional (must be installed at least 2 m above the ground)
Optional 1 on the driver's side and/ or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (must both be installed at least 2 m above the ground)	Optional (must be installed at least 2 m above the ground)
Optional 1 on the driver's side and/ or 1 on the passenger's side	Optional 1 on the driver's side and 1 on the passenger's side (must both be installed at least 2 m above the ground)	Optional (must be installed at least 2 m above the ground)

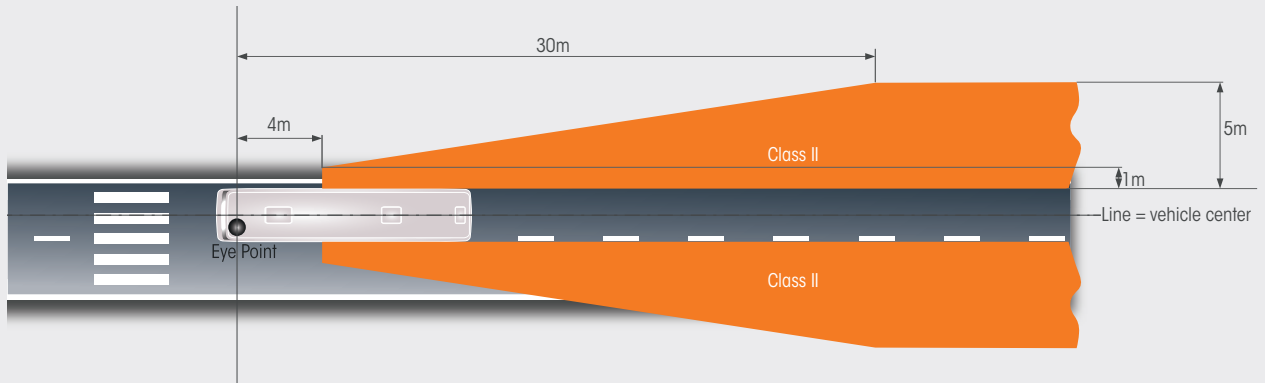
European directive overview with designations

UN ECE R 10	Electromagnetic compatibility (EMC)
UN ECE R 107	General design for buses and coaches of classes M2 and M3
UN ECE R 118	Burning behavior of interior material
UN ECE R 151	Toter Winkel Assistent zur Erkennung von gefährdeten Personen (Fußgänger, Fahrradfahrer)

Directives

European Regulations and Directives for Buses

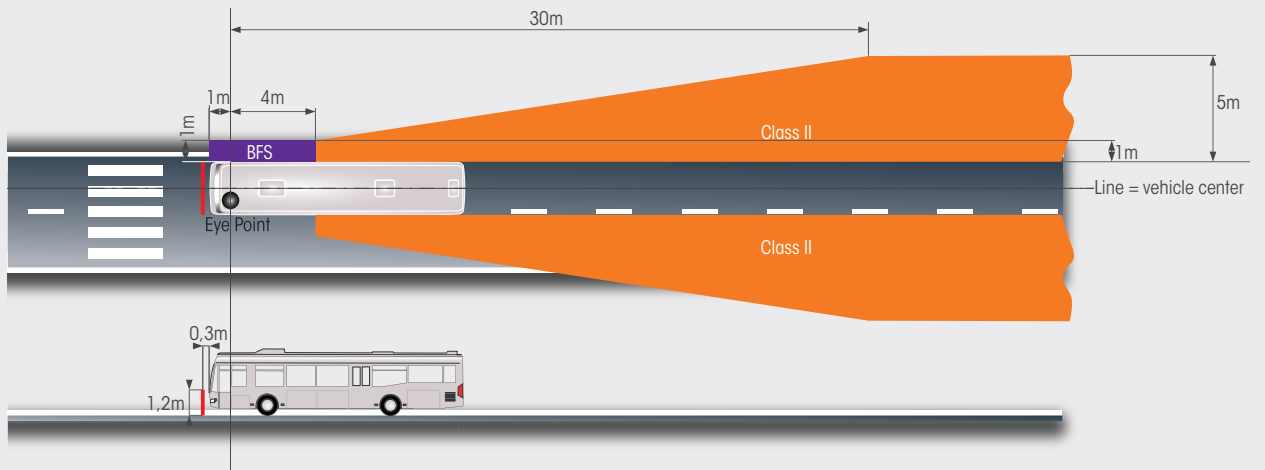
Legally Required Field of Vision for Buses



- 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



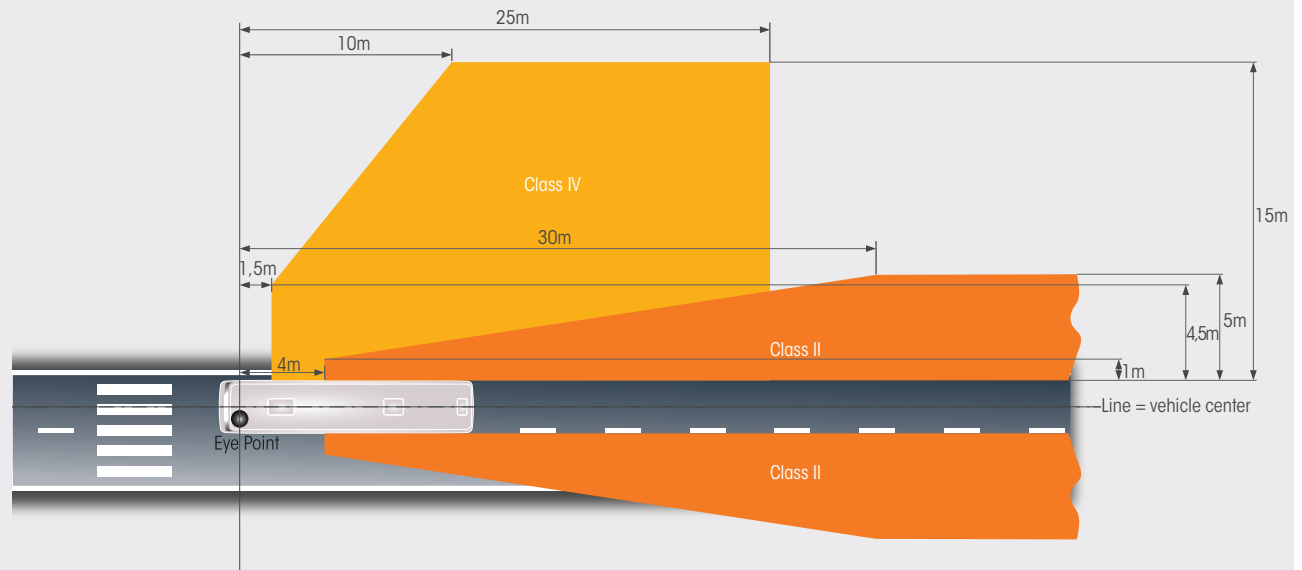
- Class II main mirror on both sides
- Passenger's side (BFS) with mirror, camera monitor system optional
- Direct front view of measuring stick or front mirror, camera monitor system optional

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

	HS	= Main mirror	≅ Class II		NBS	= Close-proximity mirror	≅ Class V
	WWS	= Wide-angle mirror	≅ Class IV		FS	= Front mirror	≅ Class VI

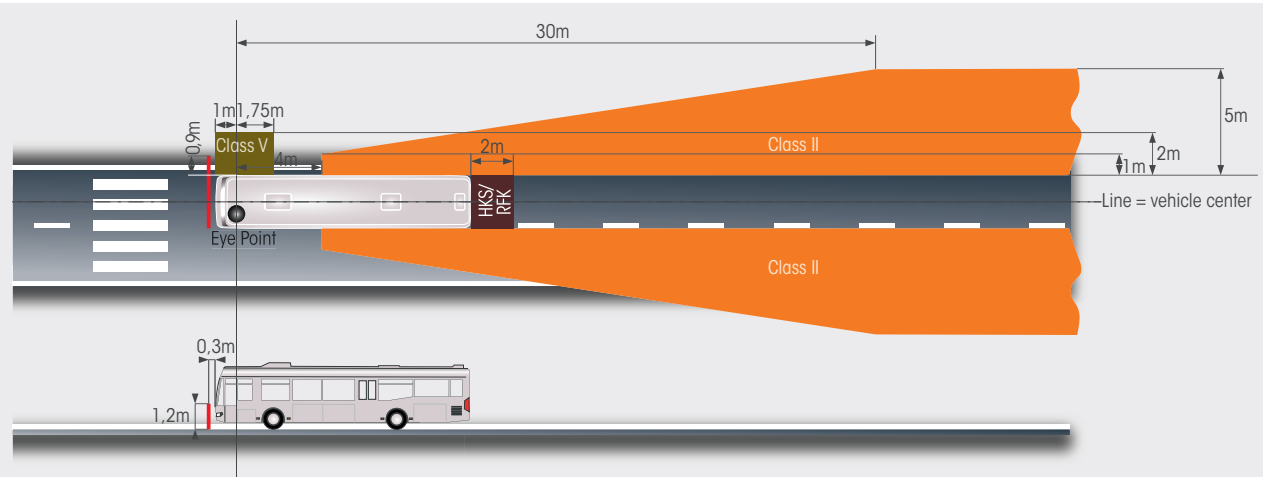
Belgian Regulation



- 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

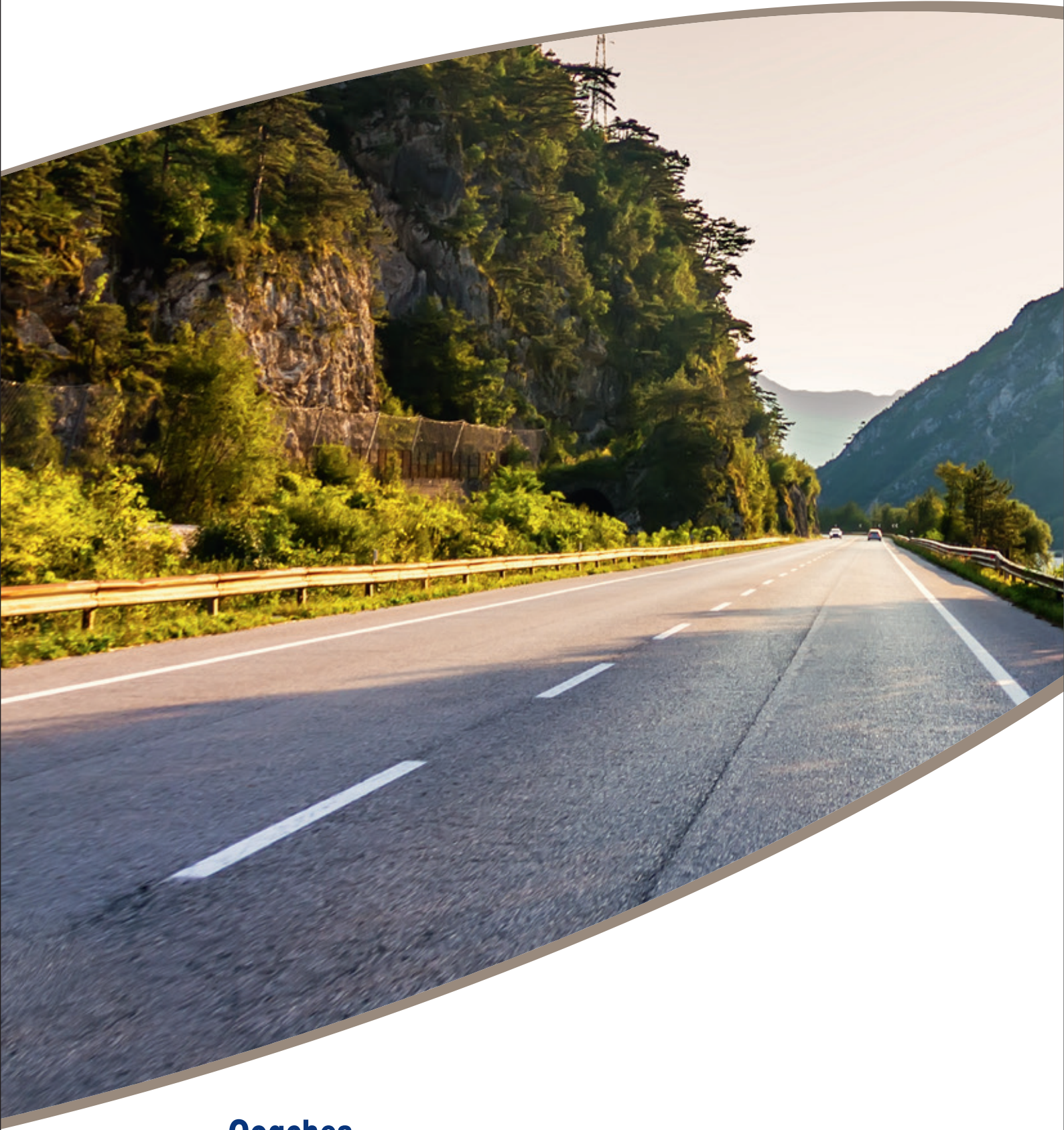


- Class II main mirror on both sides
- Class V close-proximity mirror right side, camera monitor system optional
- Direct front view of measuring stick or front mirror Class VI, camera monitor system optional
- Class V close-proximity mirror on right side not required, if the field of vision is ensured 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

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



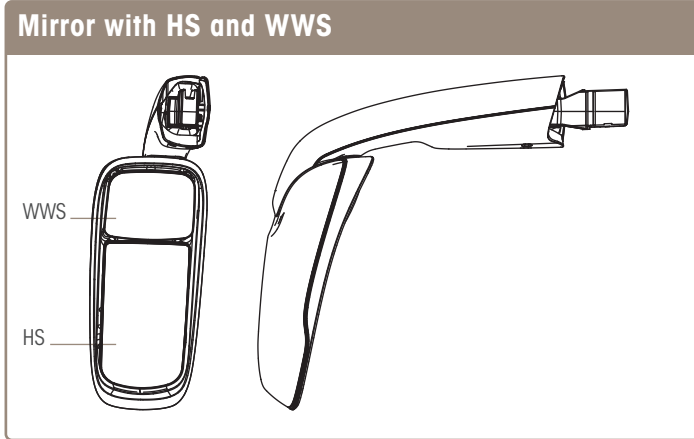
Camera



LED entry light

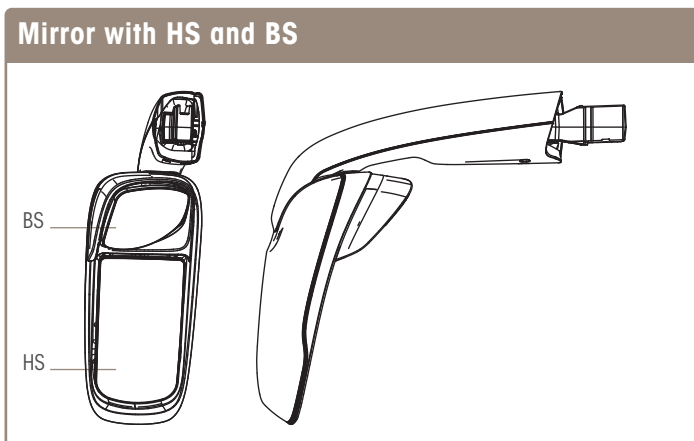


System options



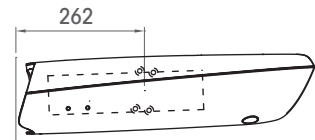
or

+

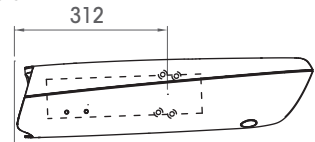


Mounting arm available in three mounting sizes

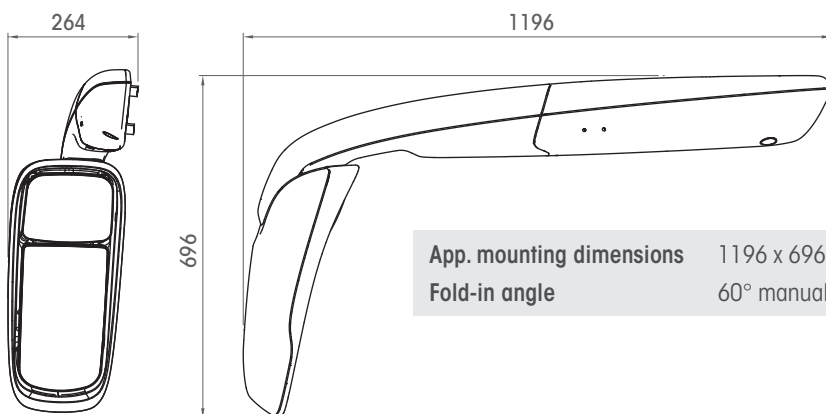
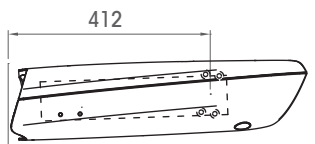
Short



Medium



Long



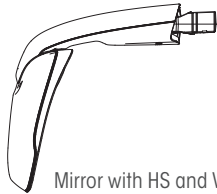
App. mounting dimensions 1196 x 696 x 264 mm (L x H x D)
 Fold-in angle 60° manual operation

Mirror System 291

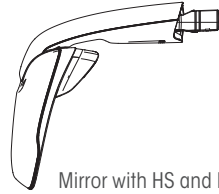
Coaches

Mirror configurations

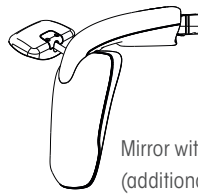
291



Mirror with HS and WWS



Mirror with HS and BS



Mirror with HS, WWS and ZS
(additional mirror)

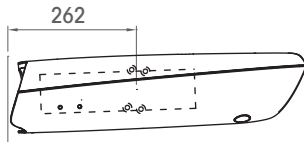


Mirror with HS,
WWS and NBS
(close proximity-mirror)

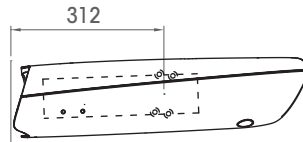
Item number	Assembly	Configuration	Directives
Manual folding			
left-hand drive			
59.2910.001.001	left side	HS WWS	
59.2910.002.001	right side	HS WWS	
59.2910.003.001	left side	HS BS	
59.2910.004.001	right side	HS BS	
59.2910.011.001	left side	HS WWS Camera	
59.2910.012.001	right side	HS WWS Camera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

Additional options upon request

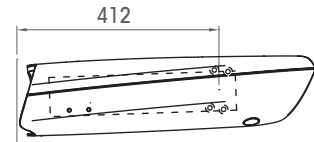
291



Short



Medium



Long

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

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

Accessories

Item number		Length
Connecting cable to vehicle		
09.2910.002.099	for HS and WWS	6.00 m
09.2910.003.099	2-pin for entry light or folding feature	6.00 m
Mirror adjustment switch		
08.3200.233	for 2-mirror operation	
Other		
08.3950.001.099	Controller for power folding mechanism	
08.2910.001.002	Power LED entry light 9 - 32 V incl. mounting clips	



retrofittable



City Buses



Mirror System 277	20
Mirror System 278	22
Mirror System 1018 Bus	24
Mirror System 1041	26
Mirror System 1042	27
Mirror System 276	28

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

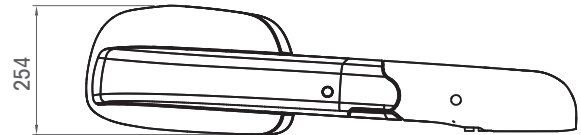
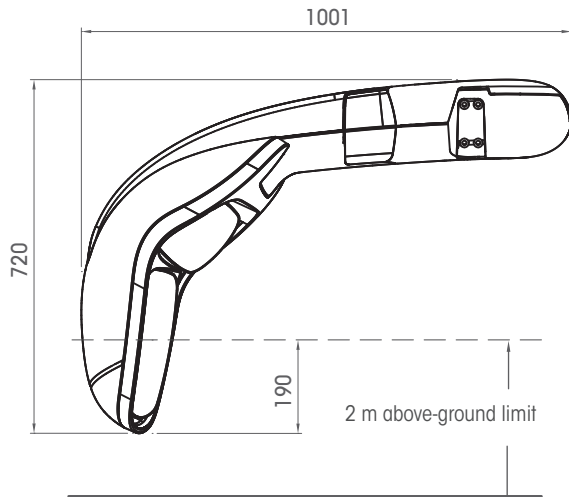


Mirror head with folding mechanism



Folding feature (manual or powered operation)





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

Item number	Configuration	Directives
right-hand mount, heated 24 V		
Manual folding mirrors		
59.2770.210.001	HS electrically adjustable ZS electrically adjustable	
59.2770.211.001	HS electrically adjustable ZS electrically adjustable	
59.2770.310.001	HS electrically adjustable ZS electrically adjustable	
Power folding mirrors		
59.2771.210 *	HS electrically adjustable ZS electrically adjustable	
59.2771.310.001 *	HS electrically adjustable ZS electrically 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
Connecting cables		
09.2770.211 + 09.2770.210	for 59.2770.211.001	6,00 m
09.2770.210	for 59.2770.210	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
Mirror switches		
08.3200.233	Switch for 2-mirror operation	
08.2770.001.000	Switch for 3-mirror operation	
Entry light/ Others		
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

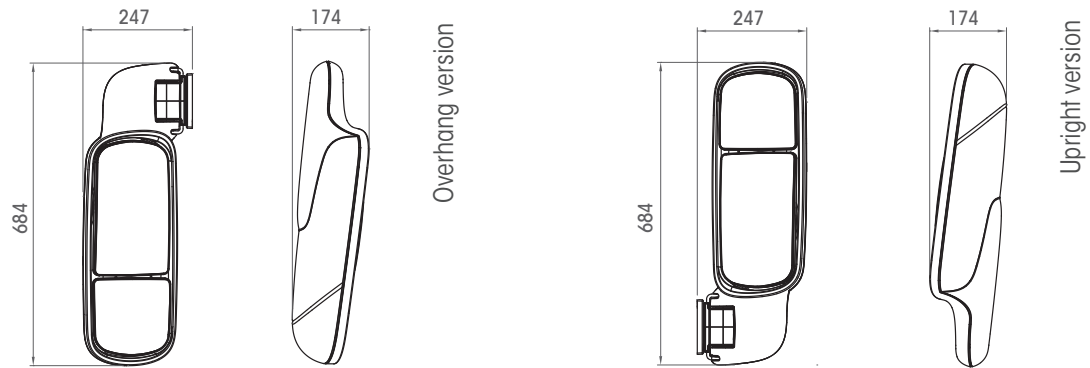
R 1200 (II E1 020951)
heated, 24 V
electrically adjustable

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
Overhang version with direct contact connection 271, WWS manually adjustable					
59.2780.120.001	left side	HS	electrically adjustable	heated, 24 V	 
59.2781.120	right side	HS	electrically adjustable	heated, 24 V	 
Upright version with direct contact connection 271, WWS manually adjustable *					
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,
Mirror switch	see Accessories – Mirror switch, page 87

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	
59.1018.502.001	right side	HS	electrically adjustable	WWS	manually adjustable	
59.1018.601.001	right side	HS	electrically adjustable	WWS	manually adjustable with front mirror 389	

Accessories

Item number		Length
Connecting cables to vehicle		
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
Mirror Switch		
08.3200.233	for 2-mirror operation	
Paintable mirror head covers		
12.1018.001.000	left side	
12.1018.002.000	right side	

Spiegelsystem 1041

Stadtbusse

Features

- ECE R46/04-compliant main mirrors
- Front crossview mirror
- Modern design
- Suitable for city, intercity & tour buses
- 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			
Variants over 2m			
59.1041.001.001	right	HS electrically adjustable	BS manually adjustable
59.1041.002.001	right	HS electrically adjustable	BS electrically adjustable
Variants under 2m			
59.1041.004.001	right	HS electrically adjustable	BS manually adjustable, standard length
59.1041.005.001	right	HS electrically adjustable	BS manually adjustable, 120mm extended

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
08.2910.001.002	Power LED entrance light 9-32V with mounting brackets retrofittable at 59.1041.005.001	2,4 m
09.2910.003.099	2-pole for entrance light	6 m

Other variants on request

retrofittable



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			
Overhang Version			
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 manually adjustable	ECE
Upright Version			
59.1042.003.001	left side	HS electrically adjustable WWS manuell verstellbar	ECE

Accessories

Item number	Lengths
20.1042.002.001	Slip-on wedge with connection 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

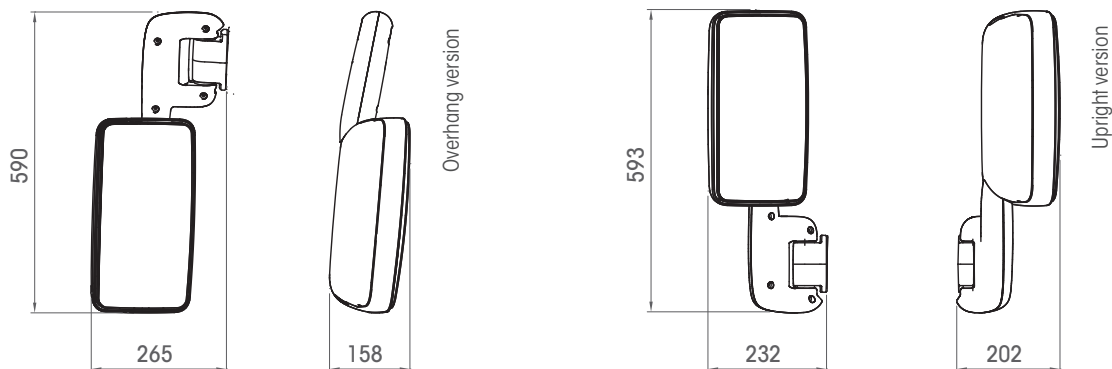
Mirror configuration

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					
manually adjustable					
59.2760.112	left side	left-hand drive	no wedge mount	unheated	ECE
59.2760.212	right side	left-hand drive	no wedge mount	unheated	ECE
electrically adjustable					
59.2761.112	left side	left-hand drive	no wedge mount	heated, 12 V	ECE
59.2761.212	right side	left-hand drive	no wedge mount	heated, 12 V	ECE
59.2762.101	left side	left-hand drive	with wedge mount 271	heated, 24 V	ECE
59.2760.007.001	left side, R 1200	left-hand drive	no wedge mount	heated, 24 V	ECE

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

Accessories

Item number	
Wedge mounts	see Accessories - Wedge mounts – Direct Contact Connection 271 , page 52
Spiegelschalter	see Accessories – Mirror switch, page 54



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

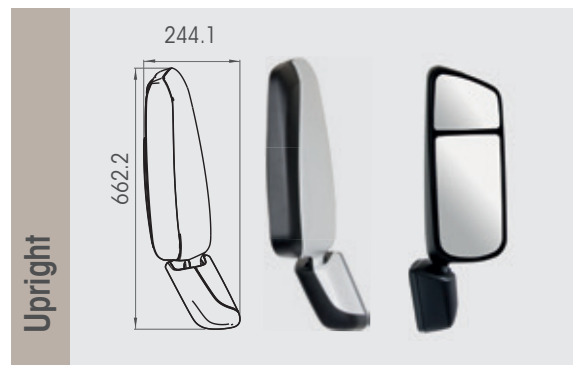
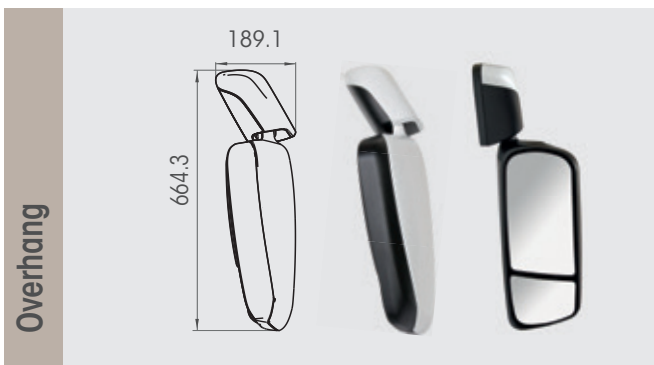


Mirror head with folding mechanism manual

for use below 2 m, collision protection,
parking position



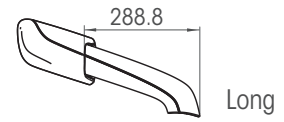
System options



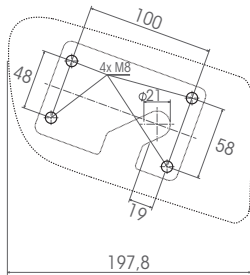
Mirror System 1018

Motorhomes

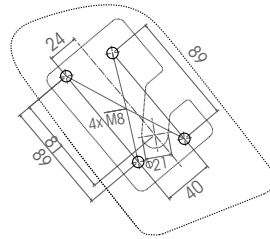
Mounting arm
available in three lengths



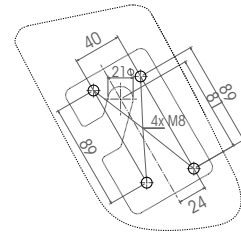
Mounting hole layout - overhang
with mounting arm



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



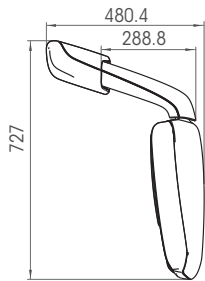
Upper mounting arm cover



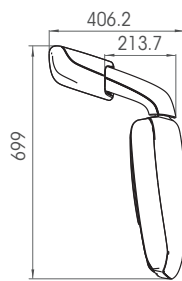
Mirror System 1018

Motorhomes

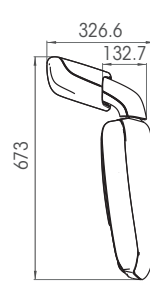
1018



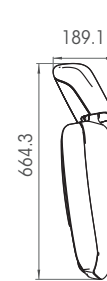
Long



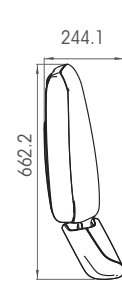
Medium



Short



Overhang



Upright

Item number	Assembly	Configuration	Directives
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Standard factory-supplied configuration, see page 39

left-hand drive

59.1018.001.001	left side	HS WWS	overhang long	ECE
59.1018.002.001	right side	HS WWS	overhang long	ECE
59.1018.003.001	left side	HS WWS	overhang short	ECE
59.1018.004.001	right side	HS WWS	overhang short	ECE
59.1018.005.001	left side	HS WWS	upright	ECE
59.1018.006.001	right side	HS WWS	upright	ECE
59.1018.007.001	left side	HS WWS	overhang medium	ECE
59.1018.008.001	right side	HS WWS	overhang medium	ECE
59.1018.015.001	left side	HS WWS	overhang	ECE
59.1018.016.001	right side	HS WWS	overhang	ECE
59.1018.019.001	right side	HS WWS	antenna overhang medium	ECE

right-hand drive

59.1018.017.001	left side	HS WWS	overhang medium	ECE
59.1018.018.001	right side	HS WWS	overhang medium	ECE
59.1018.020.001	right side	HS WWS	antenna overhang medium	ECE

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	
Connecting cable to vehicle		
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
Mirror adjustment switch		
08.3200.233	for 2-mirror operation	



Components



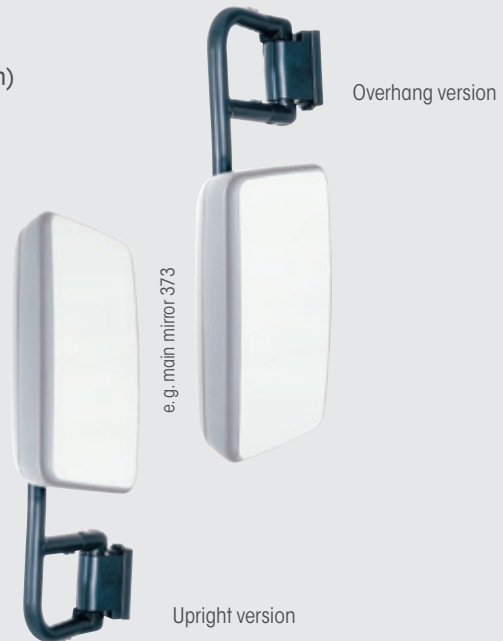
Tubular Bracket System 270, left side	40
Tubular Bracket System 270, right side	41
Main Mirrors	42
Wide-Angle Mirrors	44
Interior Mirrors	46
Special Application Mirrors	48

Tubular Bracket System 270, left side

Components

Features

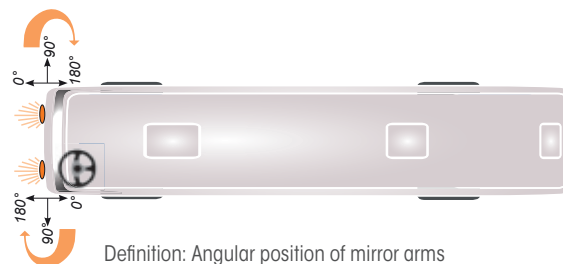
- Slip-on bracket system for city buses, coaches (low-cost version)
- Suitable for main mirrors 373/ 363 or additional main mirrors
- Foldable mounting base, angular position can be factory-set from 0° to 180°, field-adjustable by +/- 8°
- Cabling for heater and glass adjustment integrated in tubular bracket
- Pluggable connection via connecting cable 248 with female socket or via direct contact connection 271 (no plug), see page 84
- 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			
overhang			
58.2704.059	Tubular bracket with heating cable	Cable connection 248	wedge included
58.2704.090	Tubular bracket with heating cable	Direct contact connection 271	20.2710.620 *
upright			
58.2704.088	Tubular bracket with control cable	Direct contact connection 271	20.2710.620 *

* Other wedges, see accessories pages



Definition: Angular position of mirror arms

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 84
- 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			
rigid version			
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 *
foldable version			
58.2705.001	Tubular bracket with brace, heating and control cable	Cable connection 248	wedge included
58.2705.002	Tubular bracket without brace, heating and control cable	Cable connection 248	wedge included

* Other wedges, see accessories pages

Main Mirror

Components

Main Mirror 363 (II E1 020923)

Material	Plastic mirror housing (ABS)
Housing	384 x 205 x 120 mm
Back cover	Removable, paintable
Clamp	
Glass unit	368 x 189 x 40 mm
Heater	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

Item number

Spare parts

15.3802.840F	Glass unit		heated, 24 V	R 1200
11.3730.210	Cover			

Main Mirror 373 (II E1 020923)

Material	Plastic mirror housing (ABS)
Housing	384 x 205 x 120 mm
Back cover	Removable, paintable
Clamp	
Glass unit	368 x 189 x 40 mm
Heater	24 V



Item number	Assembly	Configuration		
Mirror head				
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

Spare parts

15.3731.470	Glass unit		heated, 24 V	R 1800
11.3730.210	Cover			

Main Mirror 375 (II E1 020941)

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



Item number	Configuration			
Components left-side/ right-side, please order mirror head, glass unit, mounting element separately				
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 378 (II e1 03*0018)

Material	Plastic mirror housing (ABS)
Housing	433 x 188 x 85 mm
Components	Complete mirror assembly only available with three components
Glass unit	433 x 188 x 15 mm
Clamp	
Heater	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			

Wide-Angle Mirror

Components

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

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



Item number	Configuration
Components left-side/ right-side, please order mirror head, glass unit, mounting element separately	
56.3773.147	Mounting element including cover
61.3780.100	Mounting element including cover

Wide-Angle Mirrors 386 (IV E1 021248)

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



Item number	Assembly	Configuration
Mirror head		
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	Configuration
Spare parts	
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

Components

Wide-Angle Mirror 906 (IV E1 020906)



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

Item number

Mirror head left side/ right side

heated 24 V

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

unheated

56.9065.132	Mirror Head	clamp Ø 20 - 28 mm		R 300
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Item number

Spare parts

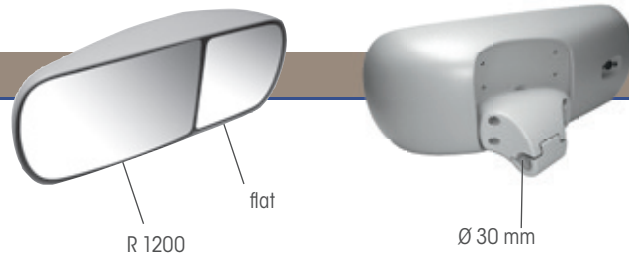
15.9060.870H	Glass unit		heated, 24 V	R 300
15.9060.670F	Glass unit		unheated	R 300
11.9060.100	Cover 906			

Interior Mirror

Components

Interior mirror 256

Material	Plastic mirror housing
Housing	545 x 219 x 227 mm
R 1200 glass unit	324 x 201 x 17 mm
Flat glass unit	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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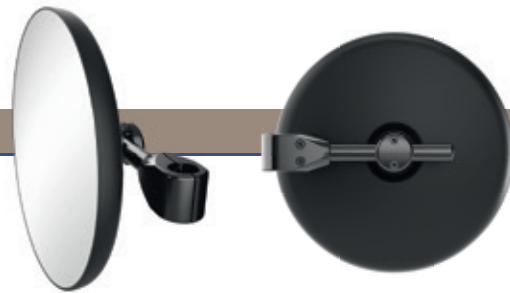
Item number

Spare parts

15.2561.600	Glass unit	unheated	flat
15.2561.640	Glass unit	unheated	R 1200

Interior mirror 300

Material	Mirror housing with profile ring
Housing	Ø 305 mm
Glass	Ø 300 mm



Item number

Configuration

Mirror head

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

51.3000.002.001	Mirror head		R 1800
61.3000.003.010	Mounting bracket	for Ø 30 mm	
61.3000.004.010	Mounting bracket	for Ø 35 mm	

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	1	for tubular bracket Ø 14 - 20 mm	unheated	R 1800
11.1523.212	Holder, universal, black	2	clamp Ø 14 - 20 mm		

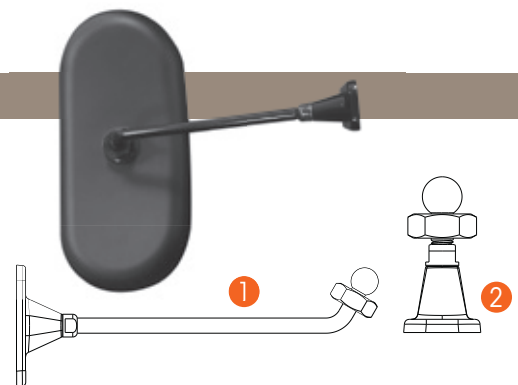
Item number

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

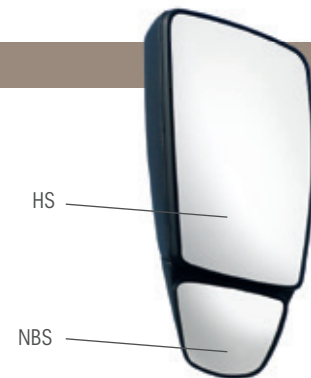
51.7504.044.001	Mirror head		unheated	R 450	
20.7504.044.001	Mounting bracket long	1	For screwing		229,5 mm
20.7504.003.001	Mounting bracket short	2	for gluing		70,7 mm
20.7504.045.001	Mounting bracket medium		For screwing		

Special Application Mirrors

Components

1009

Material	Plastic mirror housing (ABS), black
Clamp	Ø 18 bis 22 mm
Glass HS	255 x 286 mm
Glass NBS	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

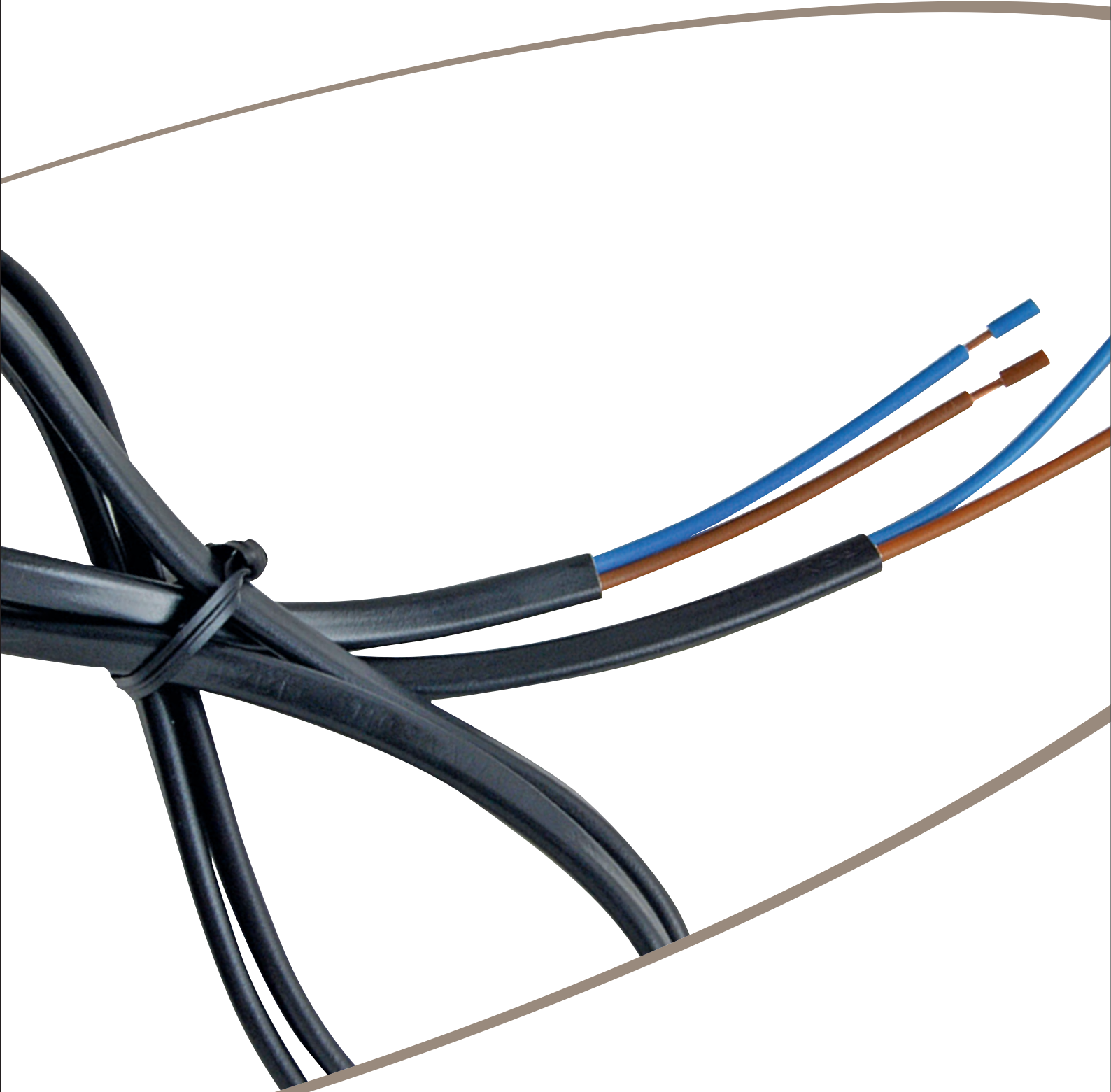
1010

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

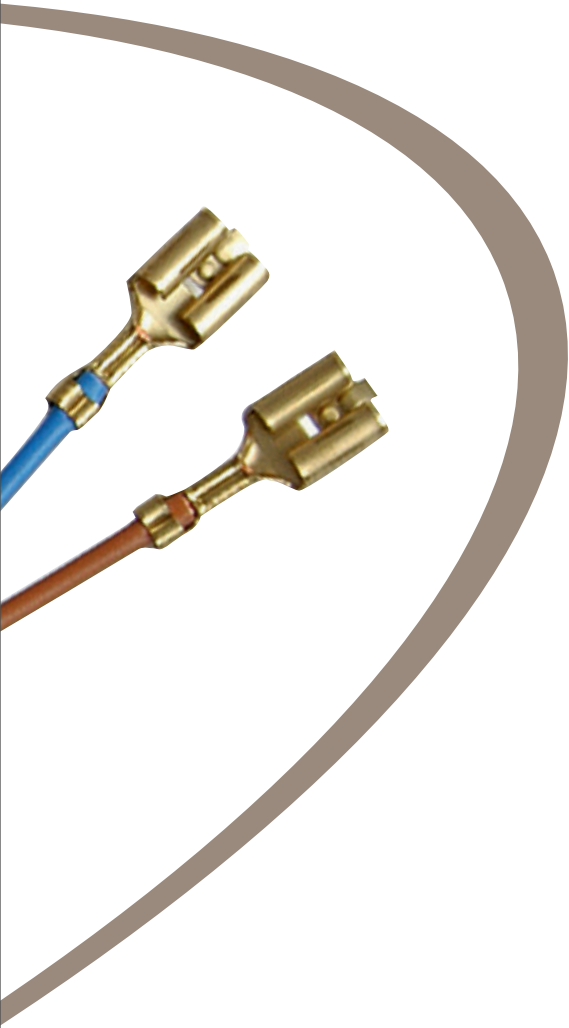


Item number	Assembly	Configuration		
Main mirror for 14 - 20 mm tubular diameter				
51.1010.000.001	left side/ right side	manually adjustable	unheated	R 1200
Main mirror for 18 - 22 mm tubular diameter				
51.1010.001.001	left side/ right side	manually adjustable	unheated	R 1200
51.1010.003.001	left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





Accessories

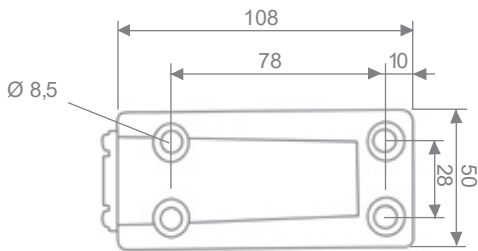


Wedge Mounts	52
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Wedge Mounts

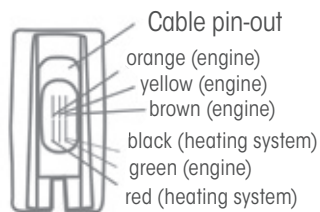
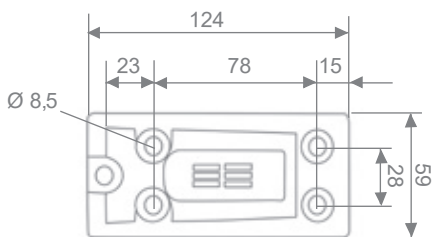
Accessories

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

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

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.





Electronics



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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.**

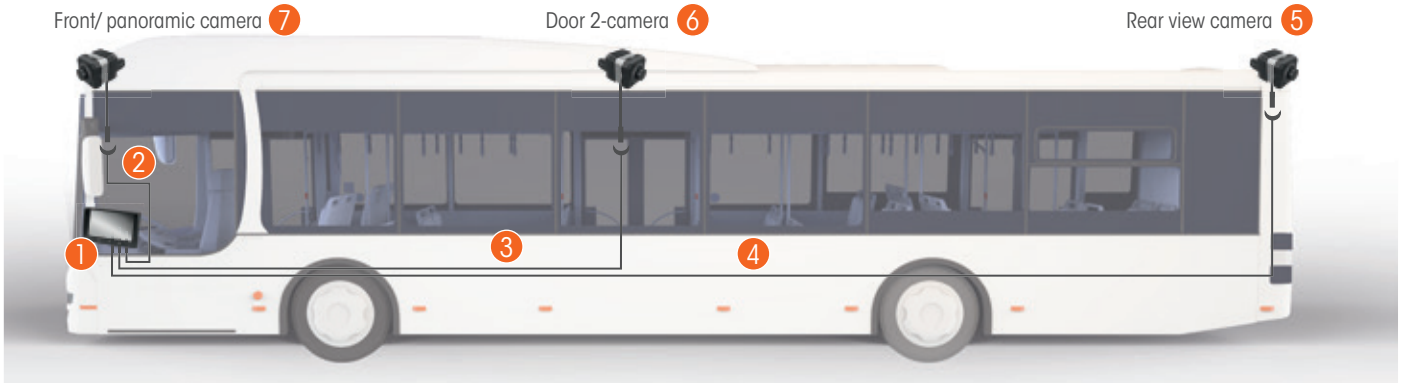
The available image sensors are automotive-grade and offer image resolutions from standard VGA up to 1.2 mega pixels. The image processor is matched to the performance characteristics of the specific image sensor. Transmission technology options include analog PAL or NTSC based video transmission as 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.			Length
MEKRA Lang camera monitor system				
24.1301.501.099	1	MCM-5029	LED TFT-color monitor 7"	
09.1301.003.099	2	MAC-5052	Connecting cable	5,00 m
09.1301.005.099	3	MAC-5054	Connecting cable	16,00 m
09.1301.006.099	4	MAC-5055	Connecting cable	21,00 m
28.1307.011.099	5	MCC-5524	Rear view camera 100° VZA	
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

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



Item number	Aperture angle	
NTSC color camera		
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
PAL color camera		
28.1307.001.099	70°	horizontal
28.1307.002.099	100°	horizontal
28.1307.003.099	120°	horizontal
28.1307.010.099	100°	horizontal low distortion

Ethernet camera 1308

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

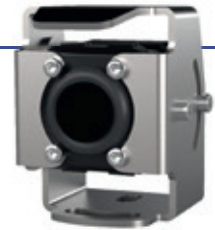
Brackets

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



Item number
11.1307.028.099

Ball bracket

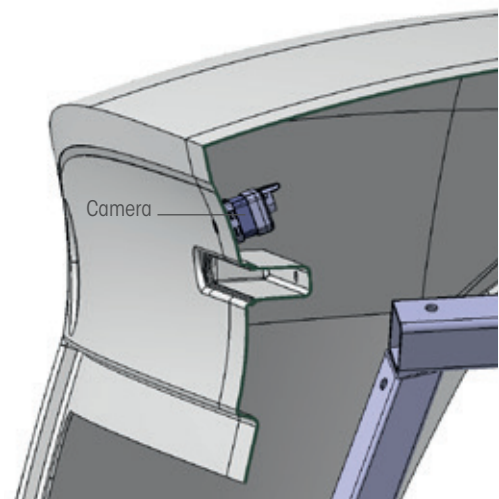
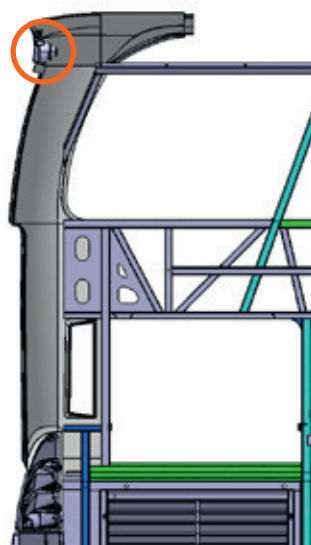
Dimensions 80 x 71 x 42 mm (W x H x D)
Orientation flexible adjusted
Adjustment Thanks to its swivel head design, the camera can be rotated 0° - 360°.
Material ABS plastics



Item number
11.1307.027.099

Example for integration in the back of a bus

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.



Shutter Camera Bracket with Integrated LED Lamp

Camera monitor systems

Shutter camera bracket with integrated LED lamp

Dimensions	114 x 96 x 107 (W x H x D)
Adjustment	Camera is rigid within bracket; for shutter camera bracket mounting positions (see below)
Material	ABS plastics
Operating temperature	-40 °C bis + 85 °C
Operating voltage	12 - 24 V
Protection class	IP 67



Item number

61.1307.014.099	Shutter case	24V
61.1307.015.099	Shutter case	12V

Shutter camera bracket mounting positions



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

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 Cameras 1301

CMOS Camera



Dimensions	65 x 59 x 50 mm (BxHxT)
Operating voltage	10 - 36 V
Operating temperature	-40 °C bis +85 °C
Opening angle	70°/100°/120°/130°
Shock resistance	50 G
Protection class	IP 69 K, dust-tight, resistant to high-pressure cleaners
Plug connection	MEKRA, IP 69 K
Video format	NTSC/PAL (analog)

RoHS FC CE

Heated and extra hardened front glass

Made in Germany

ADR-tested

Item number		Aperture angle
Video format PAL		
28.1301.008.099	CMOS camera 70° PAL	70°
28.1301.002.099	CMOS camera 100° PAL	100°
28.1301.004.099	CMOS camera 120° PAL	120°
28.1301.006.099	CMOS camera 100° PAL low distortion	100°
28.1301.175.099	CMOS camera 100° PAL With distance marking	100°
28.1301.050.099	CMOS camera 130° PAL	130°
Video format NTSC		
28.1301.007.099	CMOS Kamera 70° NTSC	70°
28.1301.001.099	CMOS Kamera 100° NTSC	100°
28.1301.003.099	CMOS Kamera 120° NTSC	120°
28.1301.005.099	CMOS Kamera 100° NTSC low distortion	100°
28.1301.176.099	CMOS Kamera 100° NTSC With distance marking	100°
28.1301.051.099	CMOS Kamera 130° NTSC	130°

Accessories for CMOS cameras

Design holder

Abmessungen	125 x 102 x 73 mm (WxHxD)	Visually appealing design holder
Ausrichtung	flexible adjusted	
Material	ABS plastics	



Item number	
11.1301.018.099	Design holder

CMOS spherical camera 1301

Video system	NTSC or PAL
Image resolution	640 x 480 pixels (W x H)
Image display	NTSC: 720 x 486 pixels (W x H), PAL: 720 x 576 (B x H)
Connector	MEKRA, Ø < 18 mm, ADR-geprüft, (IP 69 K)
Cable	ADR tested, oil and gasoline resistant, 0.5 m
Housing	Pressure-molded aluminum, painted black, dust-proof and resistant to high-pressure cleaning (IP 69 K), heated and extra hardened front glass
Shock resistance	50 G
Min. illumination	Contrast ratio >1:50 at 0.5 lux
Video output	FBAS 1Vpp at 75 Ω
Power consumption	< 1 W (< 3.5 W, with heating system ON)
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +90 °C
Protection class	IP 69 K
Operating voltage	9 - 36 V
Outside dimensions, excluding bracket	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
28.1301.039.099	120°	horizontal
PAL color camera		
28.1301.012.099	70°	horizontal
28.1301.014.099	100°	horizontal
28.1301.038.099	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



Item number

20.5630.400

11.1301.016.099 without E1 number

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



Item number

20.5631.400

11.1301.019.099 without E1 number

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

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



Item number

11.1200.501.099

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



Item number

11.1200.502.099

Magnetic base

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



Item number

20.5640.101

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



TFT color monitors

MEKRA Lang 7" surround view monitor

- Dimensions: 189 x 119 x 44 mm (B x H x T)
- 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 with sun visor, bracket and connection cable



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)



Item number

24.1301.512.099

Surround View Monitor 7

24.1301.501.099

TFT-LCD Monitor Quad 7

Spare parts

Kit with sun visor, holder and connection cable

Kit with sun visor, holder and connection cable

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) Direct connection camera to monitor

Item name Adapter cable
Length 0,5/ 5/ 11/ 16/ 21 m



without grommet



with grommet

Item number	Length		Item number	Length	
09.5610.360	0,5 m	without grommet	09.1307.008.099	5 m	with grommet
09.1301.003.099	5 m	without grommet	09.1307.007.099	11 m	with grommet
09.1301.004.099	11 m	without grommet	09.1307.006.099	16 m	with grommet
09.1301.005.099	16 m	without grommet	09.1307.005.099	21 m	with grommet
09.1301.006.099	21 m	without grommet			

Multikabel MEKRA - MEKRA (m-f) Extension cable

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



without grommet



with grommet

Item number	Length		Item number	Length	
09.5610.111	5 m	without grommet	09.1301.014.099	0,5	with grommet
09.5610.121	11 m	without grommet	09.1307.013.099	5 m	with grommet
09.5610.131	16 m	without grommet	09.1307.012.099	11 m	with grommet
09.5610.141	21 m	without grommet	09.1307.011.099	16 m	with grommet
			09.1307.010.099	21 m	with grommet

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

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.

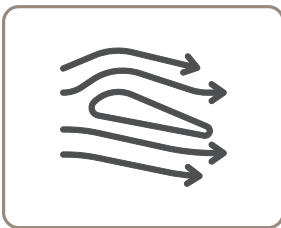
Read on to find out what makes this system so unique and how partnering with us as specialists in the field of electronic vision systems could benefit the development of your future vehicles



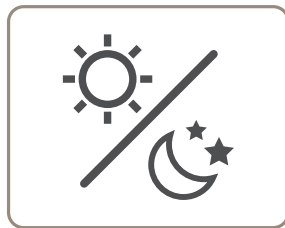
Features

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.



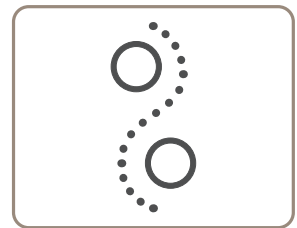
Improved aerodynamics



Perfect vision at day & night

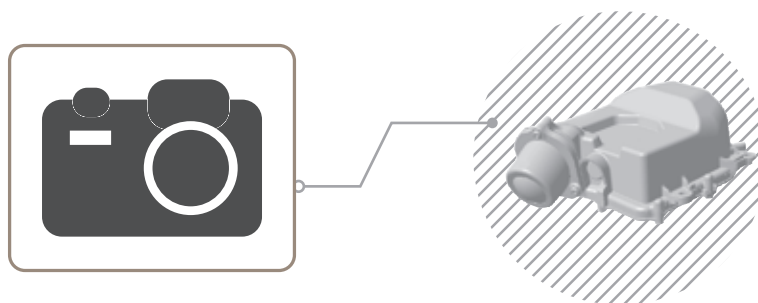


Perfect vision at in rain



Improved ergonomics

Project related applications on request



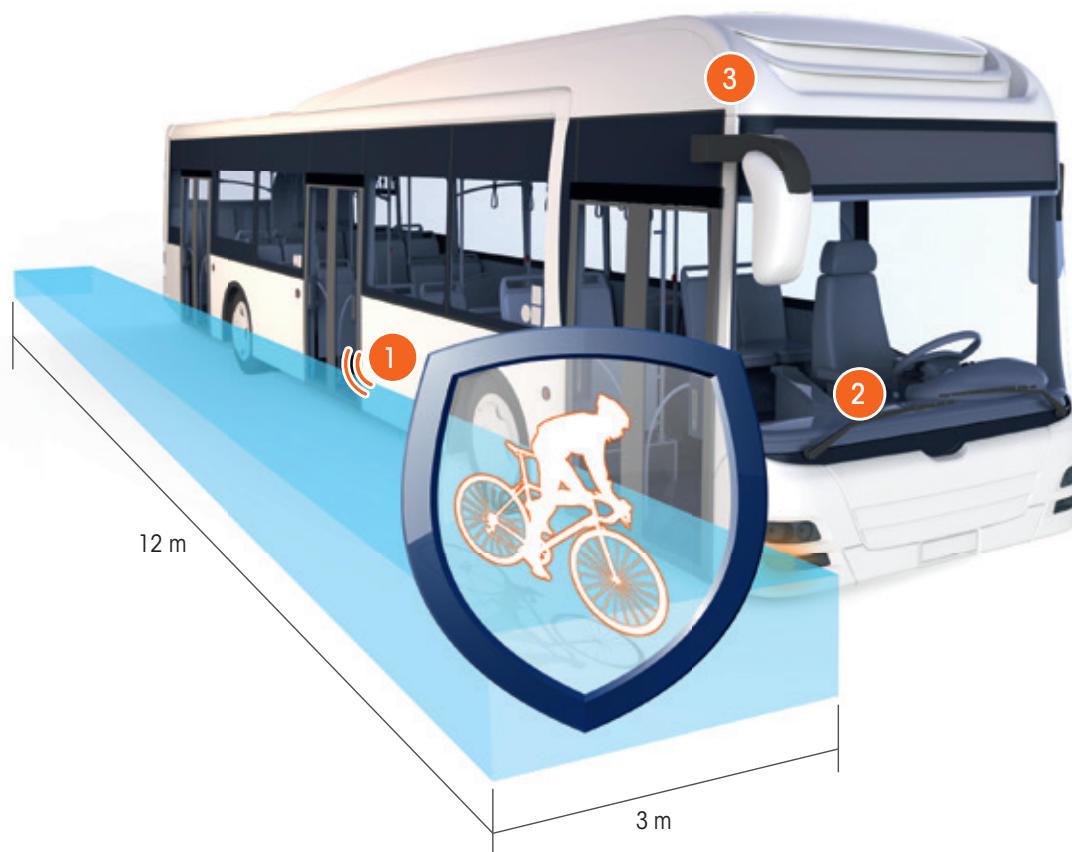
Intelligent and tough

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.



1

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.

2

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.

3

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.

Turn assist system

CAN



Item number

61.1312.001.099

GPS



Item number

61.1312.002.099



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

Intelligent and tough

GPS/ CAN Turn Assist System

Turn assistant 1312

Item number

Turn-off assistant 1312 Kit: Sensor / Display (without connection cable)

61.1312.006.099	System AAS CAN	Sensor/Display	LHD
61.1312.004.099	System AAS GPS	Sensor/Display	LHD
61.1312.005.099	System AAS GPS	Sensor/Display	RHD
61.1312.007.099	System AAS CAN	Sensor/Display	RHD

Item number

Accessories, single components, cables

08.1312.001.099	Sensor CAN		
24.1312.001.099	Display GPS		
24.1312.002.099	Display CAN		
09.1312.006.099	Chassis cable AAS	7,6 m	
09.1312.007.099	Cabin cable AAS	1 m	

For even more safety when turning right

Turn assist 1314 AAS BSIS 151

Features

- Meets the latest guidelines for
- Turn assistants according to UN ECE R151
- 180° Detection without blind spots
- Quick installation
- Establish voltage supply only
- im Standardverbau keine Kalibrierung notwendig
- No calibration necessary in standard shoring
- no vehicle signals necessary
- Suitable for almost all types of vehicles
- Large monitoring area of 70 meters x 4.5 meters
- Registration according to ABE 92031*00 for the type: „ABE 100 ID“ to obtain the possible eligibility of BSIS 151. For example at IBB Berlin.

Side Radar



LED-Display

Integrated Measuring Unit (IMU)

Among other things, the IMU contains sensors for determining speed and direction change. In this way, all the necessary data is determined without any further tapping on the vehicle. Installation is thus considerably simplified.



Spare parts

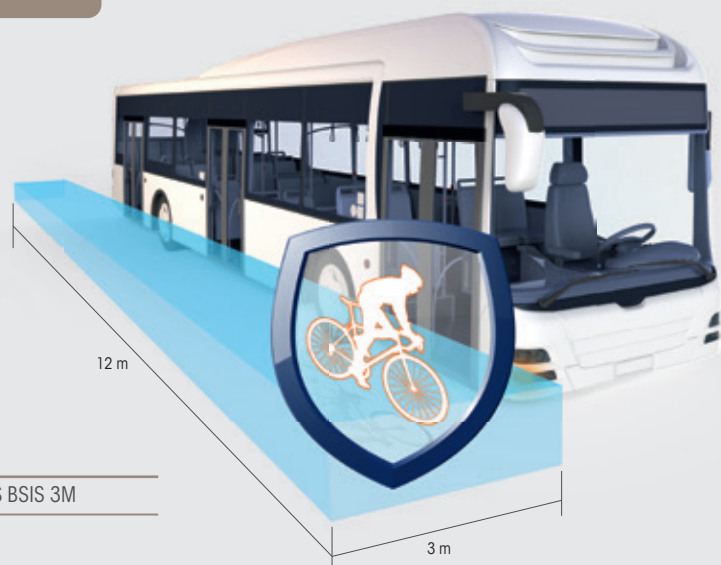
- 180° Side radar
- LED display
- Wiring harness
- Inertial Measurement Unit (IMU)

Warning zone 37 m x 4.5 m

This is divided into three individual zones. The position of the object is thus quickly visible to the driver.

Technical data sensor

Frequency range	76-77 GHz
Coverage	80 m x 7 m
Detection range	70 m x 4,5 m
Warning zone	37 m x 4,5 m
Horizontal angle	180°
Dimensions	115 x 9,5 x 41 mm (B x H x T)
Weight	230 g
Power	7 W
Operating voltage	8 - 32 V
Temperature range	-40 °C bis +85 °C
Protection class	IP 69 K
Vibration resistance	50 G



Item number

09.1314.002.099 Extension line 1314 AAS BSIS 3M

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.



Service



Maintenance and Contact Connections 271 and 248 **82**

Installation Information/ Glass Replacement **83**

Maintenance and Contact Connections 271 and 248

Service

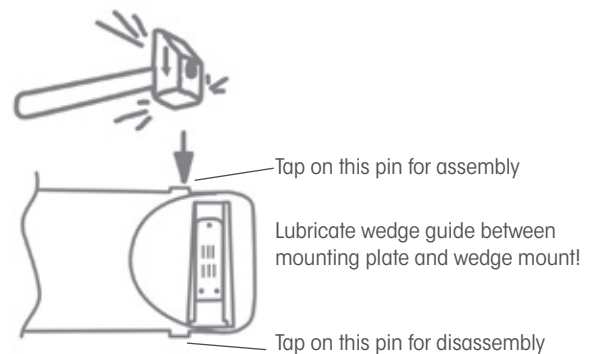
Maintenance and contact connection

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.

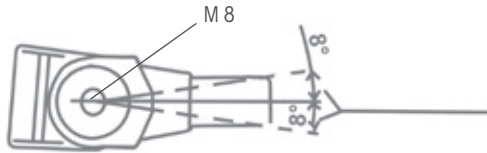
To facilitate assembly or disassembly, use a rubber mallet to lightly tap on the corresponding pins or the mounting base.

Assembly Information/ Glass Replacement

Service

Assembly information for mounting base system 270/ 271

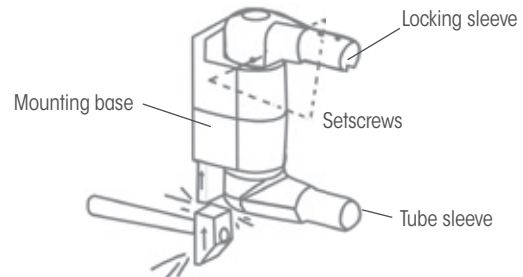
Fine-tuning the tubular bracket angle at the mirror arm pivot point



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:

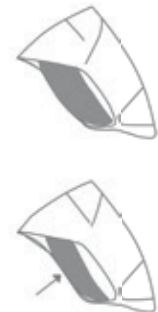
1. Tilt adjustment unit (power/ manual) down
2. Connect heating cable
3. Slide glass unit top-down onto adjustment unit
4. Verify that unit is securely in place



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: 09/ 2020

I. General Provisions

The contractual relationship between us, MEKRA Lang GmbH & Co. KG ("MEKRA Lang"), and our customers ("Purchaser") is governed exclusively by the following General Terms and Conditions, which are intended for purchases by entrepreneurs as such term is defined in § 14 BGB (German Civil Code). Any conflicting or deviating conditions on the part of the Purchaser, even if known to us, shall not become part of the contract. Our offers are always subject to change without prior notice. Our General Terms and Conditions of Sale and Delivery are considered accepted upon placement of the order, at the latest upon receipt of the merchandise. These General Terms and Conditions of Sale and Delivery apply to all ongoing business relationships as well as to all future transactions. Should individual provisions be or become invalid, in whole or in part, it will not affect the validity of the remaining provisions of this contract. In such case, MEKRA Lang and the Purchaser shall effect an arrangement that comes as close as possible to the intended purpose. Until such time, the applicable legal provisions shall apply.

II. Contract Conclusion and Prices

1. By placing an order, the Purchaser bindingly states its intent to buy the merchandise it has ordered, which is valid and binding for a period of two weeks. We have the right to accept the underlying contractual offer within two weeks after receipt thereof. Acceptance will be either by means of an explicit written declaration, or through delivery of the goods to the Purchaser.
2. Contract conclusion is conditional on the correct and timely delivery to us by our suppliers. This only applies in the event that the non-delivery is not attributable to us, in particular, in cases in which congruent hedging transactions are concluded with our own suppliers. The Purchaser will promptly be informed about the non-availability of the merchandise, and the equivalent, insofar as already paid, will be reimbursed immediately.
3. All contractual financial obligations are to be fulfilled exclusively in EURO.
4. Prices are net ex-factory or warehouse. Freight, packaging and import costs, as well as customs duties and any additional applicable taxes are the responsibility of Purchaser.

III. Delivery Times and Obligations

1. Scope, means, and date of the delivery shall be subject to written or electronic confirmation by us. Partial shipments are possible and permitted.
2. Confirmed delivery deadlines shall only be binding provided that there is an undisturbed process of operation and distribution; we shall not be liable for any delays in delivery, or, in the alternative and at our discretion, we shall have the right to cancel deliveries without any obligation for subsequent deliveries in the event of a case of force majeure or other disruptive events occurring either at our facilities, at the facilities of our suppliers, or logistics and transportation contractors (which events include, but are not limited to, operational or transport disruptions, fire, floods, labor, energy, or traffic shortages, strikes, lockouts, government actions, as well as technical or technological situations), and which make the fulfillment of the contract considerably more difficult.
3. If not agreed otherwise, we have the right to deliver earlier than the scheduled delivery time. Furthermore, deliveries of up to two weeks past a confirmed delivery date shall not be considered delayed, except where there is an express agreement to the contrary.
4. Delivery deadlines are considered to be met at the time the merchandise has left the factory or warehouse, or the Purchaser has been notified of our readiness for shipment. Subsequent changes of the contract are sufficient grounds for a reasonable extension of the delivery deadlines.

5. If the performance of a contract is comprised of multiple deliveries, the fact that one delivery was either suspended, defective or delayed does not affect the remaining deliveries under the contract.
6. Default in payment, application for the commencement of insolvency proceedings, submitting a declaration of financial status under § 807 ZPO, temporary cash flow problems, or our knowledge of facts indicating a substantial deterioration of the financial circumstances of the Purchaser shall give us the right, at our sole discretion, to immediately discontinue deliveries, or performance under ongoing contracts. Furthermore, all receivables not yet due shall become payable immediately.

IV. Shipping, Transfer of Risk

1. We have the right, at our sole discretion, to select the packaging, shipping route and method of transportation unless otherwise agreed upon between the Parties.
2. The risk of accidental loss and accidental deterioration of the merchandise shall pass to the Purchaser at the time of delivery, and, in case of mail order purchase, upon delivery of the merchandise to the carrier, or the person or agency named by the Purchaser to carry out the shipment, even if acceptance by the Purchaser is delayed.
3. Merchandise from call orders must be accepted by the Purchaser within three (3) months after issuance of the order confirmation, unless otherwise agreed.
4. We only take out insurance coverage for breakage and transportation risks upon special request, and the costs thereof will be charged to the Purchaser.
5. Customs duties and other expenses, including any expenses incurred to obtain the necessary documents for import into the country of destination, are payable by the Purchaser.

V. Payments and Payment Terms

1. Invoices are payable:
 - within 14 days from invoice date with 2 % discount on the final invoice amount;
 - within 30 days from invoice date without discount.
2. In order to qualify for a discount, all previous payments must have been made on time, either in cash or by bank deposit. The drawing of a bill of exchange does not qualify for a discount on the invoice amount. In case of cash-free payment transactions, in particular if payment is made by check, the date on which the funds are credited to our account shall be determinative. A cash discount will not be given in cases of payment or credit entry with limiting conditions or any other restrictions. The Purchaser assumes the risk of method of payment. Invoices for tools are payable immediately without cash discount.
3. Bills of exchange and checks may be accepted but will only be credited to the account upon receipt of payment in full. 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 Purchaser. We assume no responsibility for submission and protest. Protest imposed against the Purchaser's own bills of exchange or non-immediate repayment of protested external bills of exchange gives us the right to return all bills in circulation. At the same time we have the right to make immediately due and payable those accounts receivable from the Purchaser which are not yet due. Post-dated checks are not accepted.
4. In case of missed payment dates, interest on defaulted payment of 9 % above the discount rate of the German Central Bank according to § 247 BGB shall be payable, as well as default damages in the amount of €40.00 according to § 288 Sec. 5 BGB. We reserve the right to assert additional damages and claims caused by delayed performance.

5. Advance and partial payments are not subject to interest.
6. The Purchaser is only entitled to offset or withhold payment in the event that its counterclaim is undisputed or has been determined to be legally binding. The Purchaser may execute a right of retention only if his counterclaim is based on the same contractual relationship.
7. Customer and invoice numbers must be stated by the Purchaser when paying invoices. Delays or incorrect bookings resulting from failure to do so are payable by the Purchaser.

VI. Retention of Ownership, Factoring

1. Delivered merchandise remains our property until payment of all claims has been received. The Purchaser 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 Purchaser is required to ensure our rights in the case of resale of proviso goods on credit.
2. The Purchaser agrees to transfer at this time its accounts receivables which are based on the resale of the merchandise and which are subject to reservation up to the amount of the invoice. We hereby agree to accept this transfer. Regardless of the assignment, the Purchaser retains the right to collect payment under the condition that it fulfills its responsibilities to us according to the underlying contractual relationship and does not fall into financial decline. Otherwise, the Purchaser must provide the information about the assignment necessary for collection upon our demand and notify its debtors of the assignment. In this case, we reserve the right to collect the accounts receivable ourselves.
3. Any potential finishing or processing of the merchandise sold subject to reservation shall always be considered to be made on our behalf and on our account, without, however, any obligations resulting for us therefrom. In case of processing of proviso goods with other goods, which are not our property, we shall become co-owner of that portion of the resulting product up to the corresponding value of the proviso goods in relation to the other processed goods. Insofar as reference is made to the value of the proviso goods, such value is based on the amount of our own invoice.
4. In the event that the Purchaser acquires sole ownership of the new product according to § 947 Sec. 2 BGB, it is agreed that the Purchaser grants us proportional co-ownership in the value of the processed, attached, or mixed proviso goods, and that it protects these rights free of charge to us.
5. In the event that the proviso goods are being resold, whether in combination with other goods, and regardless whether they are being processed, attached, or mixed, the assignment agreed to above shall be effective only to the extent of the value of the proviso goods that were resold together with the additional goods. We agree to release on demand the securities due to us and, as provided above, when the value exceeds secured payments by 20 %.
6. The Purchaser must immediately notify us and provide the material necessary for an intervention in the event of compulsory execution by third parties against the proviso goods, or against the claims which were assigned in advance. Intervention costs resulting therefrom are payable by the Purchaser.
7. The Purchaser has to adequately insure the merchandise which is sold subject to reservation against fire and burglary and has to provide proof thereof on demand.

VII. Warranty and Claim Periods

1. The warranty period is 24 months from dispatch of the merchandise.
2. We shall first try to remedy a defect or make a substitute delivery, at our discretion. In the event of failure to remedy defects or to make substitute delivery, the Purchaser may

demand rescission of the contract or reduction of the invoiced amount. However, in the event of minor contract violations, in particular if there are only minor defects, the Purchaser shall not have the right of cancellation.

3. The Purchaser must promptly notify us in writing of any obvious defects, but in no event later than seven (7) days after receipt of the goods, and must refrain from any subsequent processing of the protested goods. Otherwise, warranty is excluded. Timely dispatch of the notice shall be sufficient in order to meet the warranty deadline. The full burden of proof for all claim prerequisites rests with the Purchaser, in particular for the defect itself, for the date the defect was noticed, and for the timeliness of the notice 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 their discovery. In the event that the Purchaser decides to withdraw from the contract based on a legal deficiency or a physical defect after a subsequent fulfillment has failed, it shall not have the right to any subsequent or additional claims for compensation for the defective merchandise.
5. In the event a subsequent fulfillment has failed and the Purchaser decides to accept compensation for the damage, the merchandise will remain with the Purchaser if this can reasonably be expected. Compensation is limited to the difference between the purchase price and the value of the defective product. This does not apply if the contract violation was based on fraud.
6. Goods which have been replaced by us become our property and are to be returned to us for refund.
7. Purchaser does not have the right to make claims for damages which are the fault of Purchaser and which are caused by:
 - improper handling or excessive use of the purchased item; or
 - altering the purchased item in an unapproved manner; or
 - not following the assembly instructions or operating manual; or
 - not following the complaint and delivery responsibility according to para. 3 and 4 above; or
 - continued usage of the purchased item after ascertaining the defect.
8. Normal wear and tear is excepted from warranty.

VIII. Liability

1. In case of only slightly negligent violations of the obligations, our liability will be limited to the customary and average amount for foreseeable and immediate damages arising under this contract, and which are typical for the merchandise in question. This also applies to slightly negligent violations of the duties of our legal representatives or employees. We are not liable for slightly negligent violations of nonessential contract obligations.
2. The liability by virtue of warranted properties as well as due to product liability remains unaffected; the same applies to events of bodily harm or health impairment attributable to us, or in the event of loss of life by the Purchaser.
3. Compensation claims by the Purchaser based on a defect shall expire after one (1) year from the delivery of the merchandise to the Purchaser. This does not apply in cases of gross negligence as well as in cases of bodily harm or health impairment attributable to us, or in the event of loss of life of the Purchaser.

IX. Returns

Generally, properly ordered and delivered goods are not returnable, except as otherwise agreed with us. In addition, the following conditions apply:

1. The products must have been acquired directly from us or from one of our warehouses.
2. The goods must be in perfect and unaltered condition.

3. Generally, returns are only accepted as long as the products are still part of our delivery program.
4. Return shipment must be „free house“ to our Ergersheim facility or to the appropriate warehouse, together with the accompanying delivery note date and number. Value reduction for returns:
 - within in the first year after delivery date /. 10 % of the contract price;
 - within the second year after delivery date /. 25 % of the contract price;
 - between the 3rd & the 5th years after delivery date /. 50 % of the contract price;
 - merchandise over five years old: no returns accepted

Upon receipt of the returned articles, we shall perform a technical inspection, and, if applicable, a credit shall be given, subject to possible reduction in value. The remaining value shall be reduced by any freight costs for the initial shipping incurred by us.

X. Industrial Property Rights

1. For custom-made articles, which the Purchaser has ordered from us, the Purchaser has the obligation to ensure that they are not infringing upon the property rights of any third parties, and shall indemnify and hold us harmless against any possible claims of third parties therefor. Purchaser shall reimburse us for any damages resulting from a violation of said obligations.
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 Purchaser has received, shall remain our intellectual property.

XI. Export Control

1. The Purchaser shall comply with the applicable provisions of national and international (re-) export control laws when passing on the goods (hardware and/or software and/or technology and associated documentation, irrespective of the manner in which they are made available), or the work and services provided by us (including technical support of any kind) to third parties in Germany and abroad. In any event, the Purchaser shall observe the (re-) export control regulations of the Federal Republic of Germany, the European Union, and the United States of America.
2. To the extent necessary for export control checks, the Purchaser shall, upon request, immediately provide us with all information about the final recipient, final destination and intended use of the goods delivered by us or the work and services provided by us as well as any applicable export control restrictions.
3. Purchaser shall indemnify and hold us harmless from and against any claim, proceeding, action, fine, loss, cost, and damages arising out of or relating to, any noncompliance with export control regulations by Purchaser, and Purchaser shall compensate us for all losses and expenses resulting therefrom, unless such noncompliance was not caused by any fault of the Purchaser.

XII. Place of Fulfillment and Jurisdiction, Additional Provisions

1. In general, our product description sets forth the condition and quality of the goods. Public statements, sales talks, or advertisements in deviation thereof do not represent a contractual description of the quality or condition of the goods. Samples and specimens are intended as approximate illustrative articles for quality, measurements and color only, and no legal claims may be inferred therefrom. Technical changes as well as alterations in shape, color, and/or weight are possible within the expected scope.
2. In the event that the Purchaser receives a deficient assembly instruction, we shall only be obligated to provide

the correct assembly instruction, and only if and to the extent that the faulty assembly instruction prevents proper assembly.

3. The Purchaser does not receive warranties in the legal sense from us; warranties of the manufacturers will remain unaffected therefrom.
4. Place of fulfillment for our deliveries ex works is the delivery factory, for delivery ex storage the warehouse. Place of fulfillment for all payments is Ergersheim/ Bavaria, Germany.
5. The exclusive place of jurisdiction for all litigation resulting from this contract is Nuremberg/Bavaria, Germany. This also applies to litigation based on a cheque or bill of exchange.
6. The Law of the Federal Republic of Germany governs these provisions. The application of the United Nations Convention on Contracts for the International Sale of Goods of April 11, 1980 shall be excluded.
7. The special terms of our products published with the appropriate price lists apply as well.
8. The Purchaser is responsible for examining the suitability of the goods for their intended use.

The protection of your privacy is important to all of us at MEKRA Lang Group. For further information about the processing of your personal data, please follow the link <https://www.mekra.de/de/impressum/datenschutz-im-unternehmen>.

MEKRA Lang - passion for excellence.

Headquarters

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