The New Zetros

Introduction into Service Manual for Model Series 949

Mercedes-Benz

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Introduction into Service Manual
for Model Series 949

Daimler AG · Technical Information and Workshop Equipment (GSP/OI) · D-70546 Stuttgart

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Contents

Dear Reader,

This Introduction into Service Manual presents the new Zetros, model series 949.

The purpose of this brochure is to acquaint you with the technical highlights of these vehicles in advance of their market launch. This brochure is intended to provide information for people employed in service, maintenance and repair as well as for aftersales staff. It is assumed here that the reader is already familiar with the Mercedes-Benz model series currently on the market.

In terms of the contents, the emphasis in this Introduction into Service Manual is on presenting new and modified components and systems.

This Introduction into Service Manual is not intended as an aid for repairs or for the diagnosis of technical problems. For such needs, more extensive information is available in the Workshop Information System (WIS) and in the Diagnosis Assistance System (DAS).

WIS is updated monthly. Therefore, the information available there reflects the latest technical status of our vehicles.

This Introduction into Service Manual presents initial information relating to the new Zetros in model series 949 and, as such, is not stored in WIS. The contents of this brochure are not updated. No provision is made for supplements.

We will publicize modifications and new features in the relevant WIS documents. The information presented in this Introduction into Service Manual may therefore differ from the more up-to-date information found in WIS.

All information relating to specifications, equipment and options is valid as of the copy deadline in August 2008 and may therefore differ from the series production configuration.

Daimler AG

Technical Information
and Workshop Equipment (GSP/OI)

Models and major assemblies

Zetros	1833A	2733A
Model series	949.016	949.066
Type of drive	4x4	6x6
Engine OM 926 LA	926.935[1)] 926.947[2)]	926.935[1)] 926.947[2)]
9-speed manual transmission G131-9 with hydraulic-pneumatic power shift (HPS)	715.570	
Transfer case VG 1700-3W	750.861	
Clutch	Single-plate clutch dia. 395 mm	
Front axle	AL7/56 DS-9 730.115	
1st rear axle	HL7/56 DS-13 748.270	HD7/56 DS-13 748.271
2nd rear axle	–	HL7/56 DS-13 748.270
Steering	LS 8 BK 765.821	
Brakes	Drum brakes	
Wheel suspension	Leaf springs	
Tires/rims	14.00 R20/10.00 V20	

1) Euro 3 emissions standard
2) Euro 5 emissions standard

Cab-behind-engine vehicles with all-wheel drive

With the Zetros, Mercedes-Benz is continuing its tradition of cab-behind-engine vehicles with all-wheel drive.

The new cab-behind-engine vehicles with all-wheel drive from Mercedes-Benz are designed to meet the following requirements of a modern special-purpose vehicle:

- Reliable handling characteristics on all types of road and off-road
- Safe and ergonomic controls
- Suitable for special deployments and specialized transport tasks
- Suitable for worldwide deployment in all climate zones
- Occupant protection
- Tactical and strategic mobility
- Large ground clearance with a large ramp breakover angle and large approach/departure angles for excellent off-road capability

As the first example of the new generation of cab-behind-engine vehicles with all-wheel drive, the Zetros naturally benefits from all of the other advantages of the cab-behind-engine vehicle concept:

- Well-balanced load distribution for optimal handling characteristics and steering ability
- Low overall height to facilitate transport by rail or air, provide a low clearance height and allow easy entry/exit by occupants
- Easy access to engine and ancillary assemblies for maintenance and repair
- On military version, optimized distribution of weight of armor over front and rear axles to maintain maneuverability and load reserves for best possible protection

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Technical design

The new Zetros meets the specific requirements of the current market and is based on tried-and-tested mass-production technology.

Proven components from the Actros, Atego and Axor model series have been used on this vehicle to ensure that general customer requirements for quality, cost-efficiency and worldwide support can be met.

The new vehicle concept, particularly the redesigned cab, allows the vehicle to meet the specific requirements placed on a modern special-purpose vehicle.

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Zetros 1833A Front view

W00.10-1049-00

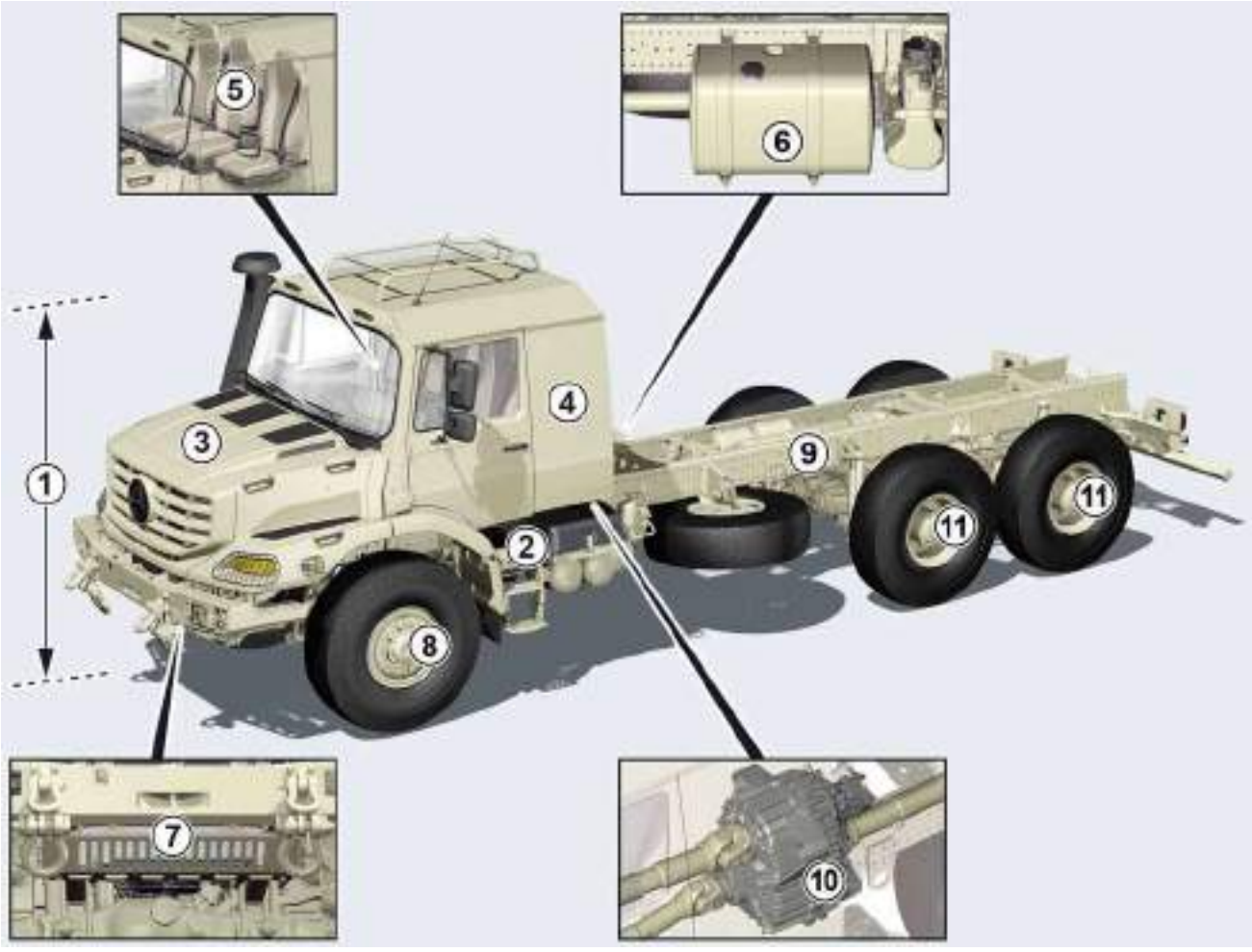
Zetros 1833A Rear view

W00.10-1050-00

Zetros 1833A Side view

Overview of the most important product features

① Low vehicle height
② Low entry/exit height
③ Cab-behind-engine concept
④ Medium-long cab
⑤ Full-size three-seater with unhindered movement between seats (no engine tunnel)
⑥ Fuel tank with 300 l capacity
⑦ Underride guard for radiator
⑧ Planetary front axle with differential lock
⑨ Reinforced frame
⑩ 2-speed transfer case with permanent all-wheel drive
⑪ Planetary rear axle with differential lock



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Cab concept

The cab has been developed with particular attention paid to ergonomics and safe and uncomplicated use/operation. The main features are:

- Fixed cab with "3-point mounting"
- Engine hood and roof (optional) can be walked on
- Easy and safe entry/exit
- Modern adjustable seats
- Ergonomic positioning and design of controls and displays/indicators
- Spacious cab design for three persons with stowage space for equipment
- Good visibility and overall view
- Low-noise interior

W60.80-1135-00

Engine hood

The engine hood can be tilted forwards to allow direct access to the engine and all maintenance items. All of the maintenance items are located under the hood and are easily accessible. This has the following advantages:

- Rapid and simple access to engine and ancillary assemblies
- Cab unloading is not necessary
- Occupants can remain in the cab
- Radio and weapons systems can be used without limitation

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Interior compartment

The spacious interior compartment is equipped with three full-size adjustable individual seats with enough room for a 3-man crew and their equipment.
The dashboard has been taken over from the Atego/Axor with its tried-and-tested ergonomic positioning of controls and displays/indicators.

W68.00-1009-00

W68.00-1010-00

W68.00-1008-00

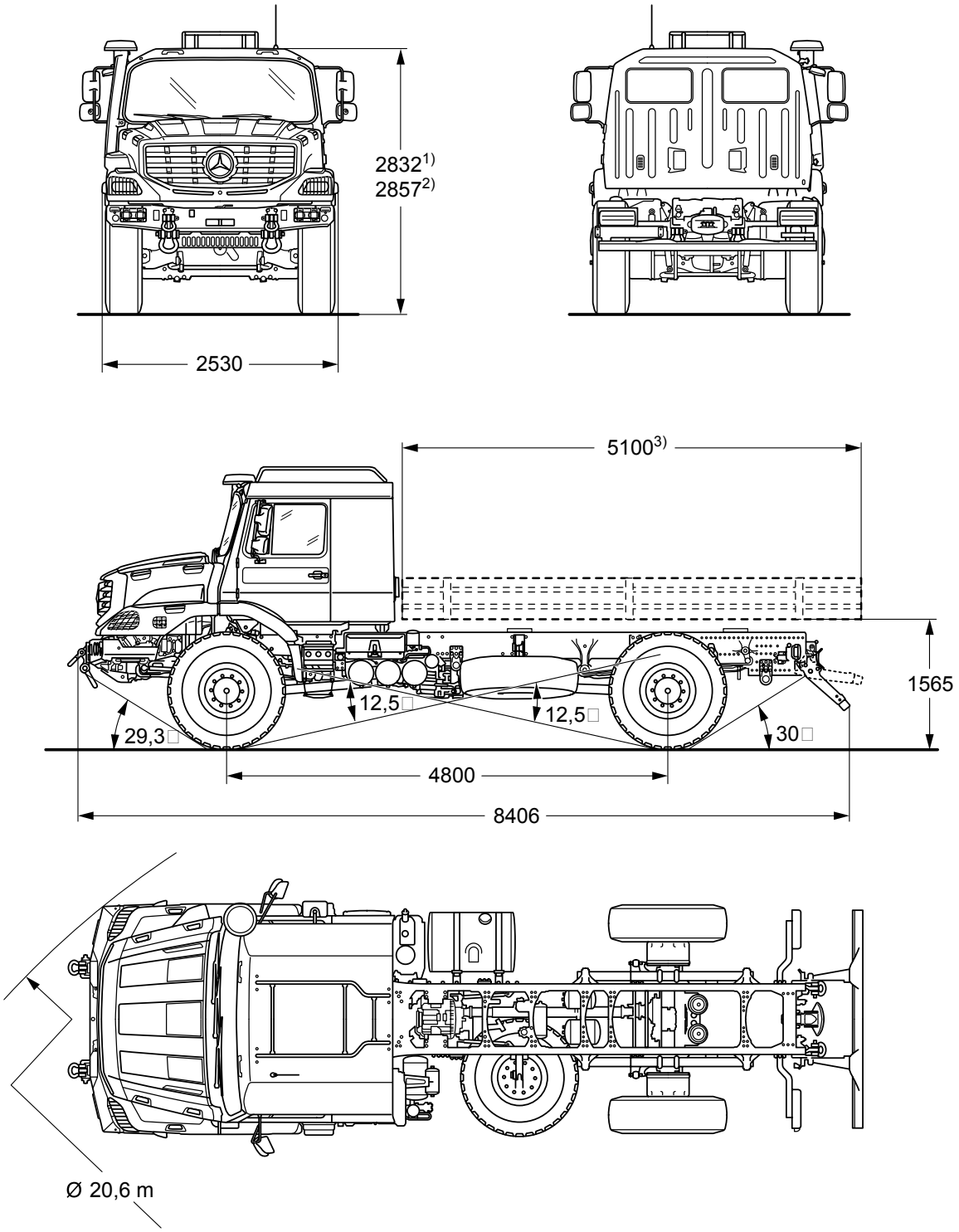
Zetros		1833A 4x4	2733A 6x6
Dimensions			
Wheelbase	mm	4,800	4,750 + 1,450
Length (without body)	mm	8,406	9,574
Width (without body)	mm	2,530	2,530
Height (unladen up to roof) Load variant FA 7.5 t Load variant FA 9.0 t	 mm mm	 2,832 2,857	 2,832 2,857
Standard platform (l/w/h)	mm	5,100/2,450/500[1)]	6,200/2,450/500[1)]
Approach angle (under rated load)		29.3°	29.3°
Departure angle (under rated load)		30°	35.2°

[1)] *Other dimensions supplied upon request*

Zetros		1833A 4x4	2733A 6x6
Dimensions and weights			
Curb weight (without body)	kg	8,600	10,500
Permissible gross vehicle weight	kg	16,500 (18,000)[2)]	25,000 (27,000)[3)]
Military payload (without body)	kg	4,000-6,000	7,000-10,000
Permissible front axle load	kg	7,500 (9,000)[2)]	7,500 (9,000)[3)]
Permissible rear axle load	kg	9,000[4)]	2x9,000[4)]
Electrical system	V	24	24
Tank capacity	l	300	300
Turning circle	dia. in m	20.6	22.8
Standard fording depth With special equipment	mm	800 1,195 and 1,500	800 1,195 and 1,500

[2)] *Load variant 18 (9.0/9.0) possible, then payload up to 6000 kg depending on equipment*
[3)] *Load variant 27 (9.0/9.0/9.0) possible, then payload up to 13000 kg depending on equipment*
[4)] *Depending on tires/rims*

Dimensions



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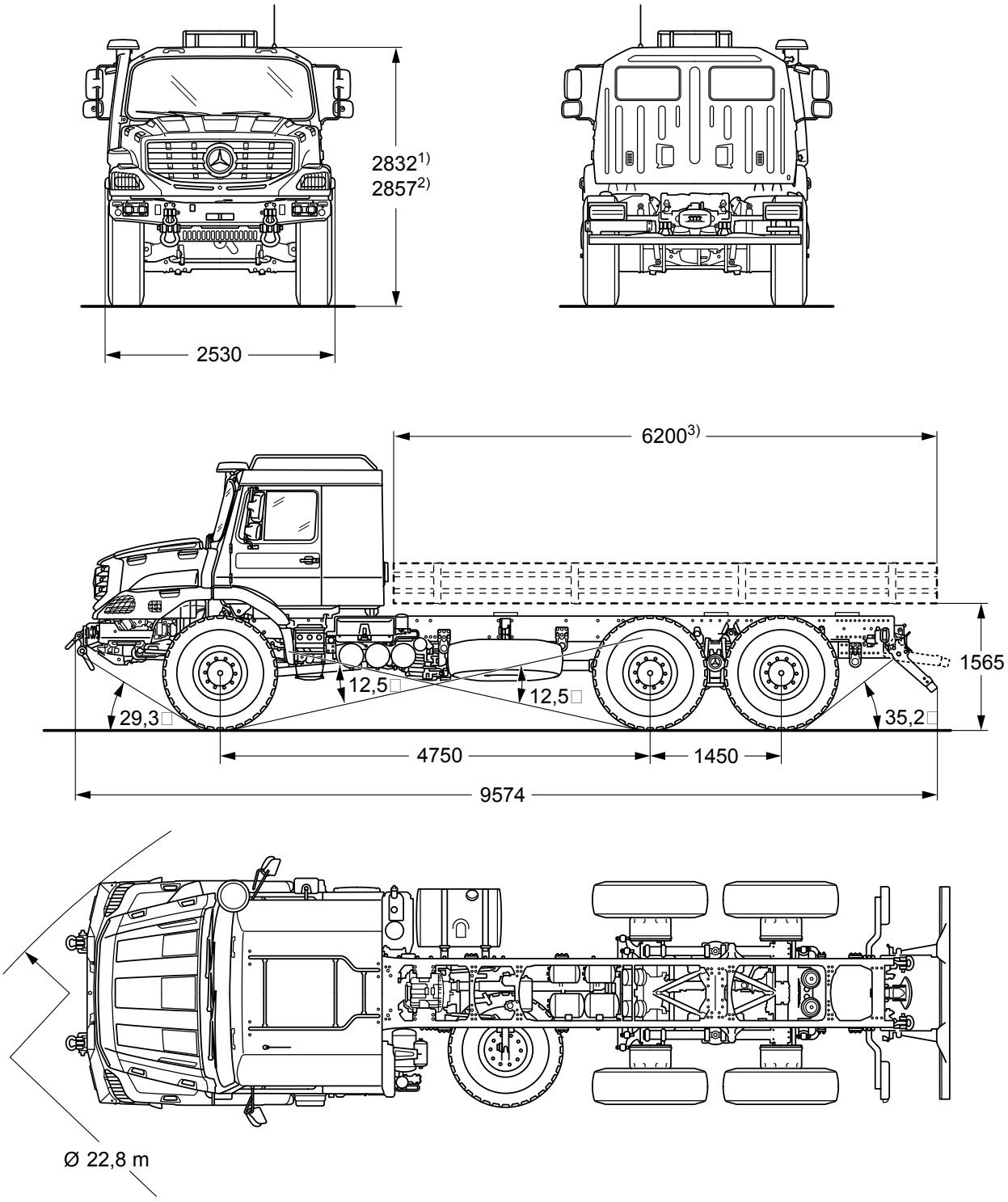
Dimensions of Zetros 1833A (4x4)

1) *Load variant 16.5 (7.5/9.0)*
2) *Load variant 18 (9.0/9.0)*
3) *Standard platform 5,100/2,450/500 (l/w/h in mm)*
Other dimensions upon request



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Dimensions of Zetros 2733A (6x6)

1) *Load variant 25 (7.5/9.0/9.0)*
2) *Load variant 27 (9.0/9.0/9.0)*
3) *Standard platform 6,200/2,450/500 (l/w/h in mm)*
Other dimensions upon request

Transport by air and rail

Due to its compact vehicle contour, the Zetros is suitable for transport by air and rail.

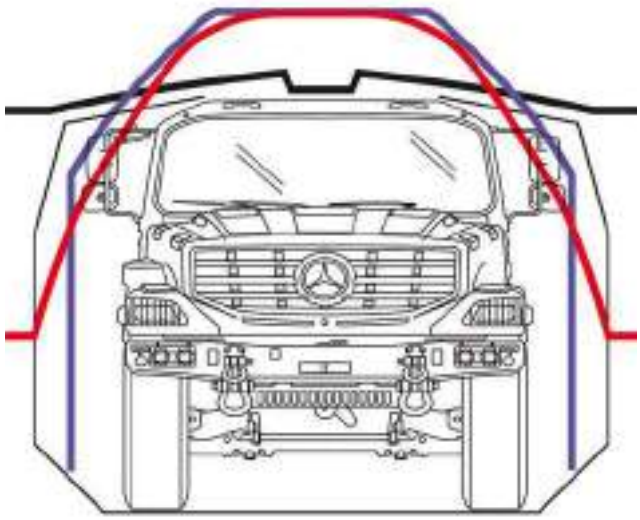
When transported on a Hercules C 130, the following preparatory measures must be performed to allow the vehicle to be loaded:

- Lowering of tire pressure
- Clamping down of front axle
- Removal of air intake and roof attachments
- Removal of spare tire
- Adjustment of tank contents

International rail dimension (GICS): Wagon height 1,300 mm, identical to cargo area of C 160 Transall

German rail dimension : Wagon height 1,300 mm

Cargo area of Hercules C 130



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Body variants

The various body variants are mounted on a torsion-free intermediate frame. The body is raised by approx. 100 mm by the intermediate frame.

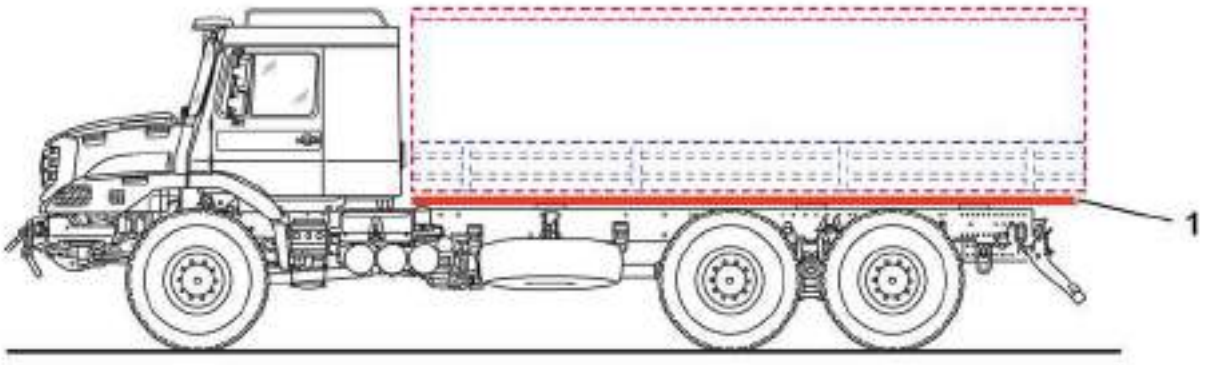
The following variants are possible:

- Platform
- Platform with crane (crane remains within cab contour in transport position)
- Tanker body
- Container

The intermediate frame isolates the body from the torsional forces transmitted into the vehicle frame by the suspension system.

This has the following advantages:

- Body and load protected from damage during transport
- Extremely high degree of axle articulation when off-road
- Greater comfort of vehicle occupants during team transport



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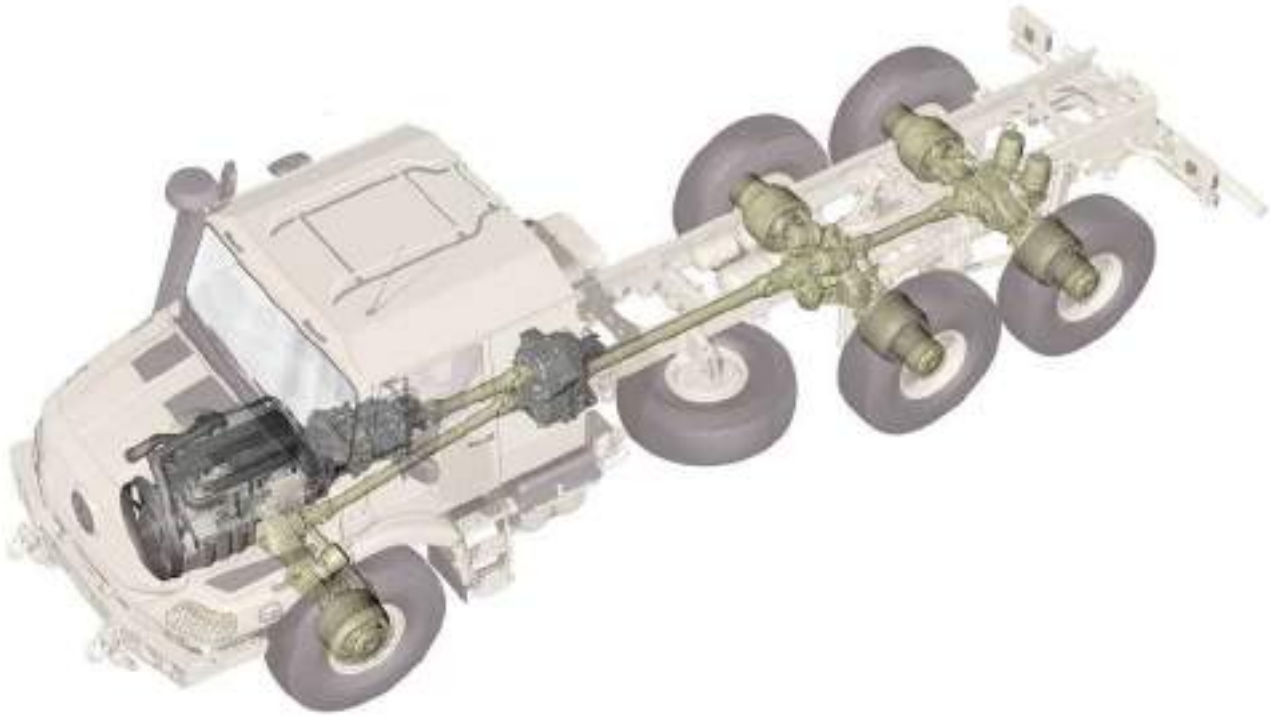
Zetros 2733A

1 Intermediate frame

Overall concept

The drivetrain of the Zetros has been taken over from the Atego/Axor and consists of the following components:

- 6-cylinder inline diesel engine with charge air cooling
- Standard 9-speed synchromesh transmission with hydraulic-pneumatic power shift (HPS)
- 2-speed transfer case
- Permanent all-wheel drive
- Planetary axles
- Differential locks (interaxle and interwheel locks)



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Drivetrain of Zetros 2733A (6x6)

Engine OM 926 LA

Diesel engine OM 926 LA is used as the drive assembly.

Features:

- 6-cylinder inline engine with turbocharger and charge air cooling
- Maximum output: 240 kW/326 hp
- Maximum torque: 1,300 Nm
- 3 valves per cylinder
- Displacement: 7,200 cm^3
- Pump-Line-Nozzle (PLD)
- Water cooling
- Engine management by fully electronic Telligent® engine control system
- Euro 3 and Euro 5 engine versions

Note

The engine can be used at max. 2,500 m above sea level without any reduction in output.

Note

The engine can be operated on low quality fuel or kerosene.

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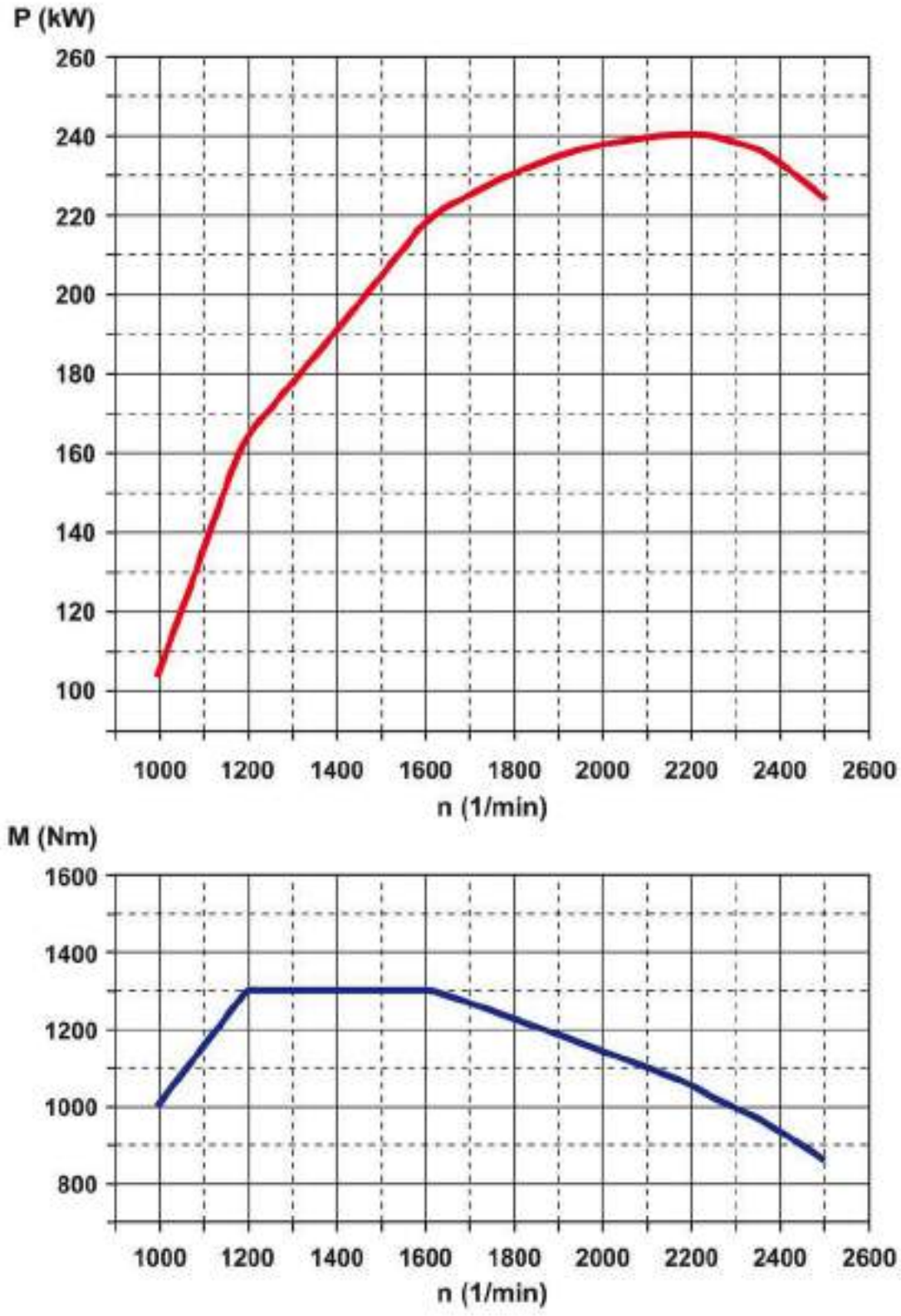
Engine OM 926.947

Power curves

Performance graph



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P *Engine power (kW)*
M *Torque (Nm)*
n *Rotational speed (rpm)*

Engine data

Zetros		1833A 2733A
Engine data		
Engine model designation		926.935[1)] 926.947[2)]
Engine designation		OM 926 LA
Engine configuration/no. of cylinders		Inline 6
Displacement	cm^3	7,200
Output	kW at rpm	240 2,200
Torque	Nm at rpm	1,300 1,200-1,600
Compression ratio		1:17.75
Injection pressure	bar	up to 1,800[1)] up to 2,200[2)]
Peak combustion pressure Injection nozzles	bar	170[1)]/190[2)] 5-hole[1)]/9-hole[2)] Centrally positioned
Exhaust aftertreatment as per Euro 5		
Optimized selective catalytic exhaust aftertreatment (SCR)	Euro 5	SCR catalytic converter with AdBlue®

[1)] *Euro 3 emissions standard* [2)] *Euro 5 emissions standard*

Manual transmission G 131-9

Transmission G 131-9 is a direct drive transmission with 8 synchronized forward gears, a constant mesh crawler gear and a reverse gear. It is designed as a 4-speed main transmission with pneumatic range group. Shift operation is hydraulic-pneumatic.

Gear ratio spread: 14,573 - 1.0

Gear ratio:

Crawler gear =	14,573
Reverse gear =	13,862
1st gear =	9,478
2nd gear =	6,635
3rd gear =	4,821
4th gear =	3,667
5th gear =	2,585
6th gear =	1,810
7th gear =	1,315
8th gear =	1,000

W26.10-1120-00

Manual transmission G131-9/14.573-1

Features

- Three-shaft transfer case with on-road ratio, off-road ratio and engageable interaxle differential lock
- Drive via planetary gear differential
  - Front axle drive via sun gear
  - Rear axle drive via ring gear
- Torque distribution between front and rear axle(s)
  - In differential: 1:3.21
  - With differential lock engaged: 1:1

The on-road/off-road ratio can be engaged with the vehicle stationary. The transfer case is switched via a rotary switch on the dashboard.

W28.10-1075-00

Transfer case VG 1700-3W

Frame

The frame of the vehicle is based on the straight frame of the Actros for construction site vehicles.
The frame is designed as a ladder-type frame with open C-profile longitudinal members and crossmembers with inside reinforcements.

The reinforced front end of the frame is screwed in and enables the attachment of front-mounted implements and raising of the vehicle for towing purposes.

The underride guard at the rear end is hinged and can be locked in the upper or lower end position.

W31.00-1068-00

Hinged underride guard

W31.00-1067-00

Frame of Zetros 2733A

Features

- Axle suspension with longitudinal leaf springs
- Stabilizer bars and dampers set up for off-road deployment
- Variants with adjusted axle loads available

Benefits

- Robust and maintenance free
- Long spring travel
- Good on-road handling characteristics combined with high off-road capability
- High ride comfort

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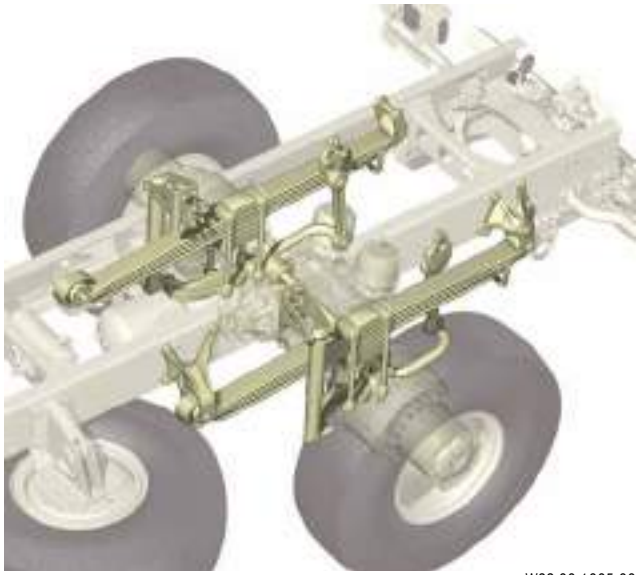
Front axle suspension springing



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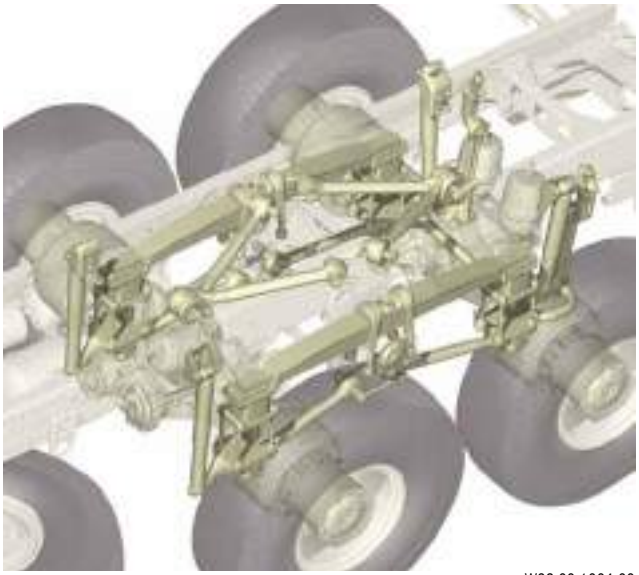
Rear axle suspension springing (Zetros 1833A)



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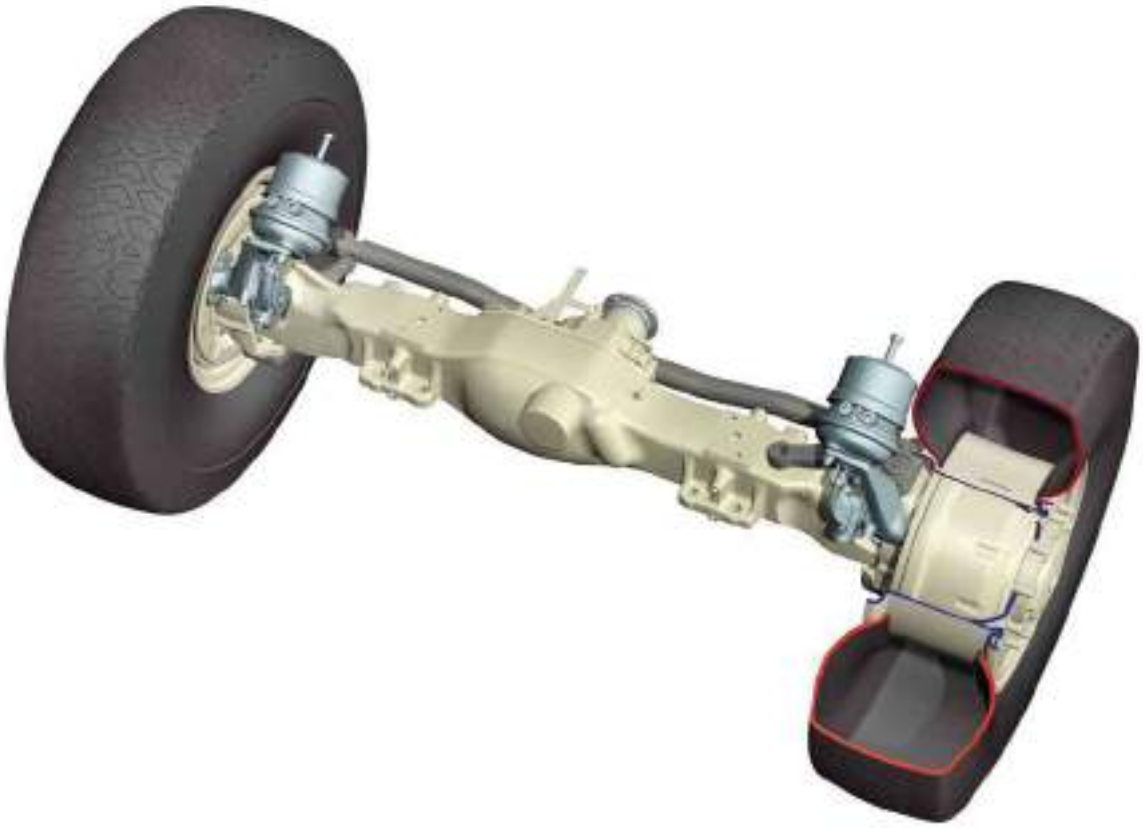
Rear axle suspension springing (Zetros 2733A)

Front axle

Features:

- Standard front axle with 7.5 t load capacity (load variant 9.0 t available as special equipment)
- Driven planetary axle with differential lock
- Differential
- Planetary gearing in every wheel hub
- Ring gear with dia. 233 mm
- Drum brakes



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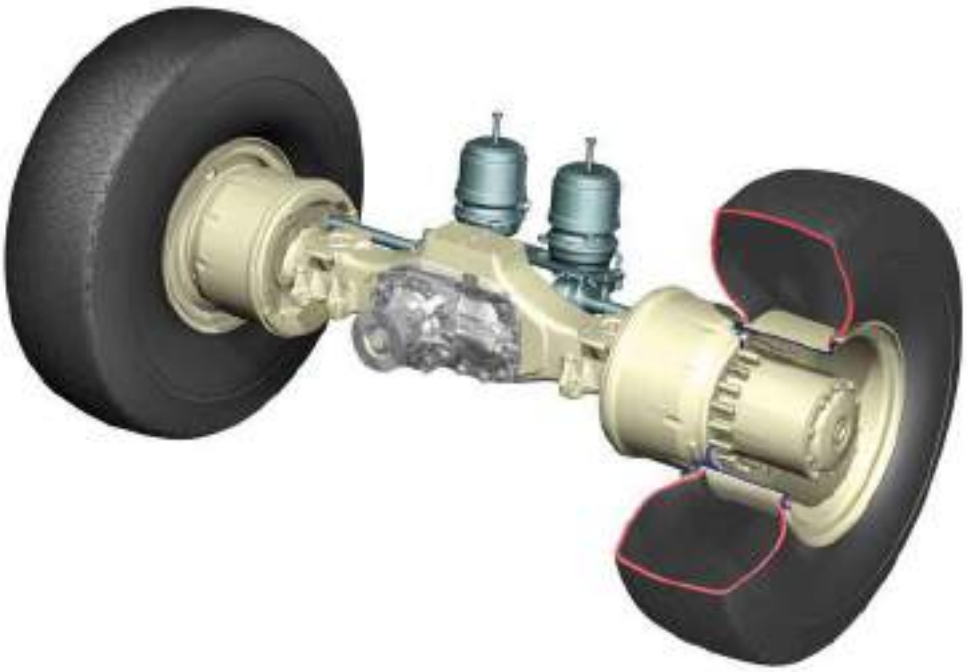
Front axle AL7

Features:

- Standard rear axle with 13.0 t load capacity
- Driven planetary axle with differential lock
- Differential
- Planetary gearing in every wheel hub
- Ring gear with dia. 233 mm
- Drum brakes
- Through-drive (only rear axle HD7)



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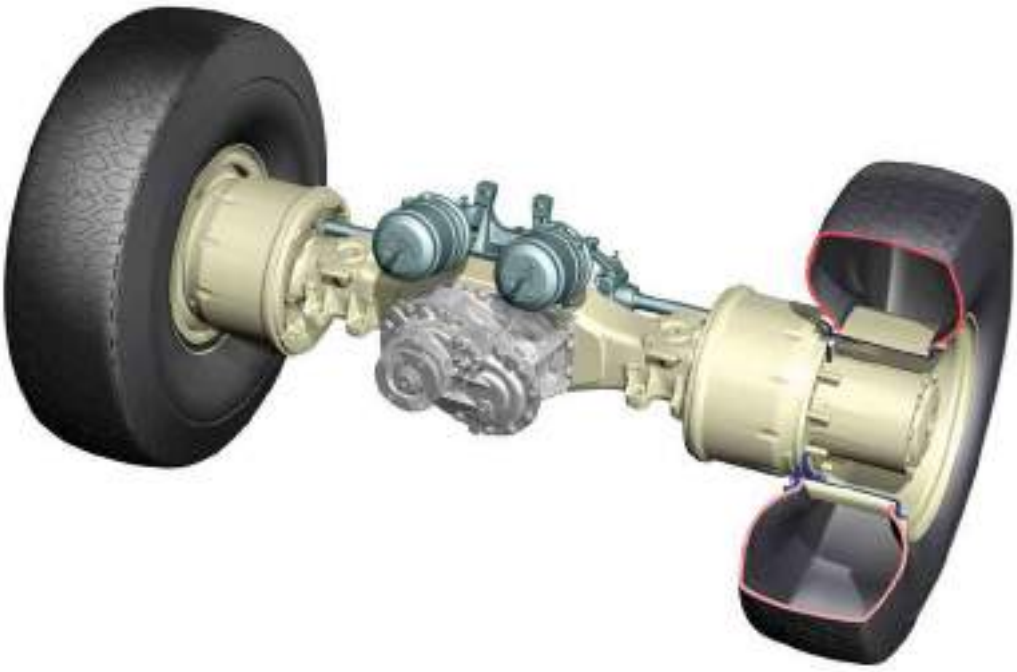
Rear axle HL7



W35.10-1034-00

Rear axle HD7 with through-drive (Zetros 2733A)

Tires

Standard tires

The following special equipment is available:

- Emergency spare wheel 14.00 R20
- Tire pressure control system

Technical data 14.00 R20 164 XZL	
Max. width	400 mm
Max. outside diameter	1,274 mm
Rims	10.00
Chafer	310-20LB
Load capacity per axle	9,000 kg
Air pressure	7 bar
Maximum speed	90 km/h

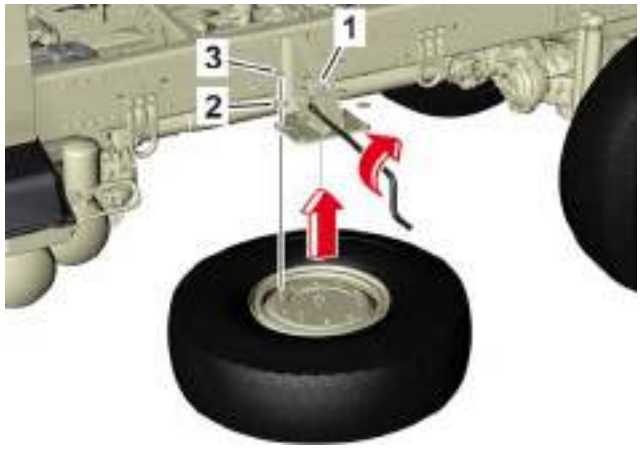
Spare tire

The spare tire, size 14.00 R20, is located on the left-hand side of the vehicle under the frame. This positioning does not impair the ground clearance or ramp breakover angle of the vehicle.

W40.10-1015-00

Spare tire lifter

The spare tire is lifted up to the bracket using a manual hand winch and secured in place using nuts and washers.



W40.10-1016-00

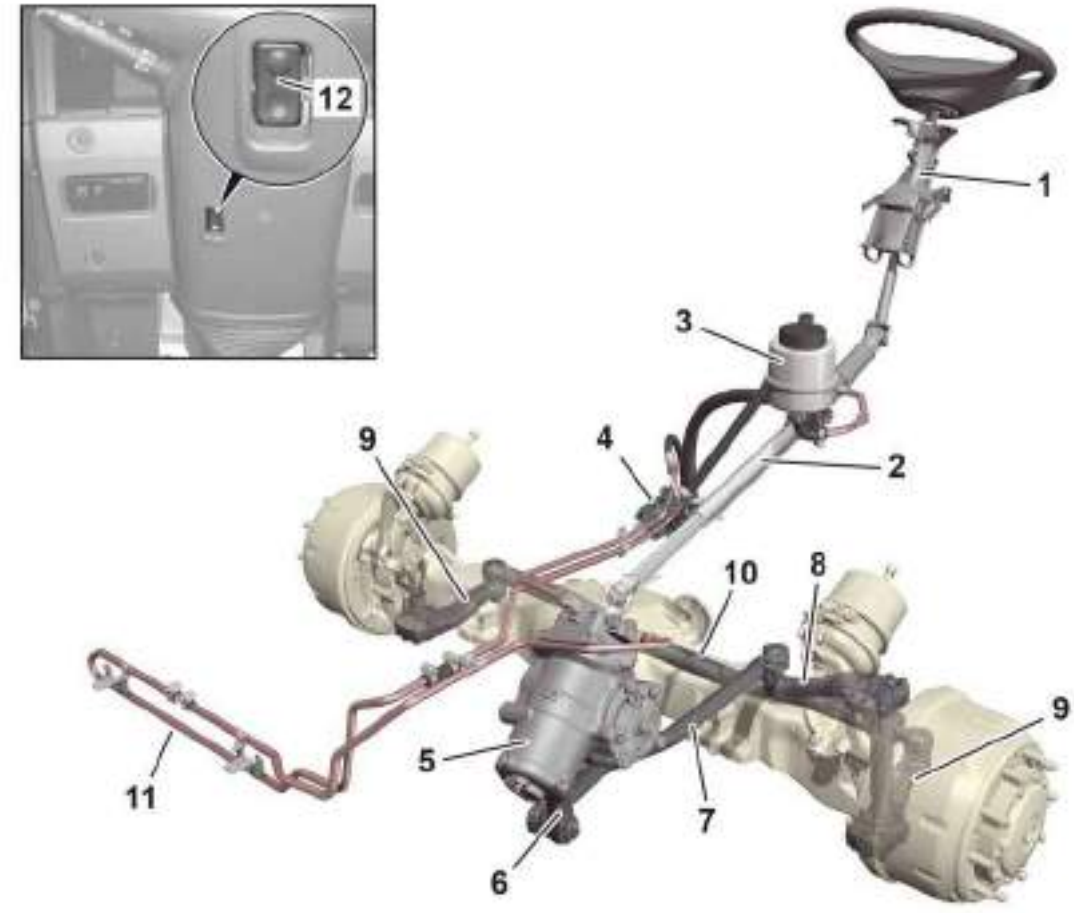
1 Manual winch
2 Washer
3 Nut

Steering LS 8 BK

The Zetros is equipped with a single-circuit hydraulic power steering system, type LS 8 BK, as standard. This system provides excellent handling and optimal road feel combined with reduced hand force requirements during maneuvering and when off-road through its variable ratio.

Steering wheel adjustment

The height and angle of the steering wheel can be adjusted. A pneumatic locking device prevents the steering wheel from being adjusted accidentally. The switch for locking/unlocking the pneumatic locking device is located on the steering column trim below the steering wheel.



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Steering LS 8 BK

1 Adjustable steering column
2 Steering shaft
3 Power steering fluid reservoir
4 Power steering pump
5 Power steering
6 Pitman arm
7 Drag link
8 Steering arm
9 Knuckle arm
10 Tie rod
11 Power steering fluid line
12 Switch for pneumatic locking device

Cab

The cab has space for a 3-man crew and features plenty of stowage space to accommodate equipment in a practical manner. It is possible to move through the interior compartment unhindered because there is no engine tunnel in the way.

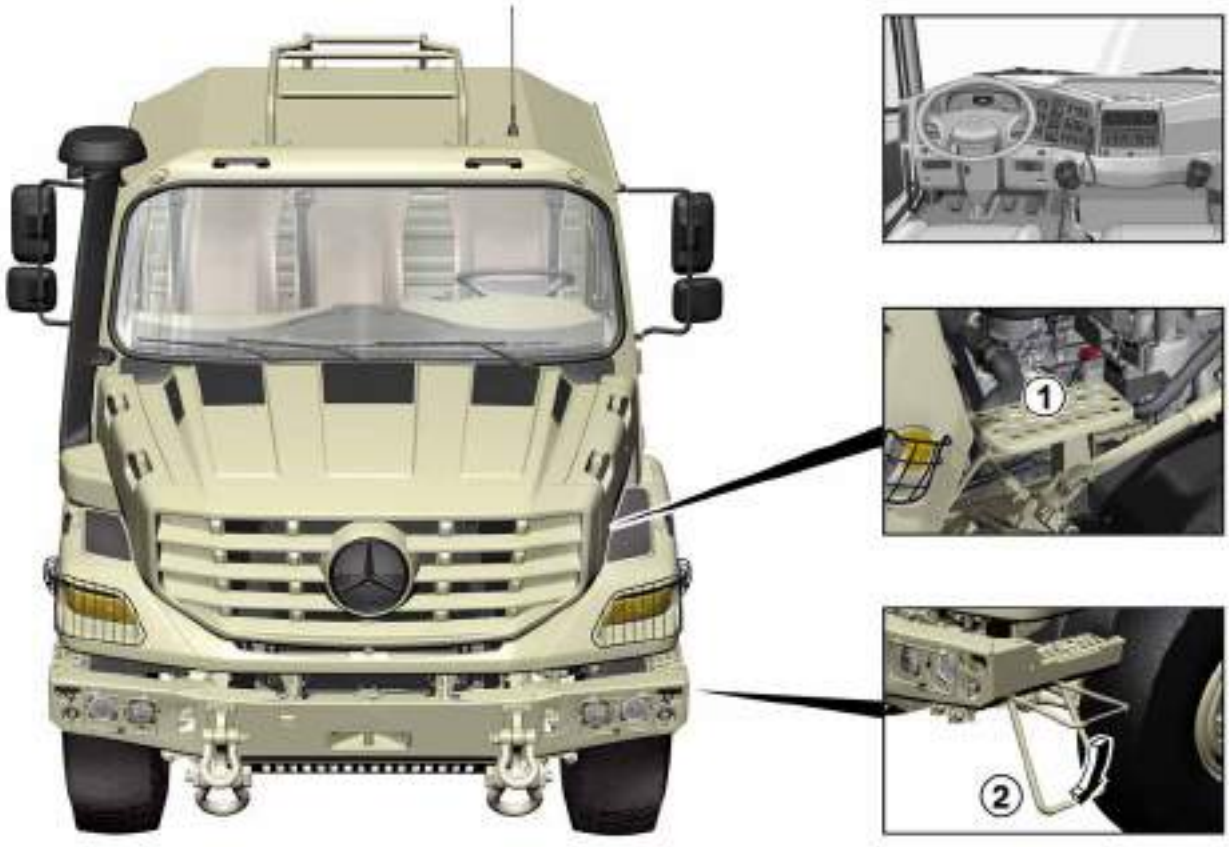
The cab is ergonomically designed to provide good visibility and overall view.

Insulation materials have been used to create a low-noise interior compartment.

The roof and engine hood can be walked on, with the grab handles on both sides of the engine hood ensuring that it is possible to climb up safely.

A step plate on the left of the engine compartment provides secure footing during service and repair operations.

There is an extendable climbing aid on the left and right front bumper respectively to facilitate access to the engine hood or engine compartment.



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Zetros cab

1 Engine compartment step plate
2 Climbing aid

The electrical system of the Zetros is based on that of the Atego/Axor model. It is a 24 V electrical system with a negative terminal-grounded basic circuit.

The Telligent® maintenance system allows maintenance intervals to be managed according to vehicle usage.

The Mercedes-Benz FleetBoard® telematics platform can be retrofitted.

The electrical system is protected by the following measures:

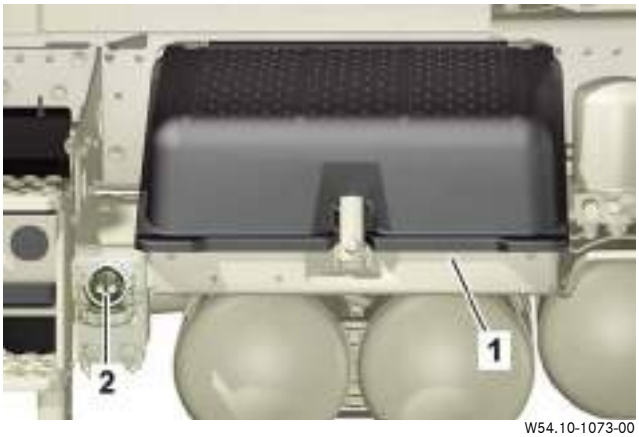
- Splash-proof lines
- Fused individual circuits (melting fuses)
- Circuit breakers (special equipment)

The following equipment is supplied as standard for military versions:

- Stealth lights
- Jump-start socket
- Nato gel battery
- Trailer sockets as per VG-Norm
- Electrical system for hazardous goods transport
- Electrical system suitable for fording, for fording depths of 800, 1,195 and 1,500 mm depending on equipment variant

Battery

The battery is located in the battery box on the left-hand side of the vehicle under the cab. The jump-start socket is located on the battery box and, on military versions, the battery main switch is also located here.



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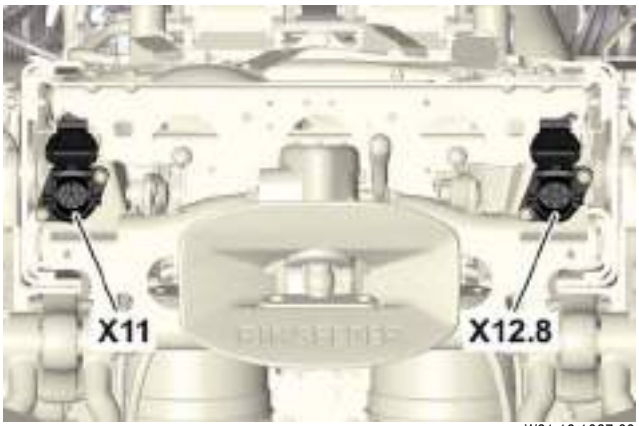
1 Battery box
X127 Jump-start socket

Trailer socket

The trailer sockets are located in the area of the trailer hitch on the crossmember. On military versions, there is an additional 12-pin socket as per VG-Norm on the left next to the convoy marking.



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X11 Trailer socket (15-pin)
X12.8 ABS trailer socket (7-pin) NATO

Electrical system

Electronics compartment

Fuses, relays and control units are located in the electronics compartment under the dashboard on the passenger side.

W54.20-1003-00

Electronics compartment

Engine control (MR) control unit

The engine control (MR) control unit is located on the left of the engine.

W54.21-1375-00

A6 Engine control (MR) control unit

On-Board Diagnosis (OBD)

The standardized diagnostic socket for on-board diagnosis is located on the right next to the steering column.

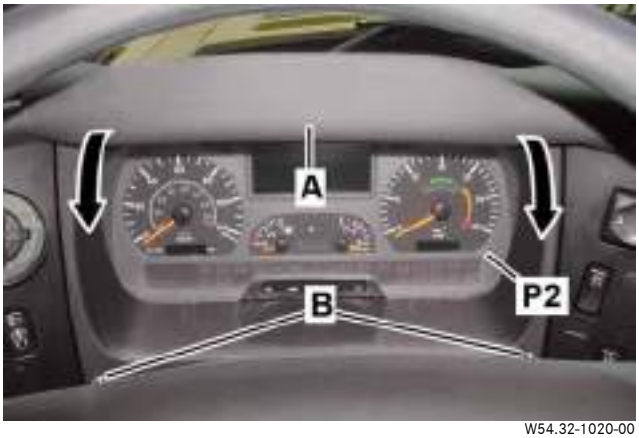
W54.22-1008-00

X13 Diagnostic socket

Instrument panel

The instrument panel has been taken over from the Axor/Atego. The Instrument (INS) is characterized by its good readability and uncomplicated presentation of indicators/displays.

A hinged cover which is fixed in place with two push buttons is available for the Instrument on military versions.



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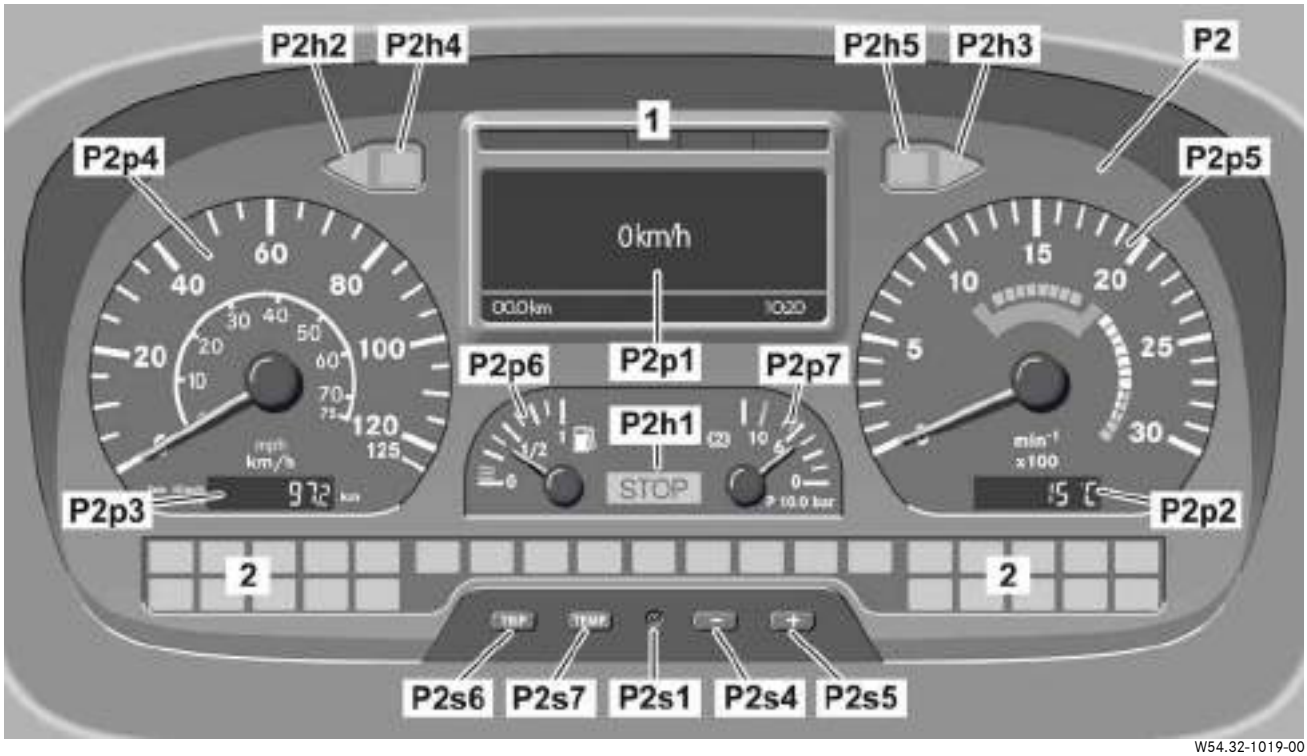
P2 Instrument (INS)
A Hinged cover
B Push buttons



W54.32-1019-00

Instrument panel

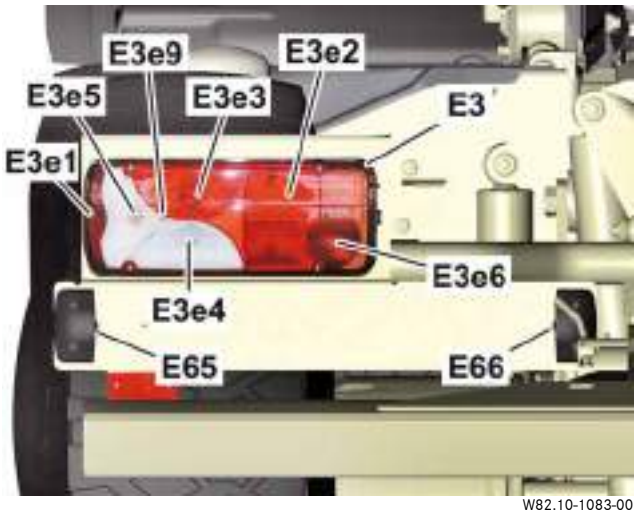
1 Status indicator
2 Indicator and warning lamps
P2 Instrument (INS)
P2p1 Driver information system (FIS) display
P2p2 Time/outside temperature display
P2p3 Travel distance display
P2p4 Vehicle speed indicator
P2p5 Rpm indicator
P2p6 Fuel gauge
P2p7 Reservoir pressure indicator for brake circuit 1 and 2
P2h1 STOP warning lamp
P2h2 Left vehicle turn signal indicator lamp
P2h3 Right vehicle turn signal indicator lamp
P2h4 Left trailer turn signal indicator lamp
P2h5 Right trailer turn signal indicator lamp
P2s1 Reset button
P2s4 Dim - button
P2s5 Dim + button
P2s6 TRIP button
P2s7 Outside temperature/coolant temperature button

Electrical system

W82.10-1082-00

Left front lamp unit

E6 Left front fog lamp
E18 Left front turn signal lamp
E83 Left low beam
E84 Left high beam
E86 Left stealth light
6 Additional turn signal lamp



W82.10-1083-00

Left rear lamp unit

E3 Left taillamp (lamp unit)
E3e1 Clearance lamp
E3e2 Taillight
E3e3 Brake light
E3e4 Backup lamp
E3e5 Turn signal light
E3e6 Rear fog light (LHD)
E3e9 Stealth brake light
E65 Left license plate lamp
E66 Right license plate lamp

The lamps for the driving lights, high beams, turn signal lights and rear lights can be protected against stone chipping etc. with a protective grille.

Front clearance lamps

A clearance lamp is positioned on the front face of the vehicle roof on the left and right-hand sides respectively.

W82.10-1084-00

E12 Left front clearance lamp
E13 Right front clearance lamp

EMERGENCY OFF switch for hazardous goods transport

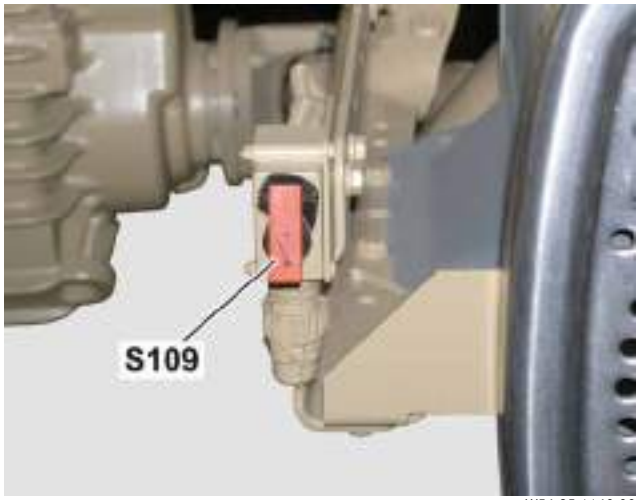
Vehicles used for transporting hazardous goods are equipped with two manual EMERGENCY OFF switches:

- In the cockpit on the dashboard
- Behind the cab on the passenger side

The switches are used to interrupt the power supply in an emergency and to prevent short circuits with sparks which may ignite a fire or an explosion.

The EMERGENCY OFF switch interrupts the voltage supply to the main consumers.

The engine is switched off automatically.



W54.25-1140-00

S109 Frame EMERGENCY OFF switch

W54.25-1141-00

S5 Dash support EMERGENCY OFF switch

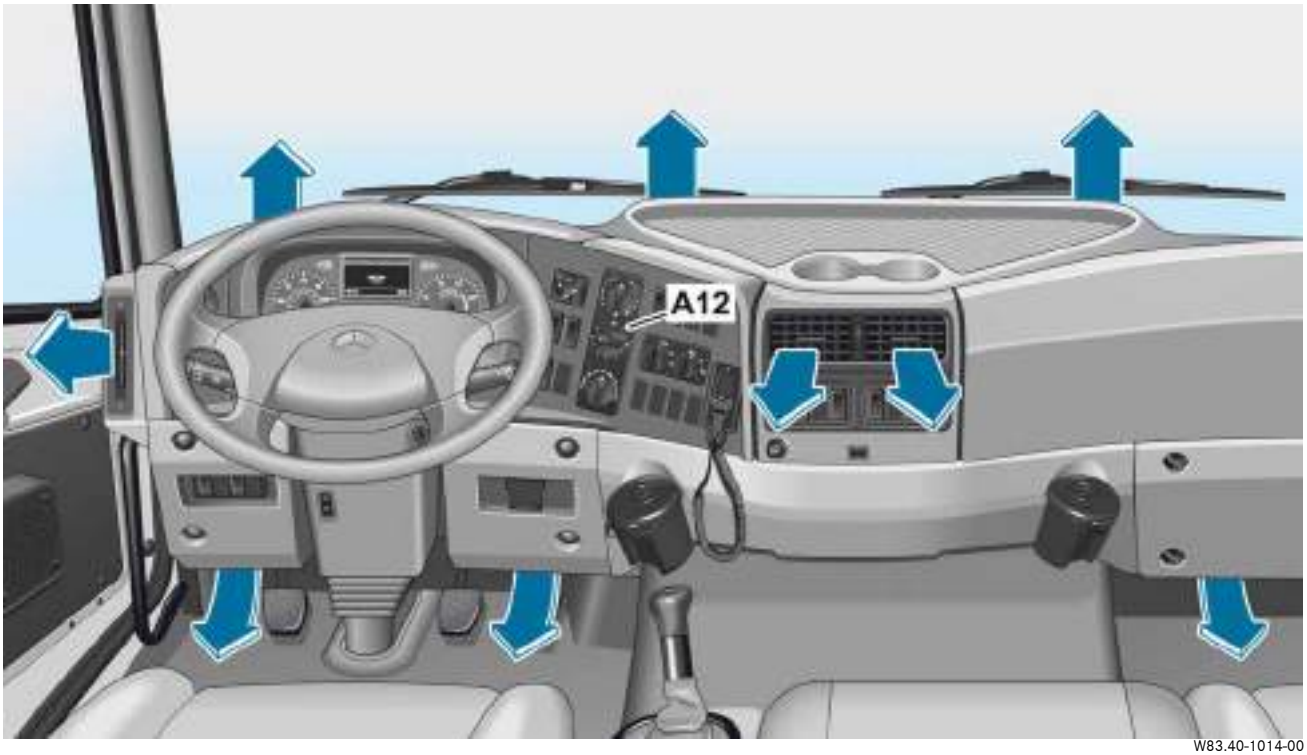
Heating/climate control

The Zetros is equipped with a single-zone air conditioning system; an auxiliary heater is available as special equipment.

The heater operating unit is located on the instrument panel on the right next to the steering wheel.

W83.70-1407-00

Auxiliary heater operating unit in center console



W83.40-1014-00

Heater/climate control air outlets

A12 Heater operating unit

The Zetros is equipped with three full-size individual seats with integrated head restraints.

The following adjustments can be made to the seats:

- Backrest angle
- Front seat cushion height
- Rear seat cushion height
- Longitudinal adjustment

All seats are equipped with three-point seat belts.

On the military version, the backrest of the center seat can be folded forwards. It can then be used as a standing surface when the roof hatch is open.

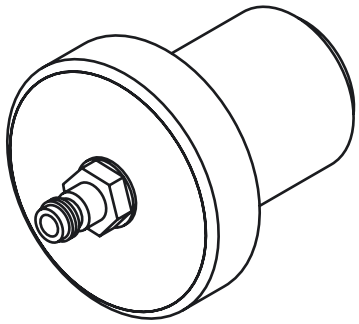
W91.00-1263-00

Seat adjustment

1 Backrest angle
2 Longitudinal adjustment
3 Front seat cushion height
4 Rear seat cushion height

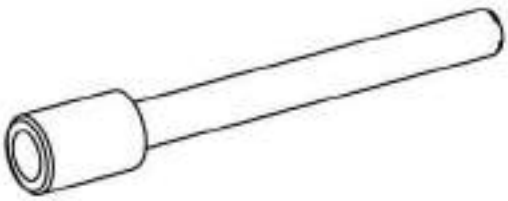
Transmission/engine

Adapter	
Use	Expansion reservoir adapter for bleeding shift mechanism
DC number	W949 589 00 91 00
FG	26
Set	B
Note	Only in combination with adapter set W000 589 02 91



W58.20-1004-00

Adapter	
Use	Adapter for removing heat protection sleeve of injection nozzle on 5th and 6th cylinder
DC number	W959 589 00 63 00
FG	01
Set	B



W58.20-1005-00

Engine installation/removal fixture

Use	Fixture for installing/removing engine or cylinder head
Note	http://gotis.aftersales.mercedes-benz.com

W58.30-1002-00-00

Abbreviations

DAS

Diagnosis Assistance System

FIS

Driver information system

GICS

Global Industry Classification Standard

HPS

Hydraulic-pneumatic Power Shift

INS

Instrument

LL

Left-hand drive (LHD)

MR

Engine control

PTO

Power take-off

NN

Sea level

OBD

On-Board Diagnosis

PLD

Pump-Line-Nozzle

RDR

Tire pressure control system

SCR

Selective Catalytic Reduction

VG-Norm

Defense equipment standard

WIS

Workshop Information System