



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

# Introduction of the New Unimog Generation

## Model Series 405

Introduction into Service Manual



Mercedes-Benz

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### Dear Reader,

This Introduction into Service Manual presents the new Unimog generation of model series 405.

This brochure is intended for the use of technical personnel familiar with service and maintenance. 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.

All of the data in this brochure correspond to the technical status as of the copy deadline in March 2013 and may therefore differ from the current production configuration.

We will publish modifications and new features in the relevant WIS documents only. Individual details in this brochure may therefore differ from more up-to-date versions published in WIS.

### Daimler AG

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#### Note

Information about the vehicles and about operating the vehicle functions can also be found in the interactive owner's manual on the Internet at:  
[www.mercedes-benz.de/betriebsanleitung](http://www.mercedes-benz.de/betriebsanleitung)

This Introduction into Service manual is also available in digital form as a PDF in SDmedia.

## Vehicle concept

### General

The product features of the new BlueTec 6 Unimog implement carrier with Euro VI emissions level have been completely revised for its market launch. The advantages of this compact and highly maneuverable implement carrier have been further improved. The vehicle concept has been weight-optimized in order to compensate for the additional weight of the Euro VI components.

The exhaust aftertreatment system with BlueTec 6 is based on the combination of a closed particulate filter and the Mercedes-Benz SCR system including AdBlue® injection, which has been used successfully for many years. This innovation allows nitrogen oxide and particulate emissions to be reduced by 90 %. The term "BlueEfficiency Power" not only encompasses the environmentally friendly and cost-efficient nature of the vehicle, but also the improved power ratings of the new engine generation. This technological leap in the area of performance, user-friendliness, traction drive, ergonomics and safety further underlines the unique selling proposition of the new Unimog implement carrier compared to trucks and tractors.

The new hydrostatic drive is revolutionary. It is an intelligent concept which integrates the hydrostatic drive with the manual transmission in a practical manner.



The new BlueTec 6 Unimog implement carrier

G00.20-3127-00

The new model designation system is a continuation/extension of the previous system.

**Note**

Model series remains the same, serial number increases.

**Model designation system**

Euro V		Euro VI	
405 . 101		405 . 104	
405	101	405	104
Model series	Serial no.	Model series	Serial no.

**Model codes in model designation system**

Model code	Model designation	Wheelbase (mm)	Load stages (t)	Engine power (kW)
U 216	405.090	2.800	7,5/8,5/10	115
U 218	405.090	2.800	7,5/8,5/10	130
U 318	405.104	3.000	7,5/8,5/10/11	130
U 423	405.105	3.000	11,99/13/13,8	170
U 427	405.110	3.150	11,99/13/13,8	200
U 430	405.110	3.150	11,99/13/13,8	220
U 423	405.125	3.600	11,99/13/13,8	170
U 427	405.125	3.600	11,99/13/13,8	200
U 430	405.125	3.600	11,99/13/13,8	220
U 527	405.202	3.350	11,99/15,5/16,5	200
U 530	405.202	3.350	11,99/15,5/16,5	220
U 527	405.222	3.900	11,99/15,5/16,5	200
U 530	405.222	3.900	11,99/15,5/16,5	220

## Model codes

The new model codes point to a completely revised product range with the introduction of the "New Unimog Generation" including new engine technology and allow for differentiation from the old/existing model series.

### Model codes

Old model code		New model code	
Euro V		Euro VI	
UNIMOG			
Implement carrier Euro V		Implement carrier Euro VI	
U 400		U 423	
Previously without code number for engine power	U 4	23	
	Code number for size class (same as U 400)	Code number for engine power (230 hp)	

With the introduction of the new generation of BlueTec 6 Unimog implement carrier, the codings of the special versions have been matched to the new codings of the truck model series. This has necessitated the complete rearrangement of some letter groups. A third of the codes have stayed the same, a third of the codes have been matched to the truck changes and a third have been added due to the new technology.

The special equipment codes still have three digits but now have the sequence "letter - number - letter". The codes are made up of the installation location, function and logical usage. Codes that belong together have the same number. For example: all front axles start with A1, rear axles with A2, etc. The range of numbers "9" in the code groups is reserved for preinstallations and/or omitted items.

### Design of new code system

1st digit Code group	2nd digit	3rd digit
Capital letter (A...Z)	Number (0...9)	Capital letters (A...Z)

### Example

A	1	W
Axles/suspension	Front axle	Front axle differential lock



## Code system

## Overview of code groups

A	Axles/suspension	N	Power take-offs
B	Brakes	O	Internal system control code
C	Chassis	P	Platform/dumper
D	Cab interior	Q	Spring/crossmember/trailer hitch/fifth wheel coupling
E	Electrical system	R	Wheels/spare wheel holder/wheel lifts
F	Cab exterior	S	Safety
G	Transmission/clutch	T	Unused
H	Hydraulic components	U	Unused
I	Internal code	V	Unused
J	Instruments/communication	W	Weight variants
K	Fuel system/exhaust system	X	Miscellaneous
L	Lighting system/lamps	Y	Accessories
M	Engine	Z	Internal system control code

Numerous optimizations and new features have been phased into the new Unimog generation. As a result, solutions have had to be found for the reduction in installation space available. The manoeuvrability and compact dimensions (2.15 m wide) of the vehicle have nevertheless been retained and existing implements can therefore still be used almost without modification.

The holistic rework of the product features of the new BlueTec 6 implement carrier is described below under brief headings:

The cooling system has been adapted to the new technology. As a result of the updated engines with cooled exhaust gas recirculation, cooling power requirements have also increased. The development of the modified cooling system was based on the aim of retaining the compact vehicle concept while integrating larger radiators at the same time.

The following concept was therefore put in place:

- Arrangement of radiator and A/C condenser on left-hand side of vehicle. This reduces radiator soiling during working operations.
- Cleanfix reversible fan with automatic control and high-speed fan drive as special equipment for dirt-intensive operations (in preparation).
- Swiveling A/C condenser in combination with a wide-meshed radiator core and smooth radiator slats for easy cleaning of the radiator unit.
- Charge air cooler decoupled from the radiator and located under the engine hood.
- Greater efficiency of fan hydraulics due to variable displacement pump and demand-based, separate control of both fans. The benefit results from the reduced energy requirement and optimized driving and working performance, including under extreme conditions.

#### Integrated exhaust management

With respect to exhaust aftertreatment, the new engine generation uses the BlueTec 6 technology which has already proven its effectiveness in practical use on mass-produced heavy duty engines.

The exhaust management system ensures that filter regeneration is carried out according to requirements.

- The cooled exhaust gas recirculation system reduces the proportion of oxygen in the combustion mixture. This results in the production of less nitrogen oxide during combustion.
- The camshaft adjustment function for increasing the exhaust temperature supports active regeneration of the diesel particulate filter during operation.

#### **i** Note

In parallel to the Unimog Euro VI, the U 400.103/123 will still also be produced with Euro III/V engines.

## Innovations

### High-performance engine brake

The engine brake developed by Mercedes-Benz significantly reduces the wear on the wheel brake systems and makes a significant contribution to the cost-efficiency of the vehicle. The engine brake is designed as a dual-pulsed decompression brake and provides a high level of brake power.

- Each cylinder in the engine has its own engine brake unit.

### Fan hydraulics with variable displacement pump

The fan hydraulics are included in the basic scope of all vehicles.

- Greater efficiency of fan hydraulics due to variable displacement pump and demand-based, separate control of both fans.

### Tilting hydraulics based on fan hydraulics

The tilting hydraulics allow the vehicle tilt cylinder to be adjusted and can be extended to allow the adjustment of external consumers (e.g. rail guide or auxiliary rear axle steering) (but not permanent consumers).

- Simple tilting hydraulics for the vehicle tilt cylinder (code HE1)
- Tilting hydraulics with additional connection option for external adjustment operations (code HE2) e.g. trailer with tilt system.

### Working/municipal hydraulics (circuit I and circuit II)

The working hydraulics allow an implement to be adjusted or a permanent consumer to be supplied. On the 1-circuit hydraulic system one circuit is available for this, while on the 2-circuit hydraulic system, two independent circuits are available, each with its own fixed displacement pump. This allows adjustment operations to be carried out and a permanent consumer to be supplied simultaneously. On the 2-circuit hydraulic system, the volumetric flow rates can be swapped over via the volume switchover function or added together via flow summation.

Changes compared to the hydraulic system of Euro V vehicles:

- Fully proportional working hydraulics at connections of cells 1–4 (connections 1–8)
- Integrated pressure filter
- Control of consumers during adjustment operations via the vehicle joystick (social distribution) with diagonal movement of vehicle joystick. Due to the omission of link motion, two adjustment operations can be carried out simultaneously. Example: Raise front loader and tilt shovel simultaneously
- Hydraulic connection possibility on valve block (e.g. for roll stabilization)
- Electrical interface for actuation of hydraulic valve block (circuit I) e.g. for external actuation of front and/or rear power lift
- Joystick with rocker switch for forward/reverse shifting of manual vehicle transmission

### Power hydraulics (circuit III and IV)

The power hydraulics allow rotating consumers to be powered (e.g. cutting roller, wood chipper etc.). Both circuits are designed as open circuits with a maximum pressure of 280 bar. Code HL4 includes one circuit while code HL5 includes two power hydraulics circuits.

The power hydraulics are located in the platform intermediate frame and can be removed if necessary (e.g. for winter service operations). They are powered by a propeller shaft on the engine power take-off, code N05. The hydraulic couplings are located at the vehicle rear above the end crossmember. Front hydraulic connections are also optionally available, either for one circuit or for both circuits.

### System concept of new hydrostatic drive G34:

The new hydrostatic drive system: code G34 combines a modified hydrostatic drive major assembly concept with the cruise control operating and control concept. The previous hydrostatic drive system (code G33) has now been superseded with the launch of the new BlueTec 6 Unimog implement carrier. The new hydrostatic drive (code G34) allows fully hydrostatic driving at up to 50 km/h and, in combination with EAS, also allows mixed hydrostatic/transmission-powered driving and can be controlled with the normal driving controls (accelerator pedal, brake, gear selector lever, steering wheel cruise control buttons). In addition, the gearshifting, cruise control and travel direction functions are supported by a left additional control lever (code DG1). The vehicle can also be accelerated and decelerated via the hydraulic joystick in "driving joystick active" mode.

### Modified suspension

The capabilities of the suspension have been retained in their entirety and continue to underline the advantages of the Unimog concept.

- Weight optimization measures: Cutouts in the frame, use of high-strength steels, greater proportion of light alloys and plastics
- The portal axles have also been reinforced which means that the permissible gross vehicle weight is above the previous level
- The additional major assembly weight has been overcompensated for with additional components
- Pneumatic disk brakes on model series U2xx/U3xx

### Standardized mounting points

On the current Euro V model series of the Unimog implement carrier, mounting points were defined which have proven effective across all areas of usage. The new Unimog generation will continue to use these standardized interfaces and dimensions. This applies to the front mounting plate, front power take-off, the ball mounting points on the platform and the mounting brackets at the rear end.

### Improved ergonomics

- Steering column with adjustable height and inclination (not on vehicles with transferable steering)
- Reduced steering wheel control force and steering capability at standstill
- Multifunction steering wheel
- Improved cab steps
- Transmission control via right multifunction control lever
- EQR operation on hydraulics joystick
- Engine speed adjustment function
- Driving and function controls within primary (400 mm - 600 mm) area of reach of driver
- Modular positioning of hydraulics joystick
- Hydraulics joystick within optimal reach area
- Improved accessibility of switches of center console

## Innovations

### New design of exterior/interior

- Hood
- Roof-mounted wiper system
- Headlamps
- Aluminium rims (optional, code R2T)
- Multifunction steering wheel
- CD radio with Bluetooth® hands-free system
- Instrument cluster
- Controls
- Center console
- Higher output heating/cooling system with improved air distribution

### 4-channel ABS

If a wheel is tending towards locking up, the pressure in the wheel cylinder is corrected depending on the road surface condition and load condition. This ensures safe handling characteristics during braking. Driving stability and steerability are maintained in the process, which reduces the risk of accident.

The ABS can be switched to off-road mode, which allows the wheels to lock up to a certain extent in order to build up a wedge of earth. The ABS off-road program must be deactivated on public roads and firm ground.

The 4-channel ABS system is installed on all model designations and has been tested on mass-produced models. It provides a high level of safety through separate actuation of each wheel on the front and rear axle.

### Further changes and improvements

- Electrical interface EN 16330 for demountable implements in preparation => code ES6
- Parameterizable special module (PSM) as standard
- Combinations of 0 to 2 trailers are possible without special measures for turn signal failure detection.
- Front camera with monitor (available optionally with code EM3). This improves visibility of the road surface and implements. Up to three additional cameras can be connected via a connecting point in the cab.
- 160 kW instead of 150 kW will now be available at the front power take-off (limitation of engine torque to 850 Nm instead of 800 Nm previously)
- Increase in permissible load values, particularly on model series U318 to up to 11000 kg and on U400 to up to 14000 kg
- Due to the optimized frame concept, front skids are not required for assembly frames for heavy bodies (e.g. crane). This makes the frames shorter, simpler, lighter and more cost-effective. It also simplifies assembly.

	Unit	OM 934	OM 936
Displacement	cm <sup>3</sup>	5100	7700
Cylinder number/arrangement		4/inline	6/inline
Valve timing		DOHC	DOHC
Number of valves per cylinder (intake/exhaust)		2/2	2/2
Idle speed	rpm	720	720
Output	kW	115 (code M1H) 130 (code M1I) 170 (code M1K)	200 (code M2C) 220 (code M2D)
Torque	Nm	650 750 900	1100 1200
Compression ratio		17,6/1	17,6/1
Stroke	mm	135	135
Cylinder bore	mm	110	110
Rail pressure max.	bar	2400	2400

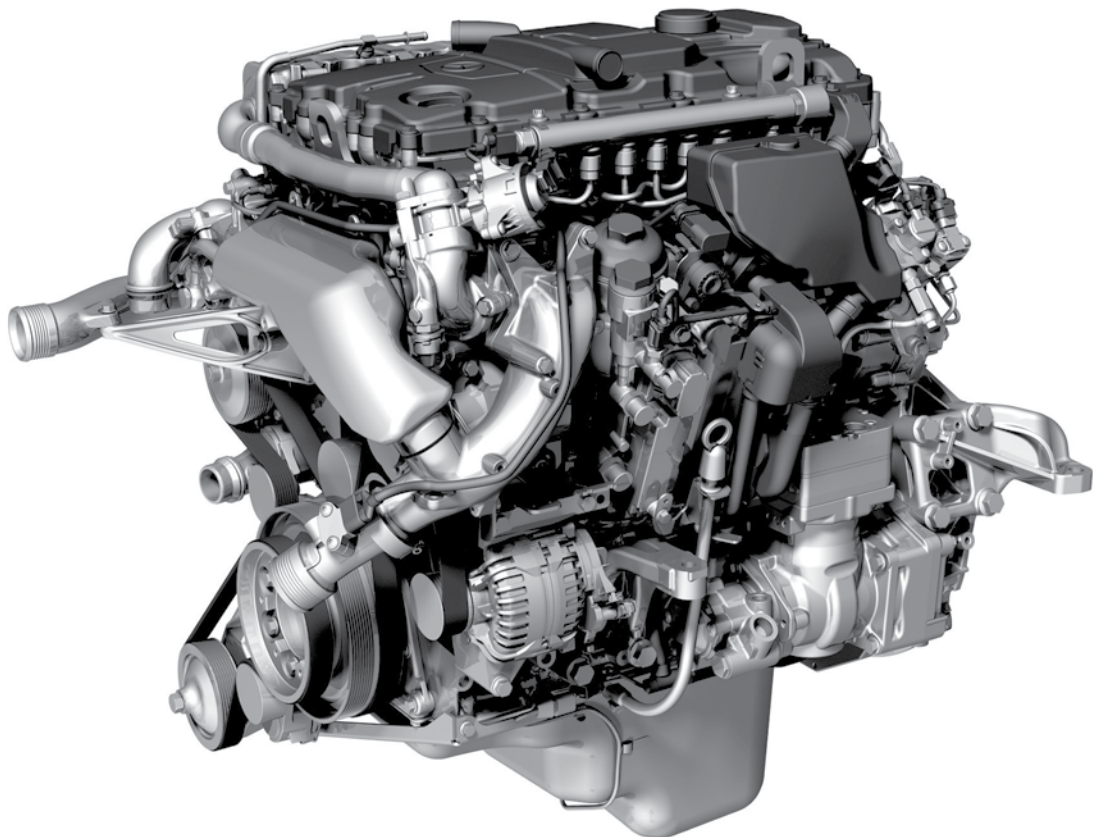
## Engine OM 934

The OM 934 is a 4-cylinder inline engine with a displacement of 5.1 l with turbocharger and cooled exhaust gas recirculation. The OM 934 is available in the following power categories:

- 115 kW, 650 Nm (code M1H)
- 130 kW, 750 Nm (code M1I)
- 170 kW, 900 Nm (code M1K)

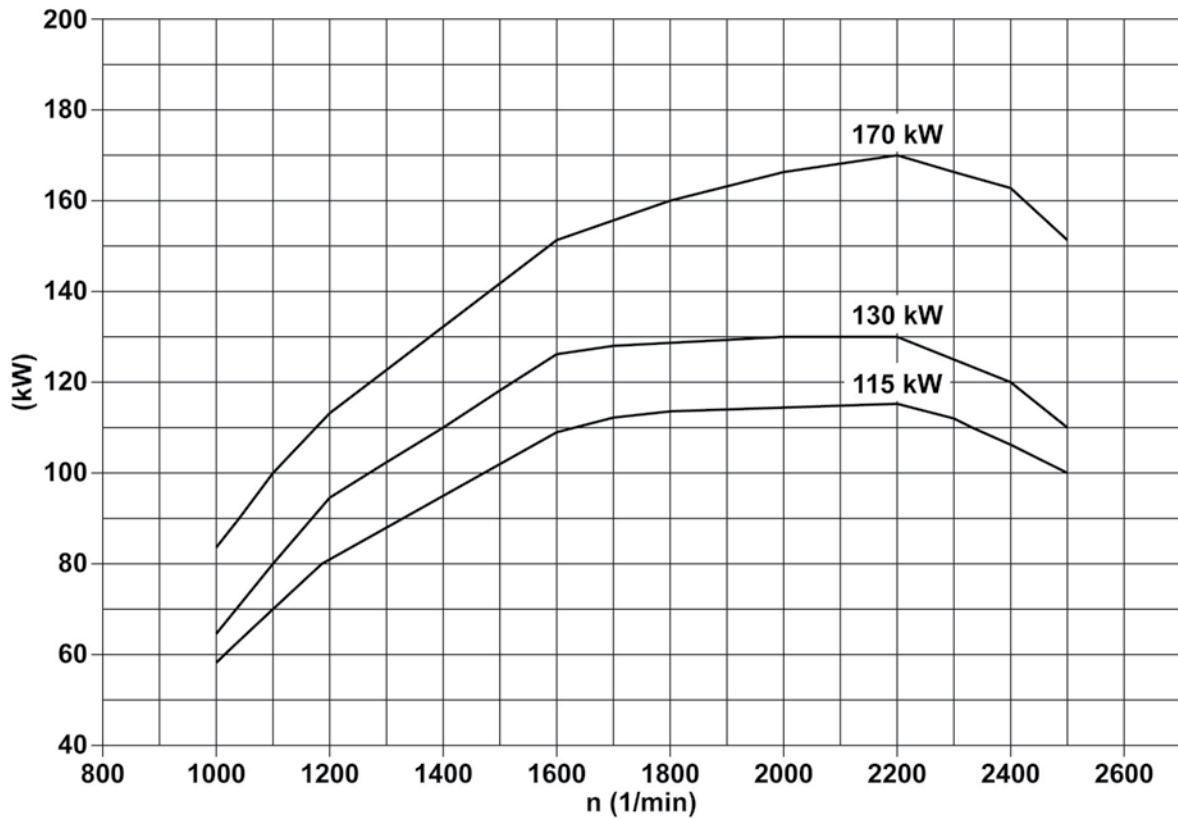
The excellent characteristics of the engines, in particular their low fuel consumption in relation to their high power, have been achieved with a range of technical innovations:

- The Common Rail injection system reduces the fuel quantity required for combustion to a minimum.
- The engine brake provides greater performance and is now designed as a decompression brake which replaces the constant throttle and exhaust flap brake.
- The engines fulfill the Euro VI emission standard with Selective Catalytic Reduction (SCR), cooled and regulated exhaust gas recirculation and diesel particulate filters.



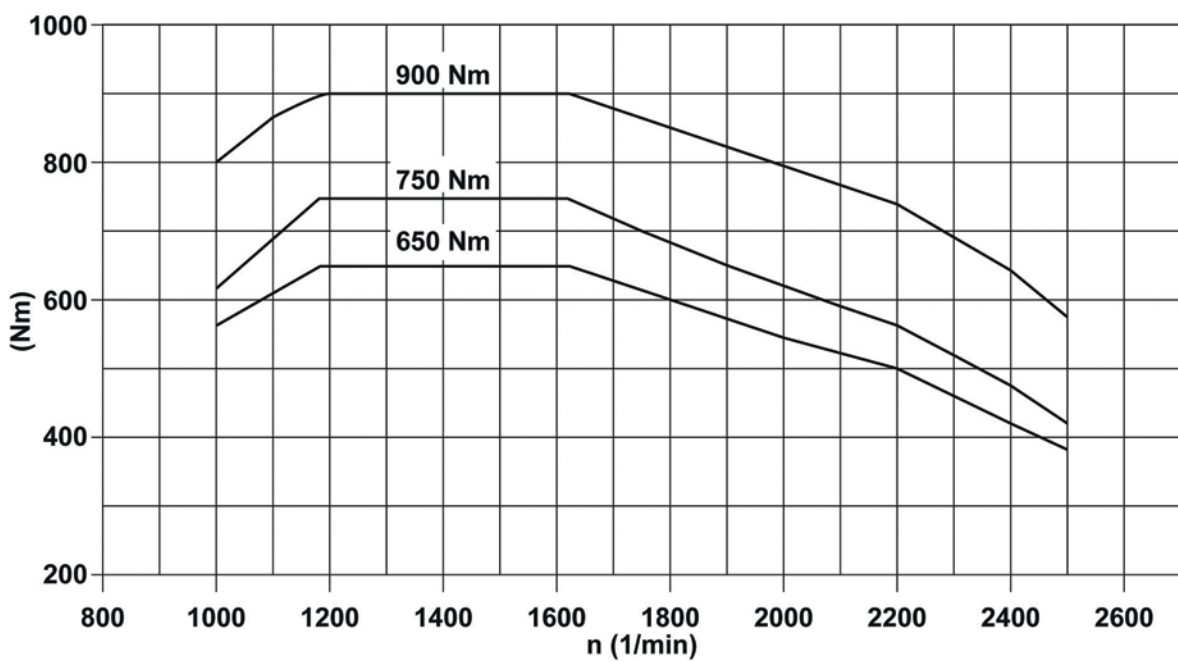
Engine OM 934.972

G01.10-3133-00



Engine power (kW)

G01.10-3135-00



Torque (Nm)

G01.10-3136-00



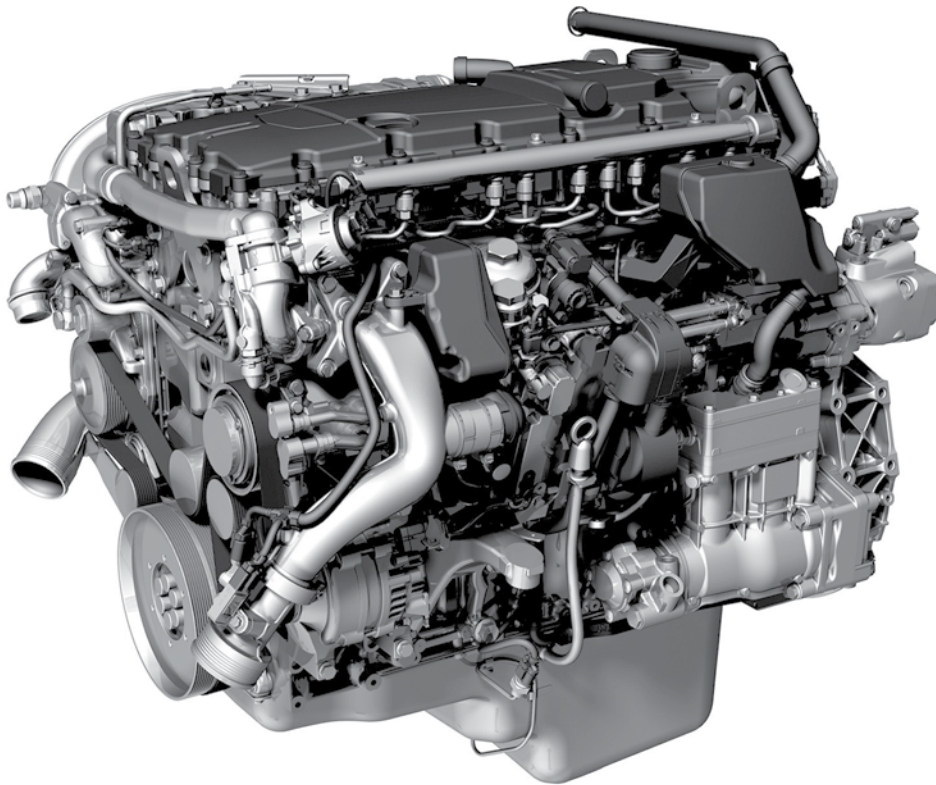
## Engine OM 936

The OM 936 is a 6-cylinder inline engine with a displacement of 7.7 l with turbocharger and cooled exhaust gas recirculation. The OM 936 is only available in Euro VI and the following power categories:

- 200 kW, 1100 Nm (code M2C)
- 220 kW, 1200 Nm (code M2D)

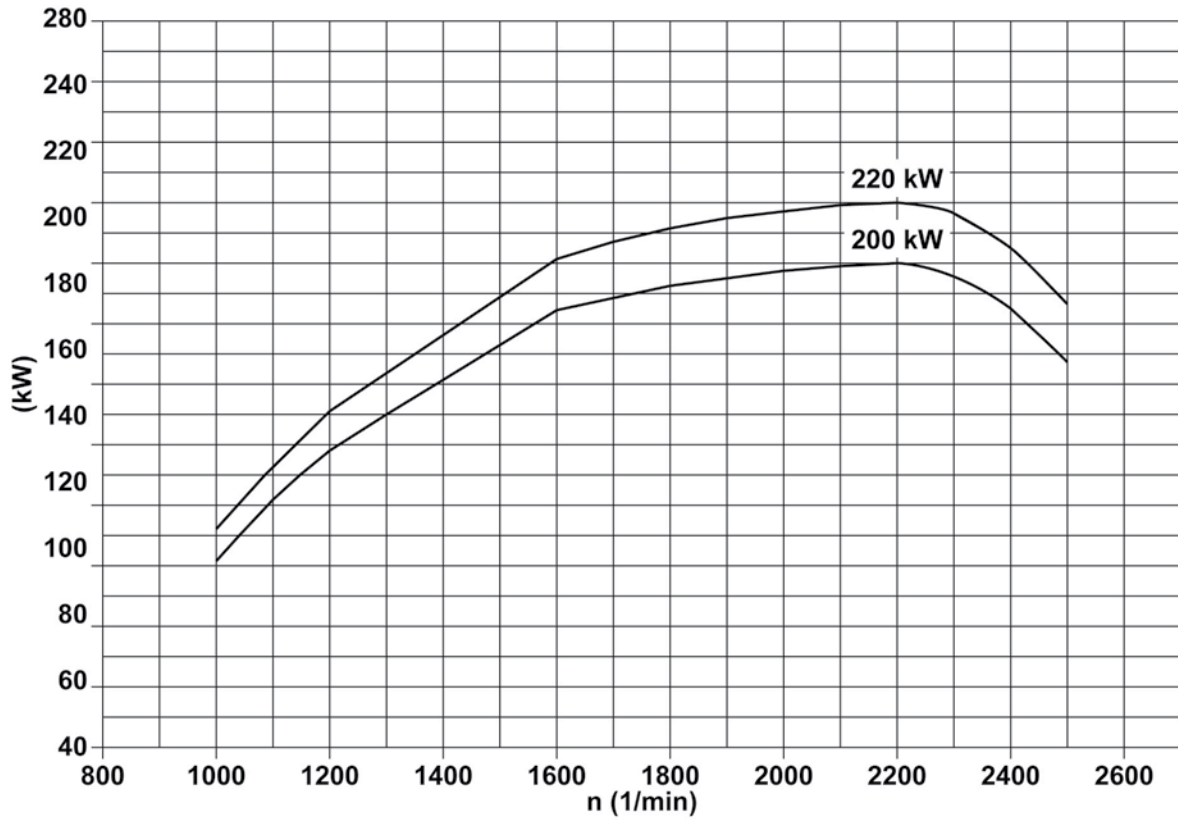
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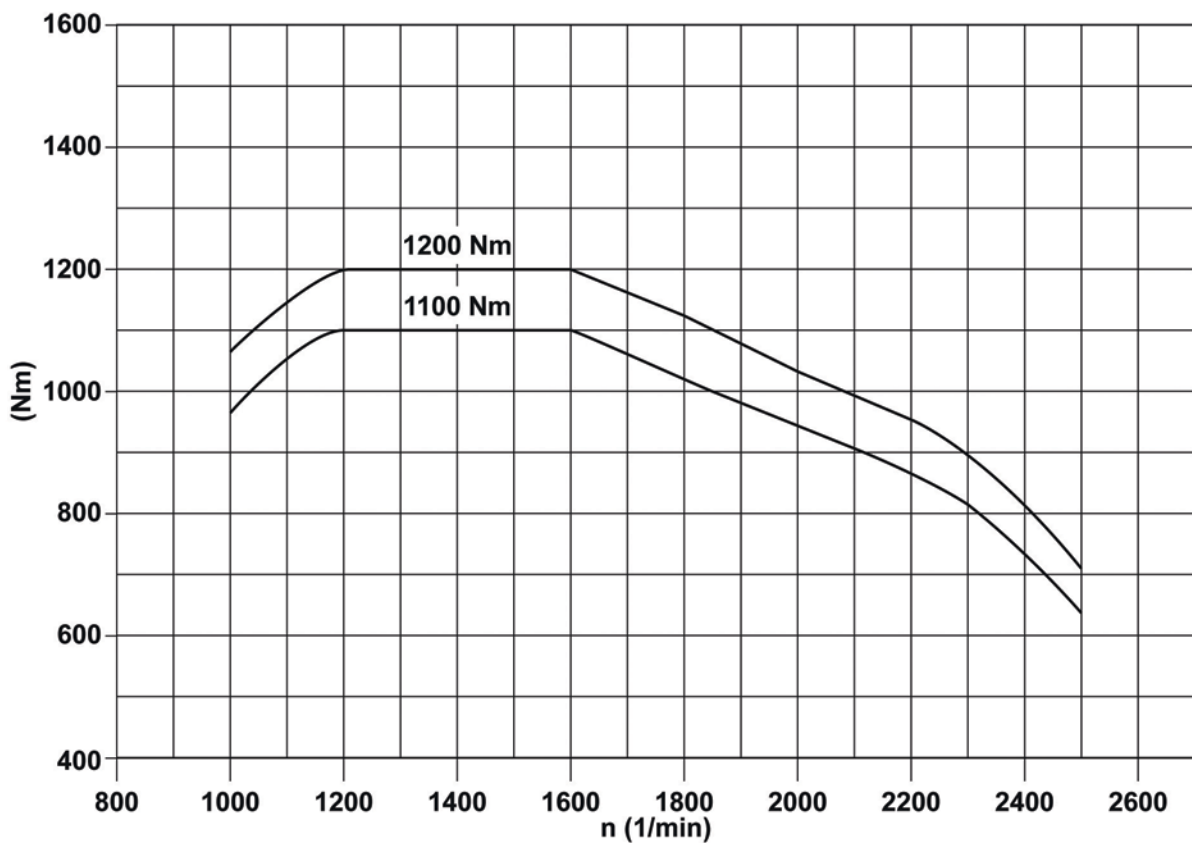
Engine OM 936.972

G01.10-3134-00



Engine power (kW)

G01.10-3137-00



Torque (Nm)

G01.10-3138-00

## Model codes

Vehicle		Engine					Exhaust box (AGN)		
Model code	Model designation	Wheelbase (mm)	Model designation	Engine power (kW)	Code	Cylinder	Charging	Model designation	Length (mm)
U 216	405.090	2.800	934.971	115	M1H	4	1-stage	930.728	806
U 218	405.090	2.800	934.971	130	M1I	4	1-stage	930.728	806
U 318	405.104	3.000	934.971	130	M1I	4	1-stage	930.728	806
U 423	405.105	3.000	934.972	170	M1K	4	2-stage	930.728	806
U 427	405.110	3.150	936.971	200	M2C	6	1-stage	930.728	856
U 430	405.110	3.150	936.971	220	M2D	6	1-stage	930.728	856
U 423	405.125	3.600	934.972	170	M1K	4	2-stage	930.728	806
U 427	405.125	3.600	936.971	200	M2C	6	1-stage	930.728	856
U 430	405.125	3.600	936.971	220	M2D	6	1-stage	930.728	856
U 527	405.202	3.350	936.971	200	M2C	6	1-stage	930.728	856
U 530	405.202	3.350	936.971	220	M2D	6	1-stage	930.728	856
U 527	405.222	3.900	936.971	200	M2C	6	1-stage	930.728	856
U 530	405.222	3.900	936.971	220	M2D	6	1-stage	930.728	856

### Engine power take-off

The engageable engine power take-off (code N05) (engageable only with engine off) is driven by the crankshaft of the engine via intermediate gears. The flange output is located at the rear of the engine and is activated via an engageable dog clutch. The engine power take-off (code N05) may only be used in combination with a flexible coupling to insulate it from engine vibrations.

The essential features of the engine power take-off are:

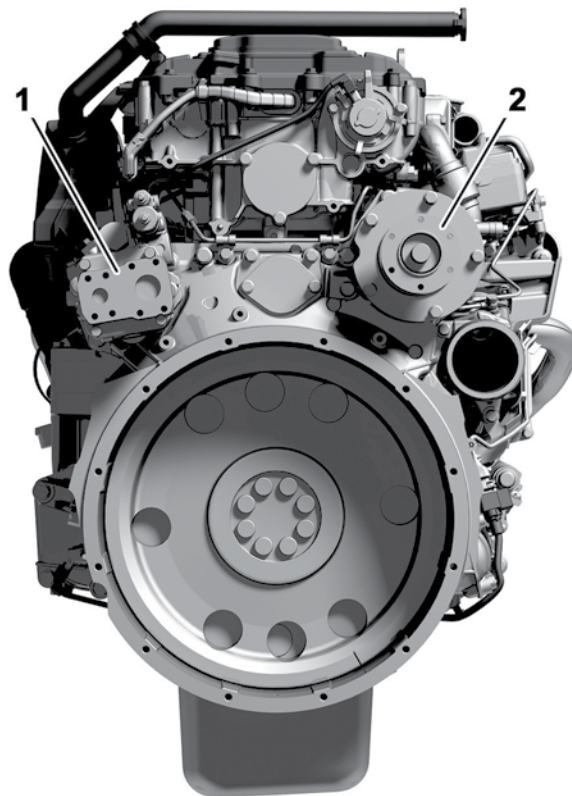
- Integrated into gear drive of engine
- Drive of power hydraulics (code HL4 or HL5) via a propeller shaft (clockwise rotation direction)

Technical data:

- $i = 0.933$
- Maximum available continuous output 148 kW
- Maximum available torque (continuous) 600 Nm

#### **!** Important

The power take-off (code N05) is only approved for powering hydraulic or water pumps. Direct mechanical drive (e.g. mechanical rear power take-off) is not permissible.



### OM 936.972 with engine power take-off

- 1) Fan drive variable displacement pump, engine power take-off additional dumper function (code N05)
- 2) Engine power take-off (code N05)

G26.45-3227-00

## Radiator system

The radiator system is located in the frame, behind the cab. This concept allows space for a windshield which extends far down towards the engine hood and provides an optimal view of the working area. The large radiator is designed for high outside temperatures and slow vehicle speeds to ensure a high level of operational reliability.

The radiator system can be folded out without the use of tools, which makes it very accessible for cleaning.

In order to increase the efficiency of the radiator, a radiator grille is installed to hold back coarse dirt particles. The radiator system is located on the left in the direction of travel and is thus located in an area which has a low susceptibility to soiling.

The hydrostatic fan drive provides optimal cooling output throughout the entire rpm range in any driving situation. It does so by adjusting the rpm of the fan drive according to demand and uses as little energy as possible.



Radiator system

G20.20-3242-00

**Rapid radiator cleaning system**

The Clean-Fix rapid radiator cleaning system (code M74) provides effective cleaning of a soiled radiator by turning the fan blades about their own axis and raising the rpm. This ensures that the optimal cooling output is available in every situation.

Activation of the reversible fan can be performed while driving or working using a button on the center console.

It is also possible to activate an intermittent switching function (automatic start-up every 10 min).

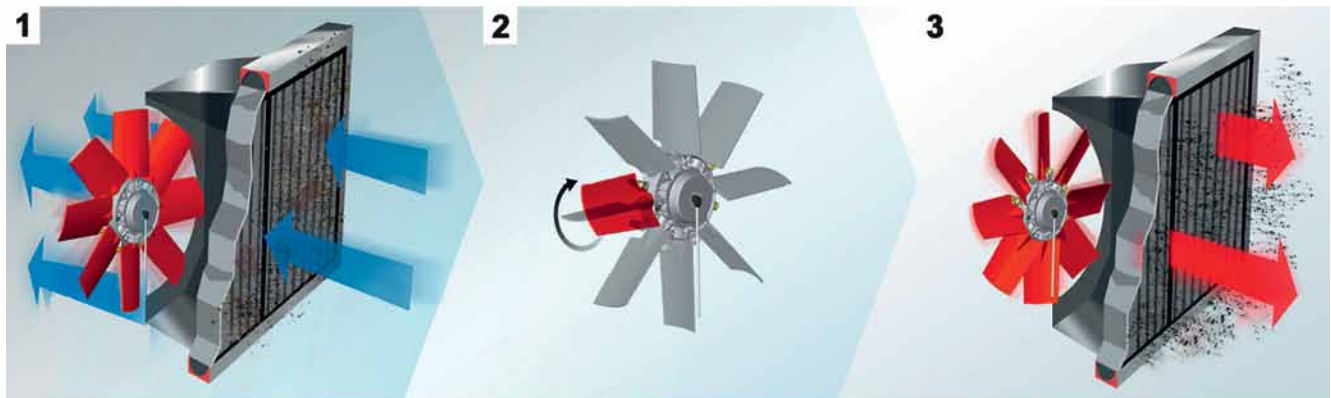
**Note**

On vehicles with code M74, a safety insert is also installed in the air filter housing in addition to the air filter. This must also be replaced with every third air filter replacement.



Safety insert in air filter housing

G09.10-3152-00



G20.20-3249-00

**Clean-Fix fan (code M74)**

- 1) Cooling
- 2) Switchover
- 3) Cleaning

## Exhaust aftertreatment

Due to the stricter Euro VI emissions regulations, additional system components for exhaust aftertreatment are required to meet the emissions regulations.

As a result of the technical implementation of Euro VI, a modified arrangement of the components on the chassis was necessary. This is known as the "Euro VI packaging". The Euro VI vehicle package differs fundamentally from the package of Euro III and Euro IV/V vehicles and new model designations have been assigned.

### Overview

Model	Euro III model designation	Euro IV/V model designation	Euro VI model designation
U200			405.090
U300k	405.100 (production up to 11/2006)	405.101	405.104
U300l	405.120 (production up to 11/2006)	405.121	Discontinued
U400k	405.102	405.103	405.105
U400			405.110
U400l	405.122	405.123	405.125
U500k	405.200 (production up to 11/2006)	405.201	405.202
U500l	405.220 (production up to 11/2006)	405.221	405.222

### Euro 6 technology and vehicle packaging

In order to meet the requirements of the Euro VI legislation and customer demands for minimal fuel consumption, new engines and a new exhaust aftertreatment system were developed. The engines feature Common Rail injection and exhaust gas recirculation and are designed for minimal consumption. The new exhaust aftertreatment system removes particulates and nitrogen oxides.

The exhaust aftertreatment system consists mainly of:

- Oxidation catalytic converter (DOC)
- Diesel particulate filter (DPF)
- SCR catalytic converter
- Slip catalytic converter

The system also includes the AdBlue® metering unit with various sensors, the ACM electronic unit (Aftertreatment Control Module) and the fuel (HC) metering system. Low-sulfur fuel is required. The fuel may contain up to 7% biodiesel.

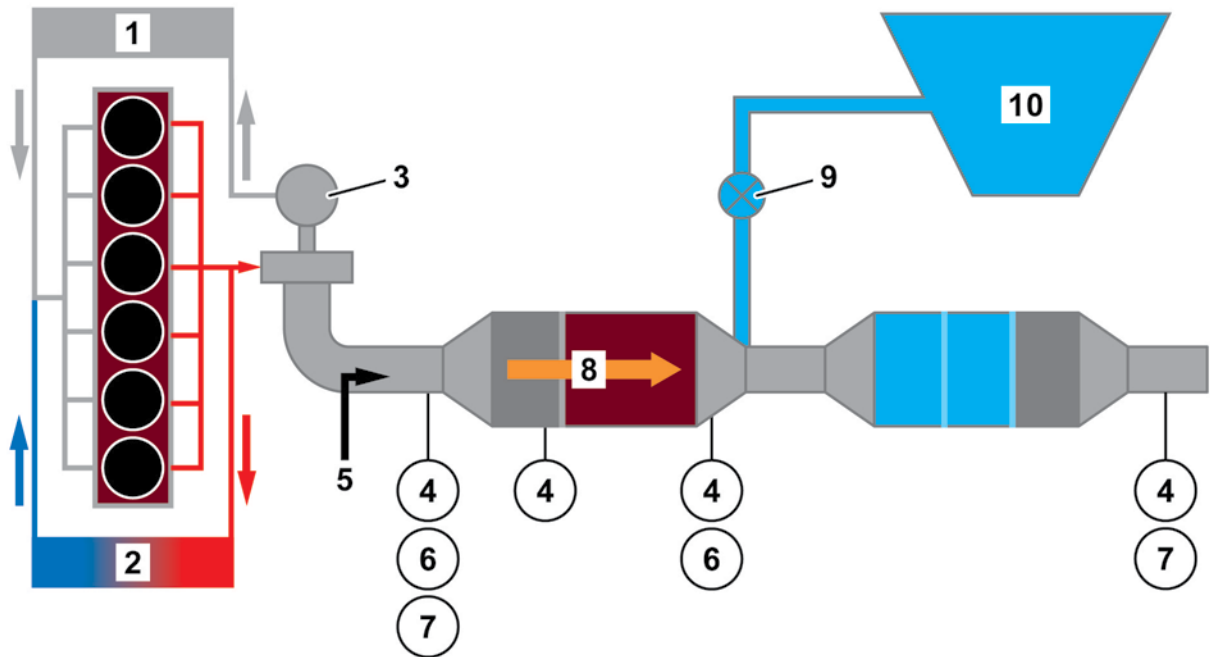
### Function description:

- The exhaust first flows through the oxidation catalytic converter. This converts the hydrocarbons and carbon monoxide present into carbon dioxide and water. Furthermore, part of the nitric oxide (NO) is oxidized to nitrogen dioxide (NO<sub>2</sub>).
- The particles are separated through adhesion and collected in the porous filter structure of the diesel particulate filter (DPF). In the particulate filter, the NO<sub>2</sub> reacts with the stored soot to produce NO and CO<sub>2</sub>. The deposits are broken down and the system regenerates itself: "passive regeneration". In order to achieve complete filter regeneration, the "passive regeneration" is coupled with "active regeneration". In the case of active regeneration, a reaction takes place between O<sub>2</sub> and soot at temperatures above the passive regeneration range. In order to reach the temperatures required for this, the exhaust temperatures are increased by injecting HC in the form of diesel fuel. The HC reacts exothermically in the oxidation catalytic converter and increases the temperature of the exhaust.
- SCR catalytic converter: The BlueTec diesel technology reduces the proportion of nitrogen oxide in the exhaust through the addition of AdBlue® (aqueous urea solution). The aqueous AdBlue® solution is injected into the hot exhaust via a metering valve.



# Exhaust aftertreatment

Exhaust gas recirculation	Diesel particulate filter	Selective Catalytic Reduction
(AGR)	(DPF)	(SCR)



### Mode of operation of Euro 6

- |                                     |                     |
|-------------------------------------|---------------------|
| 1) Charge air cooler                | 6) Pressure sensor  |
| 2) Exhaust gas recirculation cooler | 7) NOx sensor       |
| 3) Turbocharger                     | 8) Exhaust          |
| 4) Temperature sensor               | 9) AdBlue® metering |
| 5) Fuel injection                   | 10) AdBlue® tank    |

G49.20-3104-00

The AdBlue® tank is always located on the right-hand side of the vehicle ahead of the exhaust box (except on model series U200). On the U200, the AdBlue® tank is located on the left-hand side of the vehicle ahead of the fuel tank.

Two variants of the exhaust system are available:

- Exhaust system, upward tailpipe (code K7A) - standard
- Exhaust system, downward outlet (code K7Q) - SA

**Note**

On all predecessor vehicles, the upward exhaust (code C87) was special equipment. Exhaust tailpipe positioned between the axles (code K7Q).



Standard exhaust system (upward exhaust)

G49.10-3191-00

## Exhaust aftertreatment

### AdBlue® supply

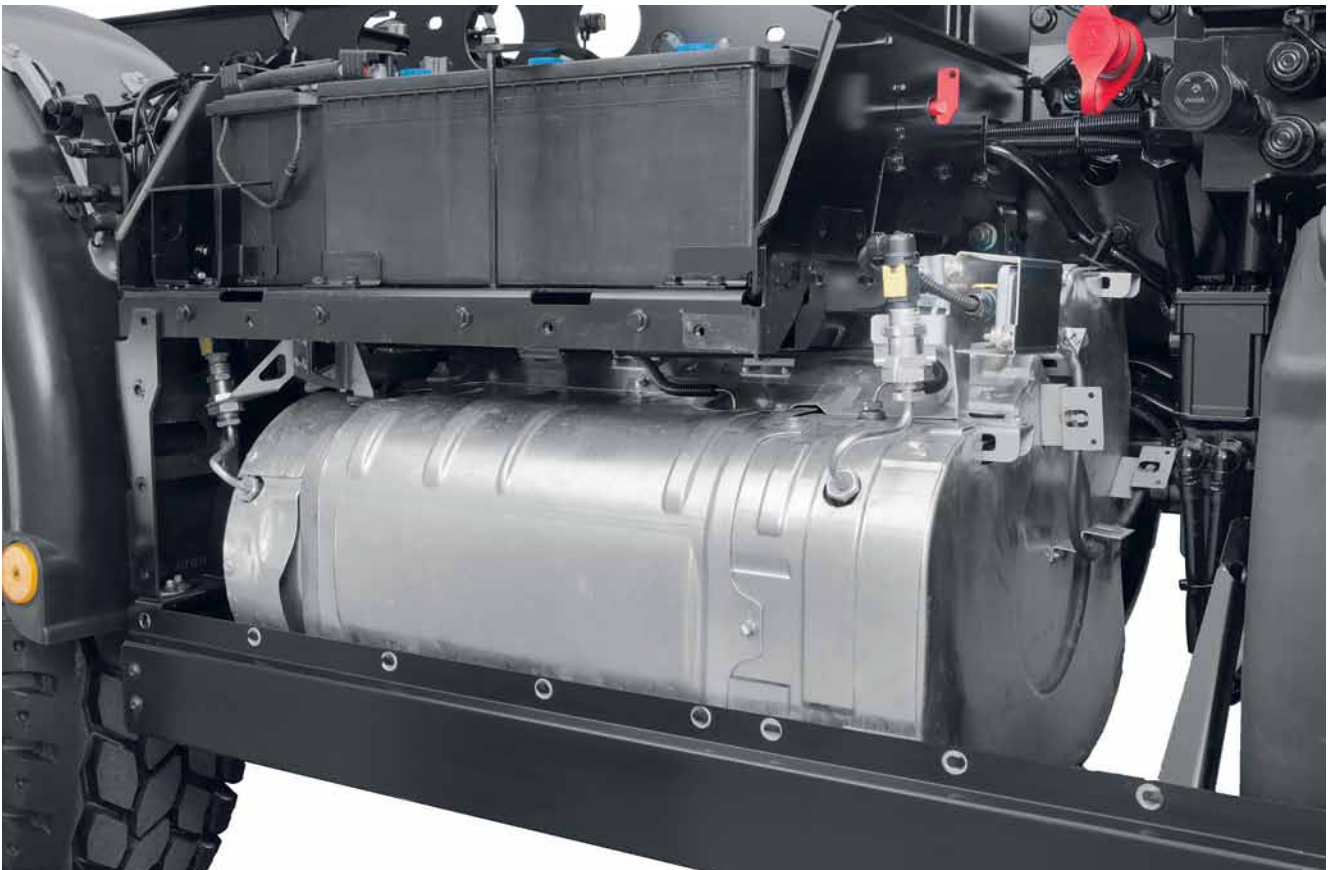
The AdBlue® is supplied via a heated tank. The AdBlue® is supplied via the intake line to the supply unit and from there to the metering unit on the exhaust system via the pressure line. AdBlue® can be diverted from the metering unit directly back to the AdBlue® tank via the return line. A special tank fitting with reduced diameter prevents the AdBlue® tank from being filled incorrectly with diesel fuel. The tank size is 18 l for the U200 and 25 l for all U300/U400/U500 models.

The AdBlue® intake line between the AdBlue® tank and pump module and the AdBlue® pressure line between the pump module and metering unit are heated electrically by the heating elements integrated in the line sections.

### Rear muffler with integrated oxidation catalytic converter, diesel particulate filter and SCR catalytic converter

A corresponding catalytic converter volume is required depending on the vehicle's engine. Only the following AGN boxes (exhaust aftertreatment boxes) are installed ex factory:

- 806 mm long on engine OM 934
- 856 mm long on engine OM 936



Exhaust box without cover

G14.00-3313-00

## Regeneration

Soot from diesel combustion and engine oil ash is continuously stored in the closed diesel particulate filter. In order to allow longer filter change intervals and a long filter service life, regular regeneration of the diesel particulate filter is required.

High exhaust temperatures pack the soot and engine oil ash and store it in compressed form at the end of the filter. This keeps the required exhaust back pressure within the permissible limits. Since the exhaust temperatures are not sufficient for passive regeneration in every driving situation, active regeneration may be carried out depending on the driving situation.

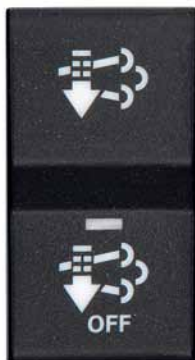
The system initiates regeneration automatically once a certain quantity of soot or ash is stored.

## Passive regeneration

- Continuously, at exhaust temperatures  $> 250\text{ }^{\circ}\text{C}$
- Without additional diesel injection
- Initiated automatically, no action required from driver

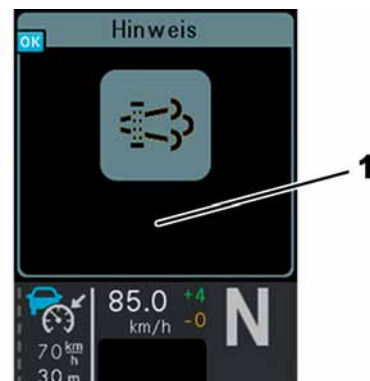
## Active regeneration

- Is required if the exhaust temperature is too low e.g. vehicle at standstill or slow driving
- Additional diesel injection to increase exhaust temperature
- Can be stopped at any time using the inhibit switch to suit the type and location of vehicle operation
- Initiated automatically, no action required from driver



Inhibit switch

G54.25-3464-00



1) Information field for regeneration messages

G54.30-3843-00

## Diesel particulate filter regeneration

## Diesel particulate filter regeneration

## Message

## What must be done?

"DPF regeneration"

No action required: Active regeneration in progress. Pay attention to high exhaust temperatures, comparable to those with wide open throttle, at the exhaust pipes. Do not interrupt regeneration if possible.

"High particulate filter fill level"

Action required within the next hours depending on fuel consumption and driving profile: Perform an extended trip using significant engine power (freeway, mountain route etc.) or perform manual regeneration. (Duration approx. 30 minutes)

"Particulate filter full"

Action required depending on fuel consumption and driving profile: Perform an extended trip using significant engine power (freeway, mountain route etc.) or perform manual regeneration at standstill. (Duration approx. 30 minutes)

"Particulate filter full"  
+  
"Output reduction"

Immediate action required: Perform manual regeneration at standstill. (Duration approx. 30 minutes)

"Particulate filter full"  
+  
"Service Required"

Immediate action required: Visit a workshop and have the DPF filter replaced. It is only possible to drive to the next workshop under reduced power. Regeneration is no longer possible.

The manual transmission is equipped with double-cone synchronization for all main gears and the reversing group and features a new transmission control system with 8 forward and 6 reverse gears to ensure optimal vehicle speeds for working deployments and transport journeys. Due to the fine graduations of the lower gears, it is possible to individually adjust the vehicle speed during working deployments.

The synchronized reversing group (EQR), for direct shifting between forward and reverse gears, enables quick reversing and can be used to rock the vehicle free.

Depending on the requirements, the transmission can be extended with a working group or crawler group and thus offers optimal gear-ratio steps for any usage profile.

The transmission model of the Euro IV/V vehicles has not changed for the Euro VI vehicles. The technical differences of the transmissions are controlled via the engine code.

**Note**

Pay attention to the engine code for replacement part orders.

## Main transmission

### Telligent® engine management

Operation takes place via the right multifunction control lever for safe and ergonomic shifting. An optimal gear preselection can be triggered through corresponding operation of the multifunction control lever.

The clutch must be operated to change gear and the shift operation then takes place automatically, which protects and conserves the engine, clutch and transmission. This means that the right hand of the driver is free during a gear change (e.g. to operate an implement).

Since there is no mechanical/hydraulic connection between the gear selector lever and transmission, there is no possibility of vibrations being transmitted into the cab. The low operating forces (shifting work is carried out by pneumatic cylinders) promote relaxed and concentrated driving.

The neutral switch with catch position in the multifunction control lever allows direct shifting to neutral from any gear as well as automatic gear selection from neutral at any speed and allows the switch and control elements to be arranged ergonomically.

### Electronic Quick Reverse (EQR)

The direct shifting function between the forward and reverse gears in all working gears and the first three on-road gears provides a safe and quick shifting process. Shifting to reverse gears is possible from all forward gears.

The selection of reverse/forward gears via the multifunction control lever provides a high level of shifting safety (hand does not have to be left on the shift lever knob), relieves the stress on the driver, improves handling, improves the driver response to various driving situations and enables better snow clearing performance on car parks/intersections. The use of reverse mode with preselection is designed to prevent the possibility of mix-ups.



Telligent® engine management multifunction control lever

G54.25-3465-00



Multifunction control lever (EQR)

G54.25-3466-00

### **New features of the electronic automated gearshift (EAS) system (code G48) for Unimog Euro VI vehicles**

The technology of the automated clutch system has been fully reworked but its operation is largely identical to that of the predecessor model series. All of the functions of the automated clutch system are combined in the transmission control unit (TCM-Transmission Control Module). This means that an additional clutch control unit is no longer required. A folding clutch pedal is still installed for manual operation. The operating medium DOT4+ (brake fluid) has remained the same.

The release travel sensor on the central clutch release bearing is used to control the automated clutch engagement process. In addition to the improved control quality, this makes it possible to compensate for tolerances e.g. due to small quantities of air in the hydraulic fluid. The additional volume required for this is held in reserve due to the increased stroke of the dual master cylinder.

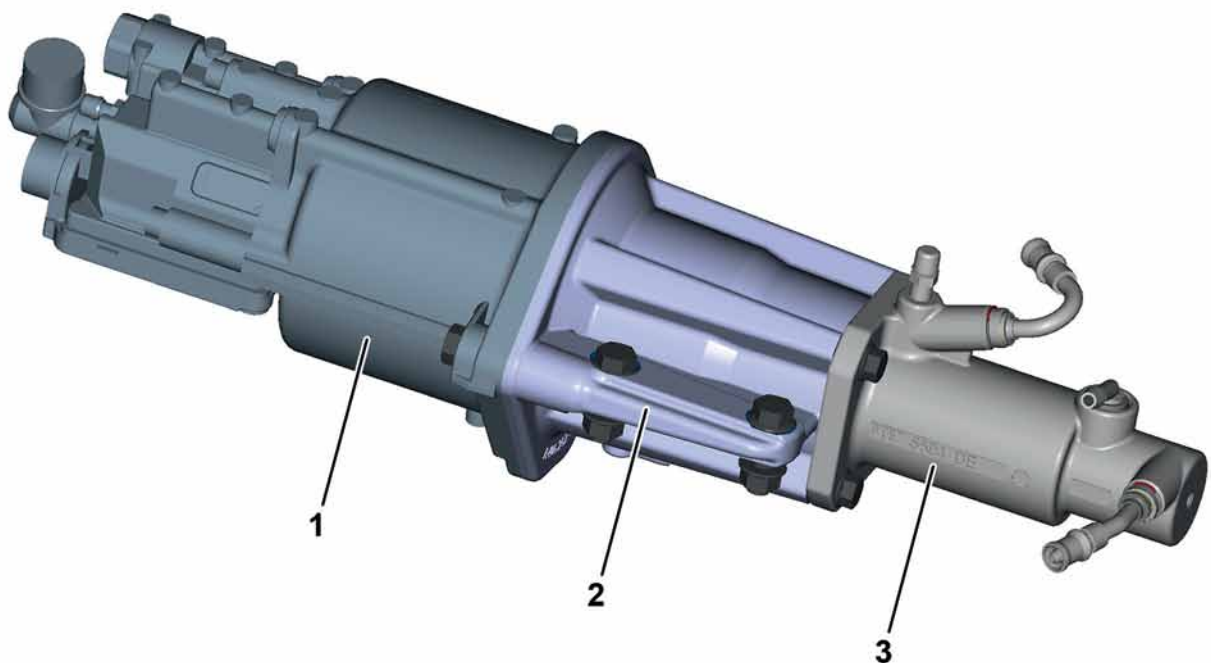
To take over the manual clutch function, the pedal must be folded out (also possible while driving) and fully depressed once. It is possible to switch to automated operation with the vehicle at a standstill (ignition OFF no longer required). In manual mode, the vehicle can be operated like an EPS vehicle.

- Automated operation by means of pneumatic clutch actuator PCA2 (Actros3 series production part) and short hydraulic circuit (dual master cylinder-central clutch release bearing).
- Two separate hydraulic circuits for optimal bleedability and higher system availability. A short main circuit (both operation types) between the dual master cylinder and central clutch release bearing with separate reservoir. A pedal circuit between the pedal master cylinder and dual master cylinder. All lines have a continuously ascending routing path to ensure the self-bleeding properties of the system.
- Hydraulic clutch pressure booster integrated in pedal circuit. Boosting is not required for automated operation.
- Both hydraulic circuits are separately filled and bled (first main circuit, then pedal circuit). This also reduces the complexity for replacing individual components because only the affected circuit has to be bled, if necessary.
- Two reservoirs, one in the pedal circuit in the cab and one in the main circuit behind the cab.



## EAS

- An additional travel sensor in the PCA and two switches on the pedal for status detection (pedal folded in/out, pedal fully depressed) ensure the best possible system monitoring and fault detection/diagnosis.
- The values of both travel sensors can be accessed on the instrument cluster for diagnosis.
- All compressed air connections of the PCA and pressure booster are now connected to the auxiliary consumer circuit. If the pressure in the auxiliary consumer circuit is insufficient (e.g. after an extended idle period), the clutch can still be manually disengaged (with increased application of force) in order e.g. to perform a cold start.
- To start off in EAS mode, a start-off gear which suits the road surface inclination and vehicle weight is preselected.



**Pneumatic actuator (PCA) with connecting housing and dual master cylinder**

- 1) PCA
- 2) Connecting housing
- 3) Dual master cylinder

G26.21-3124-00

### New hydrostatic drive

The launch of the new Unimog implement carrier marks the world premiere of a new hydrostatic drive (code G34), which combines a modified hydrostatic drive major assembly concept with the cruise control operating and control concept. It replaces the previous hydrostatic drive system (code G33) used in the Unimog implement carrier. The combination of hydrostatic drive and manual transmission now allows on-the-fly switching while driving. Previously, it was necessary to stop briefly to change systems. The new convenient Drive-Work mode is useful, for example, when a noise protection barrier interrupts the mowing of a road verge for an extended distance. While driving and working steplessly reduces clutch wear and improves performance in particular, driving with the manual transmission saves fuel due to optimized efficiency levels.

### Main functions

- The system allows fully hydrostatic driving at up to 50 km/h and, in combination with EAS, also allows mixed hydrostatic/transmission-powered driving.
- The system can be operated with the usual driving controls (accelerator pedal, brake, multifunction control levers, steering wheel cruise control buttons).
- The system is supported by an additional left multifunction control lever (code DG1) for the gearshifting, cruise control and travel direction functions.
- The vehicle can also be accelerated and decelerated via the hydraulic joystick in "driving joystick active" mode.
- Using proportional valves and pressure sensors, a control unit regulates the hydrostatically coupled variable displacement pump and variable displacement motor which can be engaged ahead of the main transmission by means of dog clutches.
- The actuation system allows both gearshifting and switching to transmission mode while driving as well as ABS-assisted emergency braking. Changing back is only possible at a standstill.

### Performance

The hydrostatic components are engaged by a dog clutch with the vehicle at a standstill but can be disengaged while driving. The electronic pressure control system allows automotive-style coasting as well as gearshifting without opening the friction clutch while driving.

The major assemblies used have a power of approx. 60 kW. In full hydrostatic mode, the gear ranges 1-6 are available. The ABS function is available without limitation in hydrostatic mode. This system operates optimally when working at speeds below 10 km/h. When driving on an uphill section, the major assembly is automatically regulated to provide the maximum power. Particularly during start-off, the skid torque is increased by roughly 20% by increasing the maximum working pressure and through electronic pressure control. This means that it is generally no longer necessary to additionally engage the working gear group.

## Overview

### Work transmission mode

During working operations, this transmission mode allows the vehicle speed to be adjusted independently of the engine speed.

The vehicle speed can, if necessary, be regulated using the work mode cruise control function within a range of 0.1 km/h to 25.0 km/h, allowing the vehicle to be driven without using the accelerator pedal. Gear changes can also be initiated manually using the controls while driving. The system is limited to 6th gear and a speed of 50 km/h.

### Drive transmission mode

This mode is used for automotive-style driving using the hydrostatic drive. Starting from an increased idle speed (900 rpm), the engine speed is regulated depending on the vehicle speed and accelerator pedal. On vehicles with EPS and EAS, gear changes can be initiated automatically or manually as desired (change via extended actuation of A/M mode button on the right multifunction control lever). The system is limited to 6th gear and a speed of 50 km/h as long as the hydrostatic drive is activated. When changing from Drive to Work (using the A/M mode button on the right multifunction control lever), the last working speed active in Work (within an ignition cycle) is automatically restored and the last active gear is engaged (provided that engagement conditions are met within 15 s). When changing from Work to Drive, the start-off gear stored for Drive is engaged with the vehicle at a standstill.

### Changing between the new hydrostatic drive and transmission

The new hydrostatic drive can be deactivated while driving by pressing the system button on the center console. On EPS vehicles or EAS vehicles with the clutch pedal folded out, the clutch must be also be operated manually. If the new hydrostatic drive has been shut off in this manner (the LED in the system button is no longer on), the new hydrostatic drive can then only be activated again using the system button with the vehicle at a standstill. Only on EAS vehicles with the clutch pedal folded in is it possible to put the new hydrostatic drive into standby mode while driving and switch to a limited mechanical drive mode. This is triggered in Work or Drive by pressing the accelerator pedal past the pressure point (kick-down). The new hydrostatic drive remains in standby mode (LED in system button flashes), while the vehicle is driven by the transmission with automatic gear changes. The mode "H drive" is shown on the display. During coasting, the system automatically switches to the new hydrostatic drive so that the vehicle is always started off hydrostatically. The start-off gear used for this can be selected with the vehicle at a standstill (gear 1-6). When the new hydrostatic drive is in standby mode, 8th gear is disabled to prevent driving at maximum speed. This is intended to prevent increased consumption over extended periods. If the driver wants to drive at full speed, he/she has to switch off the new hydrostatic drive using the system button.

The components are arranged sequentially: friction clutch, transmission. In the transmission, the direction of rotation of the engine can be inverted via the reversing group by means of a switchable gear set and the torque can be transferred via the countershaft to the main transmission. In the process, power is transmitted by the gears with an efficiency of  $> 0.9$ . In a third position (neutral position), the torque of the engine can be diverted to a hydraulic pump via a dog clutch. An oil volume can be steplessly transferred to the hydraulic motor in both directions via the closed high-pressure circuit.

The hydraulic motor draws in the oil volume from the pump hydrostatically and transfers the resulting torque to the countershaft via an additional dog clutch and thus to the main transmission when a gear is engaged. A variable gear ratio for rpm and torque is produced by adjusting the volumes in the pump and motor. As a result of mechanical and volumetric losses, the resulting efficiency levels are lower, ranging from 0.4 to 0.7.

Through the use of hydraulic assemblies which can be electrically adjusted to zero output, it is possible to interrupt power transmission to allow engagement/disengagement and shifting of transmission stages while driving. By simultaneously reducing the volumes of the hydraulic pump and hydraulic motor on a proportional (ratiometric) basis, it is possible to interrupt the power transmission of the hydraulic assembly without changing the gear ratio.

Measuring the high pressure allows the transmission to be shifted into an unpowered state at the optimal time. Opening the drive clutch allows the hydraulic assemblies to be completely shut off while driving by means of dog clutches. The pressure control system in the high-pressure circuit allows the hydraulic assemblies to be adjusted for optimal performance.

## Design

### Hydraulic pump

A variable displacement and switchable swash plate axial piston pump of 55 cm<sup>3</sup> is used. The rotation direction of the pump drive is clockwise. It is mounted via an SAE-C mounting flange with an ANSI B92.1 drive shaft with 21 teeth. The low-pressure circuit is supplied with 24 bar by an integrated feed pump. The pump displacement is varied in a pressure range of 4 - 16 bar from 0 cm<sup>3</sup> to 55 cm<sup>3</sup>. The actuating pressure is controlled on a linear basis with a 24 V proportioning valve for each direction, ranging from 225 mA - 4 bar to 600 mA - 16 bar. The pump does not feature an internal mechanical pressure cutoff function.

### High-pressure circuit pressure sensors

Pressure sensors are used at both measuring connections of the hydraulic pump (forward and reverse high-pressure circuit). Measuring range 0-600 bar, connection stud M14x1.5 DIN 3852 with sealing ring. Power supply 5 V, ratiometric voltage output 10% - 0 bar - 0.5 V, 90% - 600 bar - 4.5 V.

### Hydraulic motor

A variable displacement swash plate axial piston pump of 75 cm<sup>3</sup> is used. It is mounted via an SAE-C mounting flange with an ANSI B92.1 drive shaft with 21 teeth. The low-pressure circuit is supplied by the integrated feed pump of the hydrostat pump. The motor displacement is varied in a pressure range of 4 - 16 bar from 0 cm<sup>3</sup> to 75 cm<sup>3</sup>. The actuating pressure is controlled on a linear basis with a 24 V proportioning valve, ranging from 225 mA - 4 bar to 600 mA - 16 bar. When deenergized, the major assembly swivels to the zero position. No delayed adjustment nozzles are installed in the low-pressure circuit to improve controllability.

### Dog clutches and reversing group

The dog clutches for the new hydrostatic drive are operated pneumatically by a separate 3/2-way valve actuated by the ICM. The reversing group is actuated pneumatically by the transmission control system (TCM) via 3 separate 3/2-way valves. This allows the reversing group and hydraulic assemblies to be switched independently, which allows rapid switching between the manual transmission and hydrostatic transmission. The condition of each dog clutch is read in separately by the ICM via separate cam switches.

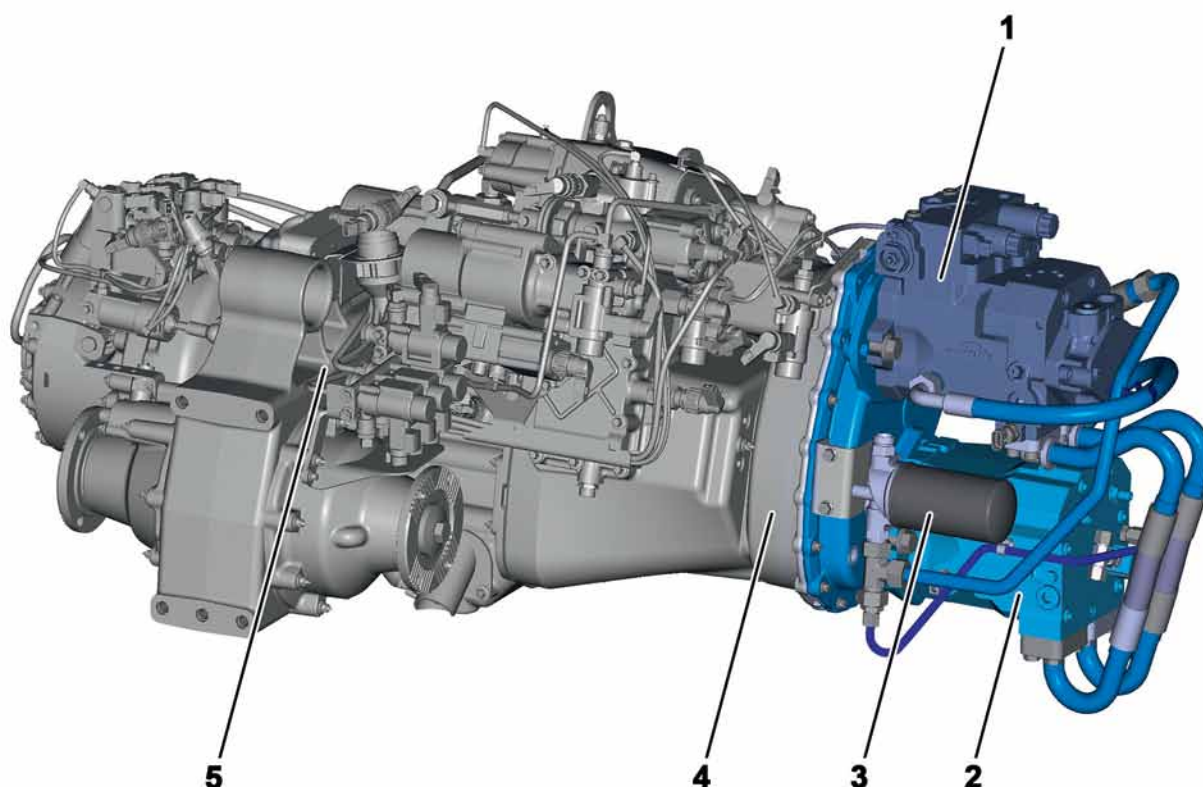
### Cooling

A temperature sensor which senses the oil temperature of the hydrostatic drive is connected to the STCU. As of 70 °C, a fan is activated via a relay connected to the STCU and is shut off again at 60 °C. If the temperature exceeds 80 °C, a warning is output on the Instrument. If the temperature does not drop, the adjustable maximum pressure is gradually limited to reduce the power output capability of the major assembly.

### Control unit

The algorithm for control of the hydrostatic drive is integrated in the ICM virtual control unit (Implement Carrier Module). The ICM runs on the physical STCU (Special Trucks Control Unit). It is diagnosis-capable, parameterizable and flashable, which allows troubleshooting using Star Diagnosis in the workshop. An operating hours counter can be accessed on the Instrument. A control joystick can be installed on the center console, which is connected to the STCU via CAN, and is evaluated in the ICM for actuation of the hydraulic components and the new hydrostatic drive.

An additional lever in the form of a cruise control lever can be installed on the left of the steering column assembly above the turn signal lever. This lever is also connected to the STCU and is evaluated in the ICM to control the transmission, cruise control and travel direction.



### Transmission with hydrostatic drive

- 1) Variable displacement pump
- 2) Variable displacement motor
- 3) Oil filter
- 4) Intermediate transmission
- 5) Manual transmission

G55.90-3169-00

## Overview

The hydraulic system of the Unimog can be made up of the following components.

- Fan hydraulics
- Tilting hydraulics
- Work hydraulics
- Power hydraulics

### Fan hydraulics

The fan hydraulics are included in the basic scope of all vehicles. Fan hydraulics are only available to body manufacturers with code HE2.

Actuation of tilt cylinders

- On vehicles without work hydraulics, the tilt cylinder is actuated on a simple on/off basis via a button in the cab.
- On vehicles with work hydraulics (code HN2/HN4/HN6/HN7/HN8), the tilt cylinder is actuated proportionally via the vehicle joystick.

### Working/municipal hydraulics (circuit I and circuit II)

The working hydraulics allow an implement to be adjusted or a permanent consumer to be supplied. On the 1-circuit hydraulic system one circuit is available for this, while on the 2-circuit hydraulic system, two independent circuits are available, each with its own fixed displacement pump. This allows adjustment operations to be carried out and a permanent consumer to be supplied simultaneously. On the 2-circuit hydraulic system, the volumetric flow rates can be swapped over via the volume switchover function or added together via flow summation.

Changes compared to the hydraulic system of Euro V vehicles:

- Fully proportional working hydraulics at connections of cells 1–4 (connections 1–8)
- Integrated pressure and return filter
- Control of consumers during adjustment operations via the vehicle joystick (social distribution) with diagonal movement of vehicle joystick.
- Hydraulic connection possibility on distributor block underneath PTO transmission (e.g. for roll stabilization)
- Electrical interface for actuation of hydraulic valve block (circuit I) e.g. for external actuation of front and/or rear power lift
- Joystick with rocker switch for forward/reverse shifting of manual vehicle transmission

#### ⓘ Important

The vehicle tilt cylinder is connected to the valve block (code HE1 / HE2 (EQR)) of the tilt hydraulics (independently of the work hydraulics). With this new hydraulic arrangement, it is possible to order a vehicle with tilting hydraulics even without work hydraulics.

#### ⓘ Note

Due to the omission of link motion, two adjustment operations can be carried out simultaneously. Example: Raise front loader and tilt shovel simultaneously.

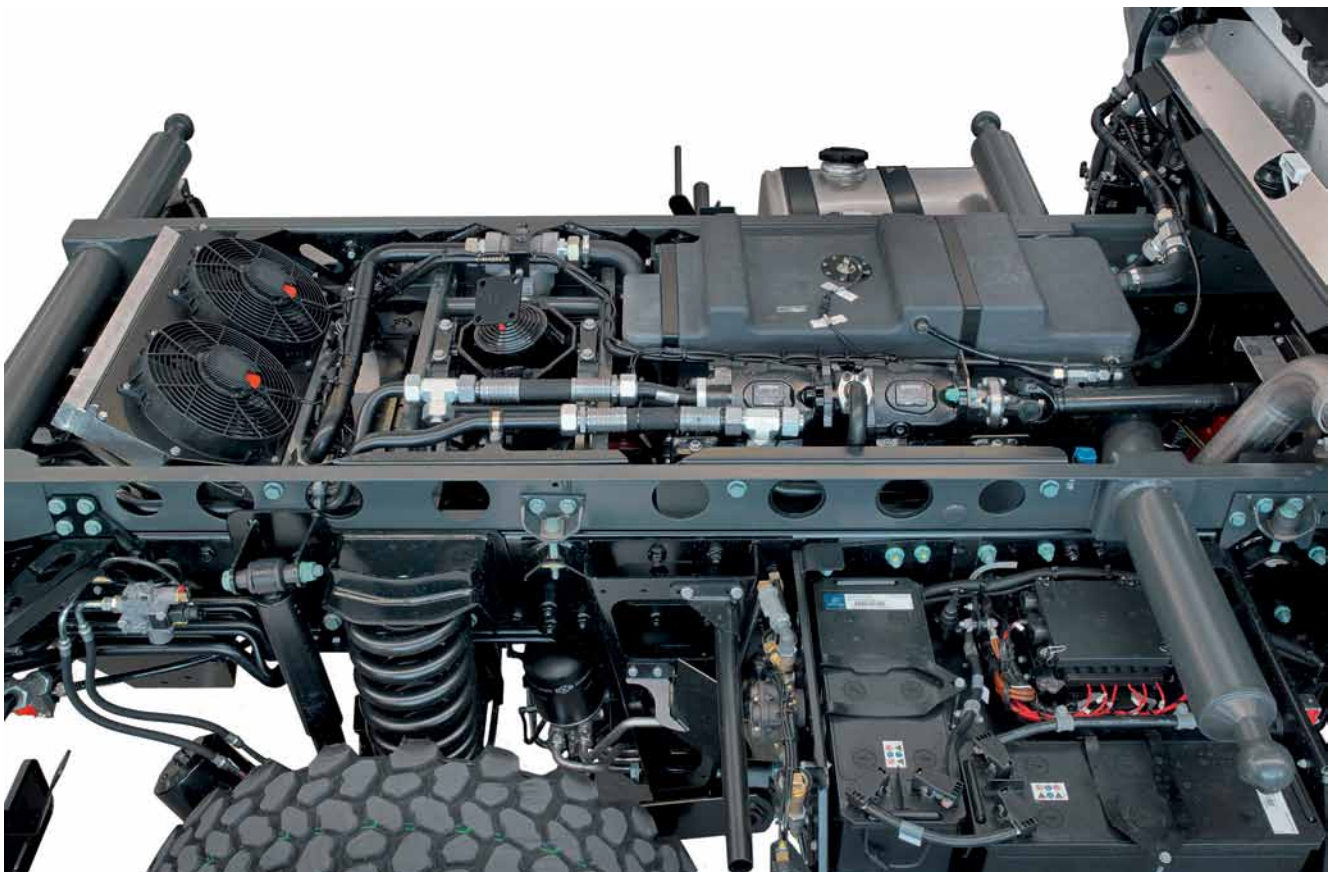
### Power hydraulics (circuit III and IV)

The power hydraulics allow rotating consumers to be powered (e.g. cutting roller, wood chipper etc.). Both circuits are designed as open circuits with a maximum volumetric flow rate of 125 l/min each at a maximum of 280 bar. Code HL4 includes one circuit while code HL5 includes two power hydraulics circuits.

- The power hydraulics are located in the platform intermediate frame and can be quickly removed if they are not required e.g. during winter service operations in order to increase the payload. As a result, the connections are no longer in the vehicle center but at the vehicle rear.
- In addition to the rear connections, front connections are also possible for both circuits (including simultaneously) with code H93 and H94.

#### **Note**

All of the aforementioned volumetric flow rate and pressure specifications are maximum values, which are only available at the corresponding engine speed and may not be available permanently.



G55.00-3169-00

Overview of hydraulic components



## Plug connections



Right front hydraulic plug connections

G55.00-3160-00

### Front connections of work hydraulics

The front connections of circuit I of the work hydraulics are located within the bumpers (cell 1 and 2 on the left side of the vehicle and cell 3 and 4 on the right side of the vehicle). The pressure connection of circuit II is positioned level with the power take-off stub shaft directly above the right-hand pocket of the front mounting plate viewed in the direction of travel. The separate return line (both for circuit I and circuit II) is located approx. 400 mm to the right (in the direction of travel) from the pressure connection of circuit II.



Left front hydraulic plug connections

G55.00-3161-00

### Front connections of power hydraulics

In addition to the connections of the work hydraulics (circuit I and II), the vehicles can be equipped at the front with the connections of power hydraulics circuit III (code H93) and also with the connections of circuit IV (code H94). The connection of the pressure line of code H93 is located at the vehicle front to the left of code H94 (viewed in the direction of travel).



Rear hydraulic plug connections

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### Rear connections of power hydraulics

The connections of the power hydraulics are integrated in the platform intermediate frame. All of the connections are located at the vehicle rear, above the end crossmember.

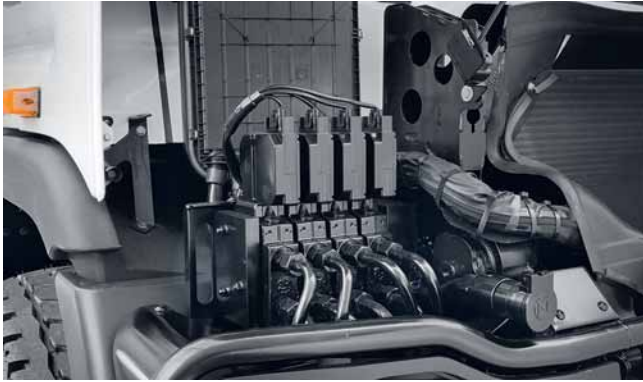
### Special hydraulic equipment at rear

- Hydraulic plug connection, rear, 4 connections, cell 1+2 (code H55). Four connections at the rear to cell 1 and cell 2 with hydraulic package, dual action for adjustment operations or continuous oil flow and flat-seal plug connections as per ISO 16028
- Pressure line, rear, 2nd hydraulic circuit (code H58). Pressure line for circuit II at rear and flat-seal quick-connect coupling, size 19
- Separate return line, rear (code H59). Separate rear return line for circuit I + II



Rear hydraulic plug connections

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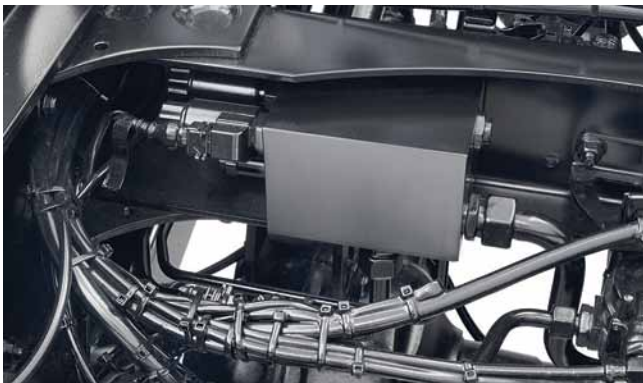


Circuit 1 hydraulic control block

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#### Special hydraulic equipment

- Hydraulic system, 1-circuit, 2-cell, fully proportional (code HN2)
- Hydraulic system, 2-circuit, 3-cell, fully proportional (code HN4)
- Hydraulic system, 2-circuit, 3-cell, fully proportional, snowplow relief (code HN6)
- Hydraulic system, 2-circuit, 4-cell, fully proportional (code HN7)
- Hydraulic system, 2-circuit, 4-cell, fully proportional, snowplow relief (code HN8)



Rear hydraulic valve

G55.00-3165-00



Circuit 2 hydraulic valve block

G55.00-3164-00

#### Center connections of work hydraulics (circuit II only)

The hydraulic connections of circuit II for the center implement mounting space are located on the right side of the vehicle and are always present on vehicles with dual-circuit hydraulics (as of code HN4 to HN8). These two connections of circuit II (pressure and separate return line) can be used to drive permanent consumers. As at the front of the vehicle, the connection of the pressure line is designed as a male connector and the connection of the return line is designed as a socket.

## Joystick



G55.00-3158-00



G55.00-3168-00

## Joystick

- |   |   |
|---|---|
| <p>1) Rocker switch<br/>Perform EQR function</p> <p>2) Rocker switch<br/>Regulate working speed</p> <p>3) Button<br/>free for assignment by body manufacturers, allows actuation of a 3rd plane</p> <p>4) Button<br/>Actuate plane 2 (cell 3+4) Button Set values (store)</p> | <p>5) Button<br/>Control text menu</p> <p>6) Button<br/>Activate float position Control snowplow relief</p> |
|---|---|

**i Note**

The joystick is a component of the work/power hydraulics. The joystick is not part of the hydraulics for the tilt mechanism.

### Volumetric flow rates of work hydraulics

The fixed displacement hydraulic pumps of circuits I and II are driven by the engine via a poly V-belt. As a result, both pumps pump oil as soon as the engine is running. If the hydraulic circuits are switched off, the flow from each respective pump is pumped back into the tank via a high-pressure filter, a bypass line and a return filter.

The following recommendations apply to the connection of consumers:

- Do not connect with the engine running
- Activate the float position of the respective cell on circuit I

The flow rates of circuit I and circuit II can be switched over using the hydraulic operating unit in the cab (known as "volume switchover"). This means that an implement connected to circuit II receives the flow from circuit I and vice versa.

It is also possible to combine the flow rates of circuits I and II (known as "flow summation"). This means that the flow rate of the other circuit is additionally made available to a consumer.

### Circuit I

When connecting implements to circuit I, remember that it is not permissible to connect implements simultaneously to the same cell (color) at the front and rear.

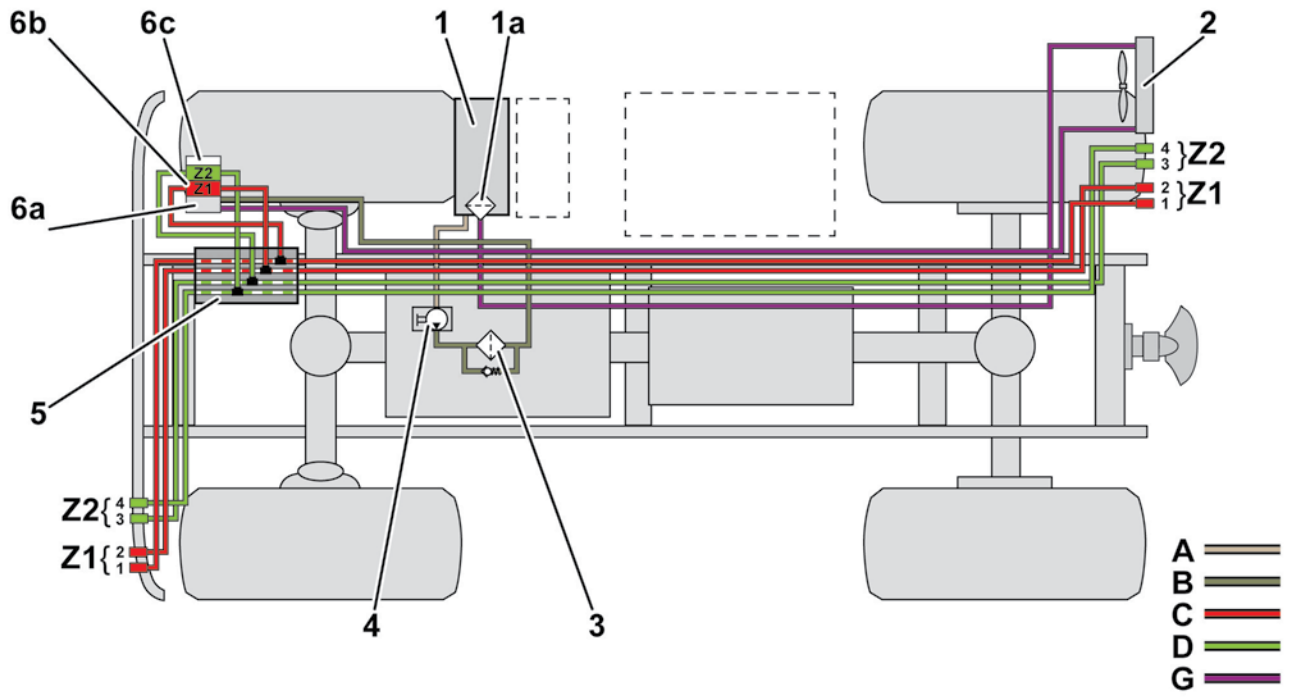
Dual action cylinders may only be connected to one cell (color) respectively and must be connected so that the actuation movement corresponds to the movements of the implement (raise: pull hydraulic control lever; lower: push hydraulic control lever).

The designation "cell" is synonymous with a hydraulic valve. Two connections are available per cell. The connections of one cell always have the same color e.g. connections 3 and 4 are supplied by cell 2 and are marked by green covers.

### Circuit II

Before switching on circuit II, a consumer (or a short circuit hose) must always be connected to the connections of circuit II in order to prevent damage to the pump.

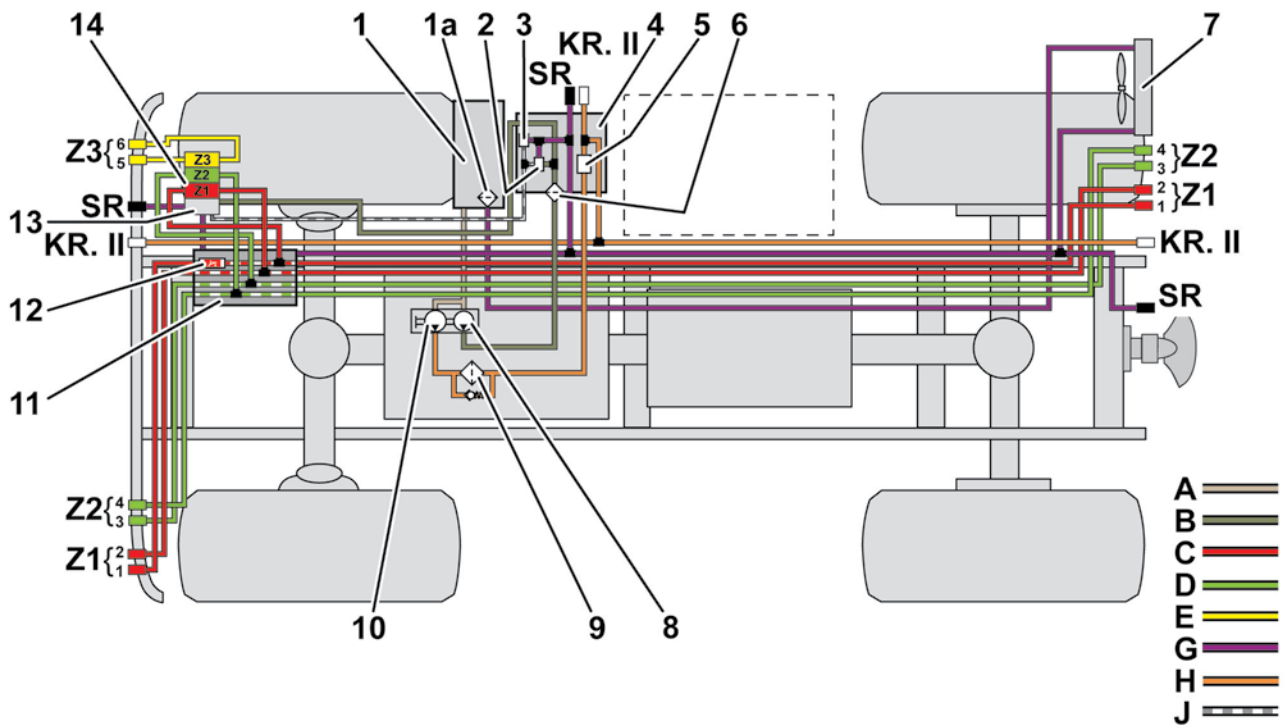
## 2-cell work hydraulics



Hydraulic diagram of work hydraulics, 2-cell single circuit hydraulic system

G55.30-3422-00

A	Intake line	1	Hydraulic oil reservoir
B	Pressure line, general	1a	Filter unit
C	Working line (cell 1)	2	Radiator
D	Working line (cell 2)	3	Pressure filter
G	Return line, general	4	Single pump
Z1	Cell 1	5	Distributor block
Z2	Cell 2	6a	Cell block inlet
		6b	Cell blocks
		6c	Cell block with pressure limiting valve

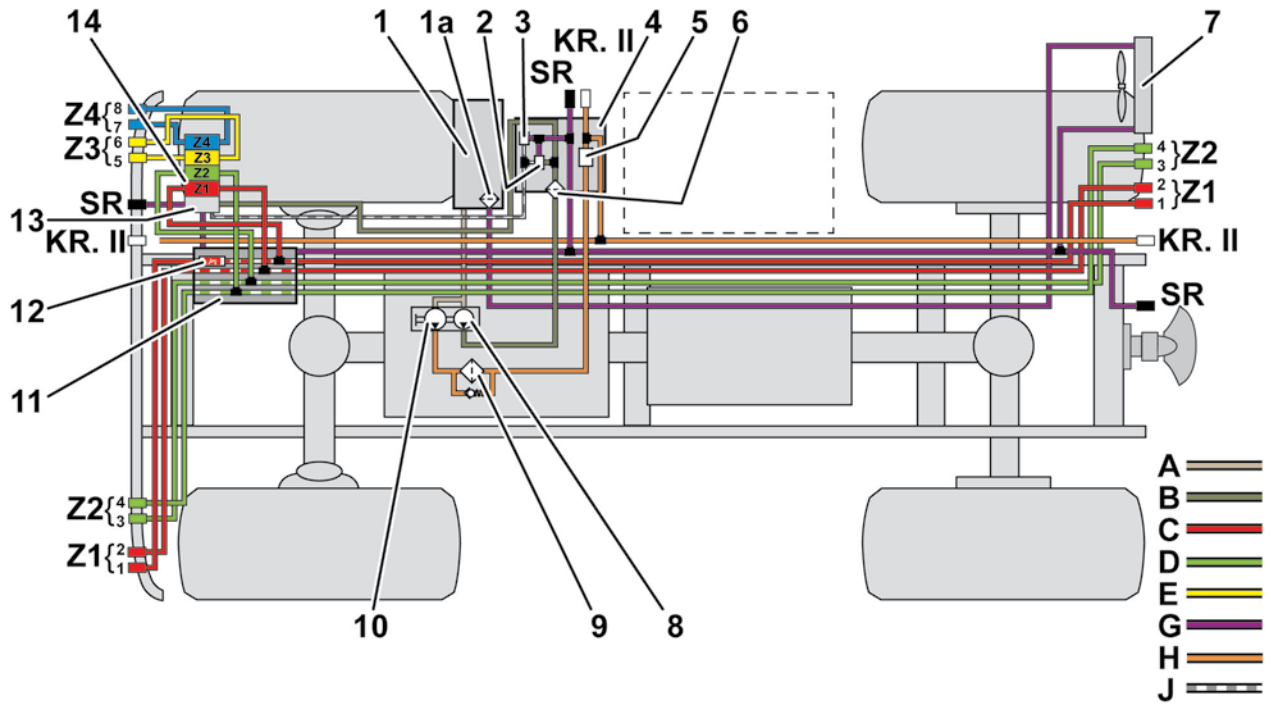


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Hydraulic diagram of work hydraulics, 3-cell dual circuit hydraulic system

A	Intake line	1	Hydraulic oil tank
B	Pressure line, general	1a	Filter unit
C	Working line (cell 1)	2	Flow control valve
D	Working line (cell 2)	3	Pressure limiting valve
E	Working line (cell 3)	4	Inlet block
G	Return line, general	5	Pressure limiting valve (DBV), circuit II
H	Pressure line (circuit II)	6	Pressure filter of pump 1
J	Load signal line	7	Radiator
		8	Pump 1
KR. II	Circuit II	9	Pressure filter of pump 2
SR	Separate return line	10	Pump 2
		11	Distributor block
Z1	Cell 1	12	Snowplow relief valves
Z2	Cell 2	13	Cell block - inlet
Z3	Cell 3	14	Cell blocks

## 4-cell work hydraulics



Hydraulic diagram of work hydraulics, 4-cell dual circuit hydraulic system

G55.30-3424-00

A	Intake line	1	Hydraulic oil tank
B	Pressure line, general	1a	Filter unit
C	Working line (cell 1)	2	Flow control valve
D	Working line (cell 2)	3	Pressure limiting valve
E	Working line (cell 3)	4	Inlet block
F	Working line (cell 4)	5	Pressure limiting valve (DBV), circuit II
G	Return line, general	6	Pressure filter of pump 1
H	Pressure line (circuit II)	7	Radiator
J	Load signal line	8	Pump 1
		9	Pressure filter of pump 2
KR. II	Circuit II	10	Pump 2
SR	Separate return line	11	Distributor block
		12	Snowplow relief valves
Z1	Cell 1	13	Cell block - inlet
Z2	Cell 2	14	Cell blocks
Z3	Cell 3		
Z4	Cell 4		

The power hydraulics are located in the platform intermediate frame and can be removed if necessary (e.g. for winter service operations). They are powered by a propeller shaft on the engine power take-off (code N05). The hydraulic couplings are located at the vehicle rear above the end crossmember. Front hydraulic connections are also optionally available, either for one circuit or for both circuits.

#### Overview of circuit III (code HL4)

- Rear pressure line, return line and leak oil line (code HL4)
- Rear pressure line, return line and leak oil line. Plus front connections: Pressure line, return line and leak oil line (code HL4 + H93)

#### Overview of circuit III and circuit IV (code HL5)

- Rear return line and leak oil line and pressure line for each circuit respectively (code HL5)
- Rear return line and leak oil line and pressure line for each circuit respectively. Lines towards front, pressure line, return line and leak oil line (code HL5 + H93).
- Rear return line and leak oil line and pressure line for each circuit respectively. Front: Return line, leak oil line and the two pressure lines for circuit III and circuit IV (code HL5 + H93 + H94)

#### Volumetric flow rates of power hydraulics

A constant delivery rate is often necessary to operate a permanent consumer.

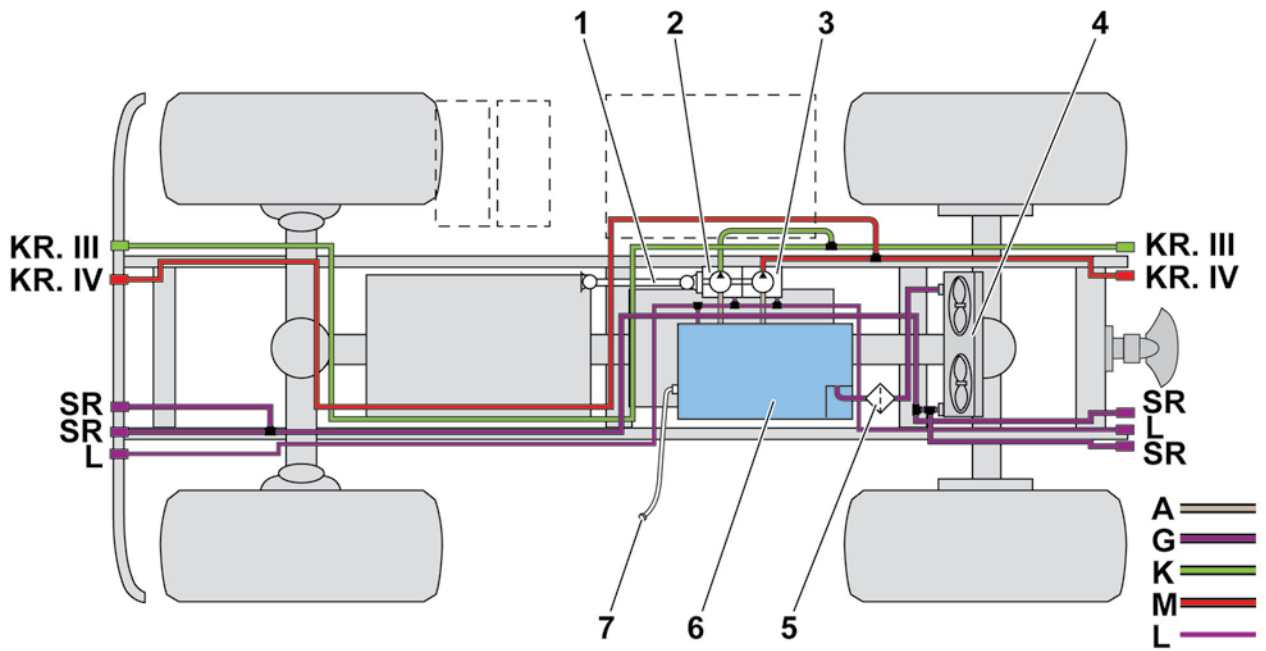
As a result, both circuits of the power hydraulics (circuits III and IV) of the Unimog are equipped with variable displacement pumps. Before usage, the operator sets the required volumetric flow rate of the corresponding circuit on the Instrument using the steering wheel buttons. The volumetric flow rate in each circuit can be set steplessly to between 0 and the maximum flow rate of 90 l (up to 125 l/min in isolated cases). This is regulated irrespective of the engine speed within the capabilities of the system. If the engine speed changes during operation, the flow rate of the variable displacement pump remains constant (within the boundaries of the available volumetric flow rate).

#### Oil heating/cooling

The radiator of the power hydraulics, which is installed in the platform intermediate frame, has a cooling output of approx. 15 kW. If a higher cooling output is required, a radiator must be installed on the implement. Care must always be taken to ensure that the hydraulic components are matched to the respective usage case/operating point to avoid unnecessarily high power losses. When using flow rate controllers, the maximum flow rate should never be exceeded.



## Power hydraulics



Hydraulic diagram of power hydraulics

G55.30-3425-00

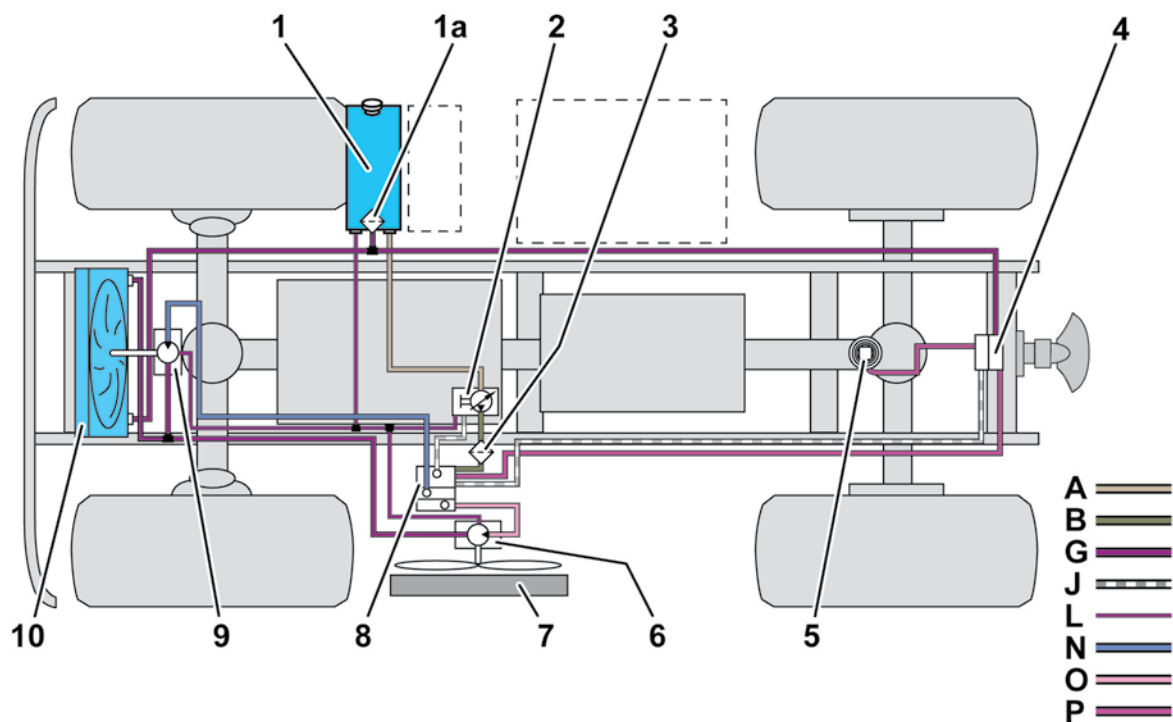
A	Intake line	1	Drive shaft
G	Return line, general	2	Variable displacement pump, circuit III
K	Pressure line (circuit III)	3	Variable displacement pump, circuit IV
M	Pressure line (circuit IV)	4	Radiator unit
L	Leak oil line	5	Return filter
KR. III	Circuit III	6	Hydraulic oil reservoir
KR. IV	Circuit IV	7	Filling/bleed line
SR	Separate return line		

**The fan hydraulics consist of:**

- Variable displacement pump
- High-pressure filter
- Valve block (control of charge air cooler and radiator)
- Fan motors (front charge air cooler and left radiator fan)
- Oil cooler
- Oil tank with integrated return filter
- Lines and hoses

**Note**

The fan hydraulics are included in the basic scope of every vehicle.



Hydraulic diagram of basic hydraulics/fan hydraulics

G55.30-3426-00

A	Intake line	1	Hydraulic oil tank
B	Pressure line, general	1a	Filter unit
G	Return line, general	2	Variable displacement pump
J	Load signal line	3	Pressure filter
L	Leak oil line	4	Valve block - dumper flatbed
N	Front fan motor pressure line	5	Tilt cylinder
O	Left fan motor pressure line	6	Oil motor
P	Dumper pressure line	7	Left radiator
		8	Valve block - fan
		9	Oil motor (charge air cooler, oil cooler)
		10	Front radiator

## Tilting hydraulics

The tilting hydraulics are based on the fan hydraulics and are equipped with an additional valve block positioned level with the frame crossmember between the two rear spring brackets.

The following versions of the valve block are available:

- Fan hydraulics with tilting hydraulics (code HE1)
- Fan hydraulics with tilting hydraulics (code HE2) incl. hydraulic connection for auxiliary consumers (rail guide and auxiliary rear axle steering)

Tilt cylinder actuation:

- On vehicles without work hydraulics, the tilt cylinder is actuated on a simple on/off basis via a button in the cab.
- On vehicles with work hydraulics (code HN2/HN4/HN6/HN7/HN8), the tilt cylinder is actuated proportionally via the vehicle joystick.

### **i** Note

The tilting hydraulics are also available without tilt cylinder (code H43) e.g. for actuation of external auxiliary consumers (not permanent consumers).

	Fan hydraulics	Tilting hydraulics	Single circuit	Dual circuit Work hydraulics	Power hydraulics
<b>Hydraulic circuit</b>	Basic scope	Based on fan hydraulics	<b>Circuit I</b>	<b>Circuit I</b>	<b>Circuit II</b>
Volume	62 l	62 l	62 l	62 l	50 l
Filling capacity for oil reservoir	Approx. 45 l	Approx. 45 l	Approx. 45 l	Approx. 45 l	Approx. 45 l
Qty. used	25 – 30 l	25 – 30 l	25 – 30 l	25 – 30 l	5 l
Pump displacement cm <sup>3</sup> /rev	28 cm <sup>3</sup>	28 cm <sup>3</sup>	19 cm <sup>3</sup>	11 cm <sup>3</sup>	63 cm <sup>3</sup>
Pump design	Variable displacement pump	Variable displacement pump	Fixed displacement pump	Fixed displacement pump	Variable displacement pump
Drive	Power take-off on engine i=1.0	Power take-off on engine i=1.0	Belt of engine i = 0.736	Belt of engine i = 0.736	Propeller shaft on N05 i=0.935
Pressure	200 bar	185 bar	210 bar	210 bar	280 bar
Flow rate at engine speed 2200 rpm	Approx. 20 l/min	Approx. 20 l/min	Approx. 55 l/min	Approx. 32 l/min	Approx. 55 l/min
Maximum power [kw]	6,66	6,66	22	12,8	22
Application	Only vehicle internals	Adjustment operations	Adjustment operations/oil supply	Adjustment operations/oil supply	Oil supply
					Oil supply
					Oil supply
					Oil supply

## Overview

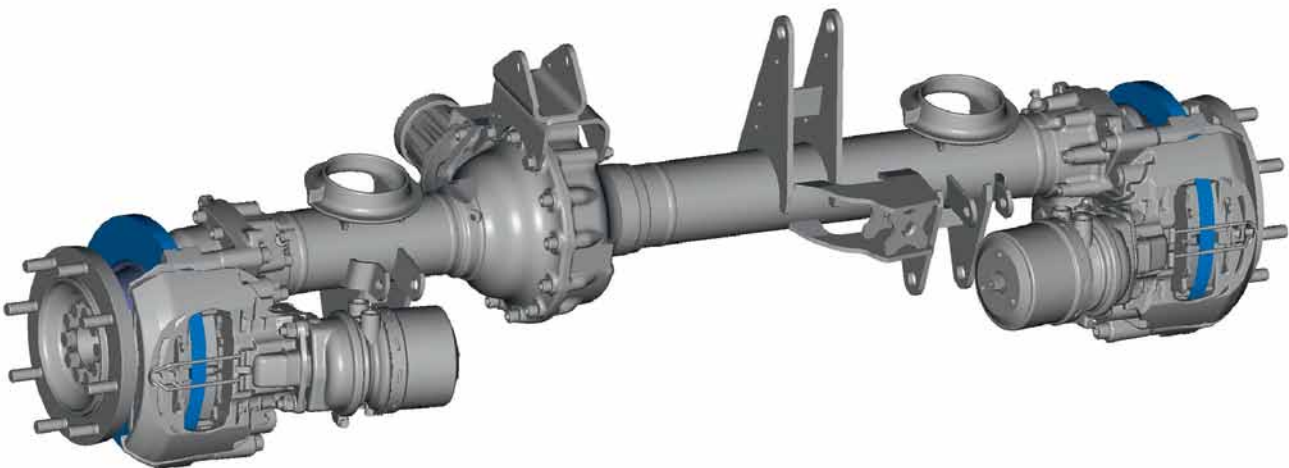
### Axle model designation

Vehicle				Front axle	Rear axle
Model series	Model code	Model designation	Wheelbase (mm)	Model designation	Model designation
U 200	U 216	405.090	2.800	737.572	747.572
U 200	U 218	405.090	2.800	737.572	747.572
U 300	U 318	405.104	3.000	737.572	747.572
U 400 k	U 423	405.105	3.000	737.583	747.583 747.584
U 400 k	U 427	405.110	3.150	737.583	747.583 747.584
U 400 k	U 430	405.110	3.150	737.583	747.583 747.584
U 400 l	U 423	405.125	3.600	737.583	747.583 747.584
U 400 l	U 427	405.125	3.600	737.583	747.583 747.584
U 400 l	U 430	405.125	3.600	737.583	747.583 747.584
U 500 k	U 527	405.202	3.350	737.592	747.592 747.593
U 500 k	U 530	405.202	3.350	737.592	747.592 747.593
U 500 l	U 527	405.222	3.900	737.592	747.592 747.593
U 500 l	U 530	405.222	3.900	737.592	747.592 747.593



View of front axle model designation 737.572 with air-powered disk brakes

G33.10-3116-00



View of rear axle model designation 747.572 with air-powered disk brakes

G35.10-3132-00

## Mechanical sliding caliper disk brake

The mechanical sliding caliper disk brake is a pneumatic single-piston brake. It has been designed for use on the front axle (model designation 737.572) and rear axle (model designation 747.572) as a service, auxiliary and parking brake. It is mechanically operated via a diaphragm or spring-loaded cylinder. This is directly attached to the brake caliper.

The direct connection of the brake cylinder to the brake caliper allows the brake to have a short axial installation length. This allows the installation space to be used optimally.

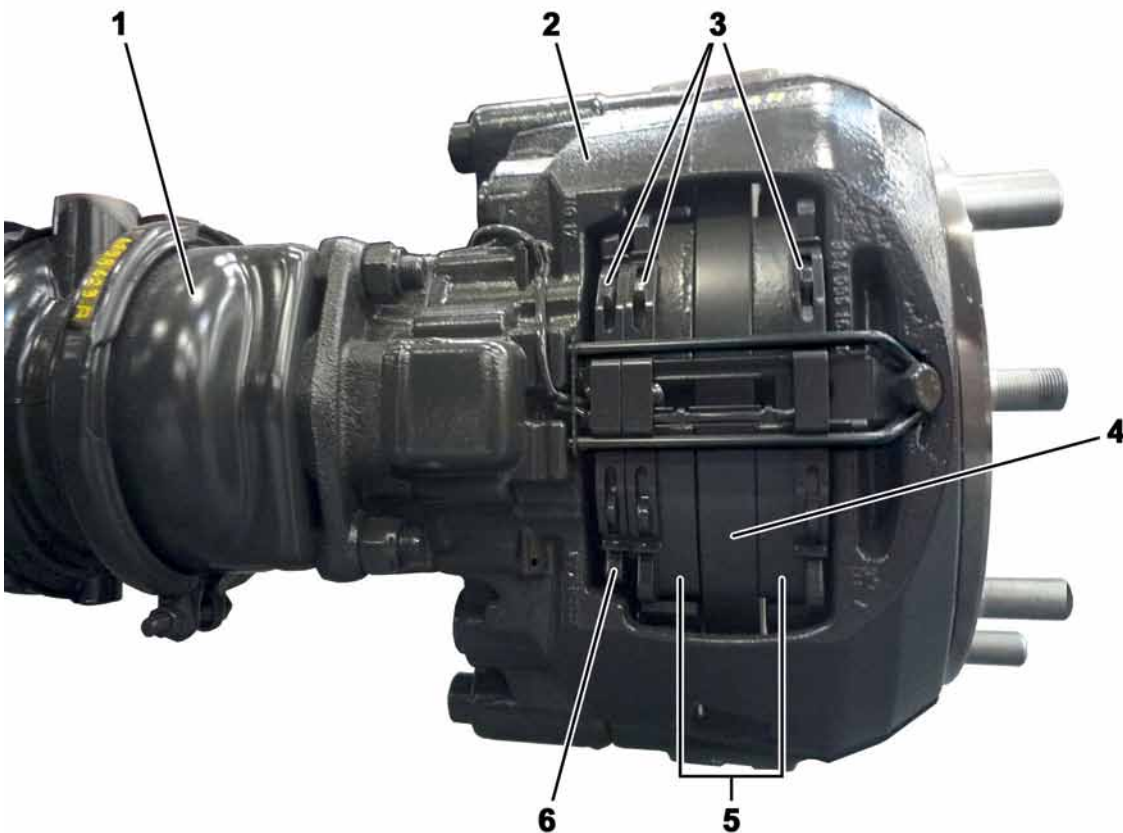
The entire disk brake including brake cylinder consists of one brake caliper and one brake carrier.

The brake caliper slides axially on the guide pins of the brake carrier. The brake pads are held and supported in the brake carrier so that they can move axially. The brake pads are held in place by a retaining bracket and by holddown springs.

In order to correct for brake wear, the operating mechanism of the brake is equipped with an automatic adjusting mechanism. This maintains a constant specified air gap irrespective of the load spectrum and different operating conditions. Together with the sturdy and rigid construction of the brake caliper, this allows the operating travel of the brakes to be controlled reliably and increases the reserve travel for emergency braking.

All of the rubber parts of the brake, including grease fillings, are maintenance free unless damaged.

The disk brake is equipped with an electrical wear indicator.



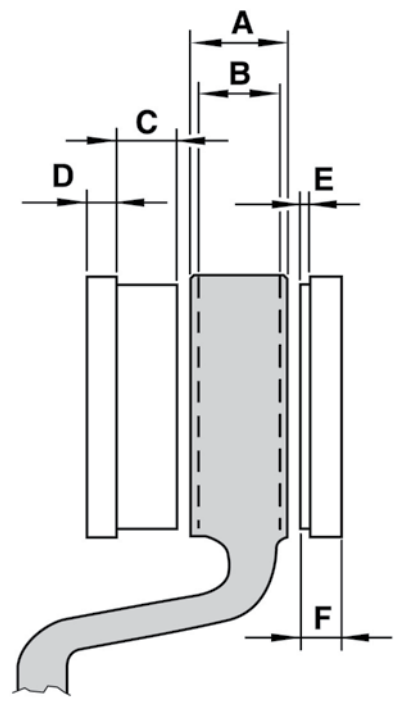
- 1 Diaphragm cylinder
- 2 Brake caliper
- 3 Holddown springs

- 4 Brake disk
- 5 Brake pads
- 6 Pressure plate

G42.10-3314-00

Technical data

Item	Designation	Dimension
A	Total thickness of brake disk (new)	25 mm
B	Wear dimension limit	21 mm
C	Total thickness of brake pad (new)	19 mm
D	Brake pad carrier	7 mm
E	Minimum thickness of brake pad	2 mm
F	Absolute minimum thickness of brake pad and brake pad carrier	9 mm



G42.10-3315-00



## Cab exterior

### Cab concept

The open-view cab presents itself in a new, modern design, while the visual and functional effect of the short engine hood is emphasized even further. LED lamps with daytime running lamps are integrated in the new bumpers. To improve visibility, the windshield wipers are now located above the windshield. The view of the road surface and implements is optimal.

In order to minimize the effect of impacts from the road surface, the cab is sprung and dampened. The seat position behind the front axle provides a high level of ride comfort and, when not driving, a generous amount of space. The entrance behind the front axle, with a door opening angle of almost 90°, allows the driver to enter and exit the vehicle safely and conveniently using 3 steps.

### Roof-mounted wiper system

A newly developed roof-mounted wiper system wipes snow to the side. This prevents snow from building up over the engine hood. Since the wiper blades are no longer installed in the field of view but on the roof, the view towards the front is improved.

### Fields of vision

The open-view cab provides an excellent 360 degree view with minimal blind spots. The windshield, which extends far down towards the engine hood, and the low side windows provide for an excellent view of the working area. The view of the road surface and implements, for coupling and uncoupling, is optimal. Visibility is further improved by the new front camera monitor system (optional, code EM3). The large rear window panels provide a direct view of the working area to the rear.



G60.80-3424-00

Cab

### Material

The cab is made of fiber composite (FVW) and is thus corrosion-free. This also provides a massive weight saving. Integrated damping layers provide good noise and thermal insulation properties. The material, which consists of multiple fiber layers, ensures a high level of strength, visual durability and longevity.

The water-soluble paints are more environmentally compatible due to the lower waste quantities produced (< 5 %). All plastic parts > 100 g are labeled in accordance with the ISO/VDA regulations, which describe environmentally compatible disposal.

The all-round heat-insulating glass significantly reduces the tendency of the interior compartment to heat up, while the windshield is made of laminated glass which protects against injuries in the event of an accident.

### Safety

All cabs are tested in accordance with ECE-R 29/02 and thus meet a high standard of safety. A UVV rollover test in accordance with PAS 16 and accepted by the agricultural trade association of Baden means that the vehicle is permitted for use in agriculture and the forestry industry (LoF).

A low inflammability test as per FMVSS 571.302, (tested low inflammability of materials), including on the interior equipment, has confirmed the low inflammability of the vehicle.



Cab

G60.80-3425-00

## Cab interior

### Interior

The large amount of space available gives the driver great freedom of movement. The high cab roof provides a large amount of headroom and facilitates movement within the cab. The heating and ventilation system has been improved and it now has better air distribution properties. Furthermore, the continuous flat footwell on the cab floor provides a large amount of legroom for all occupants.

For a variable seating arrangement depending on the use and country, 2 or 3-seater variants are available in the LHD models.

### Control and display concept

In addition to the redesigned instrument panel, a new control and display concept has also been implemented which offers greater functionality than the previous version. This provides, for example, improved operating comfort, greater driving safety and, last but not least, an improved overall visual appearance of the controls.

The following electronic components have been improved or redesigned for this purpose:

- Instrument cluster
- Multifunction steering wheel with left and right button group
- Right multifunction control lever
- Left multifunction control lever
- Modular switch panel (MSF)
- Control unit network (MUX system)
- Central gateway (CGW)



G68.00-3129-00

Interior

### General

The centerpiece of the newly developed instrument cluster is a generously sized TFT display. The different language variants are implemented by the software. All variants include pointer instruments for speed, rpm and tank content for diesel and AdBlue®.5 indicator lamp positions are available for body manufacturers which can be fitted with the corresponding symbol disks.

On the instrument cluster, an internal speaker generates noises such as the turn signal noise and warning tones. The instrument cluster is connected to the chassis CAN via an 18-pin connector.

### New features

- 10.4 cm (4.1") full-color TFT display with QVGA resolution
- Intuitive control and display concept
- Tire inflation pressure display
- Trip computer
- Display of gear recommendation and current fuel consumption
- Display in both dial-type gauges for displaying time and outside temperature (left display) as well as total distance and trip distance (right-hand display)
- Indicators for Euro VI



Instrument cluster

G54.30-3842-00

## Multifunction steering wheel

Both the height and inclination of the multifunction steering wheel can be adjusted to suit the individual seat position. Many functions can be controlled conveniently via the button groups on the left and right of the steering wheel e.g.:

- Trip computer
- Radio
- Engine speed
- And many more



Multifunction steering wheel

G46.00-3115-00

The center console, with switches arranged in blocks, facilitates simple operation with a variable modular switch panel (MSF). Furthermore, there is a 24 V on-board socket on the center console.

A stowage box behind the seats provides a large stowage facility for individual items. Door pockets with integrated bottle holders offer additional stowage space.

An equipment socket (code E87) equipped with C3 signals for equipment operation is also integrated in the cab. Cable holes sealed with plugs simplify the connection of equipment.

The following sockets and universal electrical interfaces are available:

- 12 V socket in the center console and 12 V socket behind the driver seat, switchable using a switch on the center console (code E37)
- 24 V on-board socket with C3 signals behind the driver seat (code ED6)
- 24 V socket/cigarette lighter in the center console (standard)
- Two equipment sockets (9-pin) on the end face of the center console (code ES6, not yet available)



Center console

G68.20-3139-00



Rear stowage box

G68.00-3130-00



Socket behind driver seat

G54.10-3260-00



1	Switch modules				
A1	Instrument cluster (ICUC) control unit				
A2	Central gateway (CGW) control unit				
A2 a1	Central data memory (CDS)				
A2 a2	Communications interface (COM) control unit				
A2 a3	Maintenance system (MS) control unit				
A3	Drive control (CPC) control unit				
A4	Engine management control unit (MCM)				
A5	Transmission control unit (TCM)				
A9	Radio				
A10	Antilock brake system (ABS) control unit, 4-channel				
A13	Auxiliary heater control unit (ZHE)				
A19	Multifunction steering wheel control unit				
A22	Parameterizable special module (PSM) control unit				
A43	Modular switch panel (MSF) control unit				
A52	Differential lock switch module				
A57	NOx sensor control unit, exhaust aftertreatment unit outlet				
A58	SCR control unit				
A60	Exhaust aftertreatment (ACM) control unit				
A61	Immobilizer control unit (WSP)				
A70	NOx sensor control unit, exhaust aftertreatment unit inlet				
A101	Control unit 1, control unit network (MUX1)				
A102	Control unit 2, control unit network (MUX2)				
A103	Control unit 3, control unit network (MUX3)				
A305	Special Trucks Control Unit (STCU)				
A305 a1	Implement Carrier Module (ICM) control unit				
A305 a2	Tire pressure control system (TPC) control unit				
A306	Hydraulics operating lever				
A307	Work hydraulics cell 1				
A308	Work hydraulics cell 2				
A309	Work hydraulics cell 3				
A310	Work hydraulics cell 4				
A311	Heater control and operating unit				
ASIC	ASIC data bus (Application System Integrated Circuit)				
CAN1	Exterior CAN				
CAN2	Interior CAN				
CAN3	Frame CAN				
CAN4	Drive train CAN				
CAN7	Trailer CAN (PSM)				
CAN8	Body CAN (PSM)				
CAN13	NOX CAN				
CAN14	Hydraulics CAN				
LIN3	Right multifunction control lever LIN				
LIN4	Left multifunction control lever LIN				
LIN7	Button group LIN				
P1	Tachograph (TCO)				
S19	Exterior lights switch				
S20	Left multifunction control lever				
S21	Headlamp range adjustment switch				
S23	Right multifunction control lever				
X100	Diagnostic socket				
X102	Trailer socket (15-pin)				
X103	Trailer ABS socket (7-pin)				
X305	Equipment socket (32-pin)				
Z1	Cab instrument panel CAN bus star point				
Z2	Exterior CAN bus star point				
Z3	Frame CAN bus star point				
Z4	Drive train CAN bus star point				
Z300	Hydraulics CAN bus star point				
Z301	Body CAN bus star point				



## Overall network

### General CAN information

Due to the increase in electronic systems in the new Unimog generation, more and more signals have to be made available throughout the various systems. This mainly affects the network, which has further increased in complexity. Alongside the familiar CAN and ASIC data bus systems, the LIN data bus is now being used increasingly. In the new Unimog, there are 3 LIN data buses alone to connect the various control units, switches and other electronic components to each other. On the other hand, the number of CAN data buses has only increased slightly.

### CAN data bus system

The CAN data bus system makes it possible to exchange information between control units quickly and reliably using few lines. In this case, the information is transmitted and received in succession (serially). Exchange takes place on a bidirectional basis i.e. every control unit acts as both a transmitter and a receiver.

Code	Designation
E33	Battery main switch on battery box
E37	Permanent current socket 12V/15A, on left of center console
E40	24V trailer ABS socket, additional
E42	12V trailer socket (13-pin), additional
E44	Jump start socket
E45	24V front socket (7-pin)
E87	Equipment socket (32-pin)
E89	Preinstallation, for radio remote control
ED6	24V/25A on-board socket in cab, with C3 signal
EL4	Alternator, 28V/150A
EM3	Front camera system, with monitor
ES6	Universal electrical interface for bodies and attachments
F8L	Immobilizer, with transponder
JV2	Preinstallation, for mobile radio/cell phone 12 V
J2A	CD radio
J2B	Bluetooth CD radio
J9H	Preinstallation, for 12V trunked radio system
JV5	Preinstallation, wiring/antenna, for radio
L3C	Work lamps, cab rear panel, top
L47	Additional headlamps for front implements
L9C	Preinstallation, for additional headlamps, roof
L50	Rotating beacon, yellow, left, with tripod
L51	Rotating beacons, yellow, left+right, with tripods
L58	Left tripod for rotating beacon
L59	Left and right tripod for rotating beacon
L65	Flashing light, yellow, left, with tripod
L66	Flashing lights, yellow, left+right, with tripods
Z5Z	Vehicle, for left-hand traffic
Standard	Daytime running lamps Europe
Standard	Rear trailer socket

## Overall network

### Power supply

Power is supplied via two maintenance-free 12 V batteries, each with a rating of 140 Ah.

The following three-phase alternators are available:

- Three-phase alternator 24 V/100 A (standard)
- Three-phase alternator 24 V/150 A (code EL4)

The following batteries are available:

- Batteries 2 x 12 V/140 Ah



G54.10-3263-00

Open battery box



G54.25-3470-00

Battery main switch



Coding adapter under rear stowage box

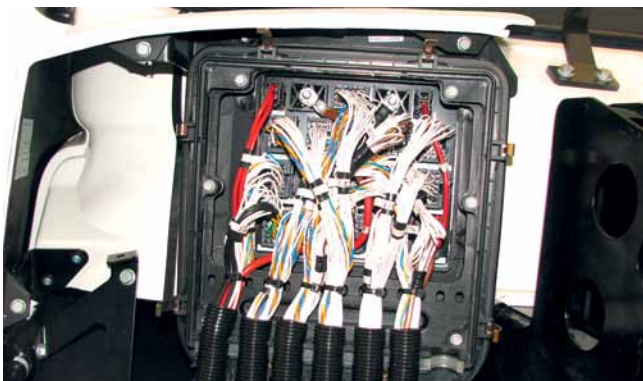
G54.15-3164-00

### Coding adapter for variable wiring of equipment sockets

Using the coding adapter, various function assignments for the pins of the equipment socket (code E87) and equipment sockets (code ES6, not yet available) can be changed.

The following signals are available optionally for standard configuration:

- Brake light
- Right turn signal/left turn signal
- Activate rotating beacon from vehicle
- Horn actuation
- CAN interface for hydraulic control/PSM (parameterizable special module)
- Rpm control request
- Signal D+ (engine running)
- External operating unit deactivated
- Standstill V0 signal
- Transmission in neutral position 0



Right engine compartment connecting point

G54.18-3301-00

### Cab-frame connecting points

The connecting points from the cab to the frame are now located on the firewall on the right-hand side of the engine compartment, which improves their accessibility.



Co-driver footwell connecting point

G54.18-3300-00

## Overall network



Trailer socket (15-pin) (standard)

G54.00-3212-00

### Trailer socket (15-pin) (standard)

Various electrical interfaces are available in the vicinity of the vehicle rear:

- Trailer socket (standard)
- Trailer ABS socket (code E40)
- 12V trailer socket (13-pin) (code E42)



Socket (7-pin) (E45)

G54.00-3211-00

### Socket (7-pin) (code E45)

A socket (7-pin) above the left front bumper is available optionally for supplying power to attachments at the front end. The design of this socket (7-pin) corresponds to the ISO 1185 standard for its style of construction and standard EN 15431 for its pin assignment.

#### **i** Note

Pin 4 of the socket is assigned to terminal 30 (24 V continuous positive). In addition, pin 7 is not used. This means that the pin assignment no longer corresponds to the ISO 1185 standard.



Equipment socket (32-pin) (E87)

G54.10-3262-00

### Equipment socket (code E87)

The equipment socket (code E87) is designed as the central electrical interface between the body and vehicle. It is located in the center of the vehicle on the left-hand side in the direction of travel and incorporates various functions ranging from supplying power to the body and controlling the engine remotely through to operating indicator lamps on the vehicle Instrument.

#### **i** Note

All Euro VI model designations of the U200/U300/U400/U500 are equipped with a parameterizable special module (PSM) as standard.

Equipment sockets (11-pin) at front and on side of vehicle (code ES6, not yet available)

## Pin assignment of equipment socket

Pin	Designation	Function
1	Terminal 30	+24 V
2	Terminal 30	+24 V
3	Terminal 30	+24 V
4	Terminal 31	Ground
5	Terminal 31	Ground
6	Terminal 31	Ground
7	Terminal 15	+24 V with ignition switched on
8	Terminal 58	+24 V with standing lights switched on
9	Terminal W	Alternator rpm signal
10	RKL	Signal, rotating beacon on
11	RüLi	Signal, backup lamps on
12	C3	Vehicle speed signal
13	C4	Travel signal
14		Actuation of transmission for crane body
15		Switch power take-off N13/N16/N19 on/off
16		Signal, power take-off N13/N16/N19 switched on
17		Signal, parking brake activated
18		Start-off fixed speed
19		Increase engine speed
20		Reduce engine speed
21		Restore engine speed
22		Engine start
23		Engine stop
24		Transmission lock or reduced v <sub>max</sub> + reverse gear lock
25		Function/warning lamp A1 on Instrument
26		Function/warning lamp A2 on Instrument
27		Function/warning lamp A3 on Instrument
28		Unused line routed to X375/PIN 8 (CAN_high)
29		Unused line routed to X375/PIN 9 (CAN_gnd)
30		Unused line routed to X375/PIN 10 (CAN_low)
31		Engine oil pressure warning indicator, min.
32		Warning indicator, engine coolant, max.

### Control unit network

The MUX system, which is used in the Unimog and other Mercedes-Benz vehicles, as a control unit network consisting of several control units. Depending on the configuration and output, loads of up to 10 A can be switched with it. The integrated overload protection function for each output also makes the use of external fuses unnecessary. The control unit network is mainly used to implement the basic electrical functions of the vehicle e.g.:

- Terminal control
- Exterior lights
- Interior lights
- Differential lock
- Horn
- 24V trailer socket
- Wiping/washing
- Various other functions

### Setup in vehicle

Each vehicle requires more output and inputs than are available in one control unit of the control unit network and, as a result, not just one control unit is installed here. On the Unimog, three control units are used per vehicle.

The particular specialty of the control unit network is its ability to function as a network linked via CAN bus.

Due to this networking, all outputs of one control unit of the control unit network can also be actuated by another control unit of the control unit network. This architecture provides the maximum level of scalability and flexibility.

#### Note

The three control units of the control unit network have identical hardware components and the control units therefore look identical. When removing and reinstalling these control units, make sure that they are reinstalled in their original position.

#### Note

Terminal signals and other signals (e.g. lighting signals) are made available to body manufacturers via an interface. Tapping the signals directly at a control unit is to be avoided.



## Central gateway (CGW)

The central gateway (CGW) is a component of the vehicle architecture. As a result, its functions are determined and defined by this architecture. All CANs connected to the CGW have a wake-up function. The CGW wakes up all of the buses if a message is sent on one bus.

The CGW only allows the buses to sleep when all connected buses indicate that they are ready to sleep i.e. the CGW synchronizes the sleep process.

K-lines are no longer used.

The CGW monitors all control units except itself for failure and the CGW is monitored by the ICUC. All messages from each control unit are monitored, not just one.

The following virtual control units are integrated in the CGW:

- Central Data Memory (ZDS)
- Maintenance system (WS)
- Communication module (COM)

It incorporates the following functions:

- It routes messages and signals between various CAN buses (function gateway)
- It can route messages and signals from an entire SUB-CAN for diagnosis purposes! This function is called the "application gateway".
- It is responsible for the timing of sleep and wake-up commands for the connected CAN buses (part of the power management system)
- It provides the interface for the external diagnostic tester (diagnosis gateway)
- It monitors the remaining control units for failure
- Information describing the vehicle is parameterized centrally in the CGW and, together with the list of installed control units, is made available to other control units by the CGW through cyclical CAN messages.

### ⓘ Important

Do not exchange control units within a vehicle or across different vehicles. Otherwise, they will receive fault messages or the terminal control function may be disabled, rendering the ignition lock nonfunctional. In this case, contact a Mercedes-Benz Service Center.

### Headlamps

The Unimog is equipped with newly designed headlamps.

The individual lamps which make up the headlamps perform the following functions from top to bottom: standing light, daytime running light, turn signal lamp and low beam/high beam, each with separate reflectors. The standing light is integrated in the daytime running light.

The following lighting equipment is installed as standard:

- Low and high beams
- Standing and daytime running lights
- Hazard warning system with additional "one-touch signaling" function
- Rear foglamp, backup lamps and brake lights
- Daytime running lights

### Additional headlamps (code L47)

Additional headlamps which are mounted higher on the vehicle are available under code L47 for the operation of equipment which conceals the standard headlamps.

### Roof lamp carrier preinstallation (code L9C)

A preinstallation for roof-mounted headlamps can be ordered with code L9C. It is not possible to combine this with additional headlamps (code L47). Code L9C contains the selection switch for the main headlamps and an electrical interface which is located in the switchbox in the area behind the sockets (code ED6) and (code E37). Existing roof lamp carriers cannot be transferred from Euro III/IV/V vehicles to Euro VI vehicles due to the different roof shape.



Headlamps

G82.10-3233-00

## Exterior lights

### Rear lamps

The 6-chamber rear lamps have been redesigned. Conventional bulbs are used in the rear lamps to perform the functions of the taillight, rear fog lamp, backup lamps, brake lamps, turn signals and position lamps.

### Backup warning system

An acoustic backup warning system (code E6Z) integrated in the rear lamps is available. The backup warning system can be switched off via a switch on the instrument panel.



G82.10-3234-00

Rear lamp

The tire pressure control system (code A30) is an electro-pneumatic system installed in the vehicle which is used to inflate and deflate the tires on the front and rear axle. It is also possible to change the tire pressures while driving. The tire pressure control system is operated pneumatically via auxiliary consumer connection 24 on the four-circuit protection valve. The compressed air supply for tire inflation is provided via a branch upstream of the four-circuit protection valve (high-pressure 18.3 bar) and is limited individually according to the tires.

- It is possible to adjust the tire pressure while driving.
- In the event of tire damage, the vehicle can drive to the nearest workshop by means of the pressure loss compensation function.
- The tire pressure can be adjusted individually at the front and rear axle.
- It is possible to equalize the actual rolling circumferences of the front and rear wheels and different axle loads can also be allowed for.
- Operation is carried out via the switch on the center console, which allows the tire pressure to be conveniently controlled from the driver's cab.
- A tire pressure indicator on the display is used to check settings and recognize pressure loss.
- The minimum and maximum tire pressure is limited, which helps to avoid tire damage.
- The tire pressure is monitored electronically and is automatically adjusted to the set value.

### Note

If necessary, components of the tire pressure control system can be relocated.

## Heating and climate control

The new Unimog features an air-regulated heating, ventilation and climate control system.

The temperature is not adjusted by means of a water regulating valve but by mixing cold and warm air with a blend air flap. This produces an immediate response and accurate adjustability.

The air distribution system of the heating, ventilation and climate control system includes:

- Defroster vents positioned along the windshield
- Four horizontally/vertically adjustable and closable air vents in the instrument panel
- Targeted air feed to the side windows through multi-range air vents
- Air vent for the driver footwell located on the left next to the steering column
- One air vent for the co-driver footwell



G83.00-3116-00

Air distribution

The combined climate control, heating and ventilation system allows the driver to individually control the climate of the interior compartment. The multistage blower allows the windows to be quickly deiced. A hot water heater with residual heat utilization saves fuel and protects the environment.

The integrated air conditioning system is used to maintain a pleasant temperature within the cab and thus improve the concentration of the driver and co-driver. A pollen filter for dust and dirt-intensive operations ensures that the air in the passenger compartment is clean and pure. The air conditioning system is easily accessible and thus easy to clean.

**Note**

An air conditioning system with automatic temperature control (code D6F) is standard on model series U300, U400 and U500. It is available as a special equipment on model series U200.



Air conditioning system (D6F)

G83.30-3149-00

## Radio unit

The radio unit is ergonomically integrated into the new Unimog in an optimal manner. All functions can be operated on the radio unit itself. The selected radio station or CD is displayed in plain text on the radio display.

The following functions can be activated via the steering wheel buttons:

- Volume +/-
- Station change/SCAN
- Selection of CD/track/music browser
- Telephone operation/phone book (only in combination with code J2B)
- Source change
- Selection of CD track

In the "Audio" menu item, the multifunction display shows plain text about the selected radio station or USB/CD activities. When operating via the steering wheel buttons, every change is displayed for easier navigation.

### CD radio (code J2A)

- DIN mounting
- CD drive (MP3)
- Mini-USB jack
- 2x20 W output
- AUX jack
- FM-RDS tuner
- AM tuner (MW/LW/SW)
- External mute
- Versatile operation (e.g. via multifunction steering wheel)
- Large, clearly separated buttons
- Installation ex factory
- Simple operation

### Bluetooth® CD radio (code J2B)

- Like (code J2A) + Bluetooth® hands-free system and audio



Bluetooth® CD radio (J2B)

G82.60-3107-00

The tachograph records driving times and rest periods for the driver and co-driver. It is available in modular or digital versions and in the following variants:

- Digital tachograph, EC, rpm, ADR (code J1R)
- Tachograph, 1 day + 2 driver, modular (code J1K)

The digital tachograph (code J1R) is available from the suppliers VDO (code J1S) or Stoneridge (code J1T).

A calibration system (code G5Z) is required to put the modular tachograph into operation; this adjusts the speed and odometer readings to the vehicle-specific situation. It takes the tire size and rear axle ratio into account for this purpose.



Tachograph

G54.61-3141-00



## Maintenance

### New maintenance intervals

With the introduction of the Euro VI emissions standard, the maintenance intervals have been extended:

- From 1200 operating hours (Bh) to 1400 Bh
- From 2400 Bh to 2800 Bh
- On vehicles with code G31 (Torque converter clutch (TWIN DISC) the maintenance scopes at 50 Bh and 600 Bh are not required
- The time of the first maintenance service is unchanged at 200 Bh
- The maintenance intervals of the power take-off transmission, power hydraulics and hydrostatic drive depend on the period of operation of the respective additional drive system.

### Note

The driver receives an indication that operating hour-dependent maintenance is due via the display on the Instrument.

### New maintenance points

Replacement of the diesel particulate filter (DPF) is now an additional maintenance point. Every DPF has its own identification number (picture). This identification number must be entered in the maintenance booklet and in VeDoc.

Before replacing a DPF, this identification number must be checked against the entry in the maintenance booklet/ VeDoc. If the numbers do not match, this means that the exhaust system has been tampered with and the customer must pay the original price and not the exchange price of the DPF.

The identification number of the exchanged DPF must be entered in the maintenance booklet/ VeDoc again after installation.



G49.10-3198-00

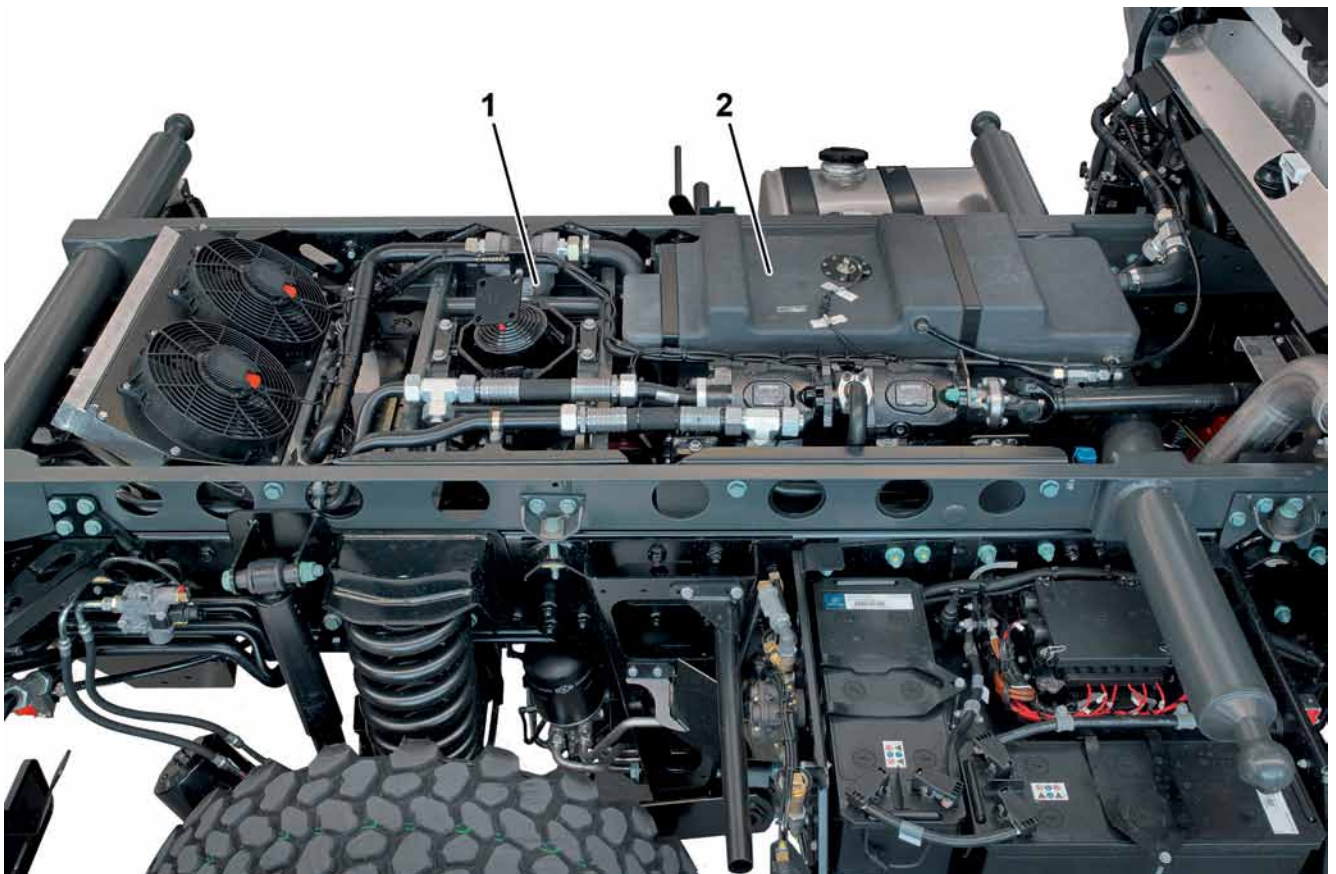
#### Diesel particulate filter

- 1) Diesel particulate filter
- 2) Identification number

## Maintenance

The hydraulic system has been improved significantly. In order to prevent fouling of the hydraulic components by dirty hydraulic fluid, appropriate oil filters have been installed.

- Basic scope of fan hydraulics/tilting hydraulics/work hydraulics: one high-pressure filter, one filter in circuit I and one return filter in the oil reservoir
- Power hydraulics: Oil filter
- Hydraulic hoses: Hydraulic hoses are subject to an aging process. Mercedes-Benz thus recommends replacing all hydraulic hoses every 6 years.



G55.00-3171-00

Overview of hydraulic components

- 1) Oil filter
- 2) Oil reservoir

### Maintenance service

Refer to the respective valid maintenance sheet and the content of the individual maintenance items for the maintenance scope. Perform safety-relevant maintenance work according to the national legislation; but at least once a year if no inspections according to law are planned within a year.

The maintenance operations to be carried out must be marked with a cross by the service advisor in the fields provided in the top part of the maintenance sheet.

The time-dependent maintenance operations and the additional operations for the maintenance service and are marked on the maintenance sheet in front of the relevant operation item with:

- A = Maintenance at 200 Bh
- B = Maintenance at 1400 Bh, 4200 Bh, 7000 Bh, 9800 Bh, 12,600 Bh etc.
- C = Maintenance at 2800 Bh, 5600 Bh, 8400 Bh, 11,200 Bh, 14,000 Bh etc.

The additional operations are combined accordingly on the maintenance sheet and separated by corresponding headings:

- V2 = Adjust valve clearance at 2800 Bh, 5600 Bh, 8400 Bh, 11,200 Bh etc.
- ZX = Additional operations at every 3rd engine oil change
- Z2 = Additional operations every 2 years
- Z3 = Additional operations every 3 years
- Z4 = Additional operations every 4 years
- Z6 = Additional operations every 6 years
- J1 = Work relevant to safety once a year, subject to separate repair order

The completion of the individual maintenance items must be recorded by entering a cross in the boxes in front of the operation titles. A cross should be entered in the boxes after the operation titles to identify items which were not OK when the vehicle was received.

Confirmation for this is provided by the mechanic by entering his/her signature in the header section of the maintenance sheet.

## Maintenance

### Maintenance of power take-off transmission, power hydraulics, hydrostatic drive

For these additional drive systems, the operating hours are recorded in "real time" i.e. independently of the engine operating time. These real times can be read out from the instrument cluster. This means that only the time during which the additional drive systems are engaged is recorded i.e. the time during which they are used for work.

The result of this is that, depending on the usage of the Unimog, an additional workshop visit may be necessary for maintenance operations on the additional drive systems.

However, the main advantage is a significant extension of the oil change interval which also means a significant reduction in costs for the customer.

On vehicles with power hydraulics and hydrostatic fan drive (shared oil system), an oil change must be performed when one of the systems has reached the corresponding operating time (operating hours).

### Minimum maintenance

Minimum maintenance servicing is only required if operating hour-dependent maintenance is not carried out.

- Annual maintenance operations
- Maintenance operations every 2 years
- Maintenance operations every 3 years
- Maintenance operations every 5 years
- Maintenance operations every 6 years
- J1 = Work relevant to safety once a year, subject to separate repair order

#### **i** Note:

A separate maintenance sheet (AP00.20-G-1030UG) for the power take-off transmission, power hydraulics and hydrostatic drive will be published in WIS about this new feature.

The quality of oil used has a massive influence on the service life of a major assembly and you should therefore only use operating fluids which comply with the Mercedes-Benz Specifications for Operating Fluids.

The sulfur content of the fuel also has an effect on the service life of the engine.

The sulfur content of the fuel can be set to three stages using the on-board computer.

- 0 - 0.05 % sulfur content = factor 1
- 0.05 - 0.1 % sulfur content = factor 0.5
- > 0.1 % sulfur content = factor 0.3

Roughly 2 weeks before a service is due, the driver is informed about this via a pop-up message when the ignition is switched on. The next warning stage appears with the message "Service immediately". All of the displayed messages are stored in the memory so that, in the event of complaints, it is possible to determine when each message was displayed.

### Engine oil

Engines 934.9 and 936.9 may only be operated with engine oil in accordance with sheet 228.51 (Low SPAsh multigrade service engine oils) of the Mercedes-Benz Specifications for Operating Fluids.

#### **Warning:**

Operation with biodiesel (fatty acid methyl ester) is not permissible.

## Diagnosis

### Diagnosis

The diagnosis functions of the control units are primarily intended to ensure that the corresponding systems operate properly. This takes place through ongoing checking of whether the sensors connected to a control unit supply plausible values. The diagnostic data can also be used for troubleshooting. The UDS (Unified Diagnostic-Services) diagnosis protocol, which is also used in the passenger car sector, is used for data transfer purposes.

Compared to the predecessor model, the diagnosis routines for service have been significantly optimized. This is particularly noticeable in the speed of communication with control units and, furthermore, multiple control units can transmit and receive simultaneously.

When a control unit is flashed, communication between control units is interrupted in order to free up the CAN line. This shortens the flashing time from approx. 30 min to approx. 3 min. Faults which occur can also be read out on the instrument cluster. The advantage of this is that the driver can read out the faults and inform the workshop in advance about which faults are occurring.

### On-Board Diagnosis (OBD)

OBD is used to monitor and diagnose all systems which affect exhaust emissions. It is a legal requirement. Malfunctions and faults which occur are displayed to the driver via an indicator lamp and stored in the fault memory. These can be read out using Star Diagnosis.

The stricter regulations of OBD 2 apply to the Euro VI standard. The OBD-NOx-Control system also monitors, for example, the quantity of nitrogen oxide (NOx) and particulate matter (PM) emissions. If the limits are exceeded, the OBD-NOx-Control system informs the driver and takes action e.g. actuation of the MIL (Malfunction Indicator Lamp) or, in the most extreme case, torque reduction.

**Claw wrench**

**Use** Claw wrench for removing and installing the water sleeve of the injector.

**MB number** W 936 589 00 07 00

**FG** 01

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3144-00

**Sleeve**

**Use** For installing the front crankshaft radial sealing ring in the oil pump cover.

**MB number** W 936 589 00 14 00

**FG** 03

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** In combination with assembly tool  
W 904 589 04 15 00



G58.20-3145-00

**Drift**

**Use** Drift for fixing the crankshaft at TDC via the starter ring gear.

**MB number** W 936 589 00 15 00

**FG** 05

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3146-00



## Engine OM 934/936

## Template

**Use** For positioning the camshafts at TDC.

**MB number** W 936 589 00 23 00

**FG** 05

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3147-00

## Adapter

**Use** For fixing the high-pressure fuel pump and compressor in place when disassembling and assembling the drive gear.

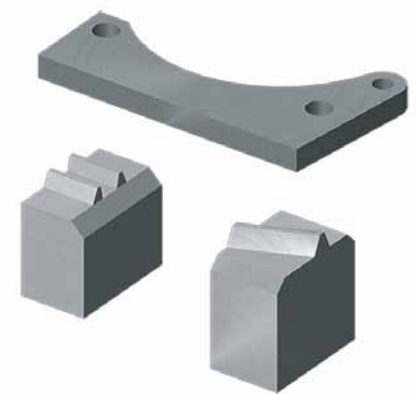
**MB number** W 936 589 00 31 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Special Operation

**Note** In combination with locating tool  
W 470 589 08 40 00



G58.20-3148-00

## Extraction tool

**Use** For pulling injectors out of the cylinder head.

**MB number** W 936 589 00 33 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Special Operation

**Note** -



G58.20-3149-00

**Valve tool kit**

**Use** For removing and installing the valve springs, incl. puller and drift for mounting the valve stem seal.

**MB number** W 936 589 00 61 00

**FG** 05

**Set** C

**Category** Mercedes-Benz Truck - Special Operation

**Note** Available as of March 2013



G58.20-3150-00

**Adapter**

**Use** For filling, flushing and bleeding the oil circuit at the oil filter module.

**MB number** W 936 589 00 63 00

**FG** 18

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** In combination with oil replenishing canister W 352 589 11 63 00



G58.20-3151-00

**Adapter**

**Use** Adapter for checking compression via the injector bore.

**MB number** W 936 589 00 91 00

**FG** 01

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3152-00

## Engine OM 934/936

**Drift**

**Use** For knocking pilot bearing with retaining ring into flywheel.

**MB number** W 936 589 01 15 00

**FG** 03

**Set** C

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3153-00

**Mounting tool**

**Use** For pulling O-rings onto injectors.

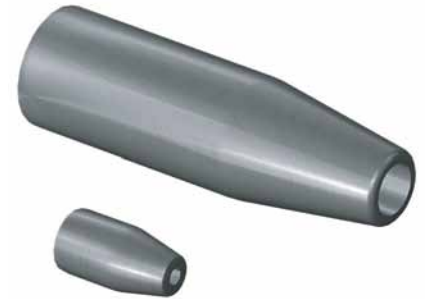
**MB number** W 936 589 01 33 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Special Operation

**Note** -



G58.20-3154-00

**Stop plug**

**Use** For sealing the rail connections during testing operations.

**MB number** W 936 589 01 91 00

**FG** 01

**Set** B

**Category** Mercedes-Benz Truck - Special Operation

**Note** -



G58.20-3155-00

**Guide pin**

**Use** For fitting flywheel on crankshaft.

**MB number** W 936 589 02 15 00

**FG** 03

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3156-00

**Puller**

**Use** For pulling off main bearing bridges.

**MB number** W 936 589 02 33 00

**FG** 03

**Set** C

**Category** Mercedes-Benz Truck - Special Operation

**Note** Available as of March 2013 in combination with puller W 470 589 02 33 00



G58.20-3157-00

**Leak tester**

**Use** For leak testing the EGR cooler.

**MB number** W 936 589 02 91 00

**FG** 14

**Set** C

**Category** Mercedes-Benz Truck - Basic Operation

**Note** In combination with pressure pump W 124 589 24 21 00



G58.20-3158-00

## Engine OM 934/936

**Tool kit**

**Use** For pulling the heat protection sleeve out of the cylinder head and pressing the heat protection sleeve onto the injector.

**MB number** W 936 589 03 33 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3159-00

**Extraction tool**

**Use** For pulling out the seals of the pressure pipe connections on the injector line.

**MB number** W 936 589 04 33 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** In combination with impact extractor  
W 355 589 01 63 00



G58.20-3160-00

**Adapter**

**Use** For function testing of engine brake.

**MB number** W 936 589 03 91 00

**FG** 14

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3161-00

**Adapter**

**Use** For measuring fuel return quantity of injectors.

**MB number** W 936 589 04 91 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** In combination with test adapter  
W 470 589 02 21 00



G58.20-3162-00

**Collet**

**Use** For mounting pistons in cylinder barrel.

**MB number** W 936 589 00 37 00

**FG** 03

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** Available as of March 2013.



G58.20-3163-00

**16-pin adapter cable**

**Use** For testing injectors.

**MB number** W 936 589 01 63 00

**FG** 07

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** In combination with test box  
W 000 589 00 21 00



G58.20-3164-00

## Engine OM 934/936

**Mount**

**Use** Mount for removing and installing the diesel particulate filter (DPF).

**MB number** W 470 589 01 62 00

**FG** 14

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3165-00

**Mount**

**Use** Mount for adapting the DPF mount to a standard forklift.

**MB number** W 470 589 04 31 00

**FG** 14

**Set** B

**Category** Mercedes-Benz Truck - Basic Operation

**Note** -



G58.20-3166-00

## Abbreviations

### ABS

Anti-lock Braking System

### ACM

Aftertreatment Control Module

### ADR

Accord européen relatif au transport international des marchandises Dangereuses par Route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)

### AGN

Exhaust aftertreatment

### AGR

Exhaust gas recirculation

### CAN

Controller Area Network

### CDS

Central Data Storage  
(Zentraler Datenspeicher)

### CGW

Central gateway control unit

### COM

Communication Interface  
(Kommunikationsschnittstelle)

### CPC

Common Powertrain Controller  
(drive control control unit)

### DIN

Deutsches Institut für Normung (German Standards Institute)

### DOC

Oxidation catalytic converter

### DOHC

Double Overhead Camshaft

### DPF

Diesel Particulate Filter

### DBV

Pressure limiting valve

### EAS

Electronic automated gearshift

### ECE

Economic Commission for Europe

### EEV

Enhanced Environmentally Friendly Vehicle

### EG

European Community (EC)

### EPS

Electropneumatic Power Shift

### EQR

Electronic Quick Reverse  
(synchronized reversing group)

### FMVSS

Federal Motor Vehicle Safety Standard

### FWW

Fiber composite

### GGVS

Regulations for the Transportation of Hazardous Goods



**ICUC**

Instrument Cluster Unit Common

**ICM**

Implement Carrier Module

**ISO**

International Organization for Standardization (ISO)

**KD**

Service

**LED**

Light Emitting Diode

**LIN**

Local Interconnect Network

**MCM**

Motor Control Module  
(engine management control unit)

**MIL**

Malfunction Indicator Lamp

**MS**

Maintenance System

**MSF**

Modular switch panel

**NA**

Power take-off (PTO)

**OBD**

On-Board Diagnosis

**OM**

Diesel engine

**OT**

Top dead center (TDC)

**PCA**

Pneumatic clutch actuator

**PM**

Particulate Matter

**PSM**

Parameterizable Special Module

**QVGA**

Quarter Video Graphics Array

## Abbreviations

---

**SA**

Special equipment

**SCR**

Selective Catalytic Reduction

**SMS**

Short Message Service

**STCU**

Special Trucks Control Unit

**TCC**

Truck Control Center

**TCM**

Transmission Control Module

**TFT**

Thin Film Transistor

**TPC**

Tire Pressure Control  
system

**UVV**

Accident prevention regulations

**USB**

Universal Serial Bus

**VDA**

German Association of the Automotive Industry

**VeDoc**

Vehicle Documentation

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