

3007  
3507  
4007  
4407  
5007  
5507  
4209  
5509



**KRAMER**  
*on the safe side*



## Product Guide

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The cover features the machine with possible optional equipment.



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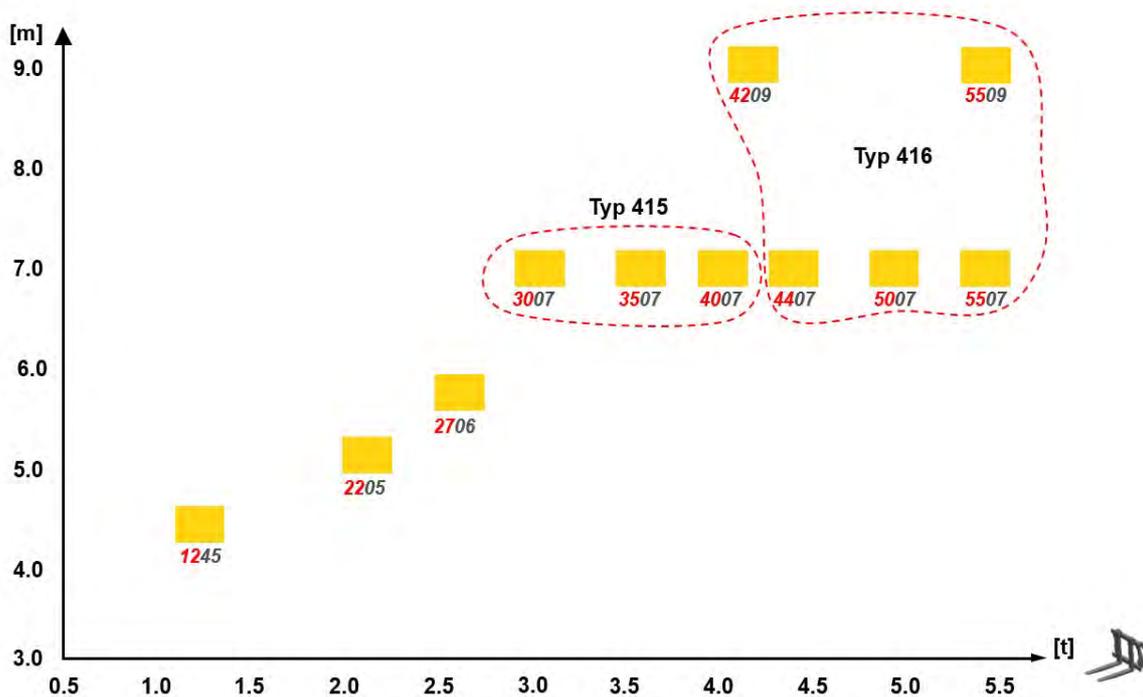


# 1 Introduction

Kramer has over 8 models in its product portfolio of telescopes from 7 m lift height. The long-term experience in the construction industry is exploited and a round portfolio for diverse applications was established in the construction industry and industry itself. All telehandlers fulfil the current exhaust stage IV and conform to the state of the art in all respects.

To meet the needs and requirements of our customers, the product portfolio is divided into two platforms. On the one hand the platform 415 with the models 3007, 3507 and 4007. These are the so-called compact all-rounders. These machines were designed with focus on application in confined spaces. The second platform 416 (4407 to 5509) was designed for maximum performance and increased operator requirements.

The following overview will give you a quick outline of all new models.



## 1.1 Differences of the platforms 415 and 416



### Platform 415

The platform 415 is the compact all-rounder. With their compact dimensions, the models 3007, 3507, and 4007 are perfectly suited for confined construction sites or buildings with low drive-through ceilings. With platform 415, Kramer is providing a cost-effective basic model of telehandlers with 7 m stacking height.

The model of the 3-t class (3007) possesses a gear pump with LUDV (load-independent flow distribution) for supplying the work hydraulics. This makes possible the simultaneous operation of several hydraulic functions. The other models (3507 & 4007) possess Load Sensing Hydraulics. The hydrostatic drive with 30 km/h is standard, the eco-speed transmission is optionally available for the models 3507 & 4007. With this, up to 40 km/h are possible. The axles of platform 415 possess a 45% self-locking differential.

The machines are characterised by small dimensions. Height is 2.26 – 2.33 m, width 2.28 – 2.30 m. This is made possible, amongst others, by the fact that the FOPS protection is assembled on the inside behind the panorama window. The machines are equipped with a single-step ascend for getting into the cab comfortably and quickly. With platform 415, the joystick is integrated in the right side console. The standard tyres have the dimensions of 405/70 R24, and maximum 460/70 R24 are possible as option.

The material thickness of the basic frame is adjusted to the loads in this performance class and is 15 mm. The Carraro axles with a static axle load of 20.4 t are equipped with disk brakes. The 3 t model does not require ballast load in the rear, the 3.5 t model is equipped with a small ballast load and the 4 t model with a large one.



## Platform 416

Platform 416 offers maximum output for professional application. The machines are designed for heavy loads such as become necessary in industrial applications or recycling plants. The high-quality equipment corresponds to the high expectations of the operators.

Load Sensing Hydraulics and the ecospeed transmission (ecospeed PRO with 5507, 5509) are standard. A 100% differential lock in the front axle that can be connected and comprehensive options round off the offer. The machine dimensions have, according to equipment, a height of 2.57 – 2.59 m and a width of 2.50 – 2.51 m. With the optional wide base tyres 600/55-26.5, width is approx. 2.66 m. Even these tyres can be assembled without causing limitations of steering angle. As standard, tyres with the size 460/60 R24 are assembled, but different profiles in the dimensions 460/70 R24 & 500/70 R24 are available as option.

The FOPS protection is assembled on the exterior before the panorama window. This facilitates cleaning of the window insides, and in the case of falling objects, the window itself is protected. Due to the large dimensions, the ascent is designed with two steps and the joystick is located inside the armrest of the operator seat. Taking into account the higher loads and forces, the material thickness of platform 416 is 20 mm (except with 4407, which is 15 mm). As additional protection, all models with this platform possess a lateral support for the telescopic boom in the lower lift area as standard. Thus, these machines are equipped to take on even the heaviest push and loading tasks. The Carraro axles possess a static axle load of 24.3 t (4407, 5007, and 4209) or 27.3 t (5507, 5509) and are equipped with oil-bath multi-disc brakes at both axles. Storage compartments with a volume of 44 l are integrated into the ballast loads of the platforms 416 (except 4209). Thus tools and small parts can be carried along comfortably and safely.



## Overview over the technical data of platform 415

	3007	3507	4007
<b>Payload (DLC 500 mm)</b>	3000 kg	3500 kg	4000 kg
<b>Payload (DLC 600 mm)</b>	-	-	-
<b>Pallet height</b>	7000 mm	7000 mm	7000 mm
<b>Operating weight</b>	5920 - 7250 kg	6170 - 7500 kg	6810 - 7850 kg
<b>Engine output</b>	100 kW	100 kW	100 kW
<b>Work hydraulics</b>	Gear pump	Load Sensing	Load Sensing
<b>Flow rate</b>	100 l/min	140 l/min	140 l/min
<b>Travelling drive</b>	Series: hydrostatic	Series: hydrostatic Option: ecospeed	Series: hydrostatic Option: ecospeed
<b>Cabin</b>	FOPS protection located on the inside Single-step ascent Joystick at right side console		
<b>Frame</b>	15 mm material thickness No lateral support		

**Overview over the technical data of platform 416**

	<b>4407</b>	<b>5007</b>	<b>5507</b>	<b>4209</b>	<b>5509</b>
<b>Payload (DLC 500 mm)</b>	4400 kg	4800 kg	5500 kg	4200 kg	5500 kg
<b>Payload (DLC 600 mm)</b>	-	-	4990 kg	-	4990 g
<b>Pallet height</b>	7017 mm	7017 mm	7017 mm	8750 mm	8750 mm
<b>Operating weight</b>	8100 - 9100 kg	8600 - 9600 kg	9500 - 10,500 kg	9000 - 10,500 kg	10,500 - 11,500 kg
<b>Engine output</b>	100 kW	100 kW	115 kW	100 kW	115 kW
<b>Work hydraulics</b>	Load Sensing				
<b>Flow rate</b>	140 l/min	140 l/min	187 l/min	140 l/min	187 l/min
<b>Travelling drive</b>	Series: eco-speed	Series: ecospeed Option: ecospeedPRO	Standard: ecospeedPRO	Series: ecospeed Option: ecospeedPRO	Standard: ecospeedPRO
<b>Cabin</b>	FOPS protection located on the outside Two-step ascent Joystick at the operator seat				
<b>Frame</b>	Material thickness: 15 mm Lateral support	Material thickness: 20 mm Lateral support			





## 2 Engine

### 2.1 Engine data

Model	3007 3507 4007 4407 5007 4209	5507 5509
Engine manufacturer	Deutz	Deutz
Type	TCD 3.6 L4	TCD 4.1L4
Exhaust-emission level	Level IV	Level IV
Exhaust after-treatment	DOC+SCR	DOC + DPF + SCR
Maintenance of the exhaust-gas treatment system	Maintenance-free	Maintenance-free (Check the particulate filter after about 3000 h and replace if necessary)
Output [kW] (in compliance with ISO 14396)	100 at 2300 rpm with charge air cooler	115 at 2300 rpm with charge air cooler
Capacity [ccm]	3621	4038
Torque [Nm]	500 at 1600 rpm	609 at 1600 rpm
Increase in torque in comparison to previous series	4.2%	±0%
Injection system	Common Rail	Common Rail
Starting aid	Glow plug	Heating flange

Disambiguation:

- DOC: diesel oxidation catalyst
- DPF: diesel particulate filter
- SCR: selective catalytic reduction

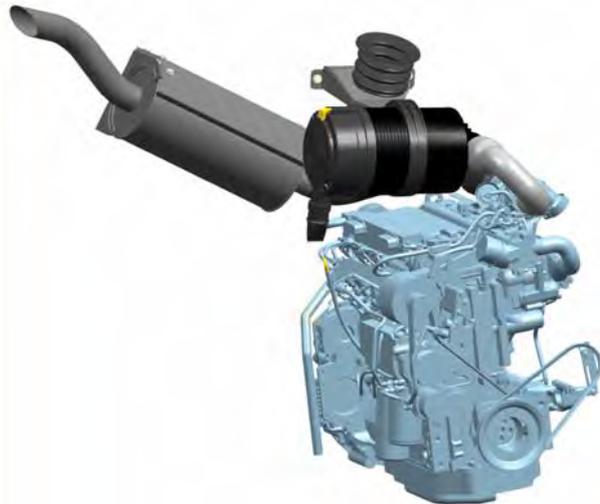
For detailed information regarding the procedures, please see page [2-6](#) and onwards.

## LRC engines (Emissions Level IIIA)

Engine TCD 3.6  
DOC+SCR are replaced by the end cap



Engine TCD 4.1  
DOC+DPF+SCR are replaced by the end cap



### Description:

For machines sold outside of the EU and the US in the LRC (less regulated countries) market, it is possible to equip the machines with a Level IIIA engine.

- The motors of Level IIIA are very similar to the engine models of the exhaust Level IV. The engine controller and the engine cable harness are, however, completely different.
- The ratings of the engine (kW, Nm) are identical.
- The DOC+SCR and DOC+DPF+SCR exhaust-gas treatment system is replaced by a "normal" end cap.
- As all sensors for exhaust-gas treatment are no longer required, the machines are equipped with a different software.
- The additional vehicle fuel DEF is not required for the LRC version
  - SCR catalytic converter omitted
  - SCR mixture omitted
  - The DEF filler neck is replaced by a cover plate

### Customer benefits:

- The engines can be run with fuel that has a higher sulphur content.
- Replacement of the diesel particulate filter when the maximum ash level is reached is no longer necessary.



## 2.2 Engine peripherals DEUTZ TCD 3.6 L4

Engine of 3007, 3507, 4007, 4407, 5007 and 4209

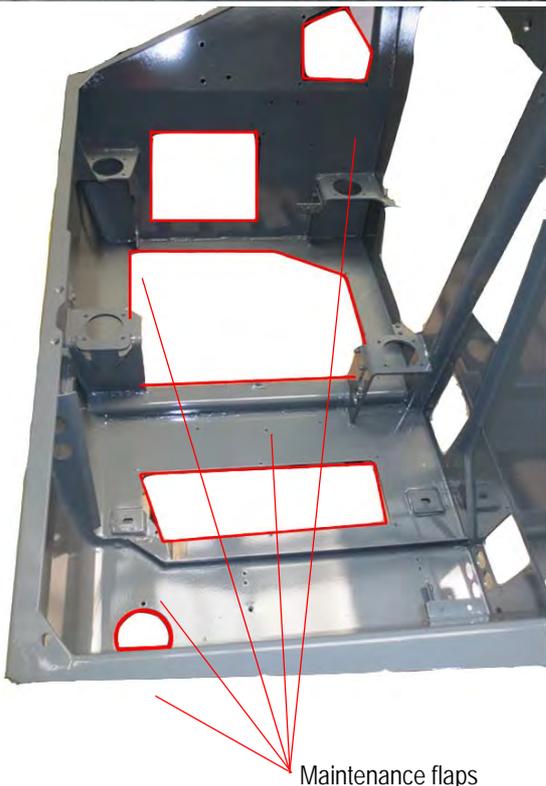


### Description:

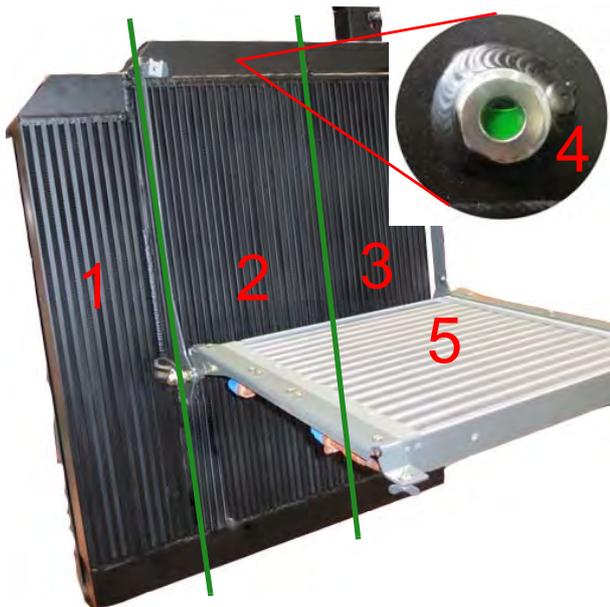
- Engine vat completely closed below, no exhaust gas is blown onto the ground
- The air is drawn in the cool area
- The fan also directs air around the engine that is blown diagonally upward
- Wide engine cover opening angle, held by two strong gas struts
- Transverse engine
- Engine vat with large, removable maintenance flaps
- All filters installed in suspended positions
- Combined radiator with wide-spaced fins
- Sight glasses for all fluids

### Customer benefits:

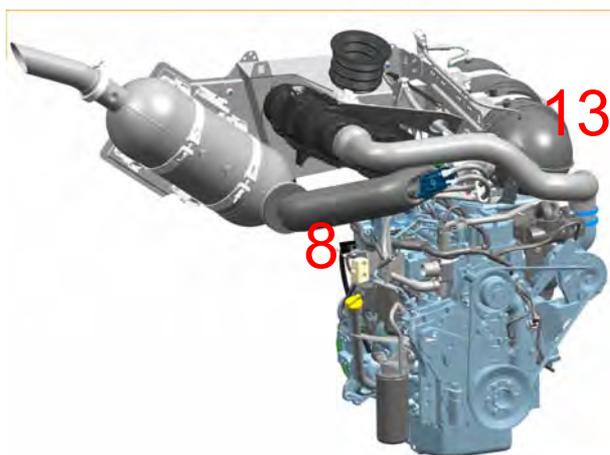
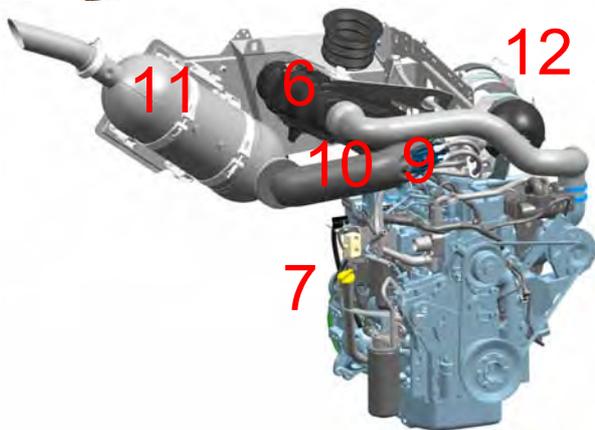
- No dust is raised by cooling air being blown downward
- Higher engine efficiency
- Easy access for maintenance and fast daily maintenance save time and money



Maintenance flaps

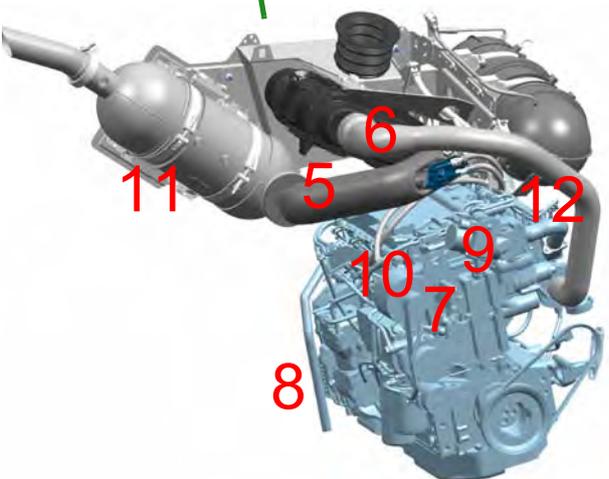
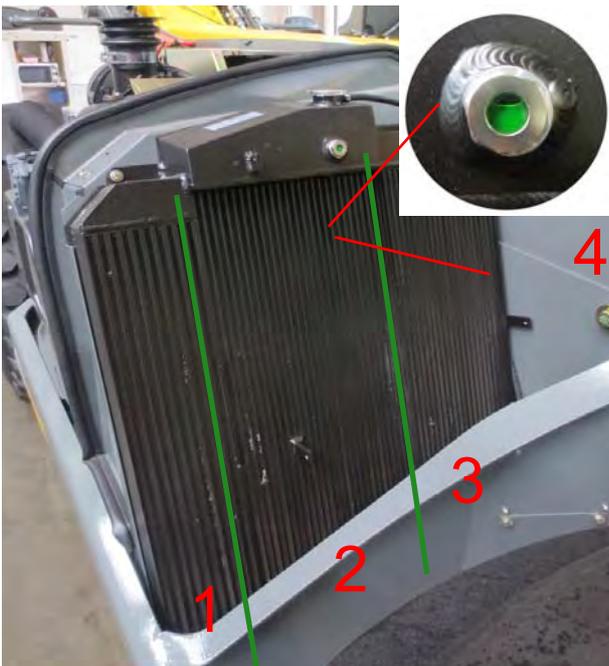


- 1 Charge-air cooler
- 2 Engine radiator (coolant)
- 3 Hydraulic oil radiator (operating and travel hydraulics )
- 4 Coolant sight glass
- 5 Radiator for air conditioning system (can be folded back for cleaning)
- 6 Air filter with cyclone prefilter and safety cartridge
- 7 Engine oil filler opening
- 8 Engine oil dipstick
- 9 SCR injectors
- 10 SCR – mixing section
- 11 SCR – catalytic converter
- 12 DOC
- 13 DOC + DPF (optional)



## 2.3 Engine peripherals DEUTZ TCD 4.1 L4

### Engine with 5507 and 5509



**Description:**

- Engine vat completely closed below, no exhaust gas is blown onto the ground
- The air is drawn in the cool area
- The fan also directs air around the engine that is blown diagonally upward
- Wide engine cover opening angle, held by two strong gas struts
- Transverse engine
- Engine vat with large, removable maintenance flaps
- All filters installed in suspended positions
- Combined radiator with wide-spaced fins
- Sight glasses for all fluids

**Customer benefits:**

- No dust is raised by cooling air being blown downward
- Higher engine efficiency
- Easy access for maintenance and fast daily maintenance save time and money

- 1 Charge-air cooler
- 2 Engine radiator (coolant)
- 3 Hydraulic oil radiator (operating and travel hydraulics )
- 4 Coolant sight glass
- 5 Air filter with safety cartridge
- 6 Air inlet of motor inlet
- 7 Engine oil filler opening
- 8 Engine oil dipstick
- 9 SCR injectors
- 10 SCR – mixing section
- 11 SCR – catalytic converter
- 12 DOC + DPF combination

## 2.4 Possible ways to reduce pollutants in combustion engine emissions

### Reduction of particles (PM) and nitrogen oxides (NO<sub>x</sub>):

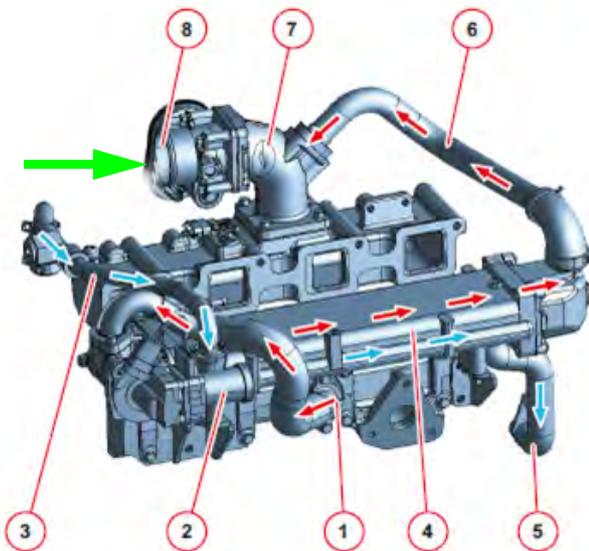
There are a number of possible ways to reduce the quantity of particles and nitrogen oxides (NO<sub>x</sub>) discharged by diesel engines. The following measures are employed for the engines used by Kramer.

- Internal engine measures:
  - Exhaust-gas recirculation (EGR)
  - Common rail injection technology
- Exhaust-gas treatment:
  - Diesel particulate filter (DPF)
  - Diesel oxidation catalyst (DOC)
  - Selective catalytic reduction (SCR)



### Notice!

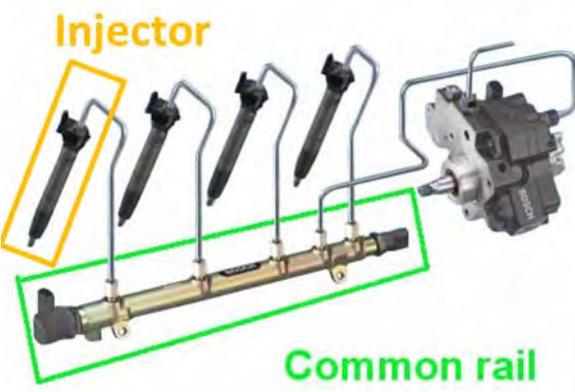
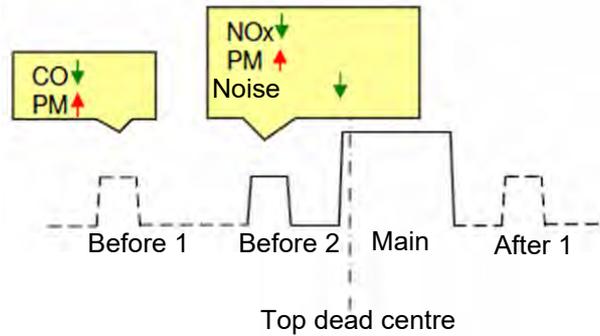
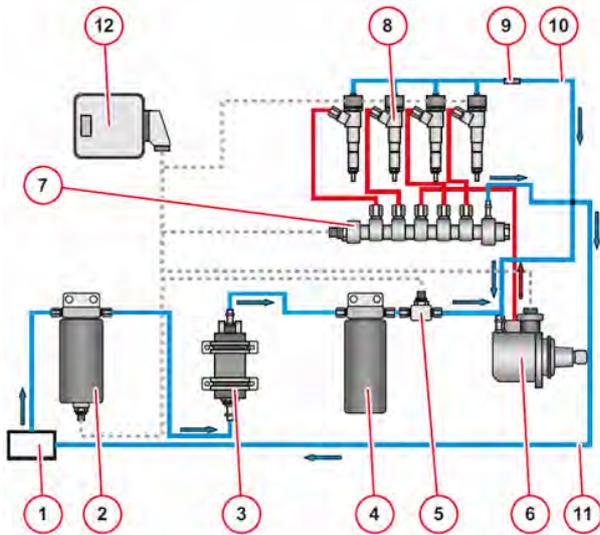
At Deutz, the engines with an output of 100 kW reach Level IV only with the aid of a DOC and SCR technology.



### Exhaust-gas recirculation (EGR)

The aim of exhaust-gas recirculation is to reduce the amount of nitrogen oxides (NO<sub>x</sub>). The higher the oxygen content in the combustion chamber, the higher the emission of nitrogen oxides (NO<sub>x</sub>). For this reason a certain amount of exhaust fumes that is controlled by the so-called EGR valve is mixed with the combustion air. As the emission of particles increases when the oxygen content in the combustion chamber is lower, it is not possible to recirculate an unlimited quantity of exhaust gas.

- 1 Exhaust gas stream
- 2 Control valve
- 3 Coolant line to EGR radiator
- 4 Radiator for exhaust reflux
- 5 Coolant reflux
- 6 Exhaust gas stream (cooled)
- 7 Mixer pipe
- 8 Throttle valve with air intake

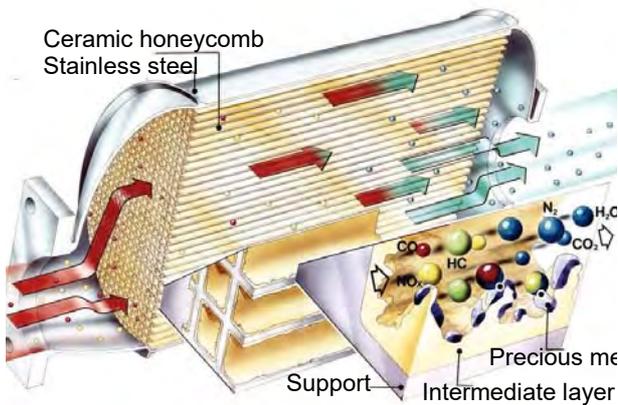
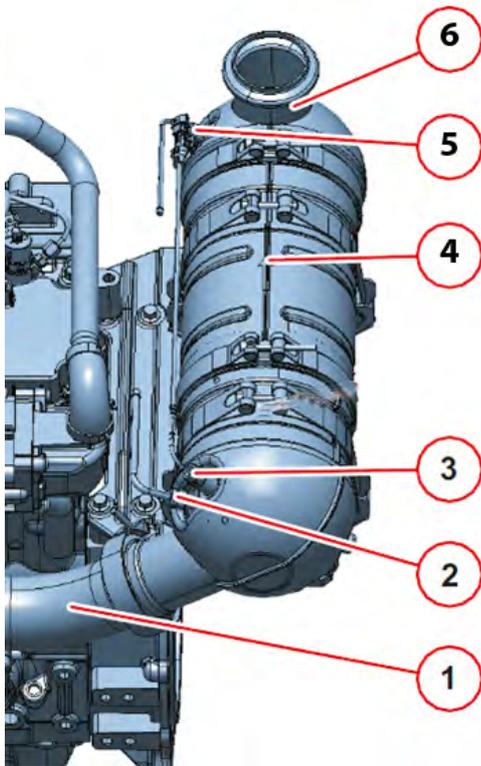


**Common rail injection:**

With the common rail system a high-pressure pump in the rail ensures a constantly applied pressure and fuel supply. The electronic engine controller emits the electrical signals determining when the respective injector should inject diesel for a specific time. It is therefore possible that more injection operations are performed before and after the main injection point. These additional firing times influence the exhaust-gas composition depending on the exhaust-gas composition and ensure a lower noise level as well as improved smoothness of running. To ensure that combustion is as effective and efficient as possible, in addition to a high injection pressure (approx. 2000 bar), the concave form in the cylinder, the injector geometry and its number of nozzle bores are also decisive.

The various components of the common rail system are described below.

- 1 Fuel tank
- 2 Fuel pre-filter
- 3 Fuel pump (electrically driven)
- 4 Fuel filter
- 5 Fuel pressure sensor
- 6 High-pressure pump with – FCU (Fuel Control Unit) control block
- 7 High pressure reservoir – common rail
- 8 Injector
- 9 Non-return valve
- 10 Return line
- 11 Fuel reflux to fuel tank
- 12 Engine control unit



**Diesel oxidation catalyst (DOC):**

This diesel oxidation catalyst, also known as a 2-way oxidation catalyst, lowers the emission of nitrogen oxide (NOx), carbon monoxide (CO) and hydrocarbons (HC).

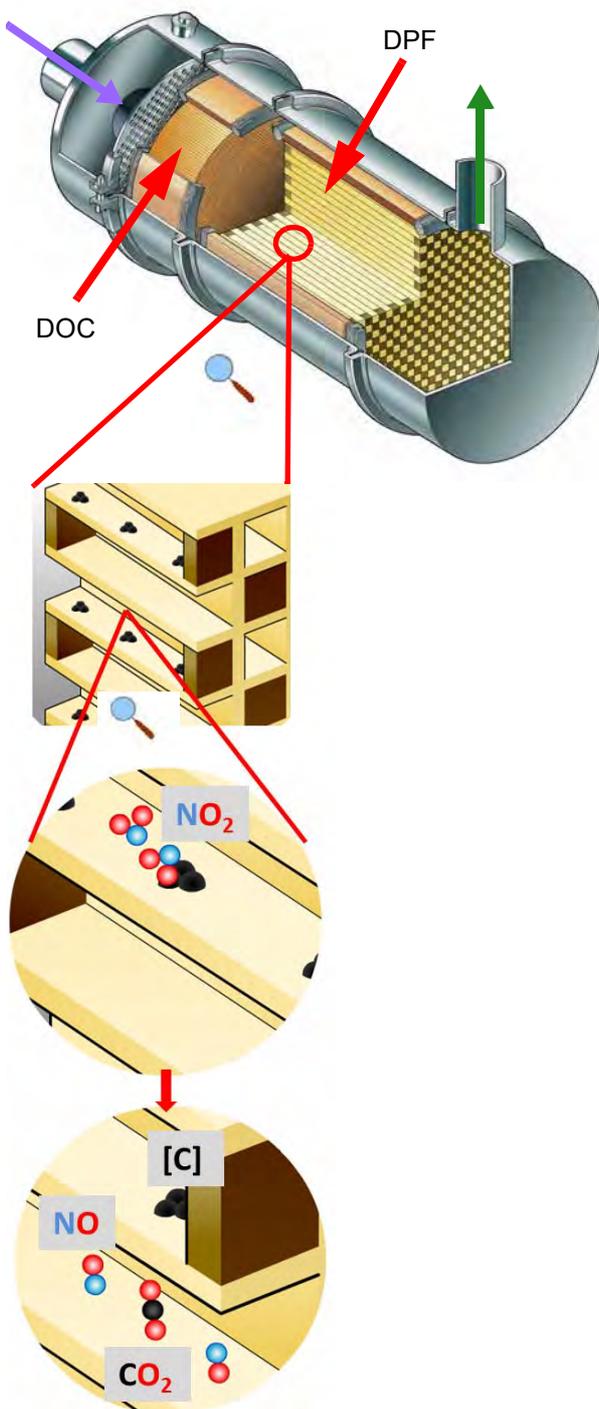
- The DOC has a catalytic surface that converts the carbon monoxide (CO) contained in the exhaust gas to carbon dioxide (CO<sub>2</sub>) by means of oxygen (O). Non-combusted hydrocarbons (HC) are made to react with the oxygen and converted into carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O). In addition, nitrogen monoxides (NO) are converted into nitrogen dioxides (NO<sub>2</sub>).
- Temperatures of > 250°C are necessary for a high efficiency.
- The DOC is a completely **maintenance-free** system which is very durable due to its stainless steel housing.
- The DOC can be run at idling speed without problems for a prolonged period, particle accumulation does not occur.
- The DOC does not require sulphur-free diesel and is resistant to ash deposits.
- The DOC can be fitted directly in the silencer for space-saving installation.

- 1 Exhaust manifold
- 2 Differential pressure sensor I
- 3 Exhaust gas temperature sensor
- 4 DOC
- 5 Differential pressure sensor II
- 6 Exhaust-gas opening



**Notice!**

If internal engine measures are sufficient to reduce particle emissions so that the particle discharge requirements of emission Level IV are met, a DOC is the only exhaust gas after-treatment upstream of the SCR system. (3007, 3507, 4007, 4407, 5007, and 4209)

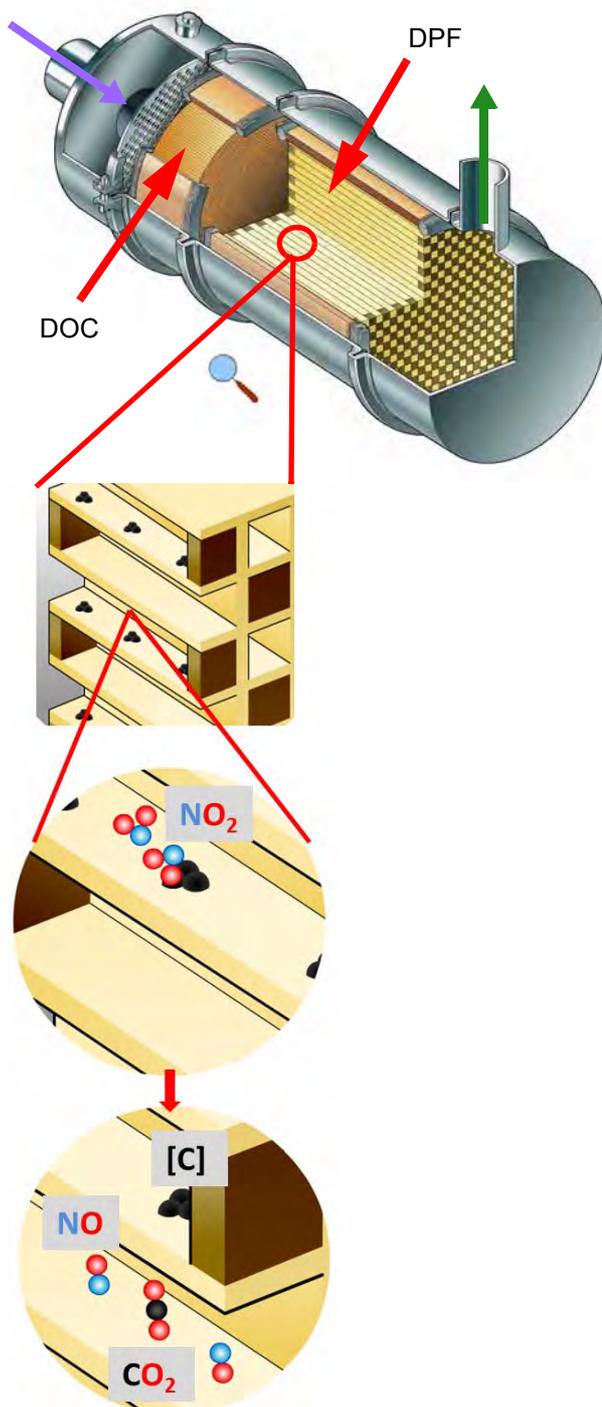
**Diesel particulate filter (DPF):**

When diesel fuel is combusted, soot is produced that comprises various carbon compounds [C]. These compounds are separated in the diesel particulate filter. When the soot accumulates, the filter must be regenerated. There are two different types of regeneration:

- 1 Active regeneration during which diesel is injected separately before the exhaust-gas treatment system. The exhaust-gas temperature is therefore increased to a very high level (approx. 600°C) and the soot is burned. This only occurs if the filter has reached a certain soot accumulation level.
- 2 Passive regeneration is based on a continuous regeneration process (CRT process) that is activated as soon as the exhaust-gas temperature of 250°C at the inlet of the exhaust-gas treatment system is exceeded.

On the Kramer models 5507 and 5509 a diesel particulate filter (DPF) is also fitted alongside the diesel oxidation catalyst (DOC). It is installed in the vehicle as a combination unit in front of the SCR silencer. This works in accordance with the passive regeneration principle (CRT).

- Continuous passive regeneration means that the soot in the diesel particulate filter is continuously converted and therefore decomposed. The nitrogen oxides (NO<sub>2</sub>) already converted by the upstream diesel oxidation catalyst react at a temperature of > 250°C with diesel soot [C] to produce less harmful carbon dioxide (CO<sub>2</sub>) and nitrogen monoxide (NO).



- To trigger the chemical process and keep it active, the exhaust-gas temperature must be  $> 250^{\circ}\text{C}$ . This is achieved by driving at an average machine capacity. The filter particulate contamination is displayed as a percentage on the display and monitored constantly by the engine control device that intervenes in the regeneration process when a certain particulate level has been reached and activates one of the following modes.

- Normal operation:

- Under normal operating conditions (exhaust-gas temperature  $> 250^{\circ}\text{C}$ ) the filter particulate level remains in a permissible range and no action is required.

- Heat mode:

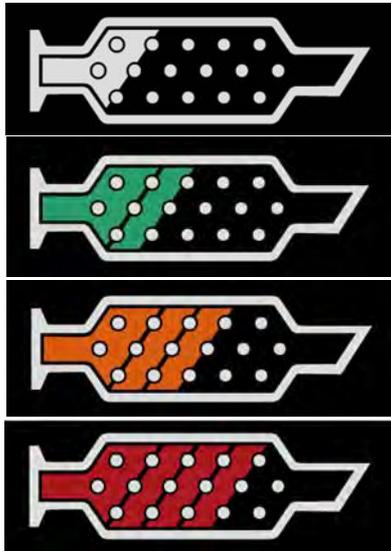
- When the operating conditions of the engine (exhaust-gas temperature  $< 250^{\circ}\text{C}$ ) do not permit any passive regeneration, the diesel particulate level in the filter increases. This can be the case when the machine is often run at idling speed. A throttle valve controlled by the engine controller is located in the combustion air inlet with which the exhaust-gas temperature is increased for regeneration of the diesel particulate filter. This occurs automatically during operation and does not affect operation of the machine or its performance.

- Idling regeneration:

- If the heat mode does not achieve a satisfactory reduction in the particulate level, soot particles still accumulate in the filter and stationary regeneration is necessary. Stationary regeneration must be manually initiated by the operator. (Required time approx. 30 minutes)
- Instead of stationary regeneration, the engine can be run for a certain time at a higher load. When the regeneration conditions return to the normal range, the warning is reset by the engine controller.



Activation of stationary regeneration



- If stationary regeneration is not performed, the engine controller activates the defined engine protection functions irrespective of the particulate level in the diesel particulate filter. If the filter contamination exceeds the nominal value and regeneration is not possible, there is the risk of damage to the filter and the engine.
- Engine protection Level I: Power reduction by 30%
- Engine protection Level II: Power reduction by 30%, the engine speed is limited to 1200 rpm, regeneration can only be activated by the DEUTZ service technicians.
- The corresponding charge of the particulate filter can be output via the settings menu in the 7" display.
- During its entire life span, the DPF also collects ash that is not removed by regeneration. Accumulation of ash results in shorter regeneration intervals, and replacing the filter then becomes necessary.
- The expected stationary time until the ash level has reached the maximum value is around 3000 – 3500 hours depending on the application.
- Deutz has set up a replacement system. The ash-laden DPF is replaced by a replacement filter by Deutz Service.



**Selective Catalytic Reduction (SCR) - technology**

In order to fulfil the currently valid emission standard IV in the power segment (> 56 kW) for diesel engines, additional measures are necessary. The goal was to reduce nitrogen oxides by up to 90%. This can only be achieved with the aid of selective catalytic reduction (SCR).

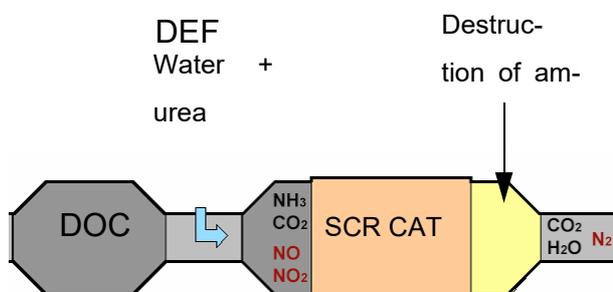
For this purpose, an additional vehicle fluid is required, such as a urea-water solution or diesel exhaust fluid (DEF) is required – this is often sold under the brand name AdBlue®. This fluid consists of 32.5% pure urea and 67.5% de-mineralised water. This has a limited shelf life and should be used within four months. The canisters should be stored in a cool, dark environment in order to prolong the service life. In this way, they can be stored for up to two years. DEF is a non-toxic, non-polluting, and non-flammable liquid. However, it can damage the paint if the tank of the vehicle is continually overfilled.

From a temperature of -11°C, the DEF begins to crystallise and freeze. In order to avoid damage to the vehicle, all lines filled with DEF are emptied after the diesel engine is switched off. Outside temperatures far below the freezing point are thus unproblematic for the functional capability of the vehicle. As soon as the vehicle is put back into operation, the tank is heated so that the DEF can defrost. After a short bridging time (released by the manufacturer), the usual functional capability returns.

The DEF is injected in the exhaust gas flow in a SCR-mixer through an injector. Depending on the utilisation of the engine the usage of DEF to diesel can vary. At higher load, the consumption of DEF is higher than diesel because more nitrogen oxides must be emitted from the engine. With the help of the SCR technology ammonia and water accrue. From an exhaust temperature from 170°C the fluid reacts with the nitrogen oxides in the exhaust gas. In the SCR catalytic converter, this mixture of ammonia and nitrogen oxide reacts to form non-toxic, elemental nitrogen and water.

**Reaction in the SCR catalytic converter:**

After the DOC, DEF is injected with the help of a probe. Through the urea, a mixture of ammonia and CO<sub>2</sub> is formed. The remaining nitrogen oxides are then reduced in the SCR catalytic converter to form nitrogen and water. In the last step, the excess ammonia is oxidised to harmless nitrogen and water.



**Working with SCR:**

The system can only work if sufficient amounts of both vehicle fluids, diesel and DEF, are present. As soon as the diesel fuel tank is empty, the vehicle stops. The DEF behaves somewhat differently. As soon as the ignition is switched on, the display shows the level in percent. This can be called up at any time during operation. If the DEF falls below a certain level, there are several escalation levels.

The DEF fill level indicator is integrated into the 7" display on the main page.

If the level drops below 20%, the fill level indicator has reached the red range. In addition, the symbol flashes in the display. If the fill level drops below the 10%, a warning beep sounds with the flashing of the symbol. If the machine continues to be operated without filling the urea solution, the engine power will be reduced by 25% after a period of 10 minutes (warning light flashes). The red warning light is continuously lit from 15 minutes with a low fill level. After 20 minutes, the motor power is reduced by 50%, and the speed is significantly reduced. After this point, it is no longer possible to work with this machine and the DEF must be topped up as soon as possible. As soon as there is enough DEF in the tank, the control lights go out and the machine can be operated as usual.

Firing a SCR catalyst for cleaning, as with the DPF, is not required under normal circumstances. If the functional capacity is affected outside the cycles because of the unusual case of crystallisation of the urea solution, you can use the "Refresh" button to perform a refresh of the SCR system.

In order to prevent the incorrect filling of the tank, the diameter of the filler neck is somewhat smaller than a conventional diesel gun. It is therefore not possible to refill the DEF tank with diesel.



### 3 Bodywork

#### 3.1 Frame structure

1.

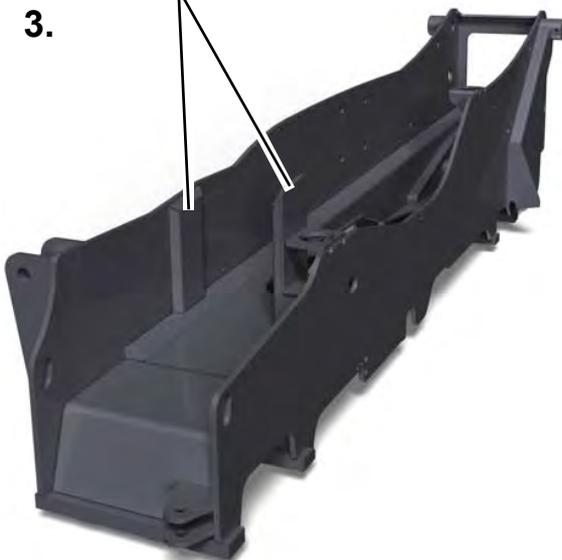


2.



Support for telescopic boom

3.



#### Description:

The rigid main frame, made of steel plates in box-section design, provide the telehandler with its stable, sturdy skeletal structure.

- 1 Frame structure for 3007, 3507 and 4007
- 2 Frame structure for 4407, 5007 and 5507
- 3 Frame structure for 4209 and 5509

- Frame thickness 3007, 3507, 4007, and 4407: 15mm
- Frame thickness 5007, 5507, 4209, and 5509: 20mm
- The telescopic boom can be fully lowered into the frame
- For the models 4407, 5007, 5507, 4209, and 5509, a welded structure is integrated in the frame to support the telescopic boom laterally. When the boom is lowered during tough pushing operation, the force is already absorbed by the front frame and not by the main bearing pin alone
- Rigid front axle, oscillating rear axle ( $\pm 10^\circ$ )
- Optional hydraulic frame levelling can be ordered for the 5509 to compensate inclinations of  $\pm 10^\circ$
- A mechanical oscillating-axle interlock at the rear axle is optionally available for all models with platform 416. It substantially improves the stability against tipping. For the 5509, a comfortable, hydraulic oscillating-axle interlock is available for the rear axle.

#### Customer benefits:

- Extremely torsion-resistant frame for maximum load capacity
- Reduced repair costs since on the large models with high pushing power, the forces are absorbed by the frame
- Balanced weight distribution and low centre of gravity for high stability
- Perfect visibility to the right and of the attachment



**Description:**

The models 4407, 5007, 5507 and 5509 are fitted with integrated storage bins in the counterweights at the rear of the machine. These bins have lockable covers and can hold 44 litres.

**Customer benefits:**

- Enables carrying ratchet straps, tools, chains, etc.
- Dirty tools and small objects can be safely stored and do not “roll” from one side to the other in the cab
- The lock counteracts a possible theft



## 3.2 Front attachment

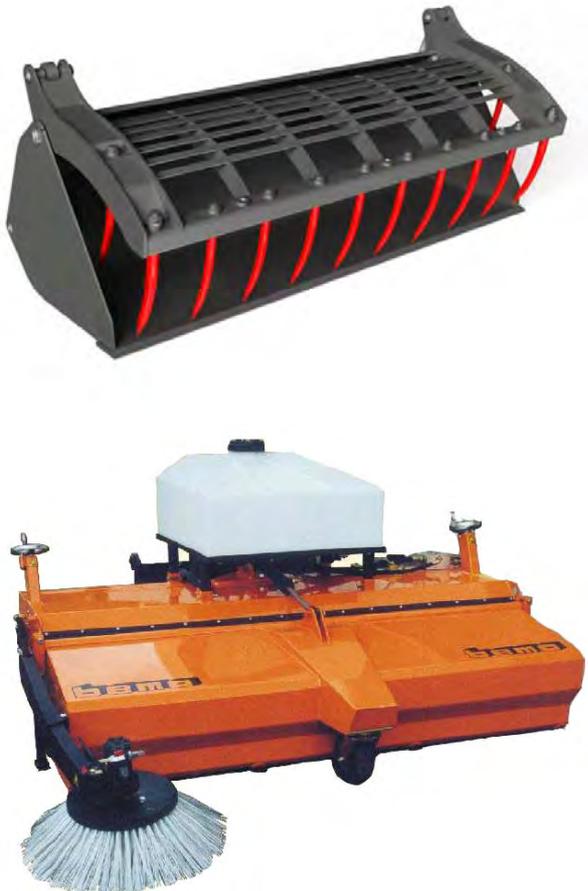
### Standard attachments



The Kramer quickhitch system allows you to change standard attachments in no time at all.

- Standard bucket
  - Density 1.8 t/m<sup>3</sup>: e.g. soil
- Range of lightweight material buckets
  - Lightweight materials bucket: density 1.3 t/m<sup>3</sup>: e.g. salts
  - Super-lightweight materials bucket: density 0.9 t/m<sup>3</sup>: e.g. wood chips
- Different pallet forks
- Crane jib
- Material and salt pusher

### Hydraulic attachments



Hydraulic attachments can be run with the hydraulically operated standard 3rd control circuit. The 3rd control circuit offers continuous electric operation. Ball-type cocks are not necessary for switchover.

- Heavy duty bucket
- Multi-service bucket
- Rotary broom
- Multi-purpose forks

### 3.3 Rear attachment

#### Using the telehandler as a tractor



The progressive transmission and the trailer coupling convert the loader into an ideal tractor for transport jobs. With the European type approval (167/2013/EC; class T1) the telehandler can be used as a tractor throughout Europe.

- Semi-automatic trailer coupling, height-adjustable upon request
- Autohitch coupling with integrated monitoring of locking unit
- An optional tipping trailer connection is available in addition to the trailer coupling
- One double-acting connection is available as an option with the 6th control circuit (not for 3007)
- Compressed-air braking system and hydraulic trailer brake available ex works
- 7-pole rear socket

#### Customer benefits:

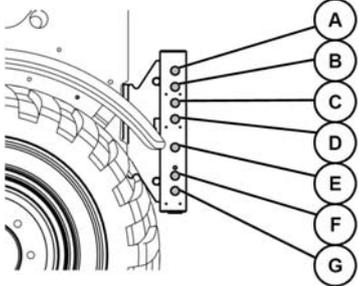
- Material, attachments and machines can be transported on a trailer
- Attachments can remain on the machine during road travel<sup>1</sup>
- Full functionality through “ex work” solution for auxiliary hydraulics connections and trailer brake
- Permits the use of a hydraulically tippable trailer
- Hydraulic attachments can be operated at the rear
- Additional trailer brake enables tractor operation with trailers up to 20 tonnes permissible gross weight rating

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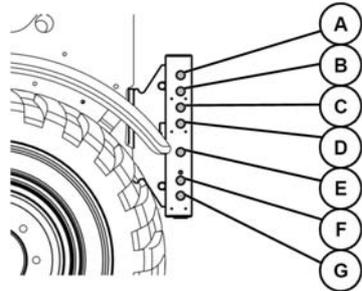
1. The legal regulations for dimensions, lights and visibility must be observed!



Trailer and drawbar loads platform 415

	3007	3507	4007	
<b>Trailer weight without brakes</b>	750 kg	750 kg	750 kg	
<b>Trailer weight with brakes (1 axle, braked)</b>	3500 kg	3500 kg	3500 kg	
<b>Trailer weight with brakes (all axles braked)</b>	8000 kg	8000 kg	8000 kg	
<b>Trailer with hydraulic or pneumatic brakes</b>	16,000 kg	16,000 kg	16,000 kg	
<b>Permissible drawbar load on rigid trailer coupling</b>				
<b>Autohitch</b>	2000 kg	2000 kg	1250 kg	
<b>Height-adjustable trailer coupling</b> 	<b>A</b>	1000 kg	1000 kg	750 kg
	<b>B</b>	1250 kg	1250 kg	750 kg
	<b>C</b>	1250 kg	1250 kg	1000 kg
	<b>DE</b>	1500 kg	1500 kg	1000 kg
	<b>E</b>	1750 kg	1750 kg	1250 kg
	<b>F</b>	2000 kg	2000 kg	1250 kg
	<b>G</b>	2000 kg	2000 kg	1250 kg

**Trailer and drawbar loads platform 416**

	4407	5007	5507	4209	5509
<b>Trailer weight without brakes</b>	1000 kg				
<b>Trailer weight with brakes (1 axle braked)</b>	3500 kg				
<b>Trailer weight with brakes (all axles braked)</b>	8000 kg				
<b>Trailer with hydraulic or pneumatic brakes</b>	20,000 kg				
<b>Permissible drawbar load on rigid trailer coupling</b>					
	1750 kg	1750 kg	1250 kg	1500 kg	1000 kg
<b>Autohitch</b>					
	2000 kg	1750 kg	1250 kg	1500 kg	1000 kg
<b>Height-adjustable trailer coupling</b> 	<b>A</b>	1250 kg	1000 kg	1000 kg	1000 kg
	<b>B</b>	1250 kg	1250 kg	1250 kg	1000 kg
	<b>C</b>	1500 kg	1500 kg	1250 kg	1250 kg
	<b>DE</b>	1500 kg	1500 kg	1250 kg	1250 kg
	<b>E</b>	1750 kg	1750 kg	1250 kg	1500 kg
	<b>F</b>	2000 kg	1750 kg	1250 kg	1500 kg
	<b>G</b>	2000 kg	1750 kg	1250 kg	1500 kg

**Certified weights**

<b>Model</b>	<b>Kerb weight</b>	<b>Gross front axle weight rating</b>	<b>Rear gross axle weight rating</b>	<b>Permissible maximum weight</b>
<b>3007</b>	5920 - 7250 kg	6500 kg	6500 kg	9000 kg
<b>3507</b>	6170 - 7500 kg	6500 kg	6500 kg	9000 kg
<b>4007</b>	6810 - 7850 kg	6500 kg	6500 kg	9000 kg
<b>4407</b>	8100 - 9100 kg	7500 kg	7500 kg	12,500 kg
<b>5007</b>	8600 - 9600 kg	7500 kg	7500 kg	12,500 kg
<b>5507</b>	9500 - 10,500 kg	7500 kg	7500 kg	12,500 kg
<b>4209</b>	9000 - 10,500 kg	7500 kg	7500 kg	12,500 kg
<b>5509</b>	10,500 - 11,500 kg	7500 kg	7500 kg	12,500 kg



## 4 Traveling drive

### 4.1 Hydraulic pump

**Description:**

The system comprises a high pressure axial-piston variable displacement pump with an electronic governor integrated in the pump. Three pumps with different displacements are used. The following pumps are installed in the standard equipment:

- 3007/3507/4007 – 78 ccm per revolution
- 4407/5007/4209 – 89 ccm per revolution
- 5507/5509 - 130 ccm per revolution

In connection with intelligent software, these drives make it possible to optimally adapt the settings to the specific telehandler requirements.

Various safety and comfort functions can also be implemented through the electronic control, such as:

- Avoiding changing direction at speeds over > 16 km/h
- Avoiding neutral position at speeds over 22 kph
- Protecting the hydraulic motor against overspeed during downhill machine travel
- A so-called “Zero-stroke regulation” is integrated on models 4407, 5007, 5507, 4209, and 5509 for electronically suppressing pressure peaks in the travelling drive. As soon as the maximum high pressure of 500 bar is reached at the hydraulic pump and the machine has no more pushing power, the hydraulic pump returns to zero delivery. As soon as a pressure of <500 bar is detected, the pump swivels out again and increases machine travel pressure to 500 bar again
- Speed-dependent load-stabiliser control (activation at speeds > 7 km/h, deactivation at speeds <6 km/h)
- The integrated connectors are dust-proof and protected against high-pressure and steam-jet cleaning

**Customer benefits:**

- Higher pushing power
- Output-controlled drive function
- Machine protected against incorrect operation, overload and pressure peaks
- Comfort functions, for example speed-dependent load stabiliser

## 4.2 Hydraulic motors and transmission variants



### Hydrostat (3007, 3507 and 4007):

Straight power train without any cardan-shaft flexion ensures maximum efficiency and handling without vibration. Standard equipment of models 3007, 3507, and 4007 includes a hydrostatic drive. A progressive axial piston transmission provides powerful, progressive handling with a travel speed of 0-30 km/h. Control is ensured by the pump's electronics. Series equipment of models 3507 and 4007 includes an ecospeed transmission.

For hydrostatic drive, the variable displacement motor has a capacity of 160 cm<sup>3</sup>/revolution.

### Customer benefits:

- Precise positioning of machine when handling material (inching)
- Progressive power transmission
- Braking causes less wear
- Direction changed easily on joystick
- Solid tried and tested technology



Cardan shaft drive

Hydrostatic drive



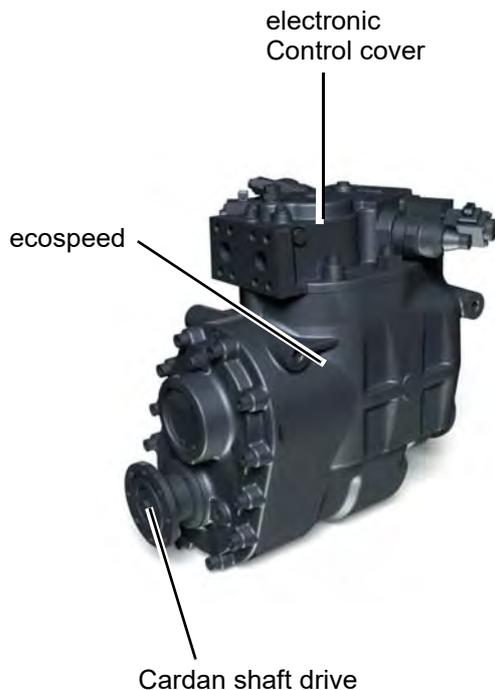
**ecospeed (4407, 5007, 4209, and optionally 3507, 4007):**

Straight power train without any cardan-shaft flecion ensures maximum efficiency and handling without vibration. The speed reduction "Smart Driving" is standard.

- The ecospeed transmission includes a hydrostatic drive with a variable displacement pump and a wide-angle motor with a maximum swivel angle of 45° (as compared to a conventional hydrostatic motor with a maximum swivel angle of 28°)
- The on-board computer processes signals on the diesel engine speed, electronic control cover, travel speed and the position of the inching pedal
- The swivel angles of the wide-angle motor and the variable displacement pump are controlled and optimally adapted to the machine's specific load condition by means of the data received and the pressure level the drive is subject to.
- The fully automatic control of the ecospeed drive ensures maximum pushing power at the lowest possible engine speed and the maximum engine torque in any work situation
- For ecospeed, the variable displacement motor has a capacity of 233 cm<sup>3</sup>/revolution

**Customer benefits:**

- Maximum pushing and tractive force in all machine travel and operation situations
- Progressive machine travel from 0 – 40 km/h
- Precise and continuous working at low speeds
- Braking causes less wear
- Reduced fuel consumption
- Reduced noise emissions by working in the optimum range of the diesel engine's characteristic curve
- Moves off smoothly on slopes, even under heavy load





**ecospeedPRO (5507, 5509, and optionally 5007, 4209)**

- In addition to the advantages of the normal ecospeed transmission, the **ecospeedPRO** transmission offers more tractive force. This increase in tractive force is realised through a larger design and thus a **26%** larger capacity (in comparison with the previous ecospeed Plus)
- Thus, it was possible to dispense with the previous ecospeed Plus auxiliary motor, so that towing losses are avoided by the second auxiliary motor and at the same time an increase in power is possible in the form of pushing power and tractive forces as well as an increase in efficiency
- An increase in the pushing power and tractive forces of up to about **8%** was achieved
- For ecospeedPRO, the variable displacement motor has a capacity of 370 cm<sup>3</sup>/revolution
- “Smart Driving” speed reduction to 1550 rpm of the diesel engine upon reaching the maximum speed

**Customer benefits:**

- Maximum pushing and tractive power in all drive and work situations
- Progressive machine travel from 0 – 40km/h
- Precise and continuous working at low speeds
- Braking causes less wear
- Reduced fuel consumption
- Reduced noise emissions by working in the optimum range of the diesel engine’s characteristic curve
- Moves off smoothly on slopes, even under heavy load
- Increase in output in comparison to the previous model



### 4.3 Overview of travelling drive variants

The following table gives an overview of the transmission variants available for a specific model, for a specific speed and additional "Smart Driving" function. Together with the tyres selected, these different variants greatly affect the machine's tractive force.

Feature	Transmission type	Smart Driving incl.	Available for	Speed ex works	Transmission ratio version	Tractive force with tyres
M_GESCHW_001	Hydrostat	No	<b>Series</b> with: 3007/3507	20 km/h	30 kph	53 kN (405/70-24)
M_GESCHW_003			Optional for: 3007/3507	30 kph		
M_GESCHW_037	ecospeed	No	Optional for: 3507/4007	40 kph	40 kph	53 kN (405/70-24)
M_GESCHW_044	ecospeed	Yes	<b>Standard</b> for: 4407 Optional for: 3507/4007	40 kph	40 kph	57 kN (460/70R24)
M_GESCHW_045	ecospeed	Yes	Optional for: 4407/5007/ 4209	20 km/h	30 kph	70 kN (460/70R24)
M_GESCHW_035			<b>Standard</b> for: 5007/ 4209 Option for: 4407	30 kph		
M_GESCHW_053	ecospeed-PRO	Yes	Option for: 5007/ 4209	40 kph	40 kph	73 kN (460/70R24)
M_GESCHW_054	ecospeed-PRO	Yes	<b>Series</b> with: 5507/5509	40 kph	40 kph	73 kN (460/70R24)
M_GESCHW_055	ecospeed-PRO + four-wheel deactivation	Yes	Optional for: 5507/5509			
M_GESCHW_058	ecospeed-PRO	Yes	Optional for: 5507/5509	20 km/h		
M_GESCHW_057	ecospeed-PRO	Yes	Optional for: 5507/5509	20 km/h	30 kph	96 kN (460/70R24)
M_GESCHW_056			Optional for: 5507/5509	30 kph		

#### Effect on traction force:

- Final speed for a specific transmission ratio
- Tyre diameter
  - The smaller the transmission ratio and the tyre diameter, the higher the tractive force



#### Notice!

The mentioned tractive forces apply to the standard tyres. With other tyres, the tractive forces may differ.

### 4.4 Three speed settings



Shift to lower speed range      Shift to higher speed range



**Description:**

Three freely selectable speed ranges are available that can be changed during machine travel. The change is performed conveniently with two buttons on the joystick and is immediately shown in the 7" display with a corresponding symbol.

- For models (3007, 3507, and 4007) with hydrostat and a maximum speed of 30km/h (20 km/h option), the following speed ranges are available:
  - Snail: 0 - 7 kph
  - Turtle: 0 - 15 kph
  - Hare: 0 - 20/30 km/h
- For machines (4407, 5007, 5507, 4209, and 5509) with an ecospeed transmission and a maximum speed of 20 km/h / 30 km/h, the following speed ranges are available:
  - Snail: 0 - 7 kph
  - Turtle: 0 - 15 kph
  - Hare: 0-20 / 30 km/h
- For models with ecospeed transmission and a maximum speed of 40 km/h (4407, 5007, 5507, and 5509, and optionally for 3507, 4007, and 4209) the following speed ranges are available:
  - Snail: 0 - 7 kph
  - Turtle: 0 - 15 kph
  - Hare: 0 - 30 kph with 4 wheel steering or 0 - 40 kph with front axle steering

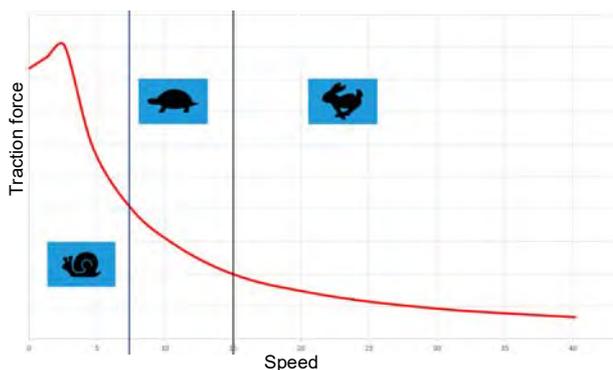


**Notice!**

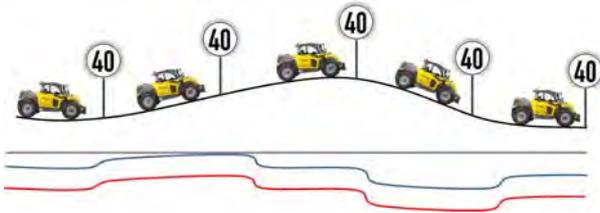
For safety reasons, crab steering can only be enabled in the Snail and Turtle modes travel range.

**Customer benefits:**

- Correct travel speed for all applications
- High productivity as the speeds can be switched during operation



## 4.5 “Smart Driving” engine speed lowering



### Description:

Smart Driving makes it possible to perform machine travel at maximum 20/30 km/h or 40 km/h speed and reduced rpm. During machine travel on a level road and maximum acceleration, engine speed stays at a maximum 2300 rpm until final speed is reached. When final speed is reached, engine speed is lowered to 1550 rpm (5507, 5509) or 2000 rpm (4407, 5007, 4209; option for 3507, 4007). This is made possible by the progressive wide-angle hydrostatic drive (ecospeed and ecospeedPRO) that modifies the position of the hydraulic motor depending on the load. If more tractive force is required from the telehandler, for example during uphill machine travel, the machine tries to keep the maximum speed by regulating the engine speed between 1550 or 2000 rpm and 2300 rpm, depending on the load, and by putting the transmission unit in a position with higher torque. During downhill machine travel, engine speed is lowered again provided that final speed can still be maintained. When the machine is back on a horizontal surface, engine speed is again increased to 1550 or 2000 rpm, and the hydraulic motor swivels to the specific position to maintain a speed of 40 km/h.

- Smart Driving is always enabled and is possible at maximum speeds of 20, 30 and 40 km/h provided that the machine is equipped with an ecospeed transmission
- The machine's noise level is reduced
- Up to 30% of fuel can be saved with the active engine speed lowering
- Less strain on machine components

### Customer benefits:

- No strain and no tiring during long working days
- Reduction of fuel and repair costs
- The machine durability is increased

## 4.6 Manual throttle and low-speed control



### Description:

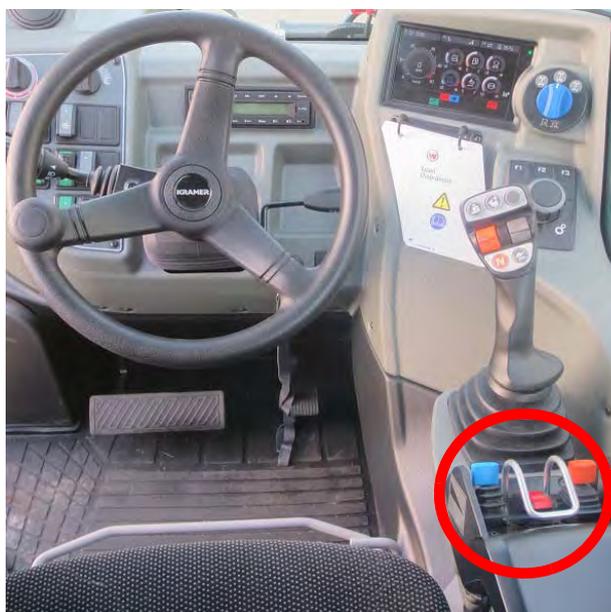
Electronic low-speed control and manual throttle on joystick console for precise and fast operation (option). The creep gear potentiometer works in the speed ranges of up to 7 kph or 15 kph, in other words, in “Snail” mode and “Turtle” mode. The speed is controlled continuously via a sliding potentiometer. Diesel engine rpm can be set with the manual throttle independent of the speed

- There are three variants for setting the engine speed
  - Briefly pressing the manual throttle increases/lowers engine speed in steps of 100 rpm
  - The manual throttle can be held forward or backward to increase/lowers the engine speed progressively
  - The required speed is set with the accelerator pedal and maintained by pushing the manual throttle once

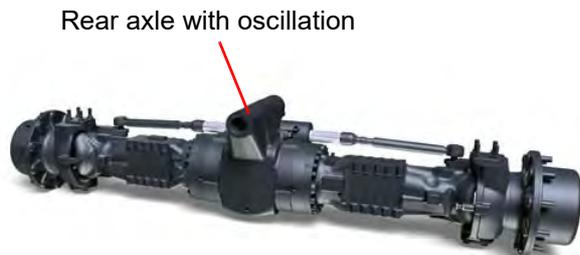
The settings of the low-speed control and manual throttle are not changed during backward vehicle travel and inching. In addition, engine speed can be overridden with the accelerator pedal. If the neutral push button is pressed, engine speed returns to idling speed.

### Customer benefits

- Low-speed control and manual throttle is used for example for attachments requiring operation at constantly high rpm but very low travel speeds (for example a rotary sweeper)
- Tiring machine and engine speed control with the pedals is no longer necessary, the load on the operator is reduced
- For hydraulic circuits in the rear, a constant oil flow can be guaranteed with the help of the manual throttle lever (e.g. for the operation of worm drives on trailers)



## 4.7 Axles



### Description:

Heavy-duty planetary steering and drive axles for maximum load capacity and transmission of high pushing power.

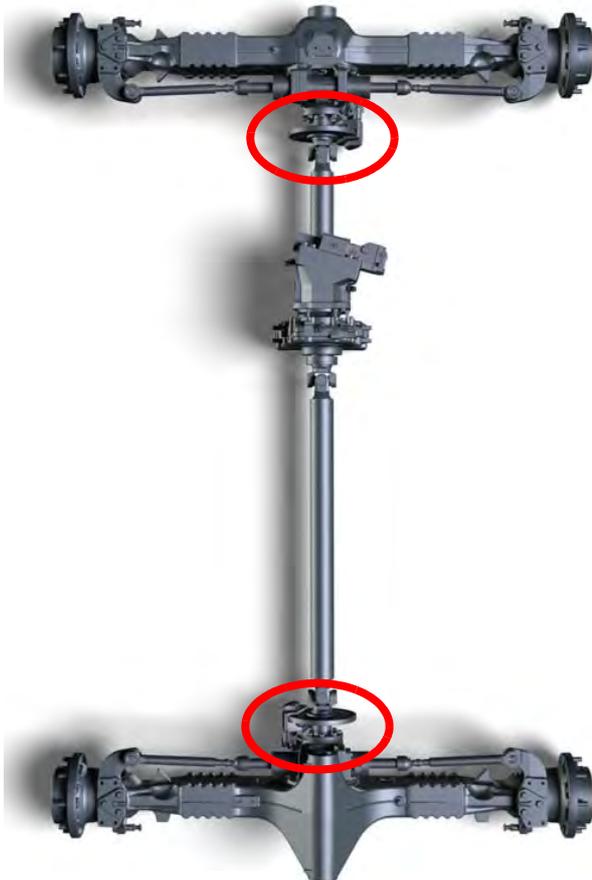
- 38° maximum steering angle
- Front axle is rigidly screwed onto the frame (oscillating axle of the 5509 has oscillating-axle interlock by standard)
- Front axle 5509 with optional hydraulic frame levelling for vehicle inclination of +/- 10°
- Differential lock in front axle (45% self-locking differential or 100%)
- Oscillating rear axle, maximum oscillating angle +/- 10°
- Oscillation at top of axle also ensures enhanced stability
- A mechanical oscillating-axle interlock is available as an option for models 4407, 5007, 5507, 4209, and 5509. An additional hydraulic oscillating-axle interlock is also available for model 5509

### Customer benefits:

- Sturdy axles for increased reliability and low maintenance costs
- Excellent manoeuvrability with high steering angle
- Best traction on loose ground with differential lock

	3507 / 3507 4007	4407 / 5007 4209	5507 5509
Static axle load	200 kN	238 kN	268 kN
Dynamic axle load	80 kN	85 kN	107 kN
Manufacturer	Carraro	Carraro	Carraro
Differential lock in front axle	45% self-locking differential	100% switchable	100% switchable

## 4.8 Braking system 3007, 3507, and 4007



### Description:

Brake discs at the front and rear axle inputs ensure optimal braking values.

- Service brake affects both axles by means of brake fluid
- Mechanical parking brake effect on the front axle brake disc, by means of a Bowden cable



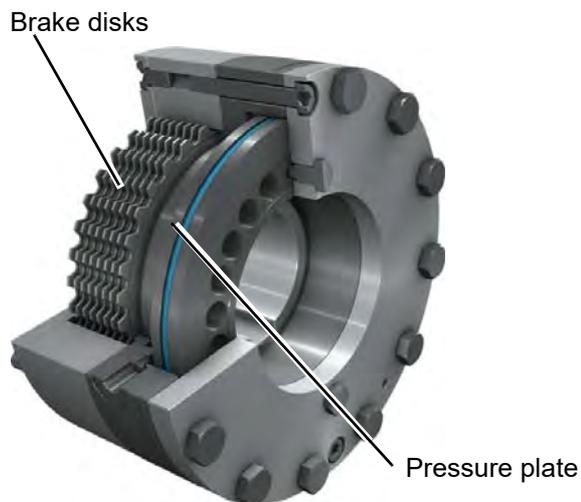


- Suspended brake pedal, with combined inching function
- 1 The oil flow toward the drive is reduced by decreasing the swivel angle of the variable displacement pump of the drive variable displacement pump (lower speed is possible at same engine speed)
- 2 Travelling drive pump in neutral position. No oil flow, and therefore no speed. The diesel engine runs freely
- 3 The braking effect can be felt

**Customer benefits:**

- Technology that has proven its worth a million times over
- Easy maintenance
- Low servicing costs since braking with the inching function alone is often sufficient
- More operational safety since changing pedals is not required
- Easier handling
- No deposits possible
- Easy cleaning

## 4.9 Braking system 4407, 5007, 5507, 4209, and 5509



### Description:

Standard equipment of models 4407, 5007, 5507, 4209, and 5509 includes a hydraulic power brake (wet multi-disc brake) in the front and rear axles. Several brake discs rotate immersed in oil, separated by intermediate discs; these discs are braked by friction with the thrust plate, friction ring and intermediate discs. Pressure is applied by a pressure plate consisting of two discs.

- The braking system does not run with mineral brake fluid, but with the hydraulic oil of the work hydraulics
- Permanent brake pressure monitoring, the display is integrated in the 7" display
- Electro-hydraulic parking brake with automatic functions
  - The parking brake is automatically applied when the engine stops or the operator leaves the operator seat
  - If the parking brake is applied and the brake pedal is pressed, the parking brake can be released with the travel direction selection on the joystick



System pressure  
Service brake



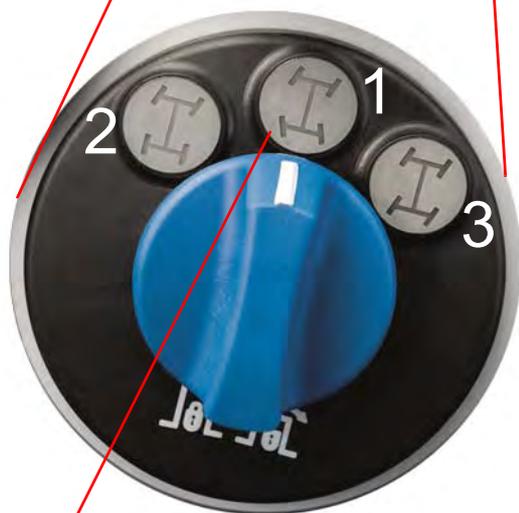


- Suspended brake pedal, with combined inching function
- 1 The oil flow toward the drive is reduced by decreasing the swivel angle of the variable displacement pump of the drive variable displacement pump (lower speed is possible at same engine speed)
- 2 Travelling drive pump in neutral position. No oil flow, and therefore no speed. The diesel engine runs freely
- 3 The braking effect can be felt

**Customer benefits:**

- Low wear and low-maintenance system ensures maximum operational safety
- Low servicing costs since braking with the inching function alone is often sufficient
- Constant braking, even when hot (since the oil carries away the heat), ensures a high level of safety
- No brake dust is produced
- Can be used with precision
- The complete lamella package is used for braking, this ensures excellent deceleration values
- Braking effect regardless of the weather conditions
- Increased safety thanks to automatic activation of parking brake (when engine stops or when leaving the operator seat)
- Increased operator comfort thanks to automatic activation and release of the parking brake

## 4.10 Steering modes



Specific symbol is backlit green during activation

### Description:

Series equipment of the telehandlers includes three steering modes to increase machine flexibility. Steering modes are changed with the steering mode switch placed in an ergonomic position on the front instrument panel. The steering mode selected is indicated by a backlit symbol. The axles are synchronized fully automatically as soon as the steering wheel is turned and a specific axle passes the middle position. When the machine starts, all symbols light up, since the synchronisation is first completed when the centre position of the rear axle is exceeded for the first time.

#### 1 4 wheel steering:

- Wide steering angles for maximum manoeuvrability in tight spaces
- Faster turning cycles when handling material
  - Maximum travel speed with 4 wheel steering: 30 kph

#### 2 Front axle steering:

- Rear axle is locked and machine is steered with the front axle only. Handling is the same as that of a lorry
- Safe driving with trailers and on public roads to construction sites
  - Maximum travel speed with front axle steering: 40 kph

#### 3 Crab steering:

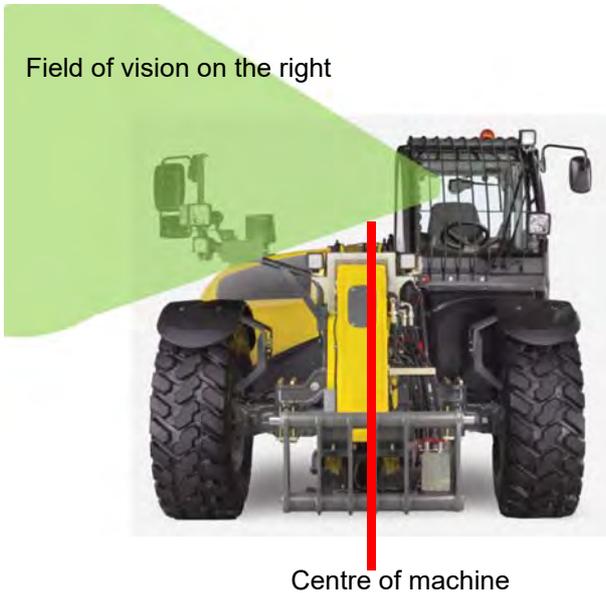
- All four wheels can be steered in the same travel direction
- With crab steering engaged, machine can be approached to an obstacle, for example a wall, with utmost precision. Parallel machine travel makes it possible, for example, to move the edge of a bucket exactly alongside a wall while keeping the machine at a certain distance from it. This avoids damage to the machine by “scraping” alongside the wall.
  - Maximum travel speed in crab steering 15 km/h for all ecospeed transmissions

### Customer benefits:

- Fast and intuitive operation of all three steering modes, easy change of modes during machine operation
- No tedious and complicated synchronization of steering angle required
- Safe road travel, also at high speed
- Machine is protected against damage

## 5 Loader unit

### 5.1 Lift frame



#### Description:

The loader unit is made of high-strength and torsion-resistant box-section profiles and with its robust dimensions, is perfectly adapted to toughest applications. The arm is located nearly in the middle of the machine and can therefore absorb maximum pushing forces. The telescopic boom can be fully lowered between the cab and the engine cover to ensure very good visibility to the right. A large boom containing all the hose routing and protecting it from falling material.

- Damped final positions of the telescopic ram during retraction, in the lifting cylinder at maximum lift height, as well as of the tilt cylinder when tilting out material avoid loss of material and minimize the load and the strain on the machine and the operator
- Hose burst valves for safety when handling material

#### Customer benefits:

- Good all-around visibility for picking up material increases safety
- Sturdy design reduces repair costs
- Damped final position makes it possible to work without any strain and without tiring
- Collisions on machine and man are prevented

Model	Coverage [mm]
3007 3507 4007	1040
4407	1090
5007 5507	1090
4209 5509	1230

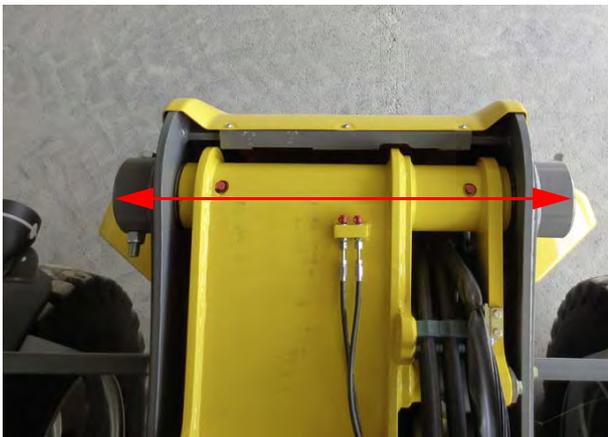
Boom bearing



Diameter of main bearing pin



Main bearing



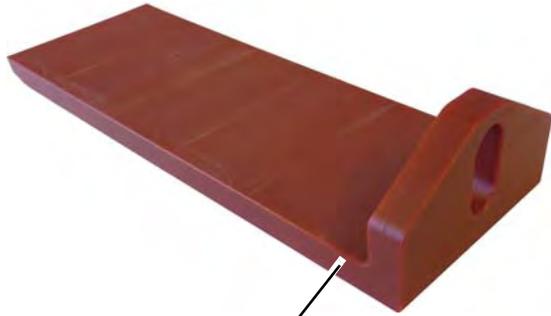
**Description:**

In heavy pushing and lift operation, the major part of the forces is applied to the main bearing, main bearing pin and boom bearing. Therefore, it is all the more important that the components absorbing the forces have sturdy dimensions adapted to high output. The larger these components, the better the resistance against torsion.

**Customer benefits:**

- Can be used as a full wheel loader
- Robust, long-lasting technology for low repair costs

	Wide boom bearing [mm]	Diameter of main bearing pin [mm]	Length of main bearing [mm]
3007 3507 4007	190	65	739
4407 5007 5507	210	75	805
4209 5509	330	75	915



**Description:**

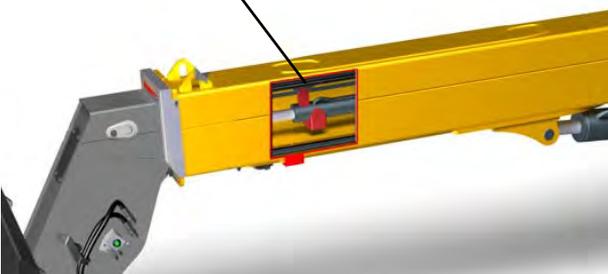
Wear and tear resistant bearing of outside and inside sections with 13 Teflon slide elements. Very large 300 x 100 x 15 mm slide elements offer maximum protection against wear. For exact travel of the inside section, different-sized brass plates can be fitted behind the slide elements to adjust them. The elements are fastened from outside to ensure easy replacement. In order to increase stability, supporting elements are fitted at the top and bottom of the telescopic ram to avoid deformation of the ram rod under maximum load

**Customer benefits:**

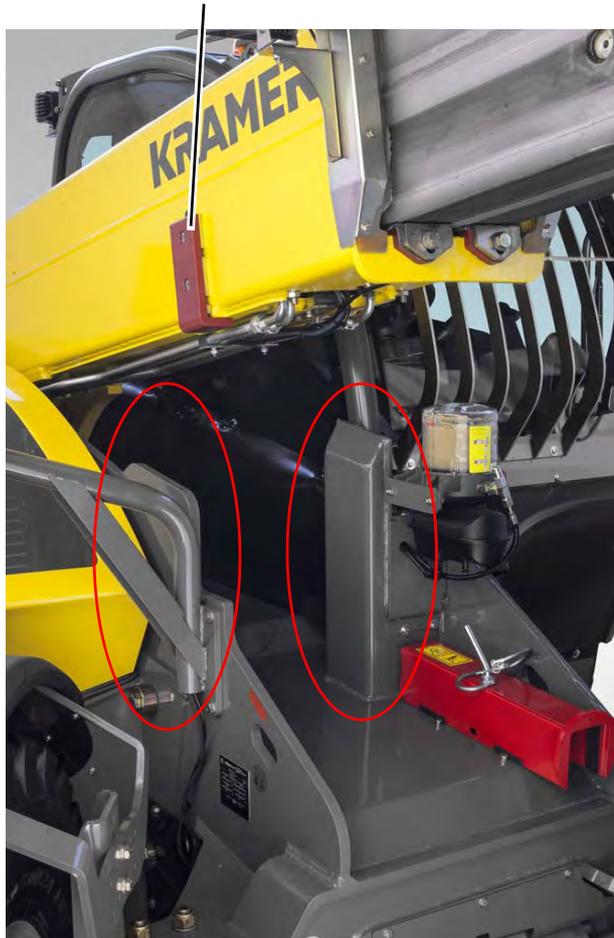
- Smooth boom retraction and extension thanks to large contact areas of the slide elements
- Robust, long-lasting technology for low repair costs
- Can be used as a full wheel loader



Ram support



Supporting elements



**Description:**

During heavy pushing and loading work, huge forces are applied to the boom due to the powerful drive of models 4407, 5007, 5507, 4209, and 5509. In order to prevent these forces from being applied only to the main bearing, boom bearing and main bearing pin, these models are equipped with a lateral guide and a boom support in the frame.

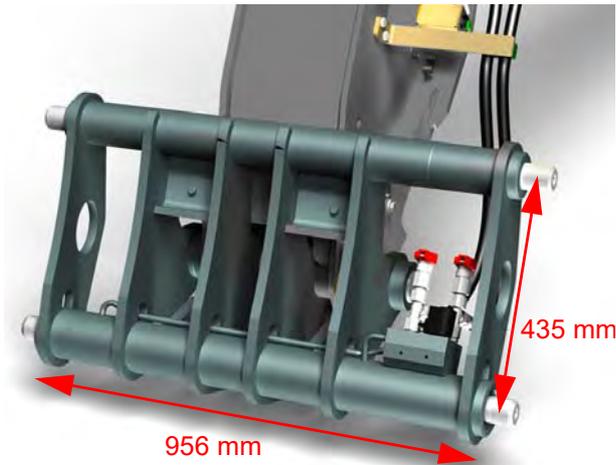
- One support element is fitted on either side of the boom
- Two higher supports in the frame

**Customer benefits:**

- Can be used as a full wheel loader
- Torsion is considerably reduced
- Robust, long-lasting technology for low repair costs



## 5.2 Quickhitch



### Description:

Sturdy Kramer telehandler quickhitch with 4-point mount, designed for toughest applications.

- Very wide and high mounting dimensions
- Sturdy mounting and lock pins (50 mm)
- Tilt cylinder protected in gooseneck for good visibility of attachment
- Hydraulic connections for third control circuit in protected position inside the quickhitch plate
- Large tilting angle of > 150°
- Small angular deviation of loader unit over the entire lift range

### High breakout forces in the lifting cylinder

Model	Breakout force (lift ram)
3007 / 3507 / 4007	43 kN
4209	49.7 kN
4407	50.8 kN
5007 / 5507	56.7 kN
5509	67.3 kN

### High breakout forces in the tilt cylinder

Model	Breakout force (tilt ram)
3007 / 3507 / 4007	50 kN
4209	50.3 kN
4407	62.4 kN
5007 / 5507 / 5509	67.6 kN

### Customer benefits:

- Can be used as a full wheel loader
- High reliability for toughest applications
- Large number of applications for attachments
- Bucket can be fully emptied in any position
- Pallets safely loaded
- Robust, long-lasting technology for low repair costs





## 6 Control stand



### Description:

The large, uncluttered cab is reached via one (model 415) or two (model 416) step-design stairs. Together with the large door the footholds that are designed for maximum grip ensure safe and convenient entry and exit.

- The large cab volume of 1.65 m<sup>3</sup> (model 415) or 1.8 m<sup>3</sup> (model 416) guarantees excellent head and leg room
- For perfect all-around visibility, the cab only has five posts and a gross glass area of 4.2 m<sup>2</sup>
- Three handholds (one on the left, two on the door) are provided for safe entry and exit
- The interior lighting is controlled by a door contact switch
- Split door, the upper half can be held in three positions. (Closed, opened by five centimetres and 180°)
- The upper door section can be easily unlocked from the outside with a Bowden cable when open
- Very low noise emissions mean less stress for the operator and lower noise pollution

Model	Operator-perceived noise level in dBA
3007 / 3507 / 4007	79
4407 / 5007 / 5507 / 4209 / 5509	78

### Customer benefits:

- Enhanced safety for the operator
- Improved ride comfort
- Operator does not tire as fast when working over a longer period of time
- Safer entry and exit at night



### Notice!

Operator-perceived noise level measured according to EC Directives ISO 6369/2000/14/EG, 84/532/EWG, 89/514/EWG and 95/27/ EWG. Measurements performed on asphalted surface.



### Description:

The cab was tested according to the OECD test protocols for ROPS (Roll Over Protective Structure) and FOPS (Falling Object Protective Structure). In the context of cab tests, the test codes 4 (ROPS for tractors), 9 (ROPS for telehandlers), and 10 (FOPS for tractors, level II) are used. In addition, the cab is approved according to the test protocol of the Tractor Directive 167/2013 for tractor class T1a. With model 415, the FOPS screen is located on the interior to keep the vehicle height low, and with model 416 it is located on the exterior. The FOPS screen possesses an optimised design for best visibility with raised loader unit. Narrow cabin pillars and panorama glazing with a glass area of around 4.4 m<sup>2</sup> for an optimum view to all sides. The section panorama front window without cross-bar increases the good overview and improves sense of space. The head and foot room is excellent. The wash and wipe system reaches over the entire front and rear windows. Optionally, with platform 416, a wash and wipe system is available for the right window. Hinged rear window combined with the hinged side windows permit a pleasant flow of fresh air.

### Customer benefits:

- Increased safety for the operator and persons around the machine
- Improved ride comfort
- Increases productivity
- Operator does not tire as fast when working over a longer period of time

## 6.1 Storage bins



### Description:

- Generously dimensioned compartments for bottles, mobile phones and other utensils
- Document net
- Optional ventilated (in combination with an air conditioning system, cooled) storage compartment behind the operator seat with a volume of 23 litres

### Customer benefits:

- Sufficient storage space which means that it is unnecessary to place any objects in the foot-well that can obstruct free movement during working hours. Enhanced level of safety
- Storage of drinks on long working days, increases operator performance



## 6.2 Ergonomically adapted to any operator



### Description:

A first glance at the cockpit shows what it's all about: the operator and his/her job. All details from seat to steering wheel have been fully adapted to the operator's requirements. These include the generous amount of room inside the cab and the excellent view of all controls and instruments.

- Instrument panel designed for best visibility and ergonomic convenience and unobstructed view to the quickhitch
- Steering column with adjustable height and angle (standard)
- Selection of comfort seats available
- All important operating conditions of the machine are shown summarised in the modern 7" display on the right side
- All important work functions are featured on the joystick so that the left hand can always remain on the steering wheel and the right hand on the joystick
- Joystick console installed on the seat and adjustable to suit the individual posture of the operator with the separate slide unit
- Electronic low-speed control and manual throttle on joystick console ensuring precise and fast operation (option). The creep gear potentiometer works in the speed ranges of up to 7 km/h or up to 15 km/h, in other words, in Snail and Turtle mode

### Customer benefits:

- Best ergonomic seating position can be adjusted for a specific operator and size
- Operator does not tire as fast when working over a longer period of time
- Long-term investment in the operator's health



### Notice!

With the 3007, 3507, and 4007 models, the joystick console is not installed at the seat but at the right side console.

## 6.3 Switches and displays



### Description:

Each functional group is colour-coded. Clearly and intuitively:

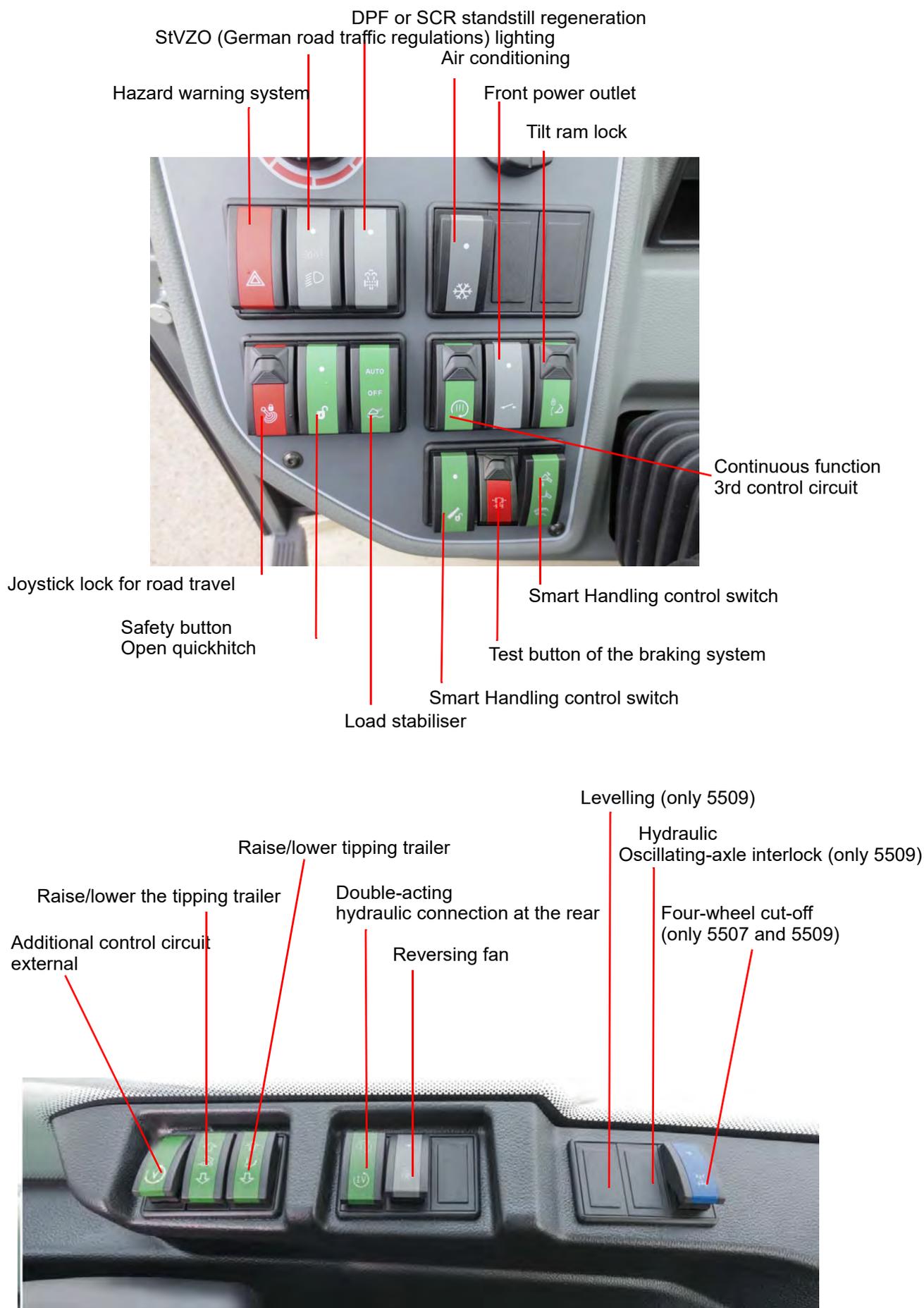
- Red = safety
  - Green = hydraulic functions
  - Blue = driving and steering system
  - Grey = electrical system
- Switches to the left of the steering wheel within easy reach of the left hand that rests on the steering wheel during travel operation
  - All additional hydraulic and machine travel functions are accommodated near the joystick in the console on the right
  - The turn indicator lever with automatic reset and intermittent setting for the wiper of the front window is located on the left of the steering wheel
  - The control of the working lights of the wiper system for the rear and side window is located on the right in the roof

### Customer benefits:

- Comfortable and safe operation of all functions
- Optimal operating comfort
- Easy intuitive machine operation for high efficiency of operator
- No risk of confusing switches and operating controls, for maximum safety of the operator, machine and the immediate surroundings

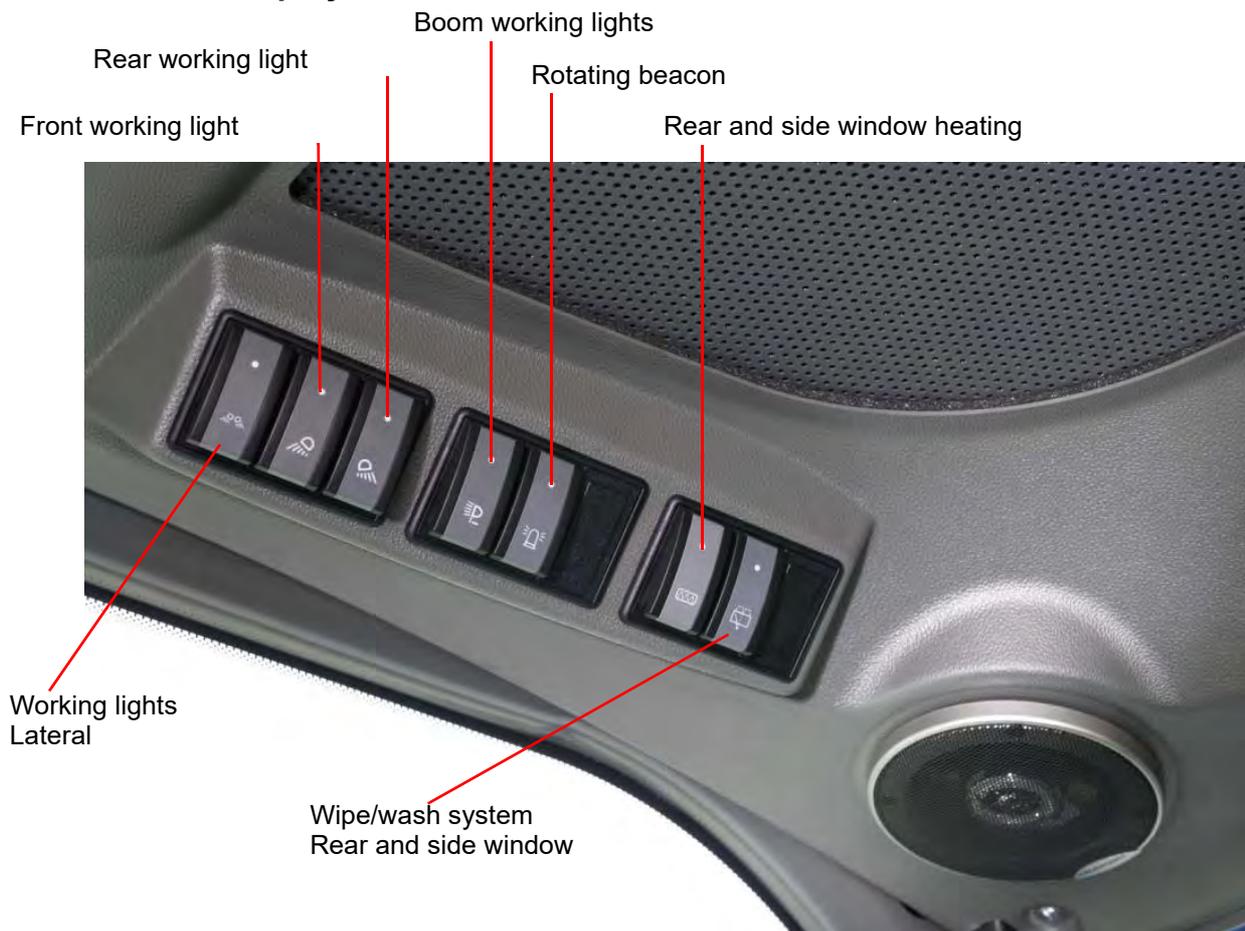


## Switches and displays 2

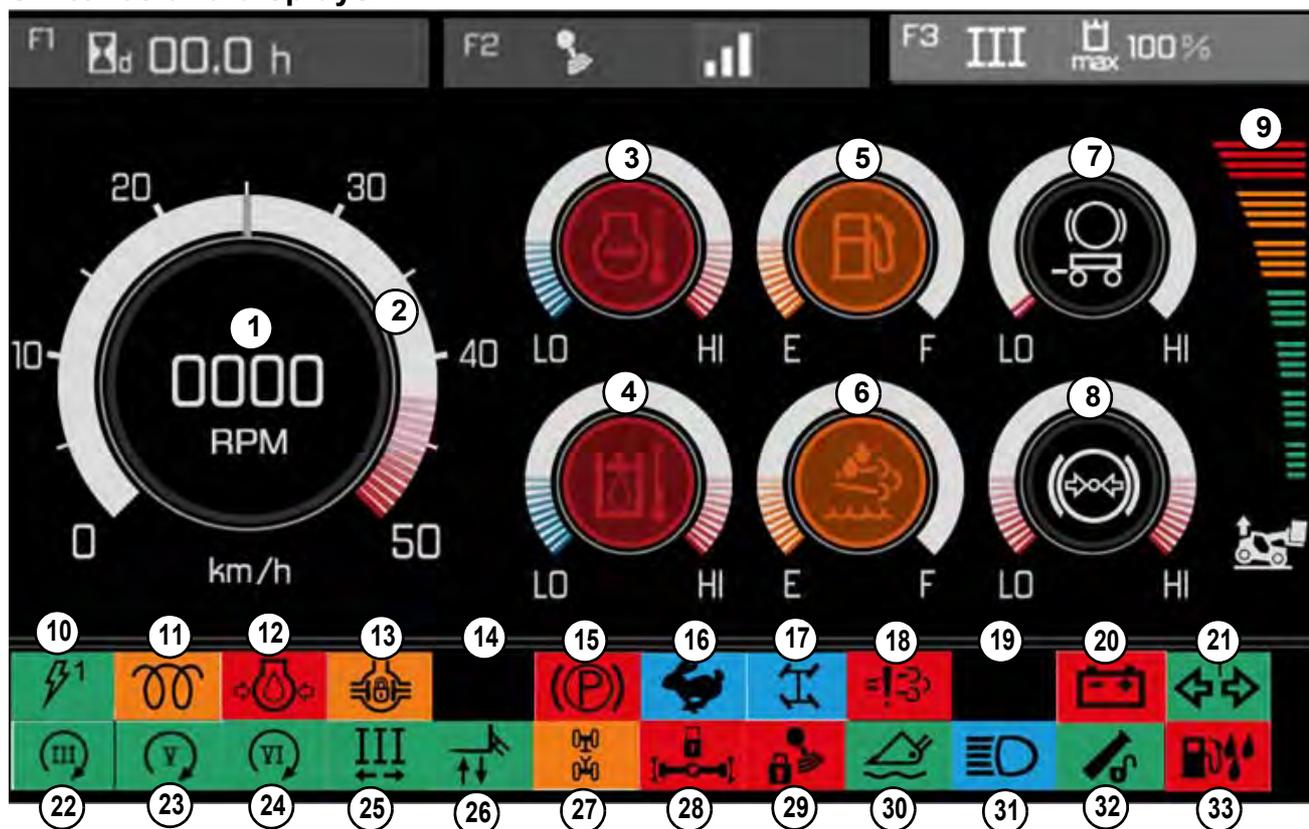




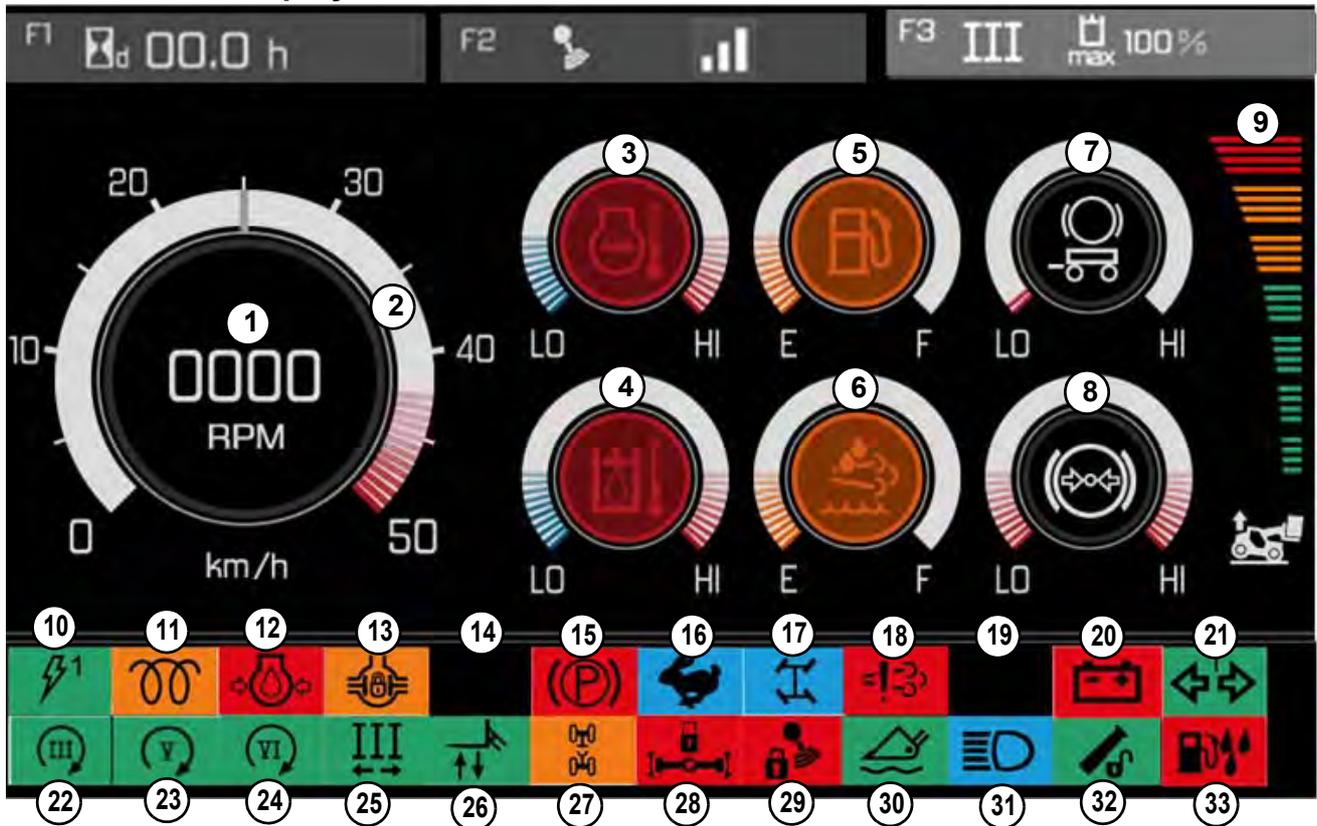
### Switches and displays 3



## Switches and displays 4

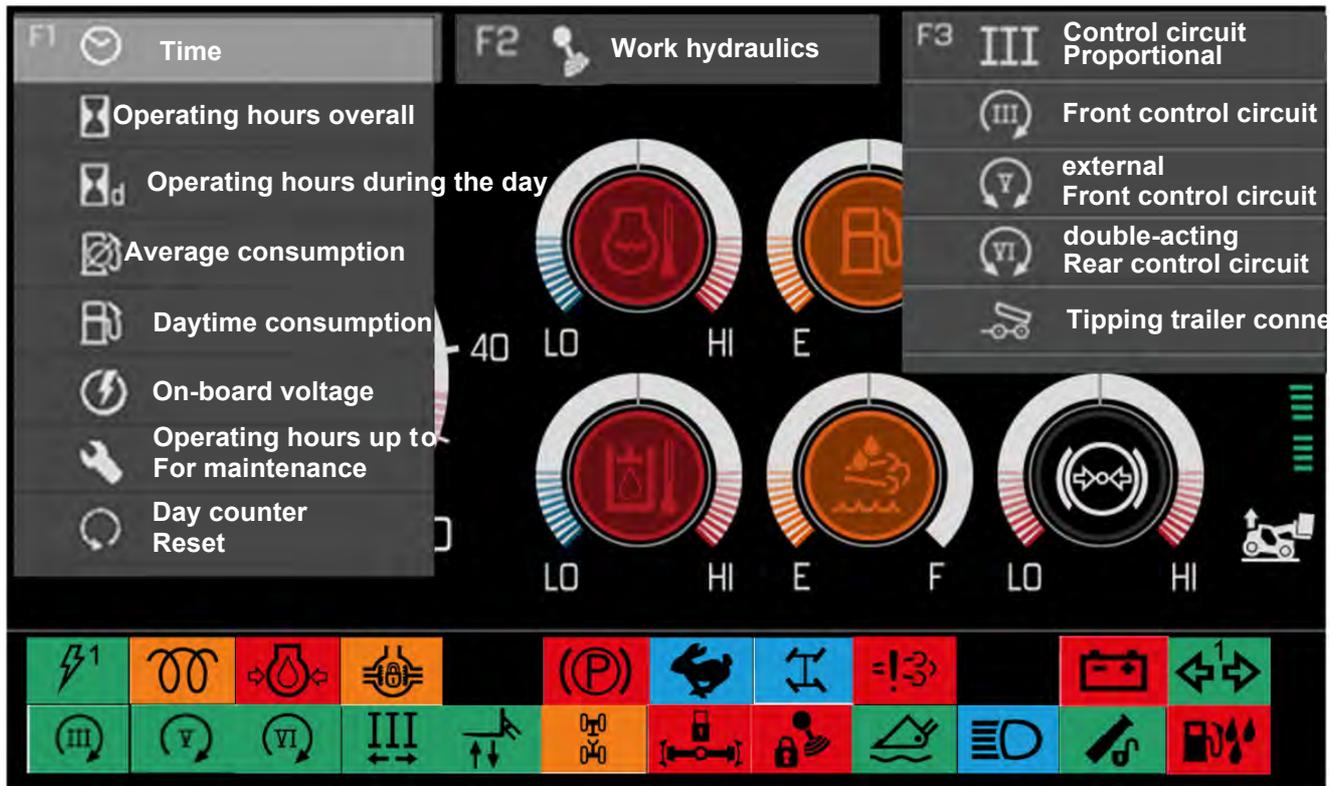


- 1 .....Engine speed indicator
- 2 .....Travel speed
- 3 .....Coolant temperature diesel engine
- 4 .....Hydraulic oil temperature
- 5 .....Fuel fill level display
- 6 .....DEF fill level display
- 7 .....Pneumatic brake system pressure reservoir
- 8 .....Service brake pressure reservoir
- 9 .....Safe load indicator
- 10 .....Front power outlet
- 11 .....Preheating
- 12 .....Engine oil pressure
- 13 .....Differential lock
- 14 .....Not assigned
- 15 .....Parking brake
- 16 .....Speed levels
- 17 .....Steering modes
- 18 .....Diesel particulate filter saturation
- 19 .....Not assigned

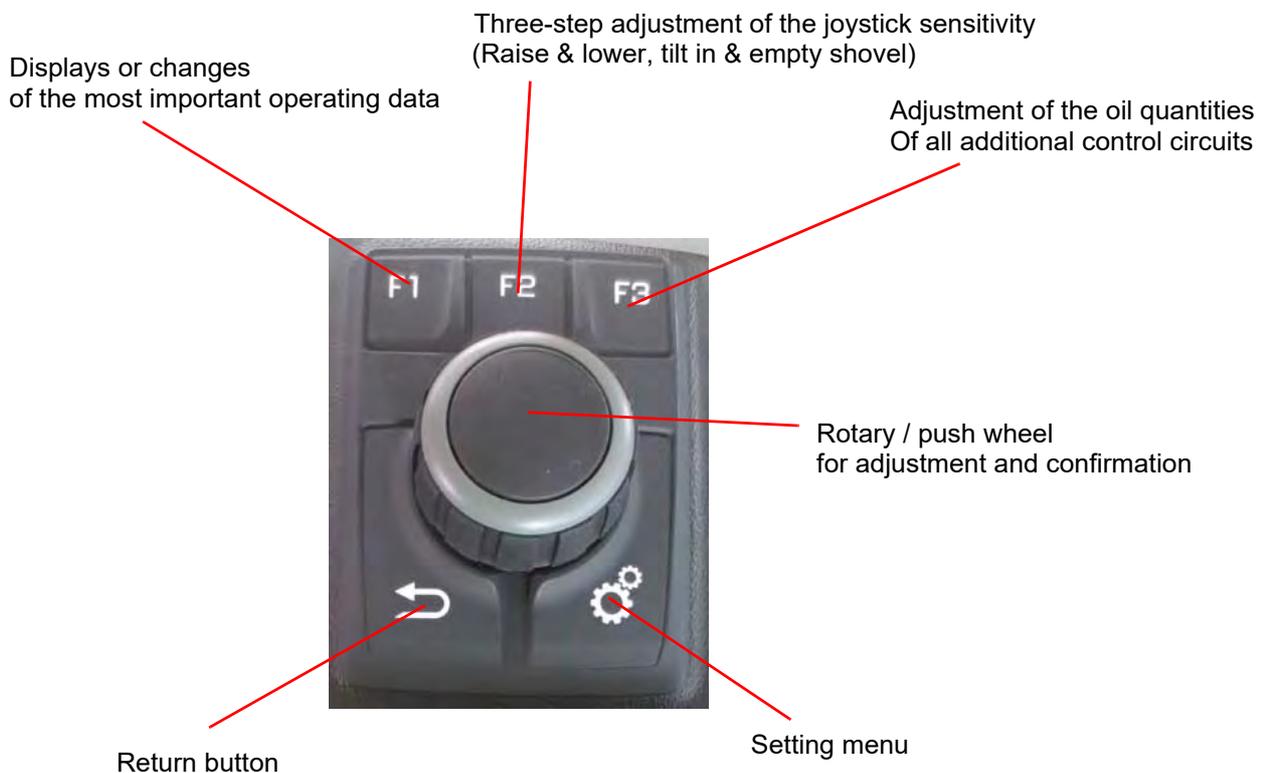
**Switches and displays 5**

- 20 .....Alternator charging function
- 21 ..... Trailer operation indicator light
- 22 .....Volume setting of continuous operation of 3rd control circuit
- 23 ..... Volume setting of exterior control circuit
- 24 ..... Volume setting of rear additional control circuit
- 25 ..... Volume setting of 3rd control circuit
- 26 .....Smart Handling
- 27 .....Four-wheel cut-off
- 28 .....Locked oscillating axle
- 29 ..... Joystick lock
- 30 .....Load stabiliser
- 31 .....High beam
- 32 .....Disabled overload cutoff
- 33 ..... Water in the fuel

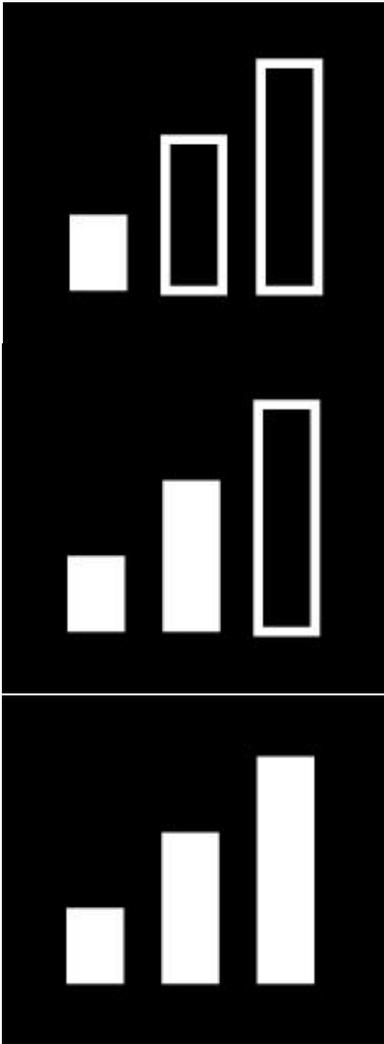
### Switches and displays 6



### Jog dial



## 6.4 F2 sensitivity of the joystick



### **Description:**

The sensitivity of the joystick can be adjusted in three stages via the F2 button on the jog dial. Thus, the operating speed of the loader unit can be individually adjusted to the respective work and the abilities and preferences of the operator. Thanks to the selection of the speed level, the operator can individually adjust the ideal measure of speed and aggressivity of the loader unit on the one hand, and precision and sensitivity on the other. The speed selection pertains to the raising and lowering of the loader unit and the tilting in and emptying the shovel of the attachment. Other functions such as telescoping in and out are not affected by the setting.

### **One bar:**

At this speed setting, the speed of movement for raising/lowering of the telescopic boom and the tilting in/empty shovel movements are reduced. This setting is particularly suitable for applications with pallet fork and works which must be handled with high precision.

### **Two bars:**

This is the medium speed setting for all common loading works with a balanced ratio of speed and sensitivity.

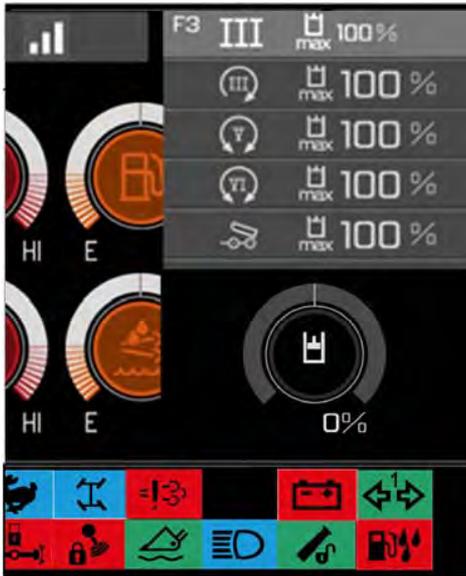
### **Three bars:**

The mode with full hydraulics speed is designed for maximum speed of work hydraulics and thus maximum loading performance of the machine. Here, the entire pump output of the machine is available for the movements of the loader unit.

### **Customer benefits:**

- The machine can be individually adjusted for different tasks
- Protection of the attachment and machine against unintended damages
- Maximum efficiency and sensitivity

## 6.5 F3 oil volume adjustment of all additional control circuits



### Description:

The oil volume adjustment of all additional control circuits is standard in the vehicle models from 3007 to 5509. This means that the oil volume for all control circuits can be directly adjusted to the needs of the operation of the external consumers. The operator can adjust the oil volume in 5% steps between 0% and 100% at any time. Examples of its practical use are, e.g., the reduction of oil volume for a heavy-duty bucket with grapple, so that it does not clasp too quickly. This protects the load as well as the hydraulics cylinder of the attachment. Another example is the salt worm screw attached in the rear, the rpm of which one can adjust via the oil volume control of the screw.

The display puts out only those additional control circuits which are built into the machine.

The series standard includes:

- 3rd control circuit (proportional)
- Continuous operation of 3rd control circuit

Optional control circuits:

- External control circuit at the front (V control circuit)
- Double-acting control circuit at the rear (VI control circuit)
- Tipping trailer connection

For all control circuits (except the 3rd, proportional, control circuit), the oil volume must be confirmed on the display after first activation after engine start.

### Customer benefits:

- The machine can be individually adjusted for different tasks
- Protection of the attachment against too high oil volumes

## 6.6 Electronically pilot controlled joystick



### Description:

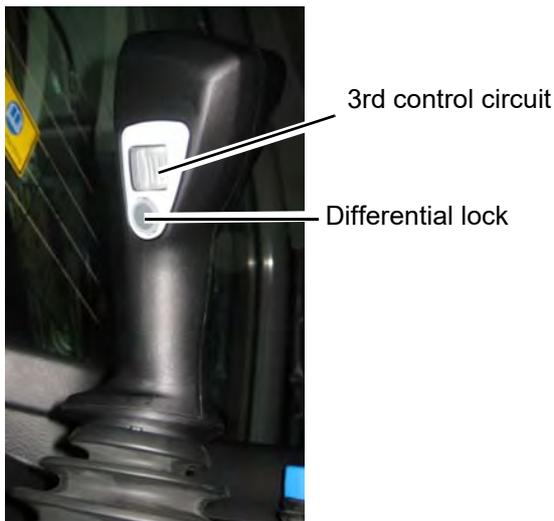
The advantages of the joystick are most evident in the dark. The innovative night-design switches and scroll wheels are backlit in different colours. This enables the operator to immediately identify a function, and to work and drive with maximum safety.

The electronic pilot control permits extremely sensitive and precise work as well as integration of driving assistance systems such as Smart Handling that also makes life easier for the operator.

- Electronic, pilot-controlled "all-in-one" joystick
- Integrated forward-reverse controls (forward/reverse/neutral)
- Proportional control during boom extension and retraction and when actuating the 3rd control circuit
- Switching the speed range (Snail, Turtle and Hare)
- 3rd control circuit changeover
- Activation of differential lock (for models 4407, 5007, 5507, 4209, and 5509 only)
- Joystick switch with background illumination (night design)
- Left hand can stay on the steering wheel

### Customer benefits:

- More safety during operation
- All travel and work functions can be operated at the same time with the joystick
- Intuitive day and night-time operation



Background illumination at night



## 6.7 Pedals



### Description:

Suspended pedals for convenient and precise control of the engine speed, inching and brake.

- 1 ..... The oil flow toward the travelling drive is reduced by decreasing the swivel angle of the variable displacement pump of the travelling drive (lower speed is possible at same engine speed).
- 2 ..... Drive pump in neutral position. No oil flow, and therefore no speed. The diesel engine runs freely.
- 3 ..... The braking effect can be felt.

### Customer benefits:

- Exact and smooth manoeuvres easily and safely performed even at high engine speed thanks to inching function
- Precise inching and braking
- Easy-clean cab floor
- Suitable for applications in aggressive environment (salt and fertiliser)
- Floor mat easily removed for thorough cleaning inside the cabin



## 6.8 Heating and ventilation



### Description:

3-speed ventilation/heating

- Maximum heating efficiency: 8 kW
- Blower output: 1150 m<sup>3</sup> per hour
- 5 adjustable ventilation nozzles in upper and lower area of cab
- 1 adjustable ventilation nozzle behind the operator seat, optional in storage bin
- 2 defroster vents for front window
- Air conditioning system (optional)

### Customer benefits:

- Pleasant working environment at low outside temperatures
- Good ventilation of the cabin in any situation
- Less dust and noise in the cab
- Ventilation demists windows rapidly in the autumn and winter
- Air conditioning ensures cooling in the summer
- Doors can remain closed even at high temperatures

## 6.9 Additional cab features



### Description:

- 12 V plug receptacle with protective cap at the front of the cab
- Coat hook on the left B-pillar
- Roller sun-visor with three positions ensures a dazzle-free view in sunny conditions and at high working heights. The perforation allows a clear view of the attachment in spite of the sun visor

### Customer benefits:

- Low-consumption electrical devices can be supplied, for example mobile phones can be charged
- Work jackets can be stored away from the important areas of visibility
- Increased safety at work on construction sites





## 7 Hydraulic system

The work hydraulics is supplied with oil by powerful hydraulic pumps that ensure fast loader unit work cycles and make it possible to run special attachments via the 3rd control circuit, with continuous functions if required. In addition, several models can be equipped with optional single and double-action additional control circuits, and with the power hydraulics.

All models have a second-generation "Smart Handling" driver assistance system as standard equipment. This system ensures the machine's safe position at all times, and prevents the operator from unintentionally putting the machine in the overload range.

### Platform 415

	3007	3507	4007
<b>Pump type</b>	Gear pump	Load Sensing	Load Sensing
<b>Maximum discharge volume (l/min) (optional)</b>	100	140	140
<b>Maximum pressure (bar)</b>	260	260	260
<b>3rd control circuit (proportional)</b>	Standard	Standard	Standard
<b>Continuous operation of 3rd control circuit</b>	Standard	Standard	Standard
<b>Tipping trailer connection</b>	Option	Option	Option
<b>Double-acting connection at the rear</b>	Not available	Option	Option
<b>Front single-action hydraulic additional control circuit on the outside – incl. return without pressure and leak oil line</b>	Not available	Not available	Not available
<b>Unpressurised front reflux line, incl. Leak oil line; external</b>	Not available	Not available	Not available
<b>Unpressurised front reflux line, incl. Leak oil line; on the external arm</b>	Option	Option	Option



## Platform 416

	4407	5007	5507	4209	5509
<b>Pump type</b>	Load Sensing				
<b>Maximum discharge volume (l/min) (optional)</b>	140	140 (187)	187	140 (187)	187
<b>Maximum pressure (bar)</b>	260	260	260	215	260
<b>3rd control circuit (proportional)</b>	Standard	Standard	Standard	Standard	Standard
<b>Continuous operation of 3rd control circuit</b>	Standard	Standard	Standard	Standard	Standard
<b>Tipping trailer connection</b>	Option	Option	Option	Option	Option
<b>Double-acting connection at the rear</b>	Option	Option	Option	Option	Option
<b>Front single-action hydraulic additional control circuit on the outside – incl. return without pressure and leak oil line</b>	Option	Option	Option	Option	Option
<b>Unpressurised front reflux line, incl. leak oil line; external</b>	Option	Option	Option	Option	Option
<b>Unpressurised front reflux line, incl. leak oil line; on the external arm</b>	Not available				

## 7.1 Operating pump & control valve



### Description of gear pump with LUDV (3007):

- LUDV = flow distribution independent of load
- Oil volume is controlled by engine speed
- Large hydraulic lines avoid overheating

### Customer benefits:

- overlapping functions possible
- system widely used in the market
- easy handling and maintenance

### Description of load sensing:

- Variable displacement pump with variable discharge volume
- oil is pumped only as much as required by the consumer
- all hydraulic functions possible in parallel
- Relatively high discharge volume even at low engine speeds
- Large hydraulic lines avoid overheating

### Customer benefits:

- Correct oil volume for all applications
- Hydraulic power is available at low engine speeds
- Fast work cycles increase productivity
- Low output losses due to heat development
- High efficiency / reduction of energy losses
- The service life of components is increased

## 7.2 3rd control circuit



### Description:

Standard 3rd control circuit for operation of additional hydraulic function on attachment, for example heavy-duty bucket with grapple. The respective oil volume can be set independently for each control circuit via the jog dial. Only the installed control circuits are shown in the display so that it cannot be confused. The continuous function is permanently activated via a rocker switch. It is not necessary to hold the switch in the continuous function.

- All additional control circuits are shown in the 7" display
- The respective active additional control circuit lights up
- Proportional control directly on the joystick
- Continuous function for example for a rotary sweeper
- The oil volume can be adjusted via the jog dial
- The adjustment range is between 0 – 100% and can be adjusted in steps of 5%
- If the additional control circuit is activated, the oil volume can be adjusted in real time. The operator can then see the effects of the changes immediately

### Customer benefits:

- The attachment is protected against damage
- The work results are improved
- Extends the machine's scope of application
- Increases productivity

### 7.3 Tipping trailer connection (option)

**Description:**

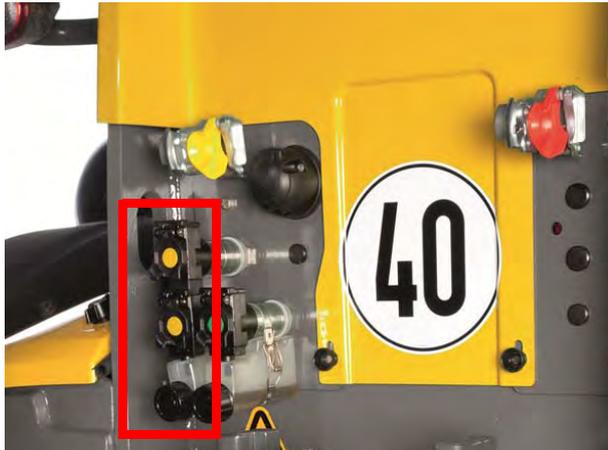
Machine equipped with an additional control circuit for a tipping trailer. Each hydraulic connection is fitted with a collecting receptacle for leak oil that can be completely removed or emptied by unscrewing it.

**Customer benefits:**

- Extends the machine's scope of application
- Avoids dirty floor due to leakage oil



## 7.4 Double-acting rear connection – 6th control circuit (option)



### Description:

Machine equipped with a double-action additional control circuit at the rear. Each hydraulic connection is fitted with a collecting receptacle for leak oil that can be completely removed or emptied by unscrewing it.

### Customer benefits:

- Extends the machine's scope of application
- Avoids dirty floor due to leakage oil

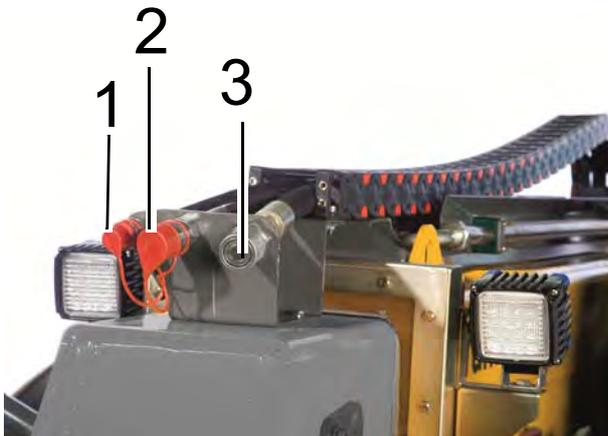


### Notice!

Not available for 3007



## 7.5 Front single-action hydraulic additional control circuit on the outside – incl. return without pressure and leak oil line (option)

**Description:**

Quick couplers for pressure, return and leak oil lines installed on top of telescopic boom for attachments with hydraulic motors and high output requirements.

- 1 Leak oil line
- 2 Pressure line
- 3 Non-pressurised reflux line

**Customer benefits:**

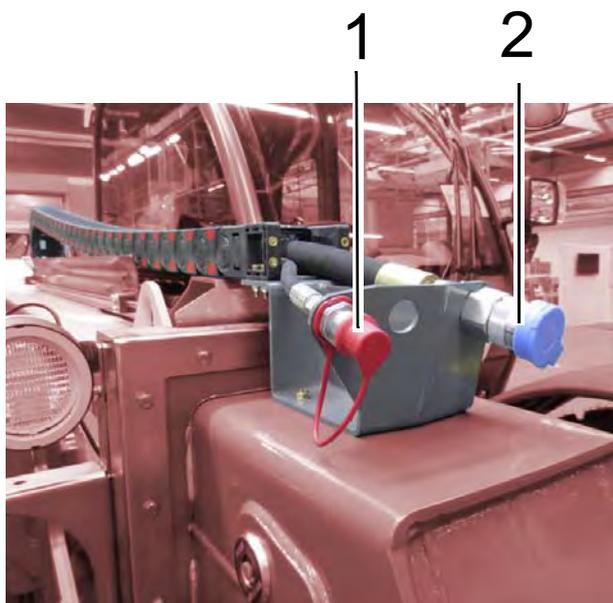
- Extends the machine's scope of application
- Attachments with leak-oil connections can be operated

**Notice!**

Available only for models 4407, 5007, 5507, 4209, and 5509



## 7.6 Unpressurised front reflux line, incl. leak oil line; External (option)



### Description:

Unpressurised return and leak oil line for oil return flow is used for attachments with hydraulic motors driven via the 3rd control circuit. A too high thermal load on the hydraulic oil is avoided when the 3rd control circuit is used in continuous operation.

- 1 Leak oil line
- 2 Non-pressurised reflux line

### Customer benefits:

- Extends the machine's scope of application
- Attachments with leak-oil connections can be operated

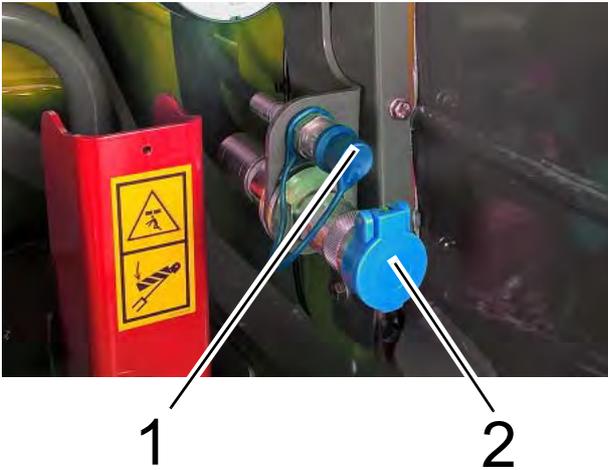


### Notice!

Available only for models 4407, 5007, 5507, 4209, and 5509



## 7.7 Unpressurised reflux line, front outer arm incl. leak oil line (option)

**Description:**

Unpressurised return and leak oil line for oil return flow is used for attachments with hydraulic motors driven via the 3rd control circuit. A too high thermal load on the hydraulic oil is avoided when the 3rd control circuit is used in continuous operation. The couplings are mounted on the outer arm and thus cannot be telescopic.

- 1 Leak oil line
- 2 Non-pressurised reflux line

**Customer benefits:**

- Extends the machine's scope of application
- Attachments with leak-oil connections can be operated

**Notice!**

Only available for models 3007, 3507, and 4007

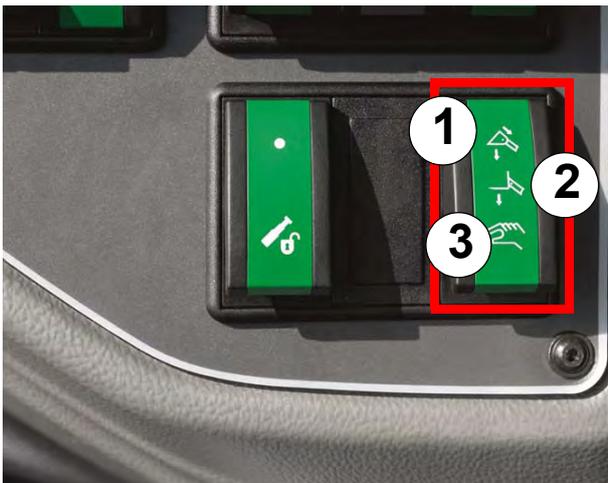
## 7.8 Performance data of hydraulic circuits

Control circuit	Engine speed [rpm]	Usable operating pressure [bar]	Flow rate per model [l/min]		
			3007	3507	4007
3rd control circuit	1500	165	45	50	50
		155	65	-	-
	2000	120	-	100	100
		145	75	-	-
2300	110	-	100	100	
	175	45	60	60	
3rd control circuit + Unpressurised front reflux line, incl. leak oil line; on the external arm	2000	170	65	-	-
		150	-	100	100
	2300	170	75	-	-
		150	-	100	100
Tipping trailer connection	1500	210	65	70	70
		150	85	90	90
	1900	210	75	80	80
		150	85	90	90
	2300	210	75	80	80
		150	85	90	90
Double-acting rear connection – 6th control circuit	1500	210	Not used	65	65
		150	Not used	80	80
	1900	210	Not used	65	65
		150	Not used	90	90
	2300	210	Not used	65	65
		150	Not used	95	95



Control circuit	Engine speed [rpm]	Usable operating pressure [bar]	Flow rate per model [l/min]				
			4407	5007	5507	4209	5509
3rd control circuit	1500	210	55	55	55	55	55
		150	75	75	75	75	75
	1900	210	60	60	60	60	60
		150	85	85	85	85	85
	2300	210	60	60	60	60	60
		150	90	90	90	90	90
3rd control circuit + Unpressurised front reflux line, incl. leak oil line; external	1500	210	60	60	60	60	60
		150	80	80	80	80	80
	1900	210	75	75	75	75	75
		150	95	95	95	95	95
	2300	210	75	75	75	75	75
		150	100	100	100	100	100
Tipping trailer connection	1500	210	70	70	70	70	70
		150	90	90	90	90	90
	1900	210	80	80	80	80	80
		150	90	90	90	90	90
	2300	210	80	80	80	80	80
		150	90	90	90	90	90
Double-acting rear connection – 6th control circuit	1500	210	65	65	65	65	65
		150	80	80	80	80	80
	1900	210	65	65	65	65	65
		150	90	90	90	90	90
	2300	210	65	65	65	65	65
		150	95	95	95	95	95
Front single-action hydraulic additional control circuit on the outside – incl. return without pressure and leak oil line (optional)	1500	210	55	55 (70)	70	70	70
		150	85	85 (100)	100	100	100
	1900	210	70	70 (85)	85	85	85
		150	100	100 (115)	115	115	115
	2300	210	85	85 (100)	100	100	100
		150	110	110 (125)	125	125	125

## 7.9 Smart Handling



### Description:

Stricter requirements on the tipping safety of telehandlers are a crucial issue for manufacturers. The EN15000 standard requires telehandlers to be equipped with an overload-protection system. It prevents vehicles from tipping over in the lengthwise direction during static operation.

The test is performed as follows: lowering of fully extended loader unit under maximum payload, at maximum engine speed and with the joystick fully pushed or pulled.

Smart Handling passes this test and supports the operator with other automatic functions. Three different assistance modes are available that can be selected with a switch.

- These modes are not attachment-specific, each mode can therefore be used for any equipment

#### 1 Bucket mode

- For handling bulk material – automatic retraction during lowering

#### 2 Forklift mode

- For fork-lift mode – automatic retraction and extension of the telescopic boom

#### 3 Manual mode

- No automatic functions

- The load indicator is integrated in the 7" display

### Customer benefits:

- Increased safety for the operator and persons around the machine
- Increases productivity

**Smart Handling – bucket mode****Description:**

In bucket mode, the automatic function is limited to the movement of lowering the boom

- As soon as the telescopic boom is lowered (joystick pushed forward), the inside boom section is automatically retracted independently of the load
- The ratio of automatic retraction to lowering has been selected so as keep the machine out of the overload range even at maximum payload
- Automatic boom retraction during lowering can be disabled with the joystick (extend boom function) up to the overload limit
- If the telescopic boom is lowered even further and the extend boom function is performed at the same time, the loader unit is automatically retracted when the overload limit is reached, to protect the operator and the machine from hazardous situations. For the operator's safety, disabling the automatic function is no longer possible

**Customer benefits:**

- Increased safety for the operator and persons around the machine
- Increases productivity

## Smart Handling – forklift mode



### Description:

In fork-lift mode, the quickhitch moves downward and upward on a vertical line. The telescopic boom is retracted/extended with regard to the lowering/raising movement so that the load is moved vertically.

- When the boom is lowered, lowering speed increases as the angle decreases, since the lever action of the boom is reduced
- When raising the boom, the hoist speed decreases as the angle increases, since the lever action of the boom is increased
- An indicator light illuminates in the display to warn the operator, for example in buildings, that the vehicle's telescopic boom is also extended when it is raised
- Automatic retraction/extension of the telescopic boom during lowering/raising can be disabled up to the overload limit with the retract/extend telescopic boom function
- If the telescopic boom is lowered even further and the extend boom function is performed at the same time, the loader unit is automatically retracted when the overload limit is reached, to protect the operator and the machine from hazardous situations. For the operator's safety, disabling the automatic function is no longer possible

### Customer benefits:

- Increased safety for the operator and persons around the machine
- Increases productivity

## Smart Handling – manual mode



### Description:

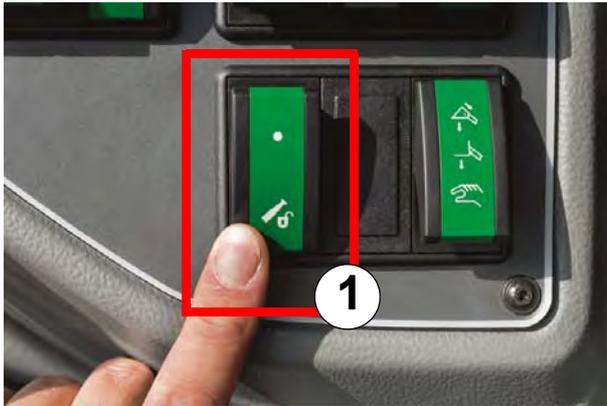
The loader unit is not operated automatically in manual mode, Smart Handling is active in the background and only intervenes in case of overload. The loader unit moves downward in an arc during lowering.

- When the boom is lowered, lowering speed increases as the angle decreases, since the lever action of the boom is reduced
- When raising the boom, the hoist speed decreases as the angle increases, since the lever action of the boom is increased
- Lowering is stopped when the overload limit is reached – only raising, retracting or tilting out is possible. These movements must be performed manually by the operator with the joystick

### Customer benefits:

- Increased safety for the operator and persons around the machine

## Disabling Smart Handling



4



3

### Description:

You can disable the overload control temporarily with two-hand controls (simultaneous operation of tip switch (1) and joystick) for the exact and easy positioning of heavy loads in the overload range.

- After 60 seconds, the overload control is automatically re-enabled even if the bypass switch is still pressed
- Disabling once more is only possible after waiting 5 seconds
- An indicator light in the display is active if the system is disabled
- The safe load indicator indicates the current load status (3), even with a disabled system. A symbol (4) lights up on the display and an acoustic signal warns the operator of the overload
- Overload bridging is applicable in any mode of Smart Handling

### Customer benefits:

- Heavy loads can also be positioned at the stability limit

## 8 Options

### 8.1 Cabin

#### M\_BELEUC\_001



#### Rotating beacon (yellow)

**Description:**

The rotating beacon on the cab roof is switched on with the switch on the instrument panel.

The rotating beacon can be folded down if necessary.

**Customer benefits:**

- Compliance with legal regulations

**Caution!**

Yellow flashing light warns against danger. [...] May only be used on a vehicle to warn against work or accident sites [...].

Equipment with a [...] marker light for yellow flashing light (rotating beacon) is allowed for:  
1) Vehicles used for construction, maintenance or cleaning of roads or of parks and green areas in the area of roads [...] and equipped with red-and-white warning stripes [...] DIN 30 710 [...].  
The rotating beacon has to be switched off when travelling to a job site and inside a fenced-off construction site.

National regulations must be complied with!<sup>1</sup>

---

1.Source: § 38 StVO and § 52 StVZO (German road traffic regulations)

## M\_BELEUC\_013



### 1 additional front working light, 1 additional rear working light

**Description:**

Front and rear working light fitted in addition to the standard halogen working lights (Hella Ultra Beam H3).

**Customer benefits:**

- Improved visibility in the dark
- Increased field of vision improves safety for the driver and the machine

## M\_BELEUC\_017



### 2 working lights laterally on the telescopic boom (outside section)

**Description:**

Two additional Halogen working lights (Hella Ultra Beam H3) on outer section of telescopic boom.

**Customer benefits:**

- Optimal illumination of work area, in particular at high working heights
- Increased field of vision improves safety for the driver and the machine



M\_BELEUC\_031

**All-round illumination (7 additional working lights – 1 at front, 1 at rear, 1 on left, 2 on right and 2 on the outside boom section)**

**Description:**

A total of nine halogen working lights (Hella Ultra Beam H3) are installed on the machine that guarantee effective illumination of the working area.

- 2 working lights laterally on telescopic boom (outer pipe)
- 3 working lights on the cab roof
- 3 working lights at front right on the mirror bracket
- 1 working lights at rear right on the lamp bracket

**Customer benefits:**

- Optimum illumination of the work area
- Increased field of vision improves safety for the driver and the machine
  - Not with “M\_BELEUC\_013 1 additional front working light, 1 additional rear working light” on page 8-2
  - Not with “M\_BELEUC\_017 2 working lights laterally on the telescopic boom (outside section)” on page 8-2



## M\_BELEUC\_028

## All-round LED illumination (8 lights) – instead of standard working lights

### Description:

A total of eight LED headlights (Hella Ultra Beam) are installed on the vehicle that guarantee the best lighting conditions at the working area with close-field illumination.

- 2 working lights laterally on telescopic boom (outer pipe)
- 3 working lights on the cab roof
- 2 working lights at front right on the mirror bracket
- 1 working lights at rear right on the lamp bracket
- Light output of 2000 lumen per headlight
- Light intensity comparable with XENON working lights
- Faster illumination than XENON working lights
- Colour of light is similar to daylight (6100K)
- Integrated thermal management (temporary reduction of light output depending on the temperature measured at the soldered joints)
- Lower power input in comparison to halogen lights (30 Watts)

### Customer benefits:

- Homogenous close-range illumination
- Pleasant illumination
- Optimally illuminated field of vision improves safety for the operator and the machine
- LED lamps illuminate the roadway with a wider range than halogen lamps and are approximately twice as light
- Service life up to 100 times longer than a halogen light bulb
  - Not with “[M\\_BELEUC\\_031 All-round illumination \(7 additional working lights – 1 at front, 1 at rear, 1 on left, 2 on right and 2 on the outside boom section\)](#)” on page 8-3
  - Not with “[M\\_BELEUC\\_013 1 additional front working light, 1 additional rear working light](#)” on page 8-2
  - Not with “[M\\_BELEUC\\_017 2 working lights laterally on the telescopic boom \(outside section\)](#)” on page 8-2



**M\_BELEUC\_029****2 additional front LED working lights 2 additional rear LED working lights****Description:**

Both headlights, installed on the cab roof as per standard (1x front, 1x rear), are replaced with LED headlights (Hella Ultra Beam). Additionally, two more LED headlights are installed on the vehicle.

- 2 LED working lights on the cab roof in lieu of the standard halogen headlights.
- 1 LED working light on the mirror bracket at the front on the right.
- 1 LED working light on the lamp bracket at the rear on the right.

**Customer benefits:**

- Pleasant illumination
- Optimally illuminated field of vision improves safety for the operator and the machine
- LED lamps illuminate the roadway with a wider range than halogen lamps and are approximately twice as light
- Service life up to 100 times longer than a halogen light bulb

**M\_BELEUC\_041****Additional rear lights****Description:**

In order to illuminate the near field in the rear better, especially a trailer coupling, an additional LED light can be installed. This facilitates the coupling of trailers in the dark environment enormously. The headlight is switched on and off in combination with the rear light button.

**Customer benefits:**

- Illumination of the near field
- Damage during coupling is avoided
- Productivity in the dark is increased

## M\_SITZ\_002



### Air-suspension comfort seat with lumbar support

#### Description:

The vehicle is equipped with an orthopaedic comfort seat with air suspension and lumbar support. The seat can be more accurately and quickly adjusted to the needs of different operators.

- 1 Horizontal adjustment independently of the joystick console
- 2 Horizontal adjustment including joystick console
- 3 Horizontal suspension (deactivatable)
- 4 Automatic weight adjustment
- 5 Adjustable spring intensity
- 6 Backrest adjustment
- 7 Adjustable lumbar support

#### Customer benefits:

- Best ergonomic seating position can be adjusted for a specific operator and size
- Operator does not tire as fast when working over a longer period of time
- Long-term investment in the operator's health



#### Notice!

The joystick console is not installed on the seat on the 3007, 3507, and 4007 models. These models therefore do not feature the "Horizontal adjustment including joystick console".



M\_KABAUS\_028



Wipe/wash system for right window

**Description:**

A wipe/wash system for the right window is installed on the right of the cabin that ensures an unobstructed view to the right.

The switch also starts the rear wipe/wash system.

**Customer benefits:**

- The windows can be quickly and easily demisted, especially in the autumn.
- Wiping difficult-to-access windows is no longer necessary, saves time by saving the operator climbing onto the vehicle.
- An unobstructed view to the right in the winter means greater safety for the operator and his environment.



**Notice!**

Available only for models 4407, 5007, 5507, 4209, and 5509

## M\_KABAUS\_014

**Outside rearview mirror with electrical adjustment including mirror heating with automatic deactivation feature****Description:**

Right-hand side mirror can be adjusted as required without having to leave the seat or the vehicle.

Mirror heating ensures defrosting and switches off automatically after a certain time.

**Customer benefits:**

- Electrically adjustable mirror considerably improves safety at work if machine is driven by several operators.
- Heating easily and speedily restores full all-round visibility if mirror is misted over or frosted.



**M\_KABAUS\_015**

**Inside rearview mirror, including bracket for mobile phone**
**Description:**

To increase comfort and safety in the cab, a near field mirror is mounted to illuminate the immediate area behind the vehicle. This is similar to the interior rearview mirror in a car.

Another component of the package is a smartphone holder that can be adjusted flexibly with the help of 2 ball joints.

Both parts, mirror and mobile phone holder are screwed in line with the cabin beam of the A-column so that there is no impairment of the overview to the front right

**Customer benefits:**

- better and easier overview to the rear
- important phone calls can easily be accepted
- modern smartphones are securely held and are protected

**M\_ZUAUSR\_014**

**Air conditioning**
**Description:**

Vehicle equipped with air conditioning switched on by means of a switch on the switch console on the left.

The cool air is blown from six air vents and two defroster vents for optimum distribution of the cooling air.

- Maximum cooling efficiency: 6 kW
- Blower output: 1150 m<sup>3</sup> per hour
- Separate evaporator and heating unit, therefore water can be drawn from the fresh air during heating which prevents misting of the windows.

**Customer benefits:**

- Pleasant working conditions in the cabin at high outside temperatures
- Cabin air filtering ensures increased cleanliness and comfort in the cabin
- Dehumidification of cab air prevents windows from misting over
- Temperature and air volume can be adjusted to the operator's requirements.

## M\_ZUAUSR\_364



### Storage bin with ventilation (cooled if machine equipped with air conditioning)

**Description:**

A storage bin with a capacity of 23 litres is installed behind the seat. The storage bin is connected to the ventilation system and the cool air flows around the food and drinks. If the air conditioning option is selected, the storage bin is actively cooled.

**Customer benefits:**

- Sufficient storage space which means that it is unnecessary to place any objects in the foot-well that can obstruct free movement during working hours
- Storage of drinks on long working days, increases operator performance

## M\_ZUAUSR\_082



### Radio preparation (aerial, loudspeakers)

**Description:**

The telehandler is supplied with an outside aerial and two integrated loudspeakers.

**Customer benefits:**

- Installation of important components at the factory
- The radio can be selected according to preference (CD, MP3)

**M\_ZUAUSR\_018****Radio system (radio, aerial, loudspeakers)****Description:**

High-quality Continental car radio with 4x25 watt output and integrated hands-free device and USB. with outside aerial and two integrated loudspeakers. The radio has a built-in microphone so it can be used as a hands-free device. In addition, a second external microphone is included in the delivery, which can be mounted in the vehicle if necessary.

- Front USB port (2.0)
- Aux-in plug
- USB connect
- Supports MP3/WMA formats
- Supports storage media of up to 8 GB
- Mobile phone hands-free function (HFP)

**Customer benefits:**

- Radio installed at the factory, optimal reception and sound
- Enhanced operator performance of the operator during long, monotonous assignments
- Secure telephone cars while driving
- Own music sources can be played back

## M\_ZUAUSR\_213



## Front right camera

**Description:**

A camera is installed on the right side of the vehicle in the direction of travel. The pictures are displayed on the terminal screen, which is equipped with integrated sun protection and automatic brightness adjustment.

- Camera system equipment and technical data:
  - Switchbox with up to four camera inputs. The switchbox is connected to the electrical system of the vehicle and supplies the operating voltage for the connected cameras as well as the terminal
  - The power cable of the switchbox features 3 trigger signal connections for automatic image control, depending, for example, on certain vehicle operations
  - The image and trigger signals are transmitted by cable from the switchbox to the terminal screen
  - Type and control of the display can be individually adjusted from the menu on the terminal screen
  - The terminal screen can display up to 4 camera images at the same time
  - Night vision is possible with the 8 infrared lenses per camera
- Terminal screen technical data
  - Can be split either horizontally or vertically
  - 7" screen size with 800x480 pixels
  - Operating temperature: -30 to +80°C
  - Shock resistance: 50 g
  - Protection class: IP30
- Camera technical data
  - Image sensor: CMOS 1/4"
  - Resolution: 640x480 pixels
  - Operating temperature: -35 to +65°C
  - Shock resistance: 50 g
  - Protection class: IP68 | IP69K

**Customer benefits:**

- Perfect view of the attachment to the right increases productivity
- Increased safety for the operator and persons around the machine



## M\_ZUAUSR\_221



## Reversing camera

### Description:

A camera is installed centrally on the vehicle. Depending on the setting, it points to the rear area of the vehicle or to the trailer coupling directly to facilitate the coupling procedure. If only this camera is ordered, the image can be output in the 7" display.

For the camera system equipment and technical data refer to "[M\\_ZUAUSR\\_213 Front right camera](#)" on page 8-12

### Customer benefits:

- Perfect visibility to the rear and to the trailer coupling boosts productivity
- Increased safety for the operator and persons around the machine

## M\_ZUAUSR\_464

**Front right camera including reversing camera****Description:**

For a complete picture of the near-field of the vehicle, the front camera including the reversing camera can be installed. Both images are each displayed either as a split screen or, depending on the gear selection, on a screen in the cab.

For the camera system equipment and technical data refer to "[M\\_ZUAUSR\\_213 Front right camera](#)" on page 8-12

**Customer benefits:**

- Perfect view to the rear and to the manoeuvring coupling boosts productivity.
- Increased safety for the operator and persons around the machine.



## 8.2 Travelling drive

### M\_GESCHW\_003



### Hydrostat 30km/h

**Description:**

The vehicle is equipped with a hydrostatic drive.

- Transmission ratio of the gearbox: 30 km/h

**Customer benefits:**

- Progressive speed setting from 0 – 30 kph

**Notice!**

Optionally available for 3007, 3507, and 4007

### M\_GESCHW\_001



### Hydrostat 20km/h

**Description:**

The vehicle is equipped with a hydrostatic drive.

- Transmission ratio of the gearbox: 20 km/h

**Customer benefits:**

- Progressive speed setting from 0–20 km/h

**Notice!**

Standard for models 3007, 3507, and 4007

## M\_GESCHW\_037




## ecospeed 40 km/h

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox. This option does not include Smart Driving.

- Transmission ratio of the gearbox: 40 kph

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving with simultaneous high pushing power

**Notice!**

Optionally available for 3507 and 4007

## M\_GESCHW\_044




## ecospeed 40km/h Smart Driving

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 40 kph
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving

**Notice!**

Standard for 4407

**Notice!**

Optionally available for 3507 and 4007



M\_GESCHW\_035

30



**ecospeed 30km/h Smart Driving**

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 30 km/h
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving with simultaneous high pushing power



**Notice!**

Standard for 5007 and 4209



**Notice!**

Optional for 4407

M\_GESCHW\_053

40



**ecospeedPRO 40km/h Smart Driving**

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 40 kph
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving



**Notice!**

Optionally available for 5007 and 4209

## M\_GESCHW\_054

**ecospeedPRO 40km/h Smart Driving****Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 40 kph
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving

**Notice!**

Standard for 5507 and 5509

## M\_GESCHW\_055

**ecospeedPRO 40km/h + all wheel shutdown****Description:**

Vehicle is equipped with an ecospeed high-speed gearbox. Additionally, the drive at the rear axle can be manually switched off using a rocker switch. This lowers fuel consumption and tyre wear.

- Transmission ratio of the gearbox: 40 kph
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving
- Less wear

**Notice!**

Optionally available for 5507 and 5509



M\_GESCHW\_056



## ecospeedPRO 30km/h Smart Driving

### Description:

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 30 km/h
- This option incorporates the Smart Driving engine speed lowering functionality.

### Customer benefits:

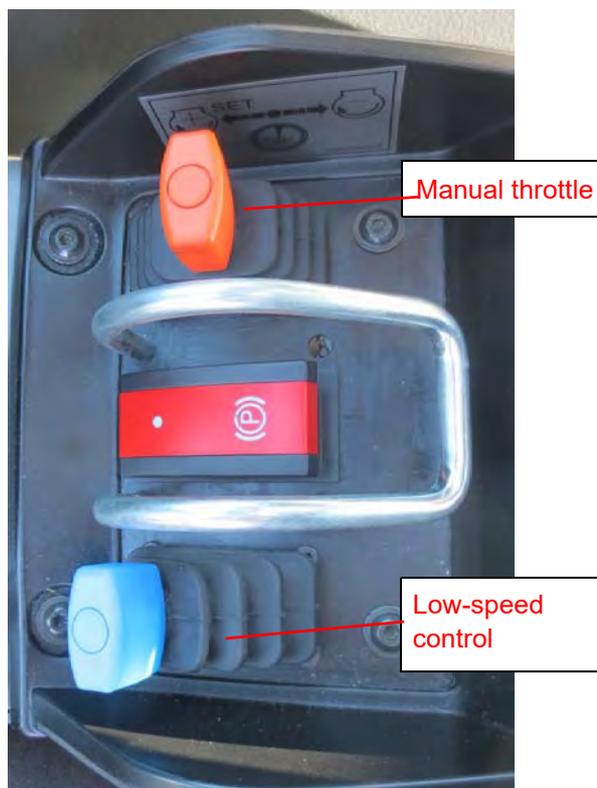
- Boosts productivity when operation involves a high percentage of driving with simultaneous high pushing power



### Notice!

Optionally available for 5507 and 5509

## M\_ZUAUSR\_338



## Low-speed control and manual throttle

## Description:

- Electronic low-speed control and manual throttle on the joystick console to guarantee precise and fast operation
- The creep gear potentiometer works in the speed ranges of up to 7 km/h or 15 km/h, in other words, in Snail mode and Turtle mode
- Speed is progressively adjusted with a sliding potentiometer
- Low-speed control ensures a constant speed, in other words, the speed is set and the vehicle automatically controls the drive to maintain a constant
- Diesel engine rpm can be set with the manual throttle independent of the speed
- The engine speed can be set in three different ways
  - Tapping the manual throttle lever increases/lowers rpm in increments of 100 rpm
  - The manual throttle can be held forward or backward to progressively increase/lowers the rpm
  - The required rpm is set with the accelerator pedal and maintained by tapping the manual throttle lever once
- The settings of the low-speed control and manual throttle are not changed during backward vehicle travel and inching. In addition, engine speed can be overridden with the accelerator pedal. If the neutral push button is pressed, rpm returns to idling speed

## Customer benefits:

- Low-speed control and manual throttle is used simultaneously for example for attachments requiring operation at constantly high rpm but very low travel speeds (for example a rotary sweeper)
- Tiring machine and engine speed control with the pedals is no longer necessary, the load on the operator is reduced





### 8.3 Equipment for use on public roads

#### M\_TUEVAB\_013/027

#### EC Certificate of Conformity for Tractors (167/2013/EG – category T1)

**EG-Übereinstimmungsbescheinigung für vollständige Fahrzeuge**

Hersteller-Kurzbezeichnung: Kramer  
 Fahrzeug-Identifizierungsnummer: 41606xxxx

Der Unterzeichner Jürgen PREIZLER Leiter Produktentwicklung, Kramer-Werke GmbH bestätigt hiermit, dass das Fahrzeug

01	Fabrikmarke (Firmenname des Herstellers)	Kramer Werke GmbH
02	Typ (ggf. Varianten und Variantenangaben) (ggf. Handelsbezeichnungen)	416-66 C21 5609
03	Merkmale zur Typenbestimmung, sofern im Fahrzeug vorhanden	
03.1	Merkmale (Lage und Anbringungsart)	vorne rechts
03.2	Fahrgestell-Identifizierungsnummer (Anbringungsstelle)	vorne rechts
04	Fahrzeugklasse	T1
05	Name und Anschrift des Herstellers	Kramer Werke GmbH Vacker-Neuson-Strasse 1 88630 Pfaffenloof
06	Anbringungsstelle der vorgeschriebenen Schilder	vorne rechts
	Fahrzeug-Identifizierungsnummer	41606xxxx

auf der Grundlage des (der) in nachstehende(n) Typgenehmigung(en) beschriebenen Fahrzeugtyp(-typen):  
 stimmt in jeder Hinsicht überein mit dem Typ beschrieben 2

- unter der Typgenehmigungsnummer 012003075430-01  
 - vom 21.05.13

Das Fahrzeug kann ohne weitere Genehmigungen zur fortwährenden Teilnahme am Straßenverkehr mit Rechts-/Linksverkehr<sup>1)</sup> zugelassen werden

#### Description:

The machine is delivered with an EC Certificate of Conformity for tractors (167/2013/EG – category T1).

#### Customer benefits:

- Material, attachments and machines can be transported on a trailer
- Attachments can remain on the machine during road travel<sup>1</sup>
- Additional trailer brake enables tractor operation with trailers up to 20 tonnes permissible gross weight rating
  - Only in connection with “[M\\_ELAUSR\\_004 7-pole socket for rear attachments](#)” on page 8-42
  - In addition, a trailer coupling (not a shunting coupling) must be selected



#### Notice!

National regulations must be complied with!

1. The legal regulations for dimensions, lights and visibility must be observed!

## 8.4 Trailer couplings / brake systems

### M\_ZUAUSR\_118



### Manoeuvring coupling

**Description:**

Vehicle fitted with a manoeuvring coupling at the rear.

**Customer benefits:**

- Manoeuvring coupler can be used for moving and manoeuvring trailers



**Notice!**

Caution: Trailer operation is prohibited on public roads. Observe the legal regulations of your country.

### M\_ZUAUSR\_119



### Automatic trailer coupling 38 mm - solid-frame

**Description:**

The vehicle is equipped with automatic trailer coupling.

**Customer benefits:**

- The vehicle can be used in trailer operation and transport material or other machines, for example, to the construction site



M\_ZUAUSR\_490



**Pillow block for trailer couplings - height-adjustable**

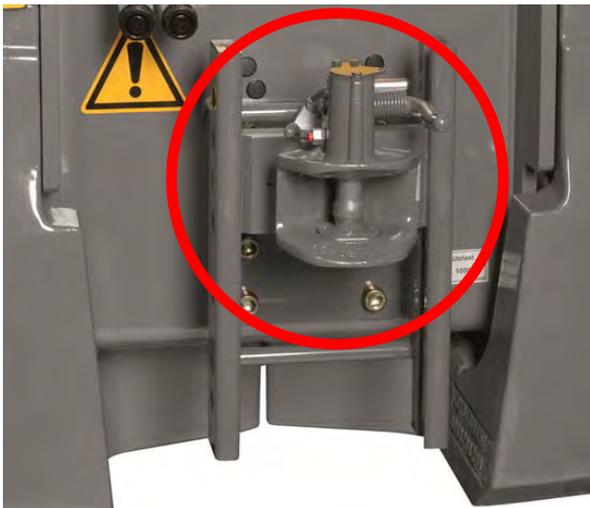
**Description:**

Pillow block for various trailer devices. Option is provided without application. Inner width of the pillow block 255 mm.

**Customer benefits:**

- Flexible options for use of all standard trailer couplings

M\_ZUAUSR\_162



**Use trailer hitch self-actuating 38 mm for trailer block height adjustable**

**Description:**

The vehicle is equipped with the use of the height-adjustable automatic trailer coupling.

**Customer benefits:**

- The vehicle can be used in trailer operation and transport material or other machines, for example, to the construction site
- Versatile attachment options

## M\_ZUAUSR\_488

**K80 variable height ball hitch coupling insert for trailer bock****Description:**

The vehicle is equipped with a skid and a ball head coupling K80 ("diameter 80 mm").

**Customer benefits:**

- The vehicle can be used in trailer operation and transport material or other machines, for example, to the construction site
- Versatile attachment options

## M\_ZUAUSR\_489

**Use of height-adjustable Piton Fix for trailer mounting****Description:**

The vehicle is equipped with the use of the Piton Fix trailer coupling.

**Customer benefits:**

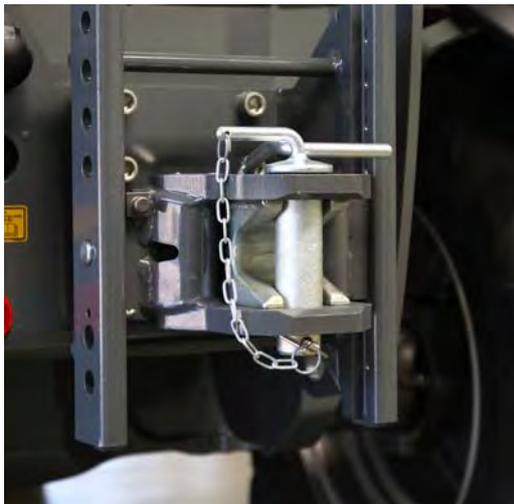
- The vehicle can be used in trailer operation and transport material or other machines, for example, to the construction site
- Versatile attachment options

**M\_ZUAUSR\_227****Use of mechanical trailer coupling (32 mm), height adjustable for trailer frame****Description:**

The vehicle is equipped with the use of the height-adjustable mechanical trailer coupling.

**Customer benefits:**

- The vehicle can be used in trailer operation and transport material or other machines, for example, to the construction site
- Versatile attachment options

**M\_ZUAUSR\_237****Trailer coupling CUNA D3 including height-adjustable trailer mounting****Description:**

The vehicle is equipped with a skid and a height-adjustable CUNA D3 trailer coupling. Due to the wider installation size, the slide is not compatible with the other inserts (use of height-adjustable trailer coupling, use of Piton, etc.)

**Customer benefits:**

- The vehicle can be used in trailer operation and transport material or other machines, for example, to the construction site
- Versatile attachment options
- Pin diameter: 50 mm

**Notice!**

This trailer coupling does not fit the skid M\_ZUAUSR\_490. It comes with a matching skid. Skid width: 329 mm

## M\_HYANBA\_023

**Auto hitch trailer coupling (including hydr. control) and tipping trailer connection****Description:**

The vehicle is equipped with a hydraulically operated trailer coupling. In addition, a tipper connection is installed.

**Customer benefits:**

- Extends the machine's scope of application



**M\_HYANBA\_123**

**Auto hitch trailer coupling (including hydr. control) and tipping trailer connection and levelling at front axle**

**Description:**

The vehicle is equipped with an hydraulically operated trailer coupling. In addition, a tipper connection is installed. Additionally, a hydraulic levelling is installed at the front axle.

**Customer benefits:**

- Extends the machine's scope of application
- Improved stability against tilting



**Notice!**

Available only for 5509



## M\_ZUAUSR\_123



## Compressed-air braking system (2 lines)

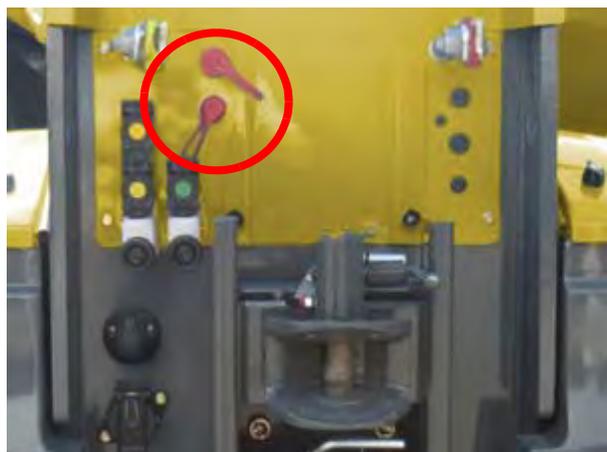
**Description:**

Vehicle is equipped with dual-circuit compressed-air braking system. This makes it possible to brake heavy, large trailers. The yellow line serves as brake line; the red one serves as supply line.

**Customer benefits:**

- Compressed air braked trailers can be pulled
- Safe technology that has proven its worth a million times over

## M\_ZUAUSR\_122



## Hydraulic trailer brake valve

**Description:**

The vehicle is equipped with a hydraulic two-line brake so that the trailer can be operated with this new braking system. The brake should be used proportionally. This brake meets the latest standards and legislation. The new 2-line system is downwardly compatible, which means that old 1-circuit trailers can still be attached.

**Customer benefits:**

- hydraulically braked trailers can be pulled

## M\_ZUAUSR\_146



## Mirror for trailer coupling

**Description:**

A mirror has been mounted to the machine to allow for a view of the trailer coupling.

**Customer benefits:**

- This makes it possible to hitch trailers securely

**Notice!**

Not applicable with M\_ZUAUSR\_221 rear-view camera



M\_ZUAUSR\_124



Mirror for autohitch trailer coupling

**Description:**

A mirror has been mounted to the machine to allow for a view of the trailer coupling.

**Customer benefits:**

- This makes it possible to hitch trailers securely

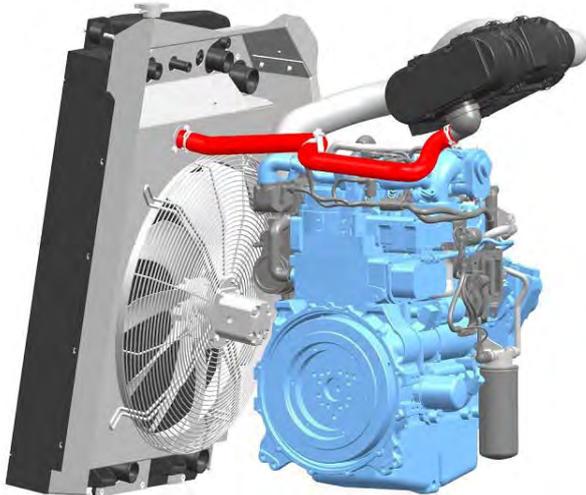


**Notice!**

Not applicable with M\_ZUAUSR\_221 rear-view camera

## 8.5 Engine

### M\_ZUAUSR\_242



### Vacuum-operated preliminary separator

#### Description:

The dirt outlet of the cyclone air filter is connected to the fan housing with a hose. Dust particles are drawn out of the cyclone air filter by the vacuum of the fan.

#### Customer benefits:

- Wear and maintenance-free system ensures maximum operational safety
- Machine is protected against damage
- Robust, long-lasting technology for low repair costs

### M\_ZUAUSR\_115



### Reversing fan

#### Description:

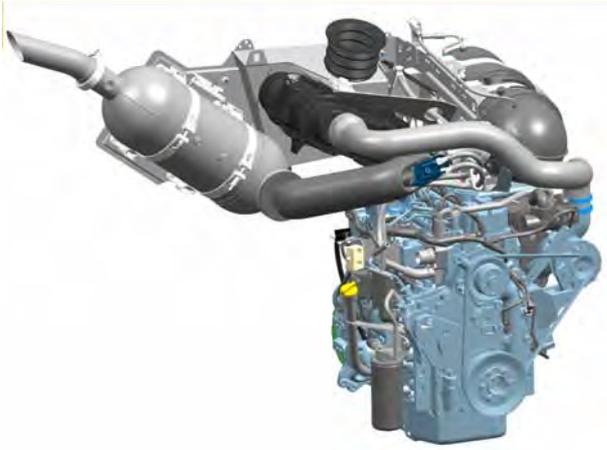
The vehicle is equipped with a hydraulically operated reversing fan. The fan's direction of rotation can be reversed with the controls in the cabin. Accumulated dirt on the radiator can be removed as required. The fan automatically switches back to the normal direction of rotation once the fully automatic reversing program is over.

#### Customer benefits:

- The machine performance is maintained at a constant level
- Low wear and low-maintenance system ensures maximum operational safety
- Machine is protected against damage
- Robust, long-lasting technology for low repair costs
- The operator can decide for himself whether it is necessary to start the reversing process



M\_ANTRIE\_100



**engine Deutz TCD 3.6 100 kW/136 hp with DPF**

**Description:**

The standard 100 kW is additionally equipped with a diesel particulate filter.

**Customer benefits:**

- Application in emission-limited areas is possible

## 8.6 Quickhitch plates/loader unit

### M\_LASTST\_002



### Load stabiliser (vibration damper)

#### Description:

A solenoid valve allows the oil column on the base side of the lift ram piston to flow to the nitrogen expansion reservoir. The nitrogen accumulator dampens the resulting oscillations.

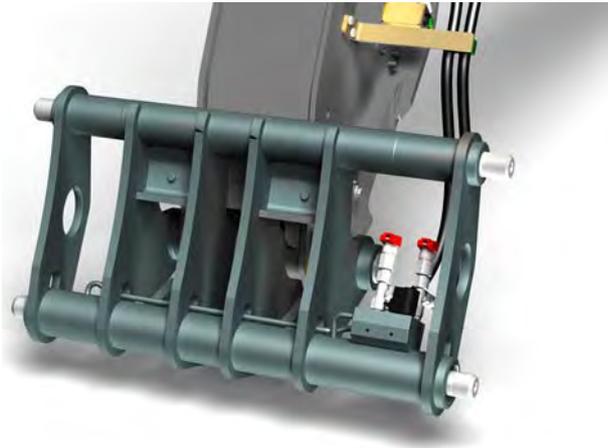
- The load stabilizer dampens the oscillations of the loader unit (material handling, transport).
- Skimming function (similar to floating position)
- Loader unit easily adapted to ground with predefined pressure on ground (snow plough, mulcher etc.).
- The load stabilizer can be switched on under load (independently of the load).
- In automatic mode of the load stabilizer, activation/deactivation is automatic at a travel speed of above 7 km/h

#### Customer benefits:

- Improved ride comfort
- Increased driving safety
- Higher travel speeds possible
- Reduces the load on the machine
- Less loss of material when handling bulk material

**M\_AUFANB\_002**

**Hydraulic quickhitch, Kramer system**

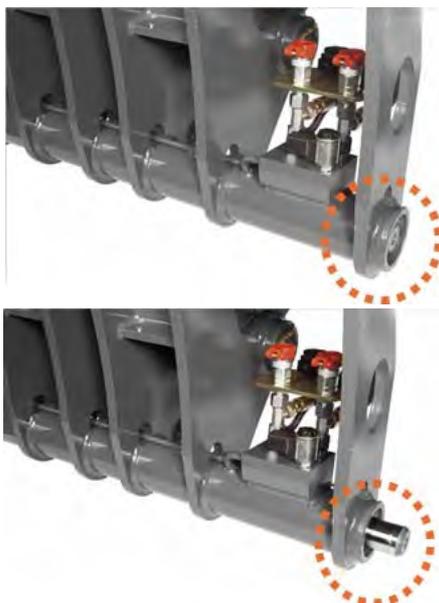
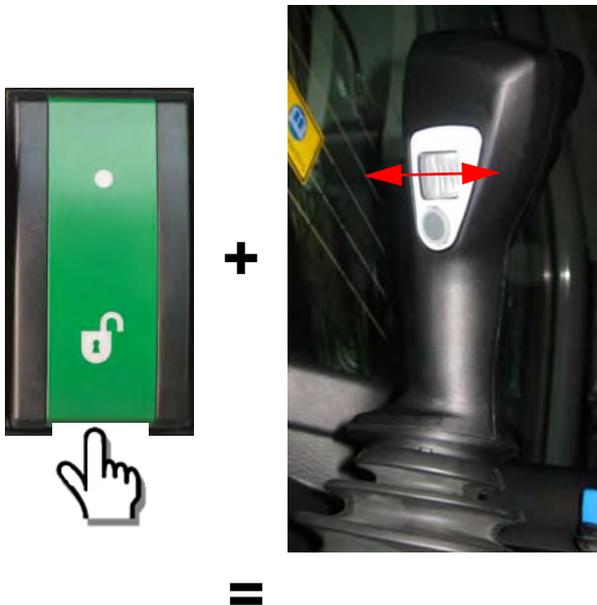


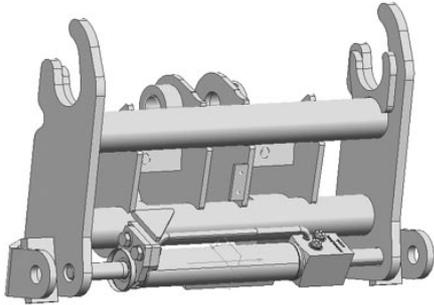
**Description:**

The vehicle is equipped with a hydraulic quickhitch. The large mounting and lock pins with a diameter of 50 mm is designed for the toughest of applications. The safety button must be pressed to open the quickhitch to prevent uncoupling the attachment accidentally.

**Customer benefits:**

- Fast and easy change of attachments from the operator seat boosts productivity
- Enhanced safety for personnel in the immediate vicinity
- Robust, long-lasting technology for low repair costs

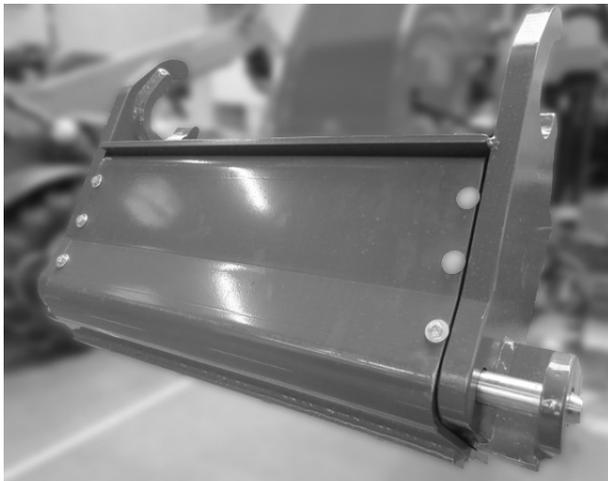


**M\_AUFANB\_035****Mechanical quickhitch, Manitou system****Description:**

The vehicle is equipped with a mechanical quickhitch for Manitou attachments.

**Customer benefits:**

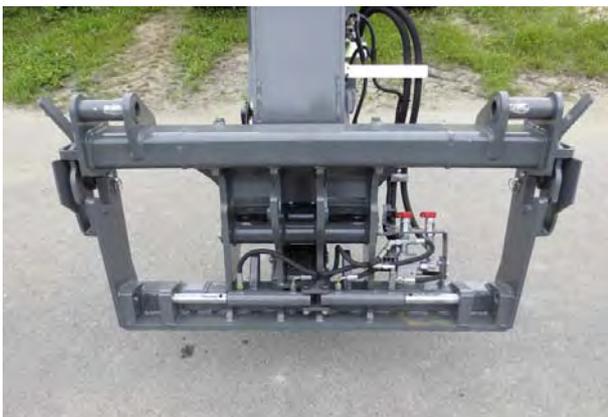
- Enables use of Manitou attachments

**M\_AUFANB\_011****hydraulic quickhitch facility Manitou****Description:**

The machine is equipped with an hydraulic quickhitch for Manitou attachments.

**Customer benefits:**

- Enables use of Manitou attachments
- Fast and easy change of attachments from the operator seat boosts productivity

**M\_AUFANB\_008****Hydraulic quickhitch, JCB (Q-fit) system****Description:**

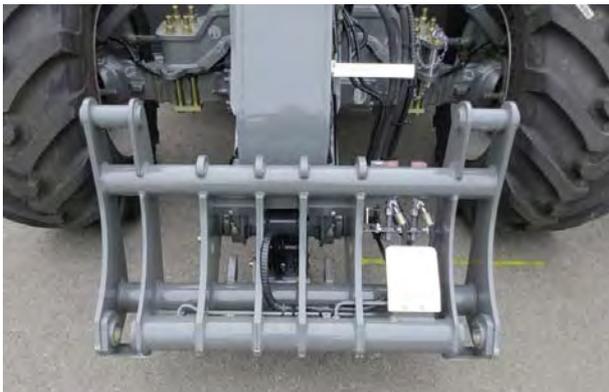
The vehicle is equipped with an hydraulic quickhitch for JCB system attachments.

**Customer benefits:**

- Enables the use of JCB attachments
- Fast and easy change of attachments from the operator seat boosts productivity



### M\_AUFANB\_007



### Hydraulic quickhitch, Volvo TPV system

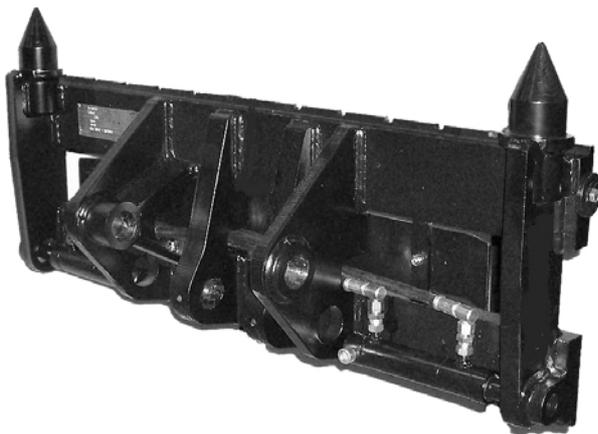
**Description:**

The vehicle is equipped with a hydraulic quickhitch for Volvo attachments.

**Customer benefits:**

- Enables the use of Volvo attachments
- Fast and easy change of attachments from the operator seat boosts productivity

### M\_AUFANB\_009



### Hydraulic quickhitch, Matbro system

**Description:**

The vehicle is equipped with a hydraulic quickhitch for Matbro attachments.

**Customer benefits:**

- Enables the use of Matbro attachments
- Fast and easy change of attachments from the operator seat boosts productivity

## 8.7 Hydraulics

### M\_ZUAUSR\_339



### Pressure relief of 3rd control circuit on the gooseneck

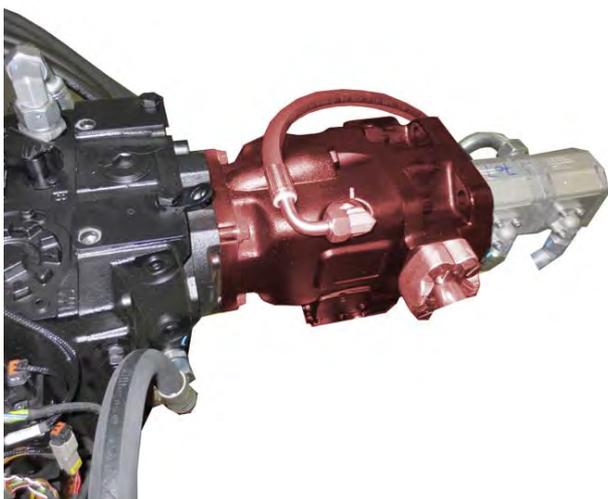
#### Description:

An external pressure release feature is installed on the gooseneck. The connections of the 3rd control circuit can be de-pressurised at the touch of a button when the engine is running or the ignition is switched on. Attachments with a hydraulic connection can be coupled and decoupled more quickly.

#### Customer benefits:

- Increases productivity
- Avoids soil contamination due to leak oil

### M\_ZUAUSR\_412



### Load Sensing operating hydraulics – 187 l/min

#### Description:

Machine equipped with Load Sensing hydraulic system with 187 l/min axial piston pump.

#### Customer benefits:

- Higher volumetric flow of oil than in the case of a Load Sensing pump
- Faster work cycles



#### Notice!

Available only for models 5007 and 4209



M\_HYANBA\_020

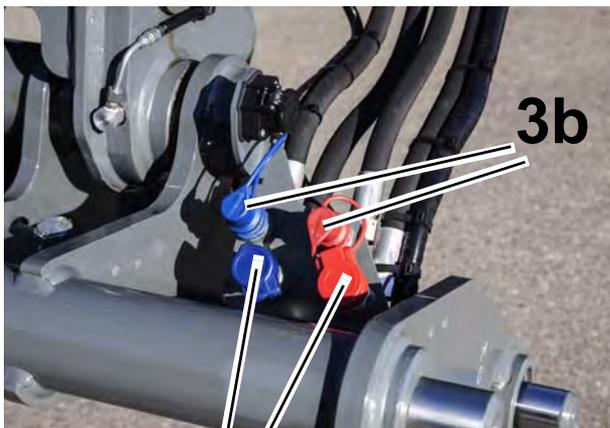
**Front hydraulic control circuit (electric changeover)**

**Description:**

In addition to quick couplers for the 3rd control circuit, quick couplers for a hydraulic control circuit are installed on the quickhitch. Electric changeover is performed in the cabin via a button on the joystick. It is therefore possible to switch between the two double-action connections 3a and 3b and to operate these with the scroll button on the back of the joystick.

**Customer benefits:**

- Operation of hydraulic front attachments with additional hydraulic functions
- Hydraulic functions can be performed without changing over the hydraulic hoses of the 3rd control circuit
- Extends the machine's scope of application



3a

3b

## M\_HYANBA\_018

## Tipping trailer connection

**Description:**

Machine equipped with an additional control circuit for a tipping trailer. Each hydraulic connection is fitted with a collecting receptacle for leak oil that can be completely removed or emptied by unscrewing it.

**Customer benefits:**

- Extends the machine's scope of application
- Avoids soil contamination due to leak oil



**M\_HYANBA\_122**

**Tipper connection and levelling of the front axis**

**Description:**

Front axle is equipped with an extra hydraulic ram on the right which can be extended or retracted to compensate slope inclination by +/- 10°. In addition, a tipper connection is installed on the vehicle (description: "[M\\_HYANBA\\_018 Tipping trailer connection](#)" on page 8-38)

- A bubble tube shows the current angle of the vehicle
- The speed of the hydraulic tilt adjustment is lowered in accordance with the angle of the telescopic boom
- The tilt adjustment and its speed can be lowered additionally as the scroll button is proportionately controlled
- A mechanical indicator on the front axle and the frame shows when frame levelling is in the centre position (the axle is at an exact angle of 90° to the frame)

**Customer benefits:**

- Machine can be set to a horizontal position with the frame levelling feature when working on sloping ground
- Increased stability



**Notice!**

Available only for 5509



M\_ZUAUSR\_013

Tilt ram lock

**Description:**

Disables the hydraulic dump in and dump out functions.

**Customer benefits:**

- Safe parallel lift of attachment (e.g. pallet forks)
- Ensures correct operation whenever exact parallel lift is required



**M\_ZUAUSR\_474**



**Automatic bucket reverse – smart loading incl. vibration function of the tipping cylinder**

**Description:**

Machine equipped with automatic bucket repositioning. Empty bucket automatically returns to pre-set position by pressing a button on the joystick. The required bucket position is programmed with a button on the joystick. If the set position has been reached and the joystick button is pressed for three seconds, the position is saved. The position is approached from the top and below irrespective of the angle position of the quickhitch. An electronic control ensures that the angle of the complete telescopic boom is compensated. This means that the attachment approaches its required position at the touch of a button irrespective of the position of the telescopic boom.

Automatic repositioning can also be used for pallet forks and other attachments.

**Vibrating function.**

The vibration function acts to completely empty the bucket of sticky materials. The function is actuated by simultaneously pressing the automatic bucket reverse button (1) and the differential lock (2). The vibrating function remains active until the button (2) is released. To jog and tilt at the same time, both pushbuttons must be deflected to the right or left to actuate, while doing the same to pushbutton 2 for the function and moving the joystick to the left or right.

However, the function is interrupted as soon as the end position of the tilt ram is reached (fully tipped or dumped). This prevents an excessive load on the components of the machine.

**Customer benefits:**

- Increases productivity
- Operator does not tire as fast when working over a longer period of time
- Machine is protected against damage. “Digging” into the ground or stack of pallets is prevented
- Less loss of material when handling bulk material.
- Complete bucket emptying in the case of adhesive materials
  - Only in connection with “[M\\_ELAUSR\\_002 4-pole socket for front attachments](#)” on page 8-42

## 8.8 Electrical system

### M\_ELAUSR\_002



### 4-pole socket for front attachments

**Description:**

A 4-pole socket is provided at the front of the telehandler.

**Customer benefits:**

- Operation of electrical attachments is possible
- Switchover of attachments with hydraulic functions is therefore possible
- Operation of attachments with additional electrical functions such as clearance lights is therefore possible

### M\_ELAUSR\_004



### 7-pole socket for rear attachments

**Description:**

A 7-pole power outlet is provided at the rear of the vehicle.

**Customer benefits:**

- The operation of electrical attachments and attachments with an additional electrical function, such as clearance lights, is then possible.
- Trailer operation

## 8.9 Safety options

### M\_ZUAUSR\_153



### Hydraulic levelling of front axle (including additional controller)

**Description:**

Front axle is equipped with an extra hydraulic ram on the right which can be extended or retracted to compensate slope inclination by +/- 10°.

- A bubble tube shows the current angle of the vehicle
- The speed of the hydraulic tilt adjustment is lowered in accordance with the angle of the telescopic boom
- The tilt adjustment and its speed can be lowered additionally as the scroll button is proportionately controlled
- A mechanical indicator on the front axle and the frame shows when frame levelling is in the centre position (the axle is at an exact angle of 90° to the frame)

**Customer benefits:**

- Machine can be set to a horizontal position with the frame levelling feature when working on sloping ground
- Increased stability



**Notice!**

Available only for 5509

## M\_ZUAUSR\_154

## Hydraulic oscillating rear axle interlock

**Description:**

The oscillating axle (rear axle) can be easily locked with a switch in the cabin. An indicator on the instrument panel shows when the oscillating axle is locked.

**Customer benefits:**

- Ensures optimal stability on sloping ground
- The oscillating axle can be locked in any position

**Notice!**

Available only for 5509





M\_ZUAUSR\_158



**Mechanical oscillating-axle interlock**

**Description:**

The rear oscillating axle can be mechanically locked with a pin.

**Customer benefits:**

- Ensures optimal stability on sloping ground



**Notice!**

Available only for models 4407, 5007, 5507, 4209, 5509



## M\_ZUAUSR\_177



## Drive interlock integrated in ignition key

### Description:

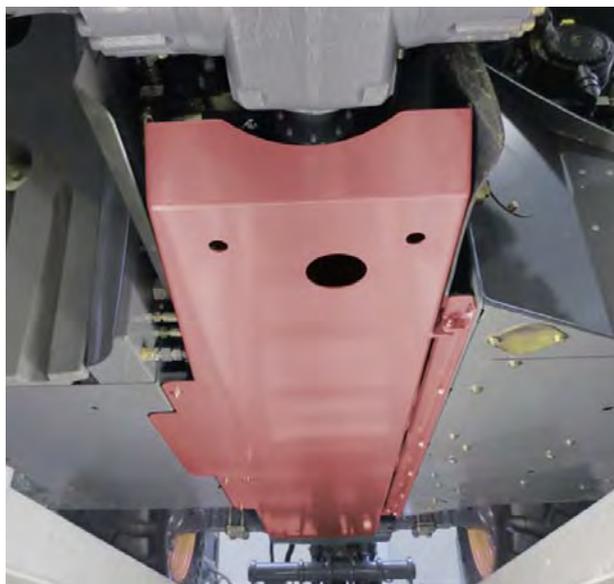
Integrated security system automatically activated 30 seconds after switching off ignition.

- Drive interlock is activated and deactivated via a transponder and a transmitter in the starting key
- Machine can be started only with the blue key assigned to the drive interlock
- The red master key is used for enabling other blue keys for the machine as required. (Up to 10 blue keys per drive interlock)

### Customer benefits:

- Effective theft protection
- Fleet management, only specific employees are given the respective key

## M\_ZUAUSR\_112



## Protective underbody panel

### Description:

A additional steel plate is fitted between the standard steel plates, the engine vat and the reservoir. This protects the entire gearbox and cardan shaft unit against damage. For repair and maintenance work the undersealant can be simply folded away on a hinge by releasing three screws.

### Customer benefits:

- Machine is protected against damage
  - Only in connection with "[M\\_ZUAUSR\\_156 Power train cover](#)" on page 8-47



### M\_ZUAUSR\_156



### Power train cover

**Description:**

A robust rubber tarpaulin protects the telehandler's power train from dirt.

**Customer benefits:**

- The cover ensures the power train is cleaned faster and more easily
- Machine is protected against damage

### M\_ZUAUSR\_134



### Fire extinguisher (2 kg)

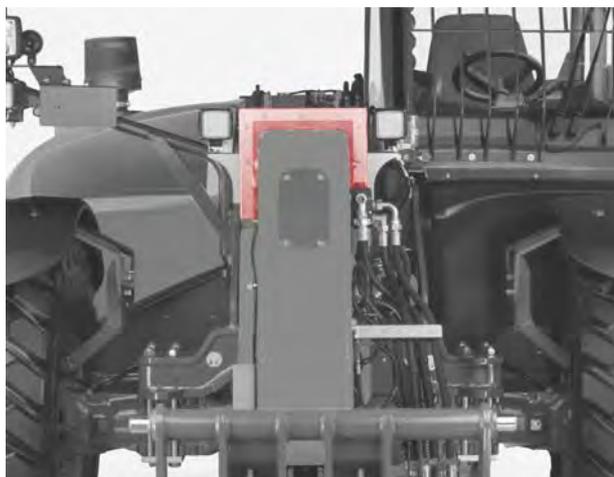
**Description:**

A 2 kg fire extinguisher is installed in the cabin.

**Customer benefits:**

- Machine protection in the event of localised overheating
- Safeguarding surroundings in the event of machine fire

### M\_ZUAUSR\_164



### Telescopic boom dirt scraper

#### Description:

Telescopic boom is equipped with a dirt scraper between the outside and inside sections.

#### Customer benefits:

- Dirt scraper prevents dirt from penetrating between the outer and inner section of the telescopic boom
- Damage to the loader unit and the hydraulic lines routed inside is avoided
- Machine is protected against damage

### M\_FZSZUB\_004



### Red/white warning stripes (as per DIN 30710)

#### Description:

Warnings are required – especially for municipal commissions and calls for tenders. With this solution, ex works standards and surface norms are complied with.

#### Customer benefits:

- Fulfils the regulations according to Paragraph 52 Sub-paragraph 4.1 of the StVZO (German Road Traffic Licensing Regulations) for vehicles used on public roads
- Increased safety for the operator and the machine during road travel, especially at night



## 8.10 Other

### M\_LAKART\_002



### Paint coating other than standard – instead of Kramer yellow, one-colour paint coating in accordance with RAL

#### Description:

All vehicle components painted in Kramer yellow can be ordered with a one-colour paint coating in a different RAL colour.

#### Customer benefits:

- Customers can create their own image



#### Notice!

We reserve the right to decline paints similar to protected colours or colour combinations by other manufacturers!

## M\_ZUAUSR\_046

## Fully automatic central lubrication system

**Description:**

Vehicle equipped with automatic central lubrication system.

- Lubrication times (duration) and intervals can be adjusted
- All lubricating points of the machine are connected to the central lubrication system (also the lubricating points of the steering axles and the quickhitch plate)
- Each lubricating point receives the correct grease quantity with the volume-adapted distributing blocks
- Functional check by a pressure relief valve in view of the operator
- The rear distributing blocks are protected by metal panels

**Customer benefits:**

- Increases the vehicle's service life and resale value
- Safe and regular lubrication of all lubrication points
- Saves time and money by reducing the time required for maintenance



## 9 Special options

### 9.1 Cabin

#### M\_ZUAUSR\_365



#### Heated seat

**Description:**

The seat surface and the backrest can be heated.

**Customer benefits:**

- Pleasant on cold days
- Long-term investment in the operator's health
  - Only in connection with "*M\_SITZ\_002 Air-suspension comfort seat with lumbar support*" on page 8-6

#### M\_KABINE\_010



#### Heated cabin windows on the right and at the rear

**Description:**

The rear and right side windows of the cabin are equipped with heating wires. The heating of each window is equipped with an automatic deactivation feature that effectively prevents overheating.

**Customer benefits:**

- Ice can be removed from the windows quickly and easily, especially in the winter when they are misted or covered with ice
- Scraping ice off difficult-to-access windows is no longer necessary, saves time by saving the operator climbing onto the vehicle
- Unimpeded visibility to the rear and the right in the winter means safety for the operator and his environment



## M\_ZUAUSR\_055

### Carbon filter

#### Description:

The cabin air supply of the vehicle is equipped with a charcoal filter instead of the standard paper filters. The filter can be easily accessed from outside without tools.

#### Customer benefits:

- When the cab is closed, the supplied fresh air is cleaned by means of a charcoal filter
- Toxic and bad-smelling substances are filtered out and therefore do not reach the cab



## 9.2 Travelling drive

### M\_GESCHW\_045



### ecospeed 20km/h Smart Driving

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 30 km/h reduced to 20 km/h
- This option incorporates the Smart Driving engine speed lowering functionality.

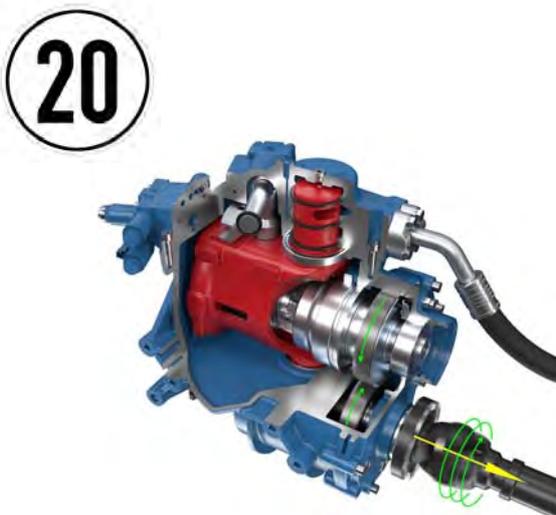
**Customer benefits:**

- No approval required
- Less wear

**Notice!**

Only available for models 4407, 5007, and 4209

### M\_GESCHW\_058



### ecospeedPRO 20 km/h Smart Driving

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 40 km/h reduced to 20 km/h
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- No approval required.
- Less wear

**Notice!**

Available only for models 5507 and 5509

M\_GESCHW\_055



**ecospeedPRO 40km/h Smart Driving + four-wheel cut-off**

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox. Additionally, the drive at the rear axle can be manually switched off using a rocker switch. This lowers fuel consumption and tyre wear.

- Transmission ratio of the gearbox: 40 kph
- This option incorporates the Smart Driving engine speed lowering functionality.

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving
- Less wear



**Notice!**

Available only for models 5507 and 5509

M\_GESCHW\_057



**ecospeedPRO 20km/h Smart Driving**

**Description:**

Vehicle is equipped with an ecospeed high-speed gearbox.

- Transmission ratio of the gearbox: 30 km/h reduced to 20 km/h

**Customer benefits:**

- Boosts productivity when operation involves a high percentage of driving with simultaneous high pushing power
- No approval required.
- Less wear



**Notice!**

Available only for models 5507 and 5509



### 9.3 Engine

#### M\_ZUAUSR\_143



#### Preheating for engine, fuel + hydraulic oil (230 V)

**Description:**

Cold-starting aid at temperatures below  $-5^{\circ}\text{C}$ . Engine and hydraulic oil is heated by heating elements according to the gravity principle (warm oil rises and is replaced by cold oil). The fuel pre-heater prevents paraffin crystals forming, which otherwise clog the fuel filter at low temperatures. The pre-heating is activated via connection to a standard 230 V plug receptacle.

**Customer benefits:**

- Engine is started and hydraulic system is commissioning more easily at low outside temperatures, boosting productivity and conserving machine components
- Wear and maintenance-free system ensures maximum operational safety
- Machine is protected against damage

## 9.4 Hydraulics

### M\_HYANBA\_014



### Control circuit rear-mounted, double-acting

**Description:**

The vehicle is equipped with a double-acting additional control circuit in the rear. Each hydraulic connection is fitted with a collecting receptacle for leak oil that can be completely removed or emptied by unscrewing it.

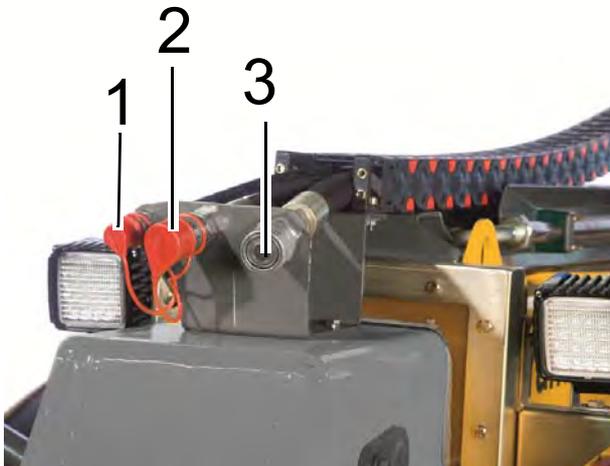
**Customer benefits:**

- Extends the machine's scope of application
- Avoids soil contamination due to leak oil
  - Only in connection with "[M\\_HYANBA\\_018](#) *Tipping trailer connection*" on page 8-38

**Notice!**

Not available for 3007

**M\_HYANBA\_013**



**Front hydraulic additional control circuit, single-action, outside – incl. non-pressurized return and leak oil line**

**Description:**

Quick couplers for pressure, return and leak oil lines installed on top of telescopic boom for attachments with hydraulic motors and high output requirements.

- 1 Leak oil line
- 2 Pressure line
- 3 Non-pressurised reflux line

**Customer benefits:**

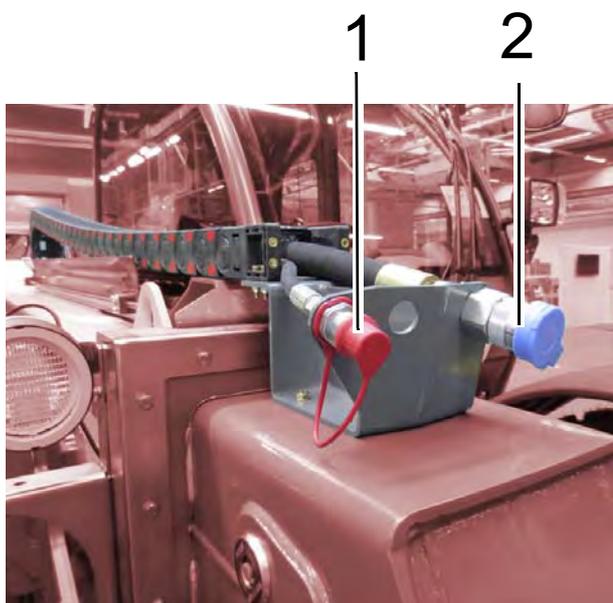
- Extends the machine's scope of application
- Attachments with leak-oil connections can be operated
- Hydraulic performance max. 35 kW
  - Only in connection with "[M\\_HYANBA\\_018 Tipping trailer connection](#)" on page 8-38
  - Only in connection with "[M\\_ZUAUSR\\_213 Front right camera](#)" on page 8-12



**Notice!**

Available only for models 4407, 5007, 5507, 4209, and 5509

M\_HYANBA\_001



**Unpressurised front reflux line incl. leak oil line; external**

**Description:**

Unpressurised return and leak oil line for oil return flow is used for attachments with hydraulic motors driven via the 3rd control circuit. A too high thermal load on the hydraulic oil is avoided when the 3rd control circuit is used in continuous operation.

- 1 Leak oil line
- 2 Non-pressurised reflux line

**Customer benefits:**

- Extends the machine's scope of application
- Attachments with leak-oil connections can be operated
  - Only in connection with "[M\\_ZUAUSR\\_213 Front right camera](#)" on page 8-12



**Notice!**

Available only for models 4407, 5007, 5507, 4209, and 5509





### M\_HYANBA\_135



### Unpressurised front reflux line incl. leak oil line; on the external arm

**Description:**

Unpressurised return and leak oil line for oil return flow is used for attachments with hydraulic motors driven via the 3rd control circuit. A too high thermal load on the hydraulic oil is avoided when the 3rd control circuit is used in continuous operation.

This function is not telescopic. If the arm is nevertheless extended, damage may occur to the attachment or the machine.

- 1 Leak oil line
- 2 Non-pressurised reflux line

**Customer benefits:**

- Extends the machine's scope of application
- Machine is protected against damage
- Attachments with leak-oil connections can be operated



**Notice!**

Only available for models 3007, 3507, and 4007

### M\_HYDOEL\_003



### Filling of hydraulics system with environment-friendly hydraulic oil; PANOLIN HLP Synt 46

**Description:**

The vehicle is filled with biodegradable hydraulic oil instead of the standard hydraulic oil.

**Customer benefits:**

- Environmental protection
- Mandatory on some construction sites (near water/ water protection area)

## M\_ZUAUSR\_130



## Oil level monitoring (hydraulic oil)

**Description:**

The machine is equipped with a monitoring feature for the hydraulic oil level (put out on a 7-inch display at the bottom on the right). If, for example, too much oil is taken by one attachment, an acoustic warning is given and a warning light is activated.

**Customer benefits:**

- Machine is protected against damage
- Any damage to the hydraulic system is detected more quickly

## M\_ZUAUSR\_451



## 2-fold multi-couplers

**Description:**

A multi-coupling is installed at the quickhitch plate for fast exchange of hydraulically operated attachments. Operation is analogous to front-end loader tractors. A single matching part is delivered ex works. Additional matching parts can be reordered through spare parts management. A cover integrated into the machine is also supplied.

This option is delivered with 2 connections for a double-acting attachment.

For trouble-free coupling, all hydraulic lines should be depressurized with the help of the push button on the boom

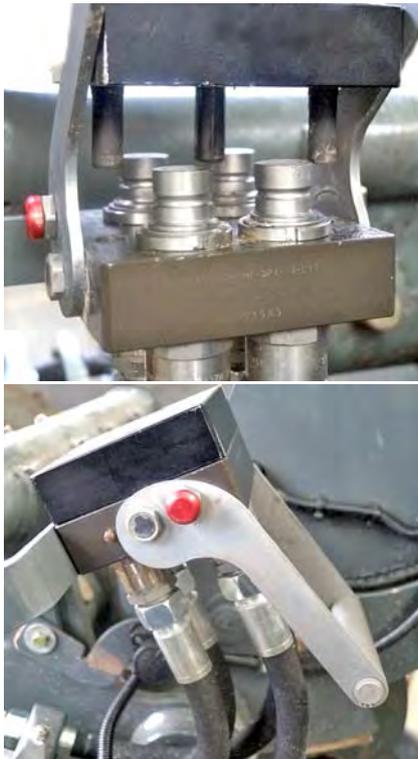
**Customer benefits:**

- rapid replacement of attachments
- longer service life due to fewer contaminants collecting on the hydraulic couplings
  - Only in connection with "[M\\_AUFANB\\_002 Hydraulic quickhitch, Kramer system](#)" on page 8-33
  - Only in connection with "[M\\_ZUAUSR\\_339 Pressure relief of 3rd control circuit on the gooseneck](#)" on page 8-36





## M\_ZUAUSR\_452



## 4-fold multi-couplers

### Description:

A multi-coupling is installed at the quickhitch plate for fast exchange of hydraulically operated attachments. Operation is analogous to front-end loader tractors. A single matching part is delivered ex works. Additional matching parts can be reordered through spare parts management. A cover integrated into the machine is also supplied.

This option is delivered with 4 connections for a double-acting attachment. Switch between the two circuits by pressing a button on the joystick.

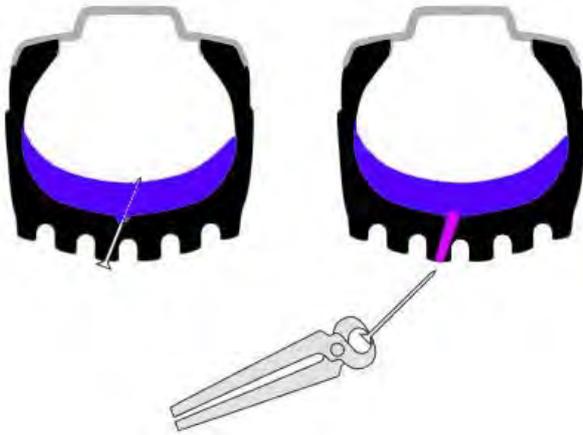
For trouble-free coupling, all hydraulic lines should be depressurized with the help of the push button on the boom

### Customer benefits:

- Simultaneous coupling of four hoses
- rapid replacement of attachments
- longer service life due to fewer contaminants collecting on the hydraulic couplings
  - Only in connection with "[M\\_AUFANB\\_002 Hydraulic quickhitch, Kramer system](#)" on page 8-33
  - Only in connection with "[M\\_ZUAUSR\\_339 Pressure relief of 3rd control circuit on the gooseneck](#)" on page 8-36
  - Only in connection with "[M\\_HYANBA\\_020 Front hydraulic control circuit \(electric changeover\)](#)" on page 8-37

## 9.5 Safety options

### M\_ZUAUSR\_020



### Tyre puncture protection kit

#### Description:

Vehicle tyres filled with special sealing gel.

- Damage from puncture objects, such as screws or nails from max. 10 mm diameter in the tyre running surface and tyre shoulder
- Hole is filled up and sealed with sealing gel in case of a tyre puncture
- Machine can still be used for some time in case of tyre puncture (depending on tyre damage)



#### Caution!

Temperature resistant down to -25°C,  
Service life: 7 years

**M\_FZEINS\_001**

Without protective wax



With protective wax

**Protective measures for operation in aggressive environment (salt and fertiliser applications)****Description:**

Protective coating of all corrosion-prone parts of the vehicle. Protective coating for machines used for example with de-icing salt or fertiliser is recommended.

- Preservation is based on a two-layer process with high-elasticity preserving agents. The first layer offers a temporary anti-corrosion protection. The second layer is resistant to chemicals and has been specially developed for applications in aggressive environment
- The protective layer retains its elasticity even after it dries out completely, shows no tendency to form cracks and therefore prevents the infiltration of water
- The engine is treated with an agent that, in addition to the aforementioned properties is also heat-resistant
- The protective film is applied with a clear agent and the vehicle therefore retains its colour
- Preservation can also be applied subsequently by a service provider. Each vehicle comes with a service booklet containing all important information on servicing, incl. contact
- Observe the following servicing instructions:
  - Clean without any pressure during the first 4 weeks after preservation, only with cold water or with a max. temperature of about 30°C
  - Afterwards: high pressure cleaning is no problem, optimal temperature up to about 60°C
  - Ensure a minimum distance of about 50 cm during cleaning, and do not use rotor nozzles

**Customer benefits:**

- Machine is protected against damage
- Increases the vehicle's service life and resale value
  - Only in connection with "[M\\_ZUAUSR\\_463 Telescopic boom anti-friction paint](#)" on page 9-14
  - Only in connection with "[M\\_ZUAUSR\\_156 Power train cover](#)" on page 8-47
  - Only in connection with "[M\\_ZUAUSR\\_164 Telescopic boom dirt scraper](#)" on page 8-48

## M\_ZUAUSR\_463



## Telescopic boom anti-friction paint

**Description:**

In order to avoid adhesions on the telescopic elements, the anti-friction paint option allows the telescopic boom to be primed and then painted with a special bonded coating. Lastly, the functional surfaces are thinly greased. This avoids adherences in dusty, abrasive settings.

For the purposes of maintenance, the gliding surfaces should be re-lubricated with special grease "Staby! TA" (Kramer material number 1000328387).

This option is only available ex works and cannot be retrofitted due to the special treatment.

**Customer benefits:**

- Increases the service life of sliding surfaces
- Avoid corrosion in the inner arm
- Lower follow-up costs

## M\_KABAUS\_002



## Removable protective screen for front window

**Description:**

A protective screen is fitted on the front window

**Customer benefits:**

- Protects the operator and the front window against falling objects when piling or loading material

**Notice!**

Caution: Not for use on public roads! The protective screen must be removed before road travel. Observe the legal regulations of your country.

## 9.6 Other

### M\_ZUAUSR\_415

Not shown

### Preparation of central lubricating system

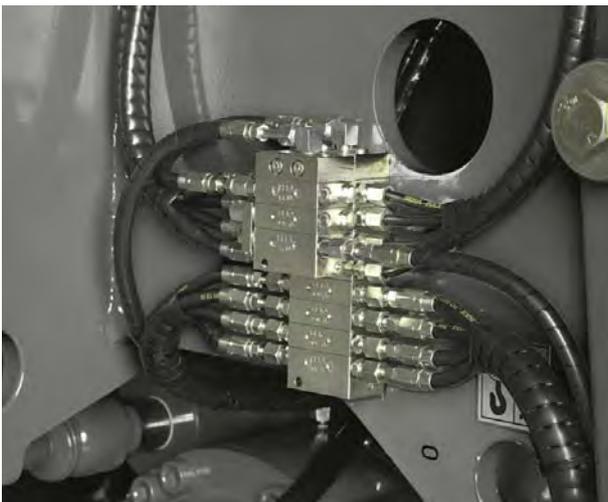
**Description:**

The vehicle is equipped with a lubrication line in the telescopic boom to prepare it for a central lubrication system.

**Customer benefits:**

- Retrofitting of a central lubrication system made easier

### M\_ZUAUSR\_113



### Central lubricating system (aggr. media)

**Description:**

Vehicle equipped with automatic central lubrication system.

- All distributing blocks and pressure-hose crimped sections of the central lubrication system are made of **stainless steel**
- The functionality and design of the central lubrication system are identical with the description in section "[M\\_ZUAUSR\\_046 Fully automatic central lubrication system](#)" on page 8-50.

**Customer benefits:**

- No damage to the central lubrication system by corrosion
- Increases the vehicle's service life and resale value
- Safe and regular lubrication of all lubrication points
- Saves time and money by reducing the time required for maintenance

## M\_ZUAUSR\_045

**Tool kit****Description:**

The on-board tool kit is kept in one of the lockable counterweights (except for 4209, in which the tool kit is stored behind the seat).

- Engineer's hammer 800 g
- Combination wrench size 13
- Combination wrench w/f 17
- Combination wrench w/f 19
- Combination wrench w/f 24
- Single-ended fork spanner w/f 36
- Allen key size 3
- Allen key size 4
- Allen key size 6
- Manual lever grease gun for 400 g cartridges including armoured hose
- Wheel nut wrench w/f 27/30 including rod
- Roll-up bag with 9 pockets for carrying and storing the tools

**Customer benefits:**

- Maintenance work and small repairs can be performed with the on-board tools

**Notice!**

Available only for models 4407, 5007, 5507, 4209, and 5509



## M\_ZUAUSR\_302



### Tool kit

#### Description:

On-board tools are stored in a toolbox at the rear left. The entire tool box can be removed and can be secured if necessary with a padlock.

- Engineer's hammer 800 g
- Combination wrench size 13
- Combination wrench w/f 17
- Combination wrench w/f 19
- Combination wrench w/f 24
- Single-ended fork spanner w/f 36
- Allen key size 3
- Allen key size 4
- Allen key size 6
- Manual lever grease gun for 400 g cartridges including armoured hose
- Wheel nut wrench w/f 27/30 including rod

Roll-up bag with 9 pockets for carrying and storing the tools

#### Customer benefits:

- Maintenance work and small repairs can be performed with the on-board tools.



#### Notice!

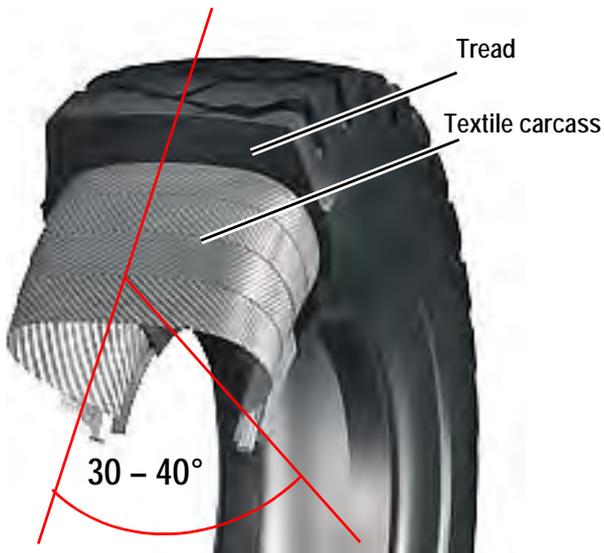
Only available for models 3007, 3507, and 4007



# 10 Tyres

## 10.1 Design principle

### Cross-ply tyre



#### Tyre design:

The reinforcing cords extend diagonally across the tyre, from one side to another of the tyre bead, at an angle of 30 to 40° to the centreline of the tyre. Each successive ply or layer of body cord runs in the opposite direction which results in a crisscross pattern. With their identical design, the side walls and the tread form one unit. The side walls become more rigid.

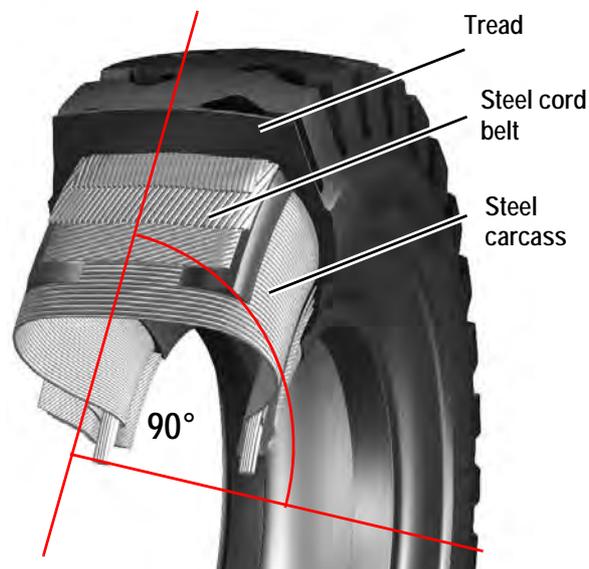
#### Features:

- High lateral stability
- Side walls less damage-prone

#### Footprint:

- Oval footprint, uneven pressure distribution

### Radial-ply tyre



#### Tyre design:

The plies of reinforcing tyre cord extend transversely (radially) to the driving direction, from one side to another of the tyre bead. Directly on top of the radial plies and under the tread are several full-length plies of cord or steel. This belt runs circumferentially around the carcass. The side walls are softer; the tread can be designed independently of the side walls. More elastic, this tyre has a longer footprint.

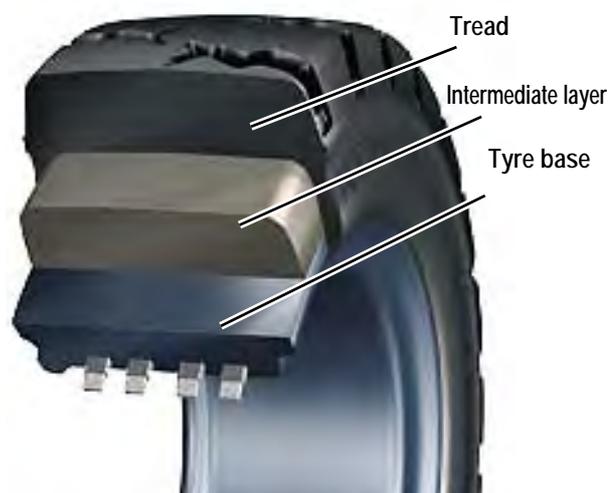
#### Features:

- Improved traction, higher transmission of tractive power
- Improved ride comfort
- Long service life
- Flexibility with respect to tyre pressure. (The lower the pressure, the larger the footprint. This reduces ground pressure and increases tractive power.)

#### Footprint:

- Square footprint, even pressure distribution

## Solid tyres



### Tyre design:

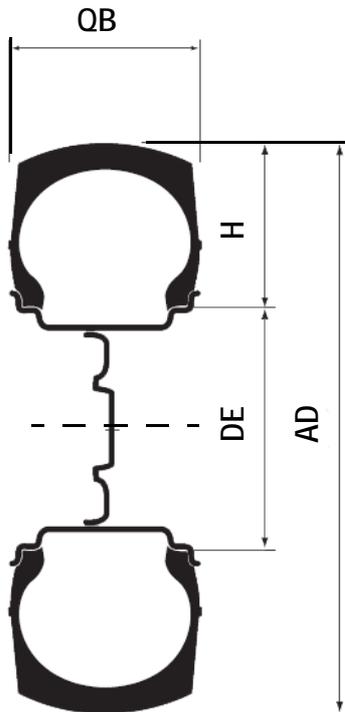
The tread is extremely tough and wear-resistant, and ensures a long service life of the tyre. The overall structural and material-specific design of the tyre ensures good shock and vibration absorption, as well as a low rolling resistance. The tyre base consists of a tough and hard, patented compound that contains the steel wire cores that ensure the tyre's firm position on the rim.

Solid tyres are perfectly suitable for tough applications with slow machines on firm ground that carries a risk of impact and damage. They are extremely stable, breakdown-resistant and maintenance-free. Furthermore, solid tyres feature a very high load-bearing capacity and profitability.

### Features:

- High stability
- High resistance load at small dimensions
- Great tread thickness

## 10.2 Tyre identification



QB = cross-sectional width  
 AD = outside diameter  
 H = cross-sectional height  
 D = rim diameter

<b>405/70R24</b>		
405	QB	Nominal cross-sectional width (in mm)
70	H	Height/width ratio (in %)
R		Radial design
24	DE	Nominal rim diameter (in inches)
<b>16/70-20</b>		
16	QB	Nominal cross-sectional width (in inches)
70	H	Height/width ratio (in %)
-		Diagonal design
20	DE	Nominal rim diameter (in inches)
<b>12.5-18</b>		
12.5	QB	Nominal cross-sectional width (in inches)
		85% height/width ratio
-		Diagonal design
18	DE	Nominal rim diameter (in inches)
<b>28x9.00-15</b>		
28	AD	Tyre diameter (in inches)
9.00	QB	Nominal cross-sectional width (in inches)
-		Diagonal design
15	DE	Nominal rim diameter (in inches)
<b>19.5LR24</b>		
19.5	QB	Nominal cross-sectional width (in inches)
L		Low-profile tyre (70% height-to-width ratio)
R		Radial design
24	DE	Nominal rim diameter (in inches)

1 inch (") = 25.4 mm





## 10.3 Overview of tyres

Type	Variant no.	Tyres	Manu- fac- turer	Profile	Rim	Wheel offset (mm)	Tyre width (mm)	Machine height and width over tyres		
								Height (mm)	Width (mm)	
3007 3507 4007	M_FOBEW-G_125	405/70-24	Mitas	MPT-04 Construction machines	13x24	ET +10	407	2310	2287	
	M_FOBEW-G_202	460/70 R24	Fires- tone	Duraforce Utility Industrie	TW14Lx 24	ET +45	458	2325	2268	
	M_FOBEW-G_104	460/70 R24	Miche- lin	XMCL traction	TW14Lx 24	ET +45	467	2327	2277	
	M_FOBEW-G_273	460/70 R24		Bibload Multi-purpose tread	TW14Lx 24	ET +45	467	2323	2277	
	<b>Standard</b> M_FOBEW-G_230	405/70- 24	Alliance	A323 traction	13x24	ET +10	407	2311	2287	
	M_FOBEW-G_216	460/70 R24		A580 traction	TW14Lx 24	Wheel offset +40	462	2332	2282	
4407 5007 5507 4209 5509	M_FOBEW-G_202	460/70 R24	Fires- tone	Duraforce Utility Industry	DW14x2 4	ET +20	458	2570	2493	
	M_FOBEW-G_248	500/70 R24			DW16Lx 24	Wheel offset +40	516	2590	2511	
	M_FOBEW-G_104	460/70 R24	Miche- lin	XMCL traction	DW14x2 4	ET +20	467	2570	2502	
	M_FOBEW-G_105	500/70 R24			DW16Lx 24	Wheel offset +40	511	2590	2502	
	M_FOBEW-G_273	460/70 R24			DW14Lx 24	ET +20	467	2570	2502	
	M_FOBEW-G_274	500/70 R24	Alliance	Bibload Multi-purpose tread	DW16Lx 24	Wheel offset +40	511	2590	2506	
	<b>Standard</b> M_FOBEW-G_216	460/70 R24			A580 traction	DW14x2 4	ET +20	462	2570	2497
	M_FOBEW-G_222	500/70 R24				DW16x2 4	Wheel offset +40	505	2590	2500
	M_FOBEW-G_208	600/ 55.26.5		A331 Flotation	26.5 x AG20.00 H2	ET +30	602	2590	2610	

- **Tolerances of up to  $\pm 2.5$  cm are possible!**





### Treads and description

Traction tread – diagonal: Alliance A-323		
<p><b>Standard tyres for:</b> 3007, 3507, and 4007 <b>as:</b> M_FOBEWG_230</p> <p><b>Standard tyres for:</b> 4407, 5007, 5507, 4209, and 5509 <b>as:</b> M_FOBEWG_216</p> <p><b>Optional tyres for:</b> 4407, 5007, 5507, 4209, and 5509 <b>as:</b> M_FOBEWG_222</p>		<p><b>Description:</b> High-traction cross-ply tyre</p> <p><b>Customer benefits:</b></p> <ul style="list-style-type: none"> <li>• Good self-cleaning properties</li> <li>• Good track properties</li> <li>• High driving safety</li> <li>• Long service life</li> </ul>
Traction tread – radial-ply: Michelin XMCL, Alliance A-580		
<p><b>Optional tyres for:</b> All models <b>as:</b> M_FOBEWG_104</p> <p><b>Optional tyres for:</b> 4407, 5007, 5507, 4209, and 5509 <b>as:</b> M_FOBEWG_105</p>		<p><b>Description:</b> High-traction radial-ply tyre</p> <p><b>Customer benefits:</b></p> <ul style="list-style-type: none"> <li>• Smooth on-road travel</li> <li>• Very good self-cleaning properties</li> <li>• Optimal for sludgy terrain and on clayey ground</li> </ul>
Multi-purpose tread – radial-ply: Michelin Bibload		
<p><b>Optional tyres for:</b> All models <b>as:</b> M_FOBEWG_273</p> <p><b>Optional tyres for:</b> 4407, 5007, 5507, 4209, and 5509 <b>as:</b> M_FOBEWG_274</p>		<p><b>Description:</b> Radial-ply, non-directional tyre</p> <p><b>Customer benefits:</b></p> <ul style="list-style-type: none"> <li>• Good self-cleaning properties</li> <li>• High side stability</li> <li>• Long service life</li> </ul>
Construction machine tread – diagonal: Mitas MPT-04		

<p><b>Optional tyres for:</b> 3007, 3507, and 4007 <b>as:</b> M_FOBEWG_125</p>		<p><b>Description:</b> Cross-ply tyre with robust construction equipment tread <b>Customer benefits:</b></p> <ul style="list-style-type: none"> <li>● Long service life</li> <li>● High traction</li> <li>● High mobility on soft soils</li> <li>● Good self-cleaning properties</li> </ul>
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**Industrial tread – radial-ply: Duraforce Utility**

<p><b>Optional tyres for:</b> All models <b>as:</b> M_FOBEWG_202 <b>Optional tyres for:</b> 4407, 5007, 5507, 4209, and 5509 <b>as:</b> M_FOBEWG_248</p>		<p><b>Description:</b> Radial-ply, non-directional tyre <b>Customer benefits:</b></p> <ul style="list-style-type: none"> <li>● Good self-cleaning properties</li> <li>● High side stability</li> <li>● Resistant to cuts and piercing</li> <li>● Very high running life</li> </ul>
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**Traction tread – diagonal: Alliance A-331 Flotation**

<p><b>Optional tyres for:</b> 4407, 5007, 5507, 4209, and 5509 <b>as:</b> M_FOBEWG_208</p>		<p><b>Description:</b> Cross-ply, non-directional tyre <b>Customer benefits:</b></p> <ul style="list-style-type: none"> <li>● High load capacity</li> <li>● Low tyre pressures possible</li> <li>● Good self-cleaning properties</li> <li>● High mobility on soft soils</li> </ul>
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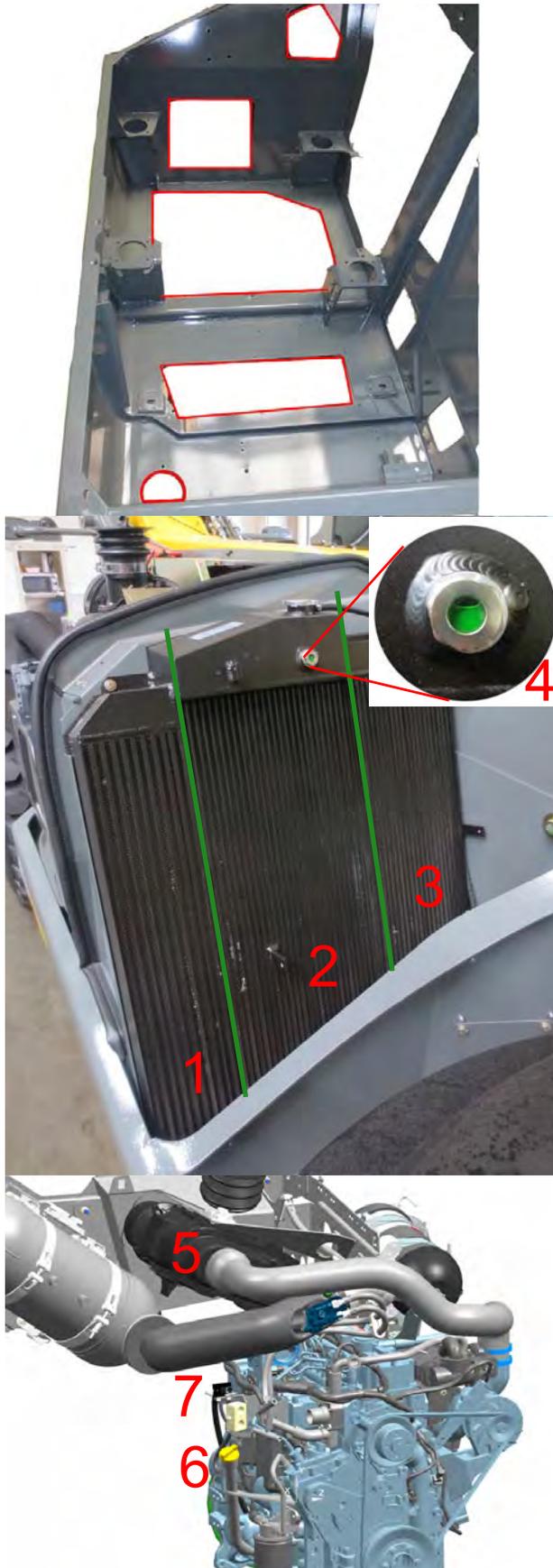


## 11 Maintenance

Good accessibility is decisive for efficient performance of daily maintenance. Wide-opening engine cover with all-around rubber seal prevents the operator from hitting his head. And if ever the machine does have to be repaired, good access to the different measurement points and main components is just as important. These important maintenance points are described in the following.



## 11.1 Accessibility to engine vat and fluid level check



### Description:

Engine vat with large removable maintenance flaps ensures good access to engine for oil changes and maintenance.

- All filters installed in suspended positions
- Combined radiator with wide-spaced fins
- Sight glasses for all fluids make daily maintenance easier

- 1 Charge-air cooler
- 2 Engine radiator (coolant)
- 3 Hydraulic oil radiator (operating and travel hydraulics )
- 4 Coolant sight glass
- 5 Air filter with cyclone prefilter and safety cartridge
- 6 Engine oil filler opening
- 7 Engine oil dipstick

### Customer benefits:

- Easy access for maintenance and fast daily maintenance save time and money



**Description:**

Low level is immediately detected with the sight glass integrated in the hydraulic oil reservoir.

**Customer benefits:**

- Easy access for maintenance and fast daily maintenance save time and money

## 11.2 Electrical system



Automatic  
Battery master switch

Battery container

### Description:

Access to large-sized battery is easy in the battery container next to the access.

- Fuse box in leg room ensures fast and easy replacement of fuses. A detailed description inside the cover provides information on the fuse assigned to which function
- The automatic battery disconnect switch automatically disconnects the battery and the electrical system after SCR lines are freed.
- The supply of electricity is automatically interrupted, even if work must be carried out on the electrical system
- Main engine fuses are well protected in a fuse box under the engine cover

### Customer benefits:

- Maintenance on the electrical system can be performed quickly. Downtimes are reduced to a minimum



### 11.3 Lubrication points



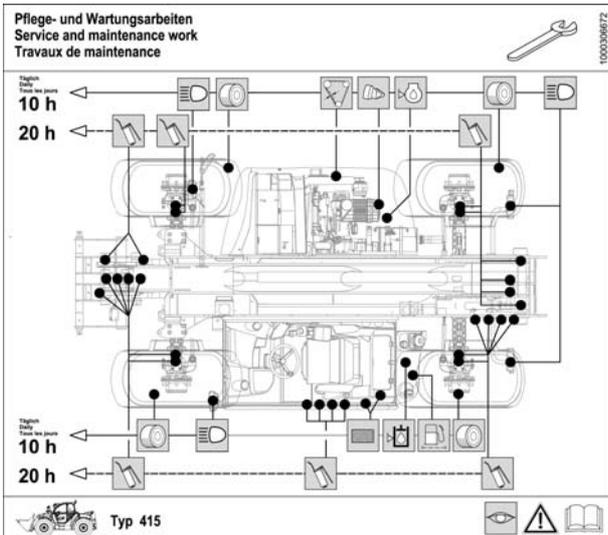
**Description:**

For easy lubrication at regular intervals, all lubrication points can be accessed with the telescopic boom lowered. Therefore no lift ram prop has to be used, and “climbing” onto the machine is not necessary either.

- The oscillating axle, and the lift and compensating rams (below) can be lubricated together at one set of lubrication points
- The lubrications points of the main bearing pin, and of the lift and compensating rams (above) are also positioned next to each other
- A lubrication plan on the window on the left provides an overview of all lubrication points and intervals

**Customer benefits:**

- Maintenance times are reduced to a minimum
- Safety for maintenance personnel is increased



## 11.4 Test connections for customer service



### Description:

In order to avoid downtimes during maintenance and repair work, all measurement connections of the drive and the operating hydraulics are installed at the front. This allows the service technician to operate the machine from the cabin and to read the measurement results at the same time.

### Customer benefits:

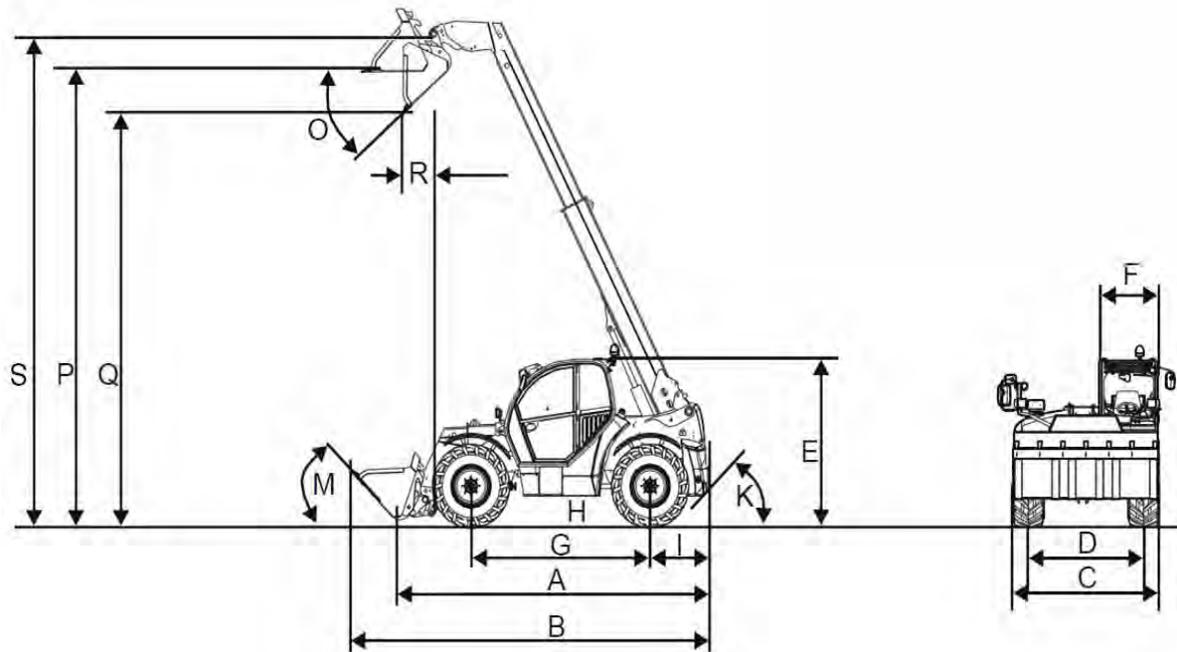
- Maintenance times are reduced to a minimum
- Repair costs are reduced





## 12 Technical data

### 12.1 Dimensions



#### Platform 415

Dimensions	3007	3507	4007
A – length incl. quickhitch (mm)	4880	4880	4880
B – length with standard bucket (mm)	5600	5600	5600
C – width (with standard tyres) mm	2285	2285	2285
D – track width mm	1880	1880	1880
E – height up to cab roof (mm)	2310	2310	2310
F – width of cabin (mm)	990	990	990
G – wheelbase (mm)	2850	2850	2850
H – ground clearance mm	415	415	415
I – distance centre of rear wheel to rear end (mm)	830	830	830
K – rear departure angle	60°	60°	60°
M – tilt-in angle (bucket)	49°	49°	49°
O – tilt-out angle (bucket)	41°	41°	41°
P – load-over height with standard bucket (mm)	6820	6820	6820
Q – tilt-out height (mm)	6330	6330	6330
R – tilt reach with standard bucket (mm)	110	110	110
S - quickhitch plate pivot point mm	7335	7335	7335



**Platform 416**

Dimensions	4407	5007	5507	4209	5509
A – length incl. quickhitch (mm)	4985	4985	4985	5600 - 5890	5600 - 5890
B – length with standard bucket (mm)	Up to 6160	Up to 6160	Up to 6160	Up to 6690	Up to 6690
C – width (with standard tyres) mm	2500	2500	2500	2500	2500
D – track width mm	1995 - 2065	1995 - 2065	1995 - 2065	1995 - 2065	1995 - 2065
E – height up to cab roof (mm)	2570	2570	2570	2570	2570
F – width of cabin (mm)	990	990	990	990	990
G – wheelbase (mm)	2950	2950	2950	3150	3150
H – ground clearance mm	418	418	418	418	412
I – distance centre of rear wheel to rear end (mm)	950	950	950	950 - 1100	950 - 1100
K – rear departure angle	36.5°	36.5°	36.5°	46°	32°
M – tilt-in angle (bucket)	45°	45°	45°	45°	45°
O – tilt-out angle (bucket)	41°	41°	41°	41°	41°
P – load-over height with standard bucket (mm)	6835	6835	6835	8498	8498
Q – tilt-out height (mm)	6183	6183	6183	7-997	7997
R – tilt reach with standard bucket (mm)	495	495	495	63	63
S - quickhitch plate pivot point mm	7409	7409	7409	9083	9083



## 12.2 Operational data

### Platform 415

Operational data	3007	3507	4007
Max. payload kg (DLC 500 mm)	3000	3500	4000
Max. pallet height (mm)	7000	7000	7000
Dead weight (kg)	5920 - 7250	6170 - 7500	6810 - 7850
Turning radius between kerbs (mm)	3840	3840	3840
<b>Engine</b>			
Product	Deutz		
Type/design	TCD 3.6 L4		
Output (kW/hp)	100/136		
Max. torque (Nm)	500		
Displacement (cm <sup>3</sup> )	3621		
Exhaust-emission level	Level IV		
Exhaust after-treatment	DOC+SCR		
Operator-perceived noise emission (dBA)	79		
<b>Power transmission</b>			
Travelling drive (option)	Hydrostat	Hydrostat (ecospeed)	Hydrostat (ecospeed)
Speed (kph) (option)	0-30 (0-20)	0-30 (0-20 / 0-40)	
Axles	Planetary steering and drive axle		
Total oscillation angle	20°		
Differential lock	45% Self-locking differential in front axle		
Service/parking brake	Foot-operated, hydraulic disc brake / hand-operated, mechanical disc brake		
Standard tyres	405/70-24		
<b>Steering and work hydraulics</b>			
How it works	Hydrostatic four wheel, crab steering and front-wheel steering		
Maximum steering angle	2x38°		
Work pump	Gear pump with LUDV (flow distribution independent of load pressure)	Load Sensing	
Flow rate l/min (option)	100	140	



Pressure (bar)	260		
<b>Kinematics</b>	<b>3007</b>	<b>3507</b>	<b>4007</b>
Bucket capacity (m <sup>3</sup> )	1.0-2.0		
Overall tilt angle of quickhitch	155°		
Payload at max. lift height (kg)	2000	2200	2400
Payload at max. reach (kg)	1000	1200	1500
Lift height at maximum load (mm)	5500	5220	4500
Reach at maximum load (mm)	1780	1680	1720
Max. reach (pallet forks) (mm)	3760	3760	3760
<b>Capacities</b>			
Fuel tank l	100	100	100
DEF - Urea tank l	9.5	9.5	9.5
Total amount for hydraulic system l	170	170	170
<b>Cycle times</b>			
Lift ram (raise/lower) (sec)	8/6	6/5	6/5
Push-out ram (retract/extend) (sec)	8/7	8/7	8/7
Quickhitch (tilt in/tilt out) (sec)	4/4	4/4	4/4
<b>Electrical system</b>			
Operating voltage (V)/battery	12 V/135 Ah 900 A		
Alternator (A)	12 V 95 A		
Starter (kW)	3.2		



## Platform 416

Operational data	4407	5007	5507	4209	5509
Max. payload kg (DLC 500 mm)	4400	4800	(5500)	4200	(5500)
Max. payload kg (DLC 600 mm)	-	-	4990	-	4990
Max. pallet height (mm)	7017	7017	7017	8750	8750
Dead weight (kg)	8000 - 9000	9000 - 10,000	9000 - 10,000	9000 - 10,500	10,000 - 11,000
Turning radius between kerbs (mm)	3755	3755	3755	4415	4350
<b>Engine</b>					
Product	Deutz				
Type/design	TCD 3.6		TCD 4.1 L4		
Output (kW/hp)	100/134		115/156		
Max. torque (Nm)	500		609		
Displacement (cm <sup>3</sup> )	3621		4038		
Exhaust-emission level	Level IV				
Exhaust after-treatment	DOC+DPF		DOC + DPF + SCR		
Operator-perceived noise emission (dBA)	78				
<b>Power transmission</b>					
Travelling drive (option)	ecospeed	ecospeed (ecospeedPR O)	ecospeedPR O	ecospeed (ecospeedPR O)	ecospeedPRO
Speed (kph) (option)	0-40 (0-30 / 0-20)				
Axles	Planetary steering and drive axle				
Total oscillation angle	20°				
Differential lock	100% switchable				
Service/parking brake	Foot-operated hydraulic dual-circuit power brake (discs in both axles)/ electro-hydraulic multi-disc parking brake				
Standard tyres	460/70R24				



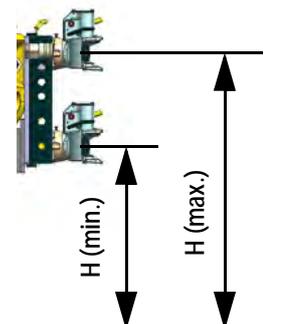
<b>Steering and work hydraulics</b>	<b>4407</b>	<b>5007</b>	<b>5507</b>	<b>4209</b>	<b>5509</b>
How it works	Hydrostatic four wheel, crab steering and front-wheel steering				
Maximum steering angle	2x38°				
Work pump	Load Sensing				
Flow rate l/min (option)	140	140 (187)	187	140 (187)	187
Pressure (bar)	260				
<b>Kinematics</b>					
Bucket capacity (m <sup>3</sup> )	1.2-3.0		1.2-4.0	1.2-3.0	1.2-4.0
Overall tilt angle of quickhitch	152°				
Payload at max. lift height (kg)	3300	3500	4000	4200	1300-4990*
Payload at max. reach (kg)	1500	1700	2000	1500	2200
Lift height at maximum load (mm)	5200	5600	5500	8750	5000 – 8750*
Reach at maximum load (mm)	1600	1700	1890	2000	2400
Max. reach (pallet forks) (mm)	3790	3790	3900	4790	4790
<b>Capacities</b>					
Fuel tank l	180	180	180	180	180
DEF - Urea tank l	13	13	13	13	13
Total amount for hydraulic system l	190	190	190	190	190
<b>Cycle times</b>					
Lift ram (raise/lower) (sec)	6.5/5	6.5/5	6.5/6	9.4/7.5	9.4/7.5
Push-out ram (retract/extend) (sec)	6/7	6/7	6/6	7.1/8.3	7.1/8.3
Quickhitch plate for empty shovel/tilt in functions, sec.	3.5/3.0	3.5/3.0	3.5/3.0	4.0/3.4	4.0/3.4
<b>Electrical system</b>					
Operating voltage (V)/ battery	12 V 135 Ah 900 A				
Alternator (A)	12 V 95 A		12 V 150 A	12 V 95 A	12 V 150 A
Starter (kW)	3.2		4.0	3.2	4.0
*With hydraulic frame levelling and oscillating axle interlock					



### 12.3 Technical information of trailer couplings

Machine model		Coupling type	Fixed height	H (min.) <sup>1</sup>	H (max.)	Driving license category <sup>2</sup>
<b>3007</b> <b>3507</b> <b>4007</b>	M_ZUAUSR_119	Trailer coupling automatic fix	820			C1E/CE L / T
			900			
	M_ZUAUSR_162	Trailer coupling automatically height-adjustable		675	1048	
	M_ZUAUSR_070	Ball head coupling		654	1027	
	M_ZUAUSR_120	Autohitch		-105	555	
	M_ZUAUSR_227	Trailer coupling Mechanical FR / ES / PT / CH		675		
	M_ZUAUSR_228	Trailer coupling Piton		630	1003	
M_ZUAUSR_237	Cuna 3D coupling		620	993		
<b>4407</b> <b>5007</b> <b>5507</b> <b>4209</b> <b>5509</b>	M_ZUAUSR_119	Trailer coupling automatic fix	755			C1E/CE L / T
			835			
			915			
	M_ZUAUSR_162	Trailer coupling automatically height-adjustable		685	1058	
	M_ZUAUSR_070	Ball head coupling		665	1038	
	M_ZUAUSR_120	Autohitch		-170	488	
	M_ZUAUSR_227	Trailer coupling Mechanical FR / ES / PT / CH		685		
	M_ZUAUSR_228	Trailer coupling Piton		636	1009	
M_ZUAUSR_237	Cuna 3D coupling		630	1003		

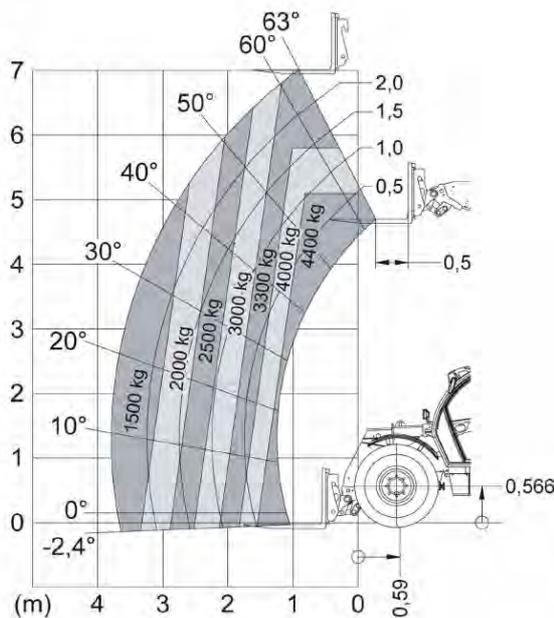
- In each case, the values indicate standard tyres 3007/4007 (405/70-20) and 4407-5509 (460/60-24), in the case of optional tyres, the height may vary
- All driving licence specifications are based on the German driving licence regulations (FeV). A C1E driver's license is sufficient, provided the gross weight of the vehicle + trailer < 12000 kg and the permissible gross weight rating of the trailer is < than the kerb weight of the tractor. Otherwise, driving licence category CE is required. For agricultural activities, the following regulations apply: self-propelled work machines up to 25 km/h may be operated with the category L. Tractors without attached trailer up to 40 km/h, with trailer up to 25 km/h. For self-propelled work machines over 25 km/h or vehicle combinations with tractors over 25 km/h requires the driving licence category T. This information applies solely to Kramer machines and does not automatically apply to the machines of other manufacturers.



## 12.4 The meaning of load capacity diagrams



Vehicle on the tilting platform



Load capacity diagram with pallet fork 4407

The stability is identified according to the Telehandler Directive DIN EN 1459 Enclosure B. These values are neatly presented in the load capacity diagram.

Standardised stability tests are conducted lengthwise and crosswise on a hydraulic tilting platform. In doing so, the angle of the tilting platform varies between 6 and 50%. This is supposed to simulate different application situations such as stacking works or transport drives. The load capacity diagram compiles all these measurements. Thus the load capacity diagram lists the maximum machine performance at given lift height and reach at which it operates safely.

- Factors that influence the load capacity diagram:

- Load centre:

The further the load centre moves away from the vehicle, the smaller the maximum load becomes which the machine can operate. Under testing conditions, usually, a load centre of 500 mm is employed (corresponds to half a Euro pallet). With payloads over 5000 kg, the value is increased to 600 mm as it is assumed that the load no longer fits onto a commercially available Euro pallet.

- Attachment:

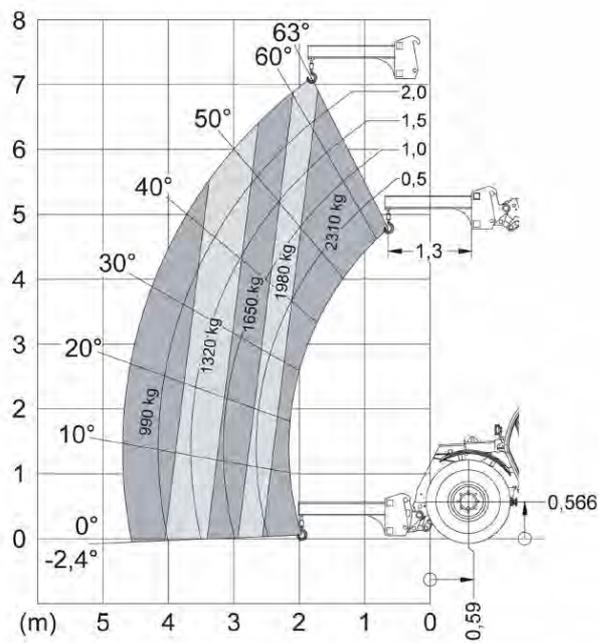
Each of the form, the dead weight, and the load centre of the attachment influence the load capacity diagram. In principle, the load capacity diagram applies to the pallet fork. If the characteristics of a released attachment deviate strongly from the pallet fork, it has a separate load capacity diagram. An example for this is the crane jib.

- Tyres :

The machine's tyres substantially influence the stability of the machine. Particularly the lateral stability against tipping over is strongly influenced by the tyre carcass. If the tyre has a soft carcass, the stability against tipping over is lower than with a solid carcass structure. According to norm DIN EN 1459, the load capacity diagram is created using the most unstable tyres for the corresponding vehicle.

- Options (dead weight, distribution of weight):

The load diagram is created using measurements from a standard machine without additional options. If the vehicle is equipped with additional options, generally speaking, the gross weight rating increases and the stability against tipping over is improved.



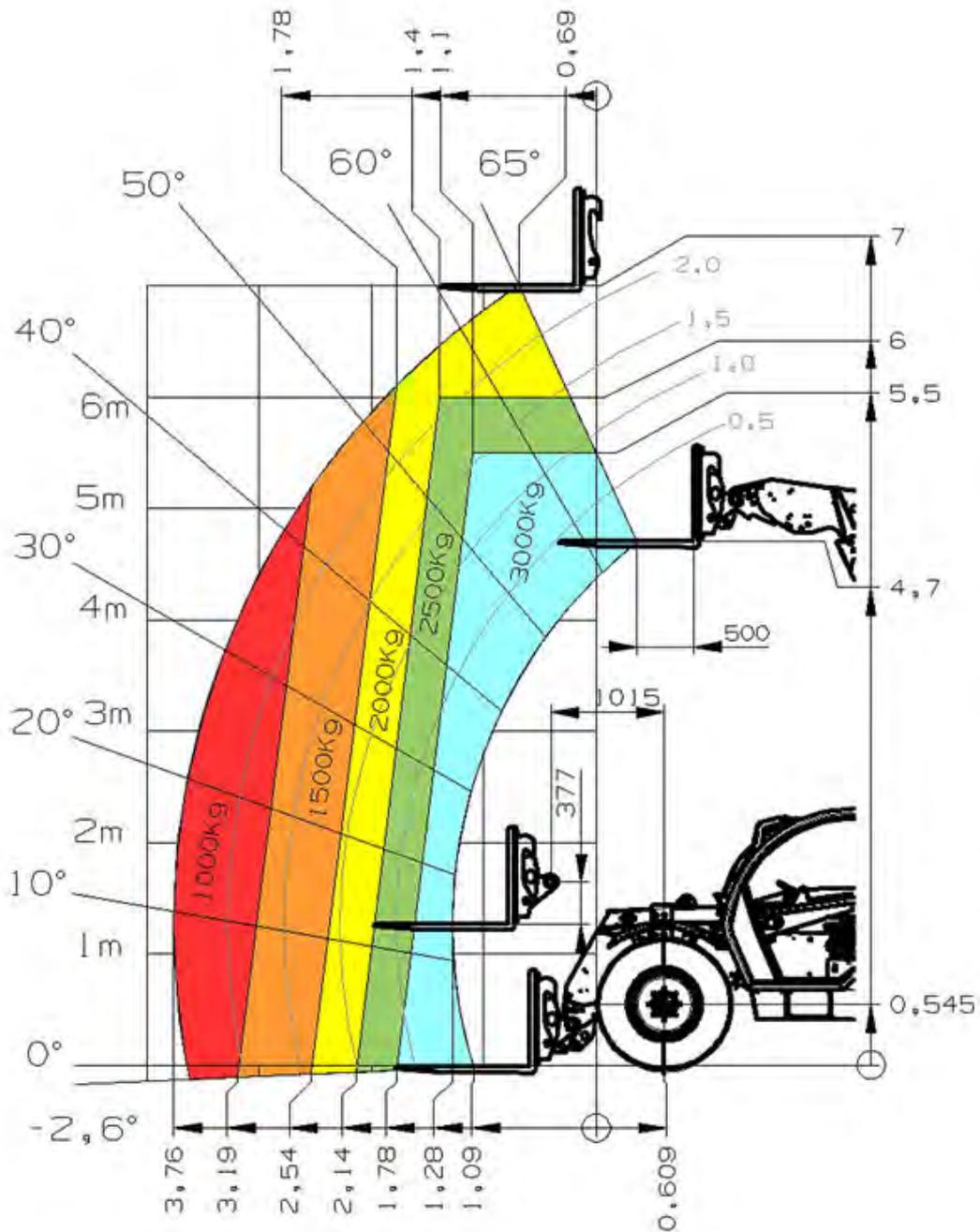
Load capacity diagram with load hook 4407

■ Oscillating-axle interlock and frame levelling:

Some options directly influence stability. These include particularly the oscillating-axle interlock (mechanical for 4407 to 5509 or hydraulic for the 5509) and the hydraulic frame levelling for the front axle (5509). Particularly in the higher lift area, these options strongly influence the load diagram. Several load capacity diagrams were created to exhibit this influence of the options under testing conditions.

## 12.5 Load diagram 3007

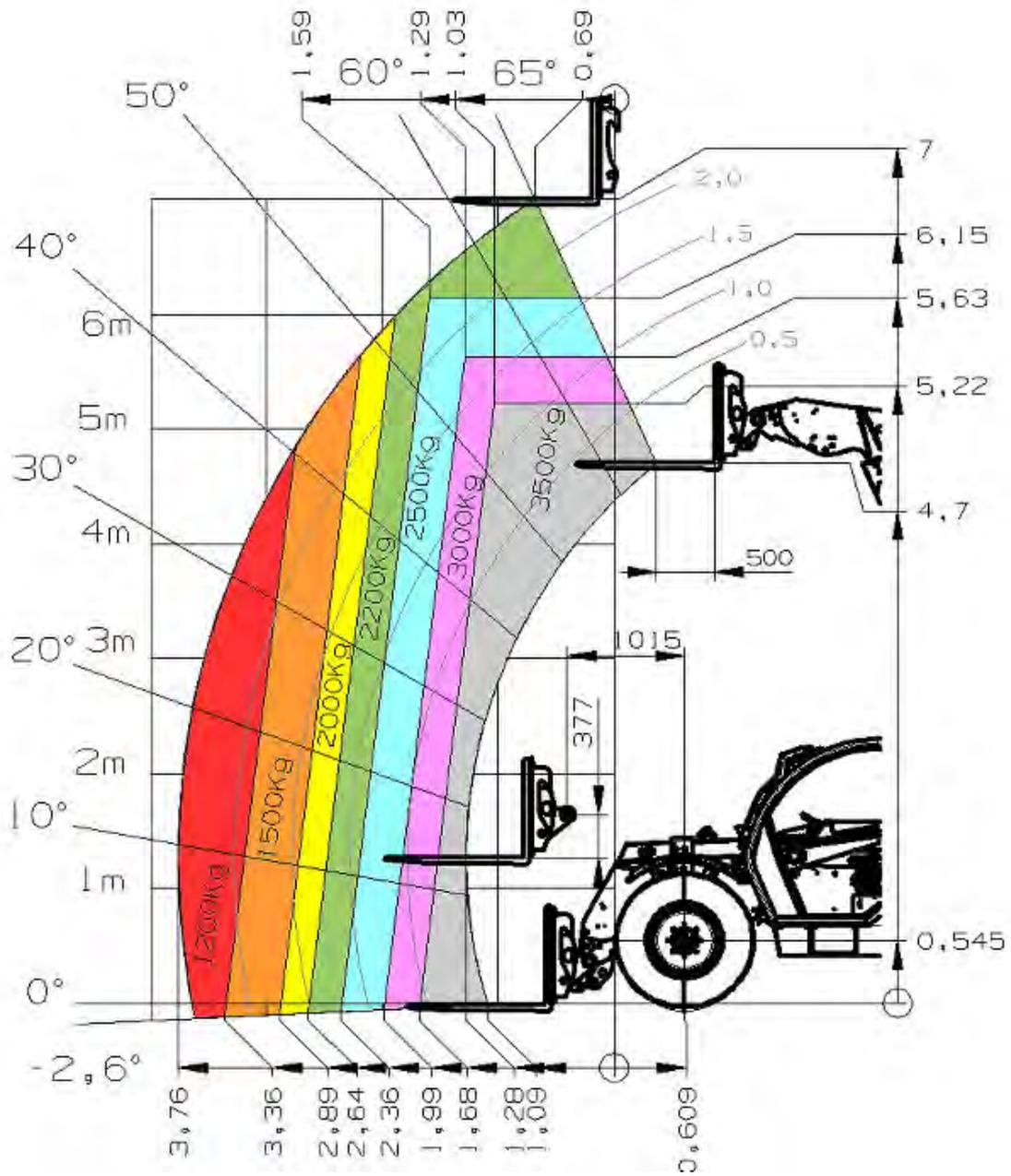
Load centre 500 mm





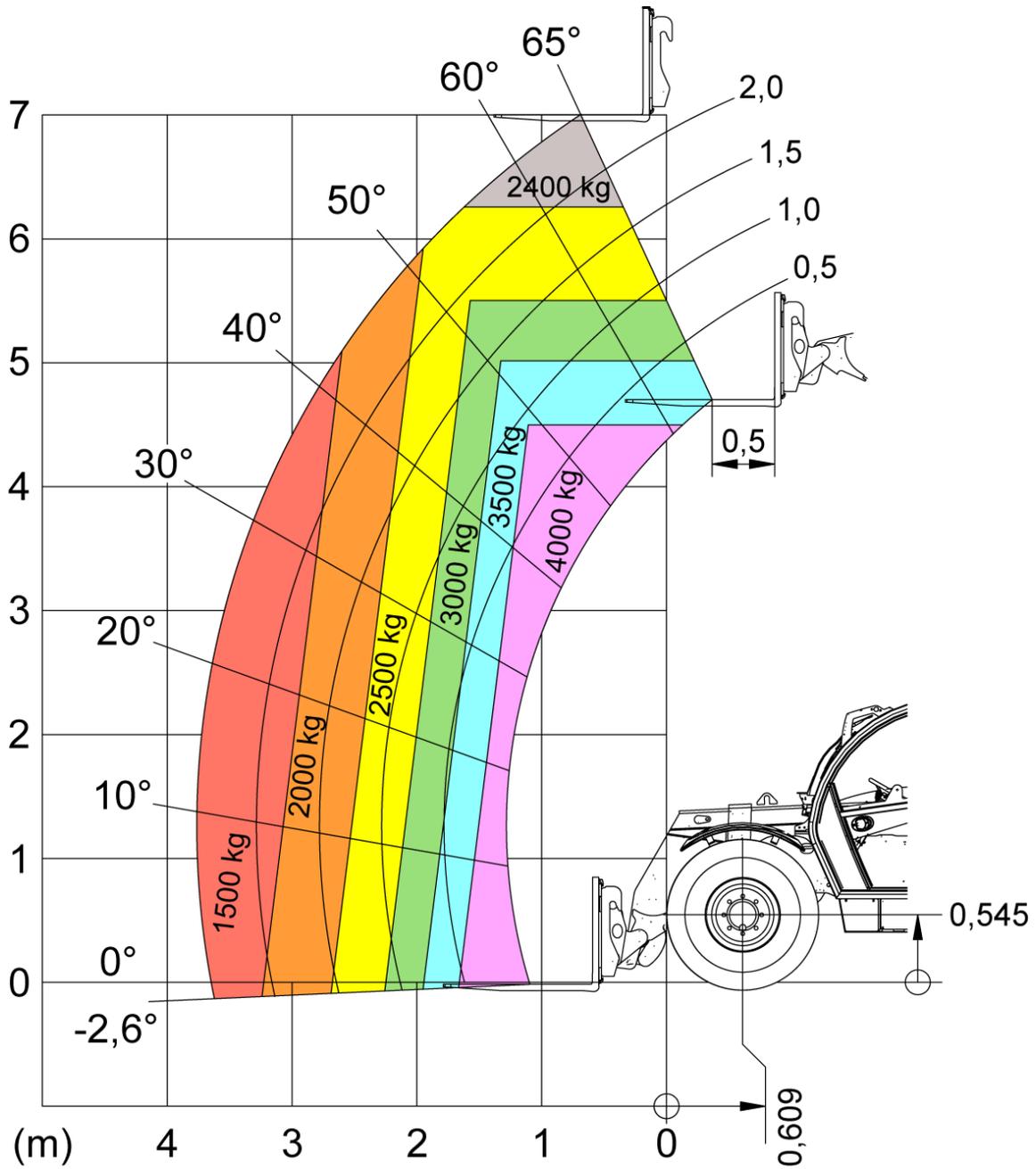
### 12.6 Load diagram 3507

Load centre 500 mm



### 12.7 Load diagram 4007

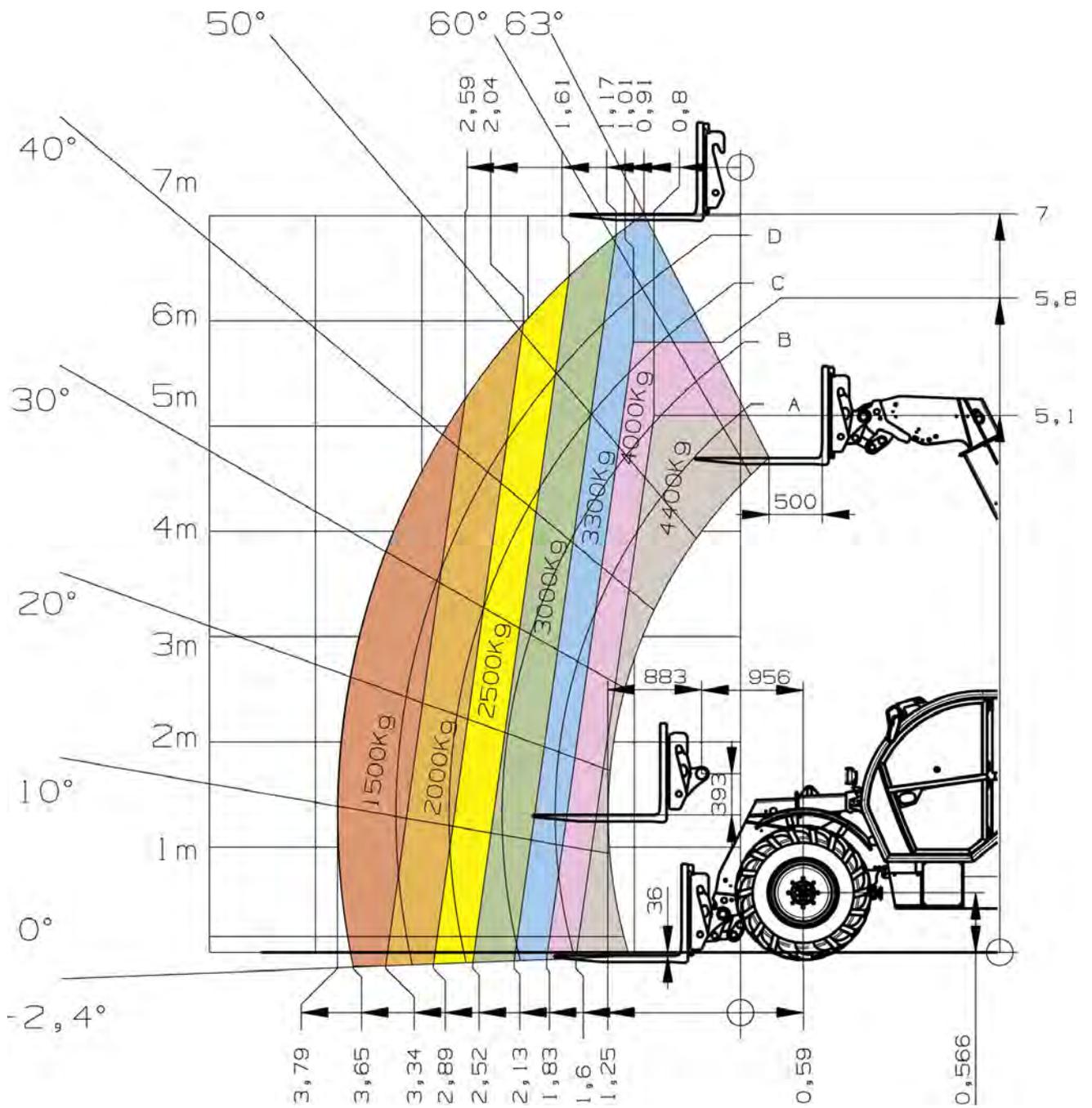
Load centre 500 mm





### 12.8 Load diagram 4407

Load centre 500 mm

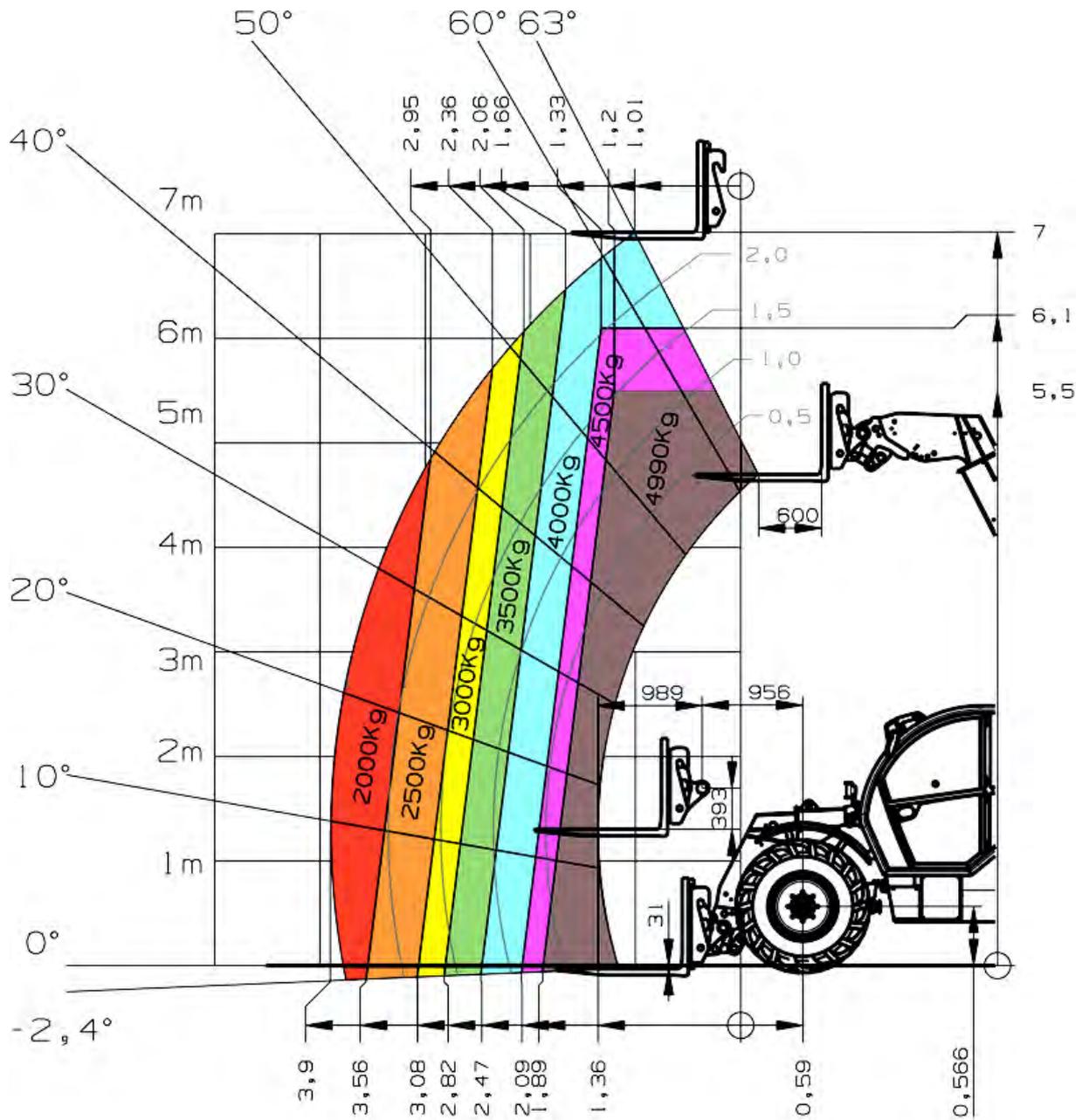






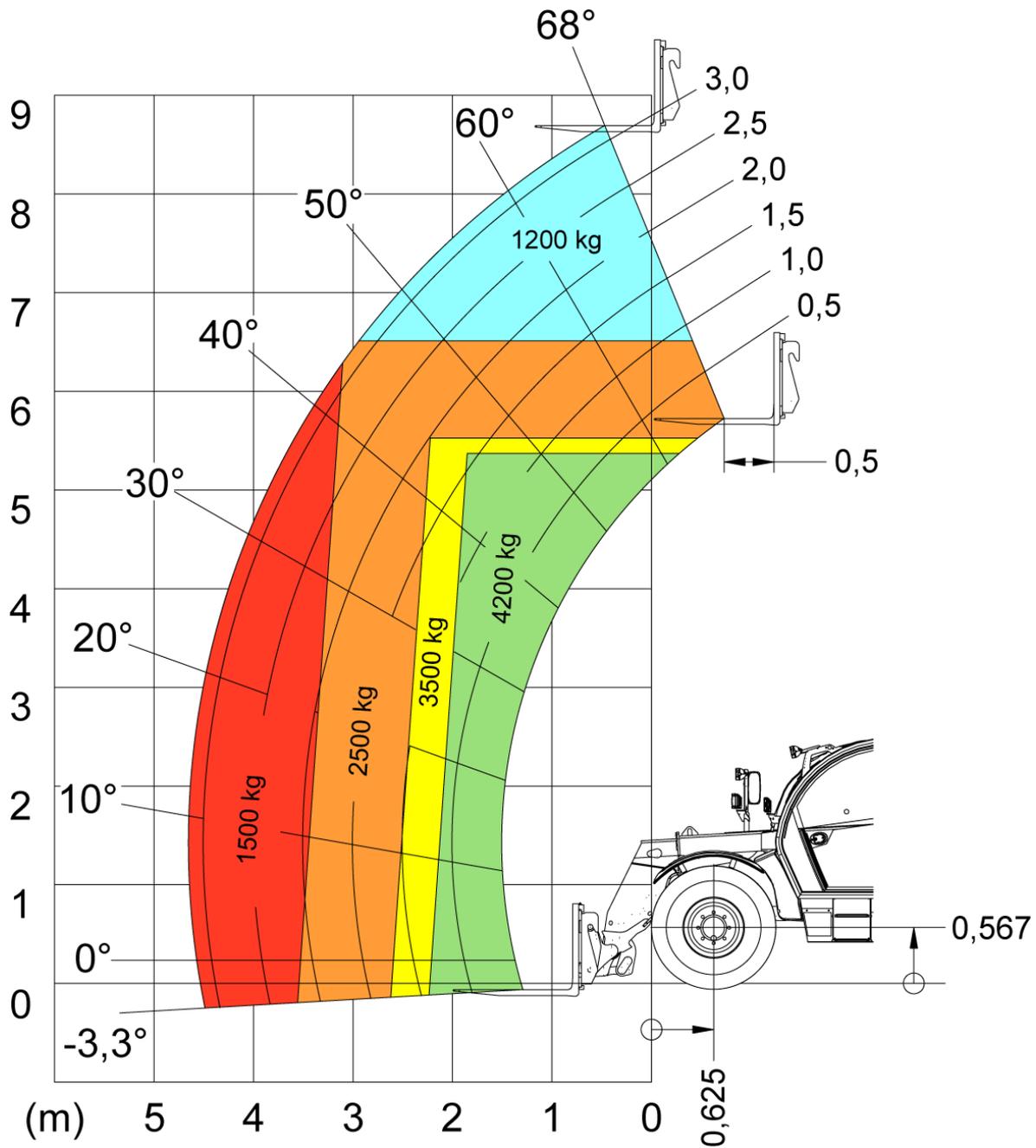
### 12.10 Load diagram 5507

Load centre 600mm



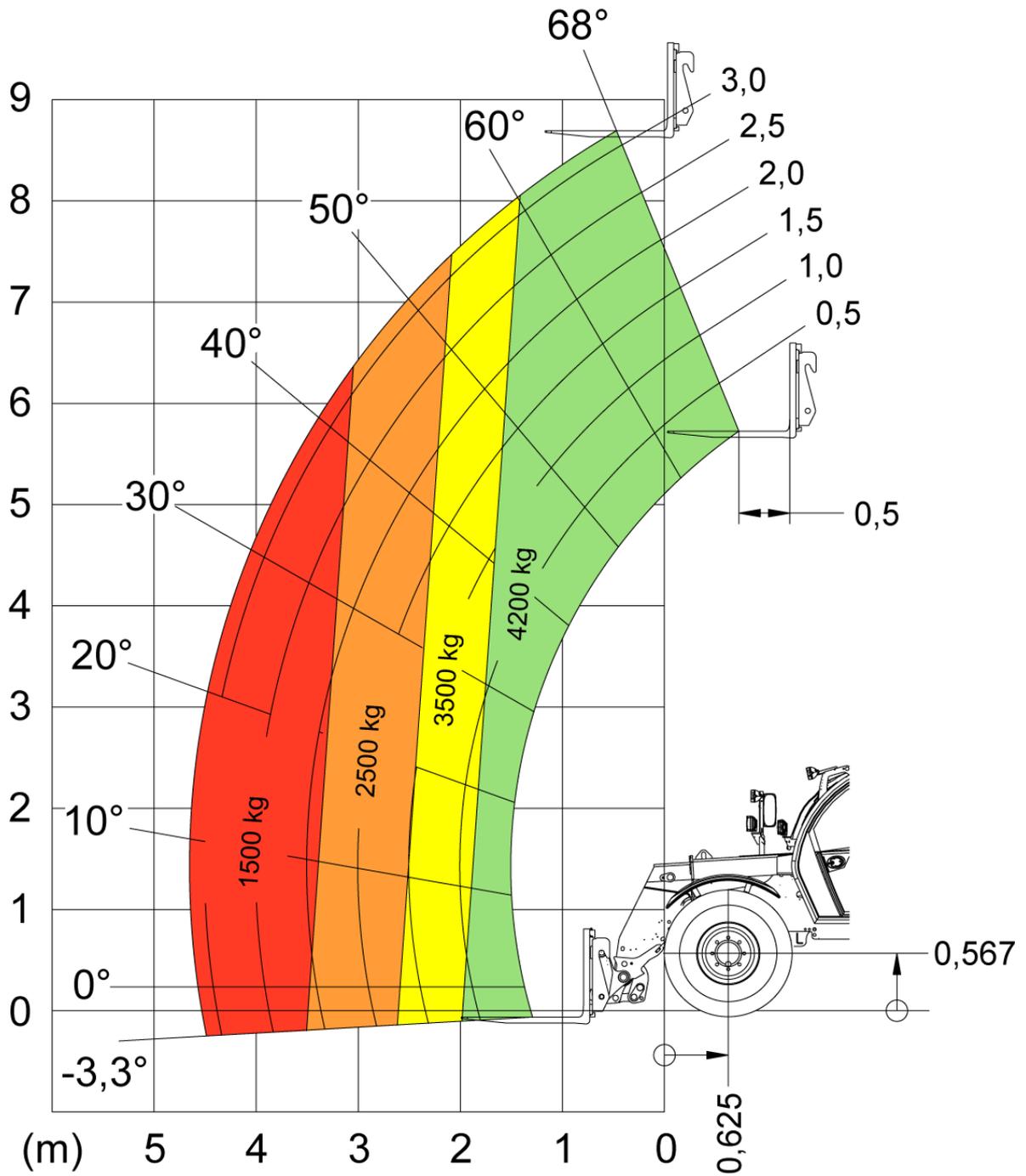
### 12.11 Load-bearing diagram 4209

Load centre 500 mm without oscillating-axle interlock



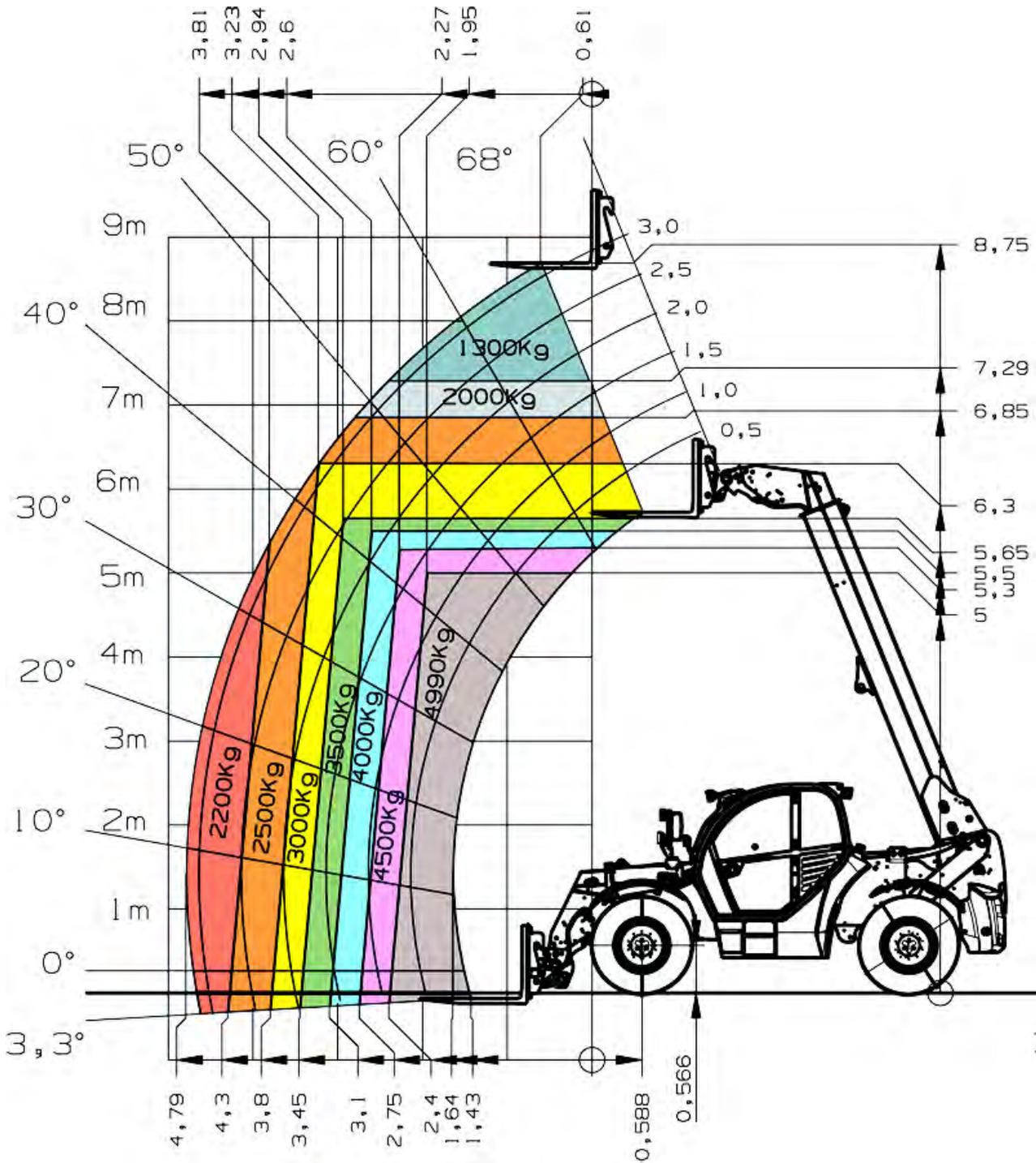


4209: Load centre 500 mm with oscillating-axle interlock



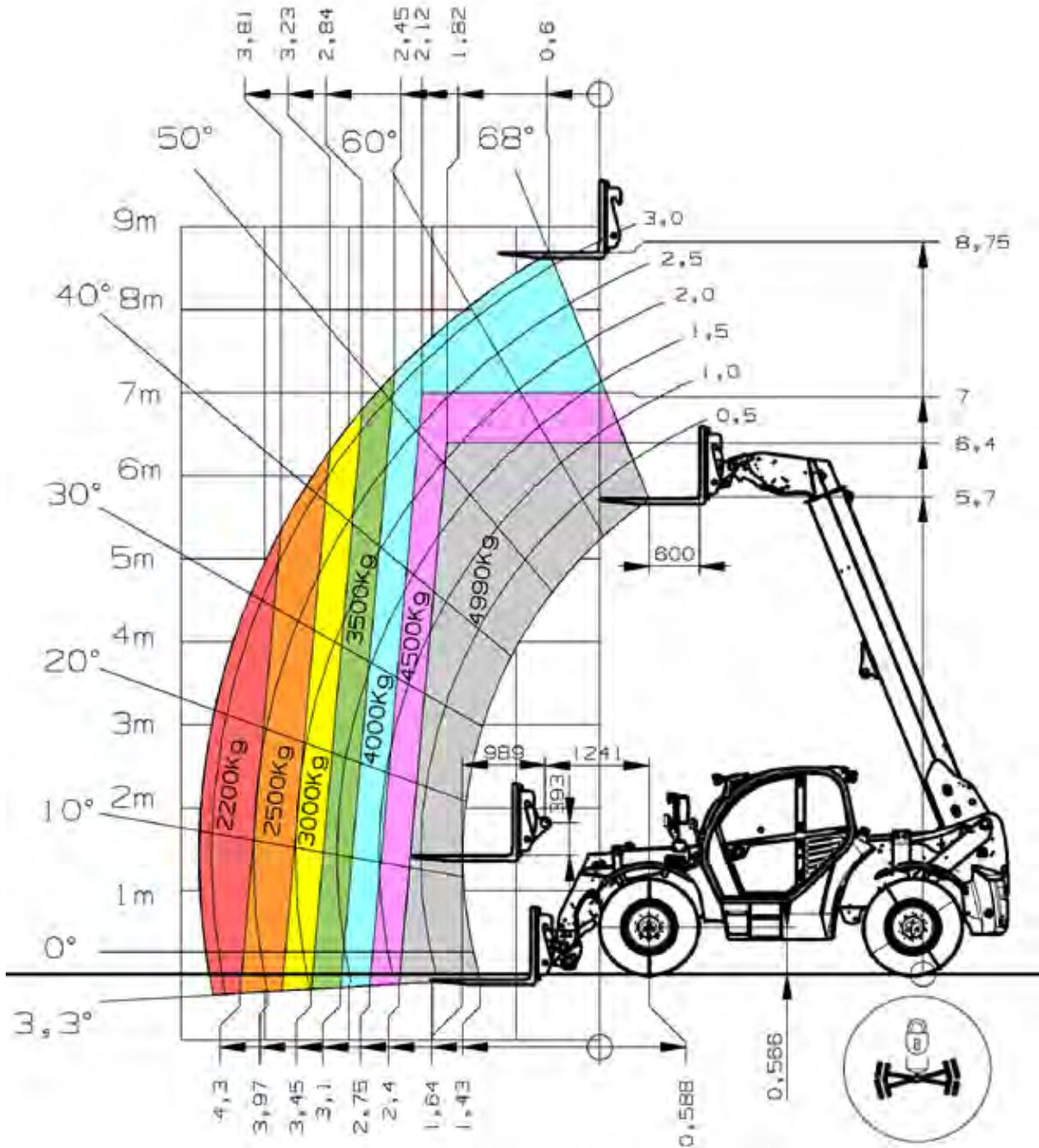
### 12.12 Load-bearing diagram 5509

Load centre 600 mm, without frame levelling, without oscillating-axle interlock

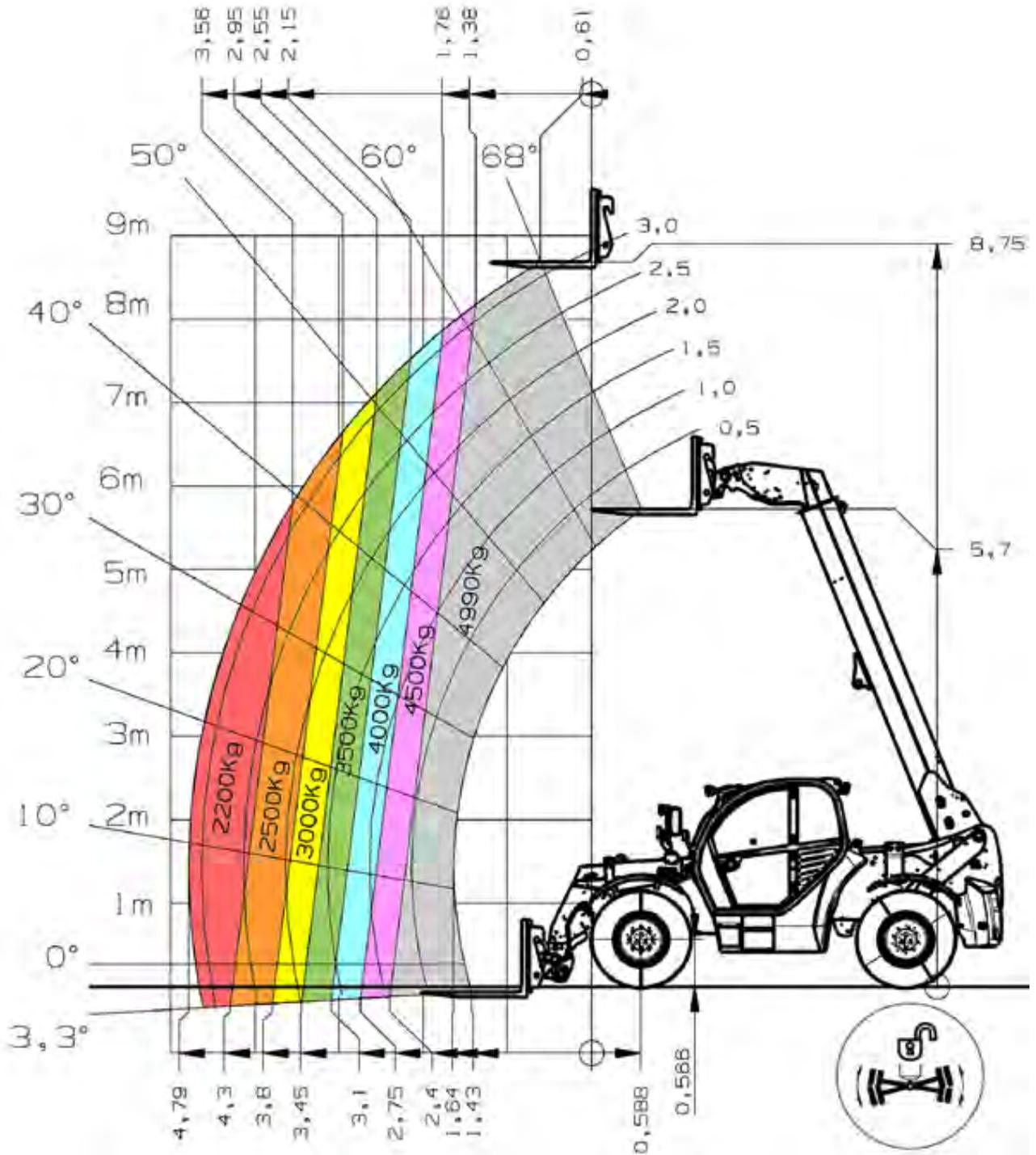




5509: Load centre 600 mm, without frame levelling, with oscillating-axle interlock

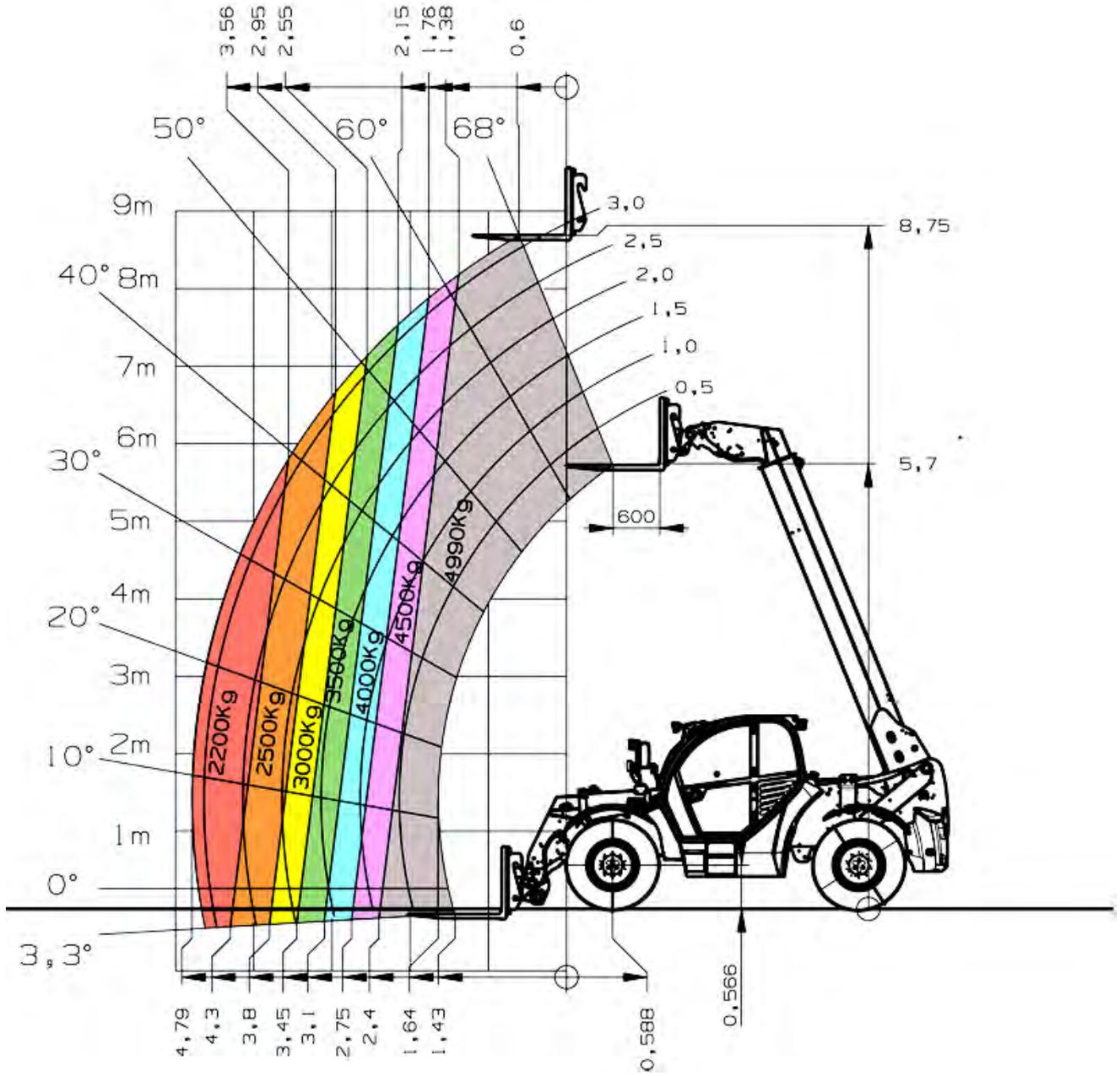


**5509: Load centre 600 mm, with frame levelling, without oscillating-axle interlock**





5509: Load centre 600 mm, with frame levelling, with oscillating-axle interlock







# A Appendix: technical information on the engine

## A.1 General information on emissions legislation

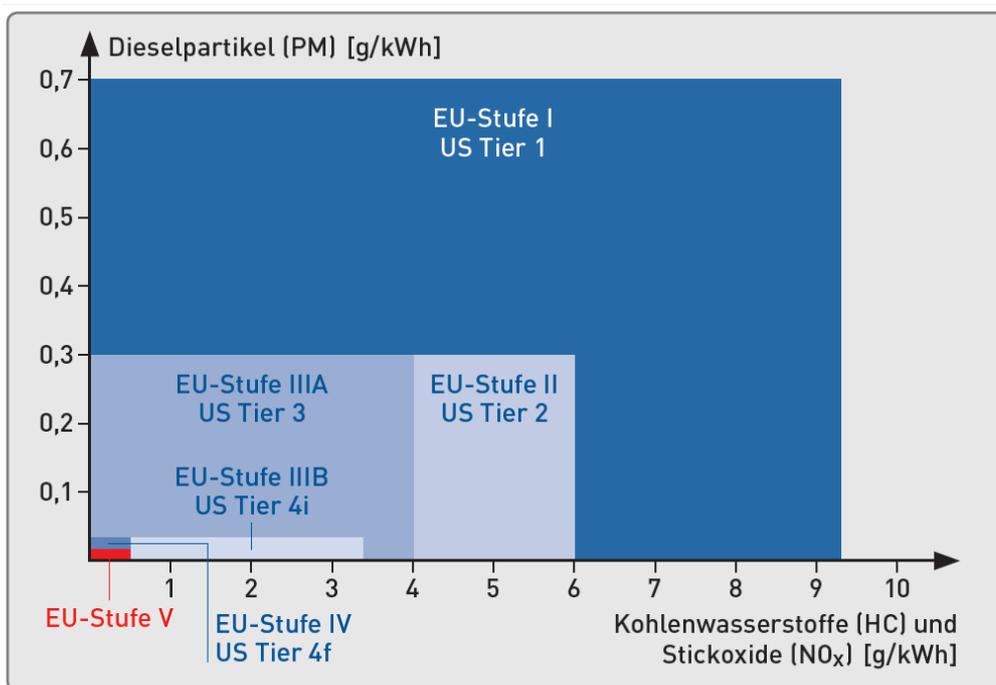
In the performance class relevant for construction and agricultural machines there are six different tiers that are decisive for the date of introduction or for the maximum emission of pollutants in g/kWh. If on this specified date the provisions of the new emission category are not yet met, the so-called prebuild engine regulation can be applied. It permits manufacturers to install engines of the previous emission stage up to 18 months after the new emissions standard has come into force as long as these "built-in engines" were verifiably manufactured in the legal period of the previous emissions stage.

Up to emissions stage IV, the emission standards still specify that the same tier must be fulfilled in all performance classes. The emissions stage V is the first to comprise performance ranges from 0 kW. From 0 kW to 56 kW, stage V enters into force at the beginning of 2019, for engines between 56 kW and 130 kW at the beginning of 2020.

- For engines from 0 to < 19 kW, stage IIIB is the currently valid emission stage (with prebuild engine regulation without directive)
- For engines 19 to < 37 kW, stage V is the currently valid emission stage (with prebuild engine regulation stage IIIA)
- For engines 37 to < 56 kW, stage IIIB is the currently valid emission stage (with prebuild regulation stage IIIB)
- For engines 56 to < 130 kW, stage IV is the currently valid emission stage

EU (2004/26/EC)				2018	2019	2020	2021	2022
0	bis	8	kW	Keine Richtlinie	Produktion ohne Richtlinie Verkauf von Maschinen ohne Richtlinie		Stufe V	
8	bis	19	kW	Keine Richtlinie	Produktion ohne Richtlinie Verkauf von Maschinen ohne Richtlinie		Stufe V	
19	bis	37	kW	Stufe III-A	Produktion Maschinen Stufe III-A Verkauf von Maschinen Stufe III-A		Stufe V	
37	bis	56	kW	Stufe III-B	Produktion Maschinen Stufe III-B Verkauf von Maschinen Stufe III-B		Stufe V	
56	bis	75	kW	Stufe IV		Produktion Maschinen Stufe IV Verkauf von Maschinen Stufe IV		Stufe V
75	bis	130	kW	Stufe IV		Produktion Maschinen Stufe IV Verkauf von Maschinen Stufe IV		Stufe V

In recent years engine developments have been vigorously influenced by emissions legislation of the European Commission and the US Environment Agency. The more stringent emissions standards must be met sooner or later, depending on the engine capacity. When jumping from stage IIIA to stage IIIB, a reduction of diesel particulates and nitrogen oxides is required. From stage IIIB to stage IV, the nitrogen oxides are again reduced by about 80%. From emission stage IV, a “diesel only” system is no longer possible, across manufacturers. With the emission stage V the introduction of a particle concentration limit of  $1 \times 10^{12}$  kWh was added within the range of 19 kW – 130 kW. With the emission level V, using a Diesel particle filter will become mandatory.



**Terms for the various emissions levels**

In the past, there has been a constant mix-up of the classification policies of the European Commission and the US Environmental Protection Agency. The guidelines of the European Commission and the US Environmental Protection Agency may differ depending on the performance class. On the one hand, these differ due to the required limit values, on the other hand due to the designations of the exhaust gas levels.

**Example:**

EC – European Commission		EPA – US Environmental Protection Agency
		
EU		EPA
“Exhaust gas levels”		“Tier”

The European and American classifications are not synonymous. For the EU stage V, the limit value with particle mass (PM) of 0.015 g/kWh is more rigorous than Tier 4final with 0.02 g/kWh. In addition, stage V comes with a particle concentration limit (PN) of  $1 \times 10^{12}$  kWh. Such limit value does not exist with the Tier classification.

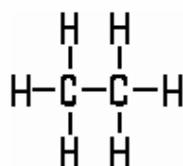
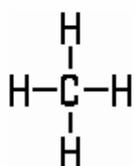
- The EU exhaust stage V emissions can thus cover all required limits of the US EPA classification Tier 4final.
- The US EPA classification **HOWEVER CANNOT** cover all required limit values of the EU exhaust emission level V.

**Particles (PM):**

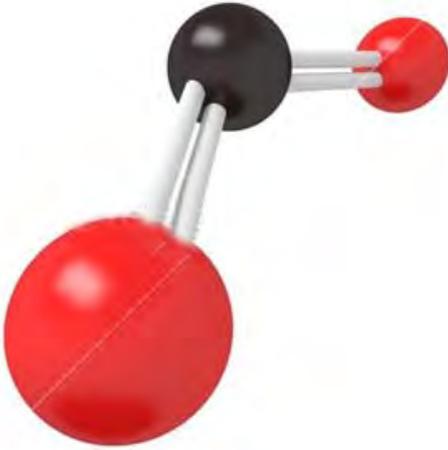
- Particles (PM) mainly refer to soot (carbon particles) and lubricant residues. They are formed during the combustion of diesel fuel but also when burning wood, for example. Particles produced during combustion are generally regarded as a health hazard, whereby the health risk increases with decreasing particle size.

**Nitrogen oxides (NOx):**

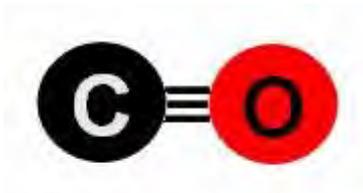
- Nitrogen oxide is a collective term that encompasses nitrogen monoxide (NO) and nitrogen dioxide (NO<sub>2</sub>). Nitrogen oxides are formed when the nitrogen and oxygen in the air react with one another at high temperatures and under high pressure during combustion.
- Nitrogen monoxide (NO) is a colourless gas comprising the elements nitrogen (N) and oxygen (O). In humans it dilates the blood vessels.
- Nitrogen dioxide (NO<sub>2</sub>) is a red-brown gas and is formed during combustion of fossil fuels. Nitrogen dioxide is toxic and is hardly perceptible at low concentrations. When nitrogen dioxide is inhaled it causes headaches and dizziness.

**Hydrocarbons (HC):**

- Hydrocarbons are a group of compounds formed from carbon and hydrogen and are mainly formed from incompletely combusted fuel and oil residues. The concentration of hydrocarbons in diesel fuel fumes is low and is lowered further by the use of high-quality fuels, more efficient combustion processes and emission treatment systems.
- One example of hydrocarbons is methane which is classified as a greenhouse gas and is regarded as damaging to the climate.
- When hydrocarbons are combusted once more, for example by an exhaust-gas recovery system, steam and carbon dioxide are produced (CO<sub>2</sub>).

**Carbon dioxide (CO<sub>2</sub>):**

- Carbon dioxide is one of two natural products of combustion; the other is water. CO<sub>2</sub> is a contributing factor in the greenhouse effect that influences our climate.
- CO<sub>2</sub> is non-toxic and the quantity produced is directly proportional to fuel consumption. Combustion of one litre of diesel fuel (0.83 kg) produces approx. 2.6 kg CO<sub>2</sub>. The increase in weight results from the inclusion of oxygen from the atmosphere.

**Carbon monoxide (CO):**

- Carbon monoxide is a compound of carbon and oxygen that is produced during incomplete combustion and lack of air.
- Carbon monoxide is a colourless, tasteless, odour-free and toxic gas.
- Diesel engines generally run with large volumes of excess air and therefore normally only emit low volumes of carbon monoxide.
- Carbon monoxide is combustible and is burned with oxygen with a blue transparent flame to produce carbon dioxide



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Technical data, dimensions and weights are only given as an indication.

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