Translation of the
Original Operating Manual
euro-Maus 4

Edition 1

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ROPA

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Superior class.

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Chapter 0

Preface

0 Preface

We congratulate you on the purchase of your new ROPA machine. Please take the time and thoroughly read the operating manual. The operating manual is mainly directed at the machine operator. It contains all information required for safe operation of this machine, informs about safe handling and gives hints on practical use as well as for self-help and servicing. The respective safety information is based on the safety, accident prevention and health protection regulations applicable at the time of printing of this operating manual. In case of questions about the machine, on operation of the machine or on ordering of spare parts, please contact the dealer in your vicinity or the manufacturer directly:

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Important information

– Original ROPA parts have been especially developed for your machine. They conform to the high ROPA standards for safety and reliability. We would like to point out that parts and accessories not approved by ROPA may not be used on ROPA machines, because otherwise the safety and operability of the machine may be impaired. We cannot assume any responsibility for such installations, additions or reconstructions. In case of unauthorized modifications to the machine, any warranty claim lapses! Furthermore, the Declaration of Conformity (CE Marking) or regulatory approvals can be declared ineffective. This also applies if seals or sealing wax applied by the factory are removed.

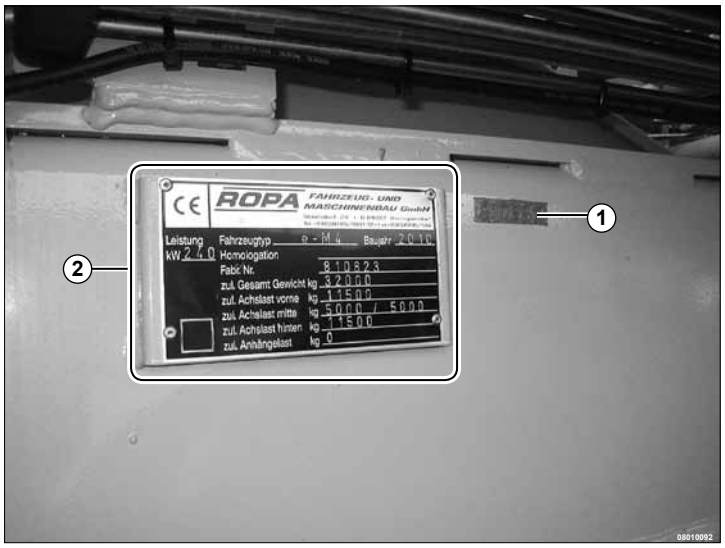
Warning! *In rare cases, massive interference of vehicle electronics or malfunctions of the machine may occur due to operation of improperly installed electronic appliances (for instance, radios or other appliances emitting electromagnetic radiation). In case of such interference, the complete machine may suddenly stop operating or execute unwanted functions. In such cases, immediately shut off the sources for interference and immediately shut down the machine. If needed, notify the company ROPA or the nearest authorized customer service of ROPA.*

- Servicing and specific maintenance work on the engine may only be performed by companies or persons expressly authorized for this purpose by Mercedes-Benz. This work must be acknowledged accordingly in maintenance vouchers of Mercedes-Benz by these persons or companies. Without these maintenance vouchers properly completed, any warranty or statutory warranty of the engine manufacturer lapses.
- We expressly reserve the right to make technical modifications for the purpose of improving our machines or increasing the safety standards – even without specific notification.
- All information about directions given in this operating manual (front, rear, right, left) are in relation to the driving direction forward.
- Please always state the chassis number of the machine for any orders for spare parts and technical inquiries. You will find the chassis number on the name plate and on the vehicle chassis above the name plate.
- Please have the machine serviced according to regulations. Comply with the information given in this operating manual and have parts subject to wear replaced in due time respectively ensure timely repairs. Have the machine services respectively repaired according to regulations.
- Employ the decades of experience collected by ROPA in sugar beet lifting and loading technology and implemented in this machine, by correct operation of this machine. Remember that any neglect in maintenance and servicing inevitably leads to loss of performance and therefore to loss of time.
- Listen for suddenly occurring, unusual noises and have their cause remedied before the machine is operated further, since otherwise heavy damage or costly repairs to the machine may be caused.
- Generally comply with the respective applicable regulations for road traffic and the applicable regulations on occupational health and safety.

We expressly point out that any damage caused by the fact that this operating manual is not or not completely complied with is in no case covered by the guarantee respectively statutory warranty of ROPA. Even though this operating manual is comprehensive, in your own interest you should completely and carefully read it and slowly attain familiarity with the machine using this operating manual.

0.1 Name plate and important data

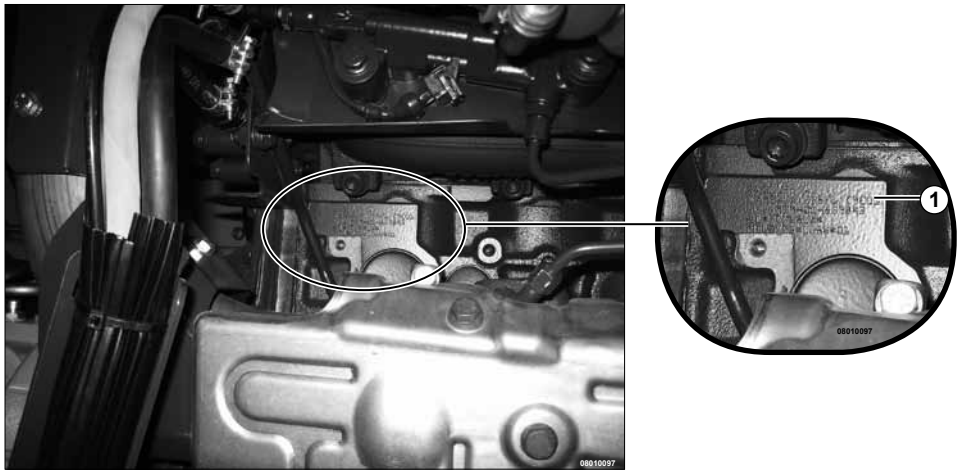
The name plate (**2**) of **euro-Maus4** is located on the right side of the vehicle, on the vehicle frame near the front wheel below the factory number (**1**).



Please enter the data for your machine in the following image of the name plate. You will need this data for ordering spare parts.

0.2 Serial number of diesel engine

The serial number (**1**) of the engine is located at the top of the engine block below the exhaust manifold.



Chapter 1

Safety

1 Safety

1.1 General description

The **euro-Maus4** has been manufactured according to the current state of technology and been tested for safety.

The machine is CE compliant and therefore conforms to the respective European regulations for free movement of goods within the European Union respectively the European economic region.

Modifications to this machine may only be performed with the express approval of the manufacturer, since otherwise the manufacturers warranty lapses. In addition, the road traffic registration may lapse and other registrations of the machine may become invalid.

The operating manual supplied must be strictly observed. The manufacturer shall not be liable for damage caused by incorrect handling, inappropriate application or incorrect repairs respectively missing maintenance and service carried out by the customer. The machine may only be operated in a technically perfect condition, for its intended purpose and with due consideration of the risks involved

1.2 Obligations of the entrepreneur

The entrepreneur employing the machine, respectively his agent, is obliged:

- to observe the applicable European work and safety regulations.
- to instruct the machine operators about their special obligation for safe driving of the machine. These instructions must be given anew before the start of each season. Records must be prepared about giving of these instructions, which must be signed by the entrepreneur and the instructed machine operator. These records must be kept for at least one year by the entrepreneur.
- before first use of the machine, to instruct the machine operators about operation respectively about safe handling of the machine.

Forms for these instructions may be found in Chapter 9 of this operating manual (documentation of instructions given to the driver). When needed, please copy these forms before completing them.

1.3 General symbols and instructions

The following symbols are used for safety instructions in this operating manual. They serve as a warning against possible personal injury or material damage, or provide help in facilitating work.

Danger! This symbol warns of imminent danger of fatal accident or serious injury. This hazard may always occur if the operating or working instructions are not or only imprecisely observed.

Warning! This symbol warns you of a possibly dangerous situation which may lead to serious injury or to death. This hazard may always occur if the operating or working instructions are not or only imprecisely observed.

Attention! This symbol warns you of a possibly dangerous situation which may lead to serious injury or to death and to prevent damage to the machine or other serious property damage. Non-observance of these remarks may lead to loss of warranty. This hazard may always occur if the operating or working instructions are not or only imprecisely observed.

Note! This icon warns you of damage to materials or draws your attention to specific characteristics. This helps to facilitate work.

This icon points out matters of special importance. If you observe these hints, then you will work more comfortably or contribute to a longer service life of the machine.

1.4 Proper use

This machine is exclusively meant for loading and cleaning of sugar beets or similar crops.

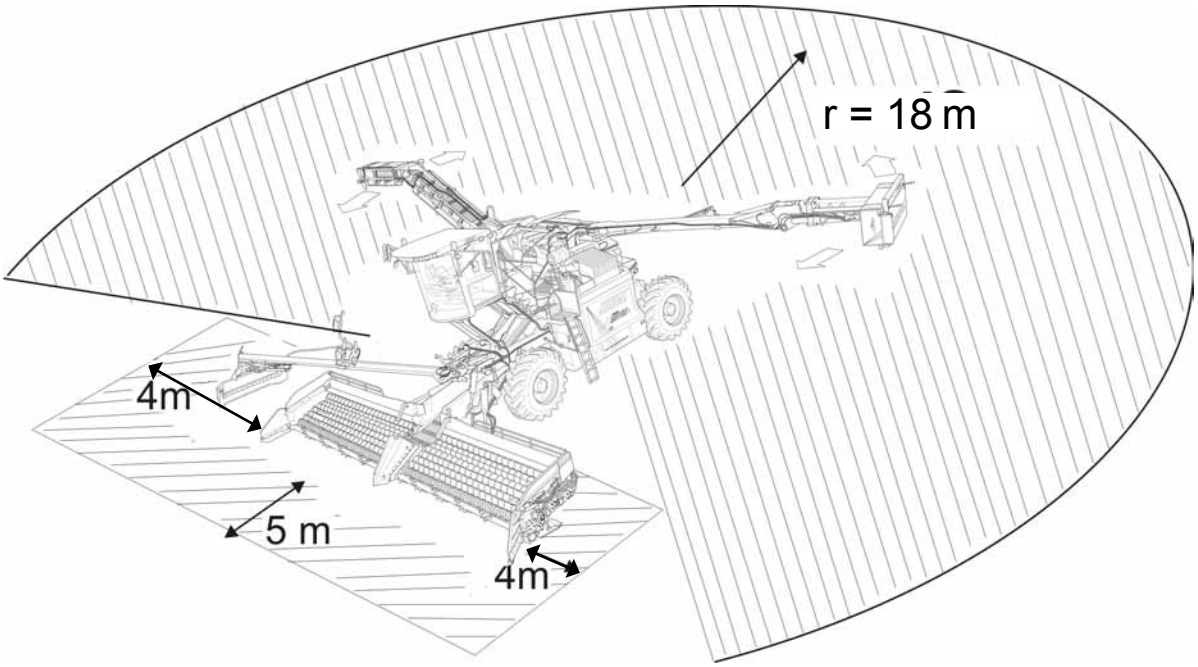
Included in proper use is that the machine is driven under compliance with the applicable road traffic regulations on public roads. This includes driving forward and backward.

Any other use of the machine is deemed improper and is therefore prohibited. We would expressly like to point out that this machine may not be used for pulling trailers, for towing or salvaging other vehicles or for pulling respectively pushing or transport of any loads or any goods.

1.5 Hazard zone

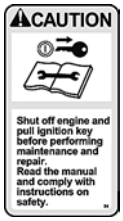
Nobody may stay in the hazard zone during operation of the machine. The operator must immediately shut down the machine in case of any threatening hazard and request the people concerned to immediately leave the hazard zone. He may only restart the machine when no people are located in the hazard zone anymore.
People wanting to approach the machine during operation must clearly communicate their intentions to the operator (e.g. by calling or by agreed hand signals) to avoid misunderstanding.
The hazard zone shown in the following drawing applies as soon as the machine is started up. When a person enters this zone, the machine must be immediately shut down and the corresponding person asked to immediately exit the hazard zone. The machine may only be restarted when no people are located in the hazard zone anymore.
Only especially authorized people after exact agreement with the operator may enter the hazard zones for maintenance or monitoring work. These people must be precisely informed about possibly occurring hazards before entering the hazard zones. All activities between the operator and these people must be exactly agreed before beginning these activities. All maintenance, adjusting and monitoring work on this machine must – to the extent technically possible – always be performed with the machine standing totally still and engine shut off. In this case, the operator of the machine is responsible that the machine may not be put into operation by unauthorized people, either inadvertently or contrary to prior agreements.

Danger! *There is a hazard of severest or even deadly injuries for people staying in the hazard zone. Especially in the sector of the pickup, people or objects may be drawn into running shafts by body parts or clothing. In this case, body parts may be ripped off and fragmented. Objects may be drawn in by the rollers and destroyed or cause severe damage to the pickup of the machine. The operator is obliged to immediately shut down the machine as soon as people or animals enter the hazard zone or reach into the hazard zone with objects.*
It is expressly prohibited to use one's hands or tools to pick up sugar beets not caught by the pickup and put them into the pickup while the machine is running. The engine must be shut off before maintenance and repair work and the ignition key must be removed. In all cases, please read the operating manual and comply with the safety instructions. In the past, these activities have lead to severest accidents. Staying under lifted machine parts or within the swiveling perimeter of machine parts is hazardous and therefore prohibited.



We recommend that the operator of the machine informs all people present during lifting about the possible hazards. You will find an information sheet for this purpose in the appendix. When needed, you should copy this sheet and hand it out to the people concerned. For your own safety and as protection against possible recourse (liability) claims, you should obtain written confirmation about receipt of this sheet in the space provided.

All parts of the machine which may cause specific hazards are additionally marked using warning labels (pictographs). These pictographs point out possible hazards. They form a part of this operating manual. They must always be kept in a clean and well legible condition. Damaged or illegible safety stickers must be replaced immediately. The meaning of each individual pictograph is explained below. In addition, a six-figure number is given for each pictograph. This is the ROPA order number. Stating this number, you may reorder the respective pictograph from ROPA. The number stated in brackets is printed on the respective sticker. This enables simple allocation of the pictograph to the order number and the explanation.



355070 (34)
Shut down the engine before performing maintenance and repair work and pull off the ignition key. Read the operating manual and comply with remarks on safety.

355068 (39)
Hazard due to electrical current! Observe a sufficiently safe distance to high-voltage power lines.

355069 (41)
Burning hazard due to hot surfaces! Keep sufficient distance to hot surfaces!

355078 (11)
Hazard of lowering machine parts! Staying in the hazard zone is only admissible when the safety lock for the lifting cylinder is engaged.

355071 (1)
Before starting up, read the operating manual respectively the maintenance manual and observe all remarks on safety.

355081 (40)
The hazard of discharge of liquids under high pressure. Before performing maintenance and repair work, read the operating manual and comply with remarks on safety.

355073 (50)
Hazard due to machine parts swinging down. Never step into the hazard zone of raised and unsecured machine parts.

355063 (33)
Hazard from parts being flung away with the engine running. Keep a sufficient safety distance!

355065 (37)
Falling hazard! Riding on steps or platforms is prohibited.

355072 (15)
Hazard from rotating parts. Never reach into the operating auger or pinching rollers. Hazard of clothing or body parts being pulled in. Do not open or remove protective equipment during operation.

355064 (52)
Hazard due to the machine inadvertently rolling away. Secure machine against inadvertently rolling away using a wedge before uncoupling or parking it.

355080 (42)
Explosion hazard. The pressure reservoir is under very high pressure. Perform removal and repair only following instructions from the manual.

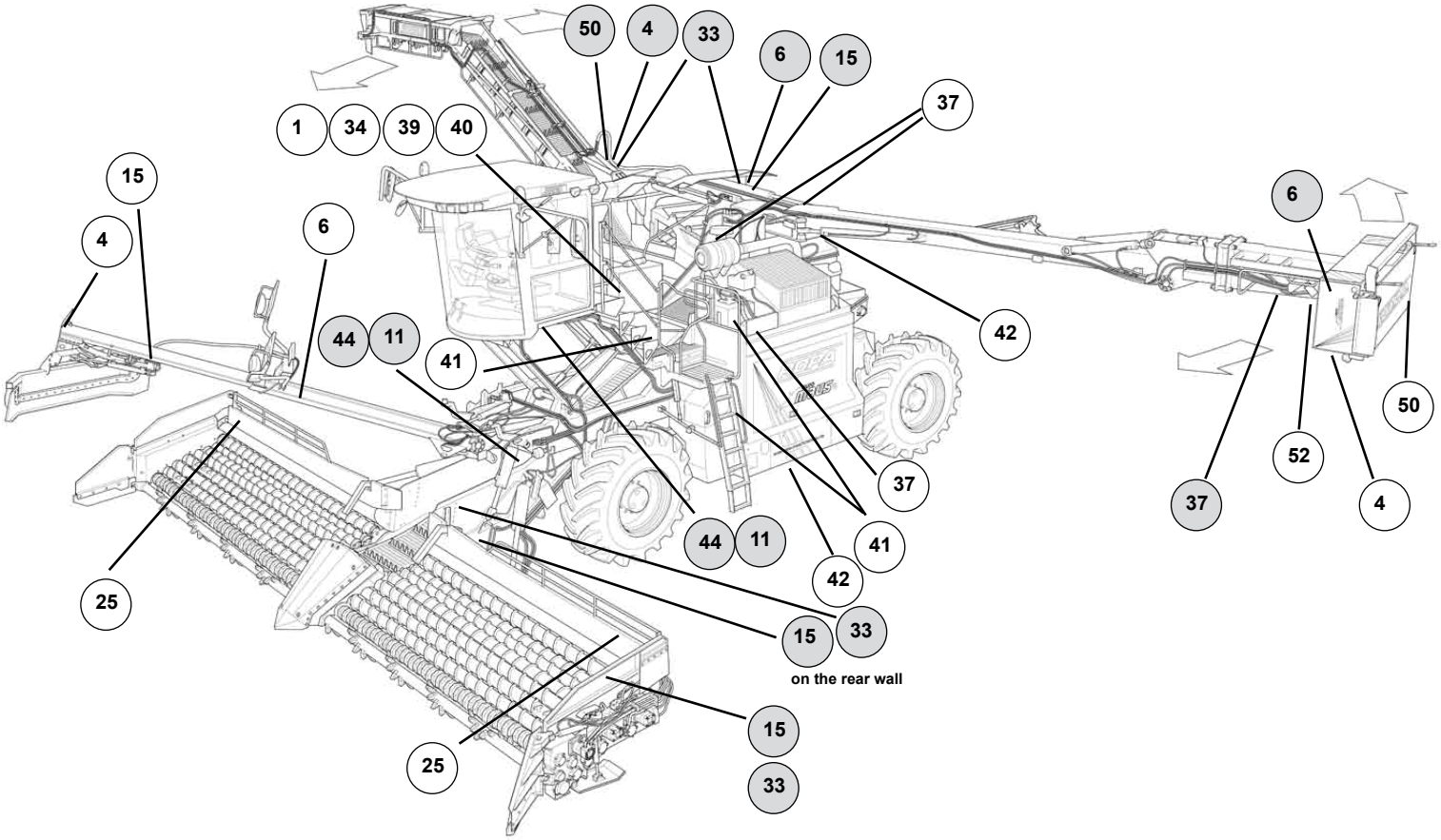
355067 (44)
Never step in the hazard area between attached device and machine.

355076 (24)
Only touch machine parts after they have come to a complete stop.

355075 (9)
Chain drive! Hazard of body parts or clothing being pulled in with running drive. Before opening the cover, shut down the machine and secure it against inadvertent startup!

355066 (9)
Avoid serious bodily injury from rotating machine parts.
Do not enter this area until rotating parts have completey stopped.
Stop engine and remove key.

1.6 Safety stickers on the machine



In case of numbers highlighted in grey, you will find the corresponding stickers at the opposite position on the machine on the rear wall as well.

1.7 Safety and health protection

The stipulations and regulations listed below must be rigorously observed in order to reduce the risk of personal injury and/or property damage. Furthermore, the regionally applicable regulations and instructions on safety at work and for safe handling of self-propelled processing machines must be observed in any case.

For safety reasons, anyone working with the machine must have read and understood the operating instructions at hand. He must also be familiar with the applicable regulations on safety atwork and health protection regulations.

For safe operation of the machine, the applicable health protection regulations, the relevant national work safety regulations

or equivalent applicable national work safety and

health protection regulations of other member states of the European Union or other states which have signed the agreement on the European Economic Area must be rigorously applied.

The operator is obliged to provide the applicable regulations in their current versions free of charge to the machine operator.

- The machine may only be used for its Intended purpose and in compliance with these operating instructions.
- The machine must be used and operated in such a manner that its stability is guaranteed at any time.
- The machine may not be operated in enclosed rooms.
- The effectiveness of operatinng and adjusting components may not be impaired or overridden in an impermissible manner.

1.8 Requirements for operating and maintenance personnel

The independent operation and maintenance of the machine is restricted exclu sively to persons who are of age and:

- must have a required and valid drivers license (when driving on public roads),
- are physically and mentally suitable,
- are not under the influence of drugs, alcohol or medicine which may impair the reactions of the machine operator in any manner,
- have been instructed about operation and maintenance of the machine and have proven their ability to the entrepreneur,
- have been instructed by the entrepreneur about their special obligation for safe driving of the machine,
- are familiar with the vicinity and it may be expected that they will reliably discharge the tasks assigned to them,
- who are specifically authorized by the entrepreneur.

All maintenance work which is not specifically the responsibility of the operator may only be carried out by instructed or trained maintenance personnel. Some activities may only be performed by people expressly authorized by ROPA for these activities. In case of doubt, ask the manufacturer whether you may perform a specific activity yourself without hazard.

Note! *Forms for proof of proficiency and instruction on safety given for operating and maintenance personnel are included in this operating manual. When needed, please copy these forms before completing them.*

1.9 Use of the boarding steps

For safety reasons, always face the machine when ascending or descending the boarding steps. When ascending or descending, always use both hands to hold on to both handrails and remember to always grasp the handrails firmly when using the boarding steps.
The safety rail at the upper end of the boarding steps serves as a fall arrester (guardrail). Please bear in mind that this safety rail always closes automatically and can not be blocked in any way. For safety reasons, this safety rail must not be permanently held open.

1.10 In the event of accidents

In the event of accidents involving personal injury, the machine must be shut down immediately. To the extent required, immediately necessary first aid measures must be initiated, medical assistance called in and the next accessible superior should be informed (if applicable).

1.11 Handling old parts and process materials

- When handling process materials the appropriate protective clothing must always be worn to prevent or reduce skin contact with these materials.
- Defective, dismantled parts shall be sorted according to material type and routed to the proper recycling channel.
- Residues of oil, grease, solvents or cleaning agents must be reliably and environmentally compatibly collected in suitable and prescribed containers and stored before being disposed of in an environmentally compatible manner in accordance with the local regulations.

1.12 Residual risks

Residual risks are special hazards involved in the use of the machine which cannot be fully eliminated despite a safety-conscious design. These residual risks are not readily recognizable and may result in injury or damage to health.
In the event such unforeseen residual risks become apparent, the machine must be shut down immediately and the responsible supervisor informed accordingly (if applicable). The supervisor then makes any further decisions and initiates the necessary measures for elimination of the hazard. If required, the machine manufacturer must be informed.

1.13 Hazards caused by mechanical influences

Danger! *With the machine running, there is* ***hazard to life*** *due to rotating shafts and overhanging attached parts. Rotating machine parts and breaking attached parts may cause the severest injuries like contusions, severing of body parts and broken bones. In especially severe cases, these injuries may be deadly. During loading, there is extreme hazard to life in the pickup area due to rotating pickup shafts.*
You can protect yourself against these hazards by maintaining a sufficient safety distance, by constant attention and by wearing suitable protective clothing.

1.14 Hazards caused by process materials

Warning! *Oil, fuel and grease can cause the following damage:*
- *Poisoning by inhalation of fuel vapors,*
- *Allergies due to skin contact with fuel, oil or grease,*
- *Fire and explosion hazard due to smoking or the use of fire or naked flame when handling fuel, oil or grease.*

Protective measures
- When handling fuel or oil, smoking or the use of open fire or naked flame is strictly forbidden. Oil and fuel may only be kept in suitable, approved containers.
- Do not expose fuel containers to direct sunlight.
- Always keep fuel containers in the shade.
- Great caution must be exercised when handling fuel. The relevant safety regulations for handling of fuel must be strictly observed.
- Clothing soaked in fuel must be removed immediately and ventilated in a suitable place.
- Rags soaked with fuel or oil must be kept in suitable, approved containers and disposed of in an environmentally compatible manner.
- Always use a suitable funnel for filling fuel or oil.

– Dispose of empty containers in accordance with regulations and in an environmentally compatible manner.
– Keep a supply of a suitable binding agent and use immediately as required.
– In all cases, avoid skin contact with fuel, oil or grease! In case of need, wear suitable protective gloves.
– Only decant fuel or oil in the open air or in well ventilated rooms.

Attention! *Hazard of damage to the environment by leaking fuel or oil! Hazard of pollution of ground or water bodies.*

Prevention

– Always carefully close containers containing fuel or oil.

1.15 Hazards caused by noise

Warning! *Noise can cause loss of hearing (deafness), hearing defects, health disorders such as loss of balance or consciousness disorders, as well as disorders of the heart and circulation. Noise may lead to reduction of the attention of people. In addition, noise may interfere with verbal communications among operating personnel as well as to the outside world. Perception of acoustic warning signals may be impaired or blocked.*

Possible causes:

Pulse noise (< 0,2 sec.; > 90 dB(A))
Machine noise in excess of 90 dB (A)

Protection

Wear ear protection (cotton wool, earplugs, capsules or helmets); keep sufficient distance to operating machines.

Driving noise (driving by) of **euro-Maus4**: 83,6 dB(A)
Cabin interior noise of **euro-Maus4**: minimum: 69,3 dB(A), maximum: 81,3 dB(A)

1.16 Hazards caused by the hydraulics system

Warning! *Hydraulics fluid may cause irritation of the skin. Leaking hydraulic fluid may damage the environment. High pressure and partially high temperatures exist within hydraulics systems. Hydraulics fluid emitting at high pressure may enter the body through the skin and cause the most severe tissue damage and scalding. If work on the hydraulics system is carried out imcorrectly, tools or machine parts may be flung away with great force and cause severe injuries.*

Protection

Regularly check the condition of all hydraulics hoses and have damaged hoses immediately replaced by trained specialist personnel. Have work on the hydraulics system performed only by especially trained personnel. When working on the hydraulics system, first render it pressureless! Work on the hydraulics system is only to be performed by specially trained personnel. When working on the hydraulics system, first render it pressureless! Avoid skin contact to hydraulics fluid.

1.17 Hazard from the pneumatic system

In case of damage to the pneumatic system, the raised warning signs on the pile pickup may suddenly come down and cause severe injury to people located in this area.
In case of faults of the pneumatic system, shut down the machine as quickly as possible and then have the cause for this damage repaired by specialist personnel being familiar with handling pneumatic systems.

1.18 General hints on safety when handling acid batterys

- Fire, sparks, smoking and open flames are prohibited. Avoid generation of sparks formed by connecting and disconnecting electrical loads or measuring devices directly to battery terminals. Before connecting and disconnecting batteries, switch off the main battery switch. First remove the ground connection. Prevent short circuits due to false polarity connections (avoid working near battery with spanner wrenches). Do not unnecessarily remove pole protection covers. When connecting, connect the ground cable last.
- Wear eye/face protection!
- Keep children away from acids and batteries!
- Batteries contain corrosive acid. Wear appropriate protective clothing and acid-resistant rubber gloves. Do not tilt the battery because acid may emit from the ventilation opening.
- Comply with instructions from the battery manufacturer.

Danger

Explosion hazard! *Increased care is required after longer operation or when charging the battery using a charging device. Charging may create highly explosive oxyhydrogen gas. Always ensure the area is adequately ventilated. Make sure that acid batteries are only charged using the permitted charging current.*

1.19 General safety instructions for the independent heating system (optional)

- The heating appliance may not be operated in enclosed rooms, not even under timer control or "Telestart" (e. g. garage or workshops without exhaust-gas extraction).
- Due to the explosion hazard, the heating system must be switched off at gas stations and fuel dispensing systems.
- Due to explosion hazard, the heating system must be shut off in any place where combustible fumes or dust can form (e. g. near fuel, coal, wood dust or grain storage or similar).
- The heating system must be checked by a specialist at the latest at the start of the heating season.
- In cases of continual generation of dense smoke, unusual combustion sounds or smell of fuel fumes, the heating system must be taken from operation by removing the fuse and may only be recommissioned after inspection by personnel trained by Webasto for this work.
- Only diesel is to be used as fuel.
- Near the heating system, a temperature of 120 °C (storage temperature) may not be exceeded. Excess temperature may cause permanent damage to the electronics.

1.20 Hazard due to vibrations

The machine meets the requirements of Directive 78/764/EEC.
Whole-body vibrations: < 0,5 m/s^2
Hand-arm vibrations: < 2,5 m/s^2

1.21 Emergency exit

Depending on the design, the machine is not equipped with a dedicated emergency exit. If the cabin is deformed by external forces - e. g. during an accident, the cabin can generally be exited via the access doors since these doors are doors are glazed with safety glass. This type of glass can be destroyed using a forceful blow with a pointed object so that the cabin can be exited without a problem. If the glass pane is subjected to excessive stresses - e. g. after deformation of the cabin, then this glass pane will automatically break and make the exit route free.

Chapter 2

Driving on Roads

2 Driving on Roads

The **euro-Maus4** is regarded as a self-propelled processing vehicle within the territory of the European Union. This type of vehicle is subject to very specific regulations and conditions which may differ between countries. In addition, differences are also possible within a country insofar as the individual conditions established by the respective competent road traffic authorities. Upon individual request, **euro-Maus4** may also be registered as a motor vehicle. In this case, regulations which are different from those listed here apply in certain cases.
In any case, the operator must make sure that **euro-Maus4** is furnished with the regionally required equipment and aids for securing, e.g. warning triangle, warning lamp, etc. and that these devices are always carried in functional condition.

Note

Note! *ROPA expressly wants to point out that the driver and owner of* ***euro-Maus4*** *are always solely responsible for compliance with the respective regulations and conditions of the competent road traffic authorities.*

euro-Maus4 set to drive on the road

The following generally applies before driving on public roads in the territory of the Federal Republic of Germany:

- The recleaner must be folded to transport position and then the truck conveyor must be laid down in transport position.
- The counterweight arm must be folded in to the central vehicle axis and locked.
- The counterweight must be folded down as far as it will go.
- The swivel arm must be locked in position.
- The cabin must be lowered as far as it will go.
- The pickup must be raised as far as it will go.
- The fold plates must be swung down, the support feet must be raised as far as they will go and the two clearing shields must be swung in as far as they will go.
- The two pickup side sections must be swung in as far as they will go.

- The pile pickup must be swung into central position, set to horizontal position and retracted as far as the central mark.
- The residual beet pickup must be turned crosswise with respect to the driving direction.
- Switch off the axle support of the rear axle.
- Switch to operating mode Rabbit II.
- The driver's seat must be locked in driving direction.
- The wheels of the rear axle must be aligned in straight position.
- Rear axle steering must be locked (lock main steering switch).
- **All** work spotlights must be switched off.
- The auxiliary steps on the fuel tank must be swung up and locked.
- The machine must be cleaned until:
  - dirt has been removed to such an extent that the road is not soiled,
  - the permissible total weight rating is not exceeded,
  - all warning signs are clearly visible,
  - all turn indicators and lighting fixtures are clean.
- The operational and road safety of the vehicle, in particular those involving steering and lighting, must be checked and, if necessary, measures taken to reestablish this safety;
- The additional axles must be lowered in order to drive on public roads and paths. Always ensure that no person is in the area of the additional axles BEFORE lowering the additional axles!

The axles cannot be used for off-road driving and must therefore be lifted up for driving on non-road terrain. If you switch from operating mode Rabbit to operating mode Turtle while the additional axles are lowered, the color terminal displays the following warning icon .

Lightly touch the toggle switch on switch panel 2 in order to lift up or activate the additional axles.

If the additional axles are activated, then the icon appears on the color terminal. If the additional axles are lifted up, then the icon appears on the color terminal.

The additional axles must be activated when driving on the road. The top speed can be reached only when the additional axles are activated.

When driving on public roads and paths, the yellow rotating beacons must be switched on regardless of the time of day.
As a self-propelled processing vehicle with a top speed of max. 20 km/h, **euro-Maus4** is not subject
to the obligation to register the vehicle and to attach number plates. But a sign must be fastened to the machine on its left side which contains the following information written indelibly and clearly legible:

- First and last name of the owner as well as place of residence and the full address of the owner.

In the model variant with a top speed of over 20 km/h, the **euro-Maus4** is subject to the obligation to register the vehicle and to attach number plates. Furthermore, the vehicle must be insured against damage from the vehicle owner's liability insurance according to the locally applicable regulations.
For both variants, the following conditions must always be fulfilled:

- If safe driving of the vehicle cannot be ensured otherwise (e.g. at intersections and road junctions, when backing up, or during inclement weather conditions), then a guide giving directions to the driver for safe driving of the vehicle must always be used.
- Only persons familiar with the vicinity, experienced and reliable may be used as driver and accompanying personnel (guides).
- The vehicle may only be moved on public roads and paths by drivers having the required and valid driving license.
  Besides the valid driving license, the driver also has to carry the general type approval of **euro-Maus4** and the existing and valid exemption permit.
- No person is permitted to ride on the platform in front of the driver's cabin.
- The vehicle owner or his representative must fully instruct every driver as regards his special duties in safe driving of the vehicle before each deployment. The instructions must be acknowledged by the drivers with their signatures. The vehicle owner must keep these acknowledgements for at least one year.
- You can find a preprinted form for this briefing in Chapter 9.
  ROPA recommends that you copy this preprinted form before completion.
- As already mentioned, the regionally competent road traffic authorities may establish additional conditions or conditions deviating from the regulations listed. It is the sole responsibility of the vehicle owner and the driver to inform themselves of these regulations and to also comply with them.
- If parts or functions of the vehicle are subsequently modified, whose condition respectively sequence has been prescribed, then the "general type approval" lapses and a new "general type approval" must be applied for with the authorities specific to each country.

Chapter 3

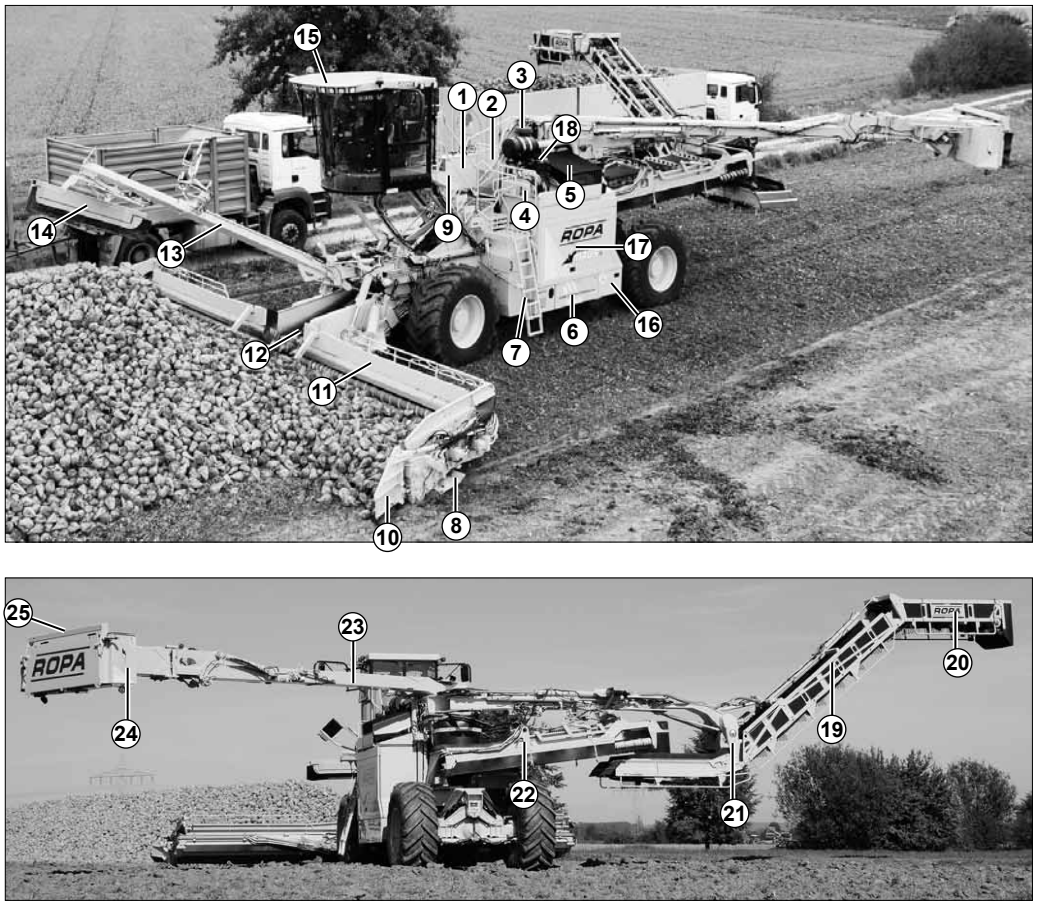
General View and Specifications

3 General View and Specifications

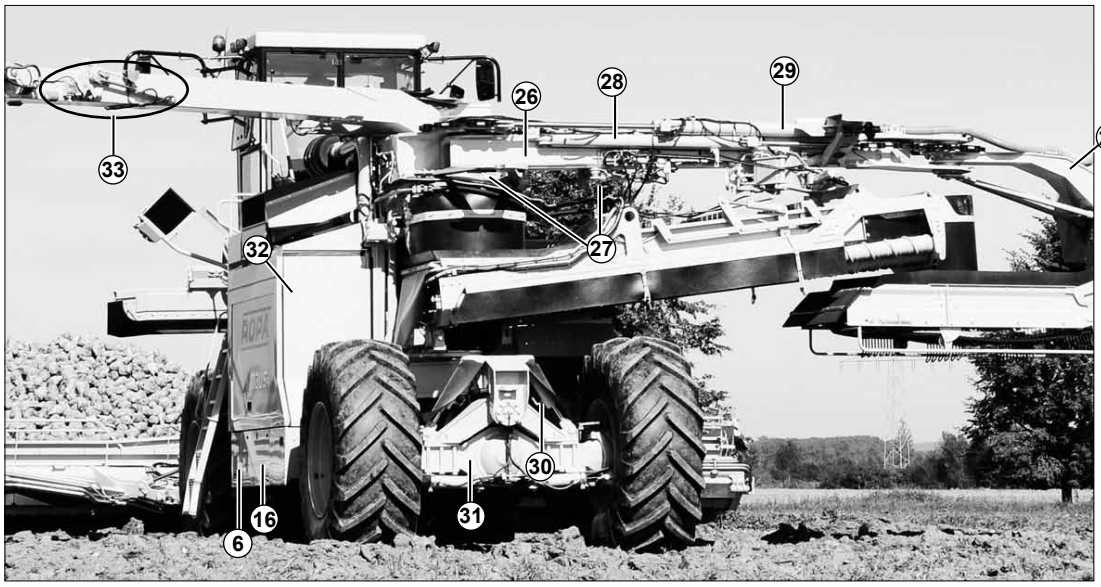
3.1 Overview photos of the euro-Maus4

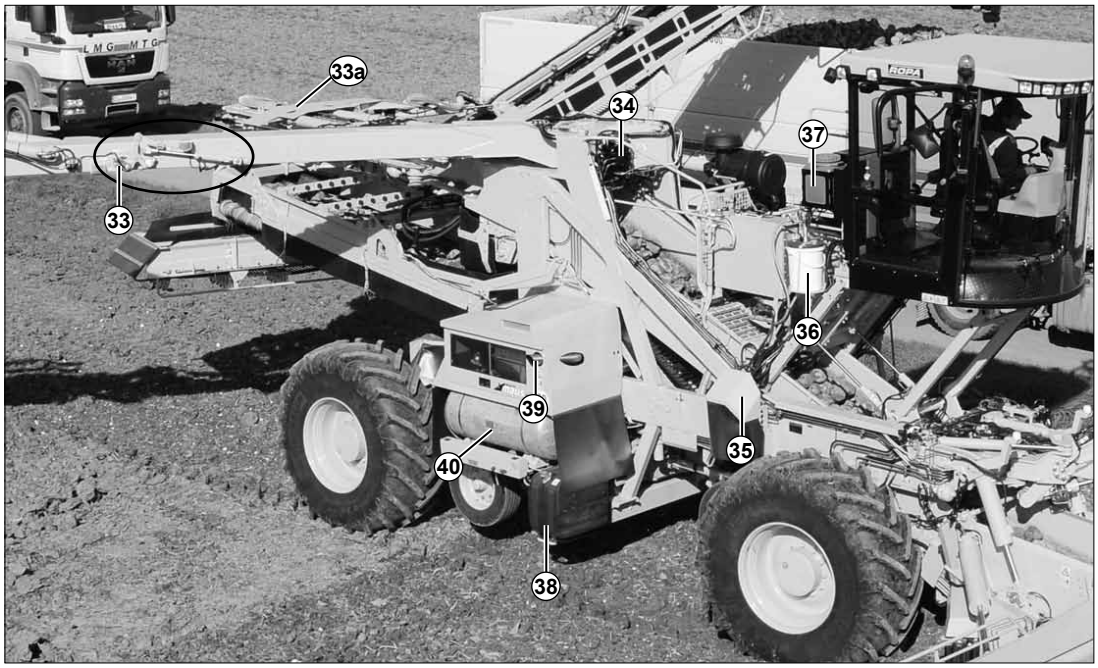
ROPA

ROPA

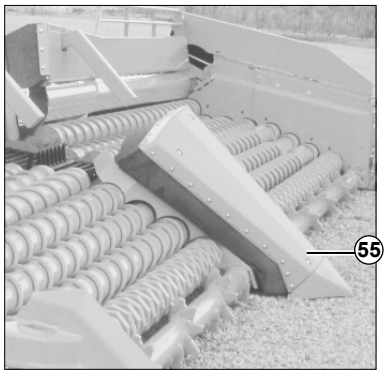


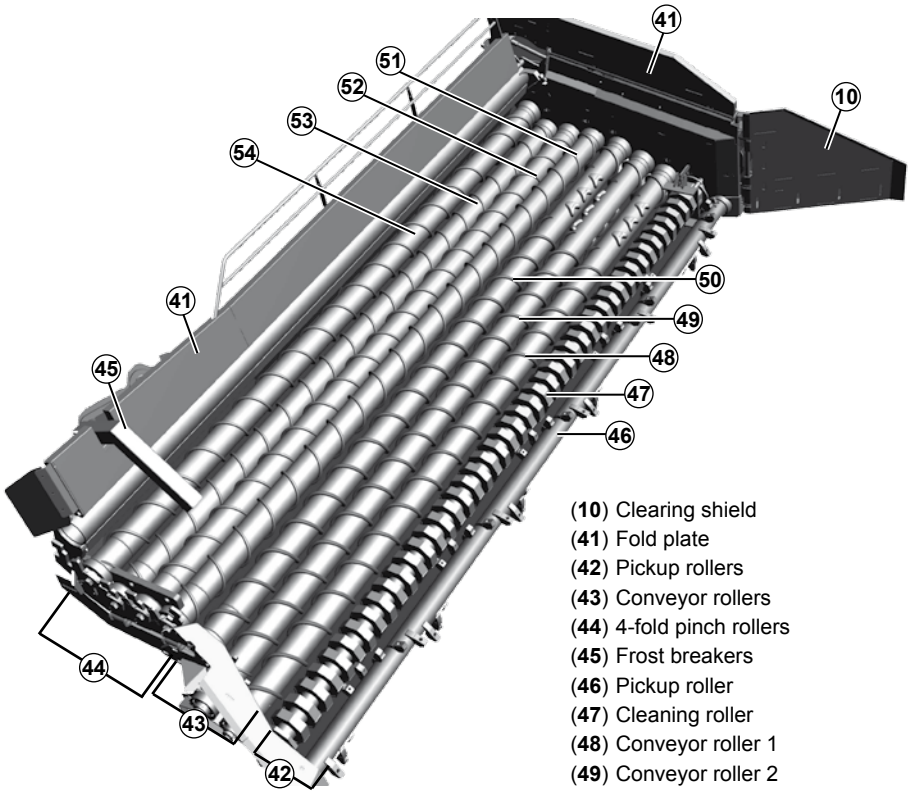
(**1**) Central electric cabinet
(**2**) Rear platform wall
(**3**) Air filter
(**4**) Hydraulic fluid tank
(**5**) Intake grid for cooling air
(**6**) Battery box
(**7**) Boarding steps
(**8**) Supporting foot
(**9**) Cabin platform
(**10**) Clearing shield
(**11**) Pickup side section
(**12**) Infeed conveyor
(**13**) Pile pickup (telescopic tube)
(**14**) Residual beet pickup
(**15**) Cabin
(**16**) Storage compartment for tools
(**17**) Engine housing
(**18**) Compensating tank for coolant
(**19**) Truck conveyor
(**20**) Articulation of the truck conveyor
(**21**) Swivel support for truck conveyor
(**22**) Recleaner
(**23**) Counterweight arm
(**24**) Fuel tank
(**25**) Underrun protective device





(**6**) Battery box
(**16**) Storage compartment for tools
(**21**) Swivel support for truck conveyor
(**26**) Swivel arm
(**27**) Swivel arm lock
(**28**) Rotary drive for truck conveyor
(**29**) Rotary drive for swivel arm
(**30**) Cylinder axle support
(**31**) Rear axle (=swing axle)
(**32**) Storage compartment in the engine compartment
(**33**) Counterweight arm lock
(**33a**) Counterweight rollover track
(**34**) Valve manifold for working hydraulics II
(**35**) Valve manifold for working hydraulics I
(**36**) Grease bucket
(**37**) Reservoir for washing system
(**38**) AdBlue® tank
(**39**) Exhaust system with SCR catalytic converter
(**40**) Water tank (optional)





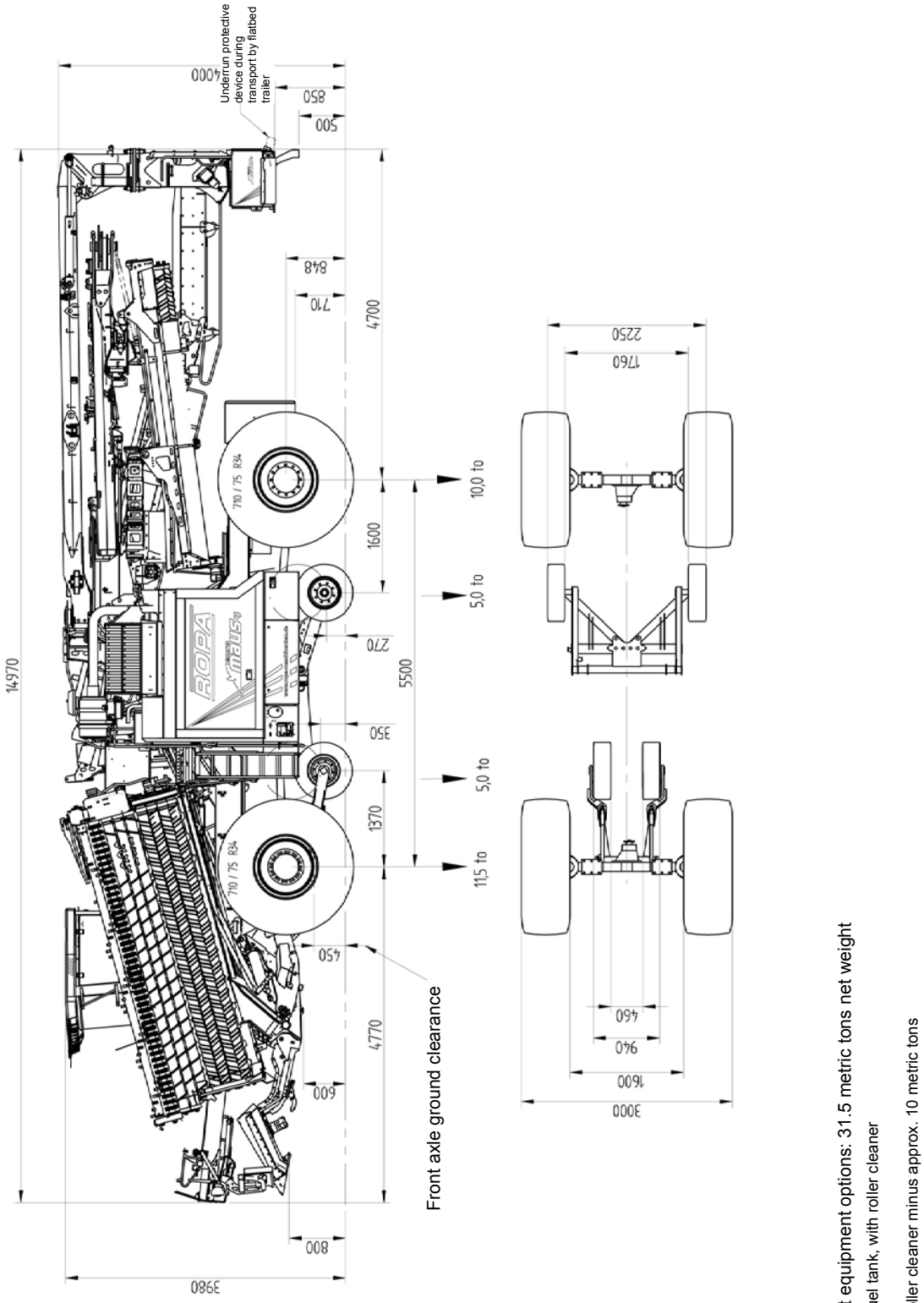
(**10**) Clearing shield
(**41**) Fold plate
(**42**) Pickup rollers
(**43**) Conveyor rollers
(**44**) 4-fold pinch rollers
(**45**) Frost breakers
(**46**) Pickup roller
(**47**) Cleaning roller
(**48**) Conveyor roller 1
(**49**) Conveyor roller 2
(**50**) Conveyor roller 3
(**51**) Pinch roller 1
(**52**) Pinch roller 2
(**53**) Pinch roller 3
(**54**) Pinch roller 4
(**55**) Central mark

3.2 Technical data

Vehicle model:	**e-M4b**
Valid starting with series:	2010
Mercedes-Benz engine model:	OM926LA E3B1
Exhaust gas category according to 97/68/EC:	Stage 3b
Exhaust gas category according to EPA (USA):	Stage 4i
Power:	240kW at 2200 rpm
Max. torque:	1300 Nm/1200-1600 rpm
Rated speed:	2200 rpm
Drive type:	Diesel engine 4-stroke, direct fuel injection
Displacement:	7200 cm³
Drive:	Continuously variable, hydrostatic in three operating modes
Operating mode "Turtle I": Operating mode "Rabbit I": "Rabbit II":	0-0.7 km/h 10.5 km/h 0-20 km/h (optionally 25 km/h / 32 km/h)
Two mechanically driven axles with differential lock swing rear axle support. Two additional axles	
Curb weight, depending on equipment variant (with full fuel tank):	30300 kg to 31500 kg
Maximum permitted weight:	32000 kg
Permissible axle load, front:	11500 kg
Permissible additional axle load, front:	5000 kg
Permissible additional axle load, rear:	5000 kg
Permissible axle load, rear:	11500 kg

Vehicle model:	e-M4b
Diesel tank volume:	1190 l
AdBlue tank volume:	95 l
Tires front and rear: Only upon specific request:	710/75 R34 178A8 800/70R32 Continental CHO 175A8
Tires for additional axles:	235/75 R17.5
Loading performance in t/h:	average approx. 250 / max. 560
Generators:	2x100 A
System voltage:	24 V
Battery capacity:	2x170 Ah
Length (setting driving on roads):	14970 mm
Width:	3000 mm (with tires 710/75 R34)
Height (setting driving on roads):	4000 mm

3.3 Transport draft for low-loader transport euro-Maus4



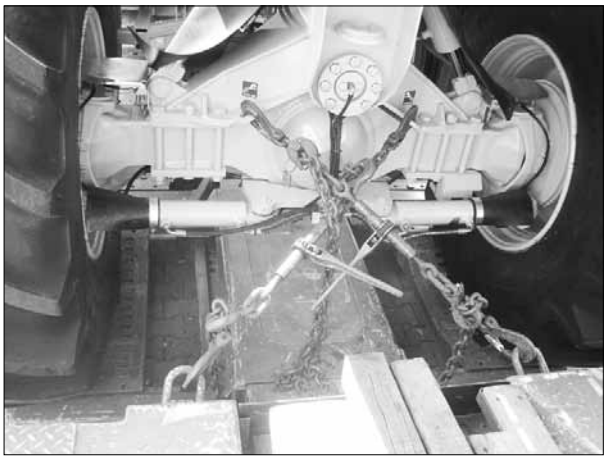
3.4 Lashing eyes for transport by flatbed trailer or ship

The front axle is equipped with eyes for clamping it down in direction of the ground. These eyes are located on the right and left side. The rear axle support is also equipped with eyes for clamping it down in direction of the ground. These eyes are located on the right and left side. Each eye may be loaded with a maximum tensile force of 5000 daN. Clamping chains, etc. must not be stretched over mechanical parts.
The machine has no mount points on which it can be lifted.

Regular flatbed trailer for road transport with minimum transport height

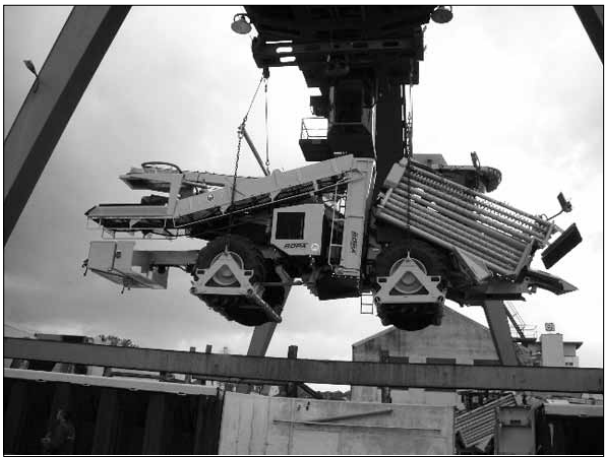
Lashing of the front axle with clamping chains

Lashing behind the front axle, left side



Lashing point at the rear axle support

For hoisting it into a ship, for example, special approved and TÜV-approved lifting devices are necessary.



Loading onto ship; photo of an earlier model

Chapter 4

General Description

4 General Description

4.1 Function

The **euro-Maus4** is a self-propelled machine for picking up, cleaning and loading of sugar beet in stacks at the side of the field.

Picking up of sugar beet is performed using a roller system. The first roller, the pickup roller, works several centimeters into the ground, picks up the sugar beet and lifts it over a cleaning roller onto three conveyor rollers. The conveyor rollers transport the beet outward. Fingers are attached top the conveyor rollers. These preclean the sugar beet and move the beet to the four contra-rotating pinch rollers located to the rear. The front and rear rollers may be individually adjusted in their speed. The direction of rotation of the rollers is reversible. Operating disturbances due to jammed stones are generally automatically detected and remedied by the machine.

If needed, the last sugar beet may be pulled onto the pickup rollers using the residual beet pickup controlled via the left joystick in the driver's cabin. No manual assistance is required.

The main cleaning action is performed on the rollers at the front of the machine. The contra-rotating rollers pull out soil, weeds and other material. Depending on equipment options, further cleaning is then performed using a sieve conveyor or a roller cleaner transporting the sugar beet to the loader. The truck conveyor moves the sugar beets to the transport vehicle.

4.2 Scope of delivery

The scope of delivery of **euro-Maus4** includes a fire extinguisher, a first-aid kit, two wheel chocks and a tool kit with spare parts package.

The first-aid kit is located in the cabin; the fire extinguisher is located on the cabinet of the central electrical system.

The tool box containing the tool kit is located in the tool storage compartment beneath the engine housing. The spare parts package is located in the storage compartment in the engine compartment.

Chapter 5

Operating Components

5 Operating Components

5.1 Steering column

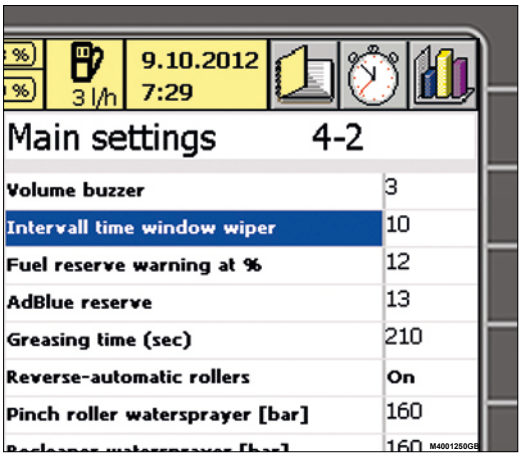
Danger! *Risk of lethal injury if the steering column is adjusted while driving. If this is the case, the machine can go out of control and cause extremely severe damage. Therefore, NEVER adjust the steering column while driving!*

Clamp screw (1), inclination adjustment

Loosen clamp screw (**1**) and pull or push steering column to the desired position. Firmly tighten the clamp screw (**1**) again. Check that the steering column is securely fixed in the desired position.

5.1.1 Steering column switch

- Pushing the lever to the right: Turn indicator right **(R)**
- Pushing the lever to the left: Turn indicator left **(L)**
- Lever up/down: Driving lights / high beam / and headlight flasher **(F)**
- Pushbutton at the end: Horn **(H)**
- Slider in front of the horn:
  Washing system **(W)**
- Turning the slider to
  first detent position: Intermittent windshield wiping
  Front wipers **(S)**. The duration of the wiping interval can be set in the color terminal menu "Basic settings", row "Wiper interval duration".



- Turning the slider to the second detent position: Continuous windshield wiping, front **(S).**

Note

To avoid damage to the wiper motor, you should not operate the wiper on dry windows as far as possible.

5.2 Driver's seat

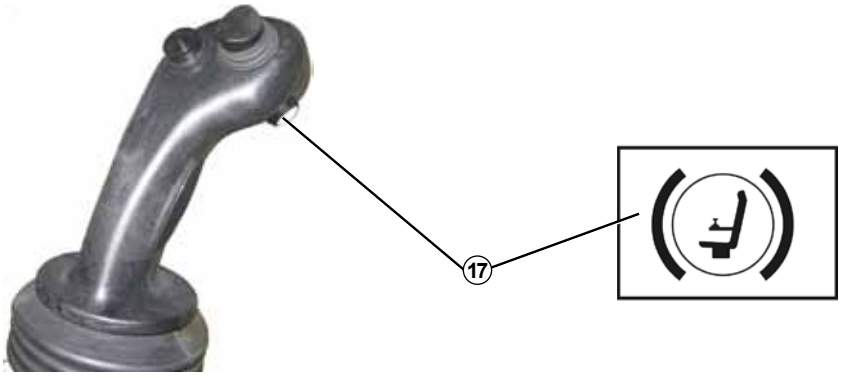
5.2.1 Rotating the cockpit

The rotatable driver's seat has a pneumatic seat brake. This seat brake is operated using the switch (**17**) on the left joystick. This enables you to fix the seat in the position most favorable for you.
An additional mechanical lock always locks the seat in the position prescribed by law when driving on roads.

Warning! *When driving on roads, the driver's seat must be secured against inadvertent rotation by using the mechanical seat lock on the bottom of the driver's seat. The seat may not be adjusted while driving, because otherwise there is increased accident hazard and danger to your health.*

Mechanical seat lock for driving on roads

The seat is locked with the inside button (**17**) on the left joystick (press once) or the lock (seat brake) is released (press again).

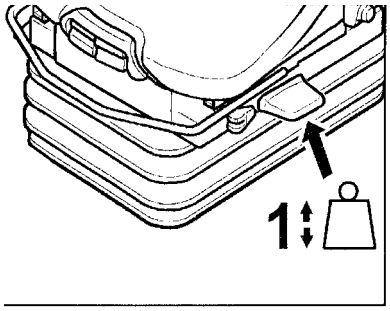


5.2.2 Adjusting the driver's seat

Safety information:

- In order to avoid back injury, the weight setting should be set to the individual weight of the driver each time before placing the vehicle into operation and each time there is a new driver.
- In order to avoid the risk of injury, do not store any items in the swivel range of the driver's seat.
- In order to avoid the risk of accident, check, before placing the vehicle into operation, that all setting controls have correctly locked in position.
- The setting facilities on the driver's seat may not be operated during operation.
- When the backrest upholstery has been removed, the backrest frame must be supported, e.g. held in place, before the backrest adjuster is operated. If you fail to do so, there is an increased risk that the backrest frame may jerk forward and cause injury.
- If you make any changes to the standard seat (e.g. not using original retrofitting and spare parts made by Grammer), it may no longer meet the safety standards to which it is tested. Functions of the driver's seat which endanger your safety may be impaired. This is why any structural modification of the driver's seat must be released by the Grammer company.
- Screw connections should be regularly checked to ensure that they are still tight. Wobbling of the seat may indicate loose screw connections or other defects.
  If the seat does not function correctly (e.g. the seat suspension), contact a specialist workshop immediately to arrange for repairs to be carried out.
- The driver's seat may be fitted, serviced and repaired only by specialist staff.

If you fail to do this, there is a risk to your health and safety and an increased risk of accident.

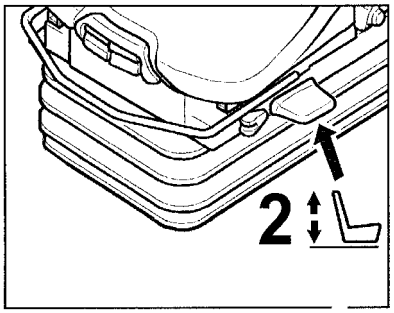


Weight adjustment

The seat should be adjusted for the drivers weight by briefly pulling the actuator lever of the automatic weight and height adjuster (arrow) with the vehicle at a standstill and the driver sitting on the seat.

The driver must sit absolutely still during adjustment.

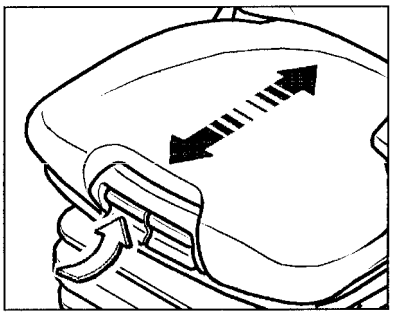
To prevent health damage, the setting for the driver's weight must be checked and adjusted as necessary before the vehicle is driven.



Height adjustment

The seat height can be set pneumatically and is infinitely adjustable. The seat height can be altered by pulling or pushing the actuator lever fully out or in (arrow). If the height adjustment system reaches the top or bottom end stop, the height is adjusted automatically in order to guarantee a minimum spring travel.

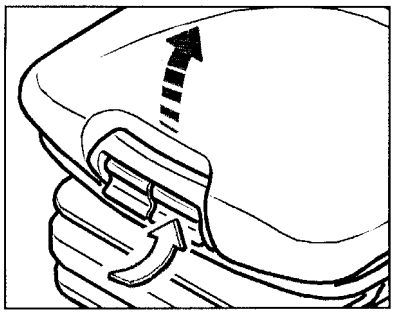
In order to avoid damage, do not operate compressor for more than 1 minute.



Seat depth adjustment

The depth of the seat pan can be individually adjusted.

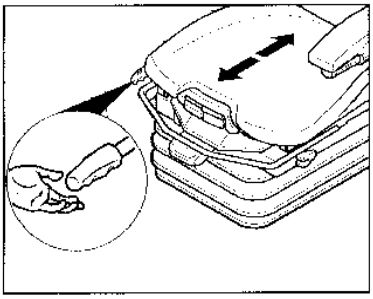
To adjust the seat depth, lift the button at the right (arrow). The desired seating position can be reached by moving the seat cushion backward or forward.



Seat inclination adjustment

The longitudinal angle of the seat cushion can be individually adjusted.

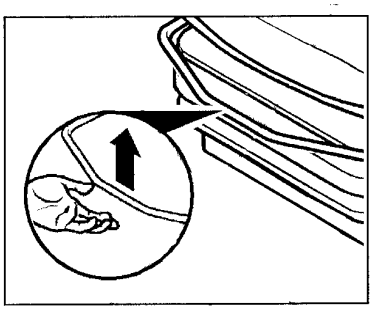
Lift the left button (arrow) in order to set the inclination angle. By exerting pressure on or off the seat cushion, it can be moved to the desired angle position.



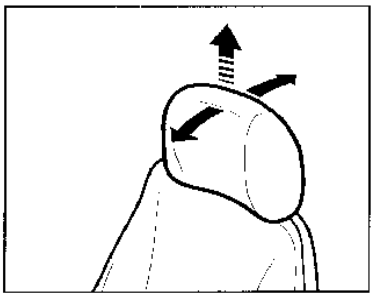
Longitudinal adjustment without control lever handle

Longitudinal adjustment of the seat is released by pressing the locking lever upward.

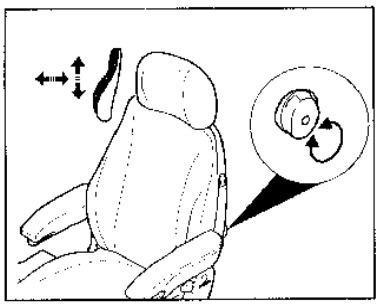
The locking lever must latch into the desired position. It should not be possible to move the driver's seat into another position when it is locked.



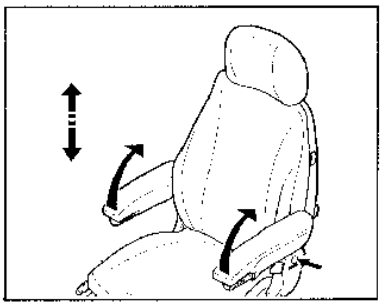
Longitudinal adjustment with control lever handle
Moving the locking lever upward releases the seat for longitudinal adjustment.
The locking lever must latch into the desired position.
It should not be possible to move the driver's seat into another position when it is locked.



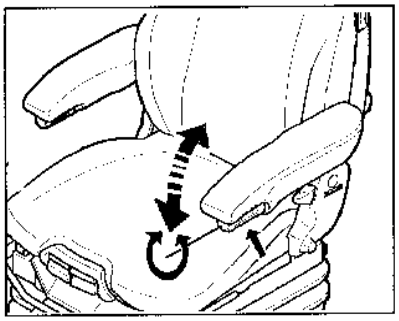
Headrest
The headrest can be individually adjusted for height by pulling it upward over the various increments up to the end stop.
The angle of the headrest can be adjusted individually by pushing forward or rearward.
To remove the headrest, pull it beyond the end stop.



Lumbar support
By turning the adjustment knob to the left or right, both the height and curvature of the backrest cushion can be individually adjusted.
This increases both the seating comfort and the performance of the driver.

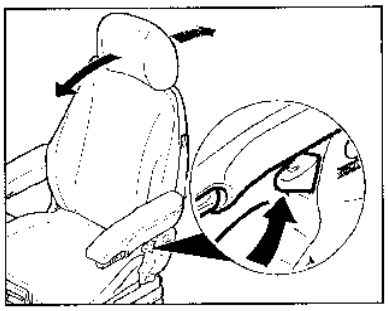


Armrests
The armrests can be folded up if required and the height individually adjusted.
Disconnect the round cap (arrow) from its cover in order to adjust the height of the armrest.
Undo the hexagon nut (width across wrench flats 13 mm), set the armrests to the required position and retighten the nut. Push the disconnected cover cap onto the nut.



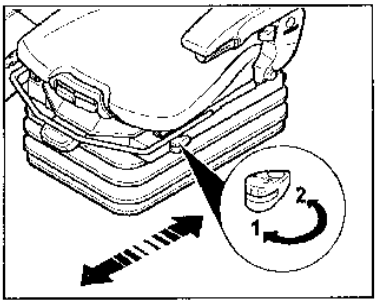
Armrest adjustment

The inclination of the armrests can be modified by turning the adjustment knob (arrow).



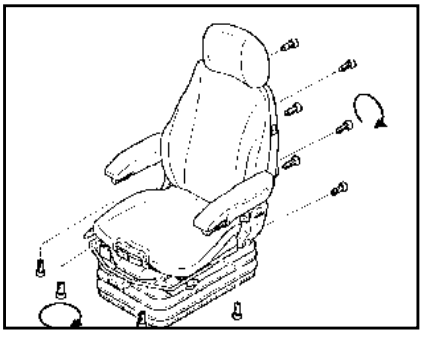
Backrest adjustment

The backrest is adjusted using the locking lever (arrow). The locking lever must latch into the desired position. It should not be possible to move the backrest into another position when it is locked.



Horizontal suspension

Under certain driving conditions, it is useful to activate the horizontal suspension. This means that shock impact in the driving direction can be better absorbed by the driver's seat.
Position 1 = Horizontal suspension ON
Position 2 = Horizontal suspension OFF



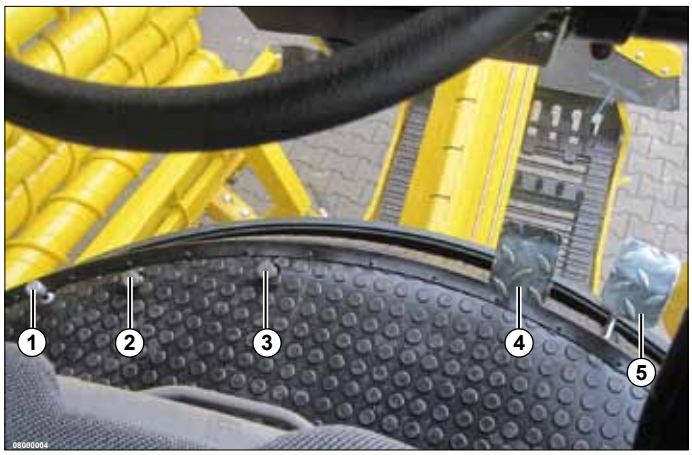
Care

Dirt may impair the function of the seat.
So you should keep your seat clean for this reason!
Upholstery can be quickly and simply removed from the seat frame for easy cleaning or replacement.
Avoid getting the upholstery too wet when cleaning it.
Try out commercially available upholstery or plastics cleaners on small, hidden areas first in order to check for compatibility.

Attention

Important! *Take care with the backrest frame – it may jerk forward and cause injury! Hold onto the backrest before adjusting.*

5.3 Operating components on the floor of the driver's cabin



(1) Opener for cleaning flap
(2) "Look forward" foot-switch
(3) Foot switch for driving direction
(4) Brake pedal
(5) Driving pedal

5.4 Operating console, right

You will find comprehensive explanations in Chapter 6 "Operation".

The console is divided into different operating control fields:

(1) Main steering switch
(2) Operating panel section
(3) Ignition lock
(4) Switch panel 1
(5) Switch panel 2
(6) Switch panel 3
(7) Right joystick with multi-function handle
(8) Color terminal

Note

Note! *The ignition should always remain switched off for approx. 10 seconds (this can be seen by the fact that the keyboard lighting on the color terminal switches off) before it is switched back on again. The color terminal requires this time to switch off correctly.*

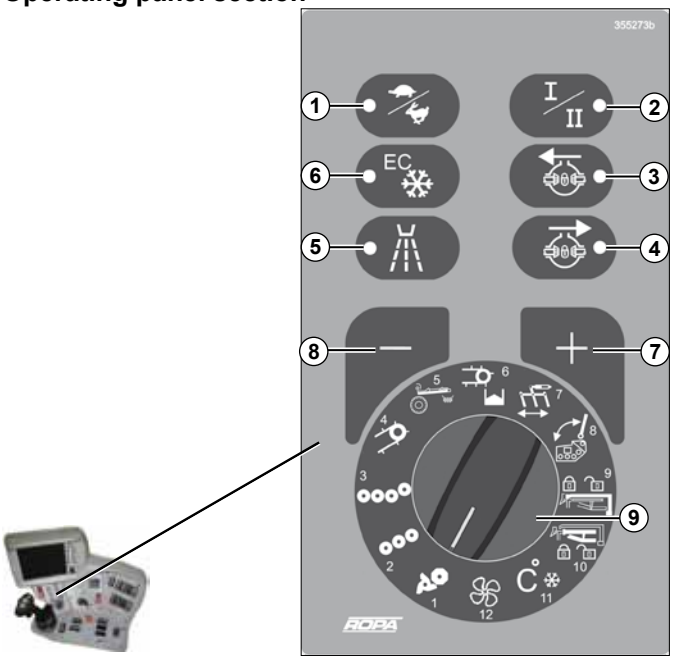
5.4.1 Main steering switch

1 Main steering switch

– Main steering switch toggled downwards = unlocked:
Steering of rear axle possible.
Driving speed is reduced.

– Main steering switch toggled upwards = locked:
Steering of rear axle locked

5.4.2 Operating panel section



(1) Switching between operating mode Turtle/Rabbit

(2) Shifting between I/II gear

(3) Differential lock front axle ON/OFF

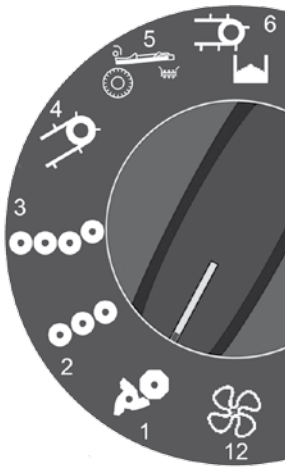
(4) Differential lock front axle ON/OFF

(5) Water spraying system (optional) ON/OFF/AUTOMATIC

(6) Air conditioning system ON/OFF/Defroster function

(7) + button:
This executes functions or increases speeds selected using the rotating selector switch.

(8) - button:
This executes functions or decreases speeds selected using the rotating selector switch.



(9) Rotating selector switch with 12 positions for selection:

Pos. 6: Truck conveyor speed

Press - button = slower,
Press + button = faster.

Pos. 5: Recleaning speed

Press - button = gentle r treatment / less throughput,
Press + button = more aggressive treatment / greater throughput.

Pos. 4: Infeed conveyor speed

Press - button = slower,
Press + button = faster.

Pos. 3: Speed of 4-set pickup pinch rollers

Press - button = slower,
Press + button = faster.

Pos. 2: Conveyor rollers speed

Press - button = slower,
Press + button = faster.

Pos. 1: Speed of pickup rollers

Press - button = slower,
Press + button = faster.

Pos. 7: Adjust beet brake (only with option roller recleaner)

Press - button = brake beet more,
Press + button = brake beet less.

Pos. 8: Fold plate

Press - button = fold down,
Press + button = fold up.
When the fold plates are folded in, both clearing shields and the support feet are also folded in or out.

Pos. 9: Counterweight arm lock

Press - button = lock,
Press + button = unlock.

Pos. 10: Swivel arm lock

Press - button = lock,
Press + button = unlock.

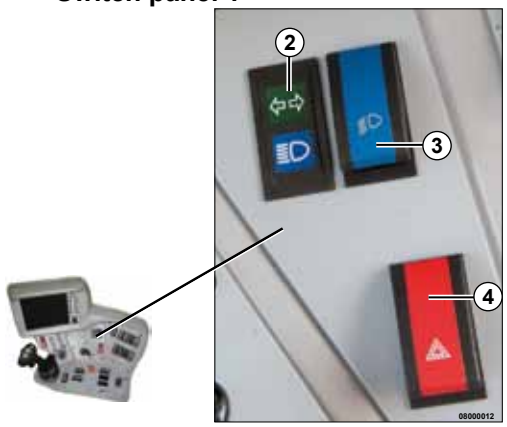
Pos. 11: Setting the desired temperature for air conditioning system

Press - button = lower desired temperature,
Press + button = increase desired temperature.

Pos. 12: Fan speed of ventilation control

Adjust using + / - button.

5.4.3 Switch panel 1

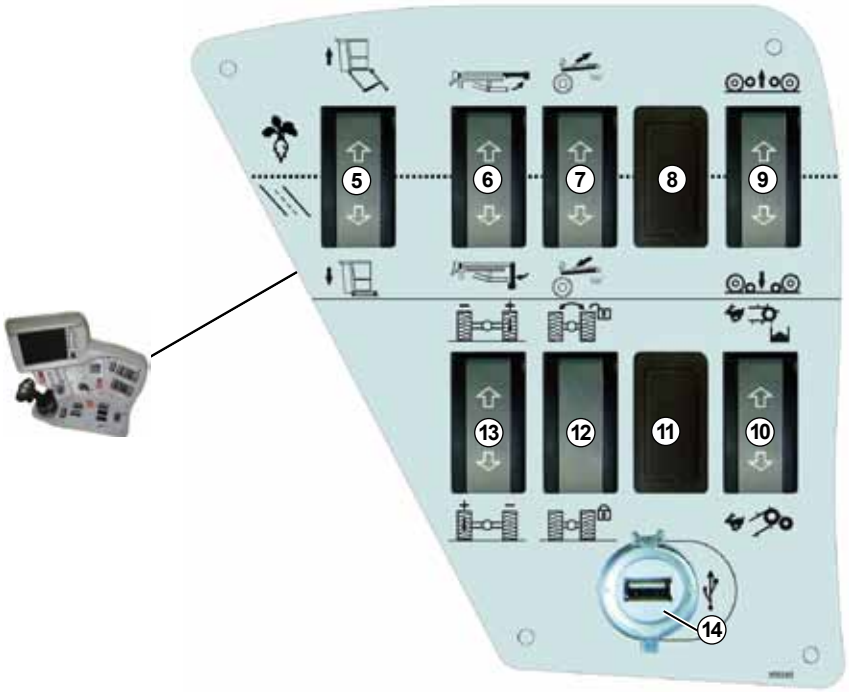


(2) top: Turn signal indicator lamp
lower: High beam light indicator lamp

(3) Switch parking lights / Driving lights
Upper: OFF
Middle: Parking lights
Lower: Parking lights and driving light (low beam)

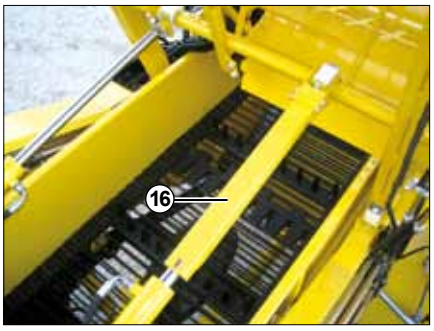
(4) Hazard warning system

5.4.4 Switch panel 2



(5) Toggle switch for raising/lowering cabin:

This switch may be operated only when both side sections of the pickup are folded out and when it has been ensured that there is no obstacle above the cabin up to a height of 5.3 m.



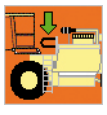
Cylinder support inserted.

Cylinder support in parking position.

Attention! *When working beneath the raised cabin, move the cylinder support (**16**) into its position. Move the cylinder support to parking position again before lowering the cabin.*

Warning! *Risk of crushing injury! The driver is responsible for ensuring that no persons are located in the area between the safety guard rail (**17**) at the boarding steps and the cabin door when lifting or lowering the cabin.*

Safety guard rail



The cabin can only be raised or lowered if the safety guard rail (**17**) on the boarding steps is closed.

(6) Counterweight (fuel tank)

Press up = raise

Press down = lower

(7) Swiveling the recleaner

Press up = swivel to working position

Press down = swivel to transport position

(8) Not used

(9) Lift/ lower additional axles

Press briefly up = lift out fully

Press briefly down = activate loading

(10) Fast speed, truck conveyor /infeed conveyor

Press up = truck conveyor fast speed

Press down = infeed conveyor fast speed

(11) Not used

(12) Switch swing axle support ON /OFF

Press up = OFF

Press down = ON

(13) Switch swing axle load to right /left

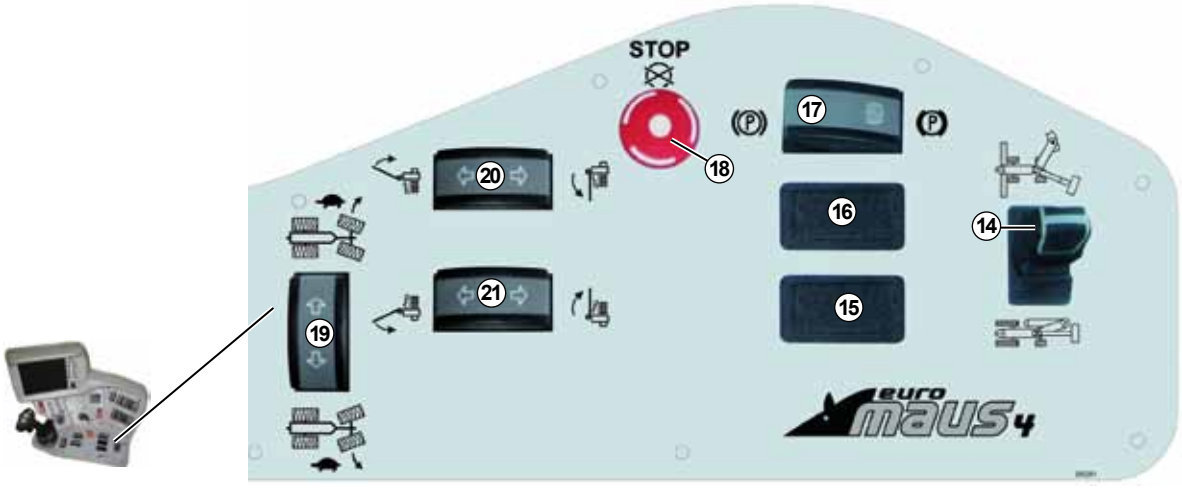
Press up = load to right

Press down = load to left

(14) USB connection

You must see the following message on screen after connecting a USB stick: "The USB stick is ready to use". This message must be confirmed by the driver by pressing the rotary knob. If you do not see this message, the USB stick must be removed immediately. This USB stick is incompatible and may not be used on this machine. Use only the USB stick supplied by ROPA or USB sticks formatted in FAT 32 with a max. storage capacity of 8 GB.

5.4.5 Switch panel 4



(14) Analog rocker switch

Automatic swing-in/out (proportionally between working position /transport position).

(15) and (16) not used

(17) Parking brake

(18) EMERGENCY-STOP

This is used to switch off all drives – with the exception of the Diesel engine.
In order to unlock, turn the EMERGENCY-STOP SWITCH APPROX. one quarter of a turn further clockwise.

(19) Steer rear axle right/left (only in operating mode Turtle)

(20) Clearing shield, right:

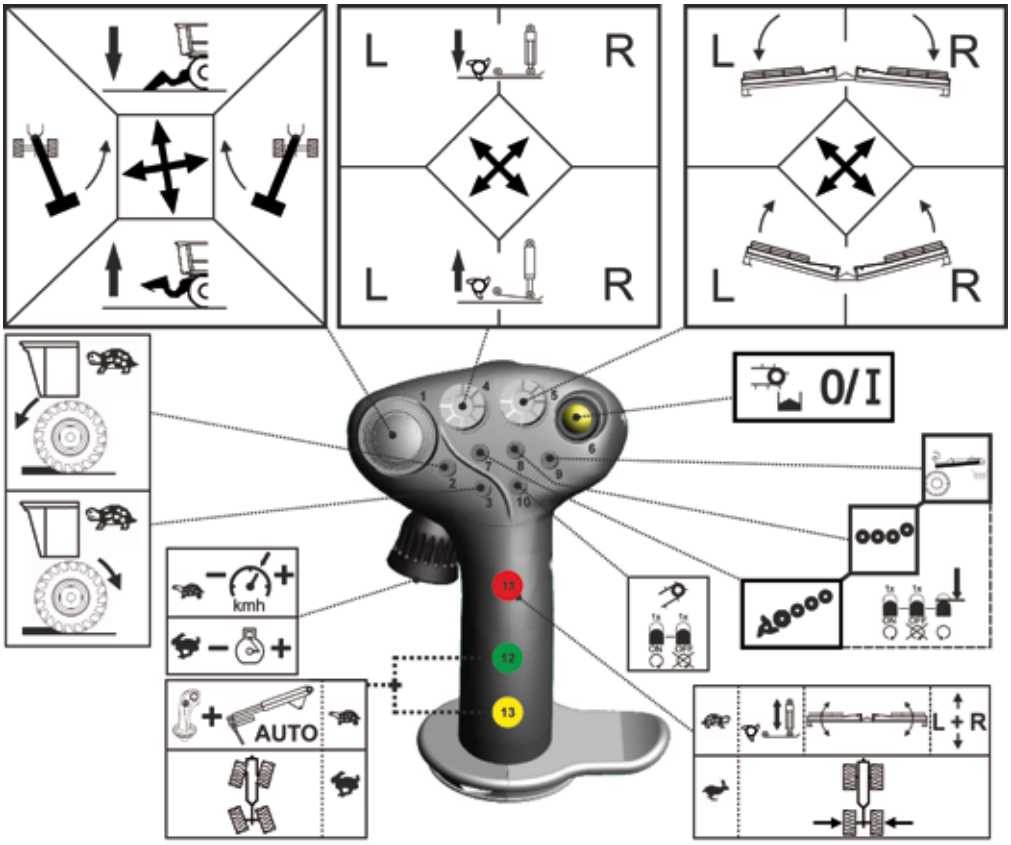
Press forward = fold out,
Press backward = fold in.

(21) Clearing shield, left:

Press forward = fold out,
Press backward = fold in.

5.4.6 Right joystick with multi-function handle

The driver can comfortably control a number of functions of **euro-Maus4** with one hand using the right joystick without distracting his attention. For improved orientation, there are stickers on the side window of the cab containing a schematic diagram of all functions of the right joystick.

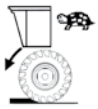


Mini joystick (1)

FORWARD	Lower pickup
BACKWARD	Raise pickup

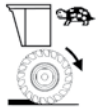
RIGHT	Swivel counterweight arm to the left
LEFT	Swivel counterweight arm to the right

Before swiveling the counterweight arm, it must be unlocked with the rotary selector switch in latching positions 9 and 10 and pressing button +.
Always swivel the counterweight arm in the opposite direction to the truck conveyor!



Button (2) Drive train forward

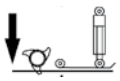
Tapping on this button, you switch the drive train forward in operating mode "Turtle". Pressing this button again stops the drive train.



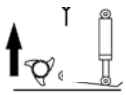
Button (3) Drive train backward

Using this button, you switch the traction drive backward in operating mode "Turtle" for as long as you keep the button pressed. If **euro-Maus4** is driving forward during loading, then you stop forward movement by tapping this button.

X-Y button (4) Support feet



FRONT LEFT	Raise left support foot	= Pickup rollers work more deeply in the ground
FRONT RIGHT	Raise right support foot	



REAR LEFT	Lower right support foot	= Pickup rollers work more shallow in the ground
REAR RIGHT	Lower right support foot	

X-Y button (5) Fold pickup

FRONT LEFT	Fold out left pickup section
FRONT RIGHT	Fold out right pickup side section
REAR LEFT	Fold in left pickup side section.
REAR RIGHT	Fold in right side part of the pickup

With this, you also change the relief pressure of the pickup side sections.

Button (6) Machine drive ON/OFF or reload (in order to do this, press and the button and keep it pressed).

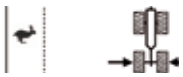
Button (7) Drive quadruple pinch rollers ON/OFF/Reverse

Button (8) Drive quadruple pinch rollers ON/OFF/Reverse

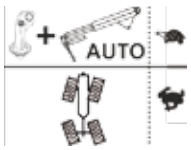
Button (9) Recleaner drive ON/OFF/Reverse
(no reversing on sieve conveyor version)

Button (10) Infeed conveyor drive ON/OFF

Multi-function button (11) ONLY in operating mode Turtle AND in conjunction with
X-Y switch (4) or (5)
Adjust both support feet at the same time or
fold in both pickup side sections at the same time.



Multi-function button (11) ONLY in operating mode Rabbit
Set rear axle to center position.



Buttons (12) and (13) ONLY in operating mode Turtle
Briefly press both buttons simultaneously and keep them pressed
In addition, briefly push the left joystick to the:
Front left = Automatic residual beet pickup function starts at the left
Front right = Automatic residual beet pickup function starts at the right

Buttons (12) and (13) ONLY in operating mode Rabbit
Briefly press both buttons simultaneously
Activate all-wheel steering

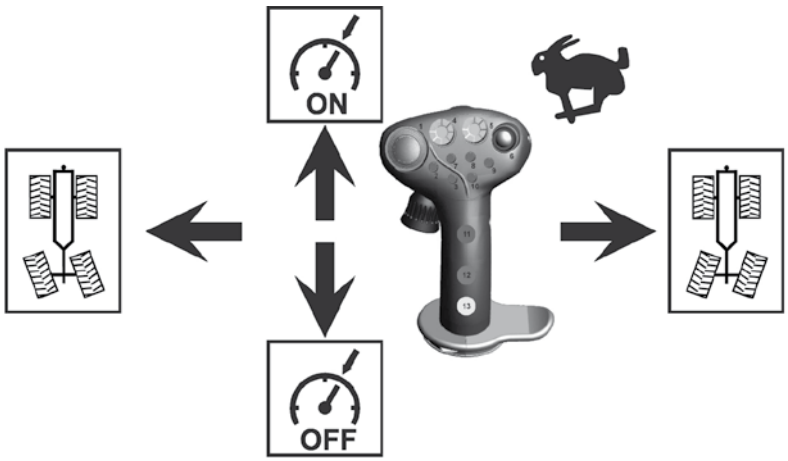
Hand potentiometer (14) ONLY in operating mode Turtle
Change forward driving speed when loading.

Hand potentiometer (14) ONLY in operating mode Rabbit
Engine speed adjustment with manual engine speed control

5.4.7 Joystick movements (right joystick)

5.4.7.1 Only in operating mode Rabbit

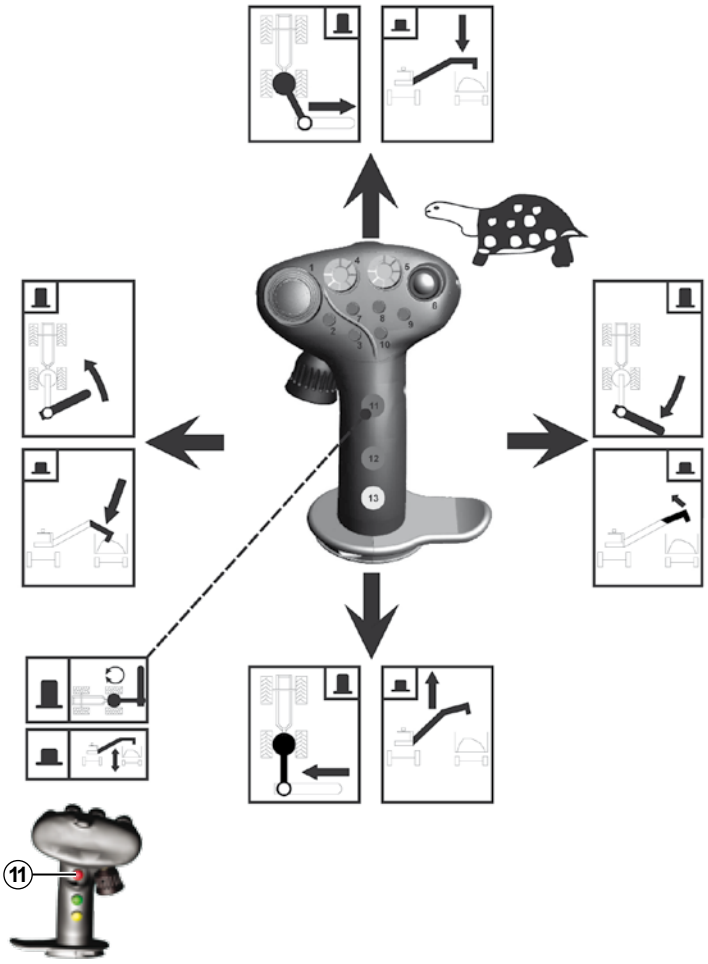
FORWARD	Cruise control ON

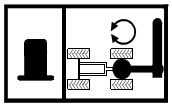


BACKWARD	Cruise control OFF

LEFT	Steer rear axle to left
RIGHT	Steer rear axle to right

5.4.7.2 Only in operating mode Turtle





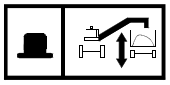
Multi-function button (**11**) NOT pressed

Only the two rotary drives turn!

Joystick FORWARD	Turn swivel arm
Joystick BACKWARD	Turn swivel arm

The rotating direction of the swivel arm always depends on the selected loading direction!

Joystick LEFT	Turn truck conveyor to the left
Joystick RIGHT	Turn truck conveyor to the right



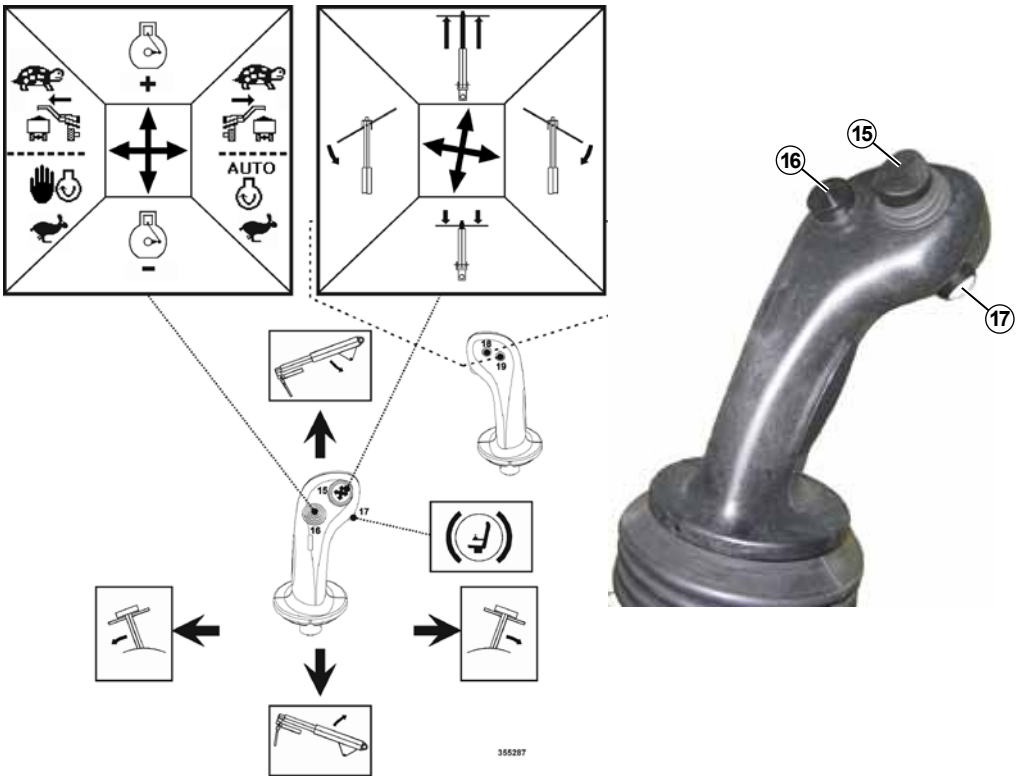
Press Multi-function button (**11**) and keep it pressed.

This lifts and lowers the truck conveyor or articulated section!

Joystick FORWARD	Lower truck conveyor
Joystick BACKWARD	Raise truck conveyor
Joystick LEFT	Fold in truck conveyor articulated section
Joystick RIGHT	Fold out truck conveyor articulation section

5.4.8 Left joystick

As soon as the left joystick console is folded up, the machine drive and the drive train stop automatically.



All functions can only be executed with the joystick if the seat console is swung down all the way and the machine is operated in operating mode Turtle I or Turtle II. Or if the machine is operated in operating mode Rabbit I or Rabbit II and the main steering switch is unlocked.

Joystick movements

	FORWARD	Lower pile pickup
	BACKWARD	Raise pile pickup
	RIGHT	Swivel pile pickup (completely) to the right
	LEFT	Swivel pile pickup (completely) to the left

Joystick (15) movements

FORWARD	Telescopically extend pile pickup
BACKWARD	Telescopically retract pile pickup

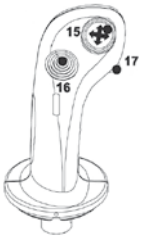
Note

Note! *These two movements may be reversed as familiar from the* ***euroMaus3*** *in the "Special Functions" menu.*

Mini Joystick (15) right/left

To the right Turn residual beet pickup to the right (same function as using button (**18**))

To the left Turn residual beet pickup to the left (same function as using button (**19**))



X-Y button (**16**)

Forward Increase diesel engine speed

Backward Decrease diesel engine speed

ONLY in operating mode Rabbit

to the left Manual diesel engine speed control

to the right Automotive diesel engine speed control

In order to switch over, slide the button joystick (**16**) in the required direction and hold it briefly in end position.

Only in operating mode Turtle

Preselect loading direction left/right In order to do this, slide the button in the required direction and briefly hold it in the end position.

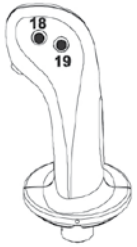
To the left Loading direction to the left (the truck is positioned on the left side of the **euro-Maus4**)

To the right Loading direction to the right (the truck is positioned on the right side of the **euro-Maus4**)

If the X-Y switch **(16)** is pushed to the left/right and held briefly, the direction of rotation of the swivel arm is reversed in each case.

With automatic folding, the preselected loading direction determines the destination of the loader (see Page 158) when folding out.

Rotatable seat brake (17) Set/release

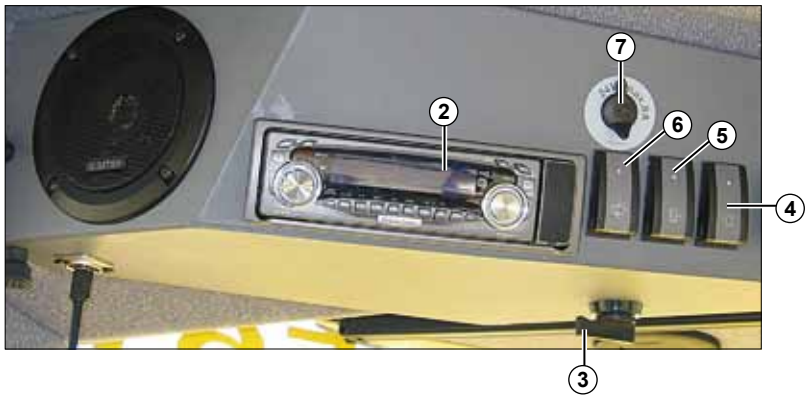


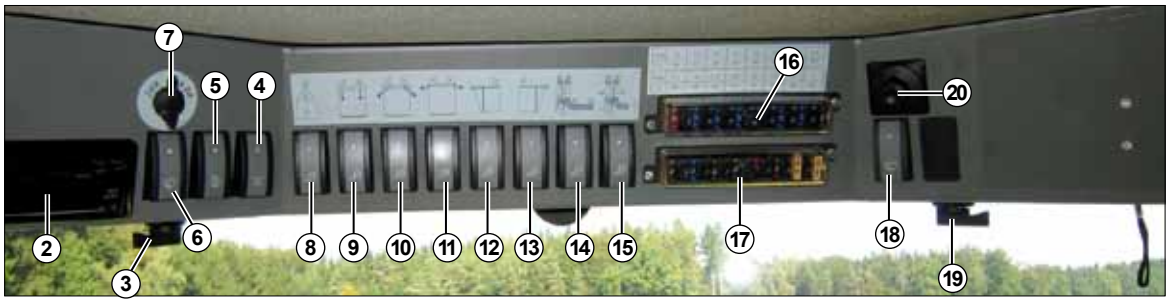
Residual beet pickup (**18**) Turn to the right

Residual beet pickup (**19**) Turn to the left

5.5 Operating components on the radio console on the cabin roof

All electrical loads switched using the switches on the radio console are operational even with the ignition switched off. If the engine is not running, please do not forget to switch off these electrical loads in due time.





(**1**) Microphone for public address (PA) system
(**2**) Radio (operation, see separate User Manual)
(**3**) Rotating switch for folding the left rear-view mirror in/out
(**4**) Switch for rotating beacons
(**5**) Mirror heater switch
(**6**) Switch for side window wipe/ washer left
(**7**) Socket 24 V/8 A maximum (for small automobile plug)
(**8**) Switch for work spotlight, central mark
(**9**) Switch for work spotlight on ROOF, lower
(**10**) Switch for work spotlight on ROOF, upper center
(**11**) Switch for work spotlight on ROOF, upper outside
(**12**) Switch for work spotlight on ROOF, rear left
(**13**) Switch for work spotlight on ROOF, rear right
(**14**) Switch for work spotlight for cleaning and truck conveyor
(**15**) Switch for work spotlights, lower left and right on the vehicle frame
(**16**) Fuse box with flat-type fuses F30 - F37
(**17**) Fuse box with flat-type fuses F38 - F45
(**18**) Side window wiper/washer, right
(**19**) Rotating switch for folding in/out of the right exterior rear view mirror
(**20**) Four-way switch for electrical adjustment of the exterior mirrors

(**23**) Socket 12 V/ 5 A maximum (for small automobile plug)
(**24**) Interior lights with integrated switch
(**25**) Switch for window wiper/washer, rear window
(**26**) Switch for interior LED lights in cabin ceiling
(**26a**) LED light in cabin ceiling
(**27**) Switch for boarding steps light
(**28**) Storage compartment

Warning

Warning! *Do not place any heavy or sharp-edged objects in the storage compartment. During jerky movements of the machine or driving around curves, these may fall out and severely injure the driver. Whenever possible, place such items in the storage compartment on the cabin rear panel.*

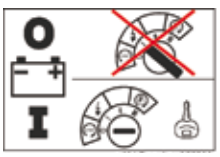
(**29**) Socket 12 V/ 5 A maximum (for large automobile plug)

Note

Note! *If the 12 V power outlets are overloaded, then this may lead to damage to the voltage transformer.*

(**30**) Installation space for radio set
(**31**) Timer for engine-independent heater (optional)
The timer for engine-independent heater even functions when the main battery switch is switched off.

(**32**) Main battery switch OFF/ON
Up = OFF
Down = ON

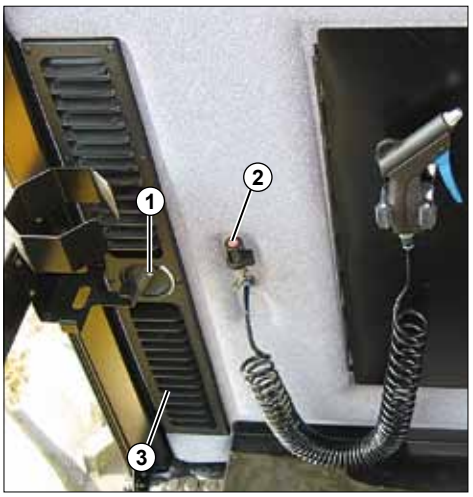


The main battery switch only disconnects the battery from the vehicle electrical system after a delay of 6 minutes. If the ignition is switched off, then the main battery switch disconnects the battery fully automatically from the vehicle electrical supply after 5 days.

5.6 Air conditioning

Air vents in the radio console

(1) Rotating switch, recirculation grille open/closed
(2) Temperature sensor for the air conditioning system
(3) Recirculation grille in the rear panel



(4) For example: air vents in the right A-column of the driver's cabin

(5) Air vent in the foot well

5.7 Video system

5.7.1 Only model year 2010

(**1**) Video monitor (see enclosed User Manual)

(**2**) Switch for central mark camera / truck conveyor camera (only if equipped with optional truck conveyor camera)

5.7.2 As of model year 2011 (quad display)

Operation, see Page 229

Video monitor, attached to the rotatable seat

5.8 Emergency switch-off of the battery

There is a toggle switch (**1**) for emergency switch-off of the battery on the front side of the central electrical system cabinet. This switch may **ONLY** be actuated **IN CASE OF EMERGENCY**.

In an emergency (e.g. fire in the vehicle), swivel the red flap upwards and toggle the switch up. This way the battery is disconnected from the vehicle power supply by the battery relay immediately and without delay.

Note

Note! *If this switch is toggled up with the ignition switched on, this may lead to data loss. With outside temperatures below 0 °C severe damage or destruction of the exhaust gas after-treatment system (SCR system) can occur as it is not blown free any more.*

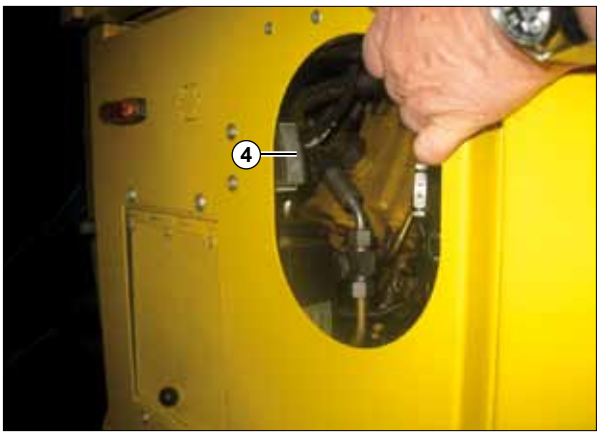
(1) Toggle switch for emergency switch-off

5.9 Engine housing lighting and sockets

The engine housing contains the switch (**2**) for motor housing lighting and a 24 V (max. 8 A) (**3**) power outlet.

There is a further 24V (max. 8 A) (**5**) at the rear located beneath the fuel filler neck next to the fuel prefilter.

5.10 Boarding steps lighting



Switch for boarding steps lighting on the outside of the machine.

The boarding steps lighting can be switched ON/OFF both with the switch (**4**) from the floor and with the switch in the radio console (**27**) from the cabin. The boarding steps lighting functions even if the main battery switch is switched off.

(27) Switch for boarding steps lighting in the radio console

5.11 Auxiliary steps on the fuel tank

(1) Auxiliary steps
(2) Locking lever
(3) Guard rail

Attention

Attention! *Falling hazard! The auxiliary steps on the fuel tank may be used only for refueling the* ***euro-Maus4*** *and for relubricating via the nipple block. It is permitted to be on these steps only inside the guard rail.*

Chapter 6

Operation

6 Operation

In this chapter, you will receive all information for safe operation of **euro-Maus4**. For most work in an agricultural operation, the mode of working and the work results are under the influence of many individual and different factors. It would exceed the scope of this operation manual if we were to address all conceivable situations (ground conditions, sugar beet varieties, weather, local landscape, etc.). This operation manual cannot be a complete instruction manual on loading sugar beets or replace driving instructions for driving on roads. Precondition for operation of this machine and for optimum harvesting results are, besides driving training offered by the manufacturer, solid basic agricultural knowledge and some experience with sugar beets and the associated work processes.
This chapter will inform you about operation processes and the context in operation of the machine and gives hints on setting of the machine.

Note

Note! *Before any operation of* ***euro-Maus4****, obtain in-depth information about safety measures for operating this machine. If there are people present who are not informed about the applicable hazard zones and safety distances, then inform these people about safety distances and hazard zones. In all cases, inform these people that you will immediately shut down the machine as soon as anyone unauthorized approaches the hazard zones.*

6.1 Initial commissioning

For the sake of safety, check all oil levels, the level of coolant, the available fuel quantity and the filling level of the AdBlue® tank. Otherwise, all the work and tasks required for the first startup are the same as those that must be performed everyday prior to startup. All bolted connections must be checked for tightness after the first 10 operating hours and be retightened as needed. In addition, the complete hydraulic system must be checked for leaks. Any existing leaks must be repaired immediately. Furthermore, all hose clamps on coolant lines, charge air lines and air intake lines must be checked for tight fit (visual inspection).

Stow the provided accessories, such as the fire extinguisher, wheel chock, cleaning scraper (**1**) and tool box in the cabinets or on the brackets provided for them.

6.2 Safety regulations for operation of euro-Maus4

- Before starting work, familiarize yourself with the machine and the operating components. If needed, obtain instructions from a person who already has sufficient experience in handling the machine.
- Before each startup, check the machine for driving and operating safety.
- Instruct all people staying in the vicinity of the machine about the hazard zones and the applicable safety regulations when dealing with the machine. Strictly prohibit all people from entering the hazard zones when the machine is running. The appendix to this operating manual contains a drawing showing the hazard zones of the machine. In case of need, copy this sheet and hand it out as needed to all people present during operation of the machine. Obtain confirmation of receipt of this sheet from each person by their signature.
- It is generally not permitted to transport people on the boarding platform either during driving on roads or during loading. If this regulation is deviated from for training purposes, then this is done at your own risk and under the responsibility of each of those participating.
- The effectiveness of operating controls or setting parts may in no way be impaired or rendered inoperative. Safety installations may neither be circumvented nor bridged or otherwise be rendered ineffective.
- When working with and on the machine, always wear tightly fitting and suitable protective clothing respectively approved personal protective equipment. Depending on the activities, the following personal protective equipment is required: Warning vest, protective helmet, safety boots, hand protection, ear protection, face protection.
- Rollers and conveyors may never be stepped on when the engine is running.
- Staying under raised machine parts is prohibited, even if the machine is shut off. These parts may suddenly come down and severely injure people.
- Staying in the swivel range of machine parts is prohibited.
- Only specifically authorized people may enter the hazard zones for discharging maintenance and monitoring tasks after precise agreement with the operator. These people must be precisely informed about possibly occurring hazards before entering the hazard zones. All activities between the operator and these people must be exactly agreed before beginning these activities. All maintenance, adjustment and monitoring work on this machine must – to the extent technically possible – always be performed with the machine standing totally still and engine shut off. The operator of the machine is responsible for the fact, that the machine cannot be put into operation by unauthorized people, inadvertently or in contrary to prior agreements.

Danger! *There is a hazard of very severe or even deadly injuries for people staying in the hazard zone. Especially near the pickup, objects or people may be drawn into rollers by body parts or pieces of clothing. In this case, body parts may be ripped off and fragmented. Objects may be drawn in by the rollers and destroyed or cause severe damage to the pickup of the machine. The operator is obliged to immediately shut down the machine, as soon as people enter the hazard zone or ingress into it with objects. As long as the machine is running, it is expressly prohibited to manually place into the machine any sugar beets that were not automatically lifted by the machine (this also applies to use of hand tools). The engine must be shut off before maintenance and repair work and the ignition key must be removed. Since in the past these activities have lead to very serious accidents, it is imperative to read the operating manual and observe safety information.*

- Shut off the engine when refilling fuel. Smoking, fire and open flames are strictly prohibited when handling fuel. Explosion hazard! Do not use cell phones or radios while refueling.
- Always give a short beep signal with the horn before starting up the engine. By doing this, you draw the attention of all people in the vicinity to the necessity of leaving the hazard zones. Make sure that no people are located in the hazard zones when the machine is started.
- Make sure of sufficient fire protection by keeping the machine free of dirt, grease residue and other combustible objects. Immediately remove spilt fuel or oils using suitable binding agents.
- Keep combustible material out of the area around the independent heating system and the exhaust pipe of the independent heating system (leaves, etc.)
- Do not operate the machine in enclosed rooms. There is a poisoning hazard due to poisonous engine exhaust gases. If the engine is to run in an enclosed room for maintenance or setting work, then the exhaust gases must be routed outside using suitable measures (evacuating device, exhaust hoses, exhaust pipe extensions, etc.).
- When driving on public roads and paths, in your own interest, comply with the applicable laws and regulations.
- Safe operation of the machine requires the full concentration and attention of the driver. Do not wear headphones for listening to the radio or for monitoring radios, etc.
- While driving, do not use radios, cell phones, etc. Should it be necessary, for operational reasons, to use such devices while driving, then always use a suitable hands-free device for this purpose.
- Set the external rear view mirrors before starting up the machine.

– Before driving off, always check if there are people present in the immediate vicinity of the machine. Inform these people about your plans and instruct these people to keep a safe distance.
– The individual vehicle handling of the machine always depends on the road condition, respectively, the ground condition. Always adjust your driving to the respective environmental and landscape conditions.
– Never leave the driver's seat with the engine running.
– When working in slopes and on hillsides, always make sure of sufficient stability of the machine.

6.2.1 Working in the vicinity of power lines

Danger! *Hazard to life due to electrical current! Due to the dimensions of the machine, the landscape and the construction of power lines, the prescribed safety distance may be violated when passing under power lines or while working in the vicinity of power lines. This causes the greatest hazard to life for the driver and bystanders.*

– When working in the vicinity of power lines, always comply with the applicable minimum distances. These minimum distances between the outside edge of the machine and the power line may amount to up to 8.5m. The size of this minimum distance always depends on the voltage of the power line. The greater the voltage, the greater the prescribed minimum distance. Obtain information from the power company responsible about the technical situation in due time before starting loading work. If needed, agree a voltage shut down with the power company for the power line for the time in which you perform work using the machine.
– Strictly abide with the agreements made between the power company and you about possible shutdown of power. Only begin your work after you have ensured yourself that shutdown has actually happened, for instance by calling the power company and inquiring about this.
– Especially when working at night or in overcast weather, exactly inform yourself about the routing of power lines. In case of need, have warning and safety sentries set up, which will warn you in due time using suitable signals (visual or acoustical signals) when hazardously approaching power lines.
– During work, make sure that you do not fall below the prescribed minimum distances.
– When installing antennas or other auxiliary devices, always make sure that the total height of the machine in no case exceeds a dimension of 4m.

Memorize the following behavioral rules well when you are working in the vicinity of power lines. Exact compliance with these rules may save your life.

6.2.2 Behavior during or after contact to power lines:

- Immediately try to interrupt contact with the electric power line by backing up, respectively, swinging away or lowering.
- Stay seated in the driver's seat – no matter what happens around you!
- Do not walk around in the cab.
- In case of electrical shock or after contact to a power line, in no case leave the driver's cab. There is extreme hazard to life outside of the cab.
- Wait until help arrives.
- In no case use a cell phone or a radio connected to an external antenna.
- Warn any people approaching the machine by means of hand signals and loud shouting of the danger.
- Only leave the driver's cab after you have been instructed to do so by rescue personnel.

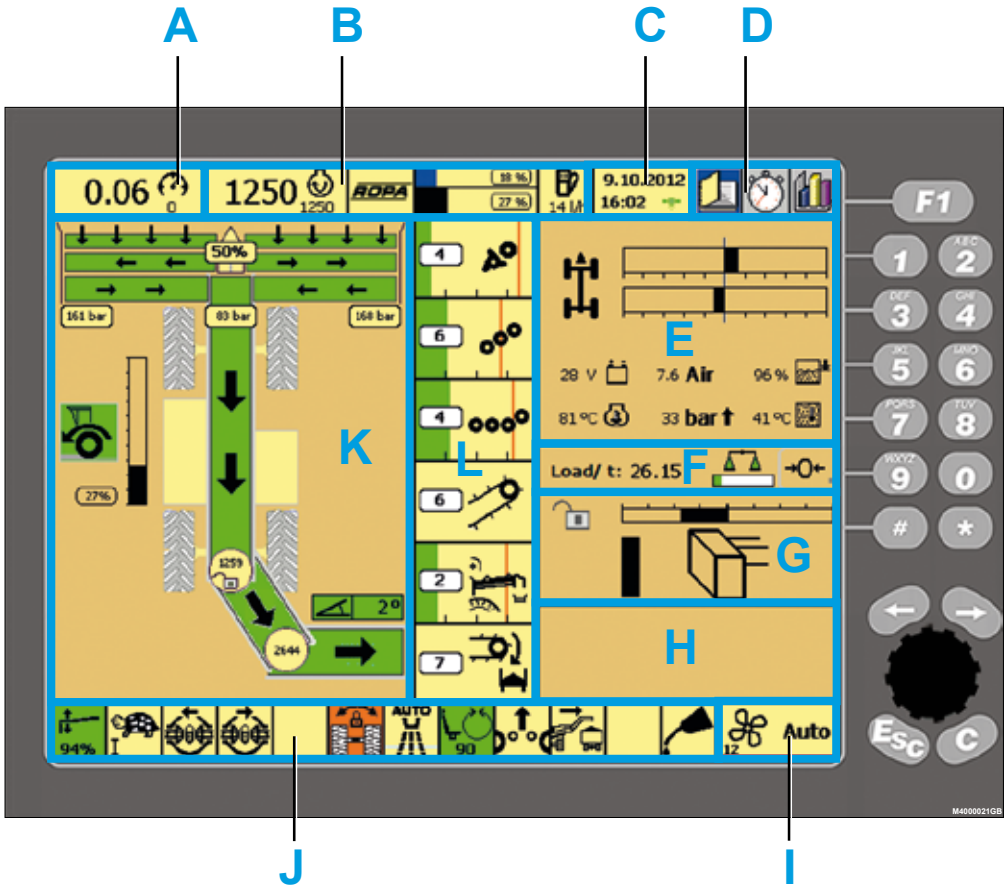
6.3 Color terminal

The color terminal is the information and command center of **euro-Maus4**. You can monitor the complete machine from here, obtain information about operating status and performance data and set parts of the machine.
Before working with **euro-Maus4**, you should definitely familiarize yourself with the color terminal and the different warning and status indications on the color terminal so that you are able to safely and effectively use the machine.

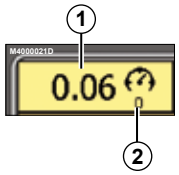
6.3.1 Keyboard and display sectors

The terminal is operated using the keyboard and the rotary knob (**1**). You can move up or down in all menus by turning the rotary knob. A blue bar or a field with a blue background (cursor) in the menu or in the function selection shows your current position. By lightly pressing the middle of the rotary knob (Enter function), you confirm the current position of the cursor.

Using the buttons (**3**) or (**4**), you move sideways in the menu or the row. In some menus, you may comfortably modify the values displayed using these keys or the rotary knob without having to input individual figures.
You can leave the current menu or the selected row by pressing the button (**5**) (jump back by one level).
You may cancel an input by pressing the button (**6**). Any beeping warning sound can be interrupted for 60 secs.
Using the numeric keys, you enter digits, special characters or letters, just like using the buttons of your telephone.
The button F1 (**7**) is programmed with differing functions, depending on the respective screen display. The respective function of this button is either directly stated on the screen or explained with the respective function in this manual, if needed.



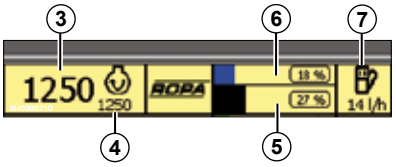
A Driving speed display section



(**1**) Current driving speed

(**2**) Desired speed cruise control

B Diesel engine display section



(**3**) Actual engine speed

(**4**) Desired engine speed

(**5**) Fuel tank level

(**6**) AdBlue® tank level

(**7**) Current consumption

C Date/Time/GPS

(**8**) GPS signal OK (optional, only with RABS system)

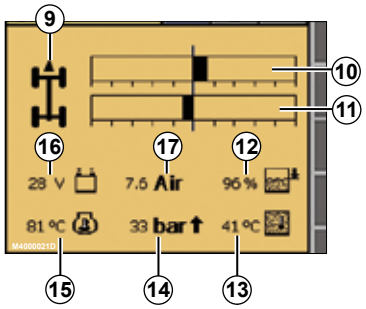
No GPS signal

GPS hardware error

D Display range Function selection

E Display range Steering status and operating parameters

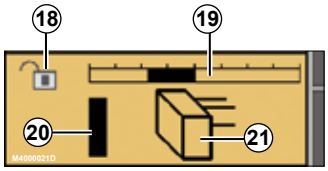
using / buttons, switches between Order management / RABS (optional)



(**9**) Active steering mode
(**10**) Position indication of front axle steering
(**11**) Position indication of rear axle steering
(**12**) Hydraulic oil level
(**13**) Hydraulic oil temperature
(**14**) Traction drive pressure;
UP arrow: higher pressure forward
DOWN arrow: higher pressure reverse
(**15**) Engine coolant temperature
(**16**) Battery voltage
(**17**) Compressed air system reservoir pressure

F Scales (optional) see page 234

G Counterweight arm



(**18**) Counterweight arm lock status
(**19**) Position of counterweight arm right/left
(**20**) Position of counterweight UP/DOWN
(**21**) Counterweight position information

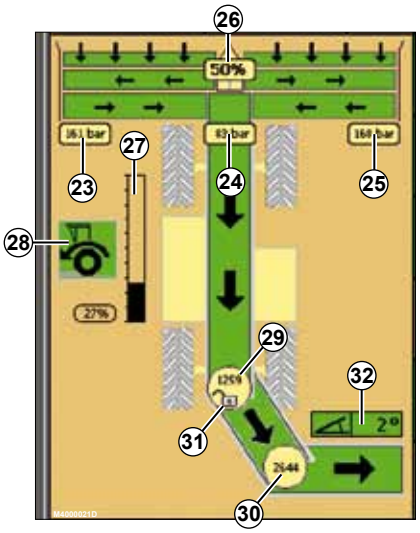
H Display field for warning indicators and information

I Dialog field of operating

This field displays the position of the rotating selector switch on the operating panel.
In our example:
Rotating selector switch on operating panel switch position 12 = Fan mode Auto

J **Fields for status displays** (see page 109, 110)

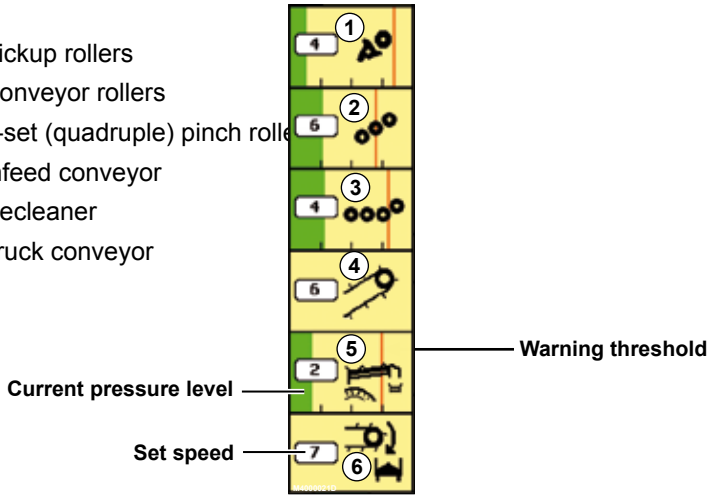
K **Display section of beet flow**



(23) Relief pressure - left
(24) Relief pressure - center
(25) Relief pressure - right
(26) Pickup height
(27) Status indicator bar showing hand potentiometer setting
(28) Status of traction drive (only during loading)
(29) Turning the swivel arm position
(30) Turning the truck conveyor position
(31) Swivel arm lock status
(32) Display of loading angle (inclination) of the truck conveyor articulation (only with Scales option)

L **Quick overview of loading parameters**

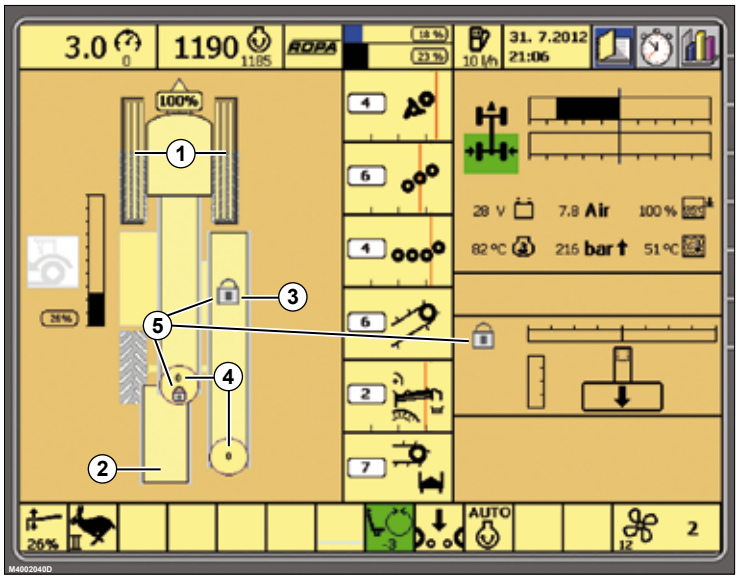
(**1**) Pickup rollers
(**2**) Conveyor rollers
(**3**) 4-set (quadruple) pinch rolle
(4) Infeed conveyor
(5) Recleaner
(6) Truck conveyor



Display of set speeds of the six separate drives. Red perpendicular line and bar graph show warning thresholds / pressure levels (does not apply to infeed and truck conveyor drive since these are monitored with speed sensor only and not with pressure sensor).

6.3.2 Main screen - Driving on the road

When driving on roads, the main screen shows the machine in "Driving on the road" setting in the display section K (beet section).



(**1**) Both pickup side sections in transport position
(**2**) Recleaner in transport position
(**3**) Truck conveyor in transport position (situated on the transport supports)
(**4**) Truck conveyor and swivel arm rotate into transport position (rotation indicator in "0" area)
(**5**) Swivel arm, counterweight arm and truck conveyor must display as locked

6.3.3 Selecting function section

Place the blue field on the desired function section using the wheel and confirm by pressing the middle of the wheel.

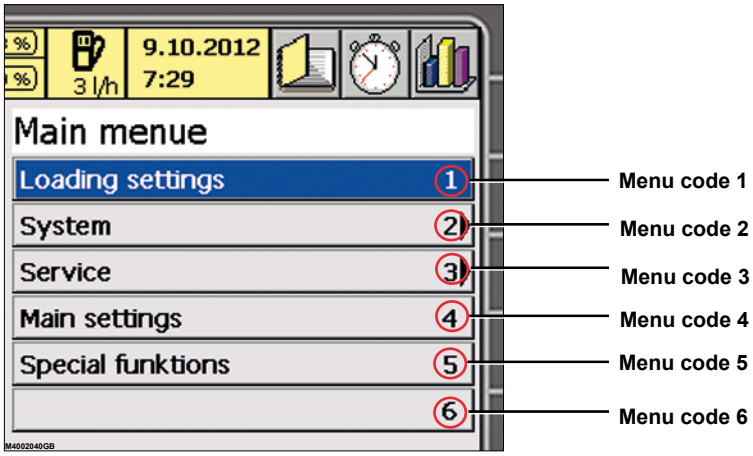
Main menu selected

Operating data selected

Machine settings selected

6.3.4 Main menu

All submenus of the main menu may be directly accessed by entering the respective menu code.



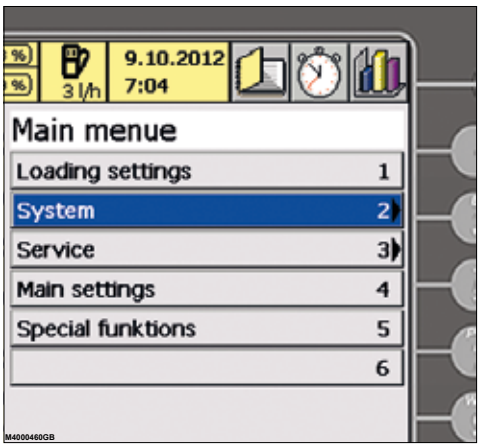
After confirmation of the selection, the following menu is displayed:

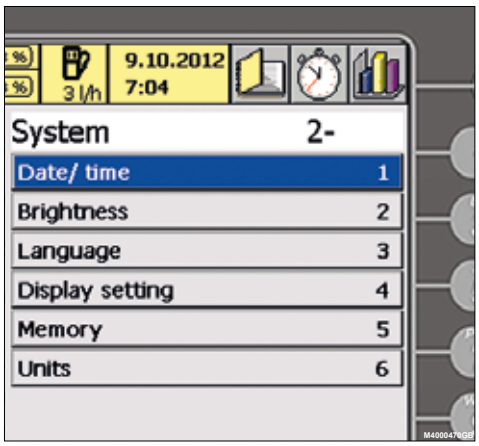
6.3.4.1 Loading settings

The desired menu item is navigated using the rotary knob and selected by pressing the middle of the rotary knob. This activates the associated bar graph.
The recommendation of the manufacturer is always the value of 0. Deviations may be set by the driver, if desired, from -10 to +10.
-values = the hydraulic circuit reacts more sluggishly +values = the hydraulic circuit reacts more aggressively

You may comfortably store your personal loading settings (those are all settings displayed on the color terminal) on your personal USB stick using the function "Export". This way, your settings are not lost in case of possible change of drivers. When starting your next work shift, you can transfer these settings from the USB stick to the machine using the function "Import". The function "Reset to factory settings" resets all settings in this menu to "0".

6.3.4.2 System menu (menu code 2)

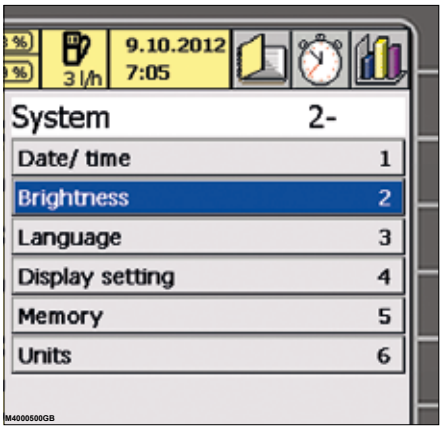


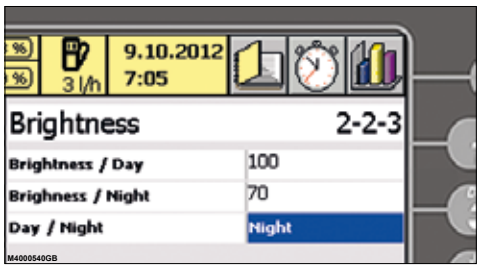


The date/time and language submenus are self-explanatory.
After a change of language setting, the menu must be exited and the ignition switched on/off (wait approx. 10 seconds until the color terminal completely switches off).

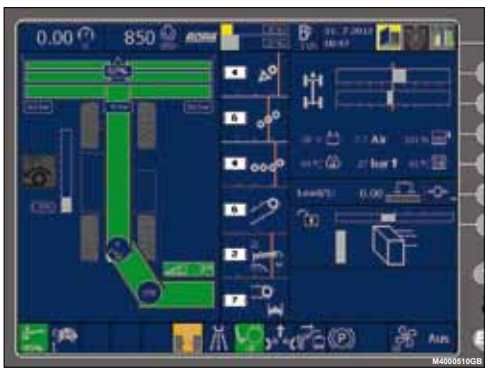
6.3.4.2.1 Brightness submenu

The brightness of the monitor for day and night-time display can be set separately in this menu. The changeover from day to night-time display is also possible. This changeover only takes effect when you leave the menu using the ESC-key.



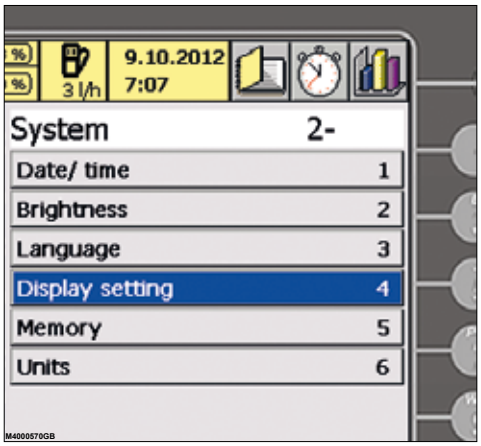


You can also switch between the day and night-time displays using the key combination * * 1.



Night-time display

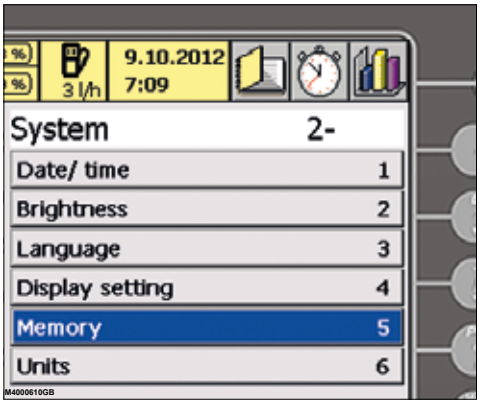
6.3.4.2.2 Display mode submenu

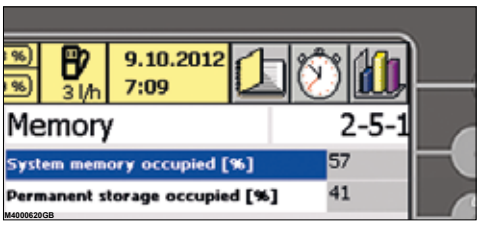


The option of switching between standard display and expert mode is included in the submenu "Display mode". It is also possible to switch between the two display types using the * * ABC 2 key combination. We generally recommend the standard display because this provides a better overview. The expert mode does not offer any additional functions or advantages for everyday work, but is mainly meant for maintenance personnel or development purposes, thereby displaying specific operating status in greater detail.

6.3.4.2.3 Memory submenu

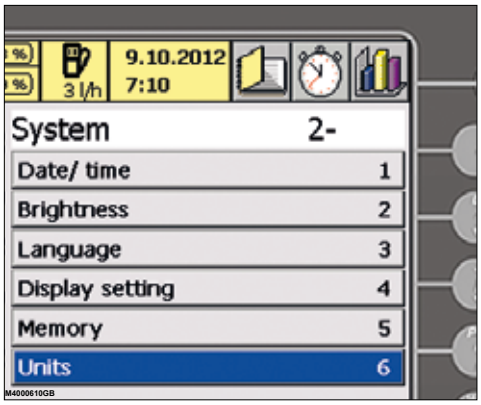
The memory submenu contains information about memory utilization in the color terminal. Faults may occur if values exceed 80%.
Please call ROPA Customer Service in such instances.

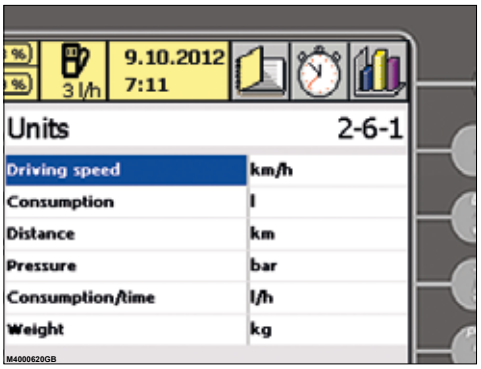




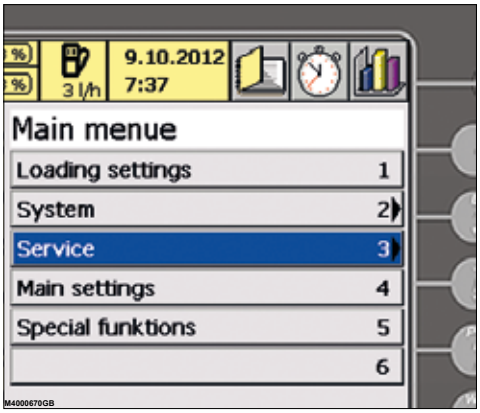
6.3.4.2.4 Units submenu

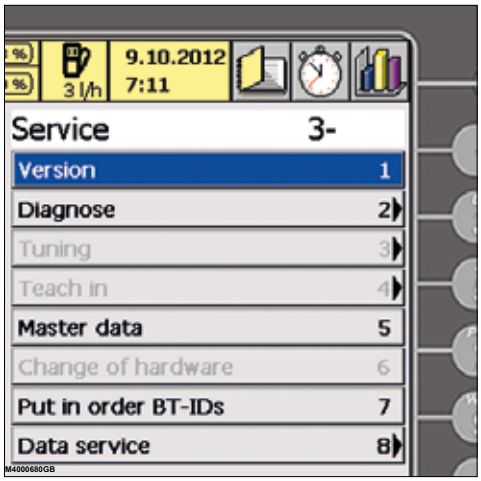
In the Units menu you can select various bases of calculation for the physical parameters speed, distance, volume and pressure.
Please be careful; if you set, for example, the driving speed at mph instead of km/h, the values on the driving speed display will be completely incomprehensible. Please do not adjust the values any more after having set them once before start of the season.
The default values correspond to the European standard.





The submenus are largely self-explanatory.



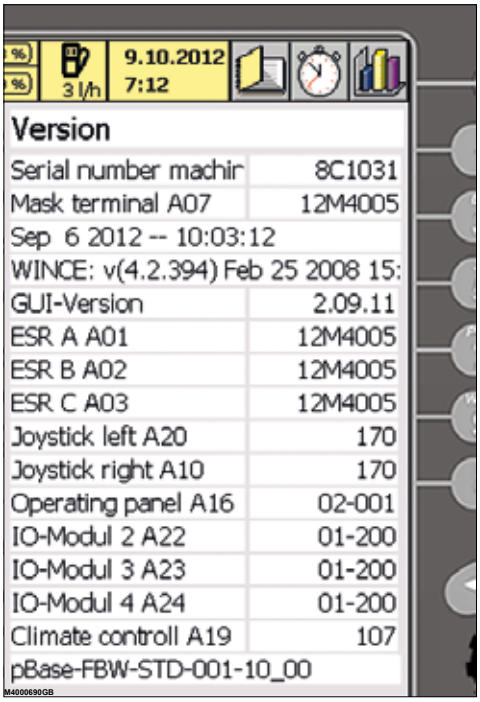


It is possible to switch between the standard display and the expert mode in the submenu display mode. We generally recommend the standard display because this provides a better overview. The expert mode does not offer any additional functions or advantages for everyday work, but is mainly meant for maintenance personnel or development purposes, thereby displaying specific operating status in greater detail.

Danger! *For safety reasons, access to these menus is locked by a specific code. If wrong settings are made in these menus or the applicable safety regulations are not or not sufficiently observed, then this may lead to extreme accidents with deadly injuries. In many cases, severe damage may be caused to the machine with the consequence of expensive repairs or long down-time periods. Access to these menus is therefore authorized only with direct contact to the manufacturer by telephone or to people expressly authorized for this purpose by the manufacturer.*

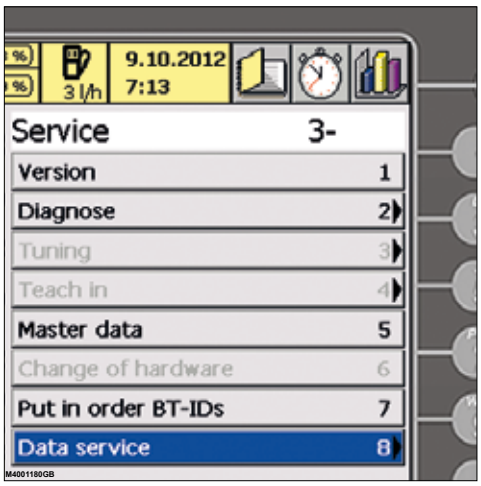
6.3.4.3 Version submenu

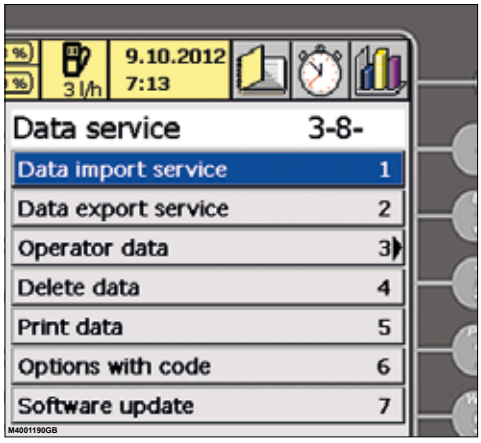
The Version submenu enables readout of the software status of the individual CAN-Bus participants.



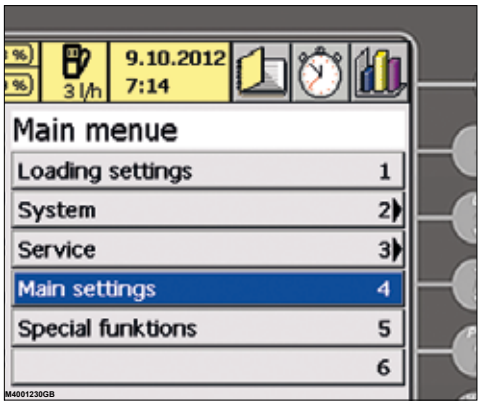
6.3.4.4 Data service submenu

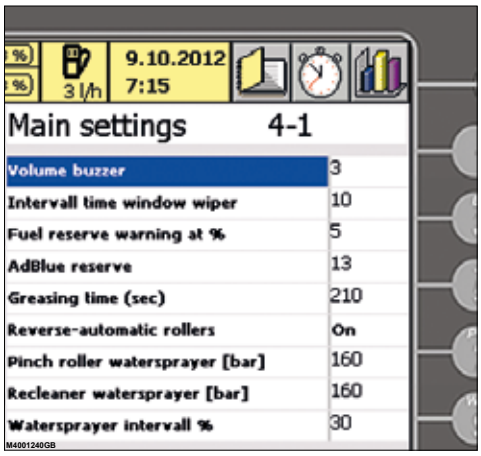
The "Data service" submenu is required for import and export and to delete databases. Software updates are also implemented using this submenu.





6.3.4.5 Basic settings menu

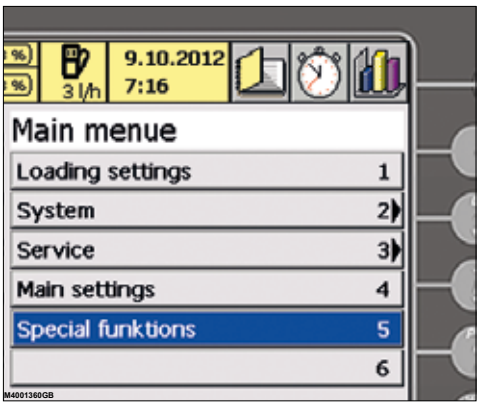


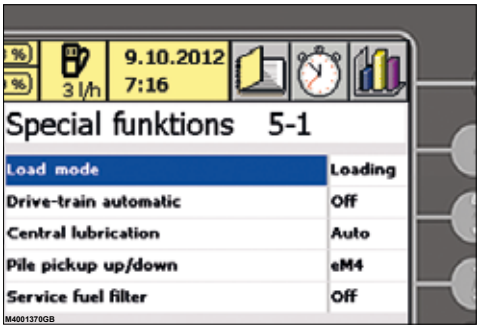


Most submenus are comprehensively described at the respective function.

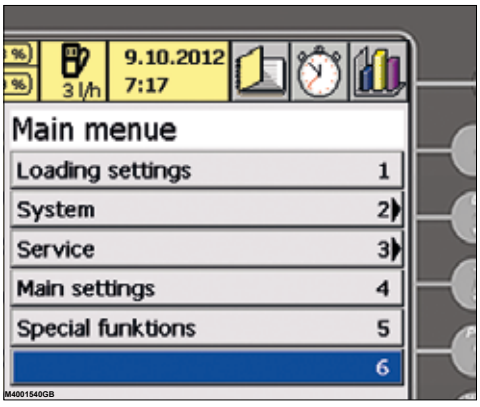
6.3.4.6 Special functions submenu

Loading mode see Page 197
Automatic traction drive see Page 129
Central lubrication see page 124
Pile pickup Up / Down see Page 209
Fuel filter service see Page 257





6.3.4.7 Empty menu



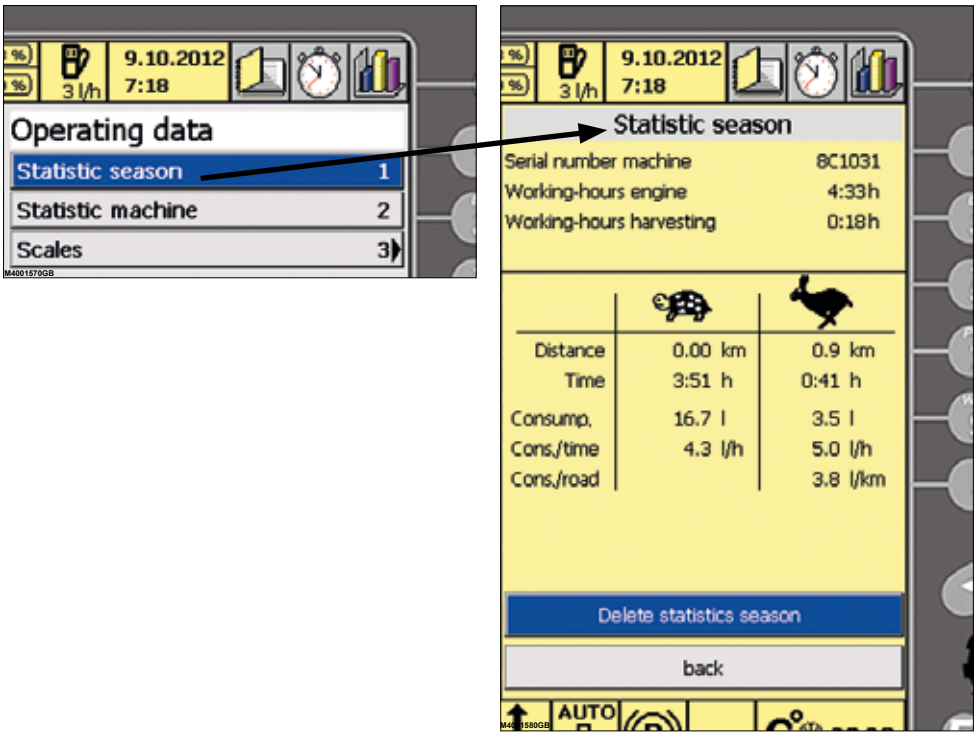
This menu serves solely to inform people working on further developments for the control program. No input of any kind are possible for the operator here. The information displayed cannot be sensibly used by the operator.
You exit this menu respectively the function section using the ESC key.

6.3.5 Operating data

Operating data may be selected using the rotary knob and the selection confirmed by pressing on the center of the rotary knob.

Operating data selected

The following menu is displayed after calling up the function section operating data:



Engine operating data	=	total engine operating hours
Harvesting operating hours	=	total operating period of machine drive
Distance	=	driven distance in km in operating modes "Turtle" and "Rabbit".
Time	=	total time in hours in operating modes "Turtle" and "Rabbit".
Consumption	=	total fuel consumption in liters in operating modes "Turtle" and "Rabbit".

Recording of operating data is performed per season (values may be deleted) as well as over the whole service life of the machine (values may not be deleted).
The values recorded are generally differentiated and evaluated separately for the operating modes "Turtle" and "Rabbit".

The "Season statistics" may only be deleted if the keys 1 and 4 are pressed one after the other before deleting. This avoids inadvertent deleting.

In "Machine statistics", it is neither possible to enter data nor to delete or modify data.

The Scales function is optional. Please see Page 234 for the description.

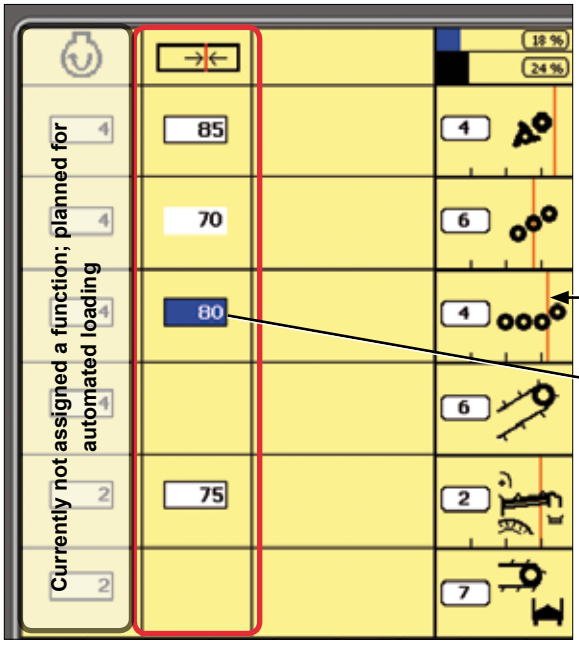
6.3.6 Machine settings

Select the "Warning thresholds" function section using the wheel and confirm the selection by pressing the middle of the wheel.

Machine settings selected

6.3.6.1 Warning thresholds adjustment

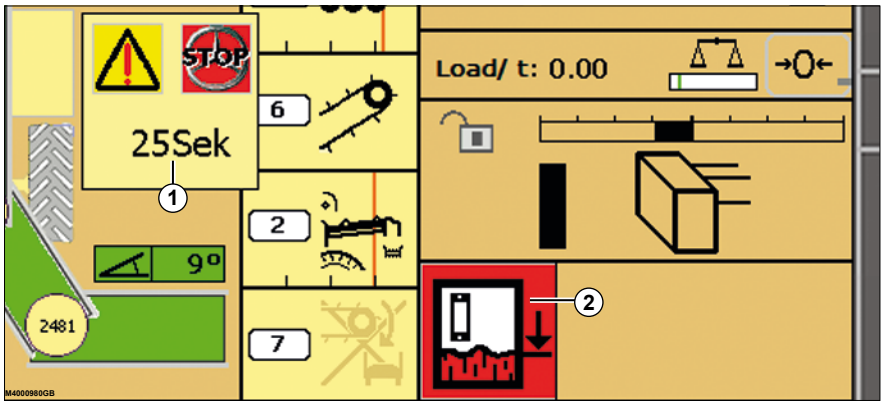
This function section may be used to modify the warning limits for drives of pickup rollers, 4 sets of pinch rollers and the recleaner.



Select the display bar for the desired drive by turning the rotary knob and confirm the selection by pressing the middle of the rotary knob .
Rotating the rotary knob scrolls the red mark for the warning limit. Confirm the setting by pressing on the center of the rotary knob .

You can exit the menu respectively the function section using the key ESC.

6.3.7 Warning and status indications at the color terminal



(1) Time until the engine is automatically switched off
(2) Error description

In the case of some severe operational outages, the diesel engine switches itself off after a certain time. An error message appears in the color terminal. An entry is logged in the fault memory at the same time. The engine can be restarted at the drivers own responsibility, e.g. to move off a railway crossing.

Warning indications

	Engine oil pressure too low		Parking brake release pressure too low
	Engine oil level too low		Battery voltage too low or too high (below 24V/higher than 30V)
	Coolant level too low		**WARNING!** Risk of injury
	Coolant temperature too high		Pickup rollers blocked (stone jammed)
STOP	Serious engine problems, immediately switch off engine		Conveyor rollers blocked
	Lubrication pump distributor gear unit failed		4-set pinch rollers blocked
	Clutch pressure pump distributor gear unit		Infeed conveyor blocked
	Hydraulic fluid level too low		Recleaner blocked
	Hydraulic fluid too hot		Truck conveyor blocked

	Stop! Insufficient supply pressure		**STOP!** Impending collision
	STOP! Emergency steering failed		

Status indicator

	Diesel engine torque limiter		Fuel prefilter dirty
	AWL warning Check diesel engine		Fuel fine filter dirty
	(Diesel Exhaust Fluid) AdBlue® warning		Air filter dirty
	Override switch active (U.S. version only)		Reservoir pressure compressed air system too low
	Fault in Mercedes engine control		Please fill up fuel tank
	Pickup rollers overloaded		Please fill up AdBlue®
	Conveyor rollers overloaded		Scales zero-balancing activated
	4-set pinch rollers overloaded		Differential lock front axle not released
	Infeed conveyor overloaded		Differential lock rear axle not released
	Recleaner overloaded		Low supply pressure
	Truck conveyor overloaded		Axle support switched on
	Generator 1 (upper generator) failed		Security code active
	Generator 2 (lower generator) failed		Collision warning (display of endangered location)

Status indicators

	Cruise control activated		Additional axles raised
	Machine drive switched on		Additional axles lowered
	Traction drive loading forward activated		Central lubrication operating
	The traction drive loading backward activated		Automotive driving active
	All-wheel steering active		Manual engine speed control active
	Automatically set rear axle straight active		Loading direction left active
	Operating mode "Rabbit" active (driving on roads)		Loading direction right active
	Operating mode "Turtle" active (loading operation)		Front differential lock engaged
	1st gear active		Differential lock rear engaged
	2nd gear active		Parking brake engaged
	Water spray system in automatic mode		Automatic parking brake active
	Water spray system in continuous operation mode		Driver's seat position indicator
	Watersprayer water tank almost empty		Height indicator pile pickup in percent

Operation instructions

	EMERGENCY-OFF pressed, please reset
	Please close engine compartment hatch
	Please close rear platform wall
	Please release "look forward" foot-switch
	Please press "look forward" foot-switch
	Please press "look forward" foot-switch or lift pile pickup
	Please swing down left joystick console
	When switching on the machine drive, please turn the driver's seat forward and check that no people are in the hazard zone of the pickup.
	Please turn the driver's seat to the right
	Please turn the driver's seat to the left
	Please lock main steering switch
	Please unlock main steering switch
	Please set rear axle straight
	Please set pile pickup to central position
	Please raise pickup further
	Please lower pickup further
	Please switch analog rocker in neutral position

	Please swing out pickup
	Please swing up the fold plates
	Please press driving pedal
	Please release gas pedal
	Please drive slower
	Please drive faster
	Start engine respectively release ignition key
	Please activate the traction drive forward
	Please swivel the recleaner into operating position
	Please swing out truck conveyor further
	Put truck conveyor in transport position
	Please lower truck conveyor
	Please lift truck conveyor
	Please swivel counterweight arm further to the left
	Please turn in front axle less
	Please turn in rear axle less
	Please switch off axle support

Operation instructions

	Please unlock counterweight
	Please lock counterweight
	Please lift counterweight
	Please lower counterweight
	Please unlock swivel arm
	Please lock swivel arm
	Please lift the driver's cabin
	Please lower the driver's cabin
	Please raise additional axle
	Please activate additional axle

	Please change gear
	Please change gear
	While in operating mode "Turtle", please shift to 1st gear
	While in operating mode "Rabbit", please shift to 2nd gear
	Please release driving pedal to switch on the differential lock
	Please release brake pedal
	Please release driving pedal to change gears
	Please close the safety bar at the incline area
	Please release parking brake

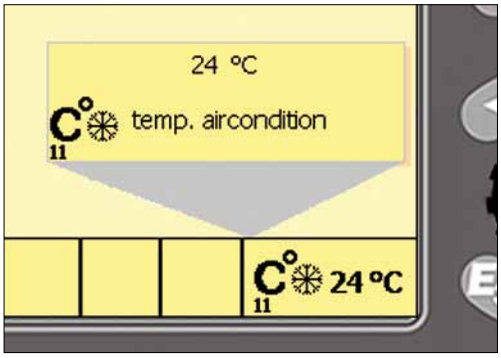
Instructions on electronic problems

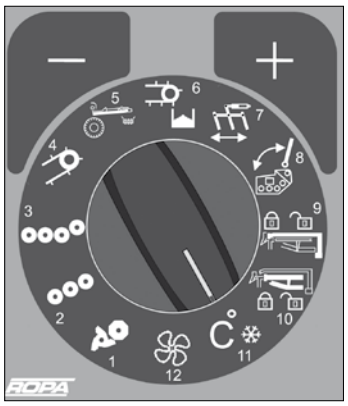
	Fault driving pedal sensors
	Analogue signal outside admissible range
	Line break or short circuit detected
	Internal memory fault in EEPROM
	Speed signal in prohibited range

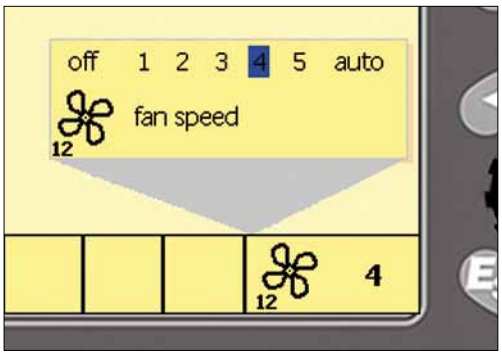
	Fault data backup
	Wrong machine configuration
	Communications problem with control device
	No connection to operating panel
	Fault level switch in intermediate tank

6.4 Air conditioning

The air conditioning system provides optimum climatic conditions in the drivers cabin, if possible. To set the desired temperature, select position 11 on the rotating selector switch.
The setting range is between 15° and 30°C. Pressing the - key lowers the desired temperature; pressing the + key raises the desired temperature.
You can read the respective set value on the color terminal.





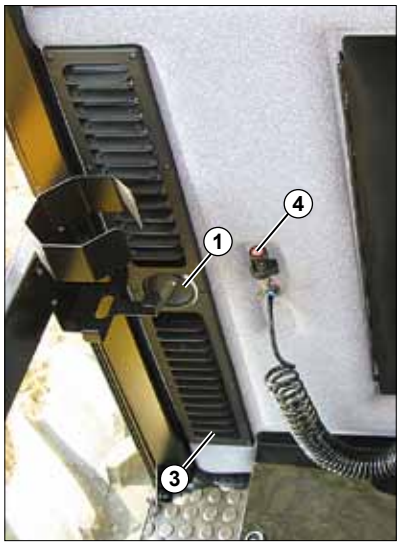


Setting the fan speed is performed using the + and - keys in the operating panel. For this purpose, select position 12 using the rotating selector switch.

Fan stage 0:	STOP
Fan stage 1:	Cooling switched off
Fan stage 2-5:	Cooling possible depending on setting of the ECO key
Fan mode AUTO:	Automated air conditioning with infinitely variable fan speed: The cabin temperature is set to the preselected desired temperature.

EC key = air conditioning system ON/OFF

Press key 1x: LED is lit, no cooling, only fresh air respectively heating.
Keep key pressed for several seconds: LED flashes, defroster function for clearing windows. Fan and heating system run at maximum power; simultaneously, the air is dried at maximum power.



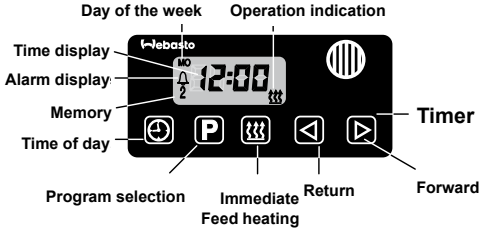
(1) Rotating switch
(2) Air nozzle in the foot well
(3) Recirculation grille in the rear panel
(4) Temperature sensor for the air conditioning system

To reach the desired cabin temperature as quickly as possible, open the circulating air grid on the right side in the rear wall using the rotating switch (**1**).

In case of cold weather, open the ventilation jet (**2**) of the fan cover for heating up the foot well.
When you have opened this jet, the air volume of the other ventilation openings substantially decreases.
Observe that fogged windows are only freed quickly if you keep the jet in the foot well closed until the windows are free.
Make sure that the temperature sensor (**4**) on the rear cabin wall is always unobstructed and is not covered by pieces of clothing or other objects because, otherwise, the air conditioning system will not work correctly.

6.5 Independent heating system (optional)

6.5.1 Operation independent heating system



The time of start of heating may be preselected using the timer within a period of up to 7 days. Programming of 3 startup times is possible, whereby only one may be activated. The timer has an alarm function.
With the ignition switch on, the clock shows the current time of day and the day of the week. If the heating system is operating, then the display and the keys are lit. After connecting up power supply, all icons of the display flash. The time of day and the day of the week must be set.

6.5.2 Operation independent heating system

Operation of the clock is designed so that all flashing icons may be set using the ◀ and ▶ keys. If no key is pressed for 5 seconds, then the time displayed is stored. If the keys ◀ and ▶ are pressed for more than 2 seconds, then fast mode is activated.
If the ignition is switched off, while the heating system is in permanent heating mode, then the display shows a residual operating time of 15 minutes and the heating system remains in operation.

Switching on

Manually:	by pressing the key (continuous heating mode)
Automatic:	by programming the start of heating

Switching off

Manually:	by pressing the key
Automatic:	by programming the operating time

With the heating system operating: by setting the residual operating time

Setting the time of day/day of the week

Press key for more than 2 seconds – time of day flashes – set time of day using the keys ◀ and ▶ – day of the week flashes – set day of the week.

Query time of day
When ignition is switched off: Press the key.

Program start of heating
Press key P – memory flashes – set start of heating using the keys ◀ and ▶ day of the week flashes – set day of the week.
The memories 2 and 3 may be programmed or a switch may be made to the time of day mode by pressing the key P several times.

Query/delete the preselect times
Press key P several times until the desired memory is displayed. To delete the preselect time – press the key P several times until the time of day and no memory is displayed.

Program operating period
The heating device must be switched off. Press the key ◀ for 3 seconds – operating period flashes – set the desired operating time using the keys ◀ and ▶ (10 to 120 minutes).

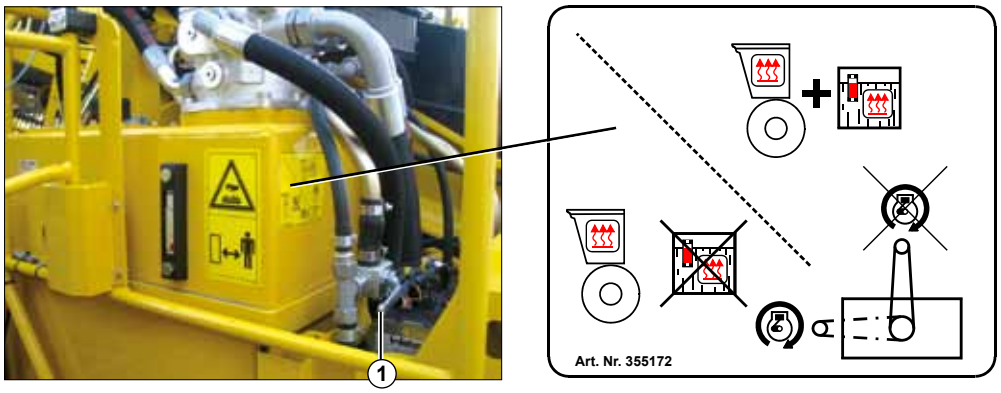
Set remaining operating time
Set the desired remaining operating time (1 to 120 minutes) using the ◀ and ▶ keys.
The remaining operating time is the time the heating device remains in operation. It may only be modified while the heating device is operating and the ignition is switched off.

Set alarm time
The alarm time is not tied to a day of the week. Press the key several times until the bell icon appears on the display. Set the desired alarm time using the ◀ and ▶ keys.
The alarm switches off after 5 minutes or when one of the keys is pressed.

Query/delete alarm time
Press the key P several times, until the bell icon appears on the display – read alarm time. Deleting the alarm time – press key P until the bell icon no longer appears on the display.

6.6 Heating hydraulic fluid tank (only in conjunction with the independent heating system)

If your **euro-Maus4** is fitted with the optional independent heating system, then the fluid in the hydraulic fluid tank may be preheated using the fluid tank heater. A heat exchanger is located in the hydraulic fluid tank, which is connected to the cooling water circuit of the diesel engine. The heater of the hydraulic fluid tank should be switched on for each cold start.



For this purpose, move the lever of the ball cock (**1**) on the outside wall of the hydraulic fluid tank upward.
To switch off the fluid tank heater, move this lever frontward.

Note

Note! *Use the fluid tank heater. Preheated hydraulic fluid reduces wear of the hydraulic system.*
As long as the independent heating system is operating, the main battery switch may only be switched off in emergencies since, in this case, the heating system is switched off without run-on (danger of overheating!).

Switch off the fluid tank heater before starting the diesel engine, but at the latest as soon as the color terminal displays a hydraulic fluid temperature of 40°C or more. Otherwise, the hydraulic fluid is constantly heated up by the cooling water of the diesel engine and unnecessarily heated up.

6.7 Diesel engine

6.7.1 Starting the engine

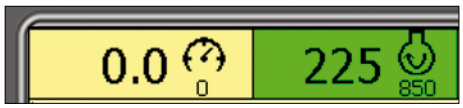
If the driving pedal is not in resting position during starting, then, for safety reasons, the traction drive is blocked. The block remains until the driving pedal is completely released and pressed again.

The engine is started and shut down using the ignition lock.
The ignition lock has four switching positions:

Position 0: Switches off engine/ignition – the key may be removed
Position I: Ignition on, engine is ready for starting
Position II: Currently not used
Position III: Starts the engine

Let the engine idle for a short time before shutting off the engine. If the engine is shut down at high speed, then the turbo charger runs on after the oil pressure has already fallen.

This leads to lack of lubricant and therefore to unnecessary wear on bearings of the turbo charger running at high speed.



The green color in the display field for the diesel engine indicates the starting process.

After each start of the engine, the fan of the cooling system is automatically reversed for a short time. This frees the cooling system of loose dirt (leaves, etc.).

Attention

Attention! *The use of chemical starting aids (for instance Startpilot, etc.) is expressly prohibited, since this may lead to injuries and to damage to the engine.*

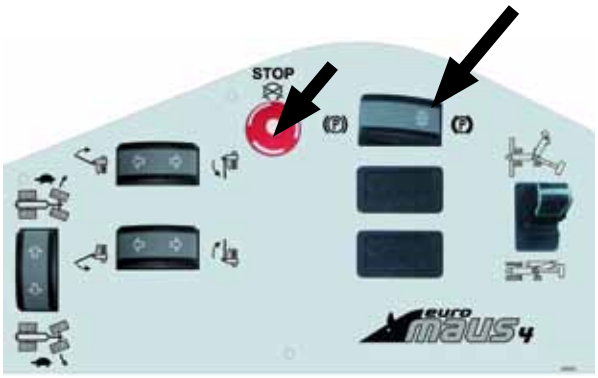
If the engine does not start immediately, then the electronic system switches off the starter after a certain period of time. In this case, wait at least 2 minutes until the next try to start so that the starter can sufficiently cool down.
If the engine cannot be started due to a starting block, then the color terminal displays the following warning icons:

Close engine compartment cover

Swing up rear platform wall

6.7.2 Shutting off the engine without booting up the terminal

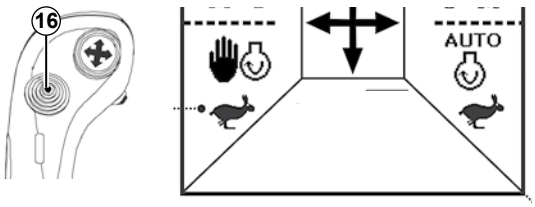
When the parking brake is engaged (toggle switch pressed to the rear), then the engine may also be shut off by pressing the EMERGENCY-OFF switch. Using this method, the color terminal continues to operate. After resetting the EMERGENCY-OFF switch, the engine may be started new.



6.7.3 Engine speed adjustment

6.7.3.1 Engine speed adjustment - operating mode "Rabbit"

By sliding the X-Y switch (**16**) to the right/left on the left joystick, it is possible to switch between driving with manual engine speed control (to the left)
and automotive driving (to the right). To switch, the X-Y switch (**16**) must be slid into the respective direction and shortly held in this position.



Automatic engine speed adjustment (automotive driving)
During automotive driving (display on the color terminal:), adjustment of the engine speed is exclusively performed using the driving pedal (also known as accelerator or gas pedal).

Manual adjustment of the engine speed
Manual engine speed adjustment in the operating mode "Rabbit can only be performed using the manual potentiometer (**14**). The highest engine speed is at about 1500 rpm. This variant is best suited for driving on uneven terrain.

6.7.3.2 Engine speed adjustment in the operating mode "Turtle"

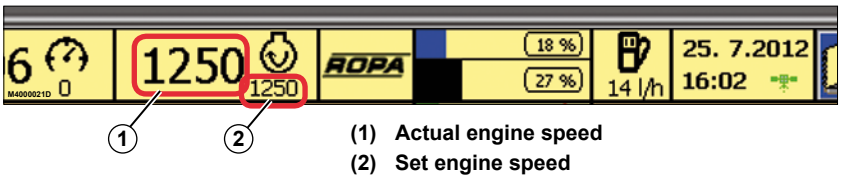
Engine speed control is manually performed by moving the X-Y key (**16**) forward/reverse on the left joystick.

Press X-Y key (**16**): The engine speed increases by 25 rpm each time it is pressed.

Briefly pull backward on the X-Y key (**16**): Each time it is pressed, the engine speed decreases by 25 rpm. Press and continue to hold pressed the X-Y key (**16**): the engine speed will continue to change for as long as you keep the key pressed.

Machine drive ON/OFF

After switching on the machine drive, the speed of the diesel engine is automatically set to the value which had been set before last switching off the machine drive. After switching off of the machine drive, the engine speed is automatically reduced to idling speed (exception "After-loading" - see page 147).



(1) Actual engine speed
(2) Set engine speed

6.8 Selecting operating modes

The **euro-Maus4** may be operated in the following operating modes:

I	"Turtle I"	=	Loading operation
II	"Turtle II"	=	While it is possible to switch into this operating mode, in practice, however, it does not make sense because this would switch off the all-wheel drive.
I	"Rabbit I"	=	Slow driving on roads with all-wheel drive
II	"Rabbit II"	=	Rapid driving on roads without all-wheel drive

6.8.1 Switching gears (gear shifting)

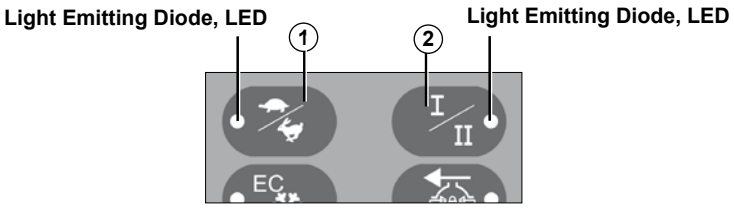
The transmission is used to switch between the operating modes "Turtle" and "Rabbit" as well as between gear I and gear II. The color terminal displays the icon of the currently active combination of operating mode and gear.
In the operating mode "Turtle", the boarding steps are swung out and the warning signs on the pile pickup swing up.

Driving speeds:

Operating mode "Turtle I":	0-0.7 km/h
Operating mode "Rabbit I":	0-10.3 km/h Operating mode "Rabbit II": 0-20 km/h (respectively 25 km/h / 32 km/h)

Gear-shifting process

- Engage the parking brake.
- Set the engine to idling speed.
- Select the desired combination of operating mode and gear using the keys (**1**) and (**2**) of the operating section:
  Select operating mode button (**1**): "Turtle"/"Rabbit";
  Select gear button (**2**): I/II.



- When switching to another operating mode, a sound may be heard ("clack").
- If one of the two key LEDs and the icon on the color terminal are flashing after switching, then the transmission is under tension. Release the parking brake and drive **very carefully** (!) and very slowly forward or backward. The transmission will now audibly switch. In spite of this, check if the icon for the selected operating mode is visible on the color terminal and if the key LED of the operating section is constantly lit.

Note! *Danger of severe damage to the transmission.*
Please observe the above hints in any case! Transmission damage caused by non-compliance or imprecise compliance is excluded from any guarantee or warranty!
The keys for switching between the operating modes may ONLY be used if the machine is standing completely still (0.0 km/h). Additionally, sufficient pressure must be present in the compressed air system. This is the case, when the icon *is no longer displayed on the color terminal. If you do not comply with this instruction, then this may lead to destruction of the transmission.*

If it is not possible to move the vehicle, then the cause for this is shown on the color terminal:

Ignition key is in the "start engine" position.

Please release the parking brake by actuating the toggle switch "Parking brake".

Please release the foot brake.

Reservoir pressure of the compressed air brake is too low!

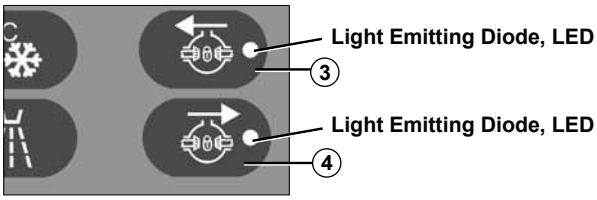
Release pressure of the parking brake is too low!

Fault of the driving pedal sensors!

Call customer service!

6.8.2 Switching the differential lock ON/OFF

The differential lock for the front axle and rear axle can be activated independently of each other.



The front axle is switched on/off by means of button (**3**)
and the rear axle by means of button (**4**) on the operating panel.
A lit LED (light emitting diode) within the respective button and an icon on the color terminal show which differential lock is switched on.
A flashing LED shows that the corresponding switching process cannot be executed, either because the axle is locked up or the engaging position has not been reached.
Remedy: move steering back and forth in the central range and/or drive a short distance forward and backward.
It is not possible to lock the rear axle alone. The lock of the rear axle can only activated if the differential lock of the front axle has been switched on. If, on the other hand, the differential lock for the front axle is switched off, then automatically the differential lock for the rear axle is switched off as well.

Only switch the differential locks when the machine is standing still (0.0 km/h) and the wheels on the axles are approximately aligned straight!

Only switch on the differential locks if they are actually needed. Use of the differential locks is not required when operating on normal terrain or with correctly set pickup depth and pickup relief.

Note

Note! *If machine traction is insufficient under demanding conditions, then first switch on just the differential lock of the front axle.*
The rear axle lock should only be used if continuation of work would otherwise be impossible. To avoid damage to the axle, the wheels must in any case be steered to about straight alignment.

The power transmitting components (differential drive, jointed shaft, planetary gears, etc.) are subject to very heavy strain.
Never steer the wheels with a too great angle with the differential lock engaged!

When you increase the steering angle too much, one of the following warning icons is displayed on the color terminal. In addition, a warning signal sounds. Before switching on, always set the wheels straight!
If the steering angle of the front or rear axle is excessively turned in a particular direction, then the differential lock cannot be engaged.

Note

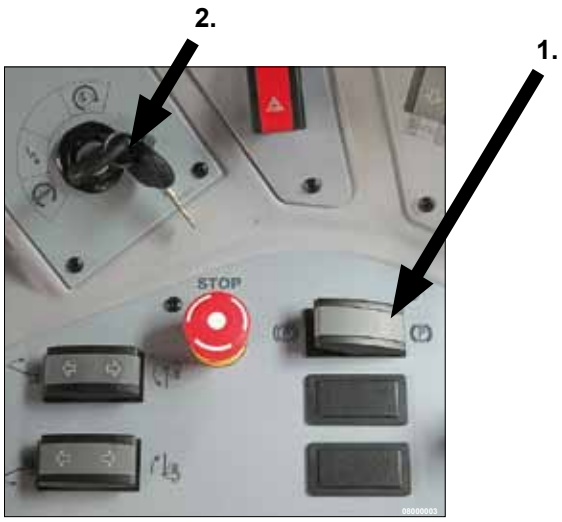
Note! *The rear axle is only able to perform limited steering tasks with the differential lock engaged. If larger steering movements of the rear axle are required, then first shut off the differential lock of the rear axle.*

When switching to operating mode Rabbit II, the differential locks are automatically switched off.

If the differential lock should be accidentally switched on while driving, the following warning icon is displayed on the color terminal: .
To cancel the differential lock, completely release the driving pedal and stop the machine.

6.9 Driving

Hydrostatic drives are deemed very safe. The following measure additionally increases this safety, if there should be any operating faults of the drive.
If, when releasing the driving pedal, the machine should neither reduce driving speed nor stand still, then a safety circuit is activated by engaging the parking brake (**1.**).
This safety circuit defeats the standard control behavior of the hydraulic system and



opens a safety valve quickly shutting off the traction drive.
If, in the extremely improbable case of failure of all safety devices, the machine should still not stop, then shut off the diesel engine (**2.**) as quickly as possible.

Danger! *Danger of severe rear-end collisions with injuries hazardous to life or even deadly when engaging the parking brake or shutting off the Diesel engine, while the machine is driving. Therefore, take this EMERGENCY-STOP measure only in extreme emergencies and try to warn following traffic by pressing the foot brake pedal several times and switching on the hazard warning system.*

6.9.1 Driving on the road (operating mode Rabbit)

If you wish to drive on the road, you can select either automotive driving or driving with manual speed adjustment (manual potentiometer on the right joystick - see page 129). The automotive driving control relieves the driver and lightens the load on the environment.

Automotive driving means that the driving speed is preselected by the pressure on the driving pedal. The electronic system controls the hydrostatic drive and the diesel engine so that the preselected speed is always driven at the lowest possible engine speed, independent of the fact whether you are driving uphill or downhill.

You control the driving speed of the machine using the driving pedal. The more you press on the pedal, the faster the machine drives. When you completely release the driving pedal, the machine strongly brakes due to the hydrostatic drive.

6.9.1.1 Switching driving direction

Foot switch for driving direction (**3**):

NOT PRESSED	Driving direction "forward"
PRESSED	Driving direction "backward"

(3) Foot switch for driving direction
(5) Driving pedal

The following is only for operating mode "Rabbit II": the driving pedal (**5**) must be released completely for switching to drive in the reverse direction. Wait until the machine is standing completely still (0.0 km/h). Only then may the "foot switch for driving direction" be pressed and held in this position. As soon as the driving pedal is pressed, the machine will drive in reverse.

In operating mode "Rabbit I", the driving direction may be changed at slower driving speeds.
A warning signal always sounds when driving backward, thus drawing the attention of other people to the backward movement. Simultaneously, both backup lamps are automatically switched on.

Note! *Risk of damage to the machine. When driving in reverse, always make sure that the counterweight is raised high enough that neither the counterweight nor the underrun protective device contact the ground/road surface. This danger exists when sharply rising terrain is located to the rear of the machine.*

The following only applies to machines equipped with the underrun protective device:

Attention! *Danger of severe personal injury. If the counterweight is raised to enable driving in reverse, then swing the underrun protective device upward. By doing so, the rear turn indicators and lighting fixtures are covered. As soon as possible, lower the counterweight completely and use the rear view camera to make sure that the underrun protective device is completely swung down.*

6.9.1.2 Cruise control

euro-Maus4 is equipped with cruise control to relieve the driver. This enables control of the driving speed in operating mode "Rabbit II" **only** and is activated by either pressing the driving pedal or by switching on cruise control. Especially when driving for longer stretches, this relieves the driver.

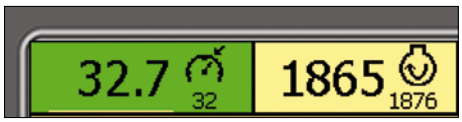
6.9.1.2.1 Switching on cruise control

Cruise control may only be switched on if the following conditions are met:

- Operating mode "Rabbit II" is switched on
- Left joystick console is swung down
- Driving speed exceeds 10 km/h.

Input the desired speed using the driving pedal. When this speed has been reached, press the right joystick all the way forward and hold it in this position, until the display field for the driving speed turns green on the color terminal.

Cruise control takes over the speed set by the driving pedal at the time at which the joystick has been moved forward.
This speed is not necessarily the speed currently being driven.
Example: The current driven speed is 11 km/h. The driver quickly presses the driving



pedal to the end-stop – the driving pedal sets maximum speed for the machine. The machine begins to accelerate. In this moment, cruise control is switched on. Cruise control assumes the speed set by the driving pedal (= maximum speed). If you would like to increase the speed shortly during the drive, then you can override cruise control at any time by pressing on the driving pedal. If you drive faster than set by cruise control, then cruise control is switched on, but the effect of cruise control during driving can only be detected when you reduce pressure on the driving pedal. When you release the driving pedal, then the machine will continue to drive at the speed recorded by cruise control.

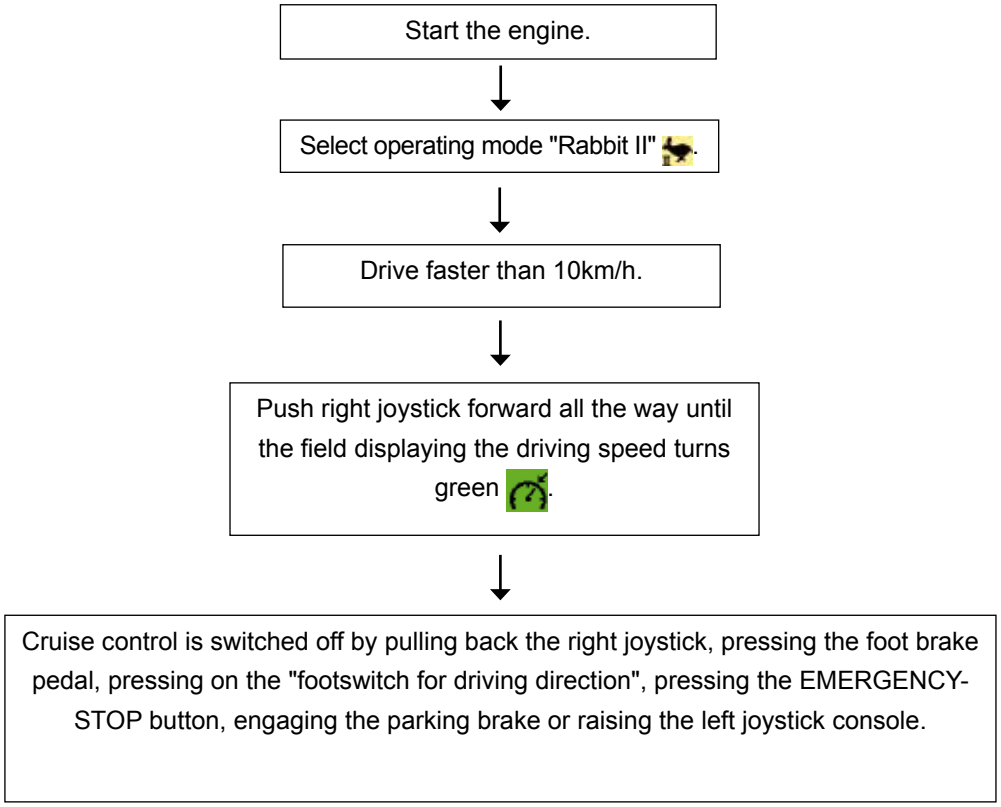
6.9.1.2.2 Switching off cruise control

Before switching off cruise control, you should always press the driving pedal down sufficiently far enough so that you can use the driving pedal to take over the same speed driven by cruise control. By doing so, you prevent a sudden braking effect of the machine after switching off cruise control.

To switch off cruise control, shortly pull the right joystick completely back. Further options for switching off cruise control are:

Pressing the footbrake pedal or pressing the foot-switch for driving direction.

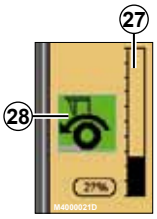
6.9.2 Quick tutorial: operating cruise control



6.9.3 Driving in operating mode Turtle (loading)

In operating mode Turtle, the traction drive is operated almost exclusively using the buttons (**2**) and (**3**) and the manual potentiometer (**14**) on the right joystick.
If driving forward is activated using key (**2**), then the terminal displays the icon .

This button is used to switch on forward driving. Pressing this button again stops the traction drive.
Switching off machine drive (yellow machine drive button (**6**)) also switches off the traction drive.



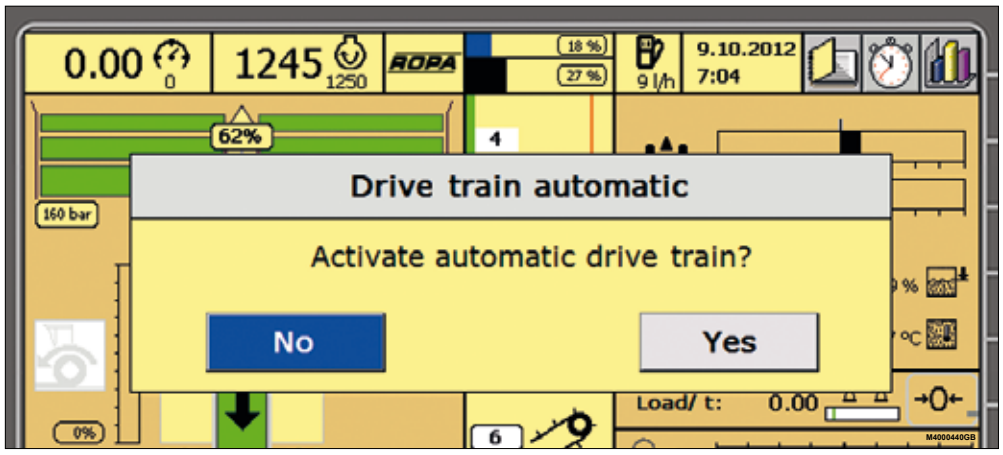
The driving speed (= feed speed) for loading operation is set using the manual potentiometer (**14**).

(27) Status indicator bar showing hand potentiometer setting
(28) Status of traction drive (only during loading)

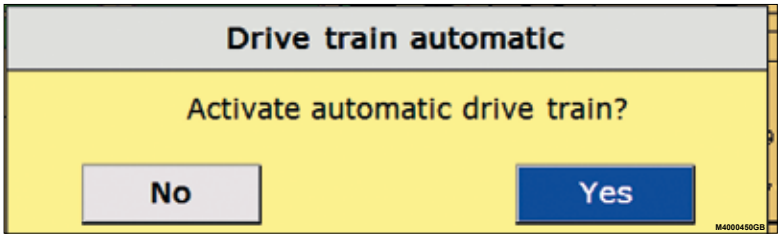
The speed set may be overridden up to maximum speed using the driving pedal. This function enables quicker driving to the beet pile.

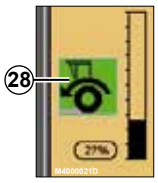
6.9.3.1 Automatic feed switch-on

Each time the ignition is switched on and each time the operating mode is changed (Rabbit ↔ Turtle), the following selection field appears on the color terminal after the machine drive (yellow button (**6**)) switches on.



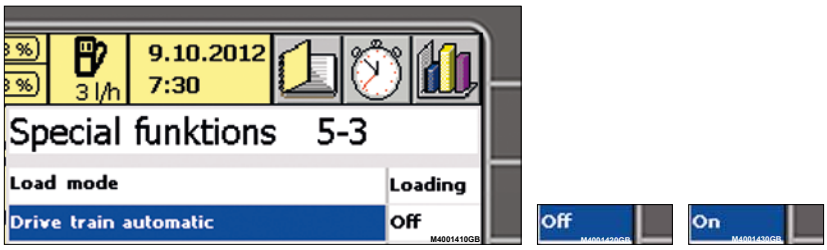
Use the rotary switch on the color terminal (rotate and press) to select either option "YES" or "NO".





Selecting "YES" activates the automatic system for the traction drive. Now press button (**2**) to switch on the feed. After switching off the machine drive, the display field for traction drive status (**28**) flashes. This means that: after the next switch-on of the machine drive, forward driving motion starts automatically (as soon as the pickup rollers start to rotate). Pressing button (**2**) is therefore no longer required. This function remain activated until the next change of operating mode or until the next boot of the computer. For safety reasons, pressing button (**3**) also switches off the automatic feed switch-on.

However, if you wish to reactivate the currently deactivated automatic feed switch-on, then you can do so by selecting the "Automatic traction drive" in the "Special functions" menu.



6.9.3.2 Driving in reverse in operating mode Turtle

If reverse driving is activated via button (**3**), then the icon . appears on the terminal. This button switches on the reverse drive direction of the traction drive for as long as the button is pressed. (**3**).

If **euro-Maus4** is driving forward during loading, then you can stop this movement by pressing this button. While driving in reverse, speed control using the manual potentiometer is not possible. The machine always drives backwards at the maximum possible speed.

In addition, the traction drive may be stopped as follows:

- Pressing the EMERGENCY-STOP button
- Briefly pressing the footswitch for driving direction
- Engaging of the parking brake.

6.10 Brake system

The brake system of every **euro-Maus4** consists of dry drum brakes (compressed air brake) on the front axle.
For safety reasons, it consists of two independent braking circuits:
The operating brake activated by the brake pedal on the cabin floor - and - the parking brake which is activated by the toggle switch (**17**).
All machines in the 32 km/h version (optional) are additionally equipped with a hydraulically actuated operating brake (drum brake) on the rear axle, however, this brake is controlled pneumatically.

Danger! *Hazard to life in case of defective brakes. Before each drive, check that the brakes function! The braking systems must regularly be thoroughly checked! Setting and repair work on the brakes may only be performed by trained specialist personnel.*

6.10.1 Operating brake

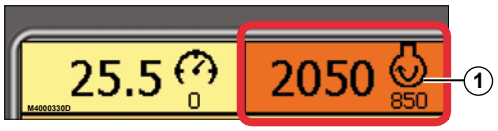
The operating brake is activated using the left pedal (**4**) on the cab floor. It takes effect on the front wheels (also on the rear wheels with the 32km/h version) and only works if there is enough pressure in the compressed air system. If the service brake should not be sufficiently functional (for instance too low reservoir pressure), then the following warning icon is displayed on the color terminal .

(4) Brake pedal
(5) Driving pedal

Danger! *When a warning icon is displayed on the color terminal referring to problems with the braking system, there is the greatest hazard to life for the driver and bystanders as well as other participants in traffic. Operation of* ***euro-Maus4*** *must cease immediately in such cases. The machine must be parked in such a manner that nobody is endangered or impaired. The machine must be secured against rolling away by engaging the parking brake. It may only be moved again after the cause for the brake fault has been repaired by specialist personnel and the machine has been released for operation by corresponding specialist personnel.*

6.10.2 Constant throttle brake

The mechanical operating brake is required only in exceptional cases. Normally, braking by hydrostatic drive is sufficient. The diesel engine is fitted with a wear-free constant throttle brake. This brake automatically activates itself when releasing the driving pedal or when driving downhill on steep slopes – when the set engine speed is greatly exceeded – and increases the braking effect of the hydrostatic drive.



The color orange in the display zone (**1**) for the diesel engine indicates that the constant throttle brake is active.

6.10.3 Parking brake

Operation of the parking brake is performed using the toggle switch (**17**) on the console. The parking brake only takes effect on the front wheels. Even if the ignition is switched off and the pneumatics system is pressureless, the parking brake is automatically engaged and takes effect.

For safety reasons, the parking brake is only released if there is sufficient pressure in the pneumatics system. If the release pressure of the parking brake is too low, then the color terminal displays the following warning icon .

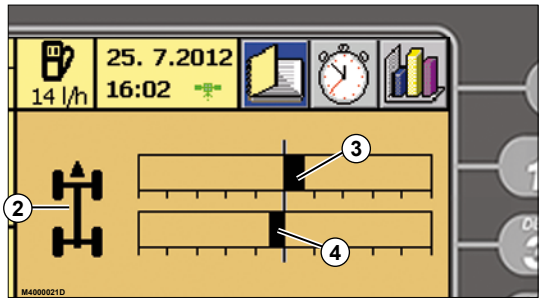
If the parking brake is engaged, then the color terminal displays the following icon .
As long as the parking brake is engaged, pressure on the driving pedal is without effect.

6.10.4 Automatic parking brake (only in operating mode Rabbit)

When the machine is standing still (driving pedal released for several seconds), then the parking brake is automatically engaged. As soon as the automatic parking brake is active, the color terminal displays the following icon: .
This avoids inadvertent rolling away of the machine, especially on sloped ground.
If the driving pedal is pressed again, then the automatic parking brake is released.

6.11 Steering

The front axle is generally steered using the steering wheel.



(2) Active steering mode
(3) Position indication of front axle steering
(4) Position indication of rear axle steering

6.11.1 Main steering switch

The main steering switch (**1**) is used to block steering of the rear axle. If the main steering switch is unlocked, then the rear axle may be steered.
At the same time, the driving speed of the machine is limited.

Danger

Danger! *Hazard of deadly injuries when driving with unlocked main steering switch and driving speed in excess of 10 km/h. If such is the case, uncontrolled swinging movements of the vehicle may occur. This may seriously endanger or even cause deadly injuries to people. The main steering switch may therefore only be unlocked for driving through very tight curves and at low speed (below 10 km/h).*

If operating faults occur at higher speeds than 10 km/h, or if hydraulic or electrical components fail, then driving safety is no longer ensured. Severe accidents can result.
In operating mode "Rabbit", the rear axle may be steered independently of the front axle by moving the right joystick right/left. For this purpose, the

6.11.2 Rear axle steering in operating mode Rabbit

6.11.2.1 Manual rear axle steering

main steering switch must be unlocked. When driving in operating mode rabbit at a speed of more than 10 km/h, the main steering switch must generally be locked.

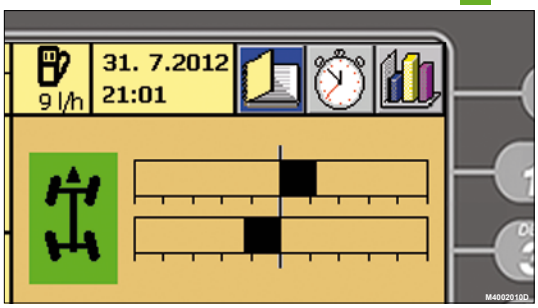
6.11.2.2 Introduction

All-wheel steering may be used to be able to simultaneously steer the rear and front axles without further activities of the driver. For this purpose, the rear axle steers in contrary to the front axle. This steering type facilitates navigating of the machine for drivers with less experience.

The following conditions must be met for switching on all-wheel steering:

– operating mode rabbit switched on
– main steering switch is unlocked (maximum permitted speed 10 km/h)
– speed at least 0.5 km/h.

To activate, press the keys (**12**) and (**13**) on the right joystick simultaneously until the color terminal displays the following icon .



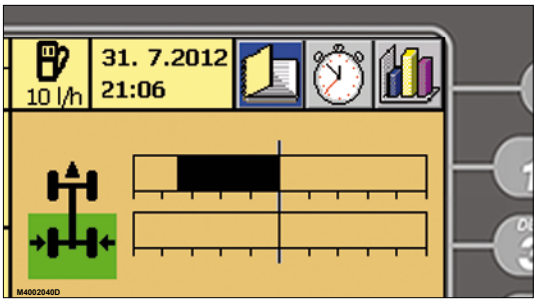
When the all-wheel steering is activated, the speed of **euro-Maus4** is limited. All-wheel steering may be switched off either by moving the right joystick right/left, by activating straight setting of the rear axle, or by locking the main steering switch.

6.11.2.3 Setting the rear axle to straight position

– Select operating mode "Rabbit".
– Drive slowly (below 10 km/h).
– Unlock main steering switch.
– Drive at least 0.5 km/h and briefly press the multi-function button (**11**) on the joystick.

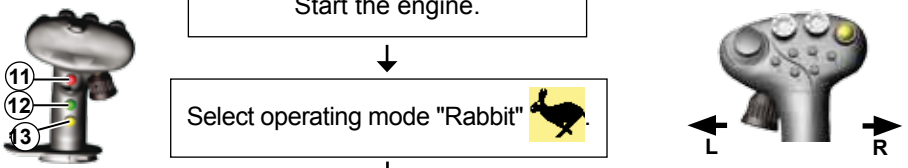
As a result, the rear axle steers in straight position. The following icon is displayed on the color terminal.

Then, the main steering switch must IMMEDIATELY be locked again.



If the rear axle is not locked in straight position, then during driving in operating mode "Rabbit II", the color terminal displays the following warning icon .

6.11.2.4 Quick tutorial: Steering in operating mode "Rabbit"



Start the engine.

Select operating mode "Rabbit".

Drive slowly (below 10 km/h).

Unlock main steering switch.

The rear axle may be steered to the left (L) or right (R) using the joystick.

Drive at least 0.5 km/h.

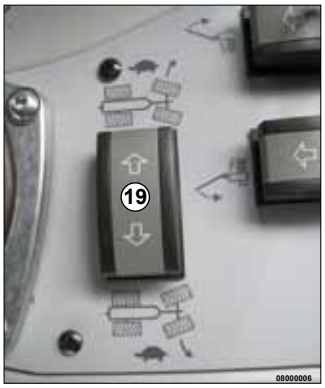
Press multi-function button (**11**).

The rear wheels are set straight and remain in this position.

Activate all-wheel steering. For this purpose, press keys (**12**) and (**13**) simultaneously while driving, until the color terminal displays the icon .

Important: Lock main steering switch.
If the rear axle is not in straight position or the main steering switch is not locked, then corresponding warning messages are displayed on the color terminal:
or

Steering in operating mode "Turtle" (loading operation)



During loading operation, the rear axle is steered using the toggle switch (**19**) in switch panel 3. The prerequisite for this is that the main steering switch is unlocked.
There are the following limitations for this type of steering:

– The steering angle is very limited when the differential lock is activated.
– Both axles should be steered as little as possible to avoid excess wear of the cardan joints.

6.12 Fold-in and fold-out of the machine

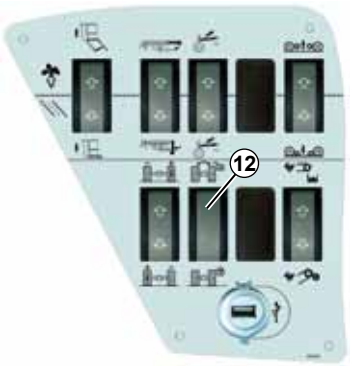
– Switch on operating mode Turtle I.

b) Before fold-out, remove securing chains for the pickup and insert them into the hooks on the vehicle frame provided for this purpose.

Note

Note! *Do not intentionally lower the pickup into the securing chains. Hazard of damage to the machine.*

– Always switch on the axle support of the rear axle before fold-out. To do this, flip toggle switch (**12**) downward.

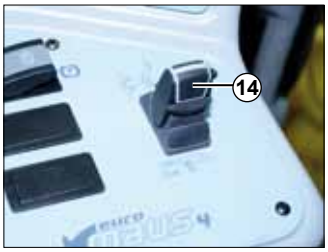


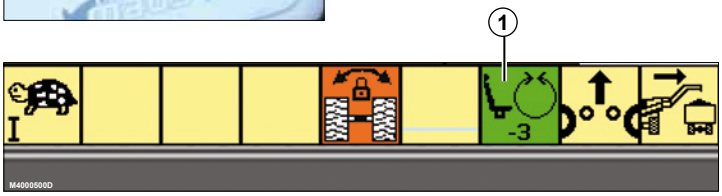
– If at all possible, use automatic fold-out to fold out the machine (thereby minimizing the setup time).

6.12.1 Folding out machine with front automatic fold-out

Warning! *Make sure that no persons are located in the hazard zone in front. Risk of very severe injuries.*

Move the rotatable seat forward to the center position until the rotatable seat status display (**1**) on the color terminal displays green (display between -25%/0%/+25%). Then press the "look forward" foot-switch (**2**) and keep it pressed.
Press the analog rocker switch (**14**) to the right and let it latch into position. Continue to press the foot-switch (**2**) down. If the foot-switch (**2**) is released, then, for safety reasons, all movements are stopped.





The following processes are executed automatically. During these processes, several movements are performed simultaneously:

a) The speed of the diesel engine increases.
b) The telescoping part of the pile pickup extends outward.
c) The pile pickup is raised.
d) Both pickup side sections fold out.

e) The cabin is raised up to the end-stop.

f) Both fold plates are swung up.
g) The clearing shields fold out.
h) The support feet are extended completely.
i) The pickup side section lowers until it is just above ground level.
j) As soon as these processes are completed, the diesel engine switches to idling speed.

k) Now move the analog rocker switch (**14**) back to the center position. If you have forgotten this, the following is displayed on the color terminal:

Automatic folding has folded out the front of the machine in this state

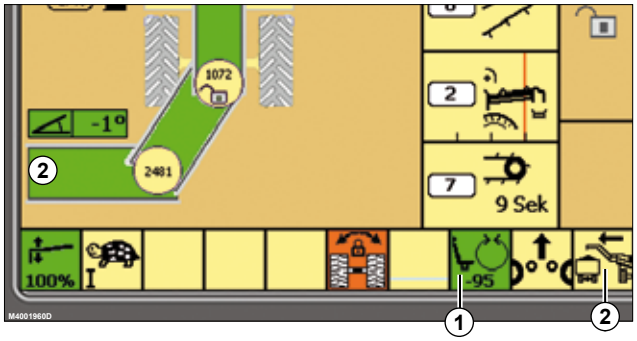
Note! *The fold plates and clearing shields are folded out using a timer. When the oil is very cold, it may be that the automatic folding mechanism does not move the fold plates and clearing shields all the way to the end-stop. In this case, please manually perform the final part of this function using latching position 8 on the operator panel.*

Tip: The automatic folding mechanism can also be started by driving slowly in operating mode "Rabbit" to the beet pile (slower than 8 km/h; **NOT** permitted when driving on public roads).

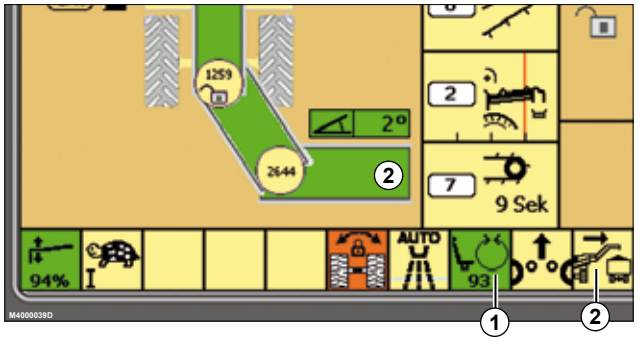
6.12.2 Folding out machine with rear automatic fold-out

The prerequisite is that the machine front is already folded out and the driver's cab is raised to the end-stop.

Use the X-Y button (**16**) to select the loading direction. The selected loading direction determines the destination of the truck conveyor. To do so, press the X-Y button (**16**) to the left or to the right and hold it for approx. two seconds in this position. The selected loading direction (**2**) is displayed on the color terminal.

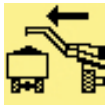


Loading direction to the left



Loading direction to the right

In the case of loading direction to the right:
Turn the rotatable seat until it almost reaches the end-stop and until the rotatable seat status display (**1**) on the color terminal displays green (display range 85%–100%).



In the case of loading direction to the left:
Choose the line of sight direction that is most favorable for you. Make sure that you always turn the rotatable seat until it almost reaches the end-stop.

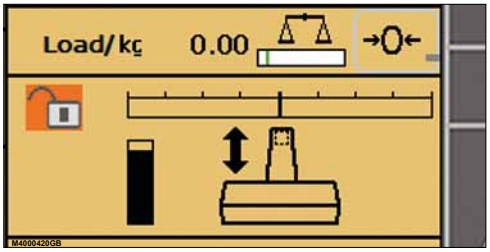
Warning! *Make sure that no persons are located in the hazard zone in front. Risk of very severe injuries.*

Move analog rocker switch (**14**) to the right (do not click into position because, for safety reasons, latching-in stops all movements) and, shortly before latching-in, hold the switch in that position until the following processes are finished:

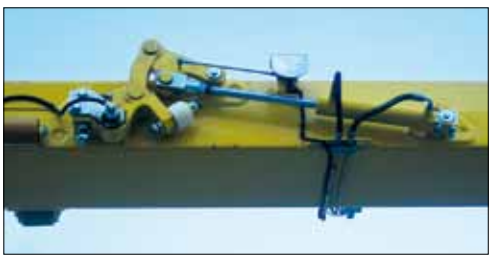
a) The speed of the diesel engine increases.

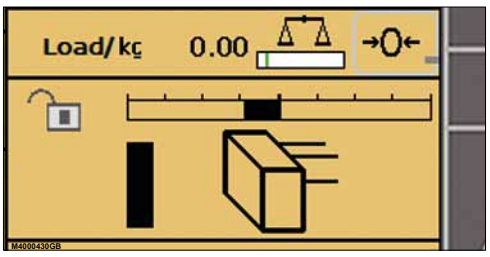
b) The counterweight is raised up to the end-stop.

c) The lock of the counterweight arm opens up to the end-stop.



d) The counterweight arm swivels a little to the left thereby enabling complete opening of the lock.

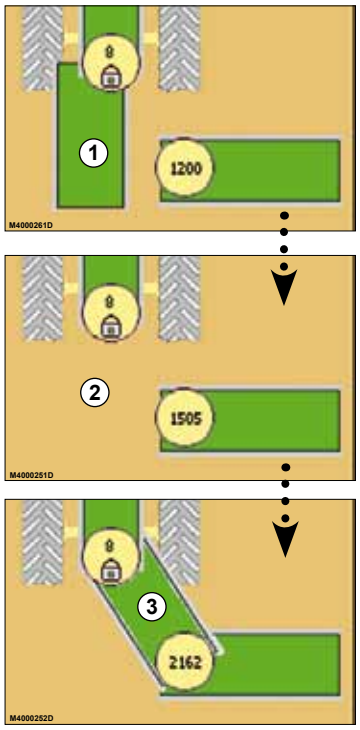




e) The truck conveyor is raised only slightly above the lateral transport support.

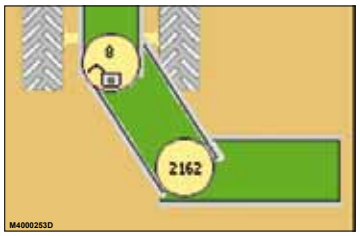
f) The truck conveyor turns to the right and out of the machine perimeter.

g) The recleaner swivels into working position.



(1) Recleaner in transport position
(2) Recleaner neither in transport position nor working position
(3) Recleaner in working position

h) The swivel arm is unlocked.



i) The truck conveyor is raised, simultaneously the truck conveyor articulation is swung up.

Completely folded-out machine - loading direction to the right

j) If "Loading direction left" was preselected, then at the rear of the machine the completely lowered truck conveyor crosses over with the counterweight (lift up to the end-stop).

Note

Note! *Always pay attention that there is sufficient free space behind the machine allowing implementation of this movement. In addition, there must be sufficient ground clearance.*

Crossing-over of truck conveyor and counterweight

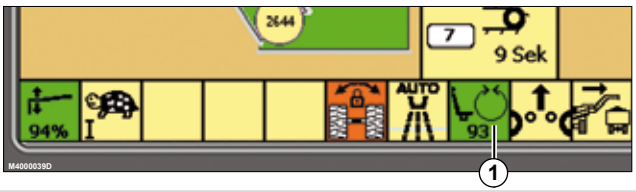
Completely folded-out machine - loading direction to the left

k) The diesel engine switches to idling speed – FINISHED.
If automatic folding is not entirely completed, you can intervene at any time and manually perform completion of the folding procedure. The sequence corresponds to the above-described automatic folding procedure.

6.12.3 Folding in machine with rear automatic fold-in

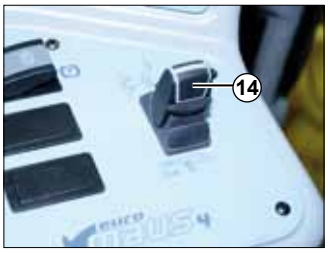
– Remove large accumulations of soiling and deposits of earth. Pay particular attention that the area around the lower pivot point of the roller recleaner is free of earth deposits.
– If at all possible, use automatic fold-in to fold in the machine (saves time).
– Check whether the folding/swiveling area of the truck conveyor and counterweight arm are free of obstacles, transport vehicles or people.

– Turn the rotatable seat forward to the right or left until it almost reaches the end-stop and until the rotatable seat status display (**1**) on the color terminal displays green (display between 80 and 100%).



Warning! *Make sure that no persons are located in the hazard zone in front. Risk of very severe injuries.*

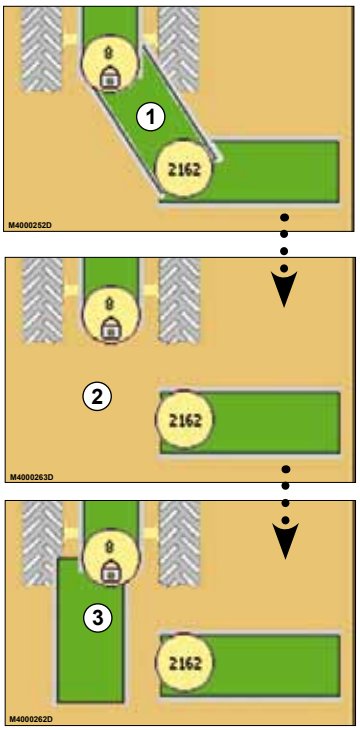
Press analog rocker switch (**14**) to the left (do not click into position because, for safety reasons, latching-in stops all movements) and, shortly before latching-in, hold the switch in that position until the following processes are finished.



During these processes, several movements are performed simultaneously:

a) Speed of the diesel engine increases.
b) If loading in the left direction, then the truck conveyor and counterweight arm must first cross over each other.
c) Counterweight arm positioned somewhat left of the center.
d) Swivel arm turns into the transport position (swivel arm position display in the "0" range) and locked.

e) Recleaner swivels up to the end-stop in the transport position.

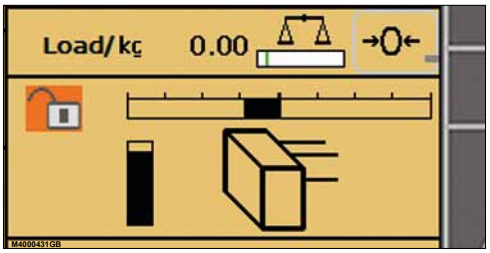


(1) Recleaner in working position
(2) Recleaner neither in transport position nor working position
(3) Recleaner in transport position

f) The truck conveyor articulation lowers down to the end-stop.

g) Turn the truck conveyor and lower it until the inner side is just above the outer end of the transport support.

h) Counterweight arm lock moves to the end-stop.



i) Counterweight arm swivels to the center up to the end-stop roller on the swivel arm.

j) Counterweight arm is completely locked (clamped on the swivel arm).

Locking of the counterweight arm completed

k) The counterweight lowers down completely to the end-stop. In addition, the underrun protective device is swung down. It must reach the end-stop with an audible sound. Look at the monitor of the rear view camera to make absolutely sure that the underrun protective device is completely swung down.

l) The speed of the diesel engine switches to idling speed.

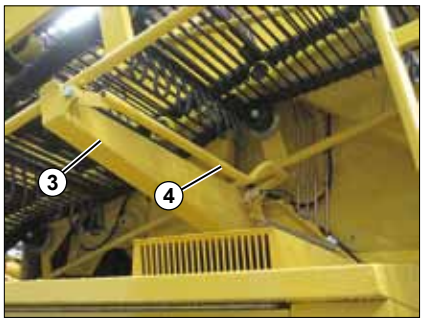
– Now, release the analog rocker (**14**).

Position when automatic folding at the rear is completed

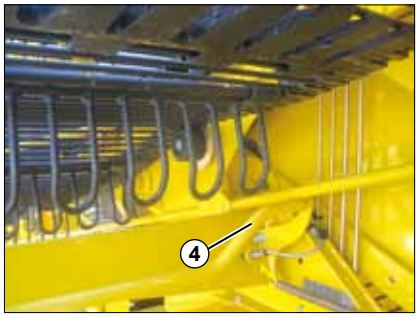
The last work step during rear fold-out is always to be performed manually using the right joystick:

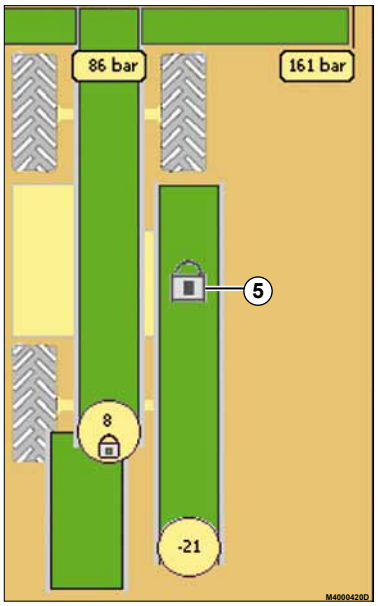
– Manually lower the truck conveyor 5-10 cm over the transport support (**3**) and turn up to the end-stop on the main frame.

– Completely lower the truck conveyor to the transport support (**3**) until the safety guard rail (**4**) is pressed. This is displayed with the icon (**5**) on the color terminal. Otherwise, it is not possible to activate front automatic folding.



Truck conveyor correctly rested on the transport support.



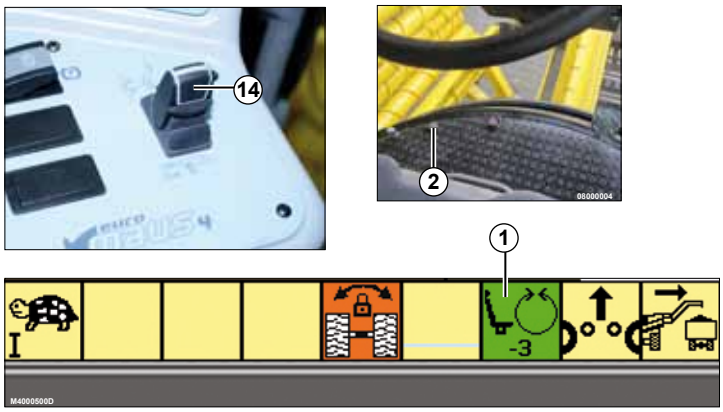


6.12.4 Folding in machine with front automatic fold-in

The prerequisite is that the machine rear is completely folded in and the truck conveyor rests on the transport support (**3**).

Warning! *Make sure that no persons are located in the hazard zone in front. Risk of very severe injuries.*

Move the rotatable seat forward to the center position until the rotatable seat status display (**1**) on the color terminal displays green (display between -25%/0%/+25%). Then press the "look forward" foot-switch (**2**) and keep it pressed.
Press the analog rocker switch (**14**) to the left and let it latch into position. Continue to press the foot-switch (**2**) down. If the foot switch (**2**) is released, then, for safety reasons, all movements are stopped.



Warning! *Risk of crushing injury! Make sure that no persons are located in the hazard zone in front and the boarding platform (risk of injury). The driver is responsible for ensuring that there are no people in the area between safety guard rail at the boarding steps and cab door when lifting or lowering the cab.*

The following processes are executed automatically. During these processes, several machine movements are performed simultaneously:

a) The pile pickup raises and rotates to the center position.
b) The residual beet pickup rotates to the center position. The telescoping mechanism retracts about half-way.
c) The pickup is raised up to the end-stop.
d) The cabin lowers down completely to the end-stop.
e) The fold plates are swung down to the end-stop; simultaneously the clearing shields and support feet move into the transport position.
f) The pickup side sections fold in completely to the end-stop.
g) The telescoping part of the pile pickup retracts completely and the pile pickup lowers to the central mark hatch.
h) The speed of the diesel engine switches to idling speed. – FINISHED

– Move the analog rocker switch (**14**) back to the center position.

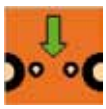
Tip: The front automatic folding mechanism can also be started by driving slowly in operating mode "Rabbit" away from the beet pile (slower than 8 km/h; **NOT** permitted when driving on public roads).

- Please switch off axle support.
- Perform a visual check to see if the fold plates and support feet are really in the transport position. If this is not the case, then manually move the fold plates and support feet into the transport position.
- The machine must be cleaned until all lighting and warning systems are clearly visible, the maximum permissible weight is not exceeded and the machine is clean enough so as to avoid soiling public roads and paths.

Inserting the safety chains and securing the pickup

There is one safety chain for the right side and one safety chain for the left side of the front chassis. When driving on public roads, these chains must be fastened to the pickup central part.

Fasten the chains on the central part of the pickup, when you have swung in the pickup and are leaving the machine. In case of a malfunction of the hydraulic system, the pickup then cannot unexpectedly come down. Otherwise, severe damage to the cab will be the consequence! Such damage is excluded from any guarantee or warranty.



- Switch into operating mode "Turtle". In doing so, the warning signs are automatically swung up and the boarding steps are swung out to the vehicle perimeter.
- The additional axles are to be activated as soon as the vehicle is located on a paved road.

6.12.5 Manually folding out the machine front

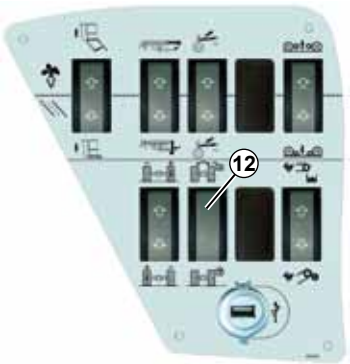
a) Switch on operating mode "Turtle I".

b) Before fold-out, remove securing chains for the pickup and insert them into the hooks on the vehicle frame provided for this purpose.

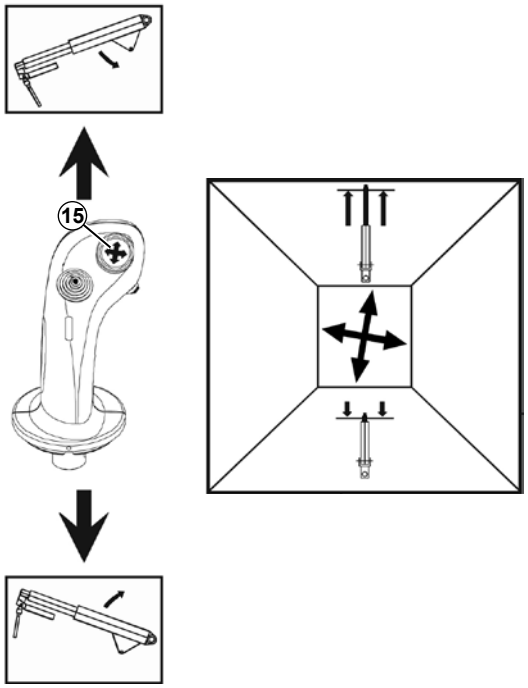
Note

Note! *Do not intentionally lower the pickup into the securing chains. Hazard of damage to the machine.*

c) Always switch on the axle support of the rear axle before fold-out. To do this, flip toggle switch (**12**) downward.



d) First extend the telescopic mechanism of the pile pickup and raise the pile pickup as high as possible.

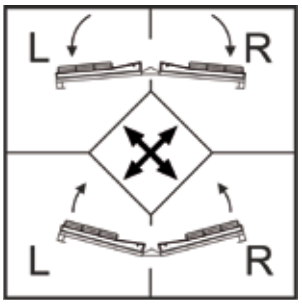


Warning

Warning! *Risk of crush injury! Make sure that no persons are located in the hazard zone in front and the boarding platform (risk of injury).*

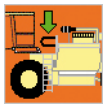
To do so, move the X-Y button (**5**)

FORWARD LEFT Folds out the left pickup section



FORWARD RIGHT Folds out the right pickup side section

To fold it out faster, press the multi-function button (**11**) and keep it pressed. If you then slide the X-Y button (**5**) to forward left or forward right, then both pickup side sections are simultaneously folded out.

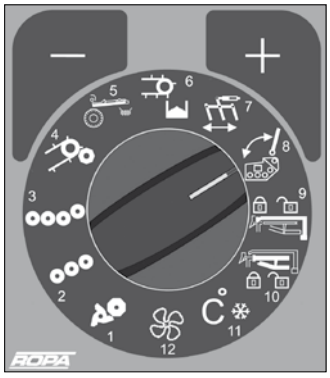


e) Raise cabin up to the end-stop

Warning

Warning! *Risk of crush injury! The driver is responsible for ensuring that there is no-one in the area between safety cage (**17**) at the boarding steps and cabin door when lifting or lowering the cabin.*

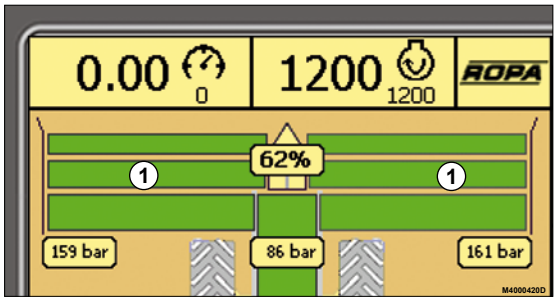
f) Fold out the fold plates



To do so, turn rotating selector switch to position 8 and fold up the fold plates all the way by pressing the + key.

When swinging up the fold plates, the support feet are simultaneously extended all the way and both clearing shields are folded out.

Swinging up the fold plates is only possible when the color terminal shows that both pickup side sections (**1**) are folded out.



g) Move pickup to operating depth
Slide the X-Y key (**4**) diagonally to forward right and retract the right support foot to the estimated operating height of the pickup.
Slide the X-Y button (**4**) diagonally to forward left and retract the left support foot to the estimated operating height of the pickup.

To retract more quickly, press the multi-function button (**11**) and keep it pressed. If you now slide the X-Y key (**4**) forward to the left or right, then both support feet are simultaneously retracted.

Push the mini joystick (**1**) forward and lower the complete pickup to the ground. This makes it almost impossible to tip the machine over during fold-out of the truck conveyor.

Note

Note! *Danger of damage to the pickup. In any case, avoid pressing the pickup into the ground when lowering it so much that the front axle becomes unloaded. This may damage the pickup.*

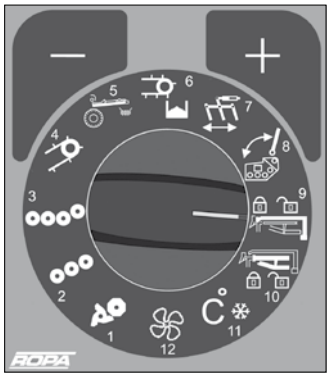
6.12.6 Manually folding out the machine rear

a) Raise counterweight (fuel tank) by pressing toggle switch (**6**) upward.

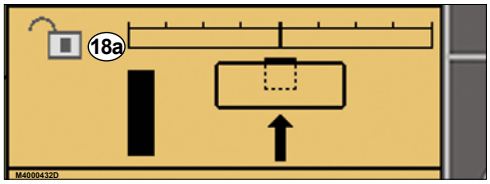
In general, always first raise the counterweight to the end-stop. You thereby minimize the risks of collision between truck conveyor and the counterweight arm if the monitoring sensors malfunction.

The counterweight may be lowered ONLY if there are no parts of the loader beneath it. Risk of damage to material.

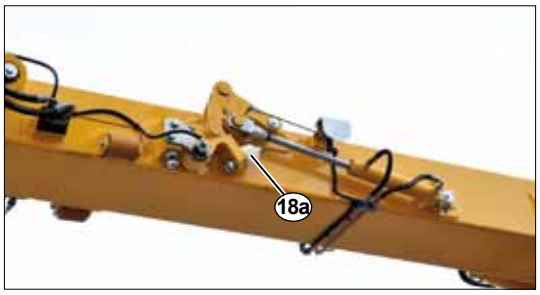
b) Unlock the counterweight arm.



To do so, turn the rotary switch on the operating panel to click-in position 9. ✚ Keep the button pressed until the lock (**18**) has completely opened. The color terminal displays the lock status. When the cab is raised, one can also view the mechanism from the driver's seat.



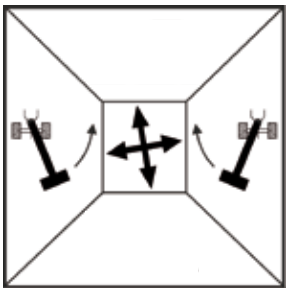
(18a) Counterweight arm lock opened
(18b) Counterweight arm lock at the end-stop
(18c) Counterweight arm lock closed



Note

Note! *If the swivel arm is swiveled under the counterweight arm, then the lock (**18a**) of the counterweight arm must be completely opened since, otherwise, machine damage may result.*

c) Use the mini-joystick (**1**) to swivel the counterweight arm somewhat out of the center position.

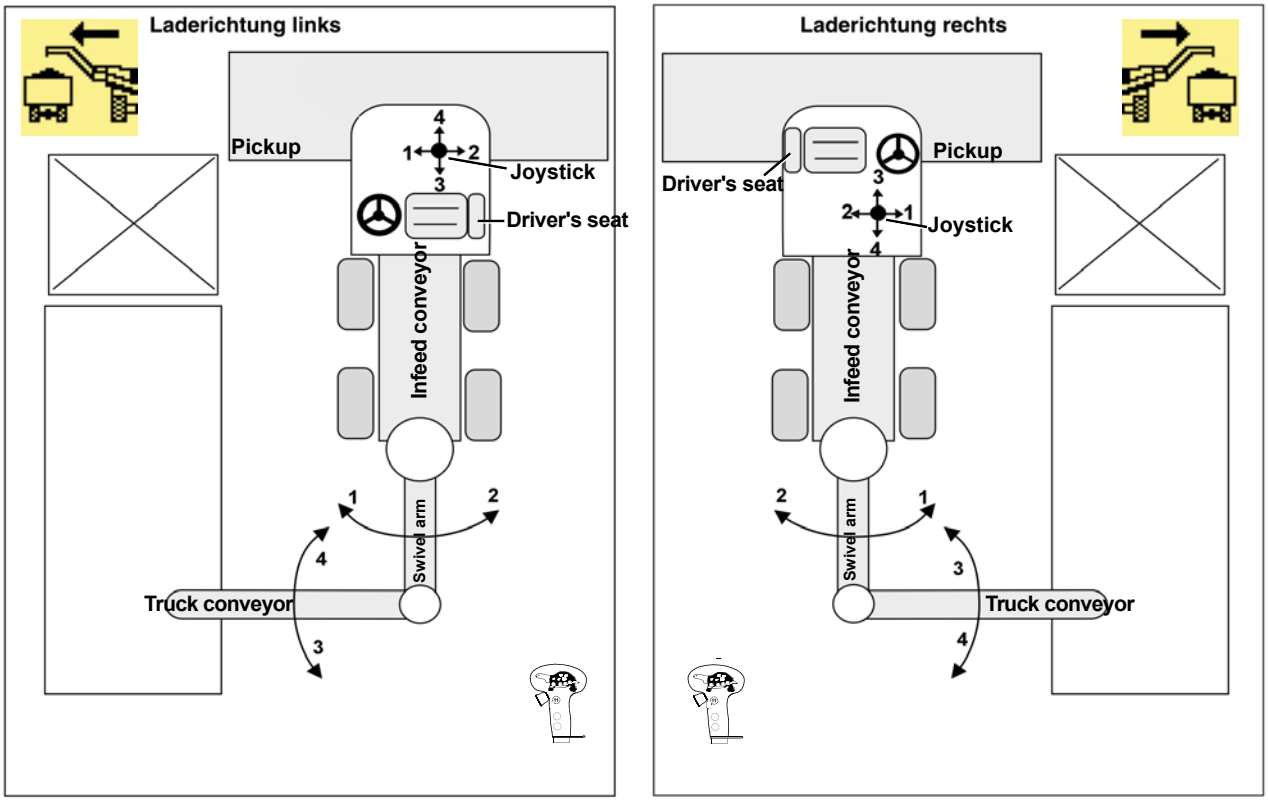


STOP
Danger

Danger! *Staying under the counterweight arm when it is swung out is strictly prohibited. There is hazard to life! The machine operator must make sure that no people are located within the swiveling range of the counterweight arm. If a person is swept into the machinery during swiveling of the counterweight arm and trapped, then this person may sustain fatal injuries!*
Hazard of deadly injuries if the machine tips over. NEVER swivel the counterweight arm to the same side on which the truck conveyor is located.

d) Specify loading direction.

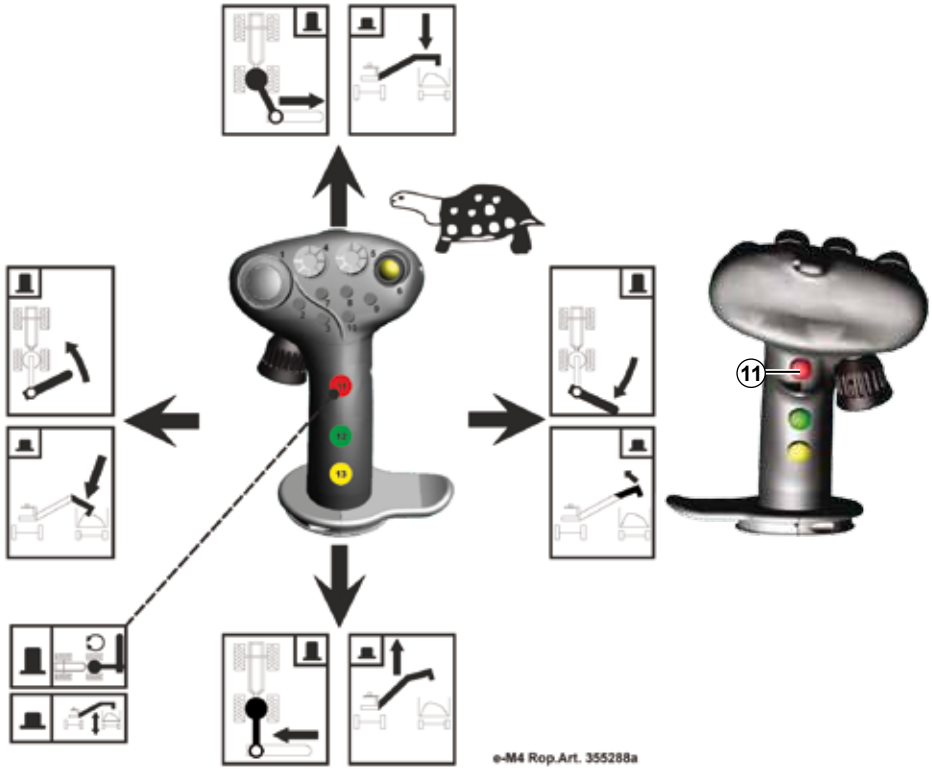
Use the X-Y button (**16**) to select the loading direction (see page 78).



Danger! *The machine operator must make sure that no people are located within the swiveling range of the truck conveyor. If a person is swept into the machinery during swiveling of the truck conveyor and trapped, then this person may sustain fatal injuries! When rotating the truck conveyor, make sure that you neither damage nor destroy the drivers cabin with the truck conveyor!*

In any case, pay attention to power lines located within the swiveling range of the truck conveyor. Always keep a sufficient safety distance to these lines. This distance is always determined by the type of power line and this information must be acquired from the competent power company.

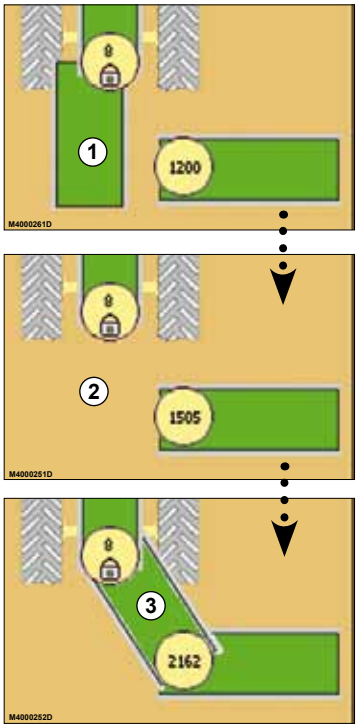
e) Fold out truck conveyor. To do this:



– Press the multi-function button (**11**) on the right joystick and keep it pressed. Simultaneously, lightly pull back on the right joystick to slightly (about 5cm) lift the truck conveyor above the transport support (**3**).
– Release the multi-function button (**11**). Then, carefully push the right joystick a little to the right, and by this, rotate the truck conveyor out of the vehicle perimeter.
– Press the multi-function button (**11**) on the right joystick and keep it pressed, simultaneously press the right joystick to the right and thereby swing up the truck conveyor articulation so far, until sufficient distance to the ground is reached.

f) Swivel the recleaner into working position.

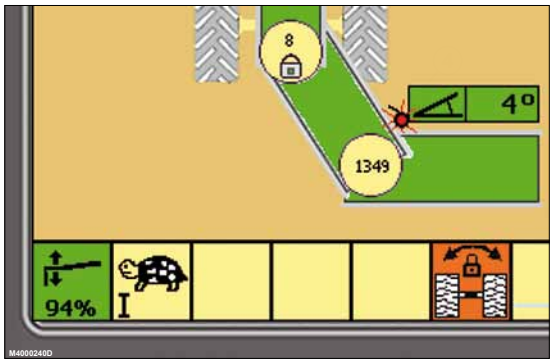
To do this, flip toggle switch (**7**) upward.



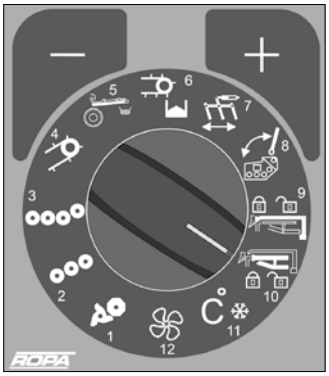
(1) Recleaner in transport position
(2) Recleaner neither in transport position nor working position
(3) Recleaner in working position

Note

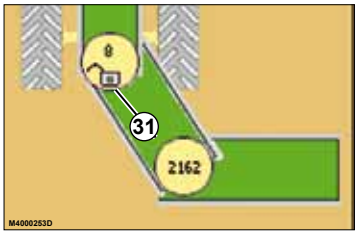
Note! *The truck conveyor must be turned out far enough from the machine perimeter. Imminent collisions (**4**) are displayed on the color terminal.*



g) Unlock the swivel arm lock.
To do so, turn the rotary switch on the operating panel to click-in position 10 and press button ✚ once.

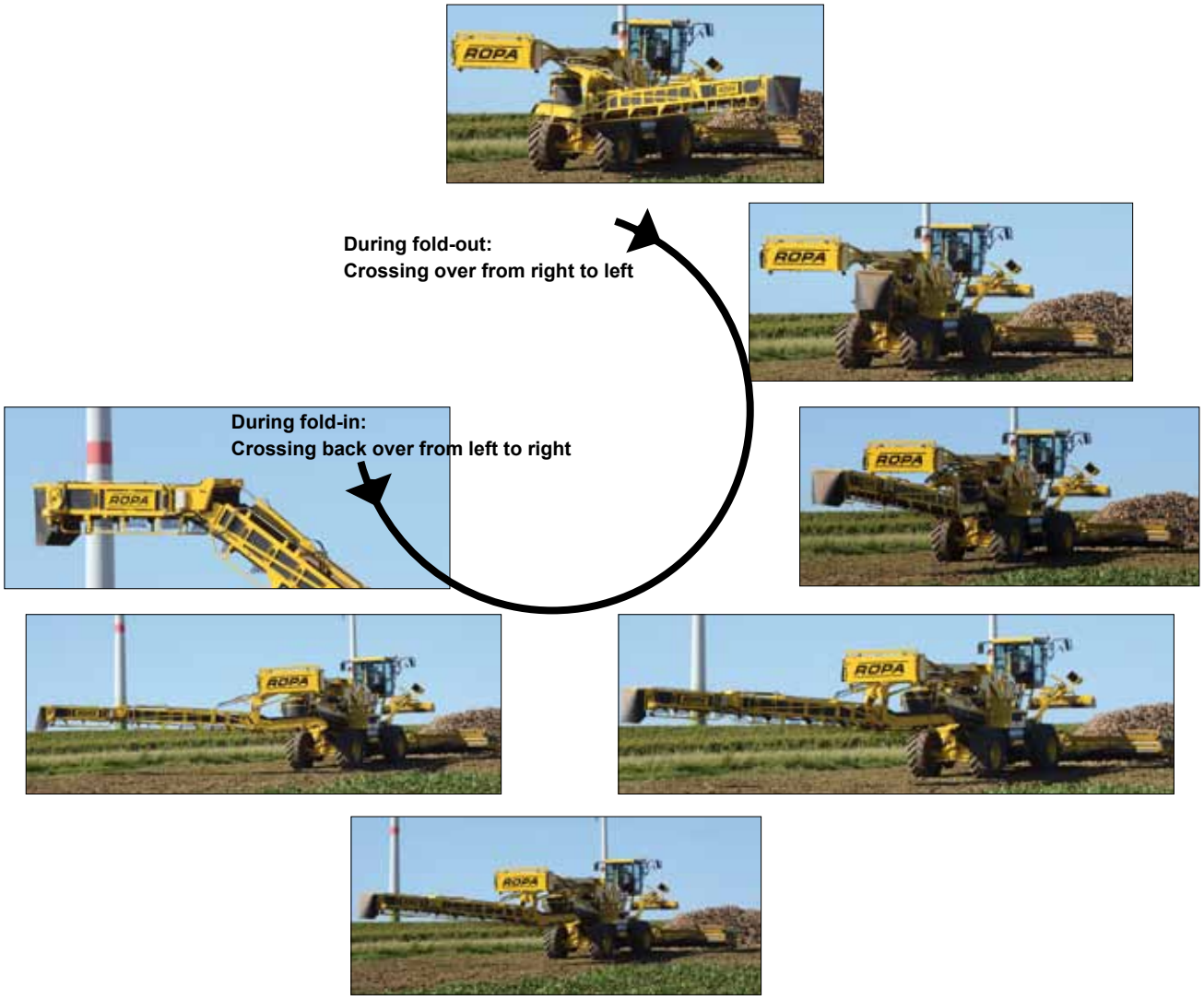


(31) Swivel arm lock status



h) If the transport vehicle is located to the right of the **euro-Maus4**, then swivel the the truck conveyor over the truck and begin loading.

i) Position the truck conveyor in the "left loading" direction.
When moving into this loading direction, the truck conveyor crosses over with the counterweight arm.
- To do so, generally lift the counterweight all the way.
- Raise the truck conveyor articulation up to the end-stop.
- Lower the truck conveyor down to the end-stop.
- Rotate the swivel arm directly to the rear.
- Rotate the counterweight arm directly to the rear.
- Rotate the truck conveyor under the completely raised counterweight to the left side of the machine.



6.12.7 Manually folding in the machine rear

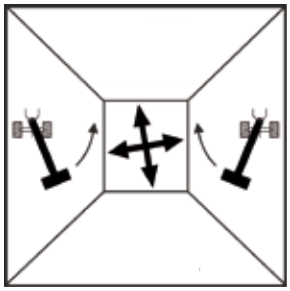
For reasons of stability when changing from working position to transporting position, do not forget to first swing in the truck conveyor and only then swing in the pickup.
When swinging in the truck conveyor, work very diligently and concentrated, since otherwise, you could severely damage the machine. ROPA therefore urgently recommends that a second, reliable person be called in as flagman during the first experimental attempts.
This person may in no case be standing in the rotating and swiveling range of the truck conveyor or the counterweight.

a) Remove large accumulations of soiling and deposits of earth. Pay particular attention that the area around the lower pivot point of the roller recleaner is free of earth deposits.
b) Check whether the folding/swiveling area of the truck conveyor and counterweight arm are free of obstacles, transport vehicles or people. The driver's cab should always be completely raised to enable the best overview of the hazard zones.

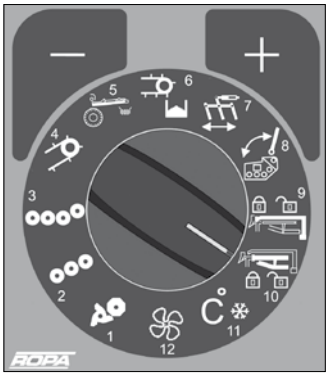
Warning! *Make sure that no persons are located in the hazard zone in front. Risk of very severe injuries. During all work with the truck conveyor, all people being near the machine must wear a suitable and approved hardhat.*

c) If the truck conveyor is positioned to the left loading direction, then the truck conveyor and counterweight arm must first cross over before fold-out (see pictorial sequence on page 162).
   – To do so, generally lift the counterweight all the way.
   – Raise the truck conveyor articulation up to the end-stop.
   – Lower the truck conveyor down to the end-stop.
   – Rotate the swivel arm directly to the rear.
   – Perform a visual check to see if the lock of the counterweight arm is completely opened.
   – Rotate the counterweight arm directly to the rear.
   – Rotate the truck conveyor under the completely raised counterweight to the right side of the machine.

d) Use the mini-joystick (**1**) on the left joystick to swivel the counterweight so that the counterweight is located slightly left of the machine center line.

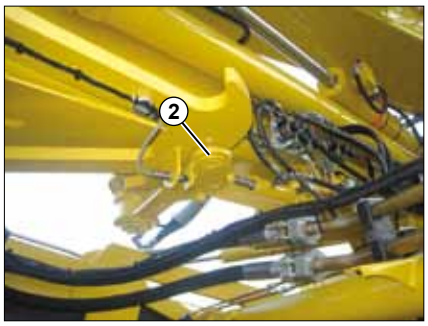


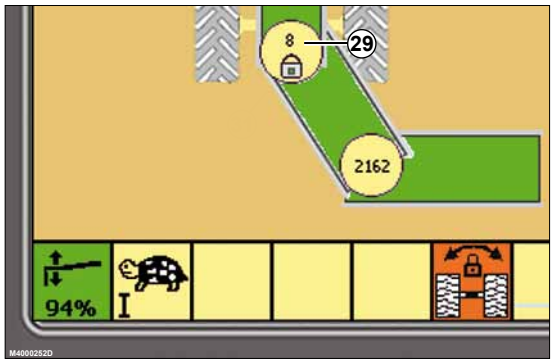
g) Activating swivel arm lock.
To do so, turn the rotary switch on the operating panel to click-in position 10 and press button ▬ once. The locking lever first begins to close when its roller (**2**) starts rolling along the cam track (**3**).



(31) Swivel arm lock status
Orange field indicates lock is activated, however it is still not latched into position

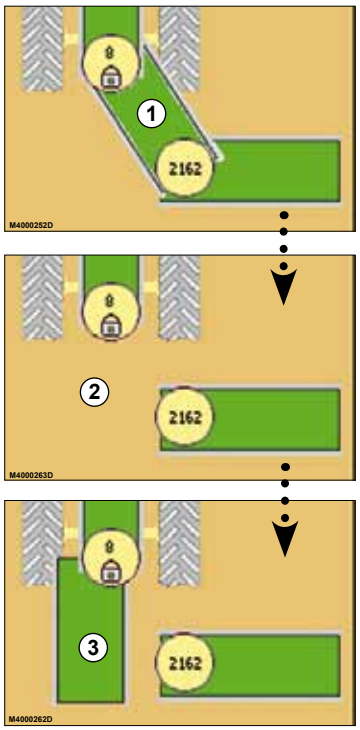
h) Turn swivel arm into transport position. When the swivel arm reaches the transport position, a value of 0 (±20) is displayed in the display field "Swivel arm position" (**29**). The activated swivel arm lock automatically latches in position and is displayed like this (**31**).





i) Swivel the recleaner into transport position.

To do this, flip toggle switch (**7**) downward.



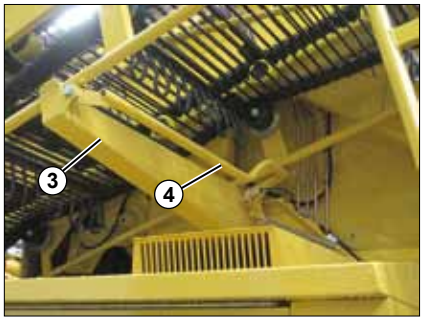
(1) Recleaner in working position
(2) Recleaner neither in transport position nor working position
(3) Recleaner in transport position

j) Lower the truck conveyor articulation down to the end-stop.

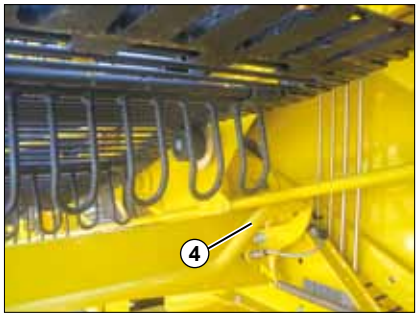
k) Turn the inner side of truck conveyor until it is just above the outer end of the transport support (**3**).

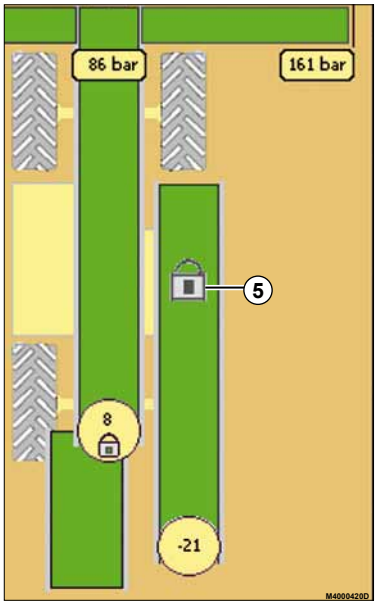
l) Manually lower the truck conveyor 5-10 cm over the transport support (**3**) and turn up to the end-stop on the main frame.

m) Completely lower the truck conveyor to the transport support (**3**) until the safety guard rail (**4**) is pressed. This is displayed with the icon (**5**) on the color terminal.

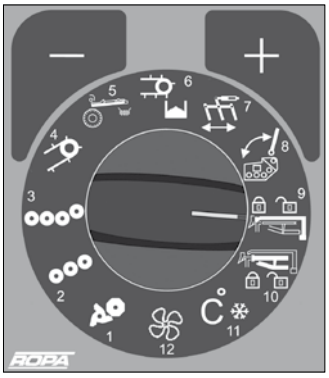


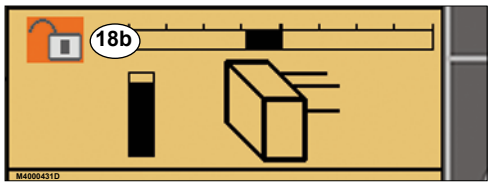
Truck conveyor correctly rested on the transport support.





n) Move the counterweight arm lock to the end-stop. To do so, turn the rotary switch on the operating panel to click-in position 9 and press button ▬ and hold until the lock status display on the color terminal displays the end-stop position (**18b**). When the cab is raised, one can also view the mechanism from the driver's seat.



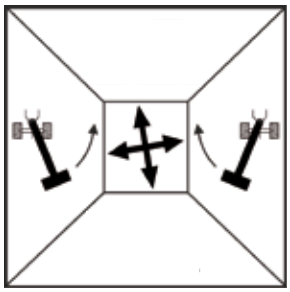


(18b) Counterweight arm lock at the end-stop

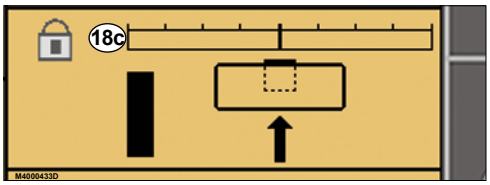
Note

Note! *Moving the lock into the end-stop is only possible if the counterweight arm is located left of the swivel arm.*

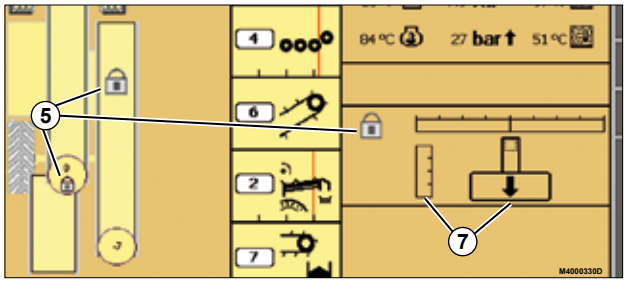
o) Swivel the counterweight arm into the center position until the roller of the locking lever rest is located on the lateral end-stop.



p) Close the counterweight arm lock up to the end-stop. To do so, press button ▪ on the operating panel (rotary switch in click-in position 9) and hold until the lock status display on the color terminal displays the correct locking position (**18c**).



q) Lower the counterweight completely to the end-stop. To do so, press down the toggle switch (**6**) until the counterweight and the underrun protective device have completely swung down. The underrun protective device must reach the end-stop with an audible sound. Look at the video monitor of the rear view camera to make absolutely sure that the underrun protective device is completely swung down.

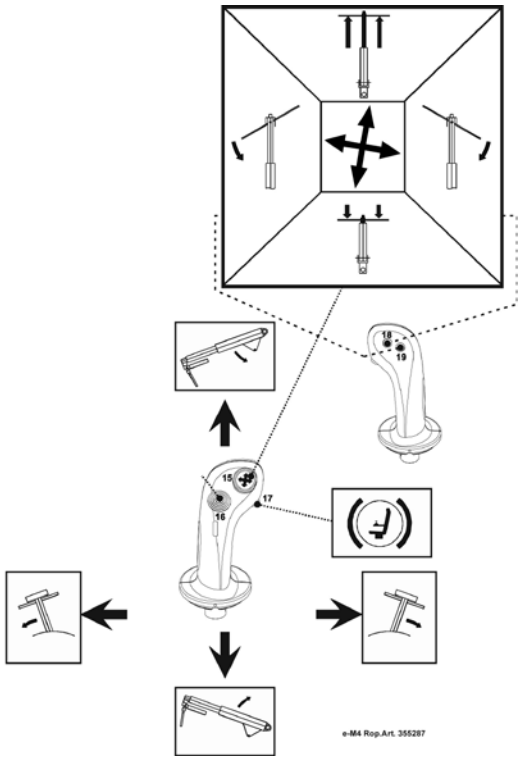


(7) Display when the counterweight is lowered to end-stop

Warning! *The counterweight and swivel arm must always be locked when driving on public roads. The machine may not be moved on roads or moved to another place if the counterweight and swivel arm not locked. The truck conveyor must rest on the transport support (see display (**5**) on the color terminal)!*

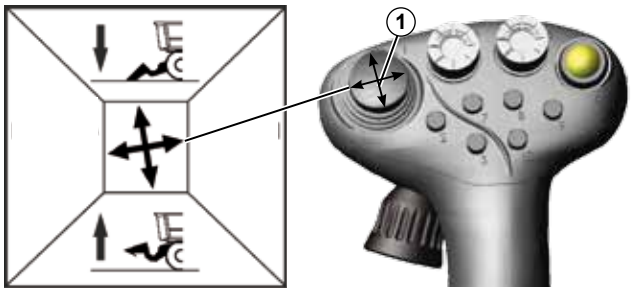
6.12.8 Manually folding in the machine front

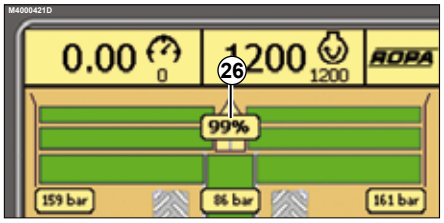
Note! *Before folding in the machine front, check on the color terminal whether the swivel arm, counterweight arm and truck conveyor are located in the correct transport positions (3x closed lock icons!)*



a) Raise the pile pickup up to the end-stop (left joystick).
b) Swing the pile pickup to the center and raise it as far as possible.
c) Telescopically extend pile pickup about half-way.
d) Turn the residual beet pickup to the center position.

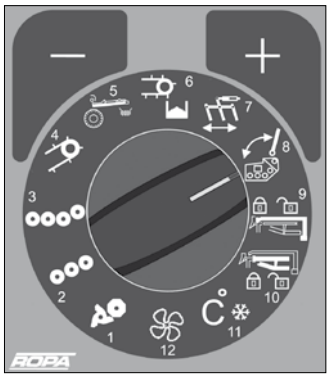
e) Raise the central part of the pickup as far as possible. For this purpose, pull the mini-joystick (**1**) on the right joystick backwards.





(26) The pickup height must display at least 98%

f) Swing down the fold plates to the end-stop. Turn the rotary switch to click-in position 8 and press button ▪ and hold until the fold plates, clearing shields and support feet move completely into the transport position.



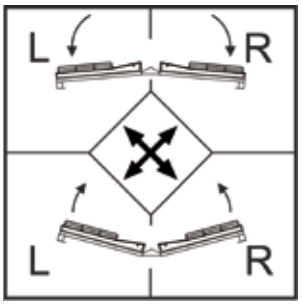
g) Lower the cabin completely to the end-stop. To do so, press down the toggle switch (**5**) until the cabin has been completely lowered.

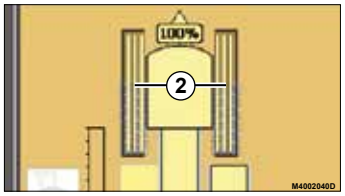
Danger

Danger! *Make sure that no persons are located in the hazard zone in front and the boarding platform (risk of injury).*

The cab may only be lowered or raised when the pickup side sections are folded out.

h) Fold in the pickup side sections completely to the end-stop. For this purpose, pull back diagonally the X-Y button (**5**) on the right joystick. To fold in faster, press the multi-function (**11**) button and keep it pressed in this position. If you then slide the X-Y button (**5**) to backward left or backward right, then both pickup side sections are simultaneously folded in. After fold-in, keep the X-Y button (**5**) pressed until you can hear the hydraulic system working against the high pressure. In this way, the pickup side sections are pressed against the end-stop.





(2) Display when pickup side sections are folded in

Note

Note! *You may only fold in or out the pickup side sections when the central section of the pickup has been raised to the end-stop and the cab has been completely lowered! If the central section of the pickup is not at the upper end-stop, then the side sections can only be folded two-thirds of the way in.*

If a machine is located on a slope to the side and the pickup can not be folded in due to heavy soiling, then first park the machine with the front oriented either uphill or downhill and fold the pickup in.

i) Switch off axle support

6.13 Loading operation

6.13.1 General information regarding loading

Familiarize yourself with the local ground and landscape before starting to work.
Even before loading, check whether the pile conforms to the requirements of the pile design plan in the appendix. Especially make sure that the pile is not wider than 10.2 m in any place. If this should be the case, make sure that the pile is as evenly as possible brought to a maximum width of 10m.

Ideal pile width

Instruct the people present before starting to work about the most important safety regulations, especially about the hazard zones and about the required safety distances. Use the form in the appendix, have the participants confirm by signature that they have received these instructions (make a copy before completing the form!).
Make it absolutely clear to all people present that you are obliged to immediately stop the machine and immediately cease work if a person enters the hazard zones or does not exit them upon request.

Tip: You can save time during fold-in and fold-out of the machine if you select "Loading direction to the right". Neither "Loading direction to the right" nor "Loading direction to the left" has any effect on the quality of work, beet flow or stability of the machine.
ROPA machines enable you to load either to the right or to the left with the same work speed and quality.
Position the machine in hilly terrain in a way that you can load "uphill". If at all possible, avoid loading at an excessively steep angle.

Drive to a distance of about 1 meter from the beet pile.

Danger! *There is an acute hazard to life for all people standing in the hazard zone during the loading process! No people may be located in the hazard zone during loading. If people approach the hazard zone, the machine must be immediately immobilized and the loading operation must be interrupted. The people must be strictly instructed to leave the hazard zone. The loading process may only be continued when all people are located outside of the hazard zone. If these people do not leave in spite of being requested to do so, then the loading process may neither be begun nor continued.*

6.13.2 Safety circuits for loading operation

The **euro-Maus4** is fitted with multiple safety circuits. It is not permitted to bypass these or otherwise render them inoperable. These circuits are the result of accident analyses and are intended to contribute to increase safety for people in especially critical phases of the loading process. Simultaneously, the driver is always reminded of his personal responsibility.

Anyone who tries to manipulate these circuits in any manner, thereby knowingly violating safety requirements, shall be held completely responsible for his actions and is guilty of gross negligence. He is fully responsible for all consequences and shall also be held liable!

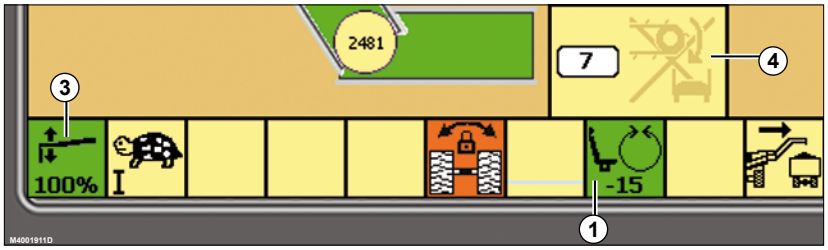
6.13.3 Switching on machine drive

Danger! *There is an acute hazard to life for all people standing in the hazard zone during the loading process! Before switching on the machine drive, therefore perform a diligent visual inspection to make sure that no people are staying in the hazard zone of the machine – especially within range of the pickup. No people may be located in the hazard zone during loading. If people approach the hazard zone, the machine must be immediately immobilized and the loading operation must be interrupted. The people must be strictly instructed to leave the hazard zone. The loading process may only be begun or continued when all people are at a sufficient distance to the machine. If these people do not leave in spite of being requested to do so, then the loading process may not be begun or continued.*

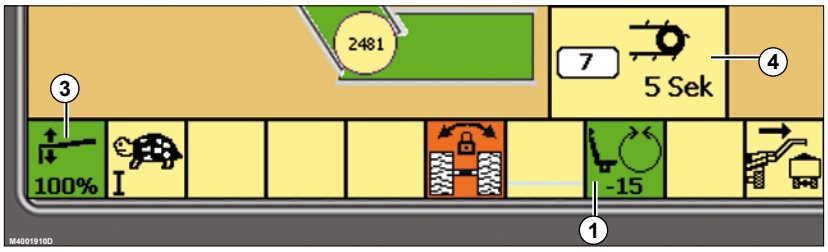
6.13.4 Safety circuit when switching on the machine drive

The driver's seat is equipped with a position encoder. Because of this, the machine drive can only be switched on with the yellow button (**6**) if the driver's seat is centered and turned forward and if you had an overview of the pickup. The rotatable seat status indicator (**1**) on the color terminal must display green (display range between -20%/0%/+20%). In addition, the pile pickup must be raised high enough so that the height indicator of the pile pickup (**3**) also shows green. To switch on the machine drive, only **briefly** press the yellow button (**6**).

First, emit a short but clear horn signal to point out to all bystanders that you are starting the machine drive and that sufficient distance to the machine must be observed immediately.



(4) Indicator for expiration of cooling-off period



(4) Indicator for expiration of cooling-off period (5 seconds remaining)

If the transport vehicles need to be exchanged rapidly, the machine drive can be switched on again without turning the driver's seat into the green zone. This is possible as long as the cooling off period has not expired. This period is counted down on the color terminal starting from the switch-off time of the machine drive.

Recommendation for fuel-saving loading:

Use the X-Y button (**16**) to select an engine speed speed between 1200 and 1300 rpm.

6.13.5 Pickup depth setting

– Depth guide of the pickup is assumed by the two support feet (**10**) adjustable in height (except for external side of the two lateral parts of pickup) and the central part (central mark).
– Drive into the beet pile.
– While doing so, set the pickup depth.
  The pickup should be set to such a height that the fingers of the pickup roller enter the ground for their whole length. This pickup depth is the optimum for preserving, power saving work.

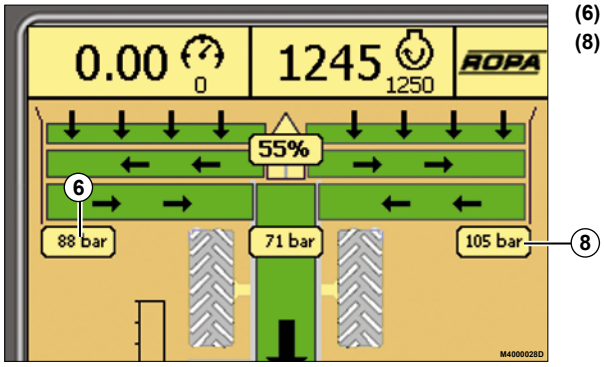
The mini-joystick (**1**) on the right joystick is used to set the height of the pickup central section and, along with it, the height at the inner edges of the pickup side sections.
The X-Y button (**4**) is used to set the height of the support feet and, along with it, the height at the right and left outer edges of the pickup side sections.

6.13.5.1 Relieving the pickup

The pickup must be relieved so that it does not sink into the ground too deeply during loading on softer pile terrain.

6.13.5.2 Relieving the pickup side sections

This means that the support feet are only required to partially carry the weight of the pickup side sections. The greatest share of the load is to be transferred to the chassis. The components used for this purpose are the hydraulic cylinders (**12**) that fold the pickup side sections in and out (X-Y button (**5**) on the right joystick). The side sections must be relieved by raising them to the point that the support feet touch the ground when just a small amount of weight is applied. If the pickup is correctly relieved, then you will see only shallow dragging tracks behind the two support feet when operating with



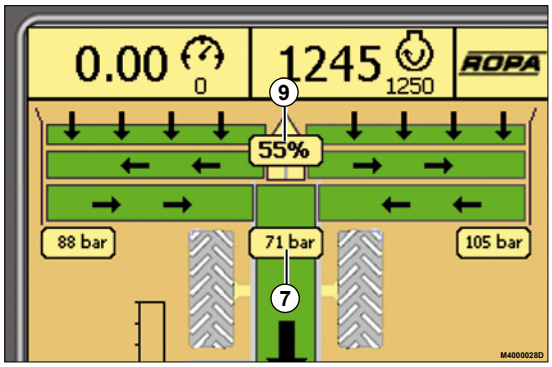
(6) Relief pressure - left
(8) Relief pressure - right

normal ground conditions.

To relieve the pickup side sections, always just press the X-Y button (**5**) briefly.

6.13.5.3 Relieving the pickup central section

The relief pressure of the central part is set using the mini-joystick (**1**) so that the front axle is loaded. This improves traction of the front tires and the drive train is more evenly loaded.



(7) Relief pressure - center
(9) Pickup height in %

There is no guideline value for the relief pressure of the central section. The only decisive criterion is how it appears on the video display. You should see here that all beets are picked up and that no beet losses occur.

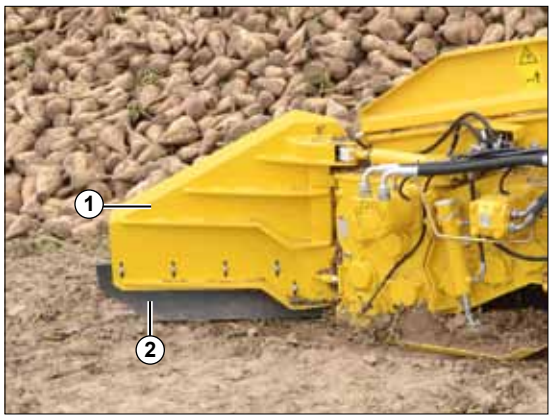
Display on the central mark camera showing how optimal adjustment looks. No beet fragments, bearing assembly of the pickup roller visible over the ground.

(11) Skids under the central mark (adjustable)

Working too deep in the ground increases the power requirements of the pickup drive and substantially increases roller wear!
The depth setting must constantly be adjusted to the ground profile and the load on the pickup by the beet weight.

6.13.6 Clearing shields

The clearing shields (**1**) delimit the pickup width and guide the beets on the side onto the pickup roller.



(1) Clearing shield
(2) Rubber skirt

When using the machine for the first time, set the rubber skirts (**2**) so that these just barely contact the ground.

During loading, especially watch out for frozen ground and built-up bulging soil in the course of the clearing shield. Do not drive through obstacles with the clearing shields! Doing so could damage the folding mechanism.

(20) Clearing shield - right:
Push forward: = swing out
Push to the rear = swing in

(21) Clearing shield left:
Push forward: = swing out
Push to the rear = swing in

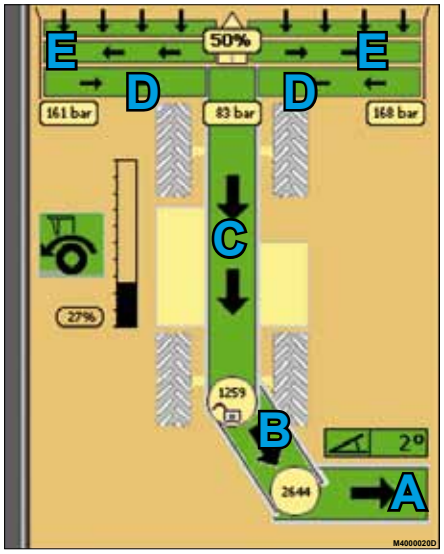
If you do not need the maximum pickup width, then please always set the clearing shields straight forward. By doing so, you improve the beet flow to the outer ends of the pickup.

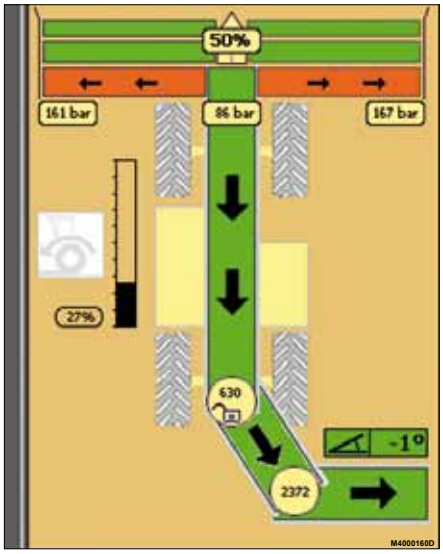
Optimal setting of the clearing shields

Incorrect setting of the clearing shields. Heaps of earth within the clearing shield area make no sense at all. Compounding the situation is incorrect drive-in to the pile. Drive-in should be as centered as possible.

6.13.7 Beet flow

This section of the color terminal depicts in symbols the flow of beets through the machine. This clearly presents all important operational parameters to you.
The following general meaning is allocated to the individual colors and icons:





White	= component is switched off
Green	= component is activated, but not in motion
Green with black arrows	= component is moving in the working direction
Green with red colored arrows	= component is overloaded
Red	= component is blocked
Orange with arrows	= component is reversed; it is moving against the working direction

– Set the speed of the complete beet flow as optimally as possible.
  Match the speeds of the pickup rollers to the 4-set (quadruple) pinch rollers. Set the speeds of the pickup rollers and 4-set pinch rollers to such a high speed that the beets picked up are moved to the infeed conveyor without buildup.
  When selecting the speed, consider the degree of soiling of the beets.
  In case of very soiled beets and wet ground, you should select a higher speed. This means that the rollers should be running faster than under "good" conditions.

– The feed speed of the traction drive is used to additionally take effect on the degree of cleaning:

  Low feed speed → thin beet cover on the rollers → all beets pass through a double cleaning path = greater cleaning effect.

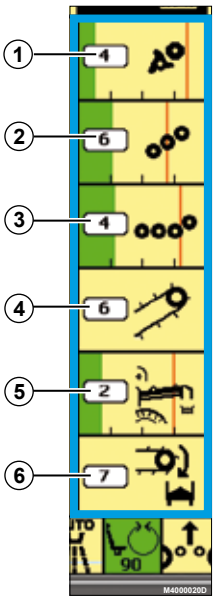
  High feed speed → a thick beet cover on the rollers → only some of the beets pass through the double cleaning path = lower cleaning effect and a gentler treatment of the beets.

Optimal distribution of beets across the entire width of the pickup.

We strongly recommend that the frost breakers are never removed from the pickup side sections. These serve as valuable aids for monitoring the correct feeding quantity. As long as the beets do not jam on the frost breakers, then a blockage of the beet flow is virtually impossible. You regulate the supply of beets via the feed speed of the traction drive.

A uniform beet flow at a reasonable throughput without any beet-jams and with a high degree of cleaning.

The greater your experience with **euro-Maus4**, the greater your precision at estimating the optimum speeds.



(**1**) Pickup roller speed
(**2**) Conveyor roller speed
(**3**) 4-set (quadruple) pinch roller speed
4) Infeed conveyor speed
5) Recleaner speed
6) Truck conveyor speed

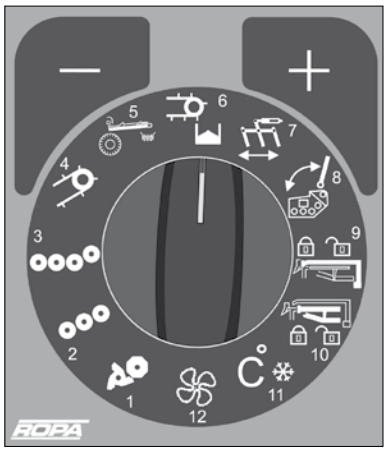
6.13.8 Truck conveyor (drive 6)

The truck conveyor moves the beets from the recleaner to the transport vehicle. The beets should be treated as gently as possible during this process.

This drive is switched on or off jointly with the machine drive using the yellow button (**6**) on the right joystick.

The speed may be set by turning to latching position 6 on the operating panel and pressing the + or - buttons. If this drive is stopped, then the drives **1** through **5** (see drawing) are also stopped. This drive can not be reversed.
If this drive is overloaded, then the following icon is displayed on the color terminal.

If the truck conveyor is blocked, then the color terminal displays the following icon .



6.13.9 Fast speed truck conveyor

Sometimes, a larger quantity of soil sticks to the conveyor – for instance when loading under unfavorable conditions. To be able to fling this soil off the conveyor, the truck conveyor is equipped with a fast speed function.

You can switch on fast speed using the toggle switch (**10**). For this purpose, move this switch upward and hold it for so long, until soiling is removed. If activated, the infeed conveyor then runs at double speed.

Only switch on fast speed when the conveyor is empty and no beets are on the truck conveyor any more. The infeed conveyor is automatically stopped for as long as the truck conveyor is switched to fast speed.

6.13.10 Recleaner (drive 5)

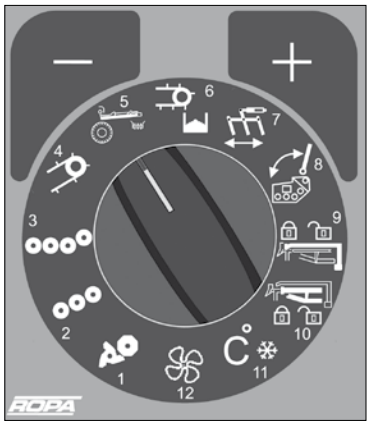
Depending on equipment, your **euro-Maus4** has a sieve conveyor cleaner or an 8-set pinch roller cleaner. This performs recleaning of the beets. The recleaner is located between the infeed conveyor and the truck conveyor. The drive for the recleaner is only operating when the machine drive has already been switched on.

Briefly press the button (**9**) on the right joystick once to switch on the recleaner.

If this button is pressed briefly again, then the drive for the recleaner is switched off.

When this button is pressed and held pressed, then the rotating direction of the recleaner is reversed. Reversing of the recleaner is only possible for the version with a pinch roller cleaner.

The speed of the recleaner may be set to one of 10 stages. To do so, set the rotary



switch to position 5. You change the recleaning speed by pressing the buttons **+**/**-**.

+button = more aggressive recleaning

-button = gentler recleaning

If the recleaner is designed as an 8-set pinch roller cleaner, then the speed may be set in 11 stages (0-10 and additionally "MAX").

To treat the beets as caringly as possible, the speed of the recleaner should not be selected higher than necessary.

The stage "MAX" should only be used in case of extremely sticky soil. In this stage, the speed of the pinch roller cleaner is exclusively dependent on the speed of the diesel engine. To switch on the stage "MAX", press and hold the **+** button until the color terminal displays the stage "MAX" indicator.

In case of blocks of the recleaner, the drives **1**-**4** are switched off.

6.13.11 Sieve conveyor cleaner

Warning

Warning! *Never climb onto the machine as long as the drive is running. When the sieve conveyor is running, there is the hazard that people's body parts or pieces of clothing may be caught by the sieve conveyor belt. This can lead to very severe injuries. Never touch the running sieve conveyor belt with either your hands or with tools or objects; they could be dragged along by the sieve conveyor belt. People could be severely injured and the machine heavily damaged.*
Before any work on the sieve conveyor, switch off the machine and secure it against starting (remove the ignition key and carry it on your person).

The cleaning effect of the sieve conveyor is mainly achieved by the fact that the conveyor is moving faster forward than the beet flow. The beets start to roll and are cleaned in this manner.

If the warning limit of the sieve conveyor cleaner is exceeded, then the following icon is displayed on the color terminal.

If the sieve conveyor is blocked, then the following icon is displayed on the color terminal.

If the sieve conveyor is blocked by a foreign object, then this foreign object must be manually removed. For this purpose, always shut off the engine and secure it against inadvertent restarting (carry the ignition key on your body).

6.13.12 8-set pinch roller cleaning

STOP
Danger

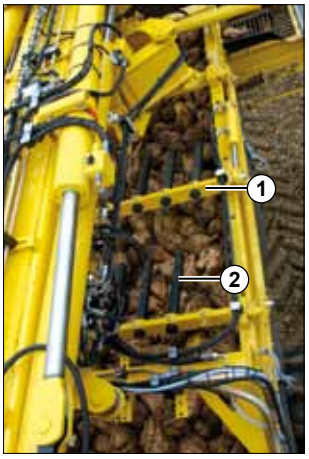
Danger! *Never climb onto the machine as long as the machine is running. When the pinch rollers are rotating, there is the hazard that people are caught on body parts or pieces of clothing and drawn in. This may lead to the most severe or fatal injuries. Body parts may be ripped off or crushed. Never touch the running pinch rollers with your hands, with tools or objects; these may be drawn in by the pinch rollers and destroyed. You could be severely injured and the machine heavily damaged.*
Switch off the machine before all work on the pinch roller cleaner and secure it against starting (remove the ignition key and carry it on your person).

If the warning limit is exceeded at the pinch roller cleaner, then the following icon is displayed on the color terminal .

If the pinch roller cleaner is blocked, then the following icon is displayed on the color terminal .

Most of the time, blockage-forming foreign objects can removed by reversing the pinch roller cleaner.

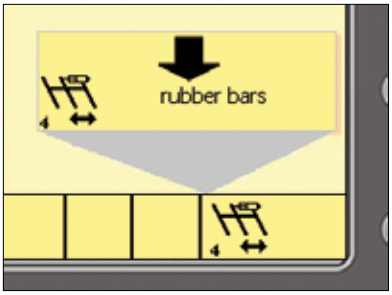
6.13.13 Beet brake (only for 8-set pinch roller cleaner)



(1) Beet brake
(2) Braking bars

For the roller cleaner, the cleaning effect is mainly achieved by the fact that the rollers pull dirt and trimmings off in a downward direction.

In addition, a swiveling beet brake (**1**) is mounted. Braking bars (**2**), which are mounted to the frame of the roller cleaner, pile up the beets. Due to this action, the beets additionally rub against each other and the cleaning effect is increased.
Insertion of the braking bars into the beet flow and therefore the intensity of recleaning may be set at the operating section.
For this purpose, set the rotating selector switch to position 7.



You change the braking effect of the beet brake by pressing the buttons **+**/**-**:
+ button = The beet flow is braked more (more intense cleaning).
- button = The beet flow braked less (gentler cleaning).

6.13.14 Infeed conveyor (Drive 4 in the drawing)

The infeed conveyor moves the beets from the pickup to the recleaner.
This drive is switched on or off using the button (**10**) on the right joystick.

The infeed conveyor (**1**) only runs when the recleaner is already running. The speed may be set by turning to latching position 4 on the operating panel and pressing the + or - button.
If this drive is stopped, then the drives **1** – **3** also stop. This drive can not be reversed.

6.13.15 Infeed conveyor fast speed

Sometimes, a larger quantity of dirt sticks mainly in the section of the infeed and the deflection rollers of the infeed conveyor. This usually happens when loading under very unfavorable conditions. To be able to fling this soil off the conveyor, the truck conveyor is fitted with a fast speed function.

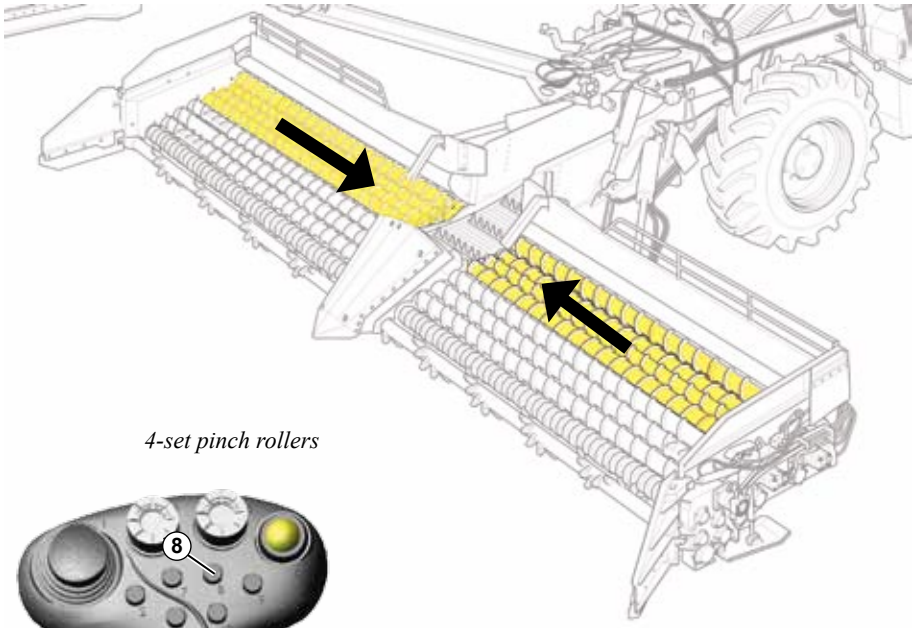
You can switch on fast speed using the toggle switch (**10**). For this purpose, tip this switch downward and hold it pressed until soiling is removed. The infeed conveyor then runs at double speed.

Only switch on fast speed when the infeed conveyor is empty and no beets are on the infeed conveyor anymore.

Briefly switch on fast speed if a "roll" made of soil and other contamination develops in the section behind the deflecting roller. Fast speed removes this roll of dirt as long as it does not exceed a specific size. Otherwise, the dirt must be manually removed.

If the recleaner is blocked, then the infeed conveyor automatically shuts off. As soon as a blockage of the recleaner has been removed, then the infeed conveyor can be started again by briefly pressing on the button (**10**) on the right joystick.

6.13.16 4-set pinch rollers in the pickup (drive 3)



4-set pinch rollers

The 4-set (quadruple) pinch rollers in the pickup move the beets to the center of the pickup onto the infeed conveyor. They only move in the feed direction when the machine drive is switched on and the infeed conveyor is running.
These pinch rollers may also be reversed when the infeed conveyor stops.
To switch on the 4-set pinch rollers, briefly press button (**8**) once on the right joystick.
If this button is briefly pressed again, the 4-set pinch rollers stop.
If this button is pressed and held pressed, then the rotating direction of the 4-set pinch rollers is reversed.

Move the rotating selector switch to position 3 to adjust the speed of the 4-set pinch rollers.

By pressing the buttons + / - , you change the speed of the 4-set pinch rollers.

+button = Increase speed (more aggressive cleaning and transport).

-button = Reduce speed (gentler cleaning and transport).

The speed of the 4-set pinch rollers may be adjusted in 11 stages (0-10 and additionally "MAX").

To treat the beets are carefully as possible, the speed of the 4-set pinch rollers should not be selected higher than necessary.

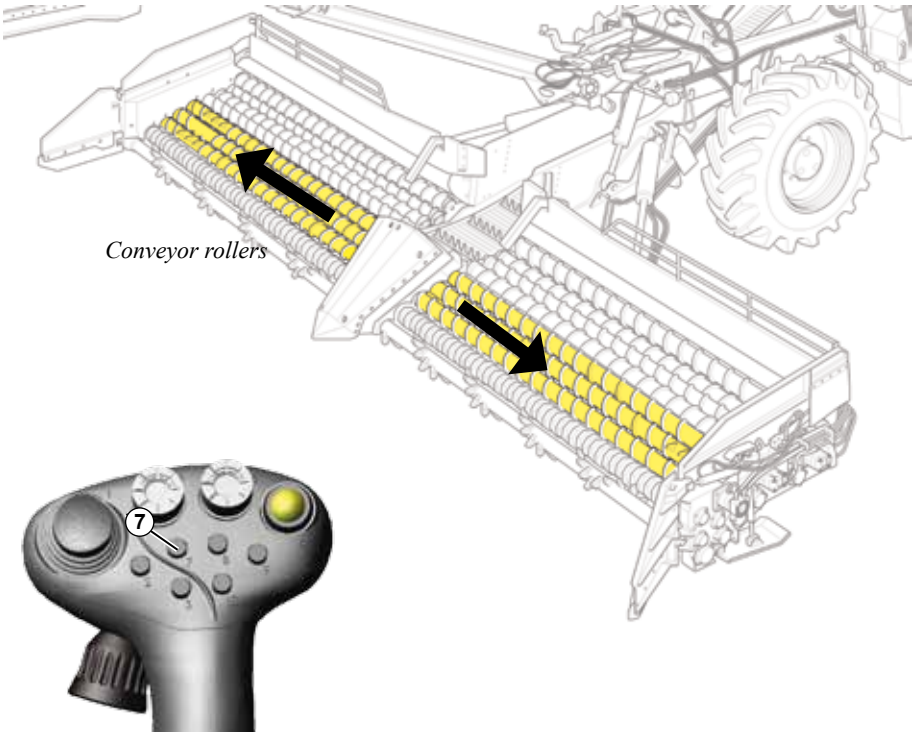
The stage "MAX" should only be used in case of extremely sticky soil. In this stage, the speed of the 4-set pinch rollers only depends on the speed of the diesel engine. To switch on the stage "MAX", press and hold the + button until the color terminal displays the stage "MAX" indicator.

If the warning limit is exceeded for the 4-set pinch rollers, then the following warning icon is displayed on the color terminal .

If the 4-set pinch rollers are blocked, then the color terminal displays the following warning icon .

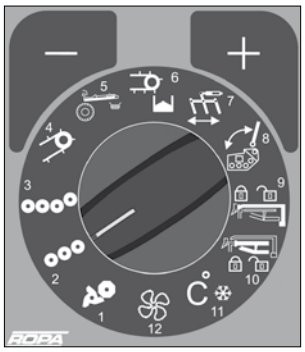
In case the 4-set (quadruple) pinch rollers are blocked, then both the conveyor roller drive and the pickup roller drive are switched off.

6.13.17 Conveyor rollers (drive 2)



The conveyor rollers preclean the beets and guide them to the outside. This achieves a greater cleaning effect due to the longer route.
The conveyor rollers always move in operating direction if the 4-set pinch rollers also move in operating direction.
To switch on the conveyor rollers (can be switched on jointly with the pickup rollers), press the button (**7**) on the right joystick once briefly.
When this button is briefly pressed again, the conveyor rollers/pickup rollers stop.
If this button is pressed and held pressed, then the rotating direction of the conveyor rollers/pickup rollers is reversed.

To treat the beets as carefully as possible, the speed of the conveyor rollers should not be set higher than necessary.
At faster conveyor roller speeds, many beets are transported to the extreme outside edge. In so doing, the cleaning path is extended. This is recommended if the beets are highly soiled.



Move the rotating selector switch to position 2 to adjust the speed of the conveyor rollers.

By pressing the buttons + / - , you can change the speed of the conveyor rollers:+
Button = Increase speed (rollers rotate faster).
- button = Decrease speed (pickup rollers rotate slower).

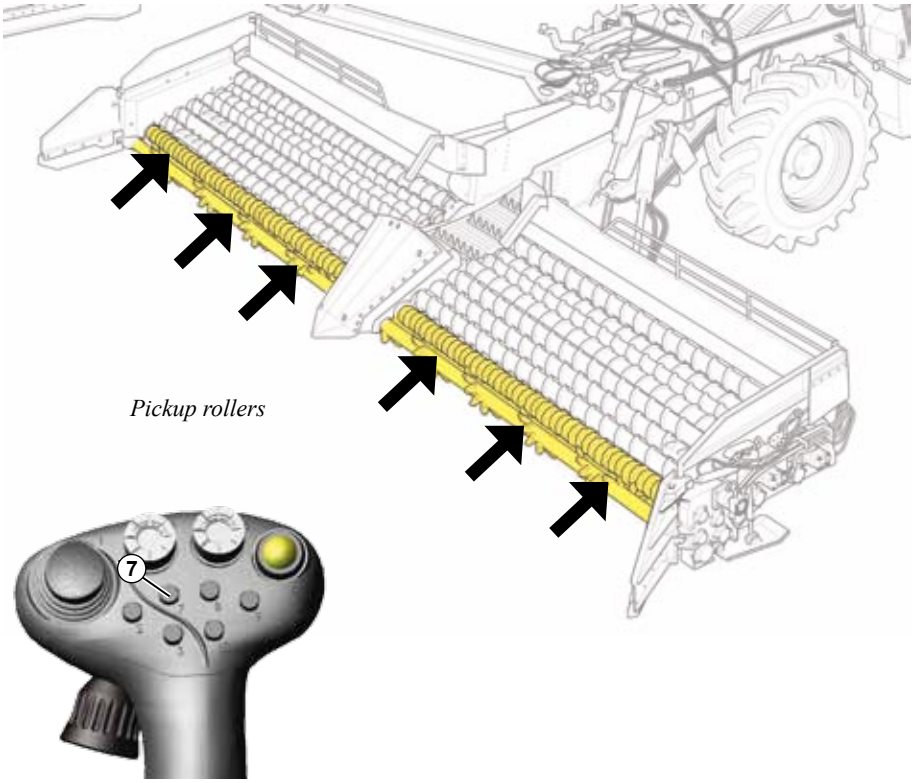
The speed of the eccentric drive of the central mark is synchronous to the speed of the conveyor rollers (due to series connection of the hydraulic motors).

If the warning limit of the conveyor is exceeded, then the following warning icon is displayed on the color terminal.

If the conveyor rollers are blocked, then the following warning icon is displayed on the color terminal.

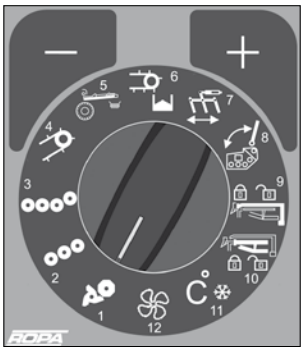
In case the conveyor rollers are blocked, the pickup drive is switched off.

6.13.18 Pickup rollers (drive 1)



The pickup rollers have different tasks. They pick up the beets from the ground and transfer them to the cleaner rollers. These forward the beets to the conveyor rollers and simultaneously clean the pig tails of the pickup rollers.
The pickup rollers always move in working direction if the 4-set pinch rollers also move in the working direction.
To switch on the pickup rollers (can be switched on jointly with the conveyor rollers), briefly press the button (**7**) on the right joystick once.
When this button is briefly pressed again, the pickup rollers/conveyor rollers stop.
If this button is pressed and held pressed, then the rotating direction of the conveyor pickup rollers/conveyor rollers is reversed.

Move the rotating selector switch to position 1 to adjust the speed of the conveyor rollers.



You change the speed of the pickup rollers by pressing the + / - buttons:
+ button = Increase speed (rollers rotate quicker).
- button = Decrease speed (rollers rotate slower).
The speed of the pickup rollers may be set to one of 10 stages (0-10).

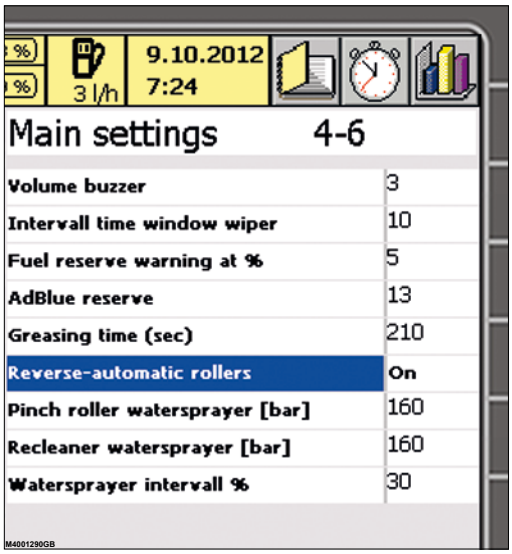
If the warning limit is exceeded for the pickup rollers, then the color terminal displays the icon .

If the pickup rollers are blocked, then the color terminal displays the icon .
When the pickup rollers stop or are reversed, the traction drive is also automatically stopped.

To treat the beets as caringly as possible and to minimize wear, the speed of the pickup rollers should not be selected higher than necessary.

6.13.19 Automatic reversing function for all roller drives

You can set the automatic reversing function in the menu "Basic settings" to "ON" or "OFF" for all roller drives.



The automatic reversing function detects blocks on all roller drives of the beet flow. When the system detects a block, then the automatic reversing function immediately stops all drives located in front of the blocked drive. Simultaneously, the traction drive is stopped.

The automatic reversing function now several times reverses the rotating direction of the blocked drive (at maximum 5 times), until the block is overcome. Then, all drives – including the traction drive – are automatically switched on again.
If you do not succeed in release the blockage by reversing after five attempts, then all drives are switched off.

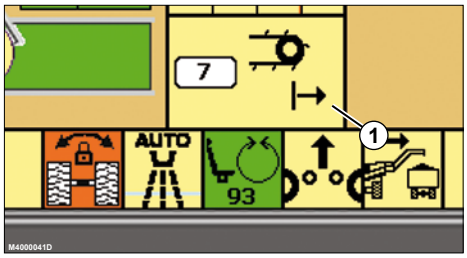
You can manually start additional tries by reversing using the buttons (**7**), (**8**) or (**9**) on the right joystick. If this is also unsuccessful, then the cause for the block must be manually removed.
For this purpose, switch off the machine and secure it against inadvertent starting.

Danger! *Danger of severe injuries when removing blocks of drives. In any case, before removing blocks, completely shut down the machine and secure it against starting by third parties. For this purpose, withdraw the ignition key and lock the driver's cab. Secure the ignition key against access by third parties!*

6.13.20 Driving into the beet pile – Loading mode - START

If no transport vehicle is already located under the truck conveyor for load-receiving purposes, then, before switching on the machine drive, open the menu "Special functions", scroll to the line "Loading mode" and change the "LOAD" (default) to "START". This enables you to drive the machine into the beet pile with running pickup without moving the other sections of the beet flow.

As soon as you switch off the machine drive (yellow button (**6**) on the left joystick), the loading mode is automatically reset to "LOAD".



(1) Recognition sign for the activated START loading mode

6.13.21 Loading transport vehicle

When loading on transport vehicles, always comply with the following tips for treating the beets as caringly as possible during loading.

– In all cases, avoid any change in direction of the beet flow that amounts to 90° or more between infeed conveyor, recleaner and truck conveyor!

Gentle treatment beet flow

– Set up the overall beet cleaning system with an eye to treating the beets as carefully as possible (i.e. lowest possible speeds).
– Work at the lowest possible diesel engine speed (1200-1300 rpm) to both save fuel and to protect the environment.
– Avoid letting the beets fall into the loading compartment of the transport vehicle deeper than absolutely required. For this purpose, lower the truck conveyor as far as possible and, at start of loading, let the articulation go as deep as possible between the walls of the transport vehicle.

Important!! The turning movements of the swivel arm and truck conveyor are executed using chain drives. Always observe the turning movements during operation to ensure that the turning movements are correctly executed and that the chains are still correctly tensioned. Chain tensioning is automatically executed hydraulically. If the chains are not correctly tensioned, then the machine must be shut down immediately.

STOP
Danger

Danger! *Risk of lethal injuries as the result of uncontrolled swivel movements of the swivel arm and truck conveyor if the chain on the rotating drive skips. Switch off the machine immediately and have the fault remedied by specialist personnel.*

6.13.22 Continued loading function

If, after switching off the machine, you would like to place a slight quantity on the transport vehicle, well dosed, then you may comfortably do this using the continued loading function.

The continued loading function is always performed using a pre-programmed low engine speed that the driver cannot influence in any way.

To use this function, press the machine drive ON/OFF button (**6**) on the right joystick and **keep it pressed until** the desired beet volume has been loaded using continued loading. When you release the button, the drive stops.

6.13.23 Special conditions during loading

6.13.23.1 Frozen beet pile

A lightly frozen beet pile may be broken up or loosened using the pile pickup. Never use the pile pickup to break up a tightly frozen beet pile. Always use suitable heavy-duty equipment for this purpose (for instance excavator, wheel loader, etc.).
The telescopic tube of the pile pickup may only be pressed into the pile using its own force. Any further, continued drive-in of the vehicle forward into the pile will invariably lead to destruction of the telescopic tube.

Note

Note! *A frozen beet pile may not be loosened by raising the complete pickup. This may lead to severe damage to the pickup.*

When loading lightly frozen beet piles, always place the frost breakers (**1**) in the infeed conveyor intake.
The machine as delivered from the factory contains the frost breaker (**1**) attached to the frame of the additional axle. If needed, sit in the infeed conveyor intake and mount the frost breaker using the screws with which it was attached to the additional axle frame.
The frost breakers help to break up frozen lumps of beets, and so make sure of largely uninterrupted flow of beets through the machine.

Mounting holes for the frost breaker in the infeed conveyor intake.

6.13.23.2 Extremely narrow beet pile

Even in the case of a very narrow beet pile for which it appears that just half the pickup width would suffice for loading, it is still required to completely fold out the pickup and use the entire width for loading.

6.13.23.3 Water spray system (optional)

Design and function

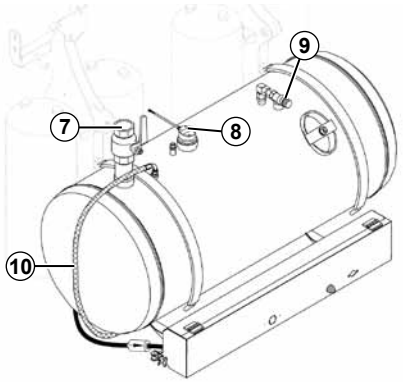
The water spraying system serves to moisten the pinch rollers when working in especially sticky ground conditions. It is also very useful when it is desired to gently load soft beets that have been dried out by the sun and wind. The beet flow slides over the moistened pinch rollers much better. The results of this are lower loading losses.
The water needed for moistening is filled from above into the tank (**5**), which is at first pressureless. The pressure required for moistening is generated by the compressed air compressor of ***euro-Maus4***.
Switching the water spraying system on and off is comfortably performed from the driver's seat.

Attention

Attention! *Risk of injury due to dirt particles and water spraying out. Before filling up the water tank, slowly and carefully open the stopcock (**7**) to relieve any pressure existing in the water tank. Do not bend over the filling opening until the pressure has been completely relieved.*

Filling up the water tank

Before filling up, close the ball cock ⟨1⟩ (OFF position).
Before filling up the water tank, slowly open the ball cock (**7**) on the filler neck to relieve possibly existing pressure.
Only fill up the container using clean water without pollutants.
Close the ball cock (**7**) as soon as the container is filled up.



(7) Filler neck with ball cock
(8) Sensor for level display
(9) Safety over-pressure valve
(10) Transparent hose for checking dill level

Attention

Attention! *The response pressure for the safety relief valve (**9**) has been factory-preset to 6 bar. The setting for this safety component may in no case be changed since, otherwise, this may lead to severe injuries or property damage. When replacing it, only an equivalent-quality spare part that is obtained directly from ROPA may be installed.*

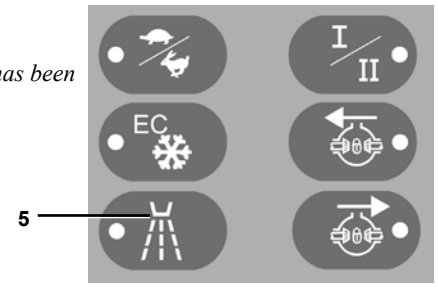
Position of the four ball cocks in the four operating modes

		1	2	3	4	
I	OFF					
II	ON					
III						
IV						

Whenever filling up, check the strainer filter in the filter bowl (**6**) for dirt and clean the strainer if needed.
To open the filter, first close the ball cock 2, then the ball cock 4. Then, open ball cock 3 so that the pressure can escape. Only unscrew the filter bowl when the ball cocks are closed. If the strainer filter is damaged, you can obtain a new strainer filter under the item number 208032.

Operation

A lit LED indicates that the water valve has been opened and the system is spraying.



The water spraying system is switched ON and OFF using button (**5**) on the operating panel. Set the four ball cocks to the operating mode desired.

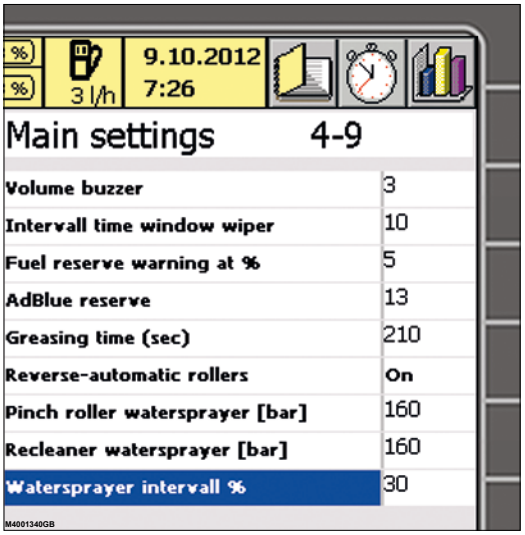
Operating mode I OFF If the water spraying system is not currently needed, then close ball cock (1).

Operating mode II ON If the water spraying system is needed, set the four ball cocks as per Operating mode II ON.

Water-saving tasks (interval control)

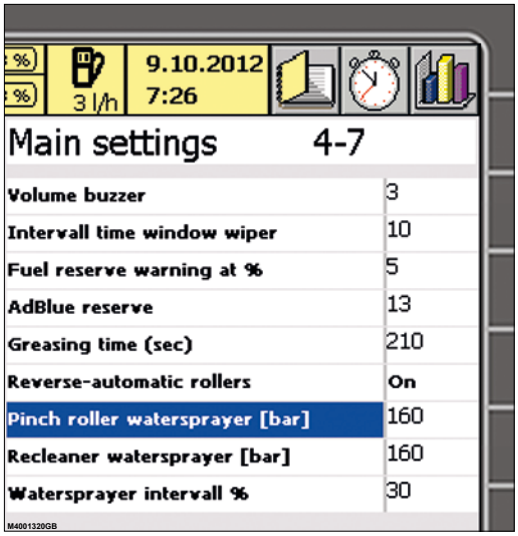
Press and hold button (**5**) until the color terminal displays the icon .
Water spraying system ON. The system sprays if the machine drive is switched on.

In order to both better regulate the moistening process and simultaneously conserve water, you can use the color terminal to set the spray duration yourself. To do so, navigate to the line "Spray system interval %" in the "Basic settings"menu. Setting to 100% means the nozzles spray continuously. Example: At a setting of 50%, the system sprays for 5 seconds, then pauses for 5 seconds.



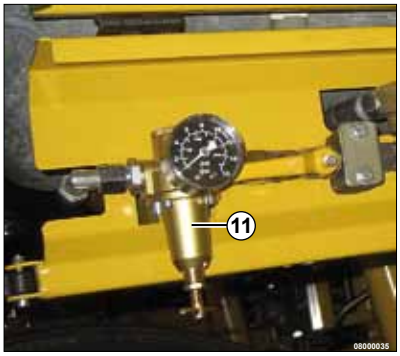
Water-saving tasks (pressure control)

Press and hold button (**5**) until the color terminal displays the icon .
Water spray system in automatic mode If the pressure threshold values that you preset in the "Basic settings"menu (for the 4-set pinch rollers and the recleaner) have been exceeded, then the water spray system begins to spray. The spraying stops when the pressure falls below the threshold values.

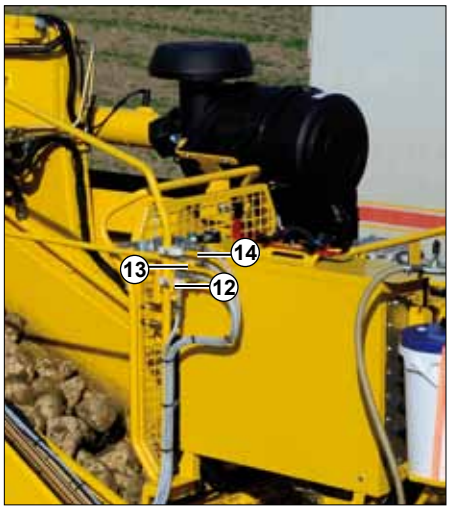


Press and hold button (**5**) until the icon disappears from the color terminal. The water spray system switches off.

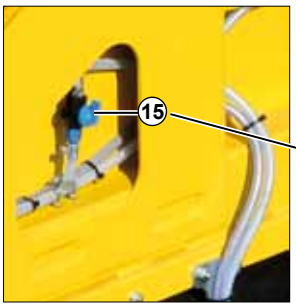
The water pressure is set as required (max. 5 bar) at the pressure reducer (**11**) of the water spraying system.



(11) Pressure reducer for the water spraying system



Shutoff cocks for the spray jets if not all are needed simultaneously:
(12) Recleaner
(13) Pickup left
(14) Pickup right



The following applies to all machines as of model year 2011: There are additional shutoff cocks (**15**) on both pickup side sections and on the roller recleaner. This allows you to shut off a particular nozzle if the moistening requirements are lower.

The following applies as of model year 2011:
The transparent hose (**10**) allows you to view the water filling level in the water tank during the filling process.
During operation, the fluid level of the water tank is displayed on the color terminal as blue-highlighted 20% increment bars.

When the water tank contents drop to 20%, then the highlighting changes to orange.

Operating mode III Draining water and emptying tank

In case of frost hazard or before longer periods of standstill, we recommend that you completely drain water from the system in due time to avoid damage to the water spraying system. To speed up emptying of the tank, the engine of **euro-Maus4** should be running (for compressed air supply).

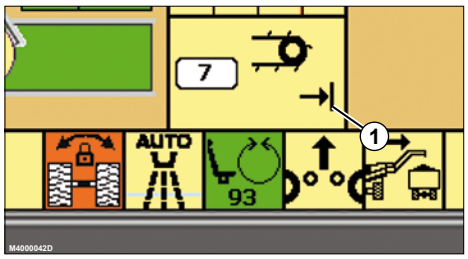
Operating mode IV Blowing out spraying jets and pressure lines

Blowing out of pressure lines and spraying jets is required in case of frost hazard. The machine drive must be switched on for blowing out the spraying jets. Set the ball cocks to the positions specified for operating mode IV and switch on the water spraying system using the key (**5**) (continuous operation). Leave the system switched on until all spraying jets only emit air without water mist. Then open the water filter and empty the filter bowl. Screw the filter bowl including strainer filter to the filter head again.

6.13.24 Loading mode END

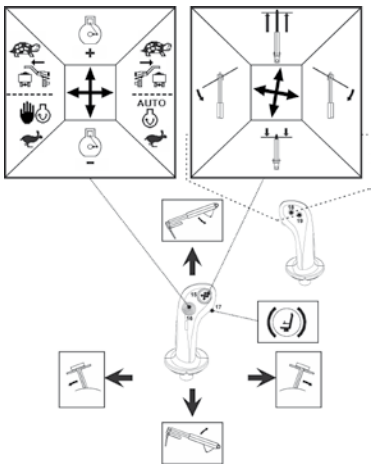
In order to save fuel, when the machine approaches the pile end, it makes sense to reduce speeds throughout the entire beet flow since the pile pickup will generally only convey small quantities of beets onto the pickup. In addition, the weighing results are more accurate when truck conveyor works with a certain minimum fullness. To do so, open the menu "Special functions", scroll to the line "LOADING MODE" and change the selection from "LOAD" (default) to "END". This selection sets the speeds of all drives to the values that you selected yourself during your last usage of the "END" mode.

To restore the default setting "LOAD", navigate to the menu "Special functions", scroll to the line "LOADING MODE" and change the selection from "END" to "LOAD".



(1) Recognition sign for the activated END loading mode

6.14 Pile pickup/picking up residual beets



The pile pickup can be used to clear the end of a beet pile to the outsides of the pickup. The residual beet pickup (plastic part) is fitted to the pile pickup. It is used to pull the last beets of a pile into the pickup. The pile pickup is controlled using the left joystick.

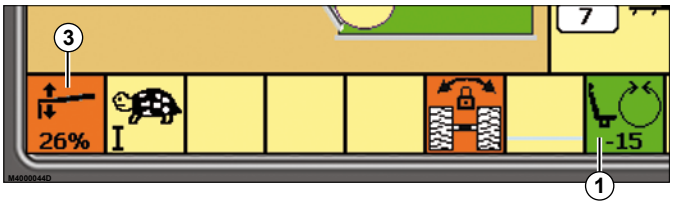
Safety circuit for residual beet pickup

Danger! *There is a hazard of very severe or even deadly injuries for people staying in the hazard zone. Objects or people may be caught by their body parts or pieces of clothing and drawn into the rollers, especially near the pickup. In this case, body parts may be ripped off and fragmented. Objects may be drawn in by the rollers and destroyed or cause severe damage to the pickup of the machine. The operator is obliged to immediately shut down the machine, as soon as people enter the hazard zone or ingress into it with objects.*

As long as the machine is running, it is expressly prohibited to manually place into the machine any sugar beets that were not automatically lifted by the machine (this also applies to use of hand tools). Please always bear in mind that residual beet pickup activities have lead to very serious accidents in the past.

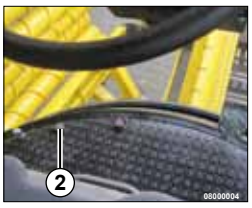
Pile pickup up

As long as the pile pickup is lifted up sufficiently high, the indication for the pile pickup height (**3**) on the color terminal is displayed highlighted in green. The green color indicates that the safety circuit has no effect during loading. As long as it does not lower under a certain minimum height, the pile pickup may be used without restrictions (for instance, in a half-frozen beet pile).



Pile pickup down

If the height indication for the pile pickup (**3**) is displayed highlighted in orange, because the pile pickup is lowered, then the telescopic arm may only be moved left/ right and up/down without additional measures. When the telescopic arm is to be extended or retracted, the driver's seat must be turned to the front . The rotatable seat status indicator (**1**) on the color terminal must display green (display range between -20%/0%/+20%). In addition, the "look forward" foot-switch (**2**) on the cabin floor must be pressed.



This "look forward" foot-switch (**2**) must always be pressed and held when residual beets are picked up. When this foot-switch is released, all rollers of the pickup stop ("deadman" switch). They can only be switched on using the right joystick if the driver's seat is rotated fully forward and the "look forward" foot-switch (**2**) is pressed. As soon as the rotatable seat is turned out of the central range, then the pile pickup can only just be raised. All other functions of the pile pickup are otherwise blocked.

If the rollers of pickup are rotating and the pile pickup is lowered below the height limit already mentioned, then you have a little time to both rotate the driver's seat forward until the color terminal displays the green "0" range indicator and to press the "look forward" foot-switch (**2**). The safety circuit only takes effect after a couple of seconds. You are informed about expiry of this cooling-off period by a visual indication on the color terminal and an acoustic warning signal.

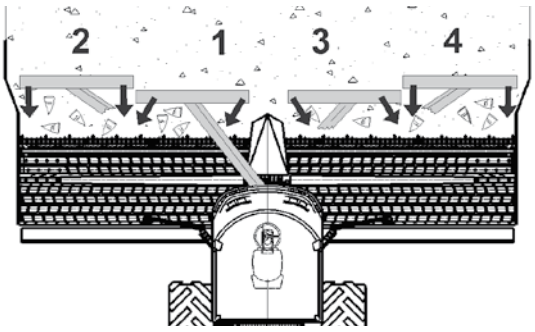
If the "look forward" foot-switch is continuously pressed (for instance, electrically bridged or pressed down with a weight), then the machine drive cannot be switched on any more.

If the color terminal displays the following icon , then the pile pickup must be turned to the center and raised before raising the pickup.

If the pile pickup is to be swung far to the right or left, then the pickup must first be lowered. If the pickup is not lowered far enough, then the color terminal displays the following icon .

Before picking up residual beets, we recommend lowering the pickup, at very slow speed, by a few centimeters, and picking up the residual beets as follows:

– Always pull the residual beets onto the conveyor rollers near the central mark. For



this purpose, move the residual beet pickup in parallel to the conveyor roller and wait until the beets have been transported to the infeed conveyor.

– Pull the beets lying on the outside across the conveyor rollers. With a little experience, you should have most of the residual beets picked up in six passes.

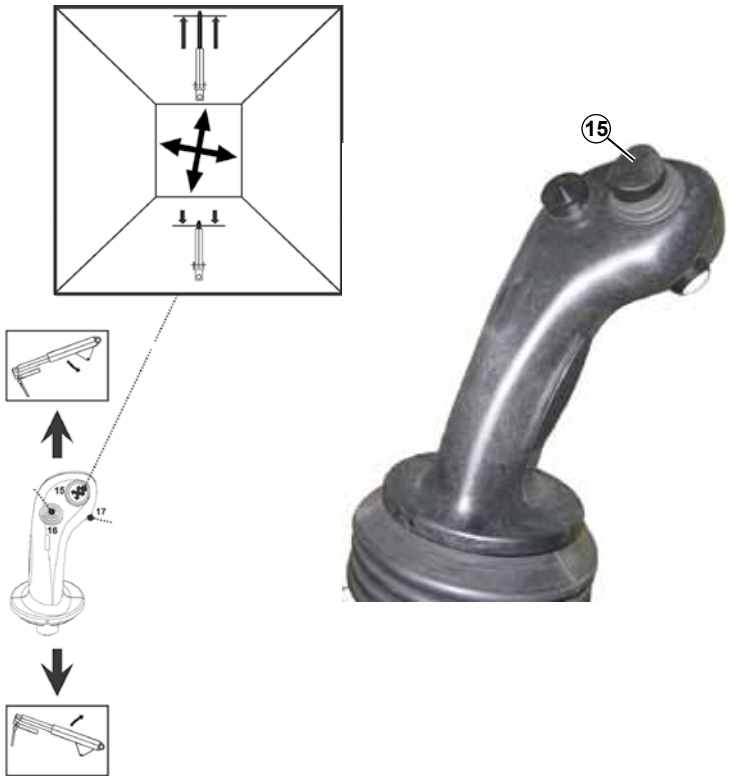
6.14.1 Changeover of operation controls, Raise/lower pile pickup

The default operation control for the two functions:

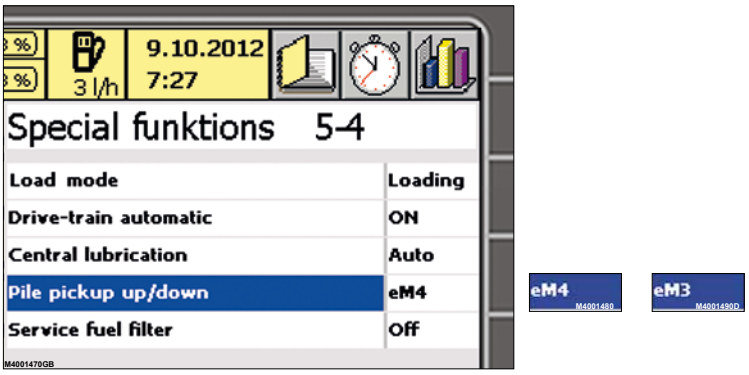
– Raise/lower pile pickup

– Extend/retract pile pickup telescoping section

is displayed in the illustration.



For drivers who are used to the operation control logic of the previous model **euro-Maus3**, it may prove advantageous to exchange the two functions of "joystick left forward/ backward" and "mini-joystick (**15**) forward/backward". It is possible to do this by opening the menu "Special functions" and scrolling to the selection line "Pile pickup UP/DN".



Tip! When picking up residual beets, always work near the central mark and always from the center of the pickup to the outside.

Beets lying on the edge can be picked up more easily if you swing the clearing shields inward

6.14.2 Automatic residual beet pickup

The function described in the following is still in development and is not available in the current software.

Prerequisite:

– Rotatable seat is in the central range (green)
– "Look forward" foot-switch is pressed

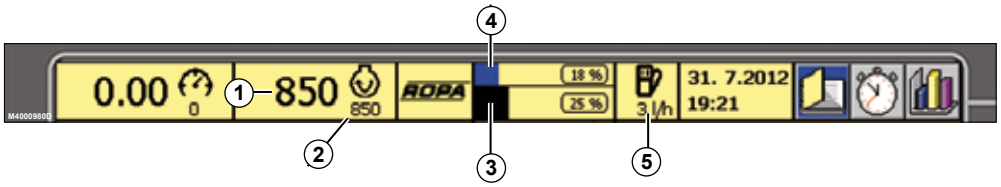
Press both buttons (**12**) and (**13**) simultaneously and keep them pressed
In addition, briefly push the left joystick to the:
Front left = Automatic residual beet pickup function starts at the left
Front right = Automatic residual beet pickup function starts at the right

If the "look forward" foot-switch is no longer pressed or if the left joystick is moved again, then the automatic function is switched off.

6.15 Diesel engine

A summary of the required maintenance work on the engine is found in Chapter 7, in the original operating instructions and the original maintenance booklet of Mercedes-Benz. Notes about which measures should be taken if there are malfunctions can be found in Chapter 8 "Troubleshooting" and in the original operating manual from Mercedes-Benz.

The contents of the fuel tank and AdBlue® tank are displayed on the color terminal in percent.

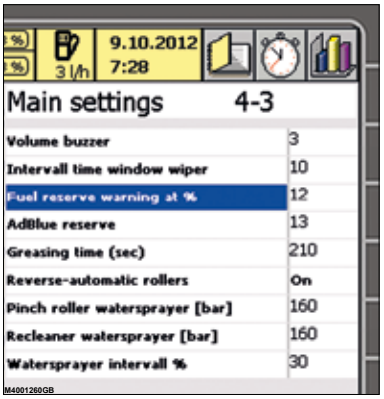


(1) Actual speed
(2) Desired speed
(3) Fuel tank level
(4) AdBlue tank level
(5) Current fuel consumption in l/h

(7) Constant throttle intervention info (orange)
(8) Starter control info (green)

You can set the warning limit for fuel reserve in the menu "Basic settings", line "Fuel reserve warning at (%)". You state this value in percent of the total tank capacity.

You can set the warning limit for AdBlue® reserve in the menu "Basic settings", line "AdBlue® reserve warning at (%)". Enter this value in % of the AdBlue® tank level.



Note

Note! *Depending on the design, fuel tank contents exceeding 1000 liters are not indicated on the display.*

The following warning indications are displayed on the color terminal in case of engine trouble:

Engine oil pressure too low. IMMEDIATELY SHUT OFF and refill engine oil.

Engine oil level too low. IMMEDIATELY refill engine oil. Please note: the oil level monitoring system does NOT replace the need for daily manual oil level checks!

Coolant temperature too high. Shut off engine and determine and fix the cause. (for instance clean the radiator).

Coolant level too low. Shut off engine and immediately fill up coolant.

Serious engine problems!
Turn off the engine **IMMEDIATELY** and call the Mercedes Benz customer service.

Note! *Risk of serious engine damage. When one of the above warning icons is displayed on the color terminal, immediately shut off the engine and determine the cause of the warning. The engine may be started again only after the cause has been removed.*

Fault in Mercedes-Benz engine control.

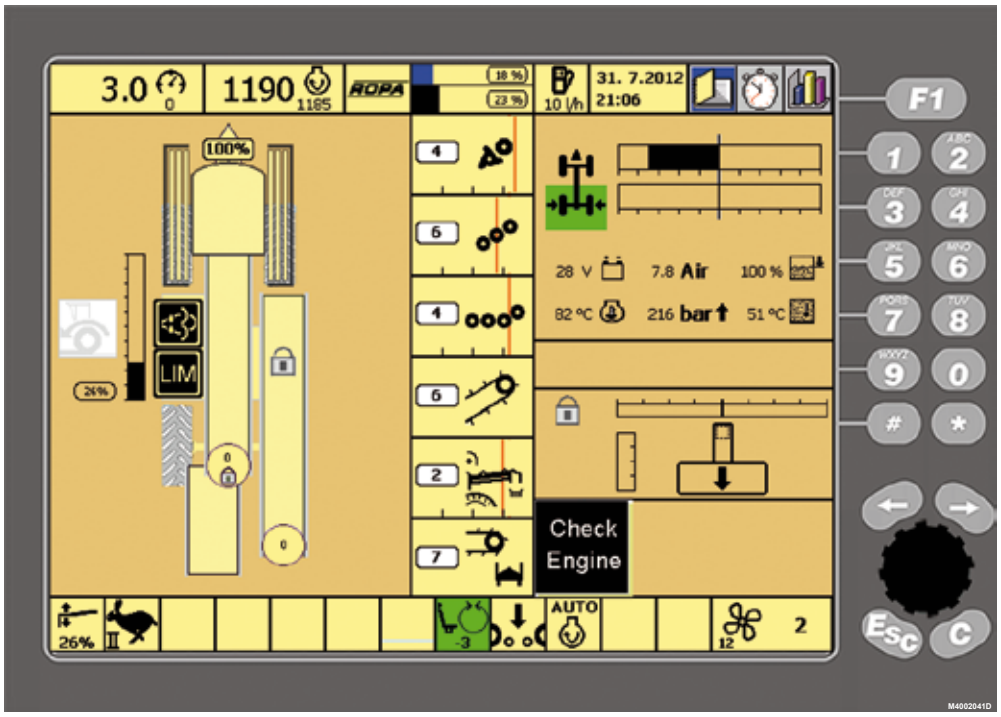
Air filter dirty! Immediately perform maintenance on the air filter!

Fuel prefilter dirty! Replace the filter, otherwise, expect decreased engine power.

Fuel fine filter blocked! Replace the filter, otherwise, expect decreased engine power in the near future.

Reserve fuel quantity being used!
If this warning icon is displayed on the color terminal,
it means the reserve fuel quantity (set by you) is now being consumed.

Reserve AdBlue® quantity being used



The diesel engines of the different **euro-Maus4** models are supplied with two different engine certifications:

a) Euromot 3b only (according to Directive 97/68 EC) and
b) Tier 4i (EPA-USA and Euromot 3b (according to Directive 97/68 EC)

The following applies to both models:
If the AdBlue® tank level falls below 14%, the DEF warning indicator appears on the color terminal.
If the AdBlue® tank level falls further down to 10% or less, the DEF warning indicator starts flashing 30 minutes after this state has been reached. In addition, the LIM warning indicator is displayed continuously on the color terminal. At the same time, the available torque of the diesel engine is automatically throttled (in a continuously variable manner) to 80% of the nominal output. This means that for 10 minutes after the LIM warning appears as a permanent display with flashing DEF warning on the color terminal the engine can only be operated with 80% of the nominal output.
We **STONGLY** recommend immediately filling up AdBlue® at this stage at the latest.

Sixty minutes after reaching or falling below the 10% mark in the AdBlue® tank, the available torque of the diesel engine is automatically further throttled (in a continuously variable manner) to 20% of the nominal output. In addition, the engine speed is automatically reduced to max. 1000 rpm within this period. As soon as the engine output is reduced to 50% or less of the nominal output during this 60 minute period, the LIM warning indicator also starts to flash.

Note

Note! *If only the DEF warning is displayed, this indicates either a lack of AdBlue® reserve or poor AdBlue® quality.*
If the DEF warning indicator is displayed in conjunction with the AWL warning, this indicates technical problems in the exhaust after-treatment system.

Check Engine

An override switch (**1**) is provided for exceptional cases. This is located on the cover of the central electronics cabinet.
This override switch first delays the reduction of engine torque and engine speed for a period of 30 minutes. It can be pressed up to 3 times.
However, after expiration of the last 30 minute period, the engine speed is reduced abruptly to 20% of the nominal output with simultaneous reduction of the engine speed.
The LIM warning is no longer displayed.

Note

Note! *Pressing the override switch only makes sense after the LIM warning indicator is displayed.*

In engines which are ONLY certified in accordance with Euromot 3b (according to Directive 97/68 EC), the automatic limitation of torque and speed is not activated.
The LIM warning indicator is not displayed. These machines are not equipped with an override switch.

6.15.1 Modifications or additions to the engine operating manual from Mercedes-Benz

The following items listed below must generally be considered for the engines from Mercedes-Benz that are installed in ROPA machines:

– Models in which OM 926 LA euroMOT 3a (models with 220kW at 2200 rpm) are installed. This means that only a part of the operating manual from Mercedes-Benz applies, namely those referring to these engine models as well as those parts generally applying to all engine models.
– All engines that are not fitted with a flame starter system, but are equipped with a constant throttle brake. Control is effected by the ADM3 electronic control unit via the CAN-Bus. This control unit is located in the central electrical system cabinet!
  The exhaust after-treatment system of **euro-Maus4** is controlled by the SCR frame module. This is located somewhat in the middle/left side of the **euro-Maus4** frame over the rear side of transmission.

The "warning lamp electronics" and "stop lights" mentioned in the operating manual from Mercedes-Benz are replaced by warning indicators on the color terminal of ROPA machines. But the meaning for these indications is identical to the light/lamps described in the operating manual from Mercedes-Benz.
As soon as the STOP indication is displayed on the color terminal, the engine must be IMMEDIATELY shut off because there is a serious engine fault that may lead to an engine breakdown operation is continued.
The "charging current" indicator lamp is also replaced by a warning indicator on the color terminal of ROPA machines.

– An emergency switch for the full engine power (override switch) is listed in the Mercedes Benz manual. This switch is only installed in machines fitted with engines certified in accordance with EPA/Tier 4i.

– The diagnosis socket (X-340 (**2**)) for engine electronics is located at the rear side of the central electronics cabinet.
– The START / STOP button on the engine is render inoperable by securing the hatch on the engine compartment.
– Instead of the original oil drain plug, the engine has a special oil drain valve. This is intended to facilitate changing of the engine oil.

– ROPA machines are fitted with two generators with a capacity of 100A each.
– If the engine is to be operated using biodiesel as fuel, then exclusively the following quality may be used:

  FAME (= fatty acid methyl ester) as per DIN EN 14214.

  This also applies to engines equipped with a BlueTec® exhaust after-treatment system.

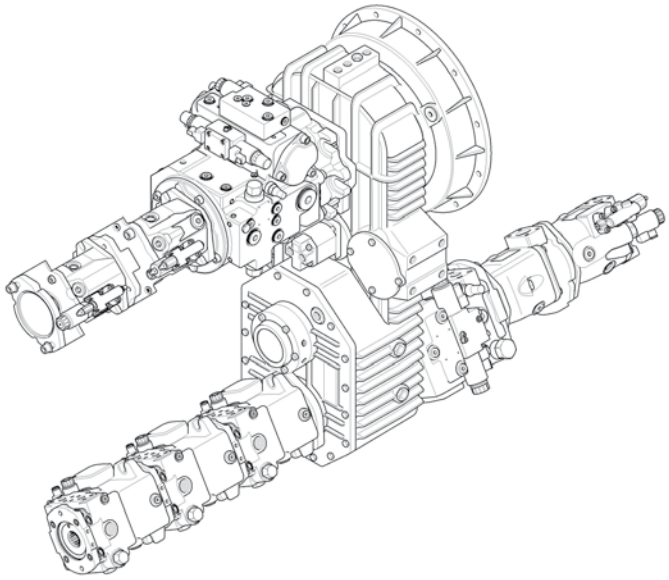
When operating using biodiesel fuel, then at least two complete tank fillings of pure, unblended diesel fuel (no additives) must be used up immediately before terminating the harvesting season. If biodiesel remains in the fuel lines, respectively, injectors during the standstill time, then this may lead to far-reaching damage to the complete fuel system and the engine.

– Please keep confirmations of maintenance work from the Mercedes Benz customer service with the enclosed original documentation from Mercedes Benz.

The Mercedes-Benz operating manual is absolutely binding; an original copy has been supplied with the machine.

6.16 Pump distributor gear unit (PVG)

The pump distributor gear unit is connected directly to the diesel engine and transmits the engine power to the hydraulic pumps. A multi-disk clutch is used to switch in those particular hydraulic pumps needed for loading. This clutch (and thereby the machine drive) is switched on or off by briefly pressing the yellow key (**6**) on the right joystick.



The pump distributor gear unit is fitted with a pressure circulation lubrication system. If lubrication is not sufficient, then a warning signal sounds. The following warning icon is displayed on the color terminal .

Note

Note! *Hazard of severe damage to the machine. Immediately shut off the engine when the warning signal sounds.*

If the machine drive is switched on and the oil pressure of the multi-disk clutch is too low, then the color terminal displays the following warning icon (clutch pressure pump distributor gear unit). In this case, the machine drive must be switched off immediately and the cause for low oil pressure must be determined and removed. If the drive continues to operate in spite of low oil pressure, then the multi-disk clutch is invariably destroyed.

The highest allowable diesel engine speed for driving the hydraulic pumps may not be exceeded, not even for a short time.
Maximum speed
Machine drive switched off (with constant throttle brake): **2700** rpm
Machine drive switched on: 1975 rpm

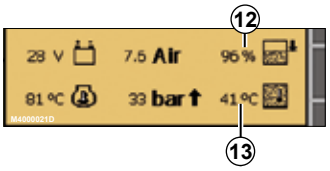
6.17 Hydraulic system

Warning! *The hydraulic system is under high pressure. Hot hydraulic fluid may emit from leaks and can cause severe injuries!*
Work on pressure reservoirs of the machine may only be performed by trained personnel. When working on the pressure reservoirs, the machine must first be rendered completely pressureless. The pressure reservoirs may in no case be damaged or opened because the constant preloading pressure may severely injure people. The preloading pressure of the pressure reservoirs is present even when the remaining components of the hydraulic system are already pressureless. During all work on the hydraulic system, ensure extreme cleanliness. If dirt – even only in minute quantities – enters the hydraulic system, this may lead to heavy damage to the complete hydraulic system.

Regularly check the hoses of the hydraulic system!
Immediately replace damaged or aged hoses. Use only original hoses from ROPA or hoses fully complying with the specifications of the original hoses! Observe the regionally applicable safety regulations regarding the service life of hydraulic hoses.

The hydraulic system is operational after the diesel engine has been started. To reduce wear of the hydraulic system, the **engine speed during the first minutes (about 5 minutes) after a cold start should in no case exceed the value of 1300 rpm**. Even higher speeds for short times should be avoided. If your **euro-Maus4** is fitted with an independent heating system, then use it for preheating the hydraulic fluid
When first starting of the machine drive for work in environmental temperatures lower than +10°C, proceed as follows:

Before switching on the machine drive, switch off the drives of the recleaner and pickup. For this purpose, press the keys (**9**) (**8**) and (**7**) on the right joystick one after the other. These drives are then displayed in white on the color terminal. Switch on the machine drive by briefly pressing key (**6**) on the right joystick. The hydraulic system is operating, the rollers are standing still. Wait for two to three minutes, before you switch on the drives again, one at a time, one after the other.



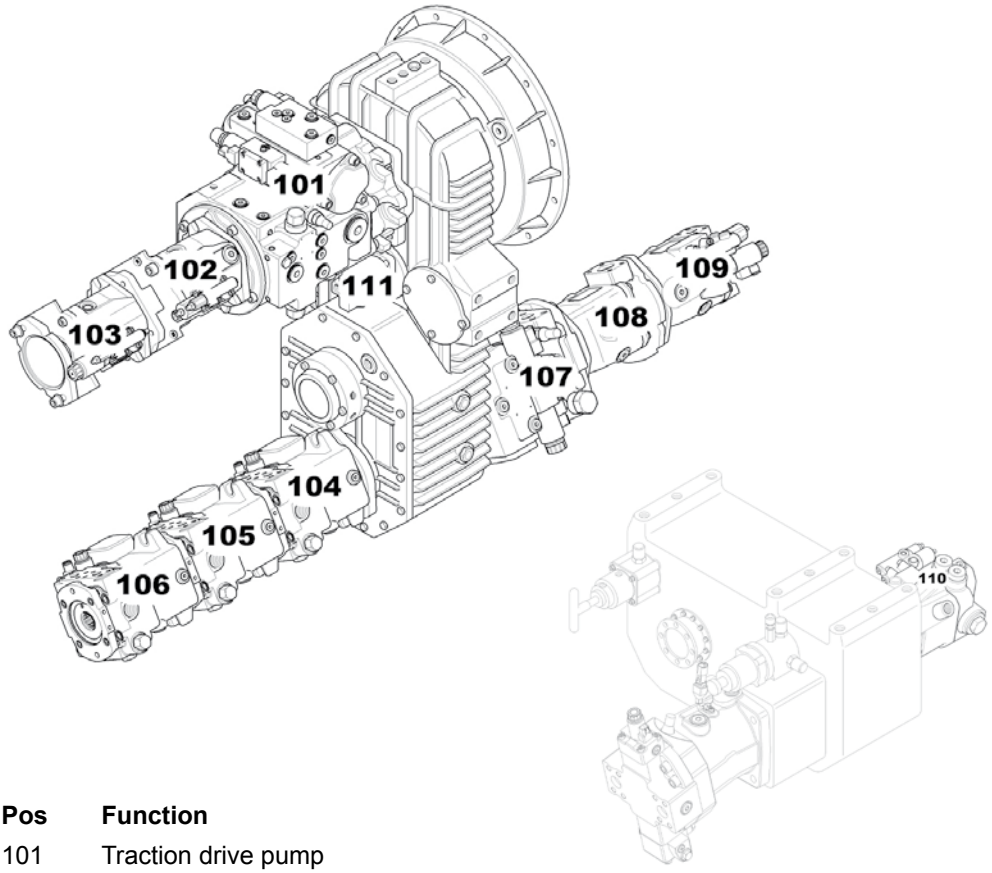
(12) Hydraulic oil level
(13) Hydraulic oil temperature

The temperature of the hydraulic fluid may be read on the terminal.
The level should be kept in a range between 80% and 100%. Displayed values above 100% should be avoided.
If the temperature of the hydraulic fluid should be 70°C or more, then clean the hydraulic

fluid cooler. The following warning icon is displayed on the color terminal .

If the hydraulic fluid level is too low, then the color terminal displays the warning icon:
hydraulic fluid level too low. IMMEDIATELY switch off the engine! If the driver ignores this warning the engine turns off automatically after a short period. Refill hydraulic fluid and determine the cause for the lack of fluid. In the worst case scenario involving a burst hydraulic hose, the complete hydraulic fluid tank is empty within 30 seconds.

Hydraulic pumps:



Pos	Function
101	Traction drive pump
102	Pump working hydraulic/front axle steering
103	Pump for radiator/charged air/oil coolers fan drive
104	4-set pinch rollers pump
105	Pickup rollers pump
106	Conveyor rollers pump
107	Recleaner drive
108	Infeed conveyor drive
109	Truck conveyor drive
110	Emergency steering
111	Pump lubrication + pump distributor gear unit (PVG) coupling

euro-Maus4 is equipped with 9 hydraulic circuits that are supplied by nine axial piston pumps. Pump number 111 only serves the clutch and transmission lubrication. It is not connected to the hydraulic system.
The pumps 101/102/103/111 are always operating when the diesel engine is running.
The pumps 104/105/106/107/108/1097 only operate when the diesel engine is running, the machine drive is switched on and the flow of power is engaged using the multi-disk clutch.

6.18 Compressed air system

The compressed air system supplies the braking system and the working pneumatics system with compressed air. The following processes of **euro-Maus4** are performed by the working pneumatics system:

- Switching of operating modes "Turtle"/"Rabbit" for the manual transmission.
- Switching between the gears "I" and "II".
- Switching off all-wheel drive.
- Switching on differential locks.
- Locking in place of the rotatable seat.
- Swinging of the two rearview mirrors.
- Raising/lowering of the warning signs.
- Swinging of the boarding steps.

In addition to the pneumatic system, the compressed air compressor also supplies to:

- the compressed air tap on the machine
- the blow-out gun in the driver's cab
- the water spraying system (if this option is available)

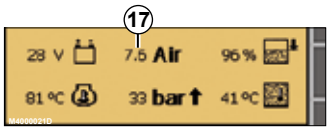
In any case, ensure that the stop valve (**1**) of the pneumatic system is always open because otherwise a large part of the pneumatic system is out of operation.

(1) Stop valve

In the position shown, the stopcock is open. To close it, turn it by 90°.

The pneumatic system also supplies the exhaust gas after-treatment system. Compressed air is needed for the injection of AdBlue® and for purging the system.

The exact reservoir pressure of the compressed air system (**17**) is displayed on the color terminal.



All pneumatically controlled switching processes can only be reliably performed if there is sufficient pressure in the compressed air system.

If the pressure in the compressed air system is insufficient, the color terminal displays the following warning icon .

As long as this icon is displayed on the color terminal, the machine may not be moved at all.

6.18.1 Compressor

The entire pneumatic system of the machine is supplied with compressed air by a compressor. The compressor is fastened directly to the engine. Air intake of the compressor takes place via the engine air filter. Once the preset maximum pressure is reached the pressure regulator blows off automatically. The compressor is maintenance-free.

6.18.2 Air dryer cartridge

The air dryer (**2**) is located below the right lateral hatch. It separates the condensation water before the air reaches the compressed air reservoirs.

There is a heating element in the air dryer which prevents freezing at low temperatures. The heating element of the air dryer is switched on automatically when needed.

6.18.3 Compressed air reservoir

(4) Compressed air coupling on the compressed air reservoir located most forward

(2) Air dryer cartridge
(3) Compressed air reservoir

The **euro-Maus4** has three compressed air reservoirs. The four large compressed air reservoirs supply the braking system and the working pneumatics with compressed air. The small compressed air reservoir (**3**) serves to regenerate the air dryer.

A compressed air service connector (**4**) is located under the protective cover over the AdBlue® tank.

6.19 Central lubricating system

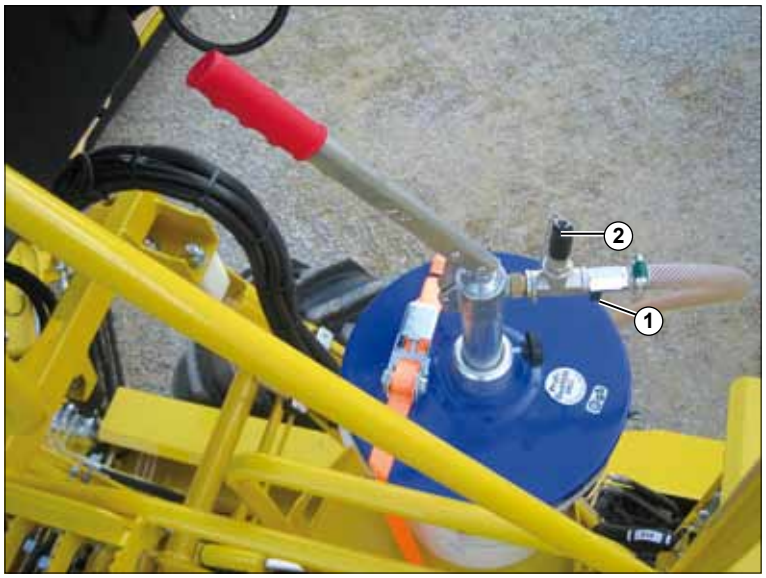
euro-Maus4 is fitted with a central lubricating system and the variant with sieve conveyor cleaner has two lubricating circuits. The other variant has an 8-set pinch roller cleaner and three lubricating circuits.
One lubricating circuit supplies the pickup, a second the chassis and a third the optionally present recleaner rollers with lubricating grease.

All lubricating points connected are automatically supplied with grease. The lubricating pump supplies the grease to the main distributors. The main distributors distribute the grease to the subdistributors and from there, the individual lubricating points are supplied. With every switching on of the machine drive, the lubricating pump is switched on for the period of time entered by the operator in the menu "Basic settings". As long as the lubricating pump is running, a stirring blade rotates in the grease reservoir and the color terminal displays the following icon . When this period of time has expired, the lubricating pump stops.
This period of time is set to 210 seconds by the factory. It may be extended by the driver to up to 300 seconds.
When loading up to 20 tons per transport unit (e.g. a truck), we recommend the standard lubricating period setting of 180 seconds (pump operating period). When loading transport units of about 28 tons (a larger truck), we recommend a pump operating period of about 210 seconds. In general, the larger the transport unit, the longer the pump-operating period.

In any case, make sure that there is always a sufficient grease supply in the grease reservoir. In no case may the grease supply be used up so much that air ingresses the line system!

The 2kg supply reservoir for the grease pump is filled up using the lever on the large grease bucket. Never completely fill up the 2-kg supply reservoir of the grease pump. Only fill up the supply reservoir for the grease pump to 90% of its maximum capacity. In this way, you avoid blocking of the ventilation pipe on the 2-kg supply reservoir. If the bleeding pipe is filled up with grease, then the system is no longer able to supply grease to the grease points anymore.

6.19.1 Filling up the grease gun



(1) Shutoff cock
(2) Nipple for filling up the grease gun

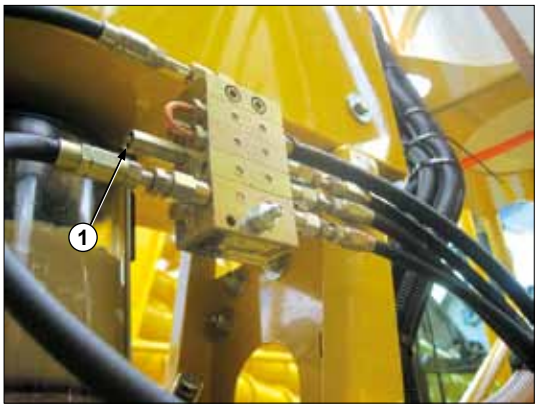
A stop valve (**1**) with a plug-in connector is located in the supply hose to the lubricating pump. This allows the grease gun from vehicle tools to be filled up directly from the grease bucket. For this purpose, press the hand lever grease gun into the connecting nipple (**2**) and close the stop valve. When you press the lever on the grease bucket, the grease gun is filled up with lubricating grease.

6.19.2 Intermediate lubrication

The lubrication system may at any time be manually activated. To do this, call up the menu "Special functions" on the color terminal. Scroll to the line "Central lubrication" and change the selection from "AUTO" to "ON".

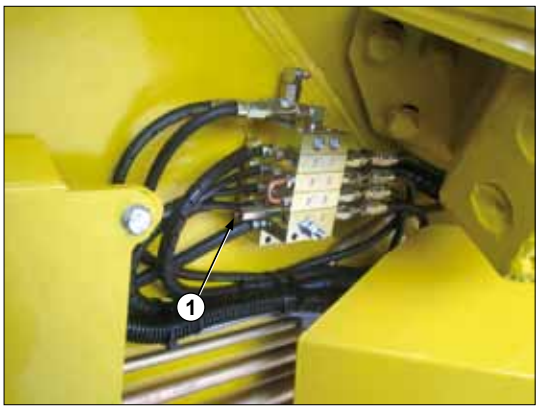
After an operating period of 20 minutes, the central lubricating system switches back to "Auto" (automatic).

Regularly check the lubricating pipe system. Check daily whether the lubricating system works without fault. One possibility is controlling the two respectively three main distributors. An indicator pin is installed there for checking functionality.
This indicator pin (**1**) moves slowly when the grease flows through the main distributor. This shows whether the pump element of this lubricating circuit is operating.



Main distributor on chassis

(1) Indicator pin



Main distributor for pickup and subdistributor for pickup

Additional lubricating nipples for manual intermediate lubrications or troubleshooting attempts.

6.20 Printer (optional)

6.20.1 Description of the keyboard functions

The keyboard functions differ depending on the status – normal operation or setup menu. This is also controlled by the length of time the key is pressed.

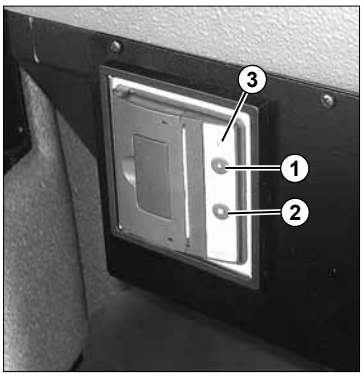
FEED/ENTER (**1**)

This key may be used to wake the printer from sleep mode and to feed paper.

When the feed key is pressed, at first one line of the currently set font is fed and – if it is pressed for more than 2 sec. – then feeding is performed constantly.

Self-test:

The printer is tested for internal functionality by printing a self-test sheet. To do so when waking the printer from power OFF, press the feed key {FEED} (**1**) for at least 3sec.



(1) Button FEED/ENTER
(2) Button OFF/NEXT
(3) Status LED

Key FEED/ENTER	Key OFF/NEXT	Activity
pressed	not pressed	Paper feed by one line
pressed > 2 s	not pressed	Continuous paper feed
Gedrückt bei Einschalten < 1 s	not pressed	Wake up, no paper feed
pressed on power on paper inserted > 2 s	not pressed	Call up TO (self-test)
pressed on power on without paper > 2 s	not pressed	Call up hexdump mode
pressed in hexdunp mode without paper	not pressed	End hexdump mode
not pressed	Release key after < 1 s in normal paper mode	Call up T1 (= default form feed 1 line)
not pressed	Key pressed > 3 s	Call up T2 (default = shutdown after one second)
pressed	pressed	Call up setup menu

6.20.2 Which thermally-sensitive paper is suitable?

The printer is designed for a paper width of 57.5mm ±0.5mm, paper weight: 60g/m². ROPA offers the suitable paper roll as standard equipment (ROPA item no. 206093). Other paper may cause malfunctions. Thermally-sensitive paper is available for specific tasks, which is water, grease and alcohol-resistant. We will gladly assist you in the selection of suitable thermally-sensitive paper.

1.

2.

Which side of the thermally-sensitive paper can be printed on?

On the paper roll, almost always the outside is the printable side. If you should still have doubts, make the finger nail test: quickly run over the paper with the tip of a finger nail, exerting pressure. The thermally-sensitive side is blackened due to the frictional heat.

3.

How is the paper inserted?

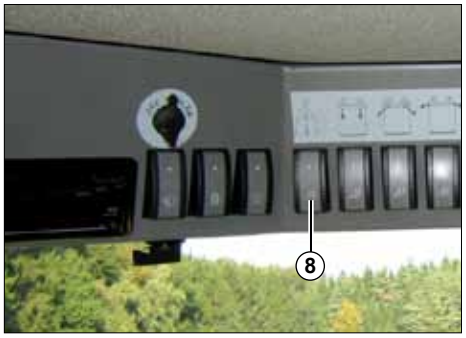
- Unwind about 10cm of paper from the roll. Keep the paper wound tight.
- Open the cover of the printer by lightly pressing the LEVER in the lid upward. The platen is levered out of the printing mechanism together with the lid. The lid may now be easily opened.

4.

- Insert the paper roll into the paper bowl in such a manner that the outside shows in the direction of the printing mechanism. Only this outer side may be printed by the printer.
- Close the lid by firmly pressing on it. It audibly engages so that you can now rip off paper at the cutting edge without the lid opening again and without allowing the paper to slip through the printing head without printing.

6.21 Video monitoring

As of model year 2011, the **euro-Maus4** is outfitted with six video camera as standard equipment. A camera is located at the front, below the central mark, and serves to determine the correct working depth. The second camera is located at the counterweight arm and serves as a rear view camera. When loading, always switch on lighting for the camera in the central mark using switch (**8**) in the radio console.
Optionally, the **euro-Maus4** may be outfitted with additional video cameras on the truck conveyor to monitor the loading process and at the recleaner.
Switching between the two cameras is performed as described in Chapter 5.



Rear view camera

Central mark camera

Truck conveyor camera (optional)

Recleaner camera

The cameras are maintenance-free. When the image quality deteriorates, you should clean the lens cover using a soft, clean and lightly moistened cloth. During cleaning, make sure that you do not scratch the lens cover.

Video monitor operating controls from model year 2011

Monitor ON/OFF

Calling up and switching of the menus in their displayed sequence:

Brightness	Brightness - 0(MIN) ... 60(MAX)
Contrast	Contrast - 0(MIN) ... 60(MAX)
Color	Color saturation - 0(MIN) ... 60(MAX)
Standard	Reset to factory settings
Language	Language - English, French, German, Spanish, Portuguese, Italian, Polish
Mirroring	The camera picture is mirrored. Pressing the menu item "Enter" navigates you back to the main menu. Use menu item "End" to exit the menu.
Video	PAL, NTSC, Auto
Poc	OFF/ON. Monitor is started when the ignition is switched on. OFF Monitor can be switched ON/OFF via the monitor.
Timer ON/OFF	Automatic camera switching ON/OFF
Timer setup	Setting of the display time for each individual camera in timer mode.

Selection button "Plus"

Selection button "Minus"

Day / Night switching

CAM Use this button to switch between single frame mode for Camera 1, Camera 2, Camera 3 and Camera 4. Split frame mode enables switching between Cameras 1/2, 2/3, 3/4 and Cameras 4/1. In divide-in-thirds and divide-in-quarters frame mode, this button is not assigned any function. The camera selection is only possible if none of the control cables is used.

MODE Pressing the Mode button enables switching between the individual view modes (single frame, split frame, divide-frame-in-thirds and divide-frame-in-quarters frame).

6.22 Electric system

6.22.1 Voltage monitoring

The battery voltage (**16**) is monitored by the system. In case of too high or too low voltage values, the color terminal displays the following warning icon .
The battery voltage (**16**) may not exceed 30V and may not fall below 23V. In case of a battery voltage (**16**) of below 23V, experience has shown that the machine cannot be started anymore.

(16) Battery voltage

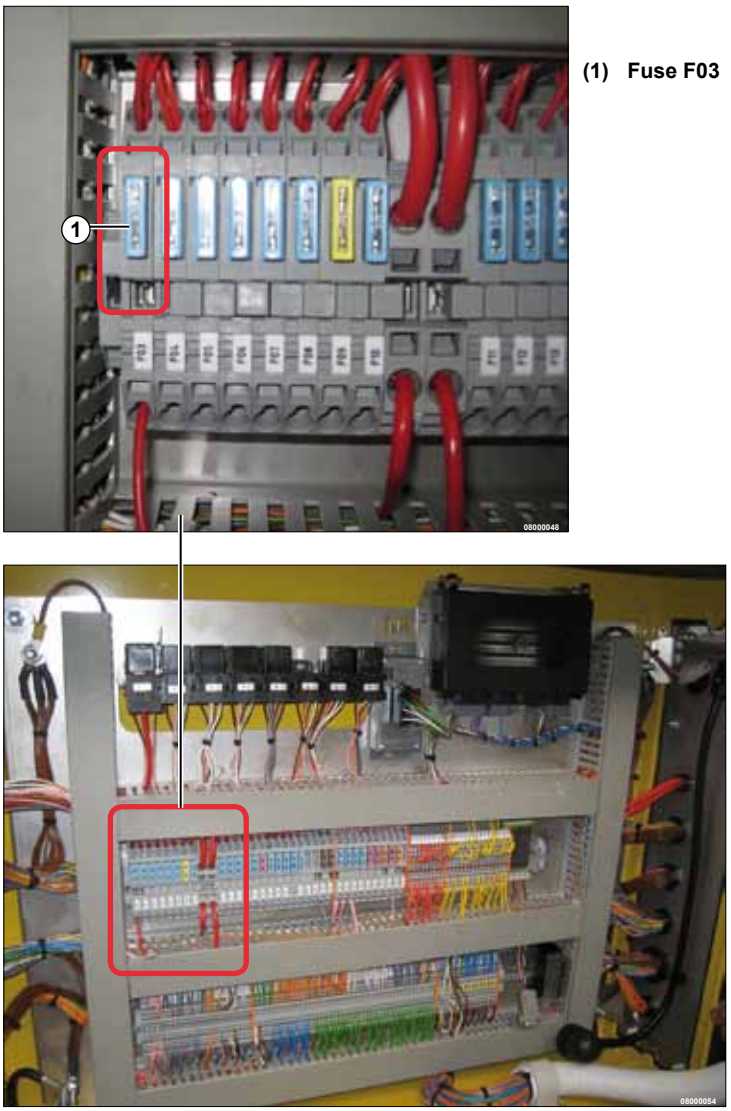
When a generator fails, the color terminal displays the following icon for generator 1 (upper generator) and for generator 2 (lower generator).

6.22.2 Fuses

Most fuses are located in the switching cabinet of the central electrical cabinet. Further fuses are located at the radio console and in the seat console. The main fuses are located in the battery box. Details on this are found in the Chapter "Troubleshooting".

6.22.3 Disconnect timer from the vehicle electrical supply

The electrical system (with the exception of the timer for the independent heating system and boarding platform lighting) can be completely separated from the batteries via the main battery switch. The main battery switch is located in the radio console.
If the timer for the independent heating system (a very minimal permanent consumer device!) is also to be separated from the power supply, then the fuse F03 (**1**) in the switch box of the central electrical cabinet must be pulled.



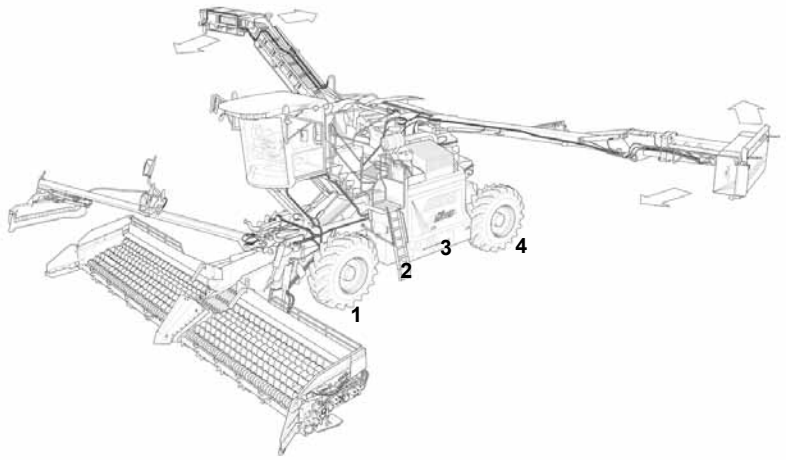
(1) Fuse F03

6.22.4 Battery disconnect relay

When you disconnect the power supply using the main battery switch (**32**), the power supply does not switch off until 6 minutes later (provided the ignition lock is in position 0/STOP). This ensures purging of the SCR exhaust after-treatment system. If you forget to switch off the main battery switch (**32**), the battery disconnect relay will switch off automatically 5 days after switching off the ignition. In this case, you have to switch the main battery switch (**32**) OFF/ON once before you turn on the ignition the next time.

6.23 Tire pressures

Use the tire pressure meter supplied to regularly check tire pressure during the season!



Tire type independent of the manufacturer		Min.	Recommendation	Max.
1	Front axle			
	710/75R34 TL 178A8	2.7	3.0	3.2
	800/70R32 Continental CHO 175A8	2.2	2.4	2.4
4	Rear axle			
	710/75R34 TL 178A8	2.7	3.0	3.2
	800/70R32 Continental CHO 175A8	2.2	2.4	2.4
2/3	Additional axles 235/75R17.5 TL143J	–	8.0	–

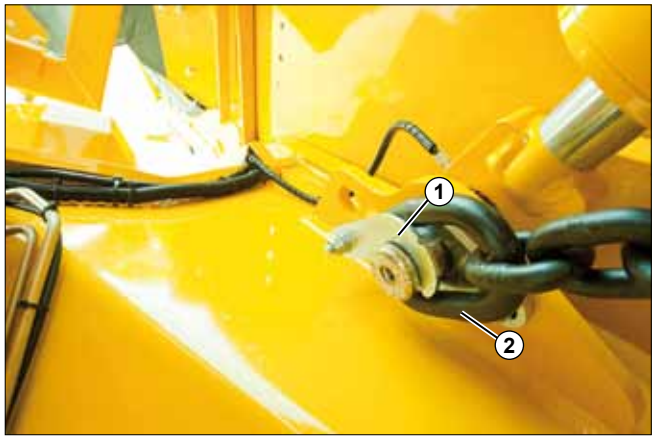
6.24 Immobilizing up to one week

Park **euro-Maus4** so that nobody is impaired or endangered. Also make sure of sufficient safety distance to any overhead power lines.

– Engage the parking brake.
– Raise the pickup all the way up.
– Shut off the engine.
– Fasten the safety chains (**2**) to the bolt end of the central pickup section and secure these with the safety hooks (**1**).

Note

Note! *Due to lowering pressure in the hydraulic system, the pickup may come down during longer standstill periods and severely damage the driver's cabin. Therefore, when parking the machine, always fasten the safety chains (**2**) to the bolts on the left and right of the pickup central section.*



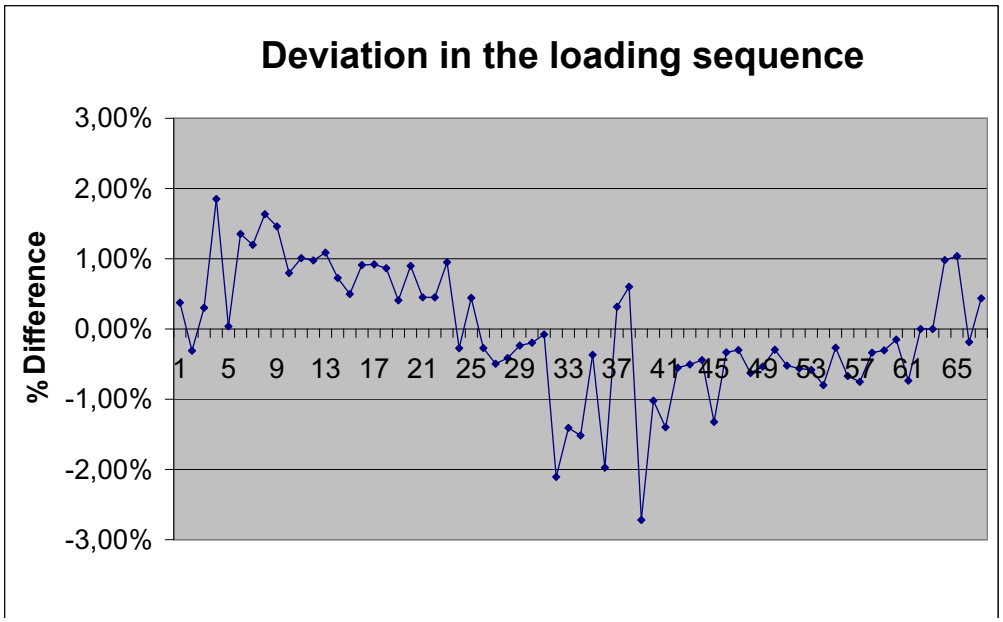
– Switch off all electrical loads.
– Remove the ignition key.
– Leave the machine and lock the driver's cab.
– Do NOT switch off the main battery switch so that the independent heating system remains operational.
– Secure the machine against rolling away using the chocks.

Note

Note! *If needed, consider additional protection for children.*

6.25 Scales (optional)

The unit is an electronic conveyor belt scales. The unit uses highly sensitive electronic weighing cells to weigh the loads and their dirt masses – herein generally called sugar beets – that are conveyed by belt to the load-receiving transportation vehicle. The accuracy of each individual weighing process is primarily affected by correct operation of the scales and is no longer under the influence of the manufacturer.

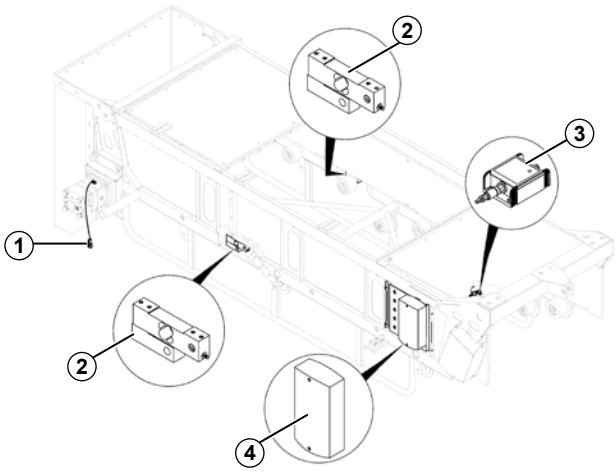


Optimal weighing results after 67 sequential loads

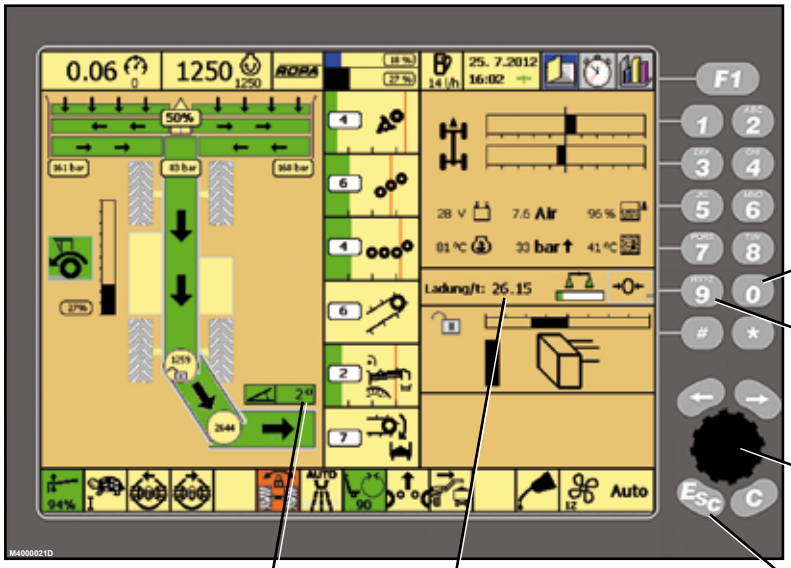
In addition to correct operation, the following factors also decisively affect scales accuracy:

- ground condition,
- degree of soiling of the sugar beets,
- degree of soiling of the scales rollers and the rollers located immediately in front of and after the scales rollers,
- the angle of inclination of the truck conveyor articulation.

6.25.1 Mechanical design



(1) Speed sensor
(2) Weighing cell
(3) Computer
(4) Inclination sensor



Button 0 – Start / End the weighing procedure

Button 9 – Resetting the currently weighed quantity

Rotating knob

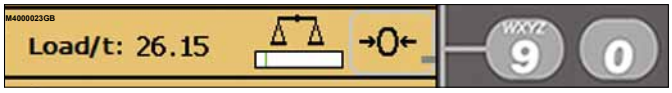
Escape button

Display of loading angle (inclination of the truck conveyor articulation)

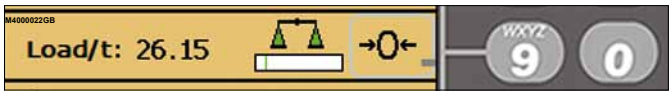
Currently weighed quantity

6.25.2 Starting / ending the weighing procedure

To start the weighing procedure, press button 0 on the color terminal.
To end the weighing procedure, press button 0 on the color terminal.



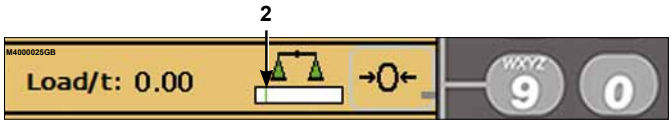
Weighing process ended or interrupted: scales icon is highlighted in yellow



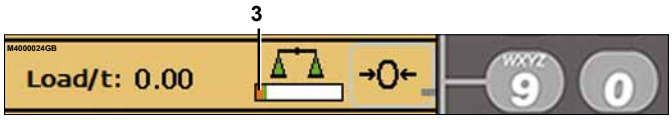
Weighing process started: scales icon is highlighted in green

6.25.3 Adding thresholds

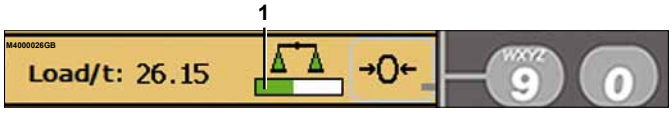
The status bar **1**) shows the loading placed on the weighing cells.
The adding threshold (= green mark (**2**)) is the value indicating at what throughput weighing will proceed. This value is preset by Ropa service.
If the throughput on the conveyor belt falls under the adding threshold, then the status bar appears orange (**3**).



Adding threshold

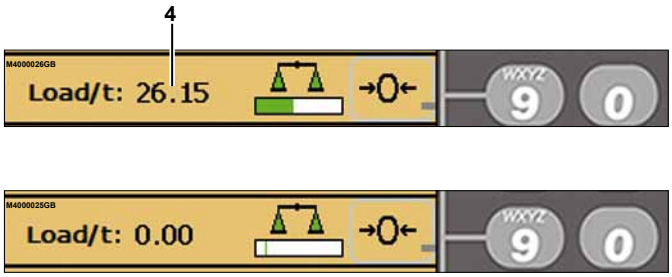


Falling below the adding threshold



A running weighing process in which the adding threshold is exceeded

6.25.3.1 Set the weighing indicator to "0"



On the color terminal, there are two methods to set the weighing indicator to "0" after changing the load-receiving transport vehicle.

1. Use the buttons on the right joystick to reset to "0". To do this, simultaneously press and briefly hold down buttons (**11**), (**12**) and (**13**).

2. By pressing the button 9 on the color terminal.

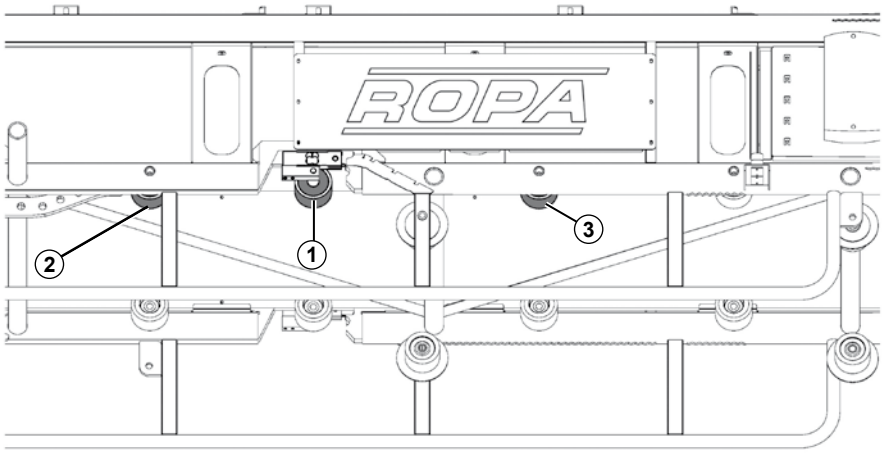
Note

Note! *We generally recommend usage of the 3 buttons on the joystick so as to avoid an extreme overuse of button* 9.

6.25.4 Weighing

Always observe the following points in order to obtain the optimal weighing results:

- the belt tension should be as low as possible
- regularly clean the rollers at the weighing cells (**1**) as well as the upstream rollers (**2**) and downstream rollers (**3**). If the ground conditions warrant, then clean these several times per day.
- During the weighing process, only move the truck conveyor slowly and without any



jolts as far as possible.

- Maintain the inclination angle of the truck conveyor as constant as possible during the weighing process.
- Do not set the angle of the truck conveyor too steeply. The inclination angle displayed on the terminal should be backlit in green as much as possible. If the color charges to orange, then erroneous weighings may result.
- Soiling on the belt exerts a strong influence on the weighing results. For this reason, regularly perform a zero-balancing (see page 9). When handling highly soiled beets or when working in very sticky soils, we recommend performance of a zero-balancing with every change of load-receiving transport vehicle. The zero-balancing is necessary since, otherwise, the dirt portion adhering to the belt will be regularly added to the weight.
  As soon as the dirt portion changes, then a new zero-balancing is to be performed. The same applies by every change of the machine's drivers.
  In our experience, the main cause of incorrect weighing results is the too seldom performance of zero-balancing.
- If incorrect weighing results occur despite regular zero-balancing, then the scales need to be recalibrated (see page 241).

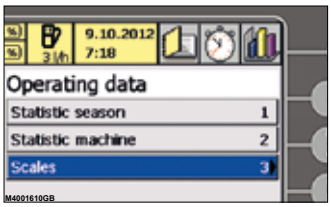
6.25.4.1 Initial commissioning of the scales

In order to use the scales for the first time, it is absolutely required to calibrate the scales. This may also be need after components of the scales system have been replaced.
Calibration consists of two work steps that are to be performed each time in the sequence described below.

6.25.4.2 Zero-balancing the scales

Select the function section "Operating data" To do this, use the rotary knob to place the blue field on the desired function section "Operating data" (see illustration) and confirm by pressing the middle of the wheel.

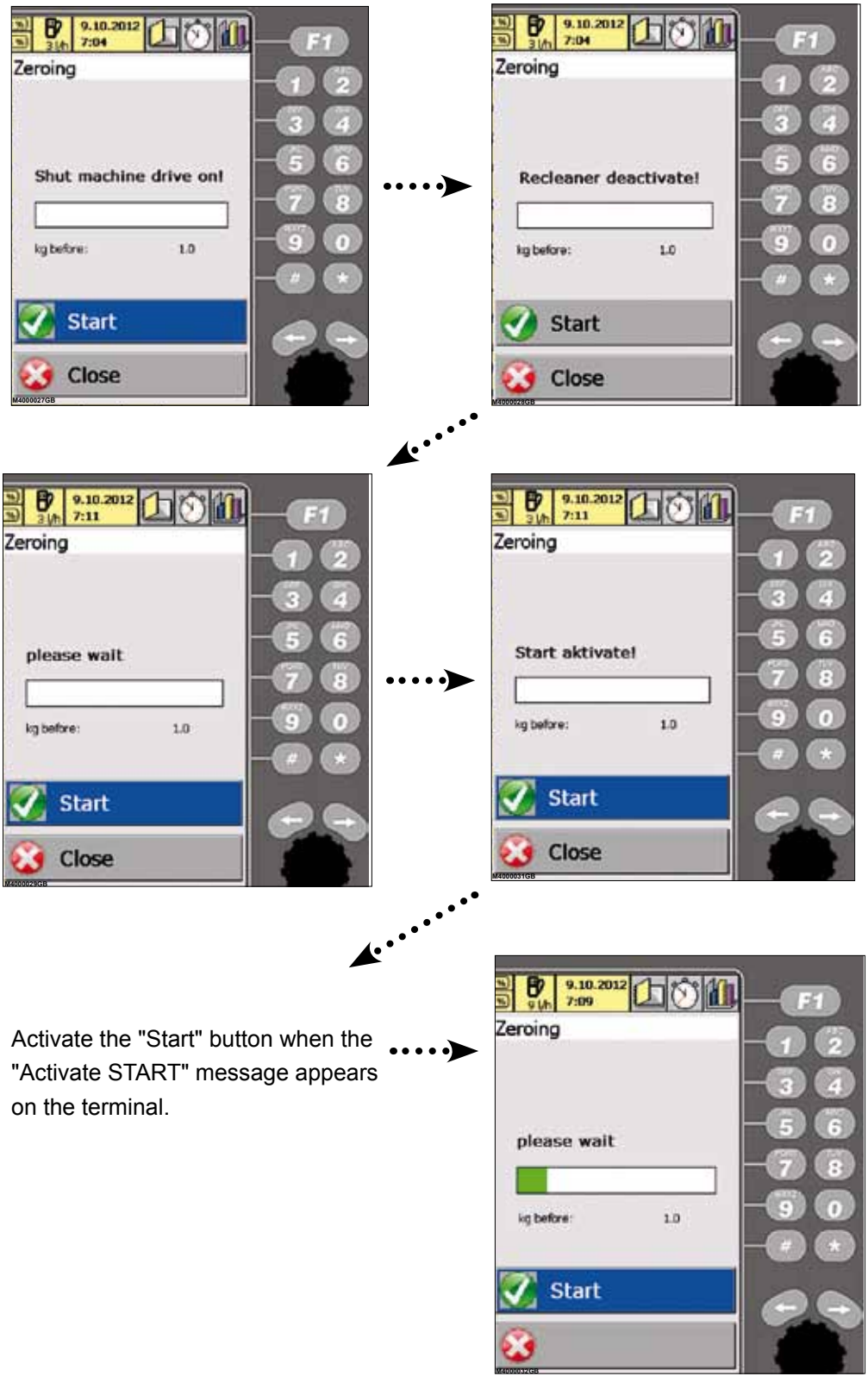
Select the "Scales" menu and confirm as described above.



In the menu, select "Zero-balancing".

The menu navigation leads you step-by-step through the entire zero-balancing process.

Switch on the machine drive and deactivate the recleaner.
Set the belt speed and the inclination angle to the values that you normally use for the truck conveyor during loading.



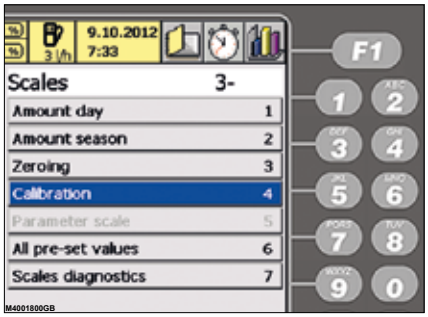
Activate the "Start" button when the "Activate START" message appears on the terminal.

Wait until the "Value saved" message appears on the terminal.
This concludes the zero-balancing procedure.

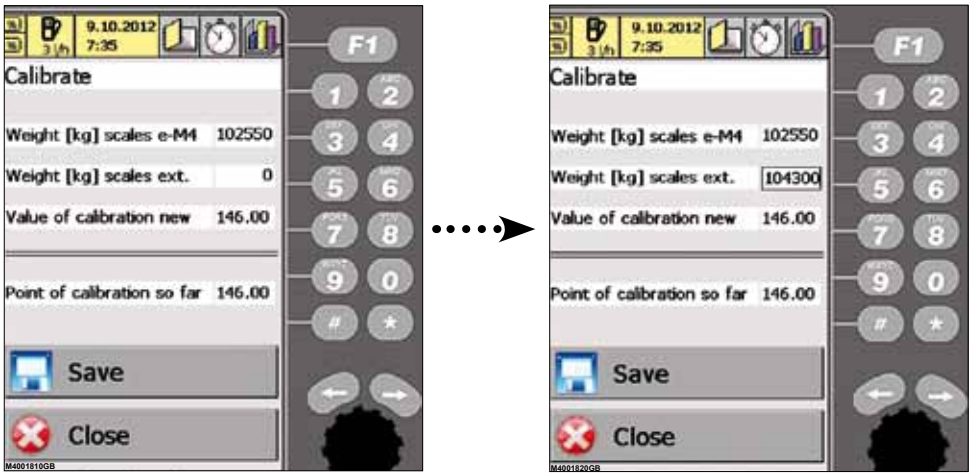
For your information, the program displays both the value before the zero-balancing process and after the zero-balancing process.
Conclude the procedure by pressing the "Close" button in the menu or press the button Esc.

6.25.4.3 Calibrating the scales

Clean the rollers at the weighing cells as well as the upstream rollers and downstream rollers. Perform a zero-balancing as described on page 9. Set the weight display of the scales to "0.00" and weigh the first truckload. Record this value.
Use the calibrated scales of the recipient to determine the actual weight of this load. Only this method takes into account the additional factor of weight loss due to fuel consumption of the transporting vehicle. As soon as you acquire the exact value, proceed as follows:
Set the weight display on the terminal to "0.00".
In the "Scales" menu, choose item "Calibration" and confirm your selection.



Enter in the value of the weight determined during the first load weighing and that you read off the color terminal.
Enter the actual weight value obtained for this load on the externally calibrated scales of the recipient and confirm the entry.



The system now calculates the new calibration value and displays both the previous and the new calibration values.
Activate the "Save" button.

Now load at least five loads having the same soil conditions and loading conditions characteristics. Prior to each load, perform a zero-balancing as described on page 239. During these weighing procedures, do not do anything that would change the essential degree of accumulated soiling on the belt.
Add up the weighing results of the individual loads.

Reweigh these loads externally on the calibrated scale of the recipient and add the results determined for these truckloads.
As soon as the results of the external weighings are available, select once again the menu "Calibration". Re-enter both weights here.

After completing this calibration procedure, check the accuracy of the scales by means of one further loading process as already described. If the results of this verification are satisfactory, then the calibration is completed.
If the desired scale accuracy is still not achieved, repeat the calibration (always using the sum resulting from at least five loads) as already described.

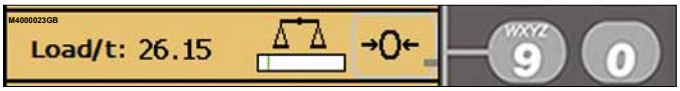
6.25.4.4 Running operation of the scales

Observe the instructions described on page 238.
Regularly perform a zero-balancing.
Regularly check the accuracy of the scales. When doing so, compare the weight of a load displayed on the scales with a weight obtained on externally calibrated scales of the recipient. In the case of large deviations, the scales of the **euro-Maus4** must be immediately recalibrated.
Always keep the rollers of the weighing cells free of soiling.

Note! *Scale accuracy depends on the position of the meticulousness of the user. A regularly performed zeroing procedure, careful calibration and keeping to a minimum build-up of soiling on the belt positively affect scale accuracy.*

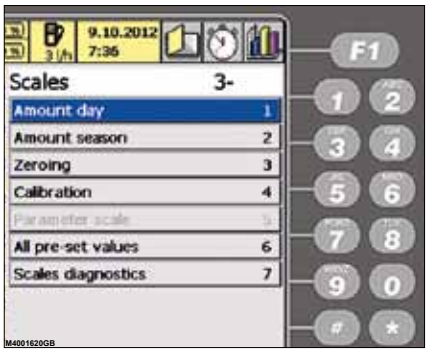
6.25.4.5 Summing totalizers

If you wish to delete one of the summing totalizers, you must first terminate the weighing process.
To do so, press button 0 on the color terminal.



Weighing process ended: scales icon is highlighted in yellow

In the "Scales" menu, choose either "Daily statistics" or "Season statistics" and confirm your selection.



Confirm the selection "Delete". By doing so, you will have deleted the summing totalizer. Alternatively, you can exit without deleting by pressing the "Close" button in the menu.

The "Season statistics" may only be deleted if the keys 1 and 4 are pressed one after the other before deleting. This avoids inadvertent deletion.

Chapter 7

Maintenance and Care

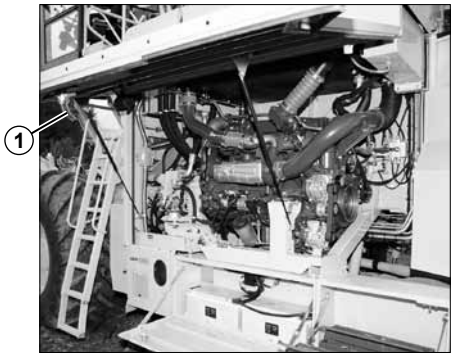
7 Maintenance and care

Warning! *There is a risk of severe or very severe injuries and the risk of damage to the machine during all maintenance work. Never climb over the rear wall of the platform. During all maintenance work, ensure that nobody is able to inadvertently start up the machine (withdraw the ignition key, lock the driver's cabin, always carry the ignition key on your body and, as far as is absolutely possible, switch off the main battery switch. Only perform maintenance work for which you have been trained and for which you have the required knowledge and tools. During all maintenance work, strictly comply with all regionally applicable regulations on health and safety and environmental protection. Never forget this: If you do not comply with the applicable regulations on health and safety or environmental protection, you endanger yourself, other people and the environment. In addition, you may lose insurance cover. Always use approved ladders and climbing aids which are safe to tread on.*

7.1 Engine

In order to open the engine housing cover, first press the unlocking button in the molded recess. Then place your hand from below into the opening on the engine housing cover and press the flap lock **(1)** upward. You can now fully open the engine housing cover.
Perform a daily check of the engine oil level using the oil dipstick. Make sure the machine is standing on level ground and the engine is cold (not running). Your engine contains sufficient oil if the oil level is in the middle between the minimum and maximum m mark. If required, add a corresponding quantity of approved engine oil. Always ensure that you do not add too much oil.

Below, you will find excerpts of a Maintenance Manual of Mercedes-Benz. To wholly preserve guarantee and warranty claims with respect to Mercedes-Benz, the operator of the engine must ensure that the maintenance work prescribed by Mercedes-Benz is performed in good time and completely by persons expressly authorized for this by Mercedes-Benz. These persons are obliged to confirm correct performance of maintenance work and that it has been performed in good time on the original maintenance slips.



7.1.1 Dry air filter

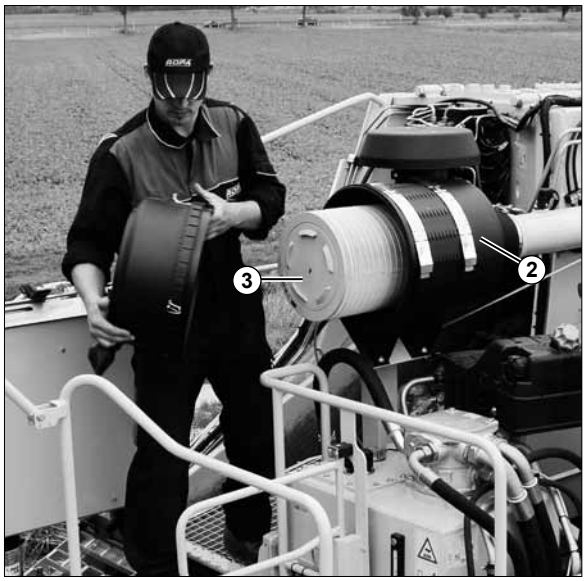
The engine is fitted with a dry air filter **(2)**, consisting of the main filter element **(3)** and the safety cartridge.

The main element must be replaced:

- once per year
- when the symbol is displayed on the terminal
- when the cartridge shows signs of damage.

The safety cartridge is accessible after removing the main element **(3)**. It protects the engine from dirt during maintenance of the main element or when the main element is damaged. The safety cartridge cannot be cleaned. It must be replaced if needed, but at the latest every two years.

Note! *Risk of damage to the engine. When replacing filters, always ensure the utmost cleanliness. Furthermore, the engine may never be operated without filter elements.*

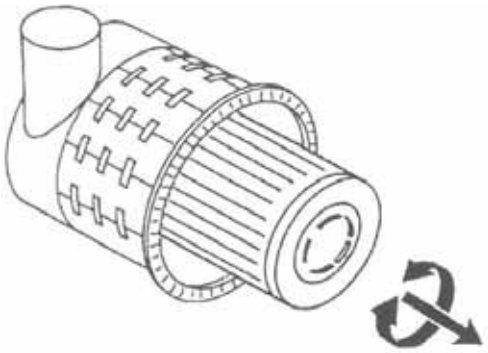


The dry air filter is located above the hydraulic fluid tank and is accessible from the climbing platform. When removing and fitting, ensure the utmost cleanliness and correct fit of the cartridge. A damaged air filter cartridge must be immediately replaced by a new, undamaged filter cartridge.

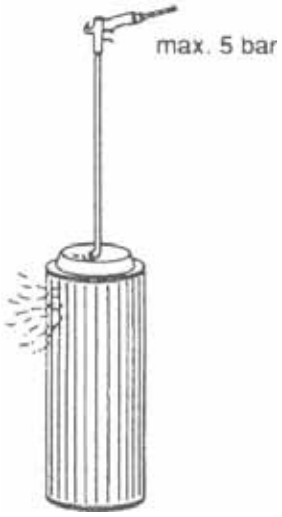
The filter cartridge may only be removed when the engine has been switched off.
The safest, quickest and cleanest method of performing maintenance on a filter cartridge is to replace it with a new cartridge.
The main element may be cleaned as described below. Since slight damage is only detected with great difficulty or even impossible to detect, we recommend that you always use a new filter cartridge to protect the engine. We do not assume any warranty for cleaned elements and the consequences caused by them.

In case of replacement, dispose of the soiled filter cartridge in compliance with the locally applicable regulations for environmental protection:

– Open the filter housing.
– Carefully pull the main element from the internal support tube, slightly turning it, and set it down so that it cannot be damaged.

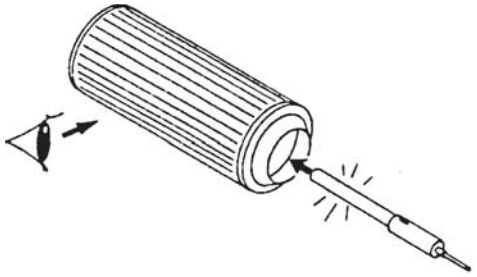


– Carefully and thoroughly clean the inside of the housing with a damp cloth, especially at the sealing surface for the filter cartridge. Carefully ensure that no dirt can reach the clean air side of the filter.
– Never rinse or brush out the main element. When blowing it through, strictly ensure that no dust reaches the inside of the main element.
– Blow it through using a compressed-air gun. This gun must be fitted with a pipe having an angle of 90° at the lower end (see illustration).



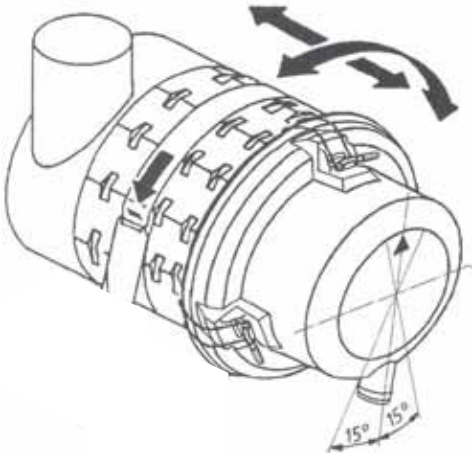
– This pipe is not commercially available; it may be made by yourself without any problem. It should be long enough to reach the cartridge bottom.
– Set the pressure reducer to max. 5 bar and blow through the filter cartridge using dry compressed air until no further dust is expelled. When blowing it out, constantly move the compressed-air gun up and down and constantly turn the filter.

– Then, check the cartridge for damage to the paper bellows and to the rubber seals. If damage (cracks, buckling, dents, etc.) is detected, a new cartridge must be used. Cracks or holes in the paper bellows may be very easily detected by checking with a flashlight (see illustration). So that even minor damage is visible, this examination should not be performed in direct sunlight or bright daylight, but in a darkened room, if available.



Examine each fold individually and carefully using a suitable rod-type flashlight. On no account may damaged filter cartridges be reused. Use **ONLY** original MANN+Hummel filter cartridges (main element ROPA Item No. 301225; safety cartridge ROPA Ite No. 3012226). Never fit filter elements with metal outer casing.

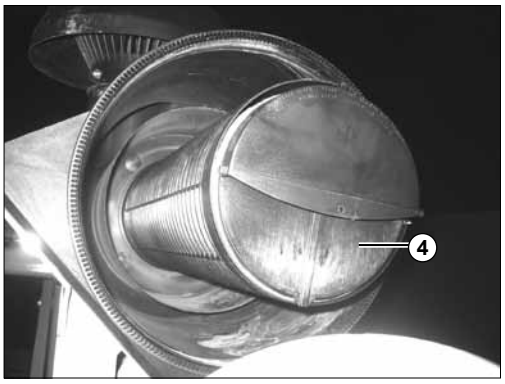
– Slide the main element into the housing with the open side first.
  Fit the cover and, when doing this, watch out for the position of the dust ejection valve (see illustration). The dust ejection valve must point downward (± 15° deviation of the "OBEN / TOP" mark is allowable); if needed, take off the lower part of the housing and reinstall after turning it.
– Reclose the wire snap-fasteners.



Exchanging the safety cartridge

The safety cartridge **(4)** must be replaced with a new safety cartridge after every fifth maintenance of the main element or at the latest after two years. The safety cartridge **(4)** may not be cleaned or reused after removal.

– Remove main element as just described.
– Grip the safety cartridge **(4)** at the recessed grip and pull it out.
– Slide in a new safety cartridge **(4)**.



Storing filter cartridges

Filter elements must be stored upright and protected against dust and moisture in original packaging so that they cannot be damaged. We recommend having at least one spare filter element in stock for each filter element.

Dust ejection valve

Dust ejection valves are largely maintenance-free. Any dust deposits are easily removed by compressing the rubber valve several times. The valve must be fitted so that it is always unobstructed and does not contact anything. A damaged dust ejection valve **(5)** must be exchanged immediately.

7.1.2 Oil change on the engine

Note

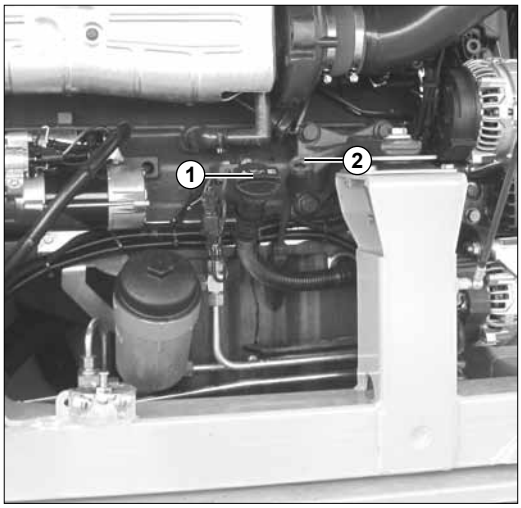
Note! *Use only* ***approved, high-performance engine oils in accordance with Mercedes-Benz Works Standard 228.5****.*
If biodiesel (FAME) is used, the oil change intervals must be reduced from 400 hours to 200 hours.

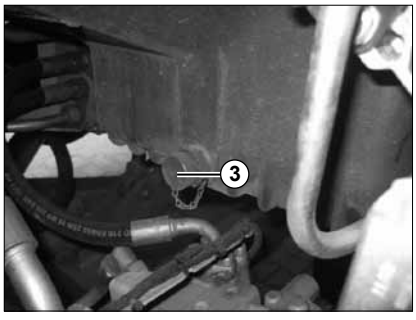
The first oil change for the engine is required after 400 operating hours – when using FAME (RME biodiesel), after 200 operating hours. Further oil changes are required after every 400 operating hours – when using FAME (RME biodiesel), after every 200 operating hours. The engine oil filter must be replaced with each oil change.
The oil change should only be performed with the engine at operating temperature. Before performing the oil change, park the machine on level ground and secure it against moving off of its own accord.

Attention

Attention! *Risk of burns! When changing the engine oil, do not touch any hot components of the engine. Wear suitable and closely fitting protective clothing.*

To drain the old oil, place a sufficiently large, oil-resistant and temperature-resistant catching pan under the drain valve. Screw off the closure cap of the oil drain valve (**3**).





(1) Oil filler neck
(2) Oil dipstick
(3) Engine oil drain valve
(4) Engine oil filter

The valve (3) opens as soon as you have screwed the supplied oil drain hose onto the valve.
When the old oil has completely drained, reclose the oil drain valve by unscrewing the oil drain hose from the valve (**3**).

Renewing the oil filter element

- Unscrew the oil filter with a ratchet and hexagon socket wrench socket, width across flats 36 mm.
- When the oil has drained from the oil filter bowl, pull out the oil filter cover including the oil filter cartridge.
- Release the oil filter element by pressing the side of the lower edge and dispose of it in line with environmental regulations.
- Renew the sealing ring on the screw-on cover. Wet the new gasket using engine oil before inserting it.
- Insert the new oil filter element in the oil filter cover and fit it into the cover by pressing its sides together lightly.
- Place the oil filter cover including oil filter element onto the oil filter bowl and screw on tightly (tightening torque 25 Nm).

Filling the engine with oil

- Fill with fresh engine oil via the oil filler neck(**1**).
  Filling capacity approx. 23-28 liters (Min-Max mark).
- Then start the engine from the driver's seat and let it idle for approx. one minute. Then switch off the engine.
  Around 5 minutes, after the engine was shut off, check the oil level using the oil dipstick **(2)**. When the oil has collected in the oil sump, the oil level should be in the middle between the Min. and Max . mark on the oil dipstick. Do not add too much engine oil.
- Check engine and oil filter for leaks (visual inspection).

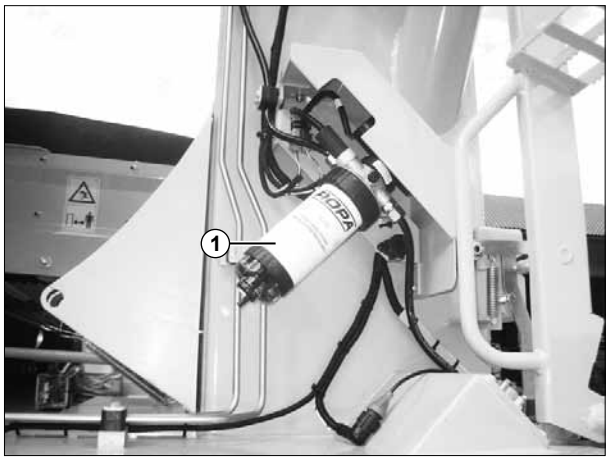
7.1.3 Fuel supply

Note

Note! *Risk of pollution of the environment owing to to leaking fuel. When working on the filter, first place a catch pan underneath and properly dispose of the recovered fuel.*

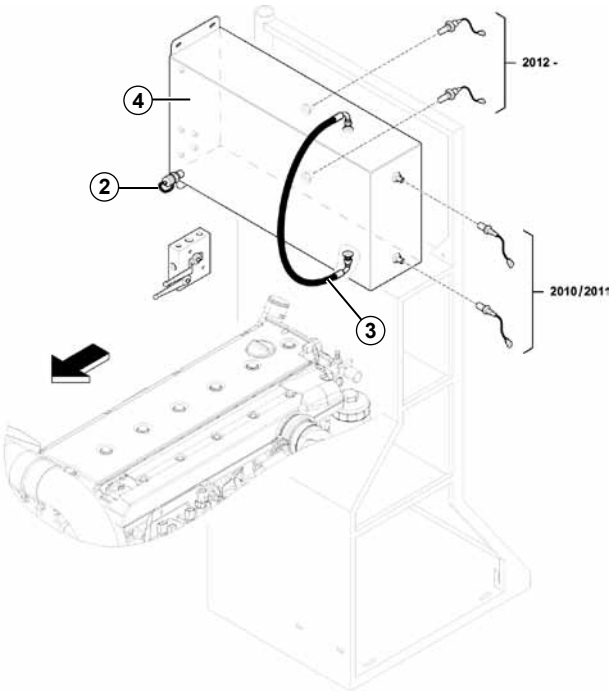
Attention

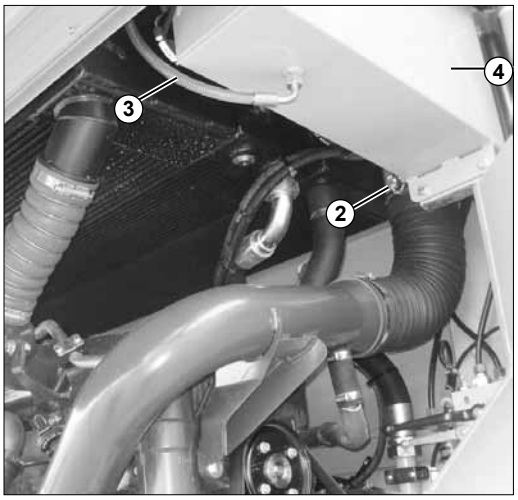
Attention! *Fire hazard when handling diesel fuel. Smoking, fire and naked lights are prohibited when handling diesel fuel since fuels and fuel fumes are easily combustible and explosive. Always ensure that there is an adequate supply of fresh air when handling fuels.*
Danger of skin injuries and risk of poisoning. Diesel fuel may cause damage to the skin in case of direct contact. When handling diesel fuel, always wear suitable protective gloves and avoid inhaling fuel fumes since this may lead to symptoms of poisoning.



(1) Standard prefilter with electrical pump

The diesel fuel is inducted by the electrical pump on the standard prefilter **(1)** (with integrated water separator and preheater) and pumped to the intermediate tank **(4)** via the engine. The fuel supply pump inducts the diesel fuel from the intermediate tank **(4)** and pumps it through the fine fuel filter to the injection elements.





(2) Drain valve, intermediate tank
(3) Transparent hose as filling level indicator for the intermediate tank
(4) Intermediate tank

The filter cartridges must be cleaned respectively exchanged as per maintenance schedule.

The fine fuel filter on the engine must be immediately exchanged, independent of operating hours, when symbol is displayed on the color terminal.

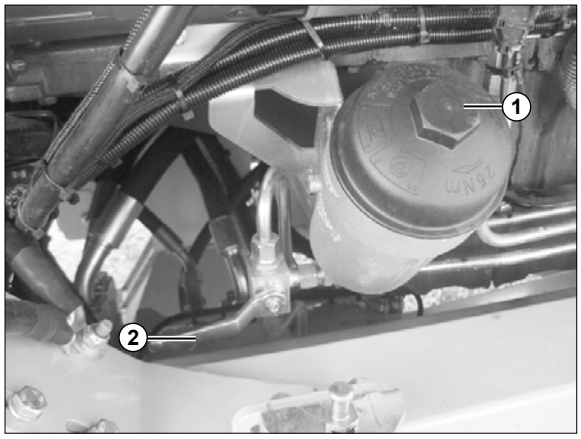
On the other hand, if the following symbol is displayed on the color terminal, the separation filter (optional) must be cleaned, respectively, the filter cartridge of the standard prefilter must be replaced.

Only use original fuel filters approved by Mercedes-Benz or ROPA.

7.1.3.1 Fine fuel filter on the engine

The fine fuel filter at the engine must be replaced after the first 400 operating hours, thereafter at least annually.

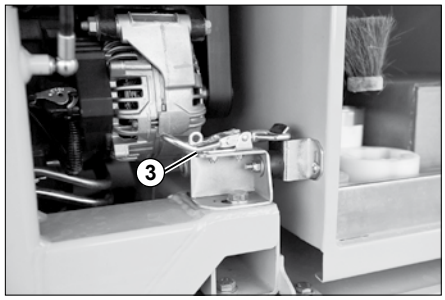
When the warning icon is displayed on the colour terminal, the fuel fine filter must also be replaced.

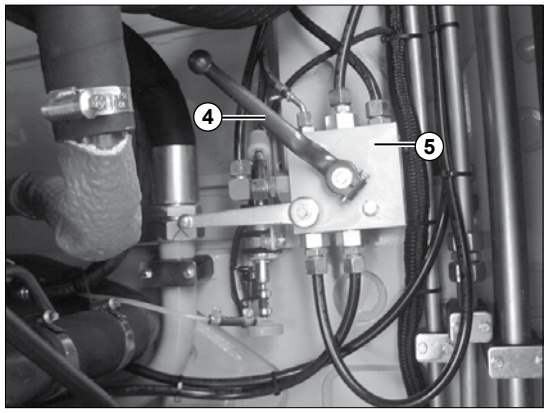


(1) Fine fuel filter
(2) 3-way cock
(3) Clamp closure, storage compartment
(4) Servicing lever
(5) Manifold, fuel supply

Proceed as follows to change the fine fuel filter (**1**):

– Shut off the engine.
– Open the engine housing.
– Open the clamp closure **(3)** of the storage compartment on the engine housing and swivel the storage compartment back and away.



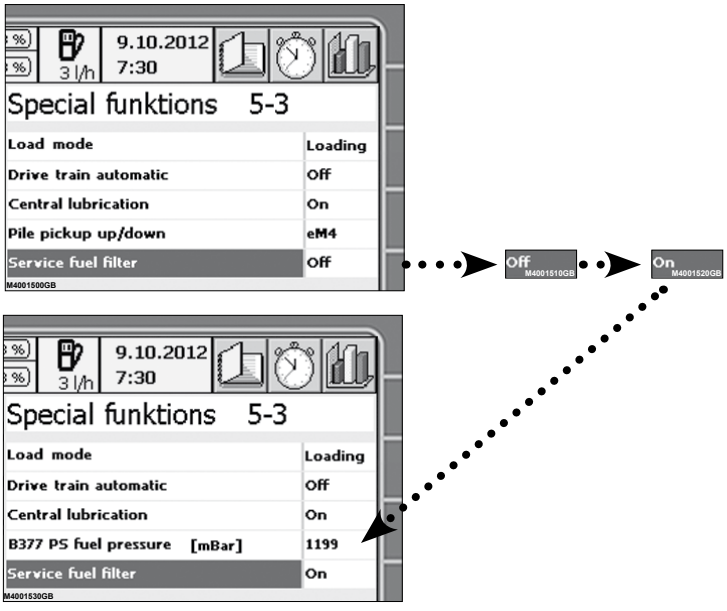


– Shut off the fuel connection to the intermediate tank. In order to do this, swivel around the longer (upper) servicing lever (**4**) on the valve manifold , fuel supply (**5**), through 45° upwards to SERVICING position. This means that no more fuel is able to flow from the intermediate tank to the engine.
– Place a fuel-resistant vessel of sufficient size under the filter bowl to catch escaping fuel.
– Swivel the lever of the 3-way cock (**2**) upwards (this allows the contents of the filter bowl to drain off into the vessel beneath).
– Unscrew the screw cover of the fine fuel filter (**1**) with a ratchet and a wrench socket (width across flats36 mm).

– Pull the screw-on cover with filter element out of the filter housing a little and let the fuel drain off.
– Take off the screw-on cover including filter element.
– Remove the filter element by lateral pressure on the lower edge.

At all events, ensure that no foreign bodies enter the filter housing. Do not, under any circumstances, wipe off the inside of the filter housing. It is absolutely essential to avoid any water penetrating the filter housing.

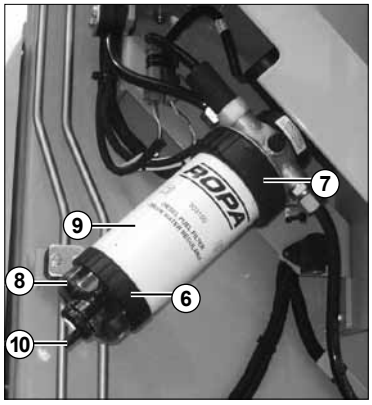
– Renew the gasket of the fine fuel filter (grease it lightly).
– Fit the new filter element into the screw-on cover.
– Screw the screw-on cover with filter element onto the filter bowl and firmly tighten it to a tightening torque of 25 Nm .
– Swivel the lever of the 3-way cock (**2**) to the front (this shuts off drainage from the filter bowl).
– Open the fuel connection to the intermediate tank. In order to do this, swivel the longer (upper) servicing lever (**4**) on the valve manifold, fuel supply (**5**) by 45° downward (horizontal position).
– Call up submenu "Special Functions" on the color terminal.
– In row "Service Fuel Filter", choose option "ON". This switches on the electrical pump on the fuel prefilter and bleeds the fuel system.
The current fuel pressure in millibars (mbar) is displayed on the color terminal.



The fuel pressure increases for a while and then remains constant at around 1000 mbar. This means that the fuel system has been bled.
– Start the diesel engine and, as soon as the diesel engine is running, set the option to "OFF" in row "Service Fuel Filter".
– Then: Check the fine fuel filter for leaks (visual inspection).

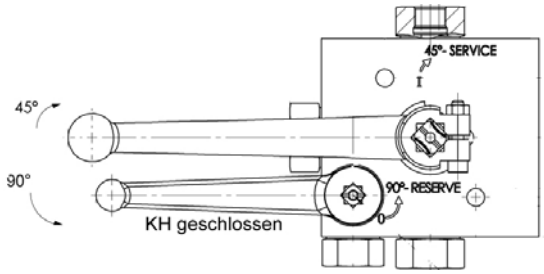
7.1.3.2 Changing the standard prefilter element respectively draining off water

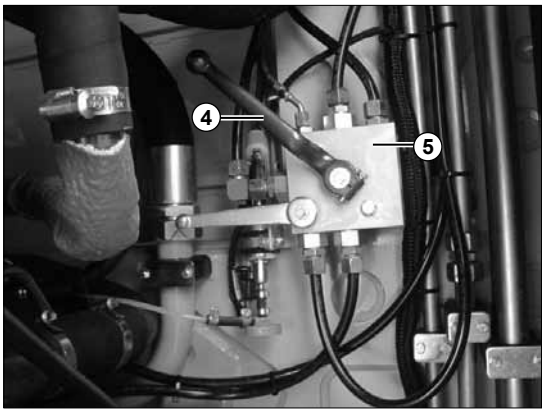
A change of filter element is necessary once per year or when refilling the intermediate tank takes too long or no longer occurs at all (the following symbol is displayed on the color terminal).



Replace the filter cartridge **(9)** as follows:

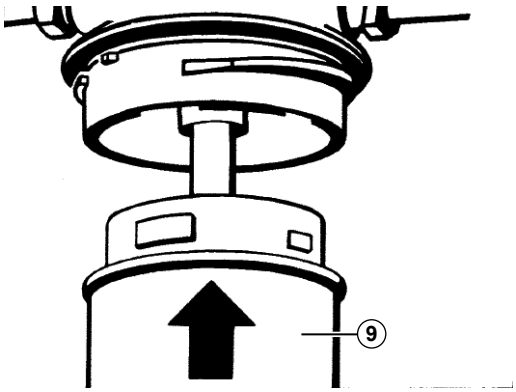
– Shut off the engine.
– Shut off the fuel connection to the intermediate tank. In order to do this, swivel around the longer (upper) servicing lever (**4**) on the valve manifold , fuel supply (**5**), through 45° upwards to SERVICING position.





– Place a suitable collecting vessel beneath it.
– Unscrew the locking ring **(6)** of the water collecting tank **(8)**.
  Detach the water collecting tank **(8)** and empty it into the collecting vessel.

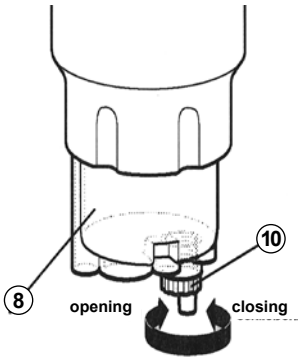
– Open the locking ring **(7)** of the filter cartridge **(9)**. Pull off the filter cartridge **(9)** and dispose of it in accordance with locally applicable disposal regulations.
– Insert the new filter cartridge **(9)** and lock it with the locking ring **(7)**.
– Attach the water collecting tank **(8)** and lock it with the locking ring **(6)**.
– The filter is bled automatically when the ignition is switched on.
– Check the filter unit for leaks (visual inspection).



Draining water from the water collecting tank

Draining off water collected is required when the water collecting tank is full, there is a risk of subzero temperatures or the filter cartridge is replaced.

– Open the drain plug (**10**) at the base of the water collecting tank (**8**).
– Allow the water to drain off.
– Screw the drain plug in again.

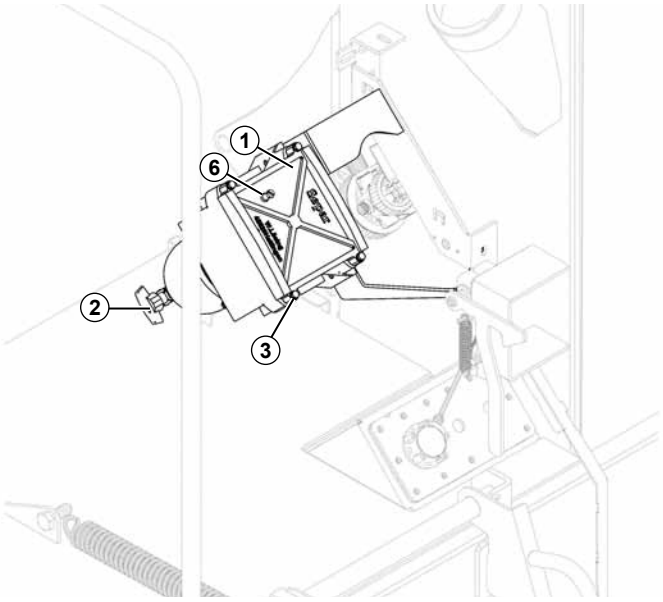


7.1.3.3 Separation fuel prefilter (option)

Maintenance separation filter
(draining off water and performing an intermediate rinse)

The collected water must be drained off if:
the water collecting tank is full, there is a risk of subzero temperatures or the filter cartridge is replaced. For this purpose:

- Shut off the engine.
- Open the bleed screw **(6)** on top of the filter.
- Open the drain cock **(2)** at the bottom of the filter.
- Let the water and dirt drain from the transparent bowl and properly dispose of it professionally. The filter strainer is flushed and cleaned by draining off the water.
- Close the drain cock **(2)**.
- Close the bleed screw **(6)**.
- Start the engine. The air in the filter is diverted into the tank.



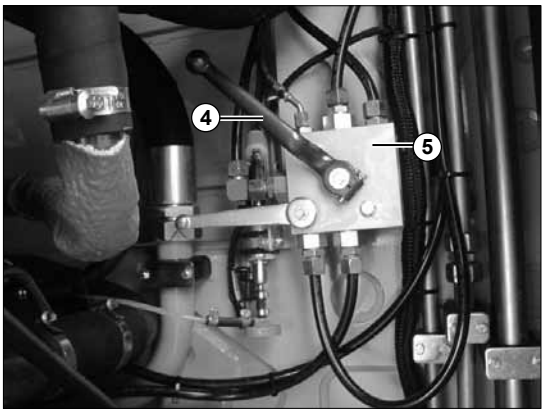
(1) Cover
(2) Drain cock for water
(3) Cover screw
(6) Bleed screw

Cleaning the filter element

The filter insert (metal strainer with a filter mesh of 60 micron;
ROPA Item No. 301231) in the separation filter must be replaced once per year or if it takes too long to top up intermediate tank or this does not occur at all (the following symbol is displayed on the color terminal).

Clean the filter element as follows:

- Shut off the engine.
- Shut off the fuel connection to the intermediate tank. In order to do this, swivel around the longer (upper) servicing lever (**4**) on the valve manifold , fuel supply (**5**), through 45° upwards to SERVICING position.



– Unscrew the cover screws **(3)** (**4** ea.).
– Detach the cover **(1)**.
– Take off the spring housing and then take out the filter element.
– Clean the filter insert using clean diesel fuel. Do not use any other cleaning agents since, otherwise, damage to the filter may occur.
– Insert the cleaned filter element and clip in the spring housing on the filter element.
– Check the cover gasket and replace it if needed.
– Fill the filter as far as possible using clean diesel fuel (shorter bleeding time).
– Fit the cover **(1)** and ensure that it is seated correctly.
– Retighten the cover screws **(3).**
– Open the fuel connection to the intermediate tank. In order to do this, swivel the longer (upper) servicing lever (**4**) on the valve manifold, fuel supply (**5**) by 45° downward (horizontal position).
– Start the engine.

7.1.3.4 Microorganisms in the fuel system

Occasionally, inexplicable obstructions will be found initially in fuel systems filled with diesel or biodiesel fuels. These obstructions are often caused by microorganisms. These microorganisms (bacteria, fungal growth or yeast) may multiply a great deal under favorable conditions. Needed for growth are water which is found in every storage or vehicle fuel tank as condensation and vital elements in chemically bound form, such as sulfur, phosphor, nitrogen, oxygen and trace elements. Fuel additives may also contribute to microorganism growth.
Depending on the temperature, stronger or weaker growth occurs, which leads to the formation of fibrous meshed fungal complexes and sludge.
The consequences: Obstruction of the fuel prefilter by rust and fibers (meshed fungal complex) and frequent filter exchange. This leads to a loss of power of the engine and, in extreme cases, to breakdown of the vehicle.

Remedial measures
If infestation with microorganisms is found in storage or vehicle fuel tanks, we recommend the following disinfecting agents to fight it:

Product: **GrotaMar 71 Ropa** Item **No. 435060 (0.5 l)**
Manufacturer: Schülke & Mayr
D-22840 Norderstedt
☎ 040 / 521 00-0
Fax: 040 / 521 00-244
www.schuelke.com
sai@schuelke.com

If necessary, please contact the manufacturer (e. g. to inquire about sources abroad).

Consumption 0.5-1.0 l per 1000 l of diesel fuel.

7.1.3.5 Other maintenance work on the diesel engine

During each service on the diesel engine, the following work must also be carefully performed in compliance with the Mercedes-Benz maintenance regulations (see maintenance booklet for the engine):

- Check for leas and check the condition of all lines and hoses on the engine.
- Check the intake line between the air filter and engine and the lines for the cooling and heating system for condition and leaks.
- Check all lines and hoses for undamaged condition as well as freedom from chafing and proper routing and fastening.
- Check all hose clips, flanged connections and air intake manifolds for firm connection.

Checking respectively adjusting of valve clearance is required after the first 400 operating hours and then once annually respectively every 1200 operating hours. This work may only be performed by persons expressly authorized for this work by Mercedes-Benz. The work sequence is described in the Mercedes-BenzMaintenance Manual.

Valve clearance for cold engine:

- nlet valves 0.40 mm
- Outlet valves 0.60 mm

7.1.4 Cooling system

The cooling system is to be regularly checked for cleanliness and, if required, cleaned. If the admissible maximum temperature of the coolant or the hydraulic fluid is repeatedly exceeded at very high outdoor temperatures, the complete cooling system must be checked for clean condition and, if necessary, cleaned immediately.

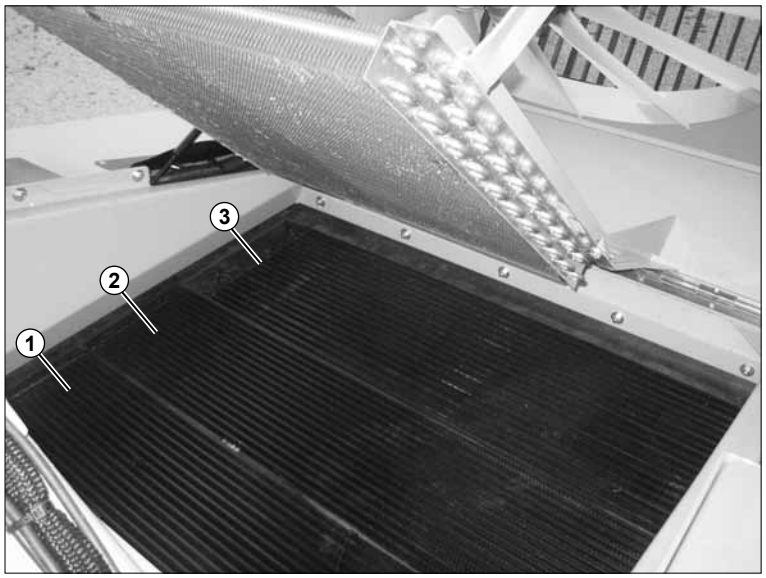
7.1.4.1 Reversing the fan drive

Ensure that the air intake grille is free of dirt and adhering foliage etc.
In order to clean the intake grille of loose dirt, the fan drive for the cooling system is reversed automatically each time the engine is started. Thus, the fan largely blows the intake grille free.

7.1.4.2 Cleaning the cooling system

The cooling system is located above the diesel engine. After swinging down the rear platform wall, the cooling system is easily accessible from the boarding platform. Always shut off the engine for cleaning work on the air intake grilles or the radiators / coolers and secure it against inadvertent starting (withdraw the ignition key and carry it on your body).

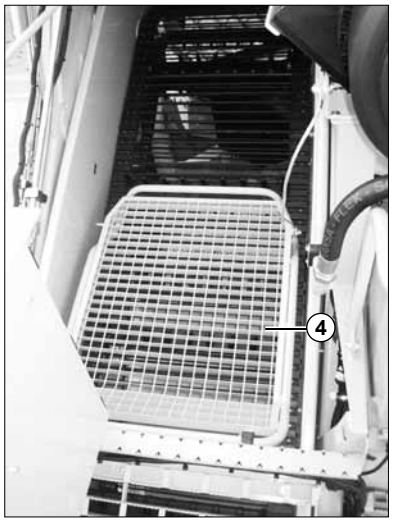
Warning! *Risk of burns! Every radiator is heated during operation. Wear protective gloves! Before all work on the cooling systems, let the machine cool down sufficiently!*



(1) Charge air cooler
(2) Hydraulic fluid cooler
(3) Water radiator

Proceed as follows for cleaning the cooling system:

– Switch off the engine and secure the machine against inadvertent starting (withdraw the ignition key and carry it on your body).
– Swing down the rear platform wall **(4)**.



(4) Platform rear wall

– Clean the air intake grille using a brush and – if necessary – using the water jet from a water hose in order to remove dirt that may be adhering to the system.
– Swing up the air intake grille **(5).**

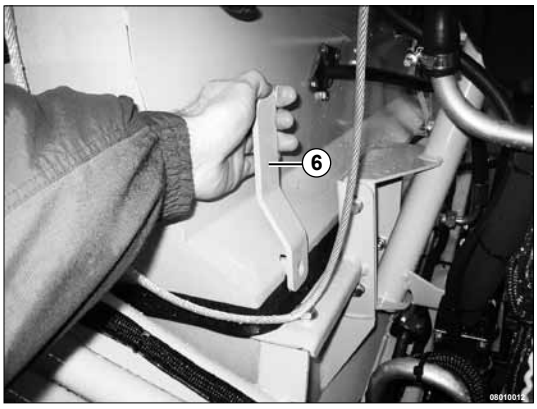
(5) Air intake grille

– Swing up the platform rear wall, close the cab door and start the engine. Wait for the sequence of automatic reversal of the fan.

Attention

Attention! *Risk of eye and skin injuries due to foreign objects blown out. There may be no-one on the boarding platform during automatic reversal. Due to the strong air current of the fan, eye and skin injuries can be caused by dirt particles flung away by the air current.*

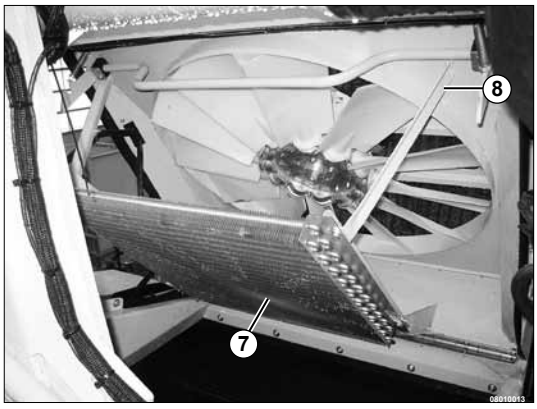
– Switch off the diesel engine and secure the machine against inadvertent starting (withdraw the ignition key and carry it on your body).
– Pull the air scoop (**6**) at the locking lever and swing it up.



(6) Locking lever, fan scoop

Attention

Attention! *Risk of skin injuries due to sharp edges on the air conditioning condenser. When working on the open fan housing, always wear suitable protective clothing (protective gloves, hard hat and closely fitting working clothing).*



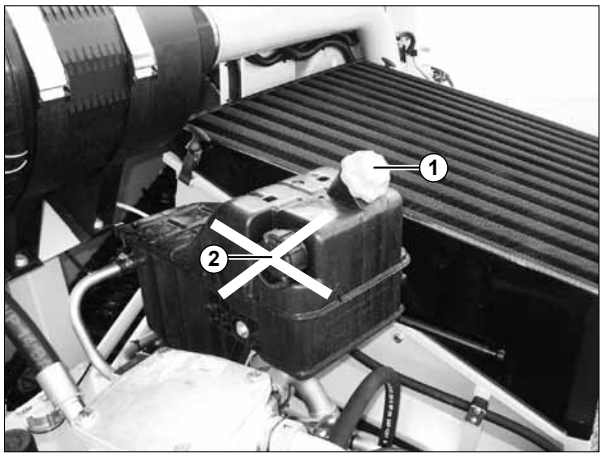
(7) Air conditioning condenser
(8) Fan scoop swung up

– Check the cooling system for soiling. Remove coarse dirt by manual collection, by cleaning the cooling system using a water hose (NOT a high-pressure cleaner) or by blowing through using compressed air. A plug-in coupling for connecting a blow gun is located at the right on the compressed air reservoir. During all work on the cooling system, ensure that you do not damage the fins of the air conditioning condenser.
– After completion of cleaning work, close the fan housing and the intake grille. Swing up the rear platform wall again.

7.1.4.3 Checking the coolant

Warning! *Risk of poisoning and risk of damage to the skin. Corrosion protection agent / antifreeze contain hazardous materials. If swallowed, there is an acute risk of poisoning. If the substance comes in contact with the skin, inflammation or caustic burns may occur. Never fill corrosion protection agents / antifreeze into drinking vessels or beverage bottles. Always store these agents so that children do not have access to these agents.*
At all events, comply with the safety information of the manufacturer of these agents. Risk of damage to the environment. Corrosion protection agents / antifreeze are hazardous for the environment. When handling these materials, always ensure that the corrosion protection agents / antifreeze do not enter the environment, but are disposed of in a manner compatible with the environment.
Always ensure that there is sufficient antifreeze and only use corrosion protection agents / antifreeze expressly approved in Mercedes-Benz– Works Standards 325.0 or 326.0. (see Page 401)

If the liquid level in the coolant expansion tank is too low, the warning symbol is displayed on the color terminal.
The coolant expansion tank with the filler neck for coolant is located on the boarding platform behind the hydraulic fluid tank.



(1) Filler cover
(2) NEVER OPEN!

Expansion tank for coolant for euro-Maus4

Warning! *As long as the engine is hot, the cooling system is subject to high pressure. There is a risk of burns due to escaping steam or hot coolant spraying out! Wear protective gloves and protective goggles. Open the filling cover **(1)** on the engine cooling system carefully when the engine has cooled down.*

Check coolant level and corrosion protection agent/antifreeze and, if needed, correct

Only check the coolant level at a coolant temperature of below 50 °C. Before correcting the coolant level, check corrosion protection agent/antifreeze.

To check the coolant level, slowly and carefully open the filler cover (**1**) of the engine cooling system. Slowly relieve any excess pressure.
Check corrosion protection agent/antifreeze using a tester.
The correct ratio of 50 % by volume of corrosion protection agent/ antifreeze in the coolant has been reached when there is protection against freezing down to -37 °C.
Correct the mixing ratio if less antifreeze is indicated.
If the concentration is too low, there is a risk of damage to the engine due to corrosion/ cavitation in the cooling system!
Avoid concentrations of more than 55 %by volume of corrosion protection agent/ antifreeze since, otherwise, maximum protection against freezing down to -45 °C is not reached.
The cooling system is correctly filled if the coolant reaches as far as just below the lower edge of the filler opening.
Only use prepared coolant with 50 % by volume of corrosion protection agent/antifreeze that has been expressly approved by Mercedes-Benz for refilling.

Mercedes-Benz information on the coolant (general):
Normally, coolants consist of water and corrosion protection agent / /antifreeze. The corrosion protection agents / antifreeze (ethylene glycol with corrosion inhibitors) have the following tasks in the cooling system, among others:

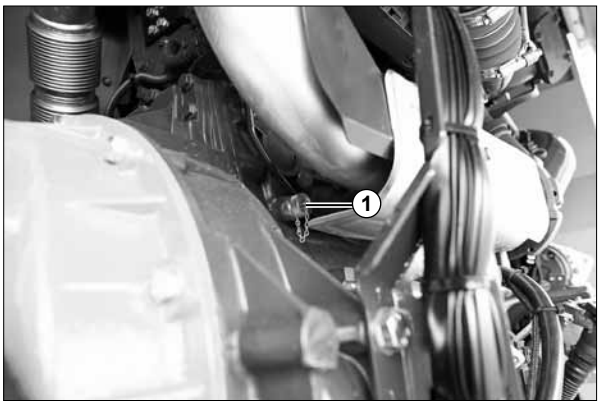
- adequate corrosion and cavitation protection for all components of the cooling system
- lowering the freezing point (antifreeze).
- increasing the boiling point.

For reasons of corrosion protection, around 50 5% by volume of corrosion protection agent/antifreeze must be added to the coolant if the outside temperatures to be expected do not require an even higher concentration. This concentration (50 % by volume) offers protection against freezing down to approx. -37 °C. A higher concentration is practical only if outside temperatures are even lower than this. Even at extremely low outside temperatures, do not use more than 55% by volume of corrosion protection agent / antifreeze since this achieves maximum antifreeze properties and an even higher mixing ratio reduces protection against freezing again and impairs heat dissipation (55 % by volume of antifreeze corresponds to protection against freezing down to approx.-45 °C). If these coolant instructions are not complied with, corrosion and damage to the cooling system are inevitable. Adding corrosion protection agent/ antifreeze increases the boiling point. Increased pressure further increases the boiling point.. Both physical interrelationships are utilized in modern cooling systems – the maximum coolant temperature is increased without increasing the risk of boiling. The cooling capacity increases corresponding to the higher temperature level. Only approved products (MB Sheet 325.0/326.0) offer reliable protection of the cooling system.

7.1.4.4 Replacing the coolant

Only use corrosion protection agents/antifreeze approved by Mercedes-Benz.
The coolant must be exchanged every three years. At all events, comply with the regionally applicable regulations on environmentally compatible disposal of coolant.

- Before renewing the coolant, check the cooling and heating system for leaks and condition.
- Slowly open the filler cover of the engine cooling system; relieve excess pressure and then detach the filler cover.



(1) Drain valve for coolant

The valve for draining off the coolant is located above the starter motor behind the exhaust pipe of the diesel engine.

Attention! *Risk of burns on the hot engine block and the hot exhaust pipe. Wait until the engine has cooled down adequately before changing the coolant. To protect against burns, wear suitable protective clothing (working clothing and protective gloves).*

- Screw the drain hose onto the coolant drain valve on the engine block.
- Drain off the coolant and catch it in a suitable vessel.
- Fill with premixed and approved coolant
  (filling capacity approx. 25-30 liters).
- Set the desired temperature of the air conditioning system to the maximum temperature, so that the control valve of the heating system is opened.
- Switch on the heating system of the hydraulic fluid tank (lever up).
- If your machine is fitted with an independent heating system, switch it on.
- Top up with coolant with the prescribed composition up to the lower edge of the filler neck.
- Start the engine and let it run for about 1 minute at various speeds.

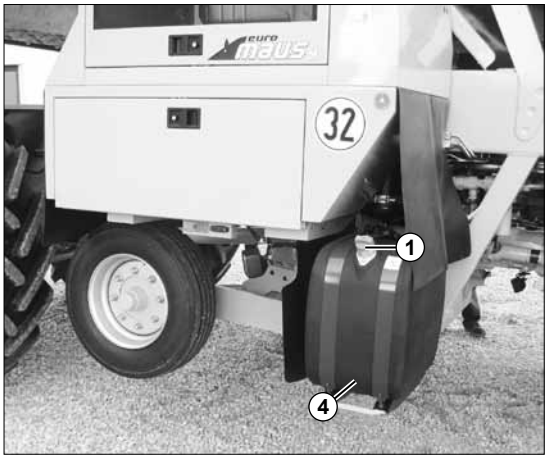
– Check the coolant level and add coolant if required.
– Close the cooling system (this process may have to be repeated several times).
– Have replacement of the coolant confirmed in the servicing log.

7.1.5 SCR exhaust gas aftertreatment with AdBlue®

The **euro-Maus4** is fitted with an SCR exhaust gas aftertreatment system. At all events, observe the safety information on handling AdBlue.® in the Annex.

Attention

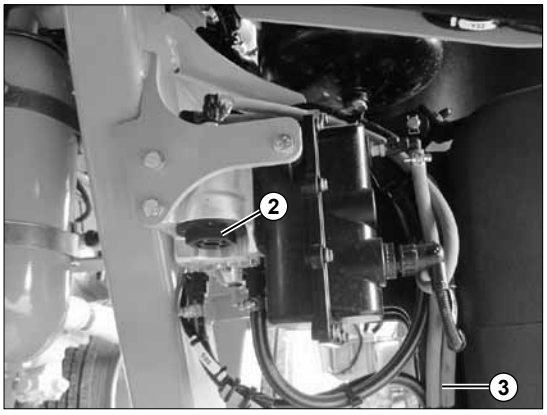
Attention! *Very great cleanliness must be observed® when adding AdBlue. Only AdBlue may be added to the AdBlue®tank; do not add water or other other fluids. Even adding small quantities of other fluids will lead to major damage to the SCR exhaust gas aftertreatment system. The warranty is null and void in the case of such damage.*



(1) AdBlue® filler neck
(4) AdBlue®tank

Maintenance work:

– Replace the AdBlue® filter element after each second engine oil change,
– Have the the AdBlue®pressure reservoir (3.2 bar ± 0.2 bar) filled by specialist personnel (MB servicing personnel) once per year.



(2) AdBlue®filter
(3) Supply and return pipe

Attention! *Burning and scalding hazard when working on the hot exhaust system and the AdBlue® system. Risk of injury to the skin or eyes on contact with AdBlue® fluid. Risk of poisoning if AdBlue® fumes are inhaled or if AdBlue® fluid.*
Start work on the AdBlue® system only when the system has cooled down and the pressure in the system has been relieved..
Fill AdBlue® only into suitable vessels and use only suitable lines.

7.1.5.1 AdBlue®-Changing the filter

- Disconnect the gray supply and return pipe (**3**) between AdBlue® tank and AdBlue® pump module with the corresponding terminals (MB order No.: 000 589 54 37 00).
- Place a suitable collecting vessel beneath the AdBlue® pump and unscrew the filter (**2**). Dispose of the filter in accordance with the applicable regional regulations.
- Use a new AdBlue® filter element (Ropa Item No. 303120) and smear the O-ring on the filter element (**2**) and on the filter bowl thinly with MB silicone grease (MB order No.: A 000 989 62 51 10).

Note! *Use only the aforesaid silicone grease from Mercedes-Benz for greasing. Ensure that this silicone grease is used only extremely sparingly since, otherwise, serious damage may be caused to the AdBlue® system.*

- Screw the filter **(2)** into the filter and unit and tighten it to torque of of 32 Nm.
- Remove the hose clips on the supply and return pipe (**3**) to the AdBlue® filter and pump unit.
- The AdBlue® system bleeds itself automatically and consequently manual bleeding is not required.

7.2 Pump distributor gear

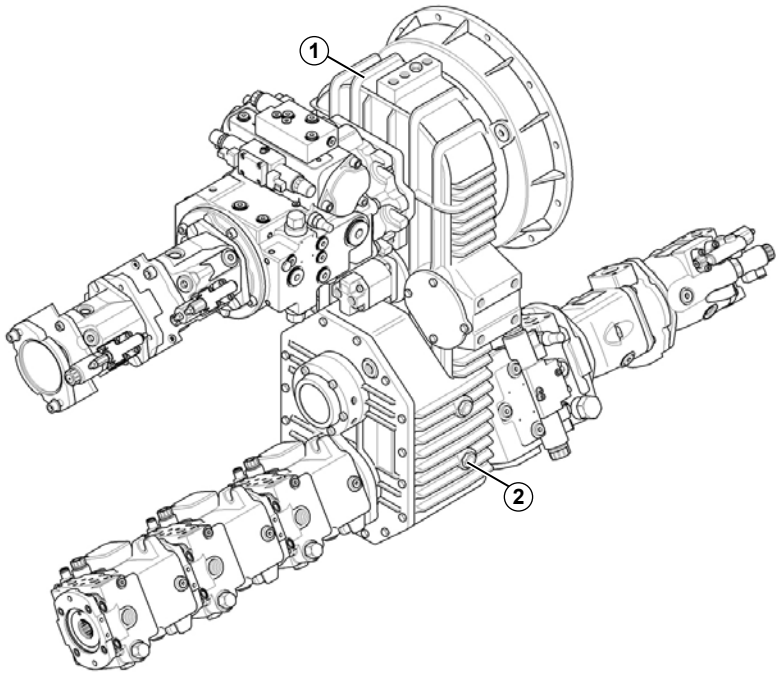
The pump distributor gear **(1)** (PVG) is directly flange-mounted to the engine and transfers the engine power to the individual hydraulic pumps.

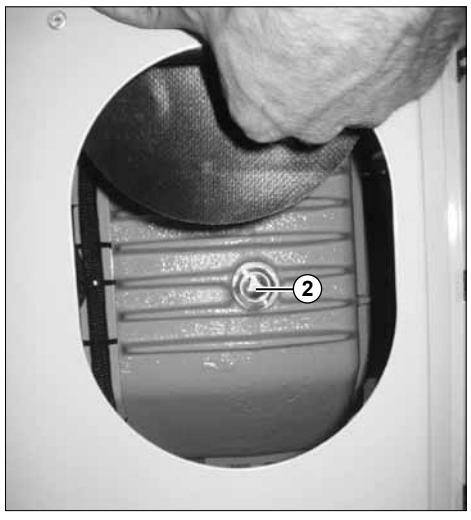
It is absolutely necessary to check the oil level of the pump distributor gear daily. Check the oil level *before starting the diesel engine*! As soon as the diesel engine has been started, it is no longer possible to check the oil level.

The machine must be standing on even and level ground and the engine must have been shut off for at least five minutes to read off the oil level.

When the oil level rises or falls without any apparent reason, call in a customer service mechanic.

The oil level can be read at the sight glass **(2)**; it must be within the sight glass range (on no account above the upper edge of the sight glass!). The sight glass is located on the left side of the pump distributor gear.



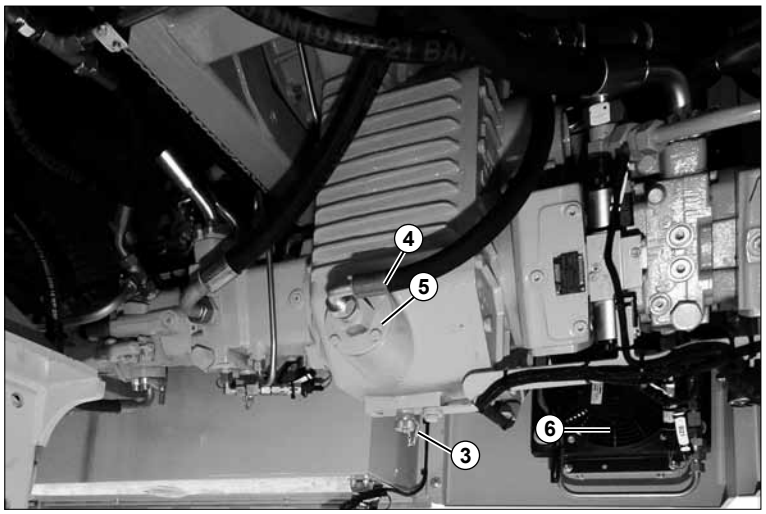


(2) Sight glass

The first oil change is required after 50 operating hours. Thereafter, the oil must be changed annually. With each oil change, the intake filter in the pump distributor gear and the pressure filter cartridge must be replaced.

7.2.1 Oil and filter change

- Before performing the oil change, clean the area around the intake and pressure filters over a large area.
- Change the oil only with the gear units at operating temperature.
- Place a catching vessel resistant to oil and of sufficient size underneath.



(3) Oil drain valve
(4) Intake line
(5) Filter flange, intake filter
(6) Pump distributor gear unit (PVG), oil cooler

- Open the closure cap of the drain valve **(3)** of the pump distributor gear.
- Screw the oil drain hose supplied onto the drain valve of the pump distributor gear. (the valve opens and the gear oil drains off).
- Unscrew the cap nut of the intake line **(4)** from the filter flange **(5)** on the inside of the gear (this requires a box wrench, width across flats 36 mm).
- Undo the hexagon screw fitting (you will need a box wrench, width across flats 46 mm) on the filter flange **(5)** (undo the fitting only, on no account should you fully unscrew the fitting itself).
- Unscrew the 4 screws (width across flats 13 mm) on the filter flange **(5)** and withdraw the filter element.
- Replace the filter element with a new one (ROPA item No: O-40320010) (Always use a new paper seal when fitting ROPA Item No.: O-20350003) and smear this seal with oil before fitting).
- Firmly retighten the flange **(5)** and hose line.
- Unscrew the pressure filter bowl **(6)** using a wrench, width across flats 24 mm, from the gear valve manifold **(8)** and replace the filter element with a new one (ROPA Item No.: 270442).

(6) Pressure filter bowl
(7) Oil filler screw
(8) Gear valve manifold with pressure filter
(9) MP connector

– The O-ring on the filter bowl **(6)** must also be replaced with a new O-ring.
– First, screw the pressure filter bowl **(6)** fully into the valve manifold **(8)**, and then unscrew by one sixth of a revolution.
– Unscrew the oil drain hose and screw on the closure cap.
– Open the oil filler screw **(7)** and add fresh oil at the filler opening until the oil level is in the upper range of the sight glass.

Prescribed oil grade:	**Gear oil ATF**
	ATF oil in accordance with Dexron II D
Filling capacity:	approx. 10 liters

Start engine and watch the color terminal. The warning symbol must disappear from the color terminal within 10 seconds. If the warning symbol does not disappear within n 10 seconds, immediately shut off the engine and bleed the gear units.
This is necessary only extremely rarely.

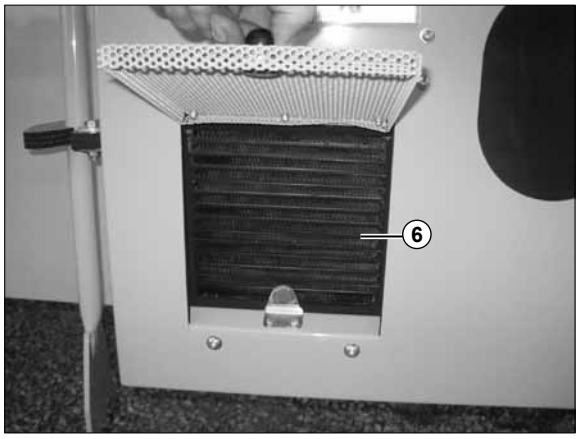
Bleeding the gear units

– Place an oil catching vessel beneath the valve manifold (**8**).
– Remove the closure plug on the MP connector (9).
– Close the engine housing hatch and swing up the pump cover behind the boarding steps.
– Watch the MP connector (**9**) on the valve manifold (**8**) through the opening.
– Have the engine started by a second, reliable and instructed person and run (maximum 15 seconds) until the gear oil escapes from the opening at the valve manifold (**8**) without bubbles.

– Immediately screw on the closure plug again when the oil escapes free of bubbles and tighten it to a torque of 16 Nm.
  If the oil does not escape within 15 seconds, screw in the closure plug again and call servicing.
– Wait at least 10 minutes and then recheck the oil level as described above.
– Add oil if necessary.

7.2.2 Pump distributor gear (PVG) oil cooler

– Check the gear oil cooler (**6**) of the pump distributor gear every day for soiling.
– Clean it if necessary either with compressed air or with the spray jet of a water hose.
– On no account may you use a high-pressure cleaner for this.



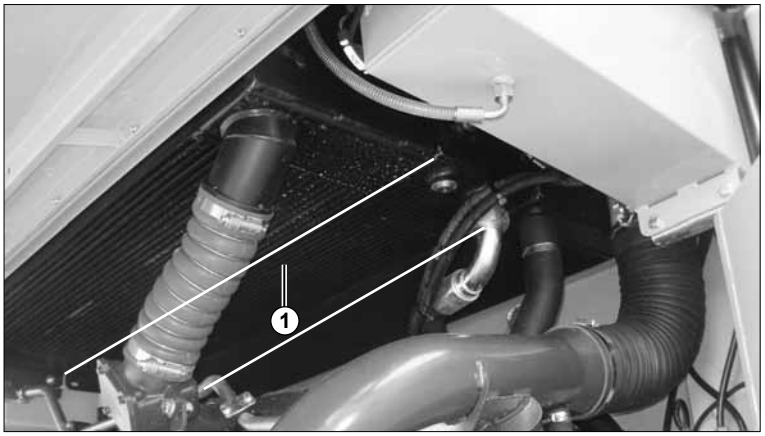
(6) Gear oil cooler

7.3 Hydraulic system

STOP
Danger

Danger! *The pressure reservoirs on the hydraulic system are permanently under high internal pressure even if the remaining hydraulic system is already depressurized. Work on the pressure reservoirs may only be performed by specially trained persons familiar with handling pressure reservoirs. The system must first be depressurized beforehand for all work on the hydraulic system or on the pressure reservoirs. Work on the hydraulic system may only be performed by persons who have been instructed about the specific risks and hazards of working on hydraulic systems.*

Regularly check the hoses of the hydraulic system for aging and damage! Immediately exchange damaged or aged hoses. Only use hoses corresponding to the technical specifications of the original hose as replacements! For reasons of cost, we recommend that you order replacement hoses directly from ROPA since original ROPA hydraulic hoses are generally offered far more economically than competing products.



(1) Hydraulic fluid cooler

Note that a soiled cooler will achieve a clearly reduced cooling performance. This substantially reduces the loading capacity of the machine. If the hydraulic fluid is heated up too much, shut off the engine and try to determine the cause. Usually, the hydraulic fluid cooler **(1)** is soiled; possibly, the heating system for the hydraulic fluid tank has not been shut off.

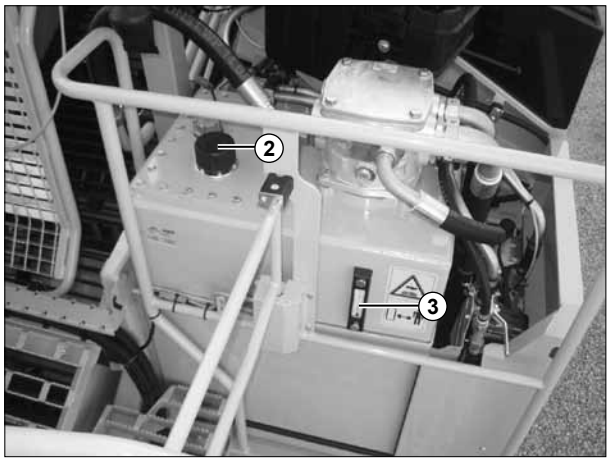
Warning

Warning! *Risk of burns! Every radiator is heated during operation. Wear protective gloves! Before all work on the cooling systems, let the machine cool down sufficiently!*

7.3.1 Hydraulic fluid tank

The tank for hydraulic fluid is located on the cab platform behind the handrail. In addition to the display on the color terminal, the oil level and oil temperature can be read off at the sight glass **(3)** on the front side of the hydraulic fluid tank. The hydraulic fluid level should always be in the area between the center of the sight glass and the upper edge of the sight glass. Always ensure that the fluid level in the hydraulic fluid tank is correct. During all work on the hydraulic system, ensure the utmost cleanliness!
Note that different grades of hydraulic fluid may not be mixed.

When using a vacuum pump, do not set a partial vacuum of more than 0.2 bar since this may otherwise cause damage to the hydraulic fluid tank.



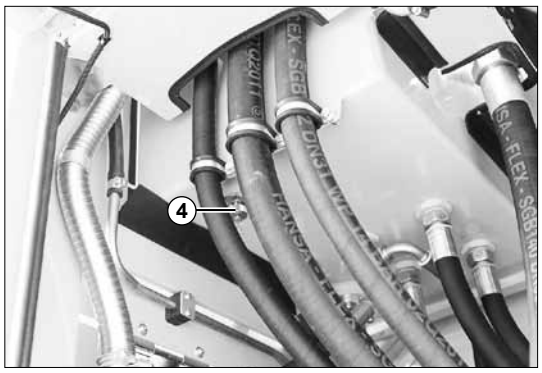
(2) Filler cover with breather/ bleed filter
(3) Sight glass oil level + oil temperature

For refilling hydraulic fluid, unscrew the black filler cover **(2)** (filler and bleed head) from the cover of the fluid tank.
You may hear a "hissing sound" when you open the hydraulic fluid filler cover. This sound is normal.

The filling and bleed filter ensures the required air equalization with fluctuating fluid level (e.g. owing to the fluid temperature). Replace it when it is soiled, but at the latest every 2 years (ROPA Item No.: 270389).

7.3.1.1 Hydraulic fluid change

The hydraulic fluid must be changed annually – best shortly before start of the season. For this purpose, provide a barrel of sufficient size. Use the fluid drain hose supplied for changing the hydraulic fluid. Screw the fluid drain hose onto the valve **(4)** in the base of the hydraulic fluid tank. The valve opens and the old fluid drains off.



(4) Drain valve, hydraulic fluid

We recommend that you fill hydraulic fluid using a suitable fluid pump via the filler valve **(4)** as such is also used at this ROPA factory. With this method, the fresh fluid passes through the intake return filter upstream of the entry point into the hydraulic fluid tank. This increases the purity of the fluid in the hydraulic system.
A suitable filler hose with the appropriate connection to the filler valve (**4**) is available from ROPA with Item No. 632409. On no account may you use the same hose as you used to drain off old fluid.

Note

Note! *The entire machine contains more than twice as much hydraulic fluid as can be drained during a hydraulic fluid change.*
For this reason, it is absolutely essential to precisely comply with the prescribed intervals for changing the hydraulic fluid.

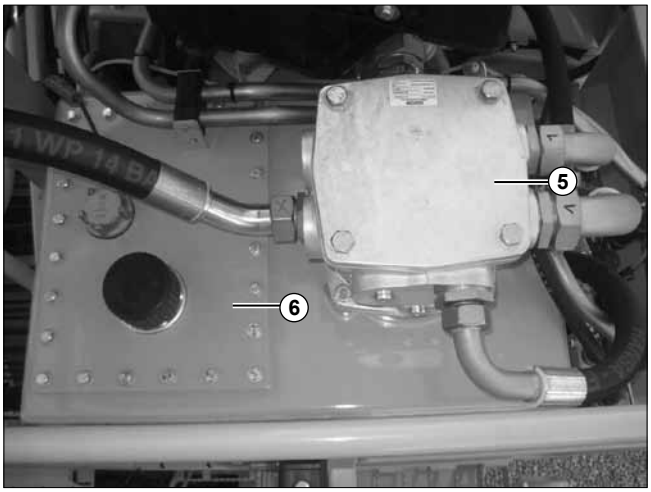
Approved fluid grades: Hydraulic fluid HVLP 46
ISO-VG 46 in accordance with DIN 51524 Part 3; use only fluids containing zinc.
Filling capacity: approx. 190 liters

7.3.1.2 Checking the intake strainers

The intake strainers inside of the hydraulic fluid tank must be checked for soiling every two years before filling up the fresh hydraulic fluid by means of a visual inspection. If the intake strainers are soiled, clean them.

Intake strainer on the inside of the hydraulic fluid tank

- For this purpose, detach the metal cover (**6**) of the hydraulic fluid tank. Flush the intake strainers from inside to outside using sufficient cleaning agent .
- Reinsert the intake strainers.
- Place the gasket and the metal cover (**6**) on them.
- Coat the bolts for fastening the metal cover **(6)** with sealing compound (ROPA Item No. 017026) before inserting them and tighten the bolts.

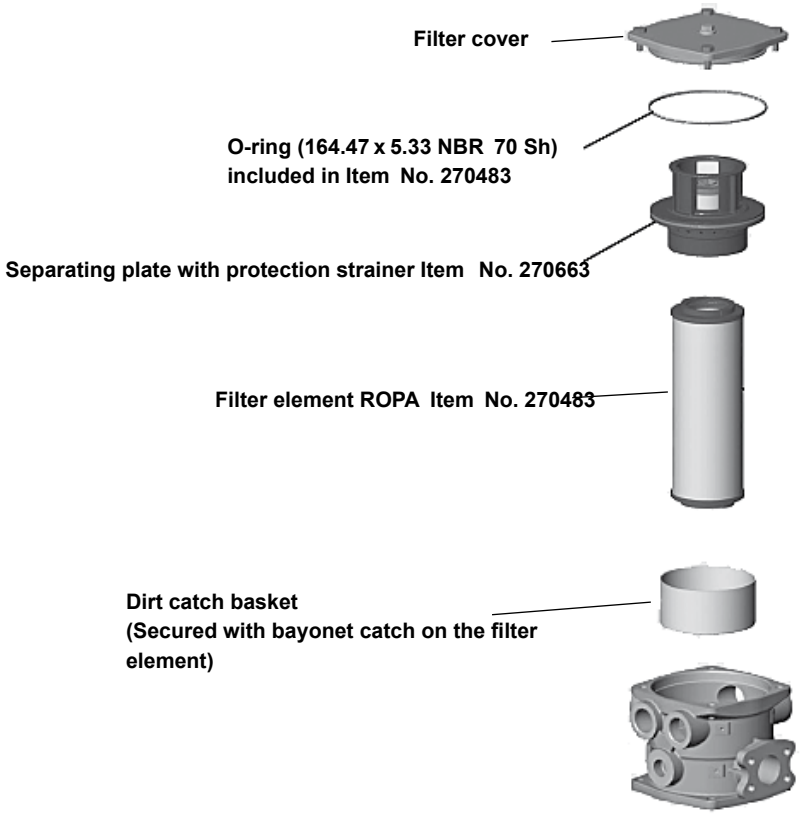


(5) Intake return filter
(6) Metal cover

7.3.1.3 Changing the hydraulic fluid

Before filling with fresh hydraulic fluid, replace both filters of the hydraulic system. These filters are disposable products. They may **not** be cleaned. Cleaning destroys the filters and the hydraulic system may sustain severe damage.

An intake return filter (**5**) is located on the hydraulic fluid tank. When replacing the filter element – as during all work on the hydraulic system – observe absolute cleanliness. Ensure that the O-ring seals in the filter housing are neither damaged nor soiled. Before opening the filter housing, ensure that the hydraulic system is fully depressurized and that the fluid filling cover is open.



Replacement of the filter element is required after the first 50 operating hours, then annually.

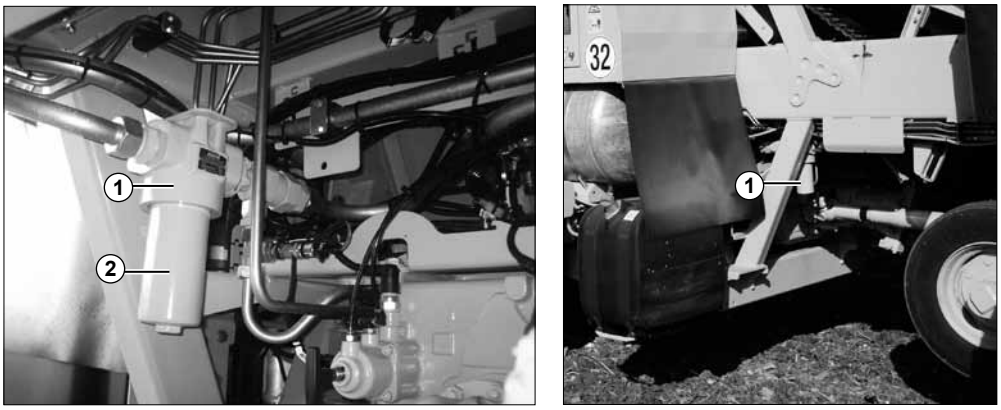
For replacing the filter element in the intake return filter, proceed as follows:

- Remove the four cover fastening bolts and keep these in a safe place.
- Take off the cover of the intake return filter.
- Using a slight rotating movement, pull the filter separating plate including the attached filter element out.
- Dismantle the pulled-out unit into its individual components: separating plate, filter element and dirt catch basket.
- Clean the housing, cover, separating plate and dirt catch basket.
  A protection strainer made of metal is integrated in the separating plate. Inspect the inside of this protection strainer for metal swarf and other foreign bodies. This

protection strainer filters the hydraulic fluid that is "entrained" out of the hydraulic fluid tank if the filter element is soiled or at low temperatures.
- Inspect the filter for mechanical damage. Damaged parts may no longer be refitted (they must be replaced immediately).
- Inspect the O-rings and replace any damaged parts.
- Before installation, wet sealing surfaces, threads and O-rings using fresh hydraulic fluid.
- Always use a new filter element (ROPA Item No. 270483).
- Use the O-ring supplied when inserting the new filter element.
- Assemble separating plate, filter element and dirt catch basket to form one unit.
- Insert the separating plate with the attached filter element and dirt catch basket into the filter head using a slight rotating movement.
- Place the cover on again and screw in the fastening bolts again. Tightening torque for fastening bolts 40 Nm.

7.3.2 Changing the pressure filter element

The large pressure filter (**1**) for the working hydraulics is located behind the AdBlue® tank. Replacement of the filter element is required after the first 50 operating hours, then annually.



Pressure filter, working hydraulics

Besides a fluid-resistant and sufficiently large catch vessel, you will need a ring or box wrench, width across flats 32 mm.

Filter change

- Switch off the engine.
- Unscrew the filter bowl (**2**). Catch the fluid in a suitable container and clean it or dispose of in an environmentally-friendly manner.
- Pull the filter element from the element holding pin. After detaching the filter element, check whether there is an end cap made of metal on the upper end. If this is not the case, detach the end cap separately from the element holding pin. Inspect the element surface for dirt residue and large particles. These may indicate damage to the components.
- Exchange the filter element
- Clean the bowl
- Inspect the filter for mechanical damage; check sealing surfaces and threads in particular.
- Exchange the O-ring on the filter head. Dirt or incomplete pressure relief during dismantling may lead to the bowl screw-in thread seizing up.

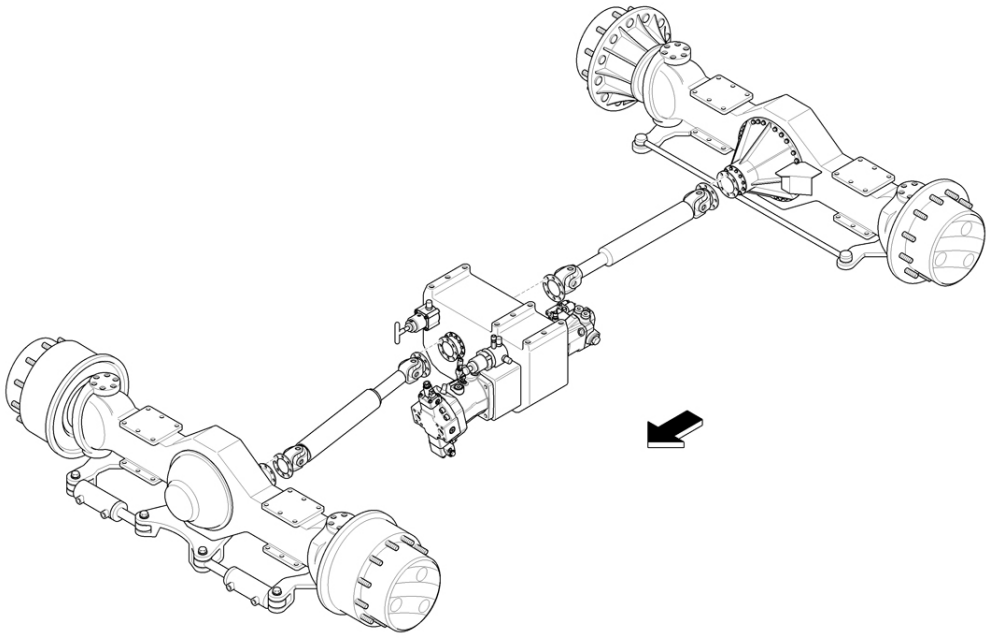
Fitting the element

- Wet thread, sealing faces on the filter bowl and filter head in addition to O-ring on the bowl and element, if necessary with clean hydraulic fluid.
- Fit a new element (ROPA Item No. 270430).
- Carefully fit the filter element onto the element holding pin.
- Screw in the filter bowl as far as it will go.
- Unscrew the filter bowl **one sixth** of a turn.
- Start the engine and lift the pile pickup upwards against the stop. (Inspect the filter for leaks).

Note! *Dispose of hydraulic fluid, filter elements and cleaning rags etc. in compliance with the locally applicable environment protection regulations!*

If AdBlue®/DEF comes into contact with painted surfaces or aluminum surfaces, rinse off the surfaces affected immediately and copiously with water.

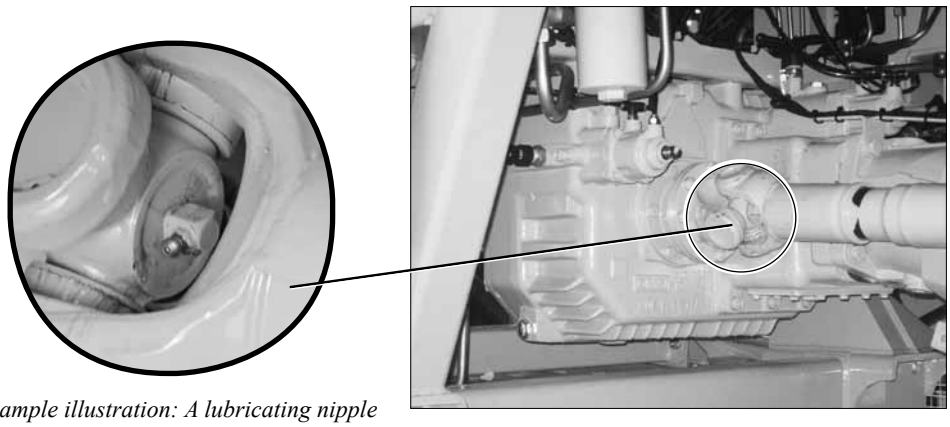
7.4 Mechanical drive of the two steering axles



7.4.1 Drive shafts from the distributor gearbox to the steering axles

Both articulated shafts of **euro-Maus4** must be lubricated after every 200 operating hours.

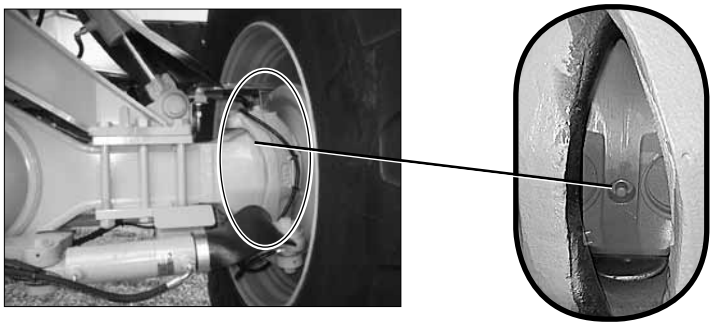
Danger! *Risk of lethal injury due to rotating machine parts. When the engine is running, body parts or items of clothing may be caught by rotating articulated shafts and pulled into the machine. Before lubricating, immobilize* ***euro-Maus4*** *and shut off the engine. The machine must be secured against inadvertent starting of the engine.*



Example illustration: A lubricating nipple

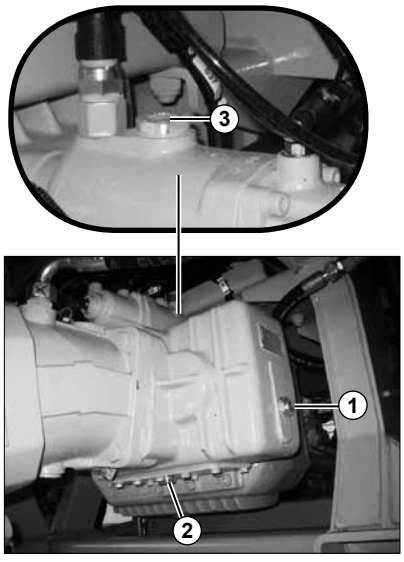
7.4.2 Maintenance, universal joints in the axles

The universal joints of the double-joint shafts in the axle arms of the two steered axles must be lubricated every 200 operating hours. Each universal joint has two lubricating nipples. Both lubricating nipples must be lubricated.

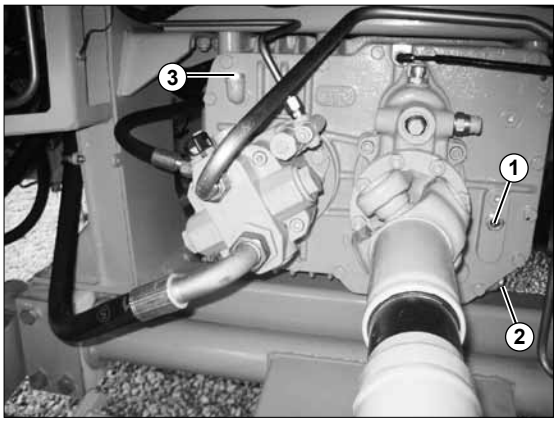


7.5 Manual transmission

The manual transmission is used for switching the operating modes "Turtle" and "Rabbit" as well as speeds I and II and all-wheel drive.



Turtle/Rabbit reduction gear



Manual transmission, 1st / 2nd gear

(1) Sight glass for checking the oil level
(2) Oil drain plug
(3) Oil filler plug

Note

Note! *The complete transmission consists of two units connected by a narrow duct and therefore having a joint oil circuit. For the oil change, the machine must be standing completely level. After filling, wait for at least one hour until the final check. It can only be determined that enough oil been added to the transmission AFTER this waiting period and if the level is the same in both sight glasses and at the center of the sight glasses.*

The oil level of the manual transmission must be checked weekly. Check via the sight glasses **(1)**. The oil level is correct if the oil level is in the central range of the sight glasses **(1).** The sight glasses **(1)** are located on the rear side of the transmission next to the articulated shaft and on the reduction gear at the left.
The gear oil must be changed after the first 50 operating hours, and, after this, annually.

Attention! *Risk of burns. Hazard due to hot oil! The oil in the manual transmission may become very hot under certain circumstances When changing the oil in the manual transmission, always wear gloves and suitable protective clothing.*

Proceed as follows for the oil change:

- Place a catch pan of sufficient size underneath.
- Unscrew the two oil drain plugs **(2)** (these are located at the lower corner of the transmission case and at the bottom of the reduction gear); the old oil is drained off.
- Clean the magnetic oil drain plugs (**2**) in order to remove abraded metal. Then reinsert the plugs and tighten them.
- Unscrew the oil filler screw (**3**) and continue to add fresh oil at the filler opening until the oil level is in the top area of the sight glass (**1**).
- Screw in the oil filler plug again.

Prescribed oil grade: **Fully synthetic gear oil**
API GL5, SAE 75W-90 as per ZF standard TE-ML 05B
Filling capacity: approx. 12 liters

7.6 Axles

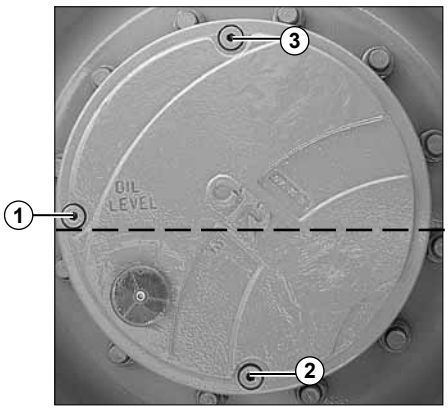
7.6.1 Planetary gear unit (applies to both axles)

Replacement of the oil is required after the first 50 operating hours, then annually.
Park **euro-Maus4** so that the respective wheel is positioned as shown in the illustration.

Attention

Attention! *Risk of injury! Immobilize* ***euro-Maus4*** *each time and shut off the engine before performing an oil change on the individual planetary gear units. The machine must be secured against inadvertent starting of the engine. All maintenance and repair work may only be performed by trained specialist personnel.*

Danger from hot oil escaping under pressure! *The oil of the planetary gear units may become very hot under certain circumstances and – due to heating up – may be pressurized. When performing an oil change on the planetary gear units, always wear gloves and suitable protective clothing. Always first unscrew the oil filler plug very slowly and with due care, so that the pressure which may have built up in the planetary gear units can be relieved safely.*



(1) Oil level inspection plug
(2) Oil drain plug
(3) Bleeding when filling with oil

Planetary gear unit, front and rear axle

Proceed as follows for the oil change:

- Change the oil only with the gear units at operating temperature. Park the machine on level ground. The oil level inspection plug ("Oil Level") (**1**) is horizontal (see illustration).
- Place a catch pan of sufficient size underneath.
- Open the oil drain plug (**2**) and the oil level inspection plug and let the old oil drain off.
- Screw in the oil drain plug again.
- Fill the planetary gear unit with the supplied ROPA planetary oil filler so that the oil level reaches the lower edge of the oil level inspection opening.
- Screw the oil level inspection plug back in again.
- Wait around 15 minutes and recheck the oil level. If needed, add a little oil. Tightening torque for the 3 plugs: 50 Nm

Note

Note! *Use the ROPA planetary oil filler to add the oil (ROPA special tool Item No. 018143). You can exactly and easily add the corresponding oil quantity using this special tool.*

Prescribed gear oil:	**Gear oil** API GL 5, SAE 90
Filling capacity:	per planetary gear on the front and rear axle approx. 3.5 liters

7.6.2 Differential gear on front and rear axle

Replacement of the oil is required after the first 50 operating hours, then annually.

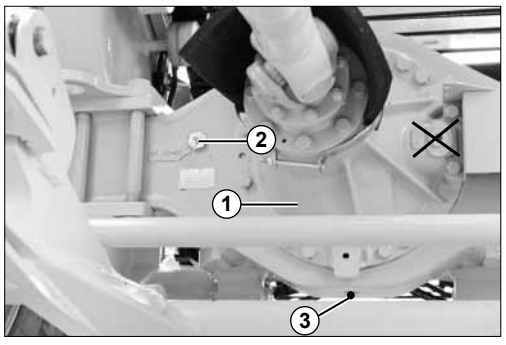
Attention! *Risk of injury. Immobilize* ***euro-Maus4*** *before the oil change and shut off the engine. The machine must be secured against inadvertent starting of the engine. All maintenance and repair work may only be performed by trained specialist personnel.*

Differential gear units (1) on both axles:

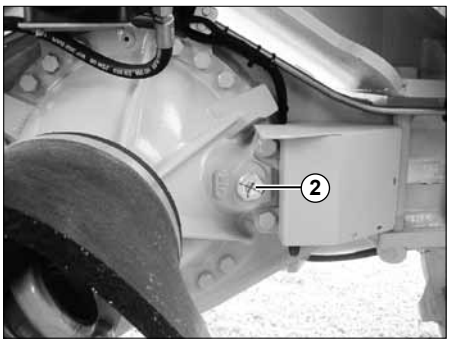
Proceed as follows for the oil change:

- Change the oil only with the gear units at operating temperature.
- Place a catch pan of sufficient size underneath.
- Unscrew the oil drain plug **(3)** of the differential gear **(1)**. It is located at the bottom, at the lowest position on the axle body.
- Open the oil level inspection plug **(2)** and wait until the oil has completely drained. off
- Screw in the oil drain plug **(3)** again.
- Add oil to the oil filler opening **(2)** until the oil level reaches the lower edge of the oil filler opening **(2)**.
- Screw the oil level inspection plug back in again.

Prescribed gear oil:	**Gear oil** API GL 5, SAE 90
Filling capacities:	Differential gear of the front axle approx. 22 liters
	Differential gear of the rear axle approx. 20 liters



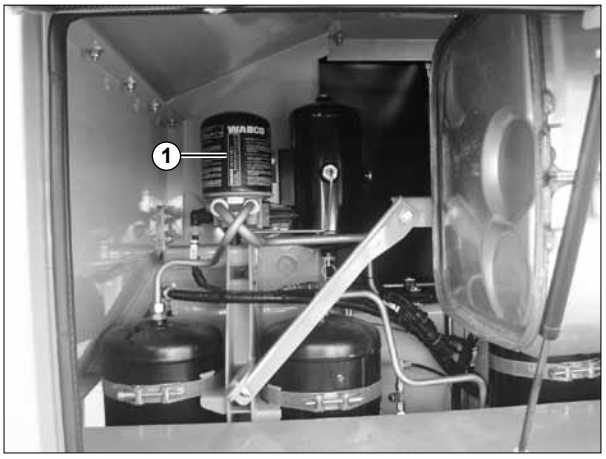
Front axle



Rear axle

(1) Differential gear
(2) Oil filler opening and oil level inspection plug
(3) Oil drain plug

7.7 Pneumatic system



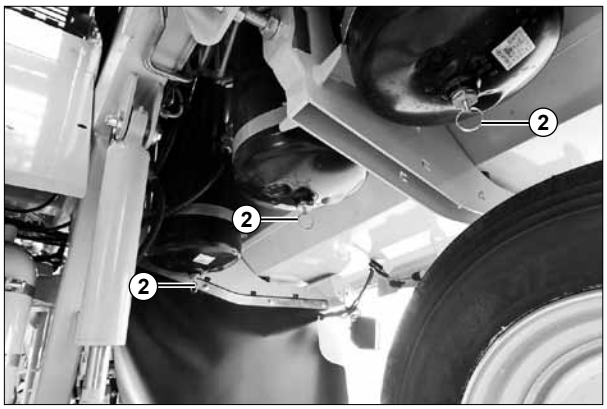
(1) Air dryer cartridge

Maintenance work on the pneumatic system is only required on the air dryer and the compressed air reservoirs. The compressor is maintenance-free.
The air dryer and the five compressed air reservoirs are located under the right lateral hatch. The dryer cartridge (**1**) of the air dryer must be replaced annually.

Note

Note! *Use ONLY original spare parts (Ropa Item No. 261081) for the air dryer since the AdBlue® dosing unit is damaged by compressed air containing oil.*

Condensation must be drained off from the compressed air reservoirs after every 100 operating hours.



(2) Drain valve for condensation

7.8 Brake system

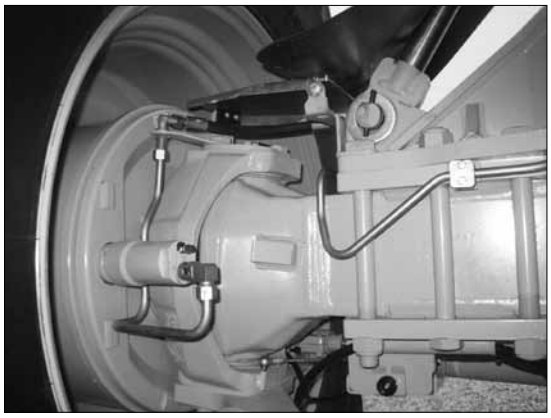
The front axle is braked by a pneumatically operated drum brake. Two independent brake circuits guarantee maximum safety, even if one brake circuit should fail.
After washing the machine, "drive the brake dry". If you attempt to move the machine with brakes frozen tight (ice formation by ingress of water), this may lead to severe damage to the brake system!
Check functioning of the brakes each time before driving!

Setting and repair work on the brakes may only be performed by specialist personnel familiar with maintenance and repair of compressed-air brakes owing to their vocational training.

Danger! *If errors are made during maintenance, repair or setting work, there is an extreme risk of lethal injury for the driver and for other road users.*

Front axle brake, pneumatic

Combination cylinder, pneumatic / hydraulic (optional only on 32 km / h version)



Rear axle with hydraulically operated drum brake (optional only on 32 km/h version)

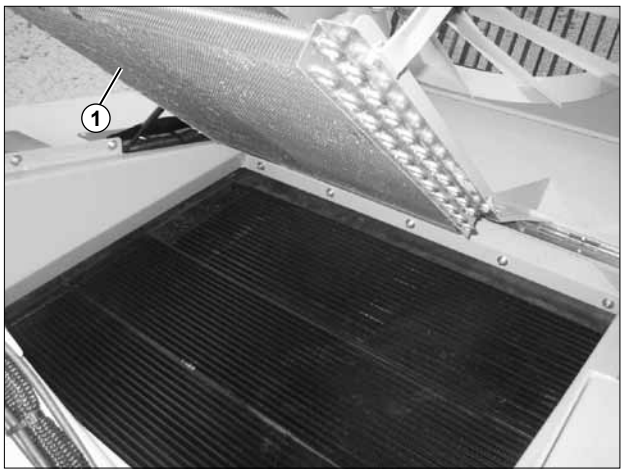
7.9 Air conditioning of the driver's cabin

7.9.1 Air conditioning system

Attention

Attention! *Risk of damage to health and risk of damage to the environment. Maintenance work on the air conditioning system requiring opening of the coolant circuit (e.g. (refilling with coolant, exchange of the collector dryer, etc.) may only be performed by an authorized specialist workshop.*

The air conditioning condenser **(1)** is located in the fan scoop. Use compressed air or a water hose for cleaning (*on no account use a high-pressure cleaner!*). The air conditioning condenser **(1)** with the fan scoop is swung up for cleaning.



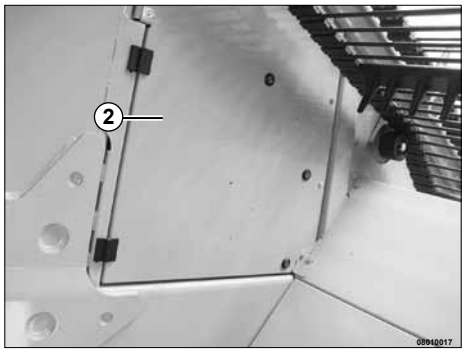
(1) Condenser, air conditioning system

If the air conditioning system isn't cooling sufficiently, this may be due to the following causes:

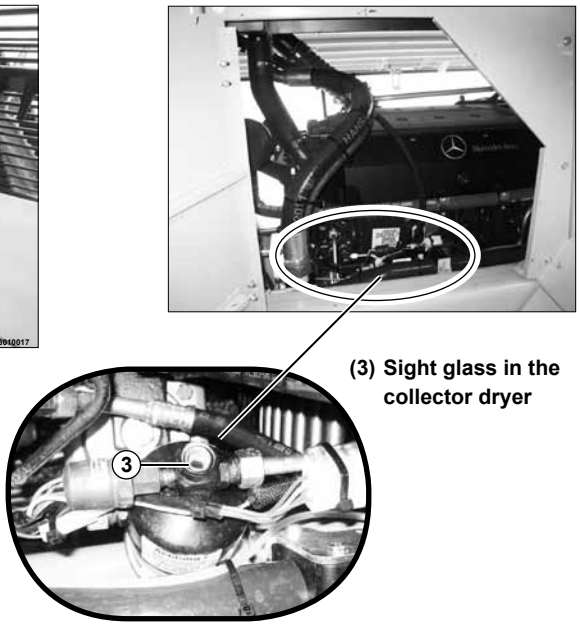
– Air conditioning condenser is dirty.
  Remedy: Blow the air conditioning condenser through with compressed air (max. 5 bar). When blowing through, ensure that the fins of the condenser are not damaged.
– Coolant circuit not adequately full.
  Remedy: Possible only by specialist personnel using the required special tools. Filling is adequate if coolant without bubbles is visible at the sight glass of the collector dryer . The collector dryer is located in the engine housing behind the engine and in front of the vehicle frame. It is accessible through a housing maintenance hatch in the area of the infeed conveyor.
– Circulating air grille in the cab not open
  Remedy: Open circulating air grille.
– Circulating air grille in the cab is clogged
  Remedy: Clean circulating air filter.

STOP
Danger

Danger! *Risk of lethal injury when opening the maintenance hatch* ***(2)*** *if the machine is operating. Before opening the hatch, switch off the engine and secure the machine against switching on. For this purpose, withdraw the ignition key and carry it on your body. Also switch off the main battery switch.*



Maintenance hatch



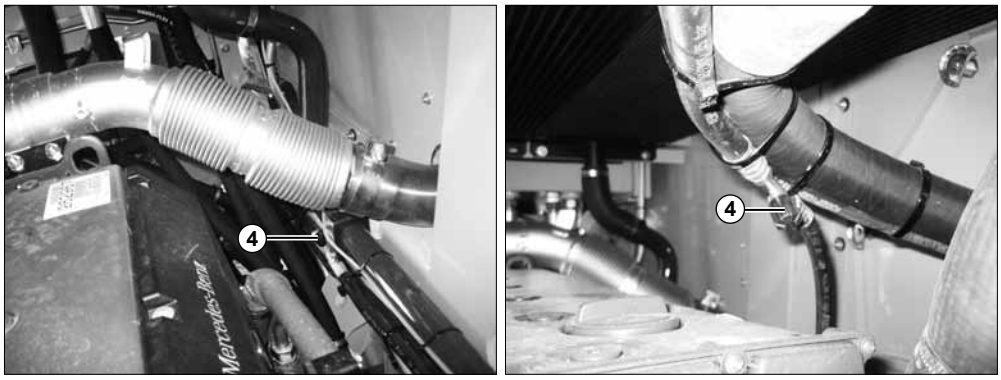
(3) Sight glass in the collector dryer

Annual maintenance:

– Have the air conditioning system checked by an authorized specialist workshop and repaired if needed.

Maintenance every two years:

– Have refrigerant and collector dryer (ROPA Item No. 301191) replaced by an authorized specialist workshop even if no bubbles can be seen in the sight glass of the collector dryer.



(4) Maintenance connections on the refrigerant circuit

Note

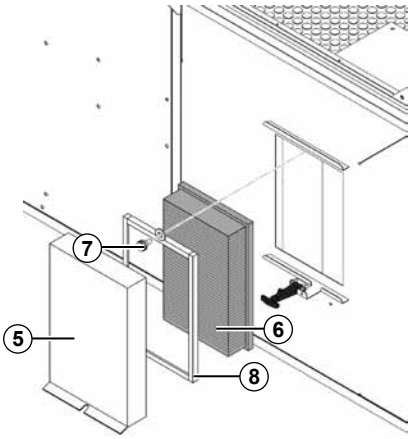
Note for the specialist workshop! *If replacing or refilling the coolant, this should be mixed with the following oil: Fuchs Reniso PAG46 (ROPA Item No. 435046). On no account may the air conditioning system be operated using other oil additives.*
Refrigerant filling capacity approx.1.75 kg.
For every 100 g of refrigerant (refrigerant type R134a) in each case, there must be 10 ml of oil circulating oil in the refrigerant circuit.

ROPA adds a fluorescent agent to the refrigerant on all machines during initial filling. This enables quick and cost-effective detection of any leaks occurring on the air conditioning system.

If the heating and ventilation system should not work at full performance, even if the circulating air grille is fully open, the cause for this is usually found in blocked filters. Therefore, always clean both filters.

7.9.1.1 Fresh air intake filter

The fresh air intake filter for the cab is located to the outside right on the rear cab wall.



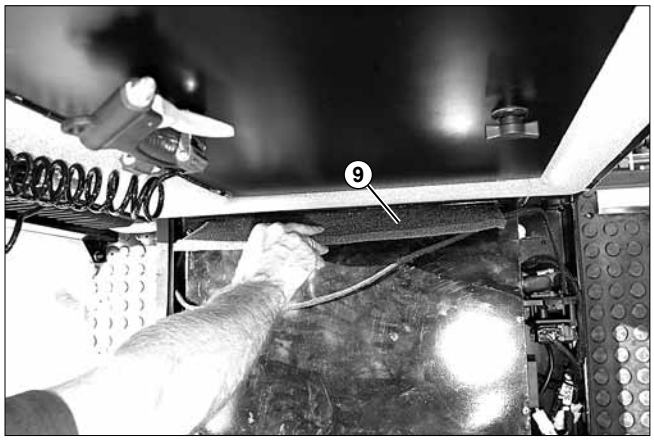
This filter must be cleaned as follows if necessary:

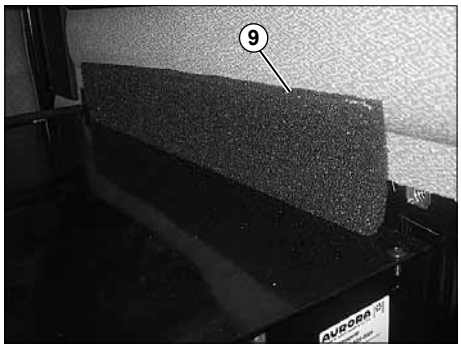
- Open the cover **(5)**.
- Unscrew the knurled screw **(7)** and take the filter **(6)** from the bracket **(8)**.
- Clean the filter element using compressed air.
- Reinsert the cleaned filter element in the bracket **(8)** and fasten it using the knurled screw **(7)**.
- Close the cover **(5)** again.

This filter element should be replaced annually at all events.

7.9.1.2 Circulating air filter

The circulating air filter **(9)** is located in the fan unit below the cover behind the driver's seat.





(9) Filter mat, circulating air filter

This filter should be cleaned at least annually using compressed air as follows:

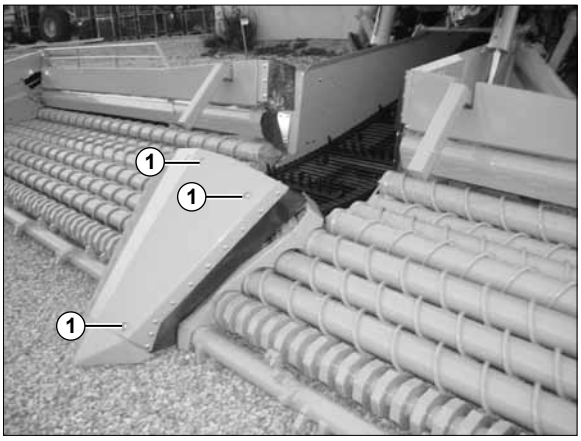
- Detach the cover.
- Open the bayonet catches.
- Pull the filter mat (**9**) up and out.
- Blow the filter mat (**9**) through using compressed air.
- Reinsert the cleaned filter mat (**9**).
- Reattach the cover.

7.9.1.3 Draining condensed water from the air conditioning system

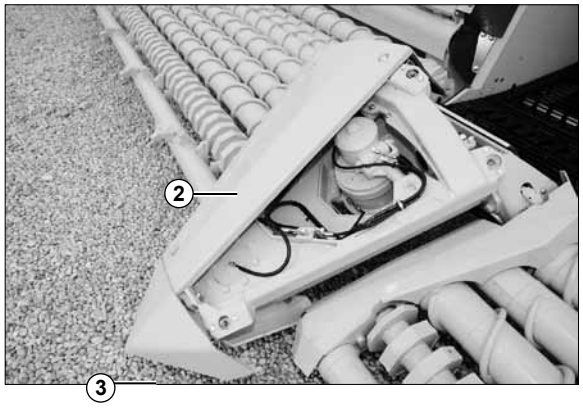
The condensate drain **(10)** of the air conditioning system is located at the cab floor below the driver's cab. Regularly check if condensation is escaping at this point. If you should not detect escaping water, the condensate drain must be cleaned.

7.10 Pickup

7.10.1 Central mark

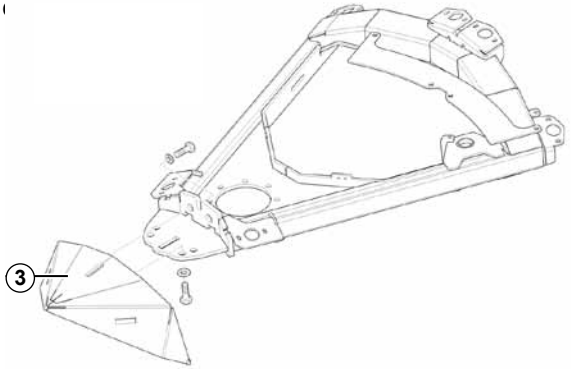


Half of the central mark hatch (**2**) can be detached after undoing three screws (**1**).

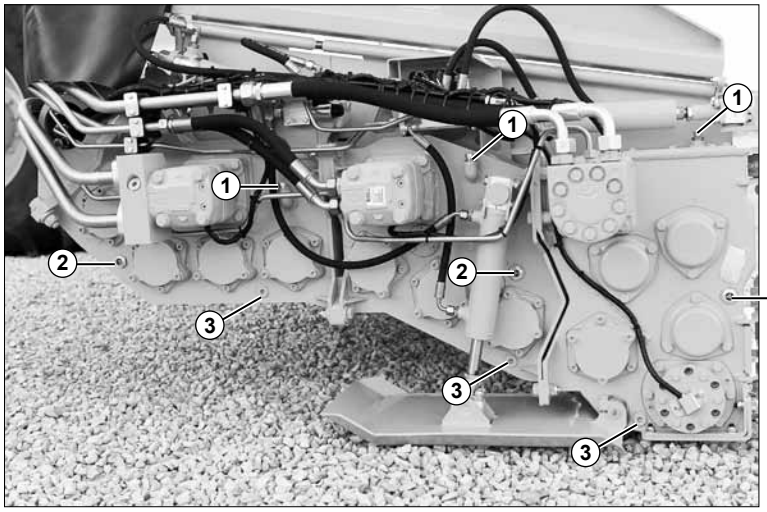


Inspect the underside of the central mark for dirt with the side sections of the pickup swung in every day for soiling (visual inspection). It is essential that heavy soiling be removed immediately.

The mark **(3)** – the frontmost section of the central mark – is subject to wear. It is essential that it be conditioned or replaced before the material is completely worn. We recommend that you keep a stock of these parts on machines which are utilized a great



7.10.2 Pickup gear



(1) Oil filler screw
(2) Sight glass
(3) Oil drain plug

4-set pinch roller gear

Conveyor roller gear

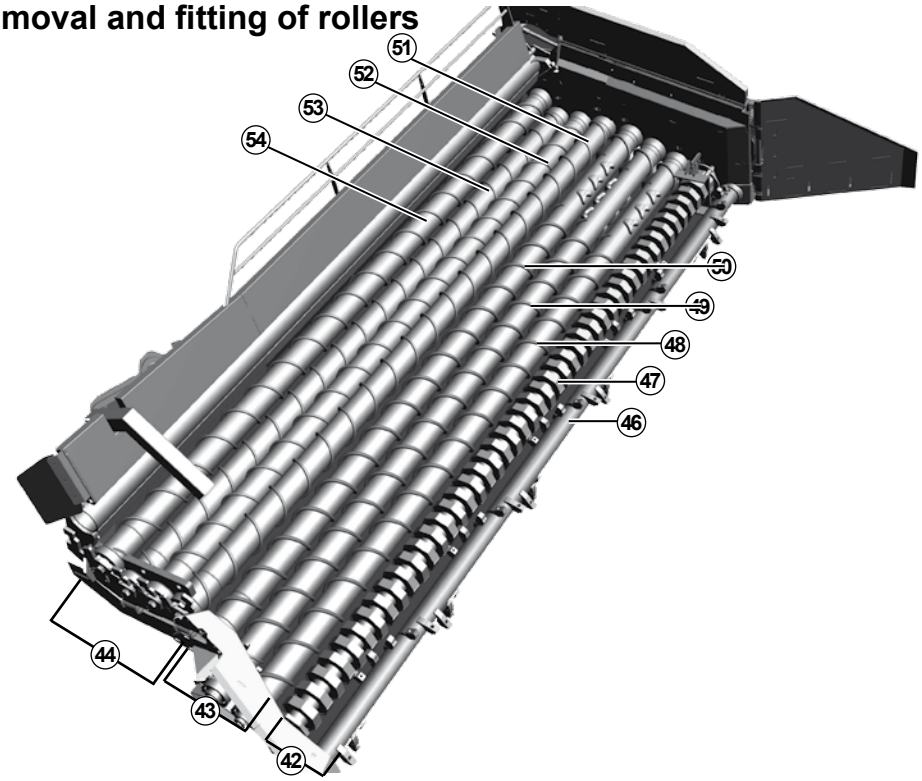
Pickup roller gear

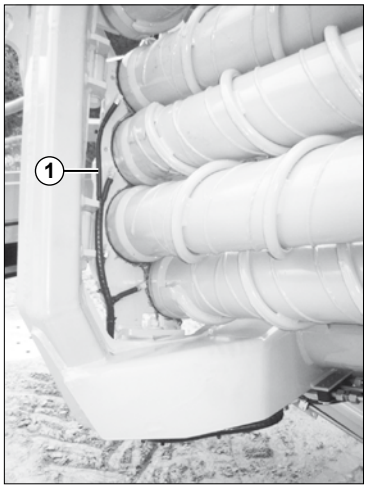
euro-Maus4 is equipped with three sets of gear units each located to the right and left outside on the pickup. The oil level of these six gear units must be checked daily with the pickup folded out and lowered. The inspection is performed at the sight glasses. If the oil level is above the center of the sight glass, no oil has to be added.
An oil change is required after the first 50 operating hours and, after this, annually.
Proceed as follows for the oil change:

- Change the oil only with the gear units at operating temperature.
- Place a catch pan of sufficient size underneath.
- Open the oil drain plugs and drain off the old oil.
- Retighten the oil drain plugs.
- Add adequate fresh oil at the filler openings (also acting as bleed screws) until the oil level with pickup lowered is in the upper area of the sight glasses.

Prescribed gear oil:	**Gear oil** API GL 5, SAE 90
Filling capacity	
per pickup roller gear unit:	approx. 9.0 liters
per conveyor roller gear unit:	approx. 3.5 liters
per 4-set pinch roller gear unit	approx. 4.3 liters

7.11 Removal and fitting of rollers





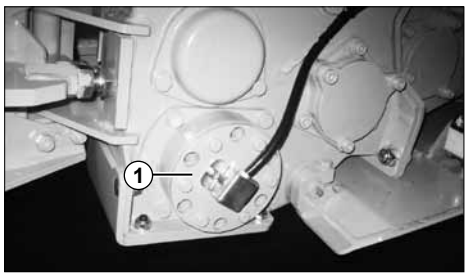
(1) Line of the central lubrication system

STOP
Danger

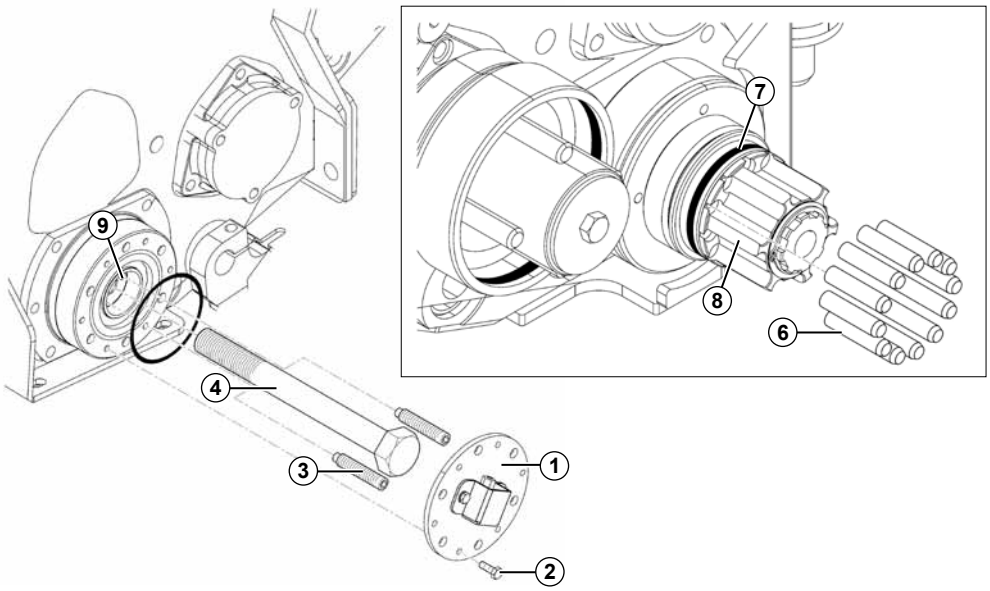
Danger! *When removing and fitting rollers, there is a risk that the side sections of the pickup swing down suddenly and that persons in this area may be severely injured. Before starting work, the respective side section of the pickup must be securely supported or suspended from a crane with sufficient load-bearing capacity and additionally secured. Comply with the applicable health and safety regulations regarding working under suspended loads.*

Check all lines (**1**) of the central lubrication system leading to the rollers daily (visual inspection of the lines).

7.11.1 Removal and fitting of pickup and cleaning roller



The pickup roller and cleaning roller may only be removed together because the pig tails of the pickup roller reach between the disks of the cleaning roller. The gear oil does NOT have to be drained for removal.



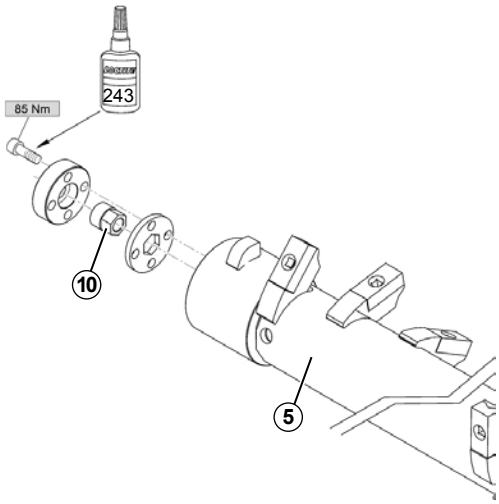
The closure cover (**1**) of the bearing flange (on the outside of the gear unit) must be taken off before removal of the pickup roller:

- For this purpose, undo the six hexagon bolts (width across flats 13 mm) (**2**) on the closure cover and detach the cover.
- Remove the two securing screws (grub screws) **(3)** which are located beside the large hexagon bolt (M20x350) **(4).**
- Unscrew the hexagon bolt (M20 x 360).

– Detach the pickup roller **(5)** from the gear unit. The pickup roller is only plugged onto 12 plastic fingers(**6**).
  These 12 plastic fingers (Ropa Item No.: 102849) (**6**) must be renewed each time the pickup roller is removed. So must the O-ring (Ropa Item No. 412217) (**7**)
– Grease the new plastic fingers (**6**) well before sliding them into the toothing bushing (**8**).
– Screw the hexagon bolt (M20x360) (**4**) back in again when fitting the pickup roller(**5**).
– Screw the bolt only very lightly tight and then turn it back through 1/8 to 1/4 of a turn until it is not tensioned and the flanks on the head of the hexagon bolt (M20x360) are parallel with the threaded bores (**9**) for the two grub screws.
– Screw in the two grub screws(**3**) and thus secure the hexagon bolt (**4**) to prevent it turning.
– Fill the cavity above the head of the bolt with lube grease up to the brim before placing on the closure cover **(1)** and then secure the closure cover with the six hexagon bolts **(2).**

Note

Note! *Once per year, the hexagon bolts (M20x360) must be replaced (Ropa Item No. 415050) (***4***). The same applies to the special M20 nuts (Ropa Item No. 102930) (***10***) in the pickup roller.*

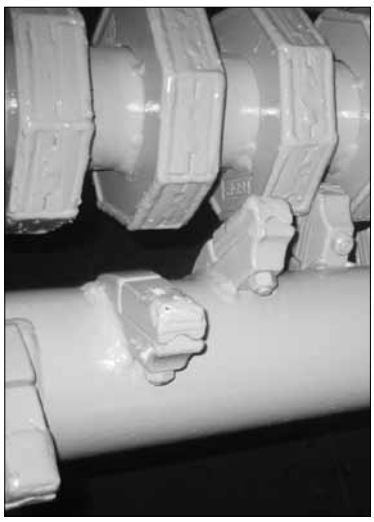


The cleaning roller is not secured to the gear. The cleaning roller is plugged onto the gear unit. After releasing the outer support, it may be pulled off at the center of the pickup (pedestal bearing with setting ring).

7.11.2 Exchanging the pig tails of the pickup rollers

The pickup rollers have hard-coated turnover plates (ROPA Item No. 102080) at the pickup pig tails.

Owing to fastening using a bolted connection, each individual turnover plate which is worn may be renewed easily and without major installation effort if needed.



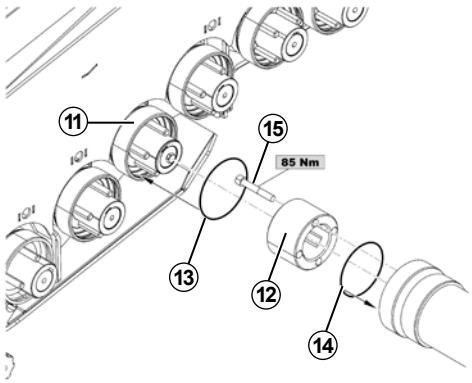
Pickup pig tail with turnover plate

Danger! *Risk of serious injury when working on the pig tails of the pickup rollers. At all events, switch off the machine completely and safeguard it against being switched on by third parties before starting work on the pickup. For this purpose, withdraw the ignition key and lock the driver's cab. Secure the ignition key against access by third parties!*

7.11.3 Removal and fitting of conveyor and pinch rollers

Please always note:

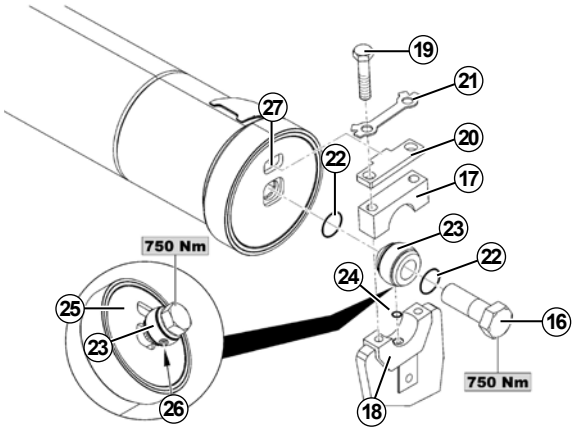
Drive side:



- The rollers are plugged onto the clutch dogs (**11)** at the gears. There is no further locking device on the gears for these rollers.
- All polyamide plug-in couplings (**12)** must be greased before sliding them onto the clutch dogs.
- Insert a new O-ring (ROPA Item No. 412338) (**13**) into the clutch dog and into the end of the roller (O-ring ROPA Item No.: 412635) (**14**) prior to installation.
- The four M12 x 80 hexagonal recess bolts (ROPA Item No. 415051) (**15**) with which the polyamide plug-in couplings **(12**) are screwed into the rollers are coated with a special screw locking compound (retention) and may be used only once.

Outer support end:

- All of the M24 fine thread bolts **(16)** have a right-handed thread (!). The tightening torque is 750 Nm. They are not locked using liquid screw locking compound (retention) (Loctite).

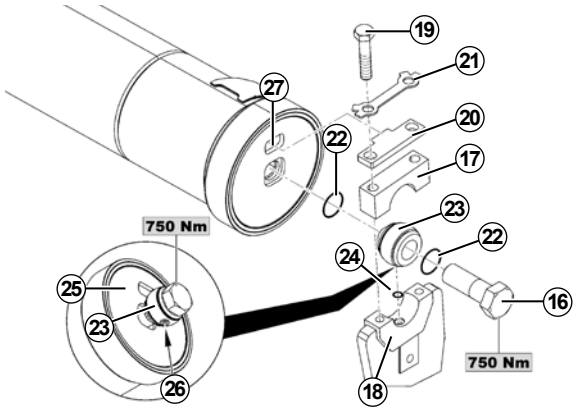


a) Before removing the upper **(17)** and lower **(18)** half shell, mark them in pairs. These parts are manufactured in pairs with a precise fit and may not be exchanged with other parts or combined with other parts.

b) Remove the two hexagon bolts M12 (**19**) and detach the upper half shell (**17**) with the anti-twist lock plate (**20**) and the screw locking plate (**21**).

Removing/fitting the roller

- In order to be able to lift out a roller, it must be lifted above the lower half shell (**18**). The simplest way is to use a lifting hook that you make yourself and which grips beneath the roller. The weight per roller is approx. 150 kg. The lifted roller will tilt a little on the clutch dog. The roller can be knocked off the clutch dog by tapping lightly on the roller turns.
- Always replace the two O-rings (ROPA Item No. 412309) (**22**) on the securing ball (**23**) by new ones when reassembling. The same applies to the O-ring (ROPA Item No.: 412320) (**24**) in the grease duct in the lower half shell.
- The hexagon bolts must be tightened to a torque of 85 Nm. The bolts are locked by bending up the corners on the screw locking plate (ROPA Item No. 102736) (**21**).
- When inserting the securing ball **(23)** in the anti-twist lock disk **(25)**, note that the lube bore **(26)** in the securing ball must always point in the opposite direction to the slot **(27)** in the anti-twist lock disk **(25)**.



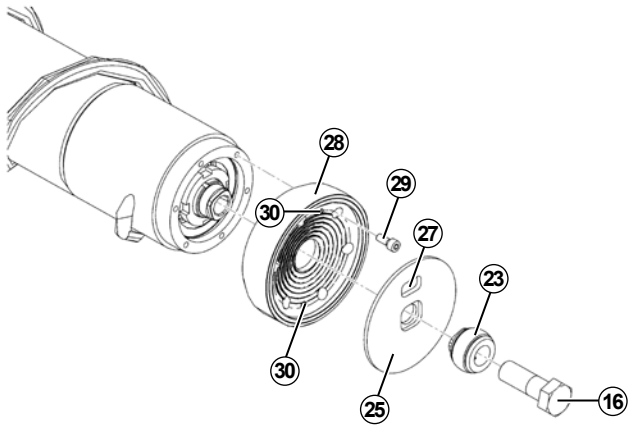
Note

Note! *Each time before screwing in the fine thread bolts M24 (***16***), smear their threads lightly with copper paste (ROPA Item No. 017159, 100 g tube.)*

- When fitting the rollers, ensure that the turns of the rollers are not aligned. The turns of the rollers should be centrally offset with respect to each other.
- To ensure even wear of the rollers, the pinch rollers should, if necessary, be fitted on the respective opposing side section of the pickup. When fitting the pinch rollers, they must be exchanged crosswise (in the opposing side). In order to avoid unilateral wear of the slot (**27**) in the anti-twist lock disk (**25**), the anti-twist lock plates (**20**) should be fitted on rollers with opposite direction of rotation after each season.

7.11.4 Exchanging the wear flange

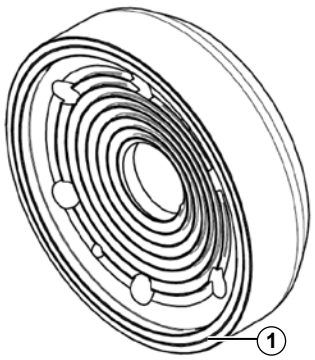
The distance between two wear flanges amounts to approx. 0.5 mm for a new machine. When this distance becomes too great, more grass, weeds and beet leaves, etc. get caught at the transition to the next conveyor.
ROPA recommends replacing the wear flanges when the distance amounts to 2 - 3 mm. This exchange is easy to perform. The settings of the taper roller bearings are left totally untouched since they are behind the wear flange.



The fundamental procedure corresponds to that for removal of pinch rollers with the difference that the fine thread bolt (**16**) must be slackened first (do not completely unscrew it).
In order to exchange the wear flange, (**28**), only the fastening bolts **29**)
of the wear flange need be replaced. If the two grub screws **(30)** are screwed into the thread, the wear flange is forced off.

Two versions of wear flange are required:

- Wear flange ROPA Item No. 102256 for rollers rotating clockwise (not marked)
- Wear flange ROPA Item No. 102257 for rollers rotating counter-clockwise (marked): 1 groove (**1**) (on end face)



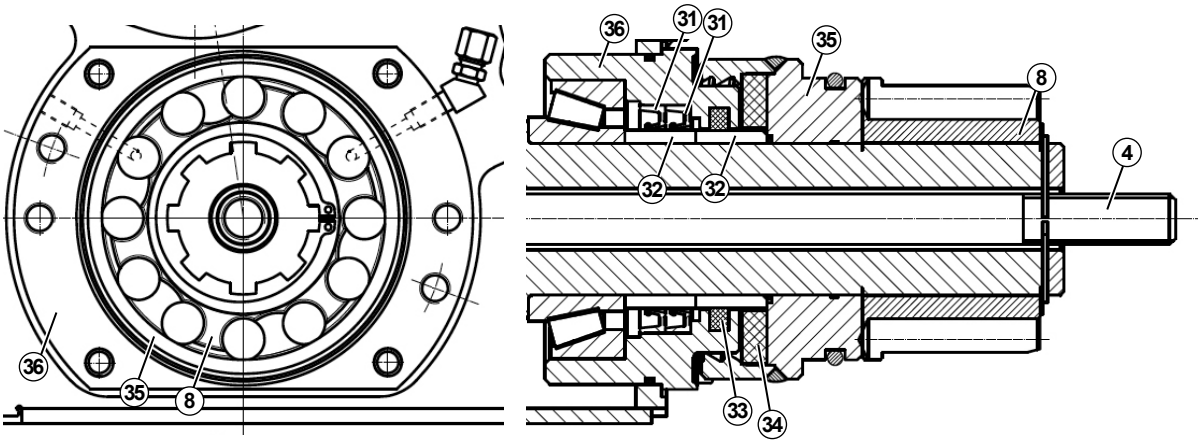
(1) Groove

The direction-of-rotation information is always stated viewing the end face of the wear flange.

7.11.5 Fitting/setting the bearings of the pinch rollers/conveyor rollers

It is essential that you use a special tool for fitting respectively setting of bearings (adjustable taper roller bearings) which are located at the ends of the pinch rollers respectively the conveyor rollers. This tool may be obtained from ROPA quoting Item number 018156. However, such work is required extremely rarely and may be performed only by experienced mechanics.

7.11.6 Exchanging the radial shaft seal rings (Simmer rings) on the gear

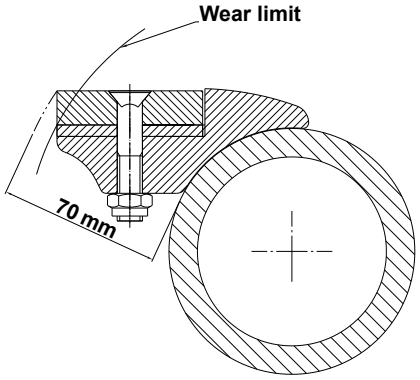


Since the pickup roller bearing assembly, owing to its design, is subject to increased soiling, soil may penetrate the gear flange over time, despite extensive sealing measures. Consequently, the two radial shaft seal rings (ROPA Item No. 246028) **(31)**, the two internal rings (ROPA Item No. 240152) **(32)** and the two felt rings (ROPA Item No. 246026 **(33)** and ROPA Item No. 246145) **(34)** on the gear-end bearing assembly of the pickup roller must, for reasons of safety, be renewed after every approx. 300,000 t of loaded material.

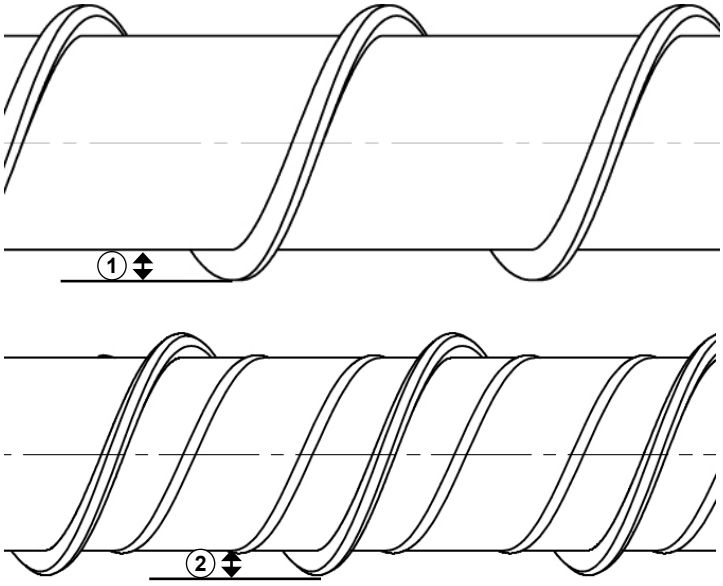
In order to do this, remove the toothing bushing (**8**), the dirt guard flange (**35**) and the bearing flange (**36**).

Remove dirt deposits on the buttress thread thread on the inside of the dirt guard flange (**35**).

7.11.7 Build-up welding



When carrying out repair work on worn pickup pig tails, the welding material may only be applied up to a height of 70 mm In all cases, ensure that the welding material is not applied too thickly so that the distance to the cleaning roller does not become too small.



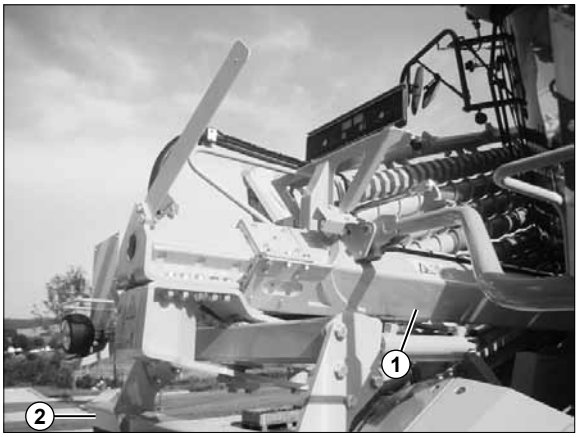
On the spirals of the conveyor and pinch rollers, the welding material may only be applied to the conveying side of the roller spirals. On no account may you apply a build-up weld bead manually and directly to the roller shaft. This will warp the complete roller due to the heating effect and it becomes useless.

It is essential that you ensure that the applied spirals (**1**) on the conveyor rollers are no higher than max. 20 mm.
It is essential that you ensure that the applied spirals (**2**) on the pinch rollers are no higher than max. 18 mm.

In order to achieve smooth surfaces on the weld build-up and thus avoid damage to the beet, these build-up welds must be done by machine. This work can be completed professionally and cheaply at many ROPA servicing outlets.
As the build-up welding rod, we recommend a special-purpose filler wire ROPA SCREWTEC with a diameter of 1.6 mm. This is applied ex-works and can be ordered, quoting ROPA Item No. 017136, on a 15 kg reel.

7.12 Pile pickup with residual beet pickup

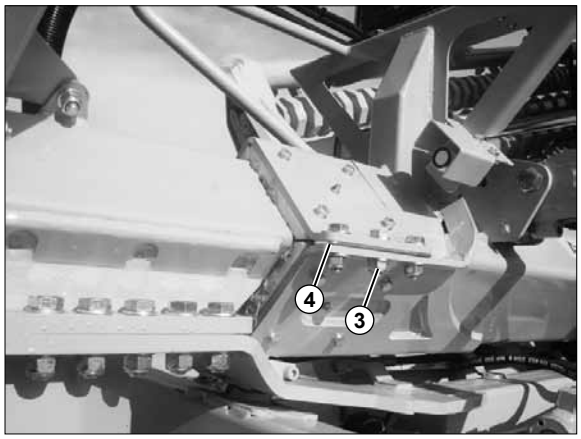
Clean the hydraulically moved parts in order to remove coarse dirt and coat the telescopic tube with lubricating grease if necessary.



(1) Pile pickup
(2) Residual beet pickup

On the telescopic tube, the play between outer and inner tube can be set if necessary as follows:

– Remove the six hexagon bolts **(3)**.
– The play is set with spacer plates **(4).**
– Reattach the sets of six hexagon bolts.



7.13 Infeed conveyor

The deflecting rollers (**1**) of the infeed conveyor (at the far front at the infeed conveyor infeed slot) are fitted with wipers(**2**). They scrape off adhering soil. The bolts in the scrapers must be checked weekly and, when the bolt heads are greatly worn, they must be replaced.

If the bolt heads are worn too much, the wiper may loosen and swing into the infeed conveyor. This destroys the infeed conveyor. Such damage is excluded from any guarantee, warranty or goodwill.

If necessary and depending on wear, the wipers must be readjusted or replaced.

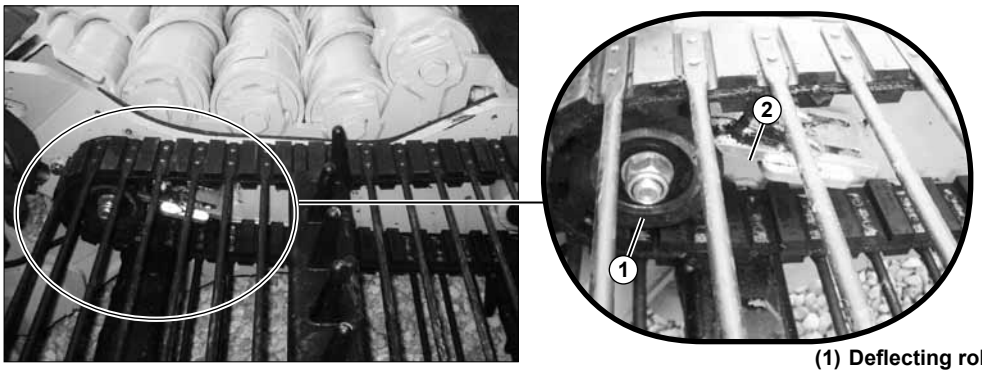
Depending on ground condition, the area of the infeed conveyor deflection must be checked several times a day to weekly and cleaned in case of major soiling. The sieve conveyor must be retightened if needed.

It may never be over-tightened.

Perform a daily check as to whether all bearing rollers in the infeed conveyor duct are in proper condition. If rollers are broken, very worn or missing in the area of the front axle, the conveyor will slide across the axle. This may cause substantial damage to the axle suspension.

Infeed conveyor duct

Inspect this area regularly and clean it if necessary



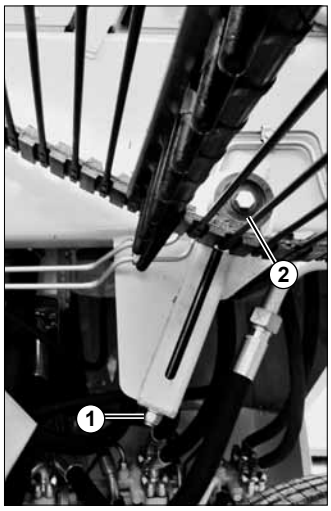
(1) Deflecting roller
(2) Wiper

Infeed roller deflection

7.13.1 Tightening the infeed conveyor

Warning! *Risk of severe injuries. Retightening of the infeed conveyor may only be performed with the drive switched off and engine shut down. Withdraw the ignition key and switch off the electrical system using the main battery switch.*

Only check tension of the infeed conveyor if the pickup is swung out and lowered to operating height.

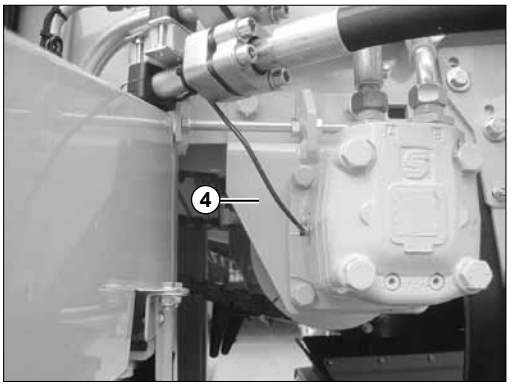


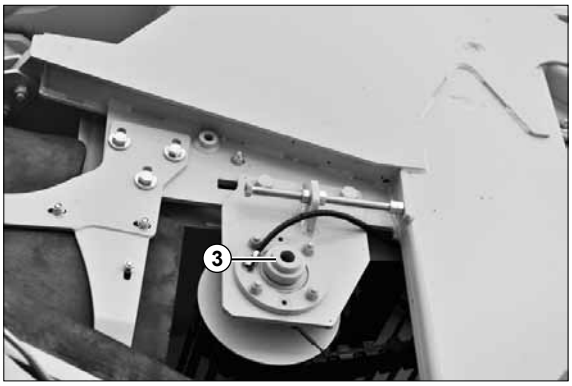
(1) Tightening screw
(2) Tightening roller

If the infeed conveyor has to be retightened, slacken the fastening bolt of the tightening roller **(2)** (to the right and left behind the front wheel, on the bottom of the frame pipe) and pull the tightening roller **(2)** down using the tightening screw **(1).** Ensure that the tightening rollers **(2)** are slid by the same distance on both sides.

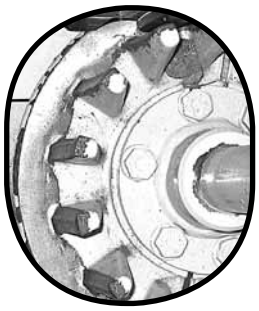
Synchronism

If the infeed conveyor knocks against the side flange of the drive wheels on one side, this can be compensated for by sliding the oil motor retaining fixture **(4)** or drive shaft **(3)**.





7.13.2 Exchanging the infeed conveyor drive wheels (finger disks)



Wear limit of the finger disks reached

Replace the drive wheels at their due time; do not wait until the sieve conveyor skips!

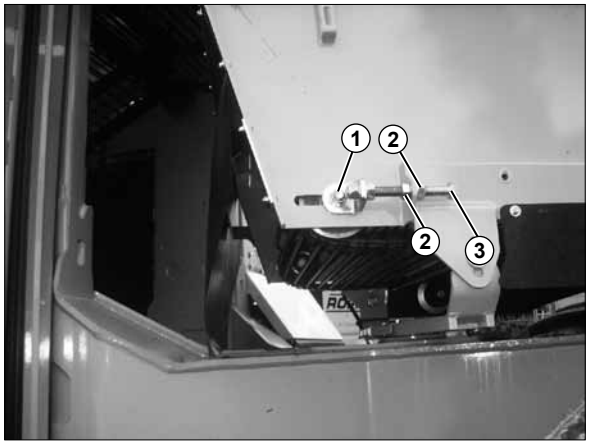
7.14 Recleaner

Depending on equipment. your **euro-Maus4** has a sieve conveyor cleaner or an 8-set pinch roller cleaner.

7.14.1 Sieve conveyor cleaning – maintenance

The cleaning conveyor may not be tightened so that it is taut It should sag slightly between the bearing rollers as the conveyor runs back.

Warning! *Risk of very severe injuries as the result of the cleaning conveyor starting up! Retightening of the cleaning conveyor may only be performed if the machine drive and the engine are switched off. Withdraw the ignition key, keep it in a safe place (carry it on your body!) and switch off the electrical system using the main battery switch.*



(1) Fastening bolt
(2) Locknut
(3) Tightening screw

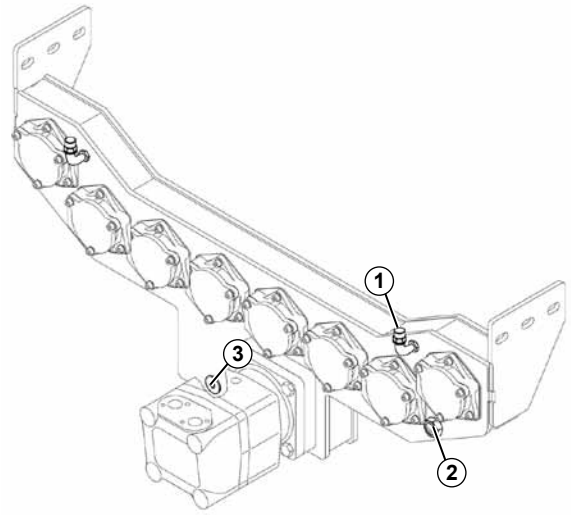
- Slacken the fastening bolts **(1)** of the deflecting rollers at the right and left.
- To retighten the conveyor, slacken the locknuts **(2)** on the two tightening screws **(3)** right and left.
- Turn the locknuts as far as necessary and retighten the locknuts.
- Ensure that you adjust the tightening screws on both sides by the same length, so that the conveyor is evenly tightened.

7.14.2 8-set pinch roller cleaner – maintenance

If the rollers in the pinch roller cleaner are greatly imbalanced, you should, on no account, continue to work with these rollers for a long period since, otherwise, damage must be anticipated on the suspension or the recleaner frame.
The procedure for removing and fitting the pinch rollers is identical to that for removal and fitting of the pinch rollers in the pickup.

Danger! *Risk of very severe injuries as the result off the pinch rollers starting up! Work on the 8-set pinch roller cleaner may only be performed after the machine drive and the engine have been shut off. Withdraw the ignition key and keep it in a safe place (carry it on your body!) Switch off the electrical system using the main battery switch.*
Falling hazard! When carrying out work of any nature on the pinch roller cleaner, always use ladders or climbing aids safe to step on or an approved working platform.

The8-set pinch roller cleaner is driven by an hydraulic motor.
The oil level of the spur gear unit must be checked weekly.
Checking the oil level is performed using the sight glass. If the oil level is above the center of the sight glass, no oil needs to be added.
Replacement of the oil is required after the first 50 operating hours, then annually.
Proceed as follows for the oil change:



(1) Oil filler opening
(2) Sight glass
(3) Oil drain plug

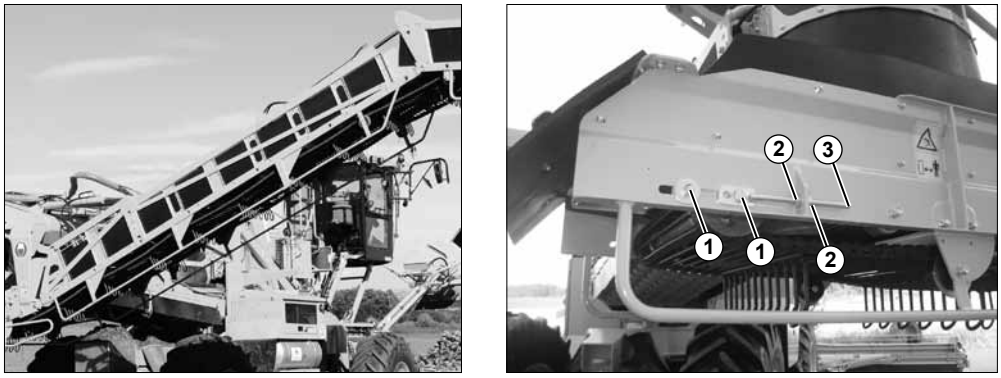
- Change the oil only with the gear unit at operating temperature.
- Place a catch pan of sufficient size underneath.
- Open the oil drain plug and let the old oil drain off.
- When the oil has drained off, insert the oil drain plug and tighten it.
- Add adequate fresh oil through the oil filler opening until the oil level is in the upper area of the sight glass.

Prescribed gear oil: **Gear oil** API GL 5, SAE 90
Filling capacity: approx. 60 liters

7.15 Truck conveyor – maintenance

7.15.1 Truck conveyor belt tightening

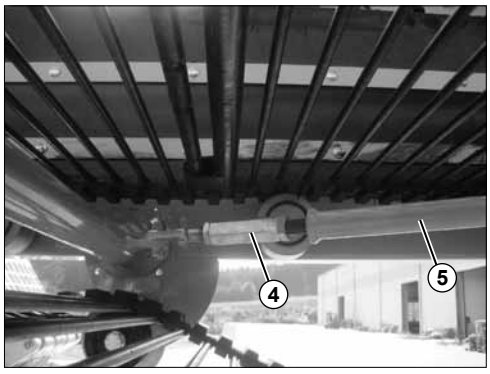
The truck conveyor belt must be retightened if needed. The conveyor belt tension is correctly set if the lower side of the conveyor which returns empty sags approx. 2 - 3 cm between the bearing rollers (with the truck conveyor fully lowered and the truck conveyor articulated section fully extended (truck conveyor almost continuously straight)).



Truck conveyor belt correctly tightened

Proceed as follows for retightening the truck conveyor belt:

- Slacken the fastening bolts(**1**) on the deflecting rollers at the left/right.
- Tighten the nuts (**2**) on the tightening bars (**3**) left/right until the deflecting rollers left/right are slid back adequately.
- Lock the nuts (**2**) on the tensioning bar (**3**) left/right.
- Firmly retighten the fastening bolts **(1)** of the deflecting rollers left/right.
- It is essential that you ensure that both sides of the conveyor are retightened to an equal extent so that the conveyor does not knock against one side and is damaged.



If the truck conveyor belt is skewed, you can compensate for this by adjusting the tensioning nut (**4**) on the diagonal strut (**5**) in the truck conveyor infeed slot.

The side walls of the truck conveyor are made of low-wear plastic panels **(1)**. These are designed so that it is possible to turn them 4 ways quickly and simply if necessary.

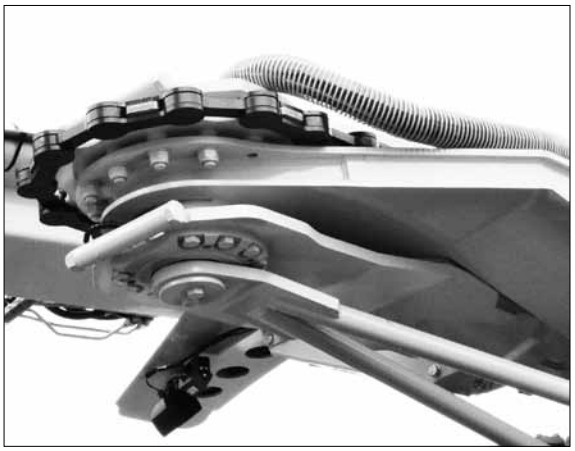
7.15.2 Rotating drives of the swivel arm and truck conveyor

The drive for rotating the swivel arm and the truck conveyor is an hydraulic drive using two chain drives. The chains are tightened automatically via hydraulic cylinders.

Attention

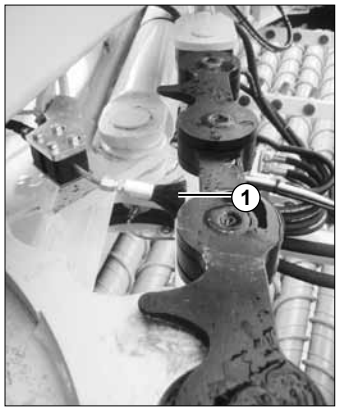
Attention! *Risk of very severe injuries due to chain drives! Work on the rotating drives of swivel arm and truck conveyor may only be performed after the engine has been shut off. Withdraw the ignition key and keep it in a safe place (carry it on your body!). Switch off the electrical system using the main battery switch.*

Falling hazard! *During all work performed on the drives of the swivel arm and the truck conveyor, always use ladders and climbing aids safe to step on or an approved working platform. On no account may you climb around on the machine.*

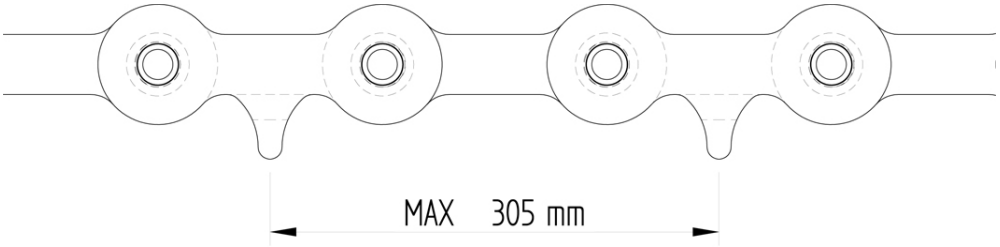


Turning the chain drive, truck conveyor

If necessary, readjust the grease brushes **(1)** and ensure that the contact faces of the chain links on the gearwheel are always coated with grease.

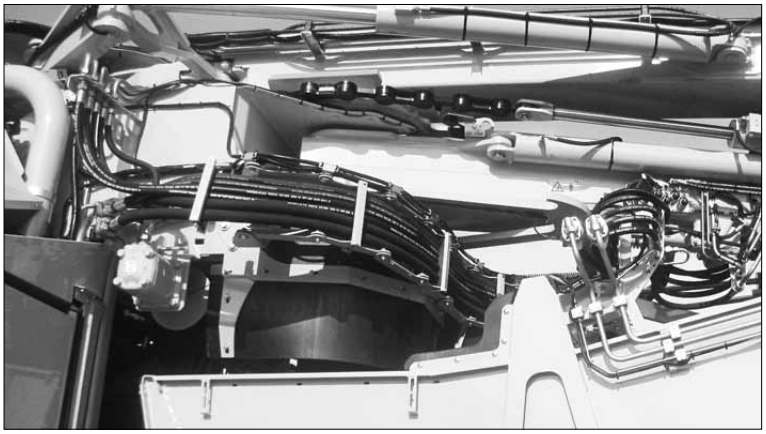


Once per year, check the chain wear as described below and replace the chain immediately the wear limit (305 mm) is reached.



Danger! *Risk of lethal injuries as the result of uncontrolled swivel movements of swivel arm and truck conveyor if the chain on the rotating drive skips. Switch off the machine immediately and have the fault remedied by specialist personnel.*

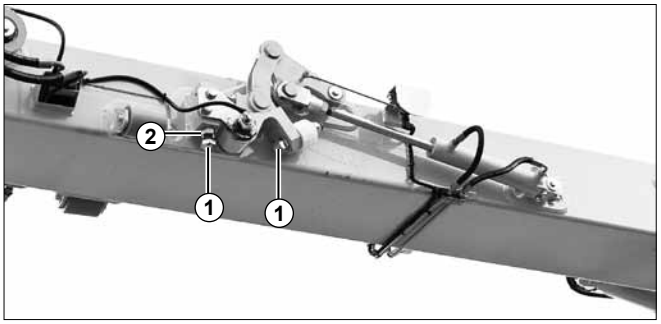
7.15.2.1 Energy ducting chain, chassis to recleaner swivel arm



The pivot points of the energy ducting chain fitted as of model year 2012 are maintenance-free. If squeaking noises occur, the pivot points must be wetted lightly with oil.

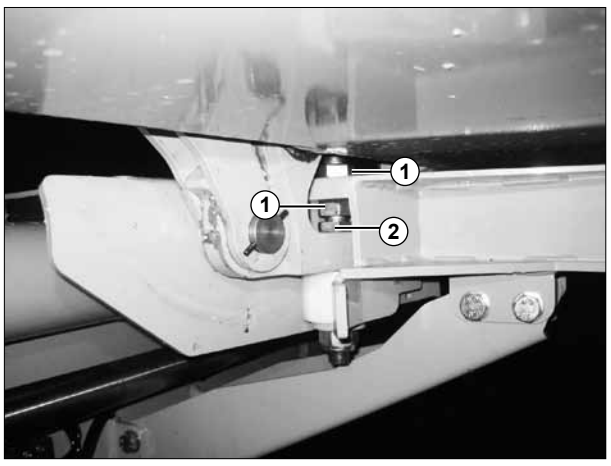
7.15.2.2 Adjusting the stop bolts, counterweight arm locking

As soon as the clamping assembly is no longer taut, the stop bolts (**1**) must be readjusted. In order to do this, slacken the locknuts (**2**) on the stop bolts and readjust the bolts to such an extent that there is no longer any play.



(1) Stop bolt
(2) Locknut

Counterweight arm locking



7.16 Battery maintenance

Check the acid level in the vehicle batteries at least once per week during the season.

Attention! *Risk of chemical burns. Battery acid may cause dangerous chemical burns on the skin and within the respiratory system. When handling acid batteries, always wear appropriate protective clothing (protective goggles, acid-resistant gloves, apron). Avoid skin contact with battery acid. Avoid inhaling acid fumes. When handling batteries, ensure that the workplace is adequately ventilated.. If battery acid comes into contact with the skin, douche the skin surface immediately and copiously with water. Then immediately consult a doctor.*

Where necessary, add adequate distilled water until the electrolyte level is 10 mm above the upper level of the plates.
You can complete this work quickly and safely with the ROPA battery cell filler with automatic level filler function (Item No. 015364).

7.17 Printer (option)

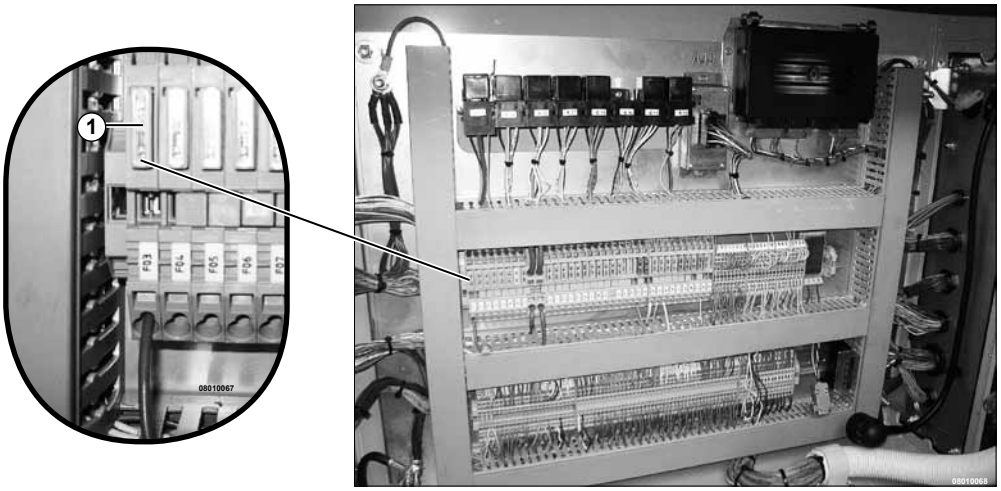
After larger print jobs, depending on the paper quality and detrimental environment effects, it may be necessary to clean the print head, the sensor and the drive roller under certain circumstances, in particular if areas are no longer being printed properly.

- Open the paper tray cover and remove the roll of paper.
- Using a small brush, clean away any dirt on paper, sensor and ripping edge.
- Blow strongly onto the paper tray recess to remove major dust deposits.
- Soak a cotton bud with pure isopropanol alcohol (IPA) and clean the printing strip or use a print head cleaning rod / cleaning card.
- Remove further heavy soiling also using a cotton bud (IPA).

Never use sharp objects for cleaning. This could damage the print head.

7.18 Shutting down for a long period of time

If **euro-Maus4** is to be immobilized for a period of one to four weeks, always switch off the main battery switch. In addition,withdraw fuse F 03 (**1**) in the central electrical system since the timer of the independent heating system is supplied with current from the batteries even if the main battery switch is switched off.



If **euro-Maus4** is to be immobilized for a period of more than four weeks, always perform the following additional work:

- Wash the machine thoroughly. Avoid directly spraying bearings and bearing rollers when doing this.
- Drain off condensation at the five compressed air reservoirs.
- Lubricate all lubricating points on the machine.
- Allow the central lubrication system to run for at least 30 minutes with the drive switched on.
- Spray the complete machine with corrosion protection oil. Ensure that no oil or grease touches the tires.
- Grease all piston rods and the collars of the hydraulic cylinders.
- Park the machine in a dry place, protected from weather – if possible in a closed room or hangar.
- Remove the batteries. The batteries should be stored cool and dry, but protected against subzero temperatures. Before storing, check the electrolyte level and add distilled water if necessary. Completely charge the batteries before storage. During storage, check the battery voltage monthly and recharge the batteries if necessary. Grease the battery terminals using a special terminal grease.

Attention! *Risk of chemical burns. Battery acid may cause dangerous chemical burns on the skin and within the respiratory system. When handling acid batteries, always wear appropriate protective clothing (protective goggles, acid-resistant gloves, apron). Avoid skin contact with battery acid. Avoid inhaling acid fumes. When handling batteries, ensure that the workplace is adequately ventilated.. If battery acid comes into contact with the skin, douche the skin surface immediately and copiously with water. Then immediately consult a doctor.*

Danger! *If acid batteries are incorrectly charged using unsuitable chargers or excessively high charging voltage, this may lead to generation of oxyhydrogen (explosive) gas. Oxyhydrogen (explosive) gas is highly combustible and may explode. Always ensure the correct charging voltage. Ensure that the batteries are charged only in well ventilated locations. Smoking, fire and naked lights are strictly prohibited.*

Service life of the batteries

Note the following in order to maintain startability of the batteries if they are not used for more than 2 weeks:

- Check the electrolyte level. If it is too low, add only distilled water up to the maximum acid level mark.
- The self-discharge rate is approx. 0.2 % of the nominal capacity / day at 20 °C.
- The electrolyte density must be checked at regular intervals to avoid exhaustive discharge. If the electrolyte density is below 1.21 kg/l , the batteries must be recharged. The recommended charging current is 1/10th of the capacity.
- Flat batteries form lead sulphate. Regeneration by recharging is no longer possible.

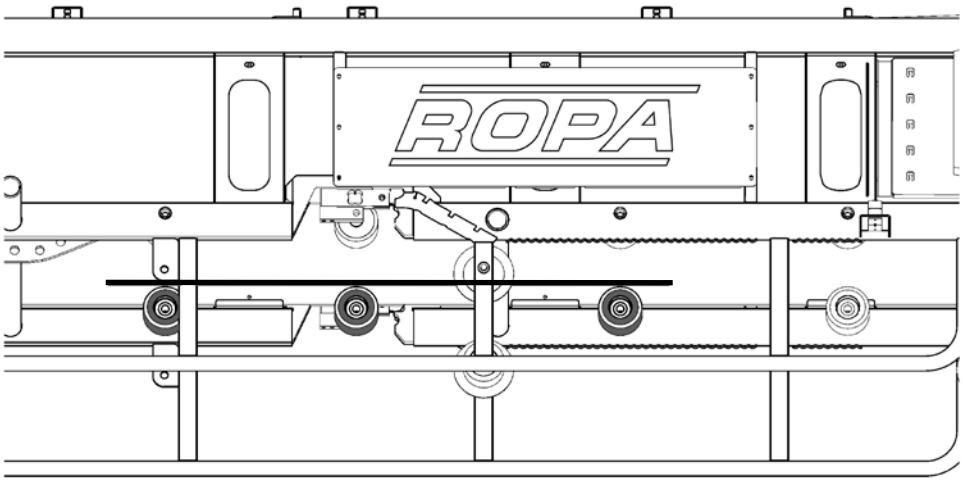
- Guarantee and warranty claims are null and void if batteries have formed sulphate, detectable from the silvery plate coating and from turbid battery electrolyte. They are also excluded from any goodwill since this damage is due to gross negligence during maintenance.

7.19 Scales

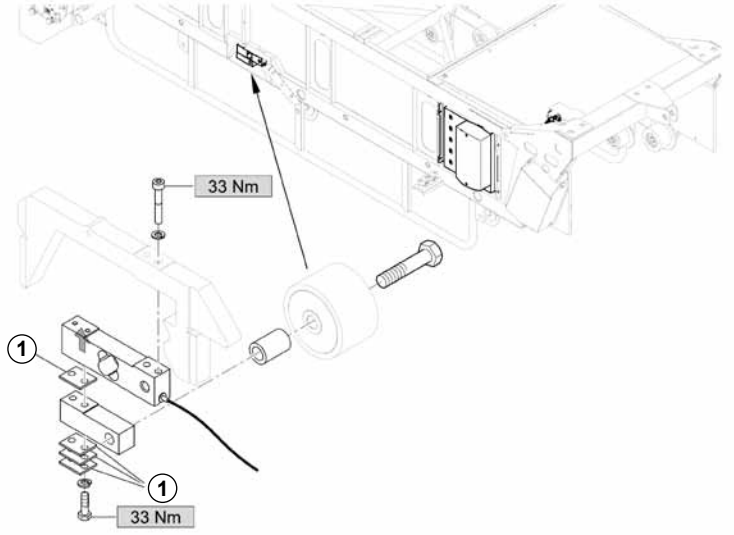
Note

Note! *Under no circumstances may the fastening bolts (M16) of the weighing cells and the related rollers be undone with an impact wrench since this would destroy the weighing cells. This also applies to major forces exerted by wrenches.*

If it is necessary to exchange a roller on a weighing cell, the roller on the second weighing cell must also be renewed. In addition, one roller, both in front of and behind the weighing cell, must be replaced (since the same diameter is required). When fitting these rollers, it is essential to ensure that, in each case, there are three rollers precisely at the same height (see drawing – black line).



When fitting, place a browning rod etc. over the three rollers or stretch a plumb-line across them. Align these rollers to the same height. In order to do this, use the spacer plates (**1**). The four supplied spacer plates (**1**) must be used for compensation. All spacer plates (**1**) not required for compensating for the height between roller holder and weighing cell must be enclosed beneath the bolt heads. If this is not done, the function of the weighing cell is impaired since the end of the fastening bolts contacts the blind hole of the weighing cell.



If it is necessary to exchange a weighing cell, this must be done by authorized servicing personnel.

Chapter 8
Troubleshooting

8 Troubleshooting

Your attention is optically drawn to malfunctions and hazardous situations by warning indications on the color terminal and acoustically by warning sounds. Individual functions may be blocked in case of hazardous situations.

8.1 Safety circuits

The machine provides the greatest possible safety to operator and materials. Safety switches in the cabin block individual functions of the machine when the operator leaves the cabin. If any function cannot be executed from the cabin or if switches are blocked, first check if the left joystick console has been swung down, the rear platform wall has been swung up and the engine housing cover and the safety guard rail on the boarding steps are closed.
If the malfunction cannot be remedied, then refer to the respective sections of this operating manual for the components concerned, respectively, non-functional components. You will find instructions on safety circuits and possible reasons for a malfunction there.

Warning! *Hazard of severest injuries or damage to the machine. Never render safety devices, safety interlocks or safety circuits inoperable. This can lead to very severe injuries. Never perform functional tests if you are not fully informed about the scope and consequences of such a test. When troubleshooting, respectively, when remedying faults, ensure that a second reliable person is present (if necessary) and that such person is familiar with the machine to the extent that he or she may immediately shut down the machine as soon as danger is imminent. In case of the slightest doubt, call in specialist personnel trained accordingly or enquire with service personnel from ROPA. Do not perform any repairs on the machine if you do not have the required specialist knowledge and experience.*

If you should be able to contact your dealer or the manufacturer by radio or cell phone, then more extensive fault diagnostics is possible using specific diagnostic menus on the colour terminal. For safety reasons, individual menus are blocked for the operator. If equipment is improperly handled, then people could receive life-threatening injuries or heavy damage could be caused to the machine, which would have the consequence of costly repairs.

8.2 Electric system

8.2.1 Melting fuses

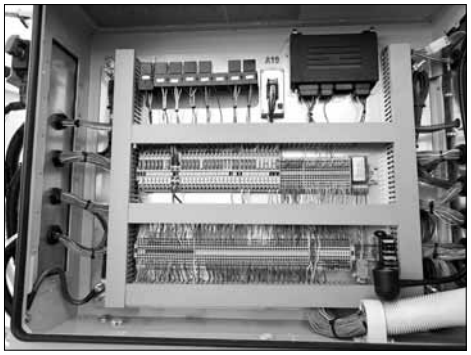
The electric fuses are located on the radio console, the seat console in the driver's cabin and in the switching cabinet of the central electric system, to the right outside on the cabin platform.

In general, **euro-Maus4** employs commercially available flat plug-in fuses (melting fuses).

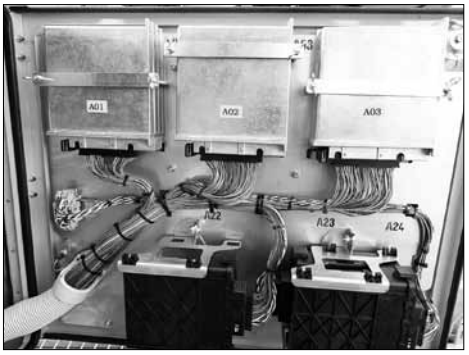
Labels on the inside of the metal cover designate the fuses.

Additionally, there are three electronic miniature circuit-breakers (cut-outs) in the plug-in sockets of the reserve fuse holder of the central electrical system.

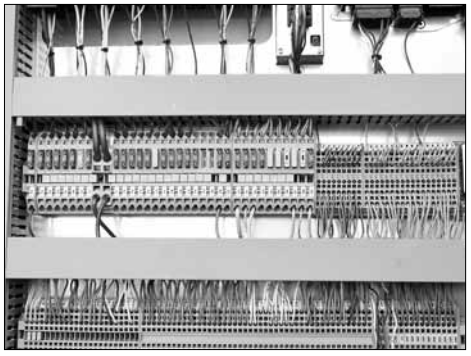
These electronic cut-outs are not integrated in the electric circuits and may therefore be used by you in searching for faults. For this purpose, plug in a suitable electronic automatic cut-out in the socket for the blown fuse. In case of overload (e.g. short circuit), the automatic cutout is triggered. The electronic automatic cut-out can be reactivated by pressing on the reset button.



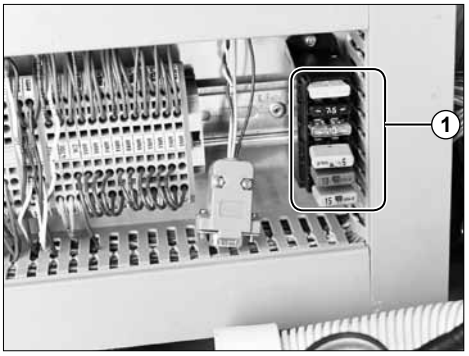
Central electric cabinet



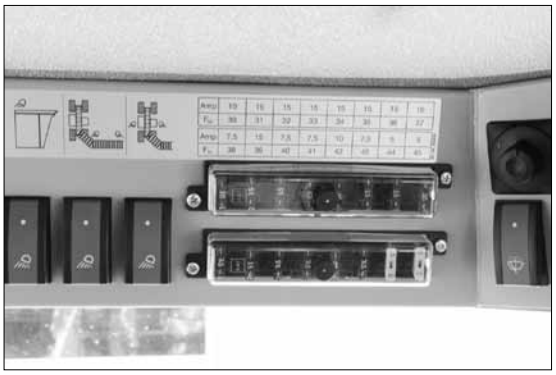
Cover of the central electric system cabinet



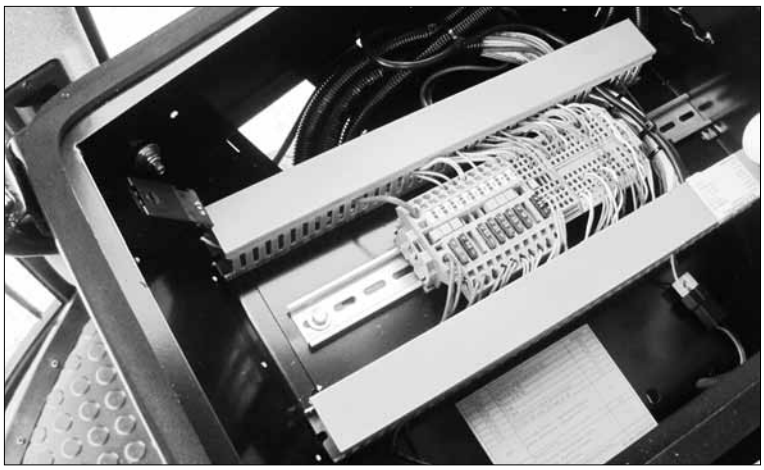
Fuses F03 to F69
in the central electric system cabinet



*Electronic cut-outs (**1**) for fault search*

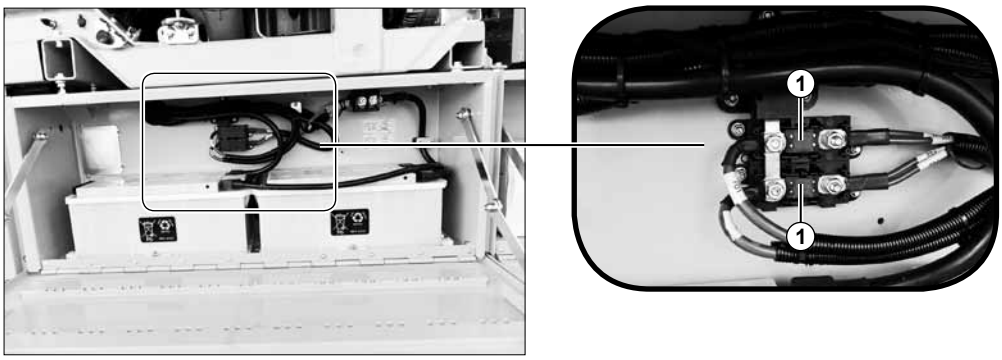


Fuses F 30 to F 45 in the radio console



Fuses F 50 to F 110 in the seat console

The battery box contains the main fuses (**1**) (Mega Fuse fuses). F 01 supplies the central electric system and the seat console of the cabin, F 02 the radio console and the work spotlights. Whether these two fuses are in working condition can only be detected using a measuring device (circuit indicator).



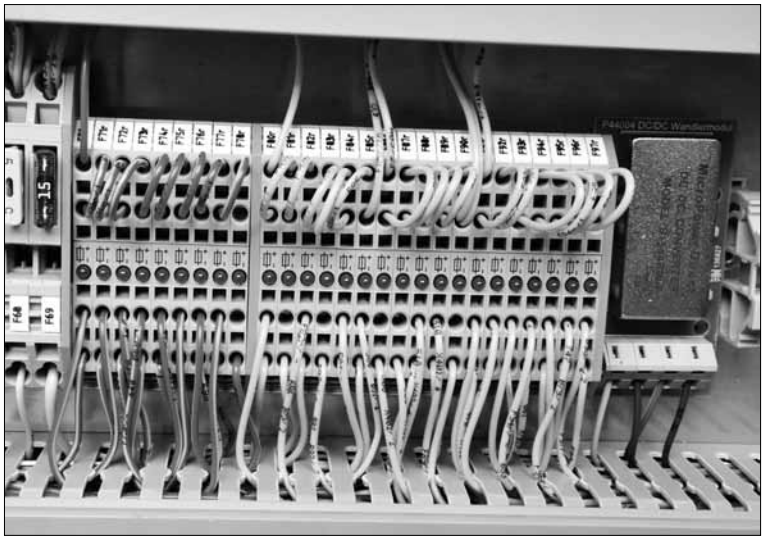
8.2.2 Schedule of fuses (melting fuses)

Schedule of fuses for ROPA e-M4 from year 2010			
Version 16 August 2012			
No.	**Ampere**	**Function**	**Pos. in the machine**
Main power supply, screw-in Littlefuse MEGA fuses			
F01	125	Supply for central electric system X1	Battery case
F02	125	Supply for lighting radio console	Battery case
In central electric cabinet			
F03	15	Main battery switch, boarding steps lighting, timer for independent heating system	in central electric cabinet
F04	15	Trm. 30 ADM3 (A403)	in central electric cabinet
F05	15	Trm. 30 computer B (A02)	in central electric cabinet
F06	15	Trm. 30 computer B (A02)	in central electric cabinet
F07	15	Trm. 30 computer C (A03)	in central electric cabinet
F08	15	Trm. 30 computer C (A03)	in central electric cabinet
F09	20	Trm. 30 MR (A435)	in central electric cabinet
F10	15	Power supply PWM outputs A22	in central electric cabinet
F11	15	Power supply PWM outputs A23	in central electric cabinet
F12	15	Power supply PWM outputs A24	in central electric cabinet
F13	15	24V sockets, rear	in central electric cabinet
F14	15	Heating ventilator for operation of the independent heating system	in central electric cabinet
F15	15	Independent heating system KI 30	in central electric cabinet
F16	3	Control device air conditioning system during operation of the independent heating system	in central electric cabinet
F17	15	Engine housing lighting, 24 V socket, light for central electric cabinet	in central electric cabinet
F18	15	Trm. 30 computer A (A01)	in central electric cabinet
F19	15	Trm. 30 computer A (A01)	in central electric cabinet
F20	15	Trm.30 SCR frame module (A95)	in central electric cabinet
F21	15	Heating for fuel prefilter	in central electric cabinet
F22		Reserve	
F23		Reserve	
F28	7,5	Parking light, right	in central electric cabinet
F29	7,5	Parking light, left; instrument lighting	in central electric cabinet
F60	15	Front window wiper	in central electric cabinet
F61	15	Trm.15 Heating fan	in central electric cabinet
F62	15	Air conditioning compressor	in central electric cabinet
F63	15	Central lubrication, air dryer, backup lights (driving backward)	in central electric cabinet
F64	3	Trm.15, Generators	in central electric cabinet
F65	3	Trm.15 Control device air conditioning system (A19)	in central electric cabinet
F66	5	15V voltage transformer for sensors, oil tank sensor B81/82	in central electric cabinet
F67	3	Scales, CAN BUS Pfreundt	in central electric cabinet
F68	5	Trm.15 MR/SCR frame module/position sensor for swivel arm	in central electric cabinet
F69	15	Heating for fuel prefilter/battery relay detection Trm.15	in central electric cabinet

No.	Ampere	Function	Pos. in the machine
Cabin radio console			
F30	10	ASW (work spotlight) camera, central mark	in radio console, upper
F31	15	ASW (work spotlight) roof, lower	in radio console, upper
F32	15	ASW (work spotlight) roof center	in radio console, upper
F33	15	ASW (work spotlight) roof, outside	in radio console, upper
F34	15	ASW (work spotlight) roof, rear	in radio console, upper
F35	15	ASW (work spotlight) for cleaning, truck conveyor	in radio console, upper
F36	7,5	ASW (work spotlight) right/ASW (work spotlight) tank, front	in radio console, upper
F37	10	Rotating beacons	in radio console, upper
F38	7,5	Mirror heating/mirror adjustment right/left	in radio console, lower
F39	15	Internal lamps, socket 24V, voltage transformer	in radio console, lower
F40	7,5	Terminal 15 RK, independent heating system timer	in radio console, lower
F41	7,5	Window wiper, left	in radio console, lower
F42	10	Window wiper, right and rear	in radio console, lower
F43	7,5	Trm.30 in front of main switch for independent heating system	in radio console, lower
F44	5	Public address system, 12V for central electric system	in radio console, lower
F45	5	12V outlets	in radio console, lower
in console at driver's seat			
F50	10	Hazard warning system Trm.30	Seat console
F51	7,5	Terminal Trm.30	Seat console
F52	Not used	RESERVED Trm.30/ only with option RABS-SZ	Seat console
F53	10	Dimmed headlight	Seat console
F54	10	High beam light	Seat console
F55	10	Air seat, compressor/video system	Seat console
F56	10	Main switch steering	Seat console
F57	10	Steering column switch, horn, turn indicator, window wiper control, window washer pump, hazard warning system Trm.15	Seat console
F58	Not used	RESERVE Trm.15	Seat console
F59	7,5	Trm.15, overall electronics, ESRs, terminal, joystick, operating panel, engine electronics	Seat console
F110	3	Trm.15 computer A (A01)	Seat console

8.2.3 Electronic cut-outs

The fuses (F 70r to F 100r) are implemented as self-resetting electronic cut-outs. If the red light emitting diode (LED) of a cut-out is lit, then the cut-out is overloaded and power supply to the component connected is interrupted.



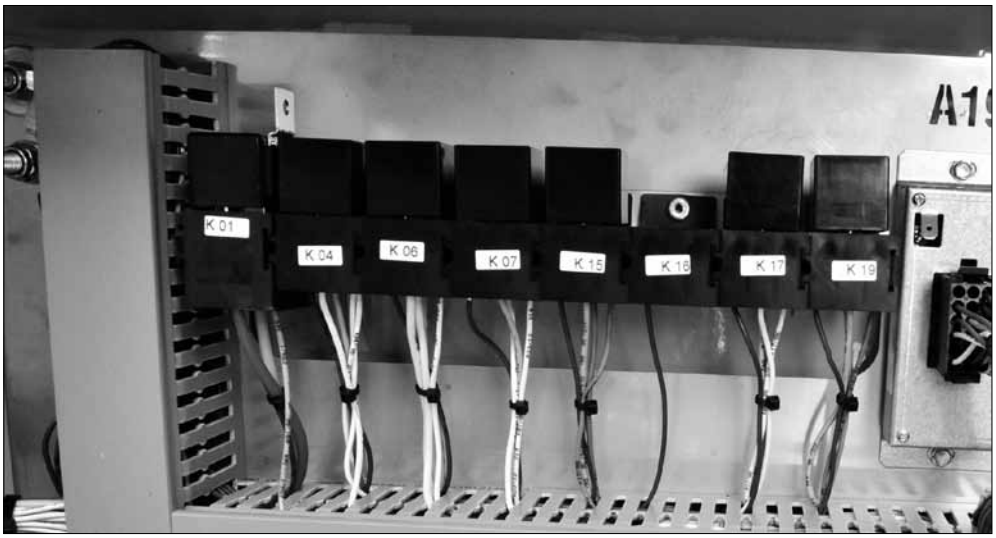
8.2.4 Schedule of fuses / electronic cut-outs

Electronic automatic-resetting cut-outs with LED			
No.	**f. comp.**	**Function**	**Pos. in the machine**
Sensors operating at 15 volts			
F70r	B26	DS traction drive, forward, 15V	in central electric cabinet, 15 V
	B61	DS braking pressure service brake	
F71r	B20	DS Pickup rollers 15V	in central electric cabinet, 15 V
	B21	DS pinch rollers 4-set (quadruple), 15V	
F72r	B22	DS Recleaner, 15V	in central electric cabinet, 15 V
	B27	DS Additional axles, 15V	
F73r	B68	DS relief pickup, right, 15V	in central electric cabinet, 15V
	B69	DS relief pickup, left, 15V	
F74r	B377	DS Fuel pressure, 15V	in central electric cabinet, 15V
	B60	DS Pressure sensor for air tank, 15V	
F75r	B84	DS traction drive, reverse, 15V	in central electric cabinet, 15V
	B85	DS PS clutch PVG	
F76r	B80	DS Emergency steering pump, 15V	in central electric cabinet, 15V
	B94	Sensor for telescoping pile pickup	
F77r	B46	Fuel tank level sensor, 15V	in central electric cabinet, 15V
	B67	DS Relief for pickup, center	
F78r	B83	DS Pickup conveyor rollers, 15V	in central electric cabinet, 15V

Sensors operating at 8.5 volts			
	B40	Temperature of hydaulic fluid cooler	directly by A02/23, over R09
F80r	B01	Front axle wheel angle sensor, 8.5V	in central electric cabinet, 8.5 V
	B86	Sensor for counterweight arm right/left 8.5V	
F81r	B02	Rear axle wheel angle sensor, 8.5V	in central electric cabinet, 8.5 V
		Not used	
F82r	B73	Cabin height	in central electric cabinet, 8.5 V
	B87	Sensor for counterweight up/down 8.5V	
F83r	B32	Sensor for accelerator pedal (safety), 8.5V	in central electric cabinet, 8.5 V
		Not used	
F84r	B34	Sensor for truck conveyor height, 8.5V	in central electric cabinet, 8.5 V
	B35	Sensor for truck conveyor articulation, 8.5V	
F85r	B51	Sensor for pump distr. gear lubrication	in central electric cabinet, 8.5 V
	B47	Driving speed	
Sensors working at 8.5 Volt, supply by A03			
F86r	B62	Speed sensor for pickup rollers, right, 8.5V	in central electric cabinet, 8.5 V
		Not used	
F87r	B63	Speed sensor for pickup rollers, left, 8.5V	in central electric cabinet, 8.5 V
		Not used	in central electric cabinet, 8.5 V
F88r	B64	Speed sensor for 4-set pinch rollers, right, 8.5V	in central electric cabinet, 8.5 V
	B10	Sensor for pickup depth, 8.5V	in central electric cabinet, 8.5 V
F89r	B65	Speed sensor for 4-set pinch rollers, left, 8.5V	in central electric cabinet, 8.5 V
	B66	Recleaning speed, 8.5V	
F90r	B09	Sensor for accelerator pedal (normal work), 8.5V	in central electric cabinet, 8.5 V
		Not used	
F100r		8.5V for driver's seat signal generation	in console, 8.5 V
Sensors working at 8.5 Volt, supply by A01			
F91r	B74	Speed sensor for conveyor rollers, right, 8.5V	in central electric cabinet, 8.5 V
F91r	B75	Speed sensor for conveyor rollers, left, 8.5V	in central electric cabinet, 8.5 V
F92r	B76	Fold pickup, R, 8.5 V	in central electric cabinet, 8.5 V
	B77	Fold pickup, L, 8.5V	in central electric cabinet, 8.5 V
F93r	B72	Infeed conveyor speed, 8.5V	in central electric cabinet, 8.5 V
	B08	Sensor for lateral pile pickup, 8.5V	in central electric cabinet, 8.5 V
F94r	B70	Sensor for pile pickup height	in central electric cabinet, 8.5 V
	B71	Speed sensor for truck conveyor, 8.5V	
F95r	B88	Counterweight arm lock, 8,5V	in central electric cabinet, 8.5 V
	B89	Swiveling recleaner, rear, 8.5V	
F96r	B79	Sensor for rotatable seat, 8.5V	in central electric cabinet, 8.5 V
F97r	B95	Sensor for turning residual beet pickup, 8.5V	in central electric cabinet, 8.5 V
	B96	Filling level sensor for water tank, 85V	in central electric cabinet, 8.5 V

8.3 Relay list

DIN	Component	Position in the machine	Remarks	Item No.
K01	Relay main load, Trm.15	In central electric cabinet	Rating 70 A, load relay electric	320099
K03	Relay turn indicator	in seat console	Flasher unit	320021
K04	Relay fan module/ independent heating system	In central electric cabinet	only with independent heating system	320154
K06	Relay wiper	In central electric cabinet	switches the front wiper motor	320573
K07	Relay central lubrication	In central electric cabinet	Switches the central lubricating pump	320154
K15	Relay for backup (reverse driving) lights	In central electric cabinet	for backup (reversing) beeper and reversing spotlights	320154
K17	Relay for air conditioning control/independent heating system	In central electric cabinet	for switching the air conditioning control device from Trm.15 to Trm.30	320154
K19	Relay for air conditioning compressor	In central electric cabinet	for switching the air conditioning compressor	320154
K43	Battery relay	In battery case	Electrically controlled main battery switch	320762



Relay in the switching cabinet of central electrics

8.4 Color code for electric wiring

Color code for electric wiring

brown	Ground
red	Terminal 30 (continuous current)
pink	Terminal 15 (ignition current)
yellow	8.5 Volt
violet	12 Volt
red/yellow	15 Volt
blue	Digital signal lines (ON/OFF)
green	Analog signal lines (modifiable sensor values)
grey	All lamps "E" light bulbs and "H" warning devices (buzzer)
white	Electrical motors and internal wiring, miscellaneous
orange	Control lines for all valves and solenoids (all "Y")

Special feature: Twisted cable
White (twisted) = CAN-high
Brown (twisted) = CAN-low
Twisted together = CAN-BUS data line

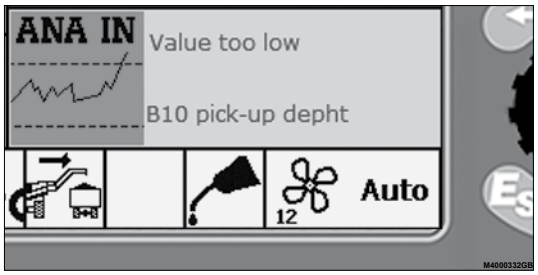
8.5 Troubleshooting using the color terminal

Some malfunctions are indicated on the color terminal by warning symbols.
In case of electrical or electronic problems, the components concerned are shown, naming the component.

Example:

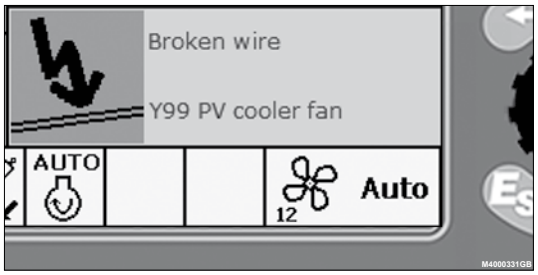
= Communication problem with control unit
A03 = computer EST C (see table below).

= Analog signal in inadmissible range.



On the color terminal, to the right of the warning symbol, the text field shows which sensor signal is out of range.

= Line discontinuity or short-circuit was determined.



To the right, beside the warning icon, an indication is made on the color terminal whether this concerns a line break or a short circuit.
You are also informed about which component is concerned.

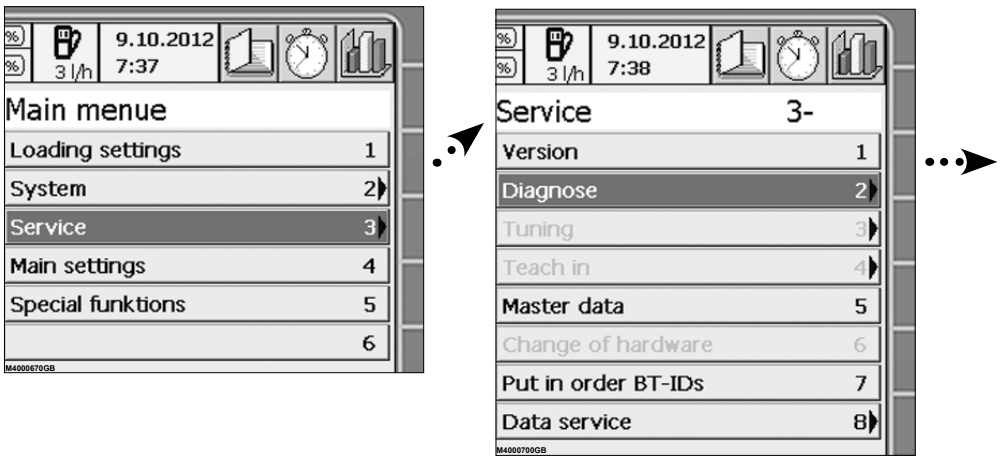
= Internal memory error EEPROM.
Error on readout of parameters.

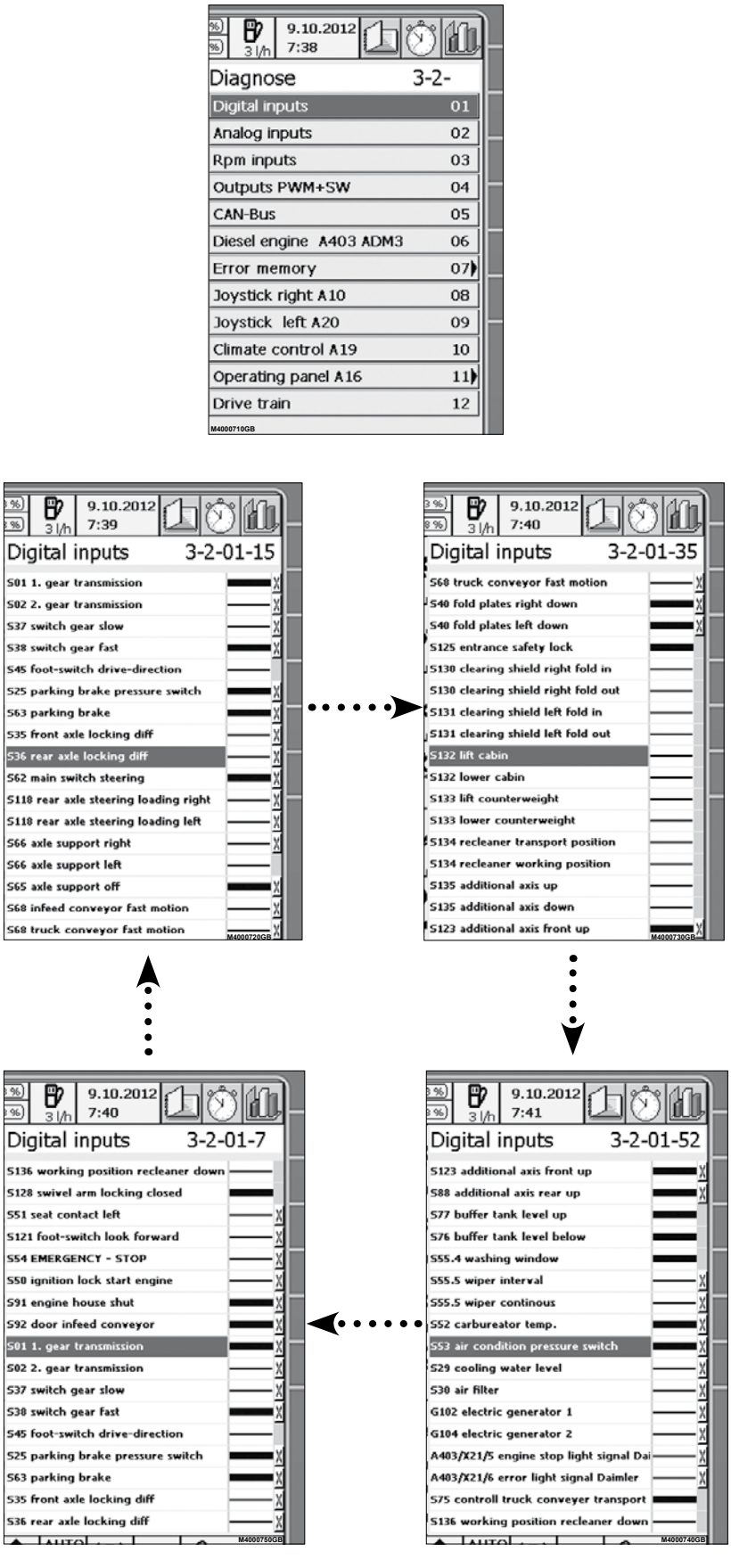
8.5.1 Schedule of all electronic modules of the e-M4

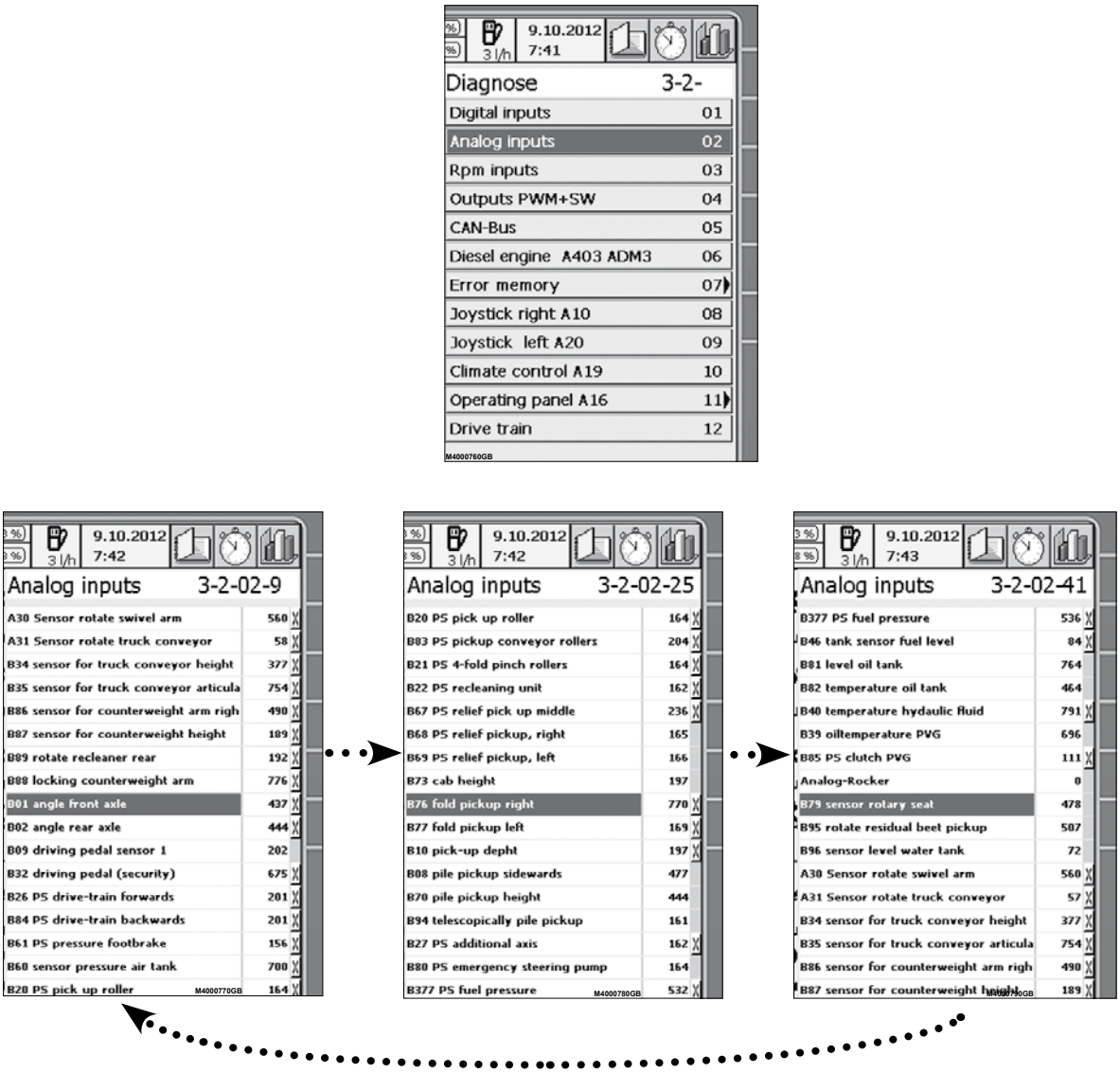
DIN	Component	Position in the machine	Remarks	Item No.
A = Components				
A01	ESR A	in central electric cabinet, inside and above at the lid	Computer with 2 CAN-Bus	320615
A02	ESR B	in central electric cabinet, center and above at the lid	Computer with 2 CAN-Bus	320615
A03	ESR C	in central electric cabinet, outside and above at the lid	Computer with 2 CAN-Bus	320615
A07	Color terminal	in the seat console, on top	Color terminal, manufacturer: Müller-Elektronik	320759
A08	Control device with independent heating system	to independent heating system	Thermo 90 ST.25 D 24V	320720
A09	Radio	in radio console		320057
A10	Joystick CAN e-M4, right	in the seat console, on CAN	covered with Gessmann grip molding	320760
A11	Printer	in seat console	Optional equipment	320764
A13	Speed module for fan	at heating fan behing seat	For controlling fan speed	320660
A16	Operating panel section	in the console, right	with 12 stage switch	320682
A19	Air conditioning control device	in central electric on the base plate	for temperature control in the cab	320659
A20	Joystick CAN e-M4, left	in the console left, may be swung up, on CAN	covered with Gessmann grip molding	320761
A22	Computer, I/O module	in central electrics at the lid, on the hinge side	for transmission and block switching	320716
A23	Computer, I/O module	in central electric cabinet at the lid, closure side, internal	for diverse functions	320716
A24	Computer, I/O module	in central electric cabinet at the lid, on the closure side	for feed valve, fast speeds, axle support	320716
A26	Scales, Pfreundt	at truck conveyor articulation (optional)	for weight detection	320730
A27	GPS antenna	left on the joystick console	for position detection (option, also on RABS)	320738
A28	Computer, RF mark transponder	on the inside of the terminal housing on the outside wall	Optional, only with option RABS-SZ	320736
A29	CAN converter	inside the terminal housing	Optional, only with option RABS-SZ+printer	320753
A30	Position sensor, swivel arm	shorter cylinder, at the right on swivel arm	MTS measuring system, CAN-Open	.276231
A31	Position sensor for truck conveyor	longer cylinder, at the right on swivel arm	MTS measuring system, CAN-Open	.276233
A95	SCR frame module, Mercedes	above the 4-speed transmission	From Mercedes, communication via HS-CAN	Mercedes
A113	NOx sensor	next to SCR catalytic converter, computer screwed on behind		Mercedes
A403	ADM3 module, Mercedes	in central electric cabinet base plate, top, rear	From Mercedes, communication via T-CAN	303139
A435	MR (PLD)	on the engine block, FR inside	Engine computer for Mercedes OM926 LA engine	Mercedes

8.5.2 Overview of diagnostic menus

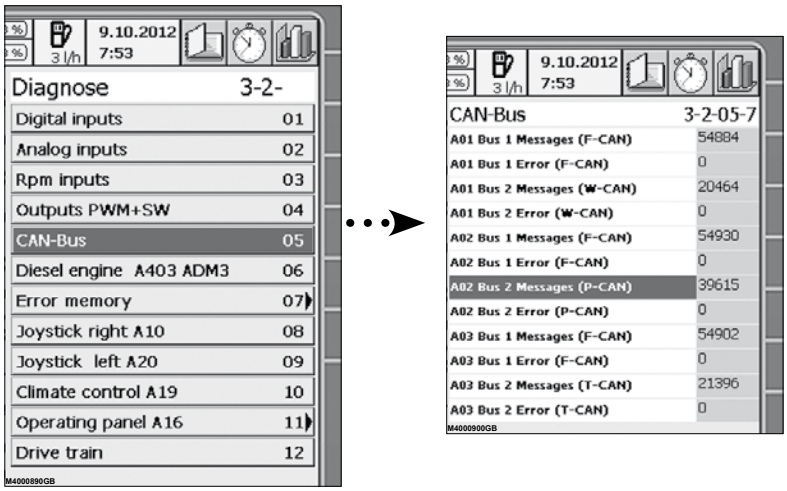
Below, please find illustrations of the available diagnostics menus on the color terminal. They facilitate malfunctions diagnostics for service personnel, if you call up the corresponding menu items after being request by service personnel and notify the values or icons displayed to service personnel.

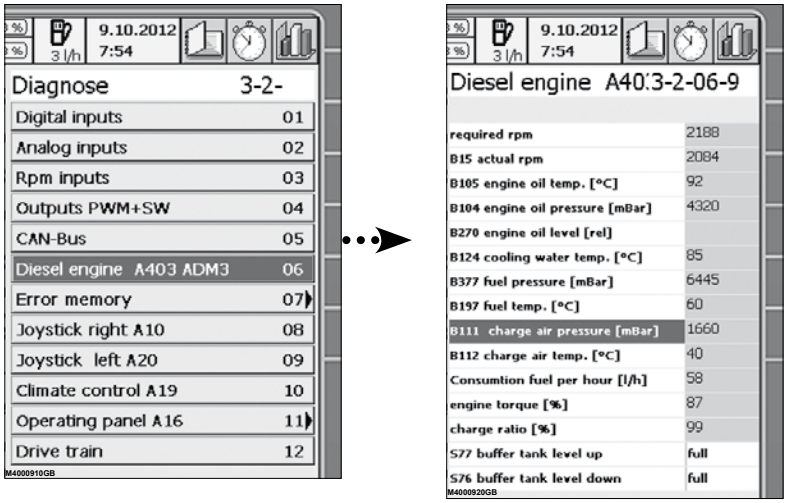


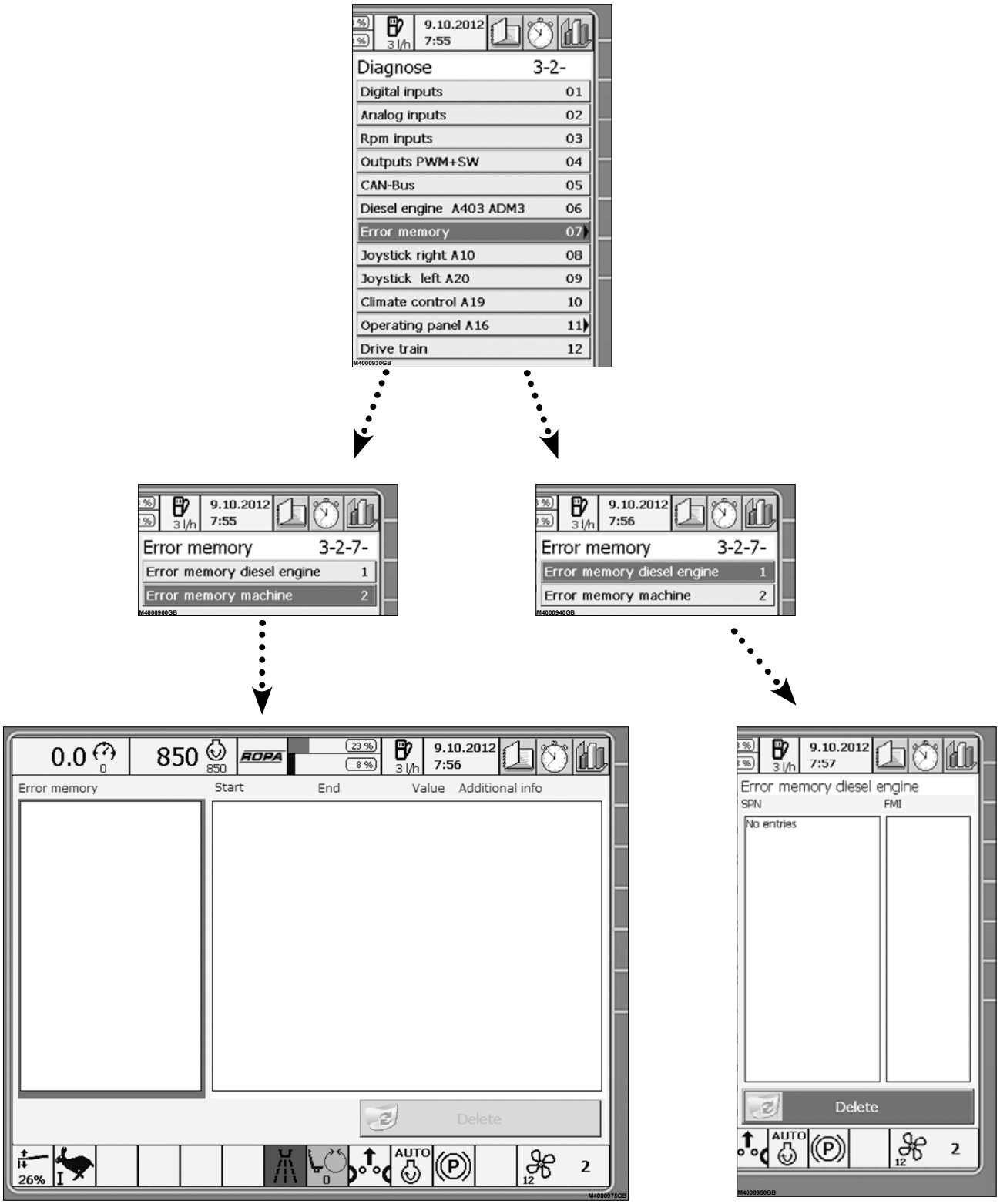

9.10.2012
7:38
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000710GB
9.10.2012
7:39
Digital inputs 3-2-01-15
S01 1. gear transmission
S02 2. gear transmission
S37 switch gear slow
S38 switch gear fast
S45 foot-switch drive-direction
S25 parking brake pressure switch
S63 parking brake
S35 front axle locking diff
S36 rear axle locking diff
S62 main switch steering
S118 rear axle steering loading right
S118 rear axle steering loading left
S66 axle support right
S66 axle support left
S65 axle support off
S68 infeed conveyor fast motion
S68 truck conveyor fast motion
M4000720GB
9.10.2012
7:40
Digital inputs 3-2-01-35
S68 truck conveyor fast motion
S40 fold plates right down
S40 fold plates left down
S125 entrance safety lock
S130 clearing shield right fold in
S130 clearing shield right fold out
S131 clearing shield left fold in
S131 clearing shield left fold out
S132 lift cabin
S132 lower cabin
S133 lift counterweight
S133 lower counterweight
S134 recleaner transport position
S134 recleaner working position
S135 additional axis up
S135 additional axis down
S123 additional axis front up
M4000730GB
9.10.2012
7:40
Digital inputs 3-2-01-7
S136 working position recleaner down
S128 swivel arm locking closed
S51 seat contact left
S121 foot-switch look forward
S54 EMERGENCY - STOP
S50 ignition lock start engine
S91 engine house shut
S92 door infeed conveyor
S01 1. gear transmission
S02 2. gear transmission
S37 switch gear slow
S38 switch gear fast
S45 foot-switch drive-direction
S25 parking brake pressure switch
S63 parking brake
S35 front axle locking diff
S36 rear axle locking diff
M4000750GB
9.10.2012
7:41
Digital inputs 3-2-01-52
S123 additional axis front up
S88 additional axis rear up
S77 buffer tank level up
S76 buffer tank level below
S55.4 washing window
S55.5 wiper interval
S55.5 wiper continous
S52 carbureator temp.
S53 air condition pressure switch
S29 cooling water level
S30 air filter
G102 electric generator 1
G104 electric generator 2
A403/X21/5 engine stop light signal Dai
A403/X21/6 error light signal Daimler
S75 controll truck conveyer transport
S136 working position recleaner down
M4000740GB

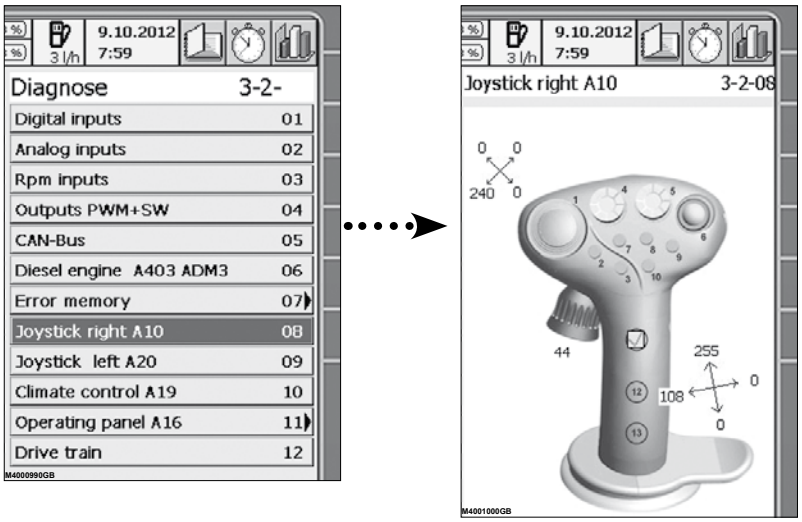

9.10.2012
7:41
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000760GB
9.10.2012
7:42
Analog inputs 3-2-02-9
A30 Sensor rotate swivel arm 560
A31 Sensor rotate truck conveyor 58
B34 sensor for truck conveyor height 377
B35 sensor for truck conveyor articula 754
B86 sensor for counterweight arm righ 490
B87 sensor for counterweight height 189
B89 rotate recleaner rear 192
B88 locking counterweight arm 776
B01 angle front axle 437
B02 angle rear axle 444
B09 driving pedal sensor 1 202
B32 driving pedal (security) 675
B26 PS drive-train forwards 201
B84 PS drive-train backwards 201
B61 PS pressure footbrake 156
B60 sensor pressure air tank 700
B20 PS pick up roller 164
M4000770GB
9.10.2012
7:42
Analog inputs 3-2-02-25
B20 PS pick up roller 164
B03 PS pickup conveyor rollers 204
B21 PS 4-fold pinch rollers 164
B22 PS recleaning unit 162
B67 PS relief pick up middle 236
B68 PS relief pickup, right 165
B69 PS relief pickup, left 166
B73 cab height 197
B76 fold pickup right 770
B77 fold pickup left 169
B10 pick-up depht 197
B08 pile pickup sidewards 477
B70 pile pickup height 444
B94 telescopically pile pickup 161
B27 PS additional axis 162
B80 PS emergency steering pump 164
B377 PS fuel pressure 532
M4000780GB
9.10.2012
7:43
Analog inputs 3-2-02-41
B377 PS fuel pressure 536
B46 tank sensor fuel level 84
B81 level oil tank 764
B82 temperature oil tank 464
B40 temperature hydaulic fluid 791
B39 oiltemperature PVG 696
B85 PS clutch PVG 111
Analog-Rocker 0
B79 sensor rotary seat 478
B95 rotate residual beet pickup 507
B96 sensor level water tank 72
A30 Sensor rotate swivel arm 560
A31 Sensor rotate truck conveyor 57
B34 sensor for truck conveyor height 377
B35 sensor for truck conveyor articula 754
B86 sensor for counterweight arm righ 490
B87 sensor for counterweight height 189
M4000790GB
9.10.2012
7:44
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000800GB
9.10.2012
7:45
Rpm inputs 3-2-03-1
B62 speed pick up rollers righ 4478 0
B63 speed pick up rollers left 4503 0
B74 speed conveyor rollers ri 4439 0
B75 speed conveyor rollers le 4505 0
B64 speed 4-fold pinch rollers 4459 0
B65 speed 4-fold pinch rollers 4455 0
B72 speed infeed conveyor 4444 0
B66 speed recleaning 4450 0
B71 speed truck conveyor 24113 0
B51 PVG greasing 1304247 187
B47 speed driving motor 1 0
M4000810GB

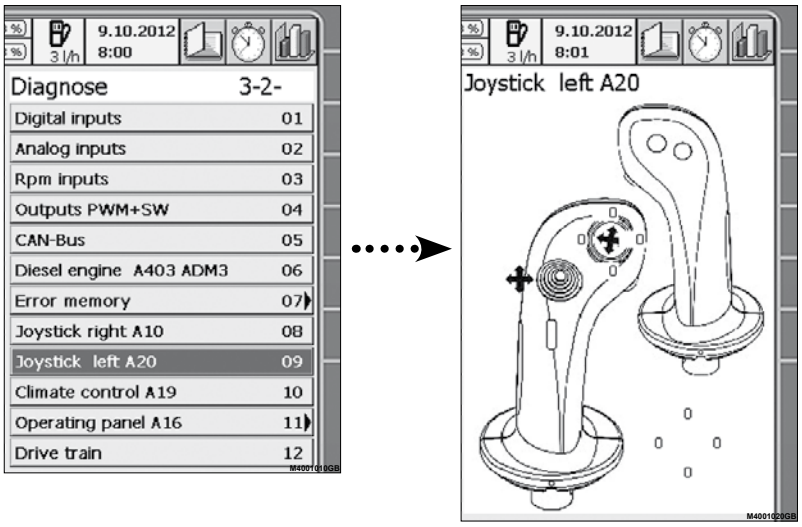
9.10.2012 7:46
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000820GB
9.10.2012 7:47
Outputs PWM+SW 3-2-04-9
Y01 MV machine on 0 800
Y14 PV pick up rollers forward 0 372
Y15 PV pick up rollers reverse 0 0
Y128 PV conveyor rollers forward 0 507
Y129 PV conveyor rollers reverse 0 0
Y62 PV 4-fold pinch rollers forward 0 468
Y63 PV 4-fold pinch rollers reverse 0 0
Y08 PV recleaning pump forward 0 312
Y05 PV recleaner reverse 0 0
Y09 PV infeed conveyor 0 558
Y136 PV truck conveyor 0 579
Y03 MV infeed conveyor fast motior 0 0
Y04 MV truck conveyor fast motion 0 0
Y33+Y03 release drive-train 0 -1
Y10 PV driving pump forward 0 264
Y11 PV driving pump backward 0 0
M4000830GB
9.10.2012 7:50
Outputs PWM+SW 3-2-04-24
Y11 PV driving pump backward 0 0
Y12 PV driving motor 0 0
Y121 MV 1. gear transmission 0 450
Y122 MV 2. gear transmission 0 0
Y123 MV transmission slow (turtle) 0 0
Y124 MV transmission fast (rabbit) 0 400
Y119 MV front axle locking diff 0 0
Y120 MV rear axle lockin diff 0 0
Y72 MV rotary seat brake 0 0
Y99 PV cooler fan pump 0 615
Y16 MV cooler fan reverse 0 0
Y133 SV lock LS-relief 0 0
Y134 PV counterweight right 0 0
Y135 PV counterweight left 0 0
Y130 SV rotate swivel arm 0 0
Y18 PV swivel arm R rotate 0 0
M4000840GB
9.10.2018 7:51
Outputs PWM+SW 3-2-04-39
Y18 PV swivel arm R rotate 0 0
Y19 PV swivel arm L rotate 0 0
Y131 SV rotate truck conveyor 0 0
Y20 PV truck conveyor R rotate 0 21
Y21 PV truck conveyor L rotate 0 0
Y24 PV truck conveyor lift 0 0
Y25 PV truck conveyor lower 0 555
Y73 SV truck conveyor lower 0 0
Y26 PV pick up lift 0 0
Y27 PV pick up lower 0 0
Y138 SV floating position pickup cer 0 0
Y28 PV fold pickup right 0 0
Y29 PV unfold pickup right 0 0
Y30 PV fold pickup left 0 0
Y31 PV unfold pickup left 0 0
Y40 PV pile pickup right 0 0
M4000850GB
9.10.2012 7:51
Outputs PWM+SW 3-2-04-84
Y141 SV swivel arm locking closed 0 0
H12 buzzer cab 0 0
E48 E49 H13 backwards drive light 0 0
K06 relay window wiper 0 0
K07 central lubrication 0 0
Y32 MV Water spray system 0 0
M14 fan oilcooler PVG 0 0
M15 fuel pump prefilter 0 0
E09 E10 brake lights 0 0
Y01 MV machine on 0 0
Y14 PV pick up rollers forward 0 0
Y15 PV pick up rollers reverse 0 0
Y128 PV conveyor rollers forward 0 0
Y129 PV conveyor rollers reverse 0 0
Y62 PV 4-fold pinch rollers forward 0 0
Y63 PV 4-fold pinch rollers reverse 0 0
M4000880GB
9.10.2012 7:52
Outputs PWM+SW 3-2-04-69
Y142 Y143 SV unfold pickup R/L 0 0
Y52 SV supporting foot R 0 0
Y53 SV supporting foot L 0 0
Y54 SV residual beet pickup rotate 0 0
Y68 SV additional axis on 0 0
Y69 SV additional axis 0 0
Y125 SV cabin up/down 0 0
Y126 SV clearing shield right 0 0
Y127 SV clearing shield left 0 0
Y132 SV rotate recleaner 0 0
Y137 SV lock counterweight arm 0 0
Y139 SV counterweight up/down 0 0
Y144 PV Circuit line valve large A 0 0
Y145 PV Circuit line valve large B 0 0
Y140 SV swivel arm locking 0 0
Y141 SV swivel arm locking closed 0 0
M4000870GB
9.10.2012 7:52
Outputs PWM+SW 3-2-04-54
Y40 PV pile pickup right 0 0
Y41 PV pile pickup left 0 0
Y42 PV pile pickup lift 0 0
Y43 PV pile pickup lower 0 0
Y44 PV pile pickup in 0 0
Y45 PV pile pickup out 0 0
Y22 PV rear axle R 0 0
Y23 PV rear axle L 0 0
Y34 PV Circuit line valve small A 0 0
Y35 PV Circuit line valve small B 0 0
Y06 Y07 SV fold plates R+L 0 75
Y36 SV truck conveyor kink 0 100
Y37 SV beet breake 0 0
Y38 Y39 SV axle support R/L 0 0
Y48 SV axle support R/L on/off 0 1325
Y142 Y143 SV unfold pickup R/L 0 0
M4000860GB

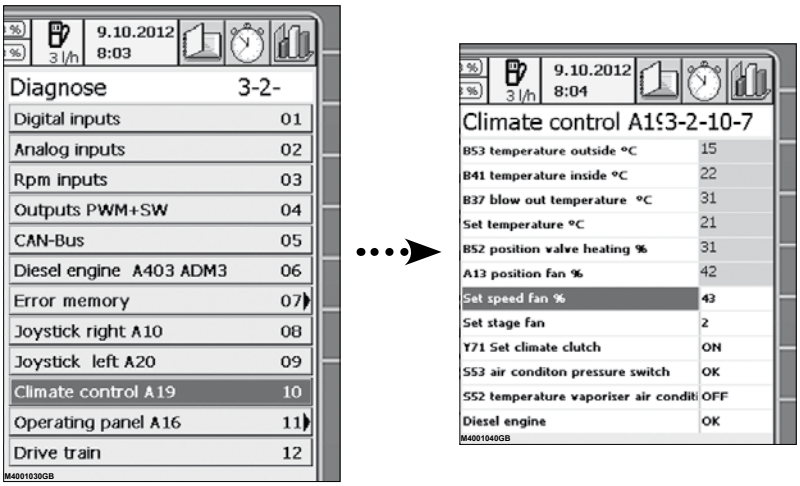

9.10.2012
7:53
3 l/h
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000890GB
9.10.2012
7:53
3 l/h
CAN-Bus 3-2-05-7
A01 Bus 1 Messages (F-CAN) 54884
A01 Bus 1 Error (F-CAN) 0
A01 Bus 2 Messages (W-CAN) 20464
A01 Bus 2 Error (W-CAN) 0
A02 Bus 1 Messages (F-CAN) 54930
A02 Bus 1 Error (F-CAN) 0
A02 Bus 2 Messages (P-CAN) 39615
A02 Bus 2 Error (P-CAN) 0
A03 Bus 1 Messages (F-CAN) 54902
A03 Bus 1 Error (F-CAN) 0
A03 Bus 2 Messages (T-CAN) 21396
A03 Bus 2 Error (T-CAN) 0
M4000900GB

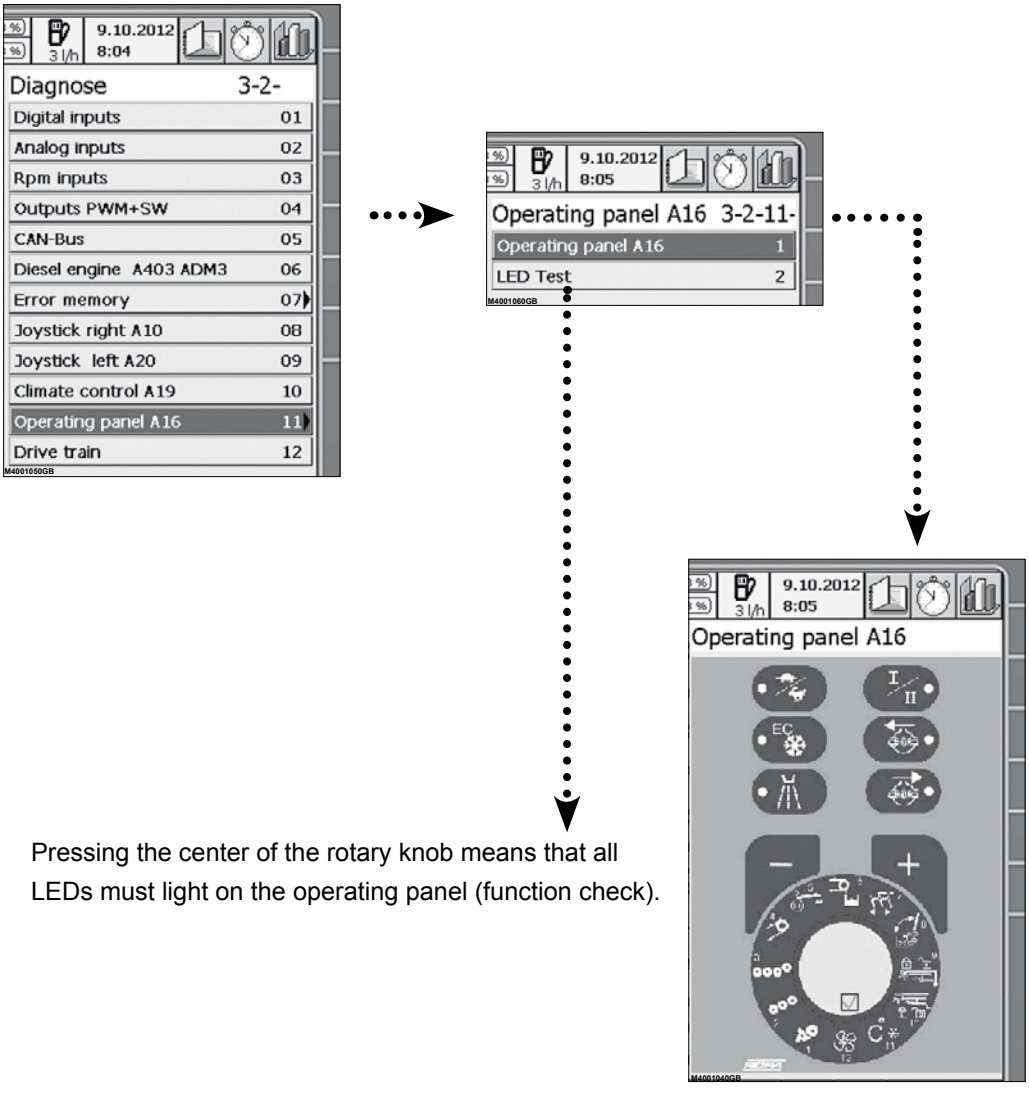

9.10.2012
7:54
3 l/h
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000910GB
9.10.2012
7:54
3 l/h
Diesel engine A40 3-2-06-9
required rpm 2188
B15 actual rpm 2084
B105 engine oil temp. [°C] 92
B104 engine oil pressure [mBar] 4320
B270 engine oil level [rel]
B124 cooling water temp. [°C] 85
B377 fuel pressure [mBar] 6445
B197 fuel temp. [°C] 60
B111 charge air pressure [mBar] 1660
B112 charge air temp. [°C] 40
Consumtion fuel per hour [l/h] 58
engine torque [%] 87
charge ratio [%] 99
S77 buffer tank level up full
S76 buffer tank level down full
M4000920GB


9.10.2012
7:55
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000930GB
9.10.2012
7:55
Error memory 3-2-7-
Error memory diesel engine 1
Error memory machine 2
M4000960GB
9.10.2012
7:56
Error memory 3-2-7-
Error memory diesel engine 1
Error memory machine 2
M4000940GB
0.0
850
ROPA
9.10.2012
7:56
Error memory
Start
End
Value
Additional info
Delete
AUTO
M4000970GB
9.10.2012
7:57
Error memory diesel engine
SPN
FMI
No entries
Delete
AUTO
M4000950GB

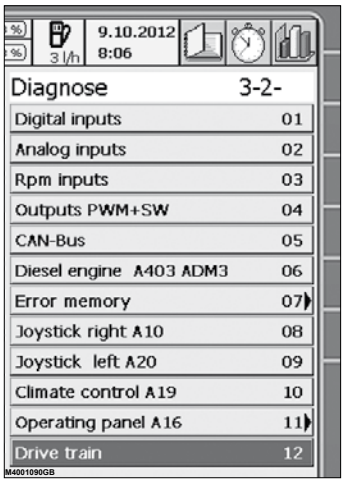

9.10.2012
7:59
3 l/h
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4000990GB
9.10.2012
7:59
3 l/h
Joystick right A10 3-2-08
0 0
240 0
44
255
108
0
0
M4001000GB

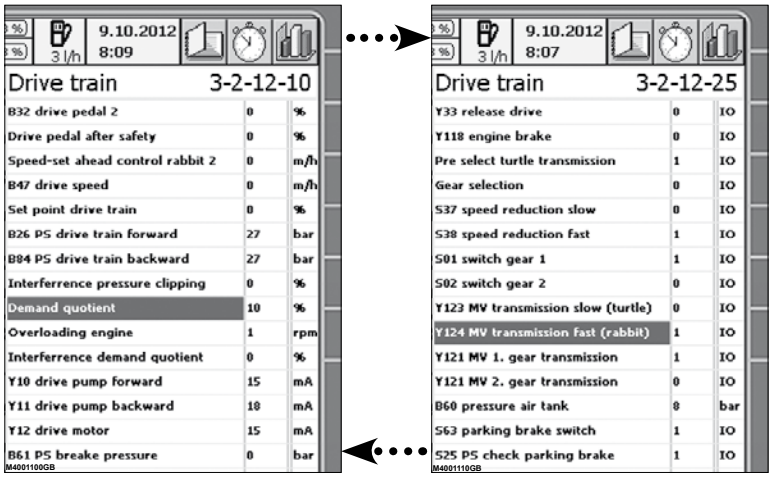

9.10.2012
8:00
3 l/h
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
9.10.2012
8:01
3 l/h
Joystick left A20
M4001020GB





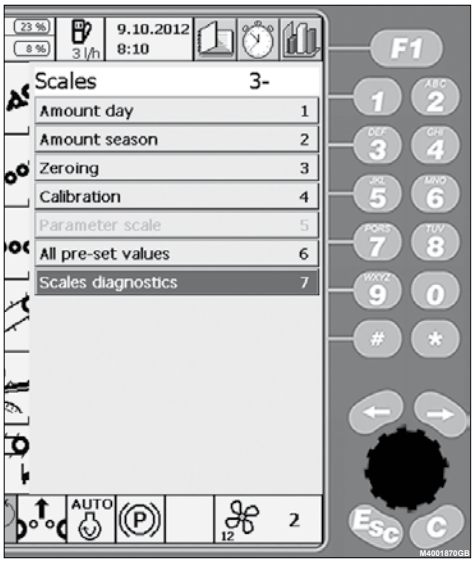
Pressing the center of the rotary knob means that all LEDs must light on the operating panel (function check).

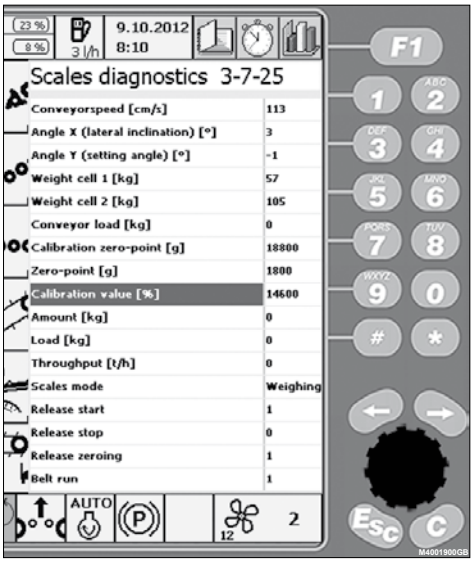

9.10.2012
8:06
3 l/h
Diagnose 3-2-
Digital inputs 01
Analog inputs 02
Rpm inputs 03
Outputs PWM+SW 04
CAN-Bus 05
Diesel engine A403 ADM3 06
Error memory 07
Joystick right A10 08
Joystick left A20 09
Climate control A19 10
Operating panel A16 11
Drive train 12
M4001090GB


9.10.2012
8:09
3 l/h
Drive train 3-2-12-10
B32 drive pedal 2 0 %
Drive pedal after safety 0 %
Speed-set ahead control rabbit 2 0 m/h
B47 drive speed 0 m/h
Set point drive train 0 %
B26 PS drive train forward 27 bar
B84 PS drive train backward 27 bar
Interferrence pressure clipping 0 %
Demand quotient 10 %
Overloading engine 1 rpm
Interferrence demand quotient 0 %
Y10 drive pump forward 15 mA
Y11 drive pump backward 18 mA
Y12 drive motor 15 mA
B61 PS breake pressure 0 bar
M4001100GB
9.10.2012
8:07
3 l/h
Drive train 3-2-12-25
Y33 release drive 0 IO
Y118 engine brake 0 IO
Pre select turtle transmission 1 IO
Gear selection 0 IO
S37 speed reduction slow 0 IO
S38 speed reduction fast 1 IO
S01 switch gear 1 1 IO
S02 switch gear 2 0 IO
Y123 MV transmission slow (turtle) 0 IO
Y124 MV transmission fast (rabbit) 1 IO
Y121 MV 1. gear transmission 1 IO
Y121 MV 2. gear transmission 0 IO
B60 pressure air tank 8 bar
S63 parking brake switch 1 IO
S25 PS check parking brake 1 IO
M4001110GB

8.6 Troubleshooting - scales

In menu "Scales", choose item "Scales diagnostics" and confirm your selection by pressing the center of the rotary knob





8.7 Error codes, diesel engine, Mercedes-Benz

The Mercedes-Benz error codes are sent by the ADM2 computer to the color terminal and may be read there.

The error code is comprised of the following sectors:
SPN number/FMI number
The following list is intended only for troubleshooting by specially trained specialist personnel. This is why it is provided in English only by Mercedes-Benz.
This allows the significance of SPN / FMI to be decoded.

8.7.1 Error codes of MB diagnostics version 210

The background colour is used to indicate the newly supported or changed fault codes since diagnosis version 207.
The background colour is used to indicate the newly supported or changed fault codes since diagnosis version 210.
The background colour indicates PLD/MR2 fault codes which are received from the PLD/MR2 control unit and are broadcasted by the ADM over J1939.

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
51 / 0	-	12419	Engine Throttle Position	Above Measuring Range		LSCAN-MR
51 / 1	-	12420	Engine Throttle Position	Below Measuring Range		LSCAN-MR
51 / 2	-	12424	Engine Throttle Position	Measuring Range Not Plausible		LSCAN-MR
51 / 2	-	14217	Engine Throttle Position	Performance		LSCAN-MR
51 / 3	-	14205	Engine Throttle Position Sensor	Circuit High		LSCAN-MR
51 / 4	-	14206	Engine Throttle Position Sensor	Circuit Low		LSCAN-MR
51 / 7	-	12431	Engine Throttle Position	Defective		LSCAN-MR
51 / 13	-	14218	Engine Throttle Position	Position Not Learned		LSCAN-MR
69 / 9	17309	-	Two Speed Axle Switch	Abnormal Update Rate		CAN-J1939
69 / 19	17319	-	Two Speed Axle Switch	Received Network Data in Error		CAN-J1939
70 / 9	17409	-	Parking Brake Switch	Abnormal Update Rate		CAN-J1939
70 / 19	17419	-	Parking Brake Switch	Received Network Data in Error		CAN-J1939
84 / 3	10103	-	Vehicle Speed (C3 or J1939)	Open Circuit	- Check wiring	15/03
84 / 9	10109	-	Vehicle Speed (C3 or J1939)	Abnormal Update Rate		CAN-J1939
84 / 14	10114	-	Vehicle Speed (C3 or J1939)	Signal Not Plausible	- Check wiring	15/03
84 / 19	10119	-	Vehicle Speed (C3 or J1939)	Received Network Data in Error		CAN-J1939
91 / 0	10200	-	Accelerator Pedal (AFPS or J1939)	Not Adjusted	- Restart accelerator pedal adjustment routine - Check wiring - Limit value idle operation position: 5,0 V - Limit value kickdown position: 4,9 V	21/11
91 / 3	10203	-	Accelerator Pedal (AFPS or J1939)	Voltage too High	- Pedal unit exchange, if defective - check wiring - Limit value idle operation position: 5,0 V - Limit value kickdown position: 4,9 V	21/11

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
91 / 4	10204	-	Accelerator Pedal (AFPS or J1939)	Voltage too Low	- Pedal unit exchange, if defective - Check wiring - Limit value idle operation position: 5,0 V - Limit value kickdown position: 4,9 V	21/11
91 / 9	10209	-	Accelerator Pedal (AFPS or J1939)	Abnormal Update Rate		CAN-J1939
91 / 19	10219	-	Accelerator Pedal (AFPS or J1939)	Received Network Data in Error		CAN-J1939
94 / 0	-	11715	Fuel Pressure	Circuit High Input		LSCAN-MR
94 / 1	-	11716	Fuel Pressure	Circuit Low Input		LSCAN-MR
94 / 2	-	11717	Fuel Pressure	Range/Performance		LSCAN-MR
94 / 3	-	13015	Fuel Pressure	Open Circuit		LSCAN-MR
94 / 4	-	13016	Fuel Pressure	Shorted To Ground		LSCAN-MR
94 / 14	-	11917	Fuel Pressure	Pressure Too High/Too Low		LSCAN-MR
96 / 9	17509	-	Fuel Level	Abnormal Update Rate		CAN-J1939
96 / 19	17519	-	Fuel Level	Received Network Data in Error		CAN-J1939
98 / 0	10400	-	Oil Level (from PLD/MR2)	Oil Level too High	- Oil discharge with to strong overstocking. - Remark: This problem can occur also if in PLD/MR2 the false type of oil pan were programmed.	PLD/MR2
98 / 1	10401	-	Oil Level (from PLD/MR2)	Low Oil Level	- Refill oil	PLD/MR2
98 / 2	-	12026	Oil Level (from PLD/MR2)	Oil Level too High or too Low		LSCAN-MR
98 / 2	-	12403	Oil Level (from PLD/MR2)	Oil Level Not Plausible		LSCAN-MR
98 / 2	-	12517	Oil Level (from PLD/MR2)	Data Erratic, Not Plausible		LSCAN-MR
98 / 3	-	12516	Oil Level (from PLD/MR2)	Voltage Below		LSCAN-MR
98 / 4	-	12515	Oil Level (from PLD/MR2)	Voltage Above		LSCAN-MR
98 / 5	-	12509	Oil Level (from PLD/MR2)	Open Circuit		LSCAN-MR
98 / 14	10414	-	Oil Level (from PLD/MR2)	Oil Level too Low	- Refill oil - Remark: This problem can occur also if in PLD/MR2 the false type of oil pan were programmed.	PLD/MR2
100 / 1	10501	-	Oil Pressure (from PLD/MR2)	Low Oil Pressure	- Check oil pump and oil circuit	PLD/MR2
100 / 1	-	12021	Oil Pressure (from PLD/MR2)	Oil Pressure too Low		LSCAN-MR
100 / 2	-	11617	Oil Pressure (from PLD/MR2)	Range/Performance		LSCAN-MR
100 / 3	-	11615	Oil Pressure (from PLD/MR2)	High Voltage		LSCAN-MR
100 / 4	-	11616	Oil Pressure (from PLD/MR2)	Low Voltage		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
100 / 14	10514	-	Oil Pressure (from PLD/MR2)	Oil Pressure too Low	- Check oil pump and oil circuit.	PLD/MR2
100 / 14	-	12020	Oil Pressure (from PLD/MR2)	Oil Pressure too Low		LSCAN-MR
102 / 0	-	11820	Turbo Charger/ Supercharger	Overboost Condition		LSCAN-MR
102 / 1	-	11818	Turbo Charger/ Supercharger	Boost System Performance		LSCAN-MR
102 / 2	-	11417	Turbo Charger/ Supercharger	Boost Sensor “A” Circuit Range/Performance		LSCAN-MR
102 / 3	-	11415	Turbo Charger/ Supercharger	Boost Sensor “A” Circuit High		LSCAN-MR
102 / 4	-	11416	Turbo Charger/ Supercharger	Boost Sensor “A” Circuit Low		LSCAN-MR
102 / 7	-	11876	Turbo Charger/ Supercharger	Boost System Performance		LSCAN-MR
102 / 7	-	11878	Turbo Charger/ Supercharger	Bypass Valve – Mechanical		LSCAN-MR
102 / 13	-	11873	Turbo Charger/ Supercharger	Underboost, Control at Limit		LSCAN-MR
102 / 13	-	11874	Turbo Charger/ Supercharger	Underboost, Control Deviation too High		LSCAN-MR
102 / 13	-	11875	Turbo Charger/ Supercharger	Boost System Performance		LSCAN-MR
103 / 3	-	12616	Turbo Charger Speed Sensor	Circuit Low		LSCAN-MR
103 / 4	-	12615	Turbo Charger Speed Sensor	Circuit High		LSCAN-MR
103 / 7	-	12612	Turbo Charger Speed Sensor	Signal Timeout, no revolution on charger 1		LSCAN-MR
105 / 0	-	11822	Intake Air Temperature	Temperature Too high		LSCAN-MR
105 / 3	-	11215	Intake Air Temperature Sensor 1	Circuit High		LSCAN-MR
105 / 4	-	11216	Intake Air Temperature Sensor 1	Circuit Low		LSCAN-MR
107 / 0	10800	-	Air Filter Sensor (LF_SE)	Differential Pressure too High	- Check wiring.	15/08
107 / 3	10803	-	Air Filter Sensor (LF_SE)	Open Circuit	- Check wiring.	15/08
107 / 4	10804	-	Air Filter Sensor (LF_SE)	Short Circuit to Ground	- Check wiring.	15/08
110 / 0	-	12122	Coolant Temperature (from PLD/MR2)	High Coolant Temperature	- Cooling-water level and cooling circuit check.	LSCAN-MR
110 / 3	-	11515	Coolant Temperature (from PLD/MR2)	Sensor 1 Circuit High		LSCAN-MR
110 / 4	-	11516	Coolant Temperature (from PLD/MR2)	Sensor 1 Circuit Low		LSCAN-MR
110 / 14	10914	-	Coolant Temperature (from PLD/MR2)	Coolant Temperature too High	- Cooling-water level and cooling circuit check.	PLD/MR2
111 / 1	11001	-	Coolant Level Sensor (KW_SE)	Low Coolant Level	- Refill coolant - Check wiring	15/07
111 / 3	11003	-	Coolant Level Sensor (KW_SE)	Open Circuit	- Check wiring - Voltage must be larger than 2,0 V.	15/07
111 / 4	11004	-	Coolant Level Sensor (KW_SE)	Short Circuit to Ground	- Check wiring.	15/07
111 / 14	11014	-	Coolant Level Sensor (KW_SE)	Coolant Level too Low	- Refill coolant - Check wiring	15/07

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
158 / 0	11100	-	Battery Voltage Switched (Terminal 15)	Over Voltage	- Check battery voltage - Check parameter 2/08 (24V/12V selection)	21/02
158 / 1	11101	-	Battery Voltage Switched (Terminal 15)	Under Voltage	- Check battery voltage - Check parameter 2/08 (24V/12V selection)	21/02
158 / 2	-	12219	Battery Voltage Switched (Terminal 15)	Inconsistent		LSCAN-MR
158 / 14	-	12319	Battery Voltage Switched (Terminal 15)	Starter Switch Inconsistent		LSCAN-MR
161 / 9	17609	-	Transmission Input Shaft Speed	Abnormal Update Rate		CAN-J1939
161 / 19	17619	-	Transmission Input Shaft Speed	Received Network Data in Error		CAN-J1939
168 / 3	-	17542	System Voltage	Voltage High		LSCAN-MR
168 / 4	-	17543	System Voltage	Voltage Low		LSCAN-MR
171 / 2	-	13617	Ambient Air Temperature	Sensor Circuit Range/Performance		LSCAN-MR
171 / 3	16603	-	Ambient Air Temperature	Voltage too High	- Check wiring - Input Pin depending on configuration of parameter 13/39	21/11, 18/18, 15/08
171 / 4	16604	-	Ambient Air Temperature	Voltage too Low	- Check wiring - Input Pin depending on configuration of parameter 13/39	21/11, 18/18, 15/08
171 / 9	16609	-	Ambient Air Temperature	Abnormal Update Rate		CAN-J1939
171 / 9	-	13604	Ambient Air Temperature	Lost Message		LSCAN-MR
171 / 19	16619	-	Ambient Air Temperature	Received Network Data in Error		CAN-J1939
173 / 0	-	12406	Engine Exhaust Gas Temperature	Above Nominal Value		LSCAN-MR
173 / 15	-	12429	Engine Exhaust Gas Temperature	Too High		LSCAN-MR
174 / 3	-	11115	Fuel Temperature Sensor “A”	Circuit High Input		LSCAN-MR
174 / 4	-	11116	Fuel Temperature Sensor “A”	Circuit Low Input		LSCAN-MR
175 / 3	-	11015	Engine Oil Temperature Sensor	Circuit High		LSCAN-MR
175 / 4	-	11016	Engine Oil Temperature Sensor	Ciruit Low		LSCAN-MR
190 / 0	-	10530	Engine Speed	Engine Overspeed Condition		LSCAN-MR
191 / 9	17709	-	Transmission Output Shaft Speed	Abnormal Update Rate		CAN-J1939
191 / 19	17719	-	Transmission Output Shaft Speed	Received Network Data in Error		CAN-J1939
354 / 3	-	13415	Ambient Air Combi Sensor, Part Humidity	Circuit High		LSCAN-MR
354 / 4	-	13416	Ambient Air Combi Sensor, Part Humidity	Circuit Low		LSCAN-MR
523 / 9	17809	-	Transmission Current Gear	Abnormal Update Rate		CAN-J1939
523 / 19	17819	-	Transmission Current Gear	Received Network Data in Error		CAN-J1939

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
524 / 9	17909	-	Transmission Selected Gear	Abnormal Update Rate		CAN-J1939
524 / 19	17919	-	Transmission Selected Gear	Received Network Data in Error		CAN-J1939
558 / 1	11701	-	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Both Signals Equal but Should Not	- Check wiring	21/12 and 21/13
558 / 5	11705	-	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Both Switches Open Circuit	- Check wiring - Pedal unit exchange, if defective	21/12 and 21/13
558 / 9	11709	-	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Abnormal Update Rate		CAN-J1939
558 / 12	11712	-	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Both Switches Closed	- check wiring - Pedal unit exchange, if defective	21/12 and 21/13
558 / 19	11719	-	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Received Network Data in Error		CAN-J1939
559 / 9	18009	-	Accelerator Pedal Kickdown Switch	Abnormal Update Rate		CAN-J1939
559 / 19	18019	-	Accelerator Pedal Kickdown Switch	Received Network Data in Error		CAN-J1939
573 / 9	18109	-	Transmission Torque Converter Lockup Engaged	Abnormal Update Rate		CAN-J1939
573 / 19	18119	-	Transmission Torque Converter Lockup Engaged	Received Network Data in Error		CAN-J1939
574 / 9	18209	-	Transmission Shift In Process	Abnormal Update Rate		CAN-J1939
574 / 19	18219	-	Transmission Shift In Process	Received Network Data in Error		CAN-J1939
596 / 9	18309	-	Cruise Control Enable Switch	Abnormal Update Rate		CAN-J1939
596 / 19	18319	-	Cruise Control Enable Switch	Received Network Data in Error		CAN-J1939
597 / 9	18409	-	Brake Switch	Abnormal Update Rate		CAN-J1939
597 / 19	18419	-	Brake Switch	Received Network Data in Error		CAN-J1939
598 / 9	18509	-	Clutch Switch	Abnormal Update Rate		CAN-J1939
598 / 19	18519	-	Clutch Switch	Received Network Data in Error		CAN-J1939
599 / 9	11809	-	Cruise Control Switch CC- (Set + Coast)	Abnormal Update Rate (Set Switch)		CAN-J1939
599 / 12	11812	-	Cruise Control Switch CC- (Set + Coast)	Both Switches CC- and CC+ Closed	- Check wiring - Check cruise control switch	18/04 and 18/05
599 / 14	11814	-	Cruise Control Switch CC- (Set + Coast)	Plausibility Check Failed (Check Stalk Switch Wiring)	- Check wiring of stalk switch - Check parameter 13/37	18/04 and 12/07
599 / 19	11819	-	Cruise Control Switch CC- (Set + Coast)	Received Network Data in Error		CAN-J1939
600 / 9	18609	-	Cruise Control Coast (Decelerate) Switch	Abnormal Update Rate		CAN-J1939
600 / 19	18619	-	Cruise Control Coast (Decelerate) Switch	Received Network Data in Error		CAN-J1939
601 / 9	11909	-	Cruise Control Switch CC+ (Res + Acc)	Abnormal Update Rate (Resume Switch)		CAN-J1939

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
601 / 12	11912	-	Cruise Control Switch CC+ (Res + Acc)	Both Switches CC+ and CC- Closed	- Check wiring - Check cruise control switch	18/04 and 18/05
601 / 14	11914	-	Cruise Control Switch CC+ (Res + Acc)	Plausibility Check Failed (Check Stalk Switch Wiring)	- Check wiring of stalk switch - Check parameter 13/37	18/05 and 12/07
601 / 19	11919	-	Cruise Control Switch CC+ (Res + Acc)	Received Network Data in Error		CAN-J1939
602 / 9	18709	-	CCVS Cruise Control Accelerate Switch	Abnormal Update Rate or Signal Not Available		CAN-J1939
602 / 19	18719	-	CCVS Cruise Control Accelerate Switch	Received Network Data in Error		CAN-J1939
609 / 0	-	19960	Anti Theft Device	Immobilizer Number of Keys Limited to 8		LSCAN-MR
609 / 2	12002		PLD/MR2 Error	Unknown Cause	- Check PLD/MR2 Error Codes	PLD/MR2
609 / 2	-	19963	Anti Theft Device	Immobilizer TPC Signal Error CAN		LSCAN-MR
609 / 2	-	19965	Anti Theft Device	Incorrect Immobilizer Key		LSCAN-MR
609 / 9	-	19964	Anti Theft Device	Immobilizer TPC Signal Error Starter Line		LSCAN-MR
609 / 11	-	14056	PLD/MR2	Data Map Manipulated, Control Module Performance		LSCAN-MR
609 / 11	-	14058	PLD/MR2	Data Map Manipulated, Control Module Programming Error		LSCAN-MR
609 / 11	-	19962	Anti Theft Device	Immobilizer Automatically Activated		LSCAN-MR
609 / 12	-	11315	PLD/MR2 Barometric Pressure Circuit	Open Circuit		LSCAN-MR
609 / 12	-	11316	PLD/MR2 Barometric Pressure Circuit	Shorted to Ground		LSCAN-MR
609 / 12	-	12401	PLD/MR2	Auxiliary Voltage 8,5V Defective		LSCAN-MR
609 / 12	-	12402	PLD/MR2	Common Internal Error		LSCAN-MR
609 / 12	-	14024	PLD/MR2	Limp Home Controller / Controller #2 Defective		LSCAN-MR
609 / 12	-	14034	PLD/MR2	High Side Driver PVB1 Defective		LSCAN-MR
609 / 12	-	14035	PLD/MR2	High Side Driver PVB2 Defective		LSCAN-MR
609 / 12	-	14036	PLD/MR2	High Side Driver PV5 Defective		LSCAN-MR
609 / 12	-	14038	PLD/MR2	Starter Driver Defective (Redundant)		LSCAN-MR
609 / 12	-	14039	PLD/MR2	Starter Driver Defective (Main)		LSCAN-MR
609 / 12	-	14040	PLD/MR2	Diagnosis Starter Error		LSCAN-MR
609 / 12	-	14041	PLD/MR2	Diagnosis Starter Error		LSCAN-MR
609 / 12	-	14054	PLD/MR2	Low Speed CAN Data Error		LSCAN-MR
609 / 12	-	14262	PLD/MR2	Wrong Boot Block		LSCAN-MR
609 / 12	-	14296	PLD/MR2 Bootloader	Application Software Defective		LSCAN-MR
609 / 12	-	14297	PLD/MR2 Bootloader	Flash Memory Defective		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
609 / 12	-	14298	PLD/MR2 Bootloader	Flash Not Erasable		LSCAN-MR
609 / 12	-	14299	PLD/MR2 Bootloader	No Application Software In Flash		LSCAN-MR
609 / 12	-	18039	PLD/MR2 Starter Relay Circuit	Shorted (Main or Redundant)		LSCAN-MR
609 / 13	-	12400	PLD/MR2	No. Of Cylinders Not Corresponding To Engine Type		LSCAN-MR
609 / 14	-	14037	PLD/MR2 Program	Wrong No. of Cylinders		LSCAN-MR
609 / 14	-	14047	PLD/MR2 Program	Set of Maps Error		LSCAN-MR
609 / 14	-	14048	PLD/MR2 Program	Wrong No. of Cylinders		LSCAN-MR
609 / 14	-	14049	PLD/MR2 Program	PWM Calibration		LSCAN-MR
609 / 14	-	14050	PLD/MR2 Program	Wrong Hardware		LSCAN-MR
609 / 14	-	14051	PLD/MR2 Program	EEPROM Checksum 1		LSCAN-MR
609 / 14	-	14052	PLD/MR2 Program	EEPROM Checksum 2		LSCAN-MR
609 / 14	-	14053	PLD/MR2 Program	EEPROM Checksum 3		LSCAN-MR
609 / 14	-	14269	Euromot3b / Tier4i Engine Control Module	Chassis Control Module Mismatch	New Since Version 10.00	LSCAN-MR
609 / 14	-	19961	Anti Theft Device	Immobilizer Response Counter Flow		LSCAN-MR
611 / 4	-	16506	Oil Separator	Circuit Low		LSCAN-MR
611 / 12	-	16564	Oil Separator	Circuit High		LSCAN-MR
620 / 3	12103	-	Supply Analog Accelerator Pedal (AFP+)	Voltage too High	- Supply voltage > 5,2 V.	21/09
620 / 4	12104	-	Supply Analog Accelerator Pedal (AFP+)	Voltage too Low	- Supply voltage < 4,8 V.	21/09
625 / 2	12202	-	CAN Link ADM3 – PLD/MR2	No Communication with PLD/MR2	- Check wiring (engine CAN) - Check configuration: PLD/MR2 parameter (../..) and ADM3 parameter 01/01 to be set to equal functionality (One wire capability)	-
625 / 2	-	10102	CAN Link ADM3 – PLD/MR2	Invalid Data Received	- Check wiring (engine CAN)	LSCAN-MR
625 / 2	-	10104	CAN Link ADM3 – PLD/MR2	No Communication	- Check wiring (engine CAN)	LSCAN-MR
625 / 14	-	10100	CAN Link ADM3 – PLD/MR2	CAN B Bus (+) Circuit	- Check wiring (engine CAN)	LSCAN-MR
625 / 14	-	10101	CAN Link ADM3 – PLD/MR2	CAN B Bus (-) Circuit	- Check wiring (engine CAN)	LSCAN-MR
625 / 14	-	10149	PLD/MR2	Control Module Vehicle Options Error		LSCAN-MR
630 / 2	-	14092	Control Module	Module Performance		LSCAN-MR
630 / 9	-	14149	Control Module	Vehicle Options Error	- Check Engine Brake Parameters	LSCAN-MR
632 / 5	-	12430	Fuel Shutoff Valve "A" Control	Circuit Open		LSCAN-MR
636 / 1	-	10310	Crankshaft Position Sensor “A”	Circuit Range/Perforamnce		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
636 / 3	-	10309	Crankshaft Position Sensor “A”	Open Circuit		LSCAN-MR
636 / 4	-	10308	Crankshaft Position Sensor “A”	Low Input		LSCAN-MR
636 / 7	-	10311	Crankshaft Position	Camshaft Position Correlation (Bank 1 Sensor)		LSCAN-MR
636 / 8	-	10312	Crankshaft Position Sensor “A” Circuit	Time Out		LSCAN-MR
636 / 14	-	10313	Crankshaft Position Sensor “A”	Polarity Error		LSCAN-MR
639 / 2	14902	-	SAE J1939 Interface	At Least One J1939 Message is Missing	- Check wiring - Check other Control Units on J1939	CAN-J1939
651 / 5	-	15027	Injector Cylinder 1	Open Ciruit		LSCAN-MR
651 / 6	-	15028	Injector Cylinder 1	Shorted Circuit		LSCAN-MR
651 / 7	-	15026	Injector Cylinder 1	Injection Timing, No Plunger		LSCAN-MR
651 / 12	-	19044	Injector Cylinder 1	Idle Control At Limit		LSCAN-MR
651 / 14	-	19045	Injector Cylinder 1	Cylinder Correction At Limit		LSCAN-MR
652 / 5	-	15127	Injector Cylinder 2	Open Circuit		LSCAN-MR
652 / 6	-	15128	Injector Cylinder 2	Shorted Circuit		LSCAN-MR
652 / 7	-	15126	Injector Cylinder 2	Injection Timing, No Plunger		LSCAN-MR
652 / 12	-	19144	Injector Cylinder 2	Idle Control At Limit		LSCAN-MR
652 / 14	-	19145	Injector Cylinder 2	Cylinder Correction At Limit		LSCAN-MR
653 / 5	-	15227	Injector Cylinder 3	Open Circuit		LSCAN-MR
653 / 6	-	15228	Injector Cylinder 3	Shorted Circuit		LSCAN-MR
653 / 7	-	15226	Injector Cylinder 3	Injection Timing, No Plunger		LSCAN-MR
653 / 12	-	19244	Injector Cylinder 3	Idle Control At Limit		LSCAN-MR
653 / 14	-	19245	Injector Cylinder 3	Cylinder Correction At Limit		LSCAN-MR
654 / 5	-	15327	Injector Cylinder 4	Open Circuit		LSCAN-MR
654 / 6	-	15328	Injector Cylinder 4	Shorted Circuit		LSCAN-MR
654 / 7	-	15326	Injector Cylinder 4	Injection Timing, No Plunger		LSCAN-MR
654 / 12	-	19344	Injector Cylinder 4	Idle Control At Limit		LSCAN-MR
654 / 14	-	19345	Injector Cylinder 4	Cylinder Correction At Limit		LSCAN-MR
655 / 5	-	15427	Injector Cylinder 5	Open Circuit		LSCAN-MR
655 / 6	-	15428	Injector Cylinder 5	Shorted Circuit		LSCAN-MR
655 / 7	-	15426	Injector Cylinder 5	Injection Timing, No Plunger		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
655 / 12	-	19444	Injector Cylinder 5	Idle Control At Limit		LSCAN-MR
655 / 14	-	19445	Injector Cylinder 5	Cylinder Correction At Limit		LSCAN-MR
656 / 5	-	15527	Injector Cylinder 6	Open Circuit		LSCAN-MR
656 / 6	-	15528	Injector Cylinder 6	Shorted Circuit		LSCAN-MR
656 / 7	-	15526	Injector Cylinder 6	Injection Timing, No Plunger		LSCAN-MR
656 / 12	-	19544	Injector Cylinder 6	Idle Control At Limit		LSCAN-MR
656 / 14	-	19545	Injector Cylinder 6	Cylinder Correction At Limit		LSCAN-MR
657 / 5	-	15627	Injector Cylinder 7	Open Circuit		LSCAN-MR
657 / 6	-	15628	Injector Cylinder 7	Shorted Circuit		LSCAN-MR
657 / 7	-	15626	Injector Cylinder 7	Injection Timing, No Plunger		LSCAN-MR
657 / 12	-	19644	Injector Cylinder 7	Idle Control At Limit		LSCAN-MR
657 / 14	-	19645	Injector Cylinder 7	Cylinder Correction At Limit		LSCAN-MR
658 / 5	-	15727	Injector Cylinder 8	Open Circuit		LSCAN-MR
658 / 6	-	15728	Injector Cylinder 8	Shorted Circuit		LSCAN-MR
658 / 7	-	15726	Injector Cylinder 8	Injection Timing, No Plunger		LSCAN-MR
658 / 12	-	19744	Injector Cylinder 8	Idle Control At Limit		LSCAN-MR
658 / 14	-	19745	Injector Cylinder 8	Cylinder Correction At Limit		LSCAN-MR
677 / 3	-	18005	Output Relay 1 (PLD/MR2)	Starter Relay Shorted To High		LSCAN-MR
677 / 3	13303	-	Output Relay 1 (REL 1)	Open Circuit	- Check wiring - Check relay 1	15/12
677 / 4	13304	-	Output Relay 1 (REL 1)	Short Circuit to Ground	- Check wiring - Check relay 1	15/12
677 / 5	-	18009	Output Relay 1 (PLD/MR2)	Starter Relay Open Circuit		LSCAN-MR
677 / 6	-	18008	Output Relay 1 (PLD/MR2)	Starter Relay Shorted To Ground		LSCAN-MR
677 / 7	-	18086	Output Relay 1 (PLD/MR2)	Starter Stick, Does not Engage		LSCAN-MR
677 / 14	-	18033	Output Relay 1 (PLD/MR2)	Starter Relay Stick		LSCAN-MR
697 / 3	-	17007	Proportional Valve 1	Circuit High		LSCAN-MR
697 / 3	-	17705	Proportional Valve Bank 1	Shorted To Battery Voltage Bank 1		LSCAN-MR
697 / 4	-	17708	Proportional Valve Bank 1	Shorted To Ground Bank 1		LSCAN-MR
697 / 5	-	12425	Proportional Valve Bank 1	Open Circuit		LSCAN-MR
697 / 5	-	17009	Proportional Valve 1	Open Circuit		LSCAN-MR
697 / 6	-	17006	Proportional Valve 1	Shorted To Ground		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
698 / 3	-	17305	Proportional Valve 2	Shorted To Battery Voltage		LSCAN-MR
698 / 3	-	17307	Proportional Valve 2	Shorted To Battery Voltage		LSCAN-MR
698 / 5	-	12426	Proportional Valve Bank 2	Open Circuit		LSCAN-MR
698 / 5	-	17309	Proportional Valve 2	Open Circuit		LSCAN-MR
698 / 5	-	17317	Proportional Valve 2	Open Circuit		LSCAN-MR
698 / 6	-	17306	Proportional Valve 2	Shorted To Ground		LSCAN-MR
699 / 3	-	17107	Proportional Valve 3	Shorted To Battery Voltage		LSCAN-MR
699 / 5	-	17109	Proportional Valve 3	Open Circuit		LSCAN-MR
699 / 6	-	17106	Proportional Valve 3	Shorted To Ground		LSCAN-MR
700 / 3	-	17207	Proportional Valve 4	Shorted To Battery Voltage		LSCAN-MR
700 / 5	-	17209	Proportional Valve 4	Open Circuit		LSCAN-MR
700 / 6	-	17206	Proportional Valve 4	Shorted To Ground		LSCAN-MR
705 / 3	-	12411	Proportional Valve 5	CNG Lock Valve Shorted To Battery Voltage		LSCAN-MR
705 / 3	-	17405	Proportional Valve 5	Shorted To Battery Voltage		LSCAN-MR
705 / 3	-	17805	Proportional Valve Bank 2	Shorted To Battery Voltage		LSCAN-MR
705 / 4	-	12412	Proportional Valve 5	CNG Lock Valve Shorted To Ground		LSCAN-MR
705 / 4	-	17408	Proportional Valve 5	Shorted To Ground		LSCAN-MR
705 / 4	-	17808	Proportional Valve Bank 2	Shorted To Ground		LSCAN-MR
706 / 3	-	17609	Proportional Valve 6	Open Circuit		LSCAN-MR
706 / 5	-	17607	Proportional Valve 6	Shorted To Battery Voltage		LSCAN-MR
706 / 6	-	17606	Proportional Valve 6	Shorted To Ground		LSCAN-MR
723 / 3	-	10409	Camshaft Position Sensor “A” (Bank 1 or Single Sensor)	Open Circuit		LSCAN-MR
723 / 4	-	10408	Camshaft Position Sensor “A” (Bank 1 or Single Sensor)	Shorted To Ground		LSCAN-MR
723 / 8	-	10412	Camshaft Position Sensor “A” (Bank 1 or Single Sensor)	Time Out		LSCAN-MR
723 / 14	-	10413	Camshaft Position Sensor “A” (Bank 1 or Single Sensor)	Polarity Error, Pins Swapped		LSCAN-MR
729 / 3	14003	-	Intake Air Heater (MBR_KD)	Open Circuit	- Check wiring - Check solenoid valve	15/10
729 / 4	14004	-	Intake Air Heater (MBR_KD)	Short Circuit to Ground	- Check wiring - Check solenoid valve	15/10
729 / 5	-	16409	Intake Air Heater (PLD/MR2)	Circuit Open		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
729 / 12	-	16432	Intake Air Heater (PLD/MR2)	Circuit Universal Troubles		LSCAN-MR
730 / 0	13900	-	Output Relay 2 (REL 2)	Grid Heater: No Increasing Boost Temperature After Activation	- Check wiring - Check relay 2 - Check grid heater	15/09
730 / 1	13901	-	Output Relay 2 (REL 2)	Relay Permanently Closed (Grid Heater)	- Check wiring - Check relay 2	15/09
730 / 2	13902	-	Output Relay 2 (REL 2)	Relay Permanently Open (Grid Heater)	- Check wiring - Check relay 2	15/09
730 / 3	13903	-	Output Relay 2 (REL 2)	Voltage too High when Activated	- Check wiring	15/09
730 / 4	13904	-	Output Relay 2 (REL 2)	Voltage too Low when Activated	- Check wiring - Check relay 2	15/09
870 / 3	-	14223	SCR Diffusor Heating	Circuit High		LSCAN-MR
870 / 3	-	14270	Heater Regeneration System	Circuit High		LSCAN-MR
870 / 4	-	14222	SCR Diffusor Heating	Circuit Low		LSCAN-MR
870 / 4	-	14269	Heater Regeneration System	Circuit Low		LSCAN-MR
870 / 5	-	14221	SCR Diffusor Heating	Circuit Open		LSCAN-MR
904 / 9	18809	-	Front Axle Speed	Abnormal Update Rate		CAN-J1939
904 / 19	18819	-	Front Axle Speed	Received Network Data in Error		CAN-J1939
925 / 3	-	17905	SCR Module Proportional Valve Bank	Circuit High		LSCAN-MR
925 / 4	-	17908	SCR Module Proportional Valve Bank	Circuit Low		LSCAN-MR
973 / 9	18909	-	Engine Retarder Selection	Abnormal Update Rate		CAN-J1939
973 / 19	18919	-	Engine Retarder Selection	Received Network Data in Error		CAN-J1939
974 / 2	14202	-	Remote Throttle Pedal (HFG)	Supply Voltage Out of Range (Pin HFG+)	- Limit values for the supply voltage of the HFG: Minimum value: 4,8 V and maximum value: 5,2 V.	18/17
974 / 3	14203	-	Remote Throttle Pedal (HFG)	Voltage too High	- Check wiring - Check remote pedal	18/18
974 / 4	14204	-	Remote Throttle Pedal (HFG)	Voltage too Low	- Check wiring - Check remote pedal	18/18
986 / 1	-	10631	Fan Speed	Speed Too Low		LSCAN-MR
986 / 9	-	10612	Fan Speed	Time Out		LSCAN-MR
986 / 9	-	17112	Fan Speed	Time Out		LSCAN-MR
1004 / 3	14403	-	Output Relay 4 (REL 4)	Open Circuit	- Check wiring - Check relay 4	18/01
1004 / 4	14404	-	Output Relay 4 (REL 4)	Short Circuit to Ground	- Check wiring - Check relay	18/01
1005 / 3	14503	-	Output PWM Pedal Supply or Transmission (FP+)	Open Circuit	- Check wiring.	15/05
1005 / 4	14504	-	Output PWM Pedal Supply or Transmission (FP+)	Short Circuit to Ground	- Check wiring.	15/05

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
1015 / 1	15001	-	PWM Accelerator Pedal (PWM FFG)	No Supply Voltage at Pin FP+	- Check wiring	15/05
1015 / 3	15003	-	PWM Accelerator Pedal (PWM FFG)	No Signal at Path 2 (GAS2)	- Check wiring - Pins 21/13, 15/05 , 21/14.	
1015 / 4	15004	-	PWM Accelerator Pedal (PWM FFG)	No Signal at Path 1 (GAS1)	- Check wiring - Pins 21/12, 15/05 , 21/14	
1015 / 5	15005	-	PWM Accelerator Pedal (PWM FFG)	Not Adjusted	- Restart accelerator pedal adjustment routine	-
1015 / 6	15006	-	PWM Accelerator Pedal (PWM FFG)	Idle Position Out of Adjusted Range	- Restart accelerator pedal adjustment routine	-
1015 / 7	15007	-	PWM Accelerator Pedal (PWM FFG)	Out of Adjusted Range	- Restart accelerator pedal adjustment routine	-
1072 / 3	10003	-	Decompression Brake Valve (MBR_KD)	Open Circuit	- Check wiring - Check solenoid valve	15/10
1072 / 4	10004	-	Decompression Brake Valve (MBR_KD)	Short Circuit to Ground	- Check wiring - Check solenoid valve	15/10
1074 / 3	14603	-	Exhaust Brake Valve (MBR_BK)	Open Circuit	- Check wiring - Check exhaust brake valve	15/06
1074 / 3	-	14256	Exhaust Brake Valve (PLD/MR2)	Circuit High		LSCAN-MR
1074 / 4	14604	-	Exhaust Brake Valve (MBR_BK)	Short Circuit to Ground	- Check wiring - Check exhaust brake valve	15/06
1074 / 4	-	14255	Exhaust Brake Valve (PLD/MR2)	Circuit Low		LSCAN-MR
1074 / 5	-	14257	Exhaust Brake Valve (PLD/MR2)	Circuit Open		LSCAN-MR
1074 / 12	-	14254	Exhaust Brake Valve (PLD/MR2)	Performance		LSCAN-MR
1127 / 1	-	14259	Intake Throttle Turbocharger	Underboost		LSCAN-MR
1132 / 3	-	13115	Intake Air Temperature Sensor 2	Circuit High		LSCAN-MR
1132 / 4	-	13116	Intake Air Temperature Sensor 2	Circuit Low		LSCAN-MR
1136 / 0	-	14273	Engine ECU Temperature	Temperature too High		LSCAN-MR
1136 / 1	-	14274	Engine ECU Temperature	Temperature too Low		LSCAN-MR
1184 / 0	-	14422	Engine Turbocharger 1 Turbine Outlet Tempeature	Temperature Too High		LSCAN-MR
1184 / 2	-	14263	Engine Turbocharger 1 Turbine Outlet Tempeature	Not Plausible		LSCAN-MR
1184 / 3	-	14415	Engine Turbocharger 1 Turbine Outlet Tempeature	Circuit High		LSCAN-MR
1184 / 4	-	14416	Engine Turbocharger 1 Turbine Outlet Tempeature	Circuit Low		LSCAN-MR
1213 / 12	-	16327	Malfunction Indicator Lamp (MIL)	Control Circuit		LSCAN-MR
1227 / 7	-	14261	Constant Throttle System	System Performance		LSCAN-MR
1231 / 9	-	10204	High Speed CAN Communication Bus	Lost Communication		LSCAN-MR
1268 / 3	-	12432	Engine Ignition Coil #1	Circuit High		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
1268 / 4	-	12433	Engine Ignition Coil #1	Circuit Low		LSCAN-MR
1268 / 5	-	12434	Engine Ignition Coil #1	Open Circuit		LSCAN-MR
1269 / 3	-	12435	Engine Ignition Coil #2	Circuit High		LSCAN-MR
1269 / 4	-	12436	Engine Ignition Coil #2	Circuit Low		LSCAN-MR
1269 / 5	-	12437	Engine Ignition Coil #2	Open Circuit		LSCAN-MR
1270 / 3	-	12438	Engine Ignition Coil #3	Circuit High		LSCAN-MR
1270 / 4	-	12439	Engine Ignition Coil #3	Circuit Low		LSCAN-MR
1270 / 5	-	12440	Engine Ignition Coil #3	Open Circuit		LSCAN-MR
1271 / 3	-	12441	Engine Ignition Coil #4	Circuit High		LSCAN-MR
1271 / 4	-	12442	Engine Ignition Coil #4	Circuit Low		LSCAN-MR
1271 / 5	-	12443	Engine Ignition Coil #4	Open Circuit		LSCAN-MR
1272 / 3	-	12444	Engine Ignition Coil #5	Circuit High		LSCAN-MR
1272 / 4	-	12445	Engine Ignition Coil #5	Circuit Low		LSCAN-MR
1272 / 5	-	12446	Engine Ignition Coil #5	Open Circuit		LSCAN-MR
1273 / 3	-	12447	Engine Ignition Coil #6	Circuit High		LSCAN-MR
1273 / 4	-	12448	Engine Ignition Coil #6	Circuit Low		LSCAN-MR
1273 / 5	-	12449	Engine Ignition Coil #6	Open Circuit		LSCAN-MR
1387 / 2	-	18417	Reductant Pressure Sensor	Circuit Range/Performance		LSCAN-MR
1387 / 3	-	18415	Reductant Pressure Sensor	Circuit High		LSCAN-MR
1387 / 4	-	18416	Reductant Pressure Sensor	Circuit Low		LSCAN-MR
1390 / 0	-	12409	Engine Fuel Valve 1 Inlet Absolute Pressure	Above Measuring Range		LSCAN-MR
1390 / 1	-	12410	Engine Fuel Valve 1 Inlet Absolute Pressure	Below Measuring Range		LSCAN-MR
1390 / 17	-	12408	Engine Fuel Valve 1 Inlet Absolute Pressure	Too Low		LSCAN-MR
1623 / 9	19009	-	Tachograph Output Shaft Speed	Abnormal Update Rate		CAN-J1939
1623 / 19	19019	-	Tachograph Output Shaft Speed	Received Network Data in Error		CAN-J1939
1624 / 9	19109	-	Tachograph Vehicle Speed	Abnormal Update Rate		CAN-J1939
1624 / 19	19119	-	Tachograph Vehicle Speed	Received Network Data in Error		CAN-J1939
1633 / 9	19209	-	Cruise Control Pause Switch	Abnormal Update Rate		CAN-J1939
1633 / 14	19214	-	Cruise Control Pause Switch	Plausibility Check Failed (Check Stalk Switch Wiring)	- Check wiring of stalk switch - Check parameter 13/37	18/06 and 12/07

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
1633 / 19	19219	-	Cruise Control Pause Switch	Received Network Data in Error		CAN-J1939
1636 / 3	-	13515	Ambient Air Combi Sensor, Part Temperature	Circuit High		LSCAN-MR
1636 / 4	-	13516	Ambient Air Combi Sensor, Part Temperature	Circuit Low		LSCAN-MR
1695 / 0	-	12413	Engine Exhaust Gas Oxygen Sensor (Lambda Sensor) Fueling Correction	Control Deviation Too High		LSCAN-MR
1695 / 2	-	12450	Engine Exhaust Gas Oxygen Sensor (Lambda Sensor) Fueling Correction	Drift Not Plausible		LSCAN-MR
1716 / 9	19309	-	Retarder Selection, non-engine	Abnormal Update Rate		CAN-J1939
1716 / 19	19319	-	Retarder Selection, non-engine	Received Network Data in Error		CAN-J1939
1761 / 1	-	16029	Reductant Level	Level Low		LSCAN-MR
1761 / 18	-	14270	Tier4i Reductant Level Sensor	Level Too Low		LSCAN-MR
1761 / 3	-	16015	Reductant Level Sensor	Circuit High		LSCAN-MR
1761 / 4	-	16016	Reductant Level Sensor	Circuit Low		LSCAN-MR
1908 / 3	-	18107	SCR Air Pressure Shut-Off Valve Solenoid	Circuit High		LSCAN-MR
1908 / 4	-	18106	SCR Air Pressure Shut-Off Valve Solenoid	Circuit Low		LSCAN-MR
1908 / 5	-	18109	SCR Air Pressure Shut-Off Valve Solenoid	Circuit Open		LSCAN-MR
2436 / 9	-	12712	Generator Speed Sensing	Signal-Timeout		LSCAN-MR
2791 / 0	-	13215	Exhaust Gas Recirculation	Temperature Sensor Circuit High		LSCAN-MR
2791 / 1	-	13216	Exhaust Gas Recirculation	Temperature Sensor Circuit Low		LSCAN-MR
2791 / 2	-	16679	Exhaust Gas Recirculation	System Performance, Temperature Diagnosis		LSCAN-MR
2791 / 7	-	16678	Exhaust Gas Recirculation	System Performance, Universal Control Error		LSCAN-MR
2791 / 12	-	13332	Exhaust Gas Recirculation	Temperature Too High/Too Low		LSCAN-MR
2797 / 3	-	14805	Engine Injector Group 1	Circuit High		LSCAN-MR
2797 / 4	-	14806	Engine Injector Group 1	Circuit Low		LSCAN-MR
2797 / 5	-	12427	Engine Injector Group 1	Open Circuit		LSCAN-MR
2797 / 9	-	19846	Engine Injector Group 1, Cylinder Contribution/Balance	Timeout		LSCAN-MR
2798 / 3	-	14905	Engine Injector Group 2	Circuit High		LSCAN-MR
2798 / 4	-	14906	Engine Injector Group 2	Circuit Low		LSCAN-MR
2798 / 5	-	12428	Engine Injector Group 2	Open Circuit		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
3031 / 3	-	16115	Reductant Tank Temperature Sensor	Circuit High		LSCAN-MR
3031 / 4	-	16116	Reductant Tank Temperature Sensor	Circuit Low		LSCAN-MR
3031 / 7	-	16169	Reductant Tank Temperature Sensor	Circuit		LSCAN-MR
3050 / 7	-	14247	NOx Emission SCR Catalyst	SCR Catalyst Error		LSCAN-MR
3050 / 13	-	16949	SCR System Calibration	Calibration Error		LSCAN-MR
3217 / 0	-	12414	Aftertreatment 1 Intake %O2 (Lambda Sensor)	Above Measuring Range		LSCAN-MR
3217 / 1	-	12415	Aftertreatment 1 Intake %O2 (Lambda Sensor)	Below Measuring Range		LSCAN-MR
3217 / 2	-	12451	Aftertreatment 1 Intake %O2 (Lambda Sensor)	Not Plausible		LSCAN-MR
3219 / 1	-	12823	NOx Sensor	Operation Temperature Not Reached		LSCAN-MR
3220 / 9	-	12804	NOx Concentration	Lost Message		LSCAN-MR
3222 / 0	-	12416	Aftertreatment 1 Intake Gas Sensor (Lambda Sensor) Heater Preliminary FMI	Above Measuring Range		LSCAN-MR
3222 / 1	-	12417	Aftertreatment 1 Intake Gas Sensor (Lambda Sensor) Heater Preliminary FMI	Below Measuring Range		LSCAN-MR
3222 / 2	-	12418	Aftertreatment 1 Intake Gas Sensor (Lambda Sensor) Heater Preliminary FMI	Measuring Range Not Plausible		LSCAN-MR
3224 / 3	-	12815	NOx Sensor	Circuit High (Bank 1)		LSCAN-MR
3224 / 4	-	12816	NOx Sensor	Circuit Low (Bank 1)		LSCAN-MR
3224 / 16	-	14234	NOx Emission	Level 2 Exceeded		LSCAN-MR
3226 / 15	-	14246	NOx Emission	Increased Raw Emission		LSCAN-MR
3234 / 2	-	14237	NOx Sensor (Bank 1)	Circuit Range/Performance		LSCAN-MR
3234 / 12	-	14245	NOx Emission NOx Sensor	Sensor Error		LSCAN-MR
3234 / 13	-	14244	NOx Sensor	Sensor Readiness Error		LSCAN-MR
3242 / 3	-	14207	Diesel Oxidation Catalyst Inlet Temperature Sensor	Circuit High		LSCAN-MR
3242 / 4	-	14208	Diesel Oxidation Catalyst Inlet Temperature Sensor	Circuit Low		LSCAN-MR
3246 / 1	-	14238	Diesel Particulate Filter Operation Temperature	Temperature Not Reached		LSCAN-MR
3250 / 3	-	14209	Diesel Oxidation Catalyst Outlet Temperature Sensor	Circuit High		LSCAN-MR
3250 / 4	-	14210	Diesel Oxidation Catalyst Outlet Temperature Sensor	Circuit Low		LSCAN-MR
3251 / 0	-	14215	Diesel Particulate Filter Differential Pressure	Pressure Too High		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
3251 / 1	-	14216	Diesel Particulate Filter Differential Pressure	Pressure Too Low		LSCAN-MR
3251 / 7	-	14231	Diesel Particulate Filter	Component Not Present		LSCAN-MR
3251 / 15	-	14258	Diesel Particulate Filter Regeneration	Regeneration Insuffcient		LSCAN-MR
3361 / 3	-	18207	Prop. Valve 7, Reductant Injector (Bank 1 Unit 1)	Circuit High		LSCAN-MR
3361 / 3	-	18907	Reductant Injector (Bank 1 Unit 1)	Circuit High		LSCAN-MR
3361 / 4	-	18206	Prop. Valve 7, Reductant Injector (Bank 1 Unit 1)	Circuit Low		LSCAN-MR
3361 / 4	-	18208	Prop. Valve 7, Reductant Injector (Bank 1 Unit 1)	Circuit Low		LSCAN-MR
3361 / 4	-	18906	Reductant Injector (Bank 1 Unit 1)	Circuit Low		LSCAN-MR
3361 / 5	-	18209	Prop. Valve 7, Reductant Injector (Bank 1 Unit 1)	Circuit / Open		LSCAN-MR
3361 / 5	-	18909	Reductant Injector (Bank 1 Unit 1)	Circuit / Open		LSCAN-MR
3363 / 3	-	14266	Reductant Tank Heating Solenoid Valve	Circuit High		LSCAN-MR
3363 / 3	-	15907	Prop. Valve 8, Reductant Tank Heating Solenoid Valve	Circuit High		LSCAN-MR
3363 / 4	-	14265	Reductant Tank Heating Solenoid Valve	Circuit Low		LSCAN-MR
3363 / 4	-	15906	Prop. Valve 8, Reductant Tank Heating Solenoid Valve	Circuit Low		LSCAN-MR
3363 / 5	-	14267	Reductant Tank Heating Solenoid Valve	Circuit Open		LSCAN-MR
3363 / 5	-	15909	Prop. Valve 8, Reductant Tank Heating Solenoid Valve	Circuit Open		LSCAN-MR
3363 / 7	-	14268	Reductant Tank Heating Solenoid Valve	Circuit, Component Defective		LSCAN-MR
3363 / 7	-	15969	Prop. Valve 8, Reductant Tank Heating Solenoid Valve	Circuit, Component Defective		LSCAN-MR
3363 / 14	-	14276	Euromot3b / Tier4i Engine Cold Operation	Invalid Engine Cold Operation		LSCAN-MR
3464 / 2	-	14224	Intake Throttle Highside Transistor	Control Module Performance		LSCAN-MR
3464 / 3	-	14200	Intake Throttle Direction Signal	Circuit High		LSCAN-MR
3464 / 4	-	14201	Intake Throttle Direction Signal	Circuit Low		LSCAN-MR
3464 / 6	-	12407	Intake Throttle Direction Signal	Command Current Too High		LSCAN-MR
3465 / 3	-	14204	Intake Throttle	Circuit Open		LSCAN-MR
3465 / 4	-	14202	Intake Throttle	Circuit Low		LSCAN-MR
3465 / 5	-	14203	Intake Throttle	Circuit High		LSCAN-MR
3485 / 2	-	18517	Reductant Injection Air Pressure Sensor	Circuit Range/Performance		LSCAN-MR
3485 / 3	-	18515	Reductant Injection Air Pressure Sensor	Circuit High		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
3485 / 4	-	18516	Reductant Injection Air Pressure Sensor	Circuit Low		LSCAN-MR
3509 / 2	-	14239	5V Output Reference Voltage 1	Voltage Too High/Too Low		LSCAN-MR
3510 / 2	-	14240	5V Output Reference Voltage 2	Voltage Too High/Too Low		LSCAN-MR
3511 / 5	-	14241	Sensor Reference Voltage “A”	Circuit Open		LSCAN-MR
3512 / 5	-	14242	Sensor Reference Voltage “B”	Circuit Open		LSCAN-MR
3513 / 5	-	14243	Sensor Reference Voltage “C”	Circuit Open		LSCAN-MR
3515 / 3	-	18315	Reductant Temperature Sensor	Circuit High Input		LSCAN-MR
3515 / 4	-	18316	Reductant Temperature Sensor	Circuit Low Input		LSCAN-MR
3516 / 1	-	14236	NOx Emission Reducant Dosing	Unsufficient Reductant Dosing		LSCAN-MR
3516 / 14	-	14249	NOx Emission Reductant Dosing	Reductant Quality/Unsufficient Reductant Dosing/SCR Catalyst Error		LSCAN-MR
3516 / 18	-	14248	NOx Emission Reductant Dosing	Reductant Quality/Unsufficient Reductant Dosing		LSCAN-MR
3520 / 18	-	14235	NOx Emission Reductant	Reductant Quality		LSCAN-MR
3597 / 2	-	14227	Proportional Valve Bank 1	Control Module Performance		LSCAN-MR
3597 / 3	-	14225	Proportional Valve Bank 1	Circuit High		LSCAN-MR
3597 / 4	-	14226	Proportional Valve Bank 1	Circuit Low		LSCAN-MR
3605 / 3	-	14252	Coolant Pump Control	Circuit High		LSCAN-MR
3605 / 4	-	14250	Coolant Pump Control	Circuit Low		LSCAN-MR
3605 / 5	-	14251	Coolant Pump Control	Circuit Open		LSCAN-MR
3609 / 2	-	14232	Diesel Particulate Filter Inlet Pressure Sensor	Circuit Range/Performance		LSCAN-MR
3609 / 3	-	14211	Diesel Particulate Filter Inlet Pressure Sensor	Circuit High		LSCAN-MR
3609 / 4	-	14212	Diesel Particulate Filter Inlet Pressure Sensor	Circuit Low		LSCAN-MR
3610 / 2	-	14233	Diesel Particulate Filter Outlet Pressure Sensor	Circuit Range/Performance		LSCAN-MR
3610 / 3	-	14213	Diesel Particulate Filter Outlet Pressure Sensor	Circuit High		LSCAN-MR
3610 / 4	-	14214	Diesel Particulate Filter Outlet Pressure Sensor	Circuit Low		LSCAN-MR
3673 / 0	-	12421	Engine Throttle Position 2	Above Measuring Range		LSCAN-MR
3673 / 1	-	12422	Engine Throttle Position 2	Below Measuring Range		LSCAN-MR
3673 / 2	-	12423	Engine Throttle Position 2	Measuring Range Not Plausible		LSCAN-MR
3826 / 0	-	18790	Average Reductant Consumption	Consumption Too High		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
3826 / 1	-	18791	Average Reductant Consumption	Consumption Too Low		LSCAN-MR
3828 / 0	-	18690	Current Reductant Consumption	Consumption Too High		LSCAN-MR
3828 / 1	-	18691	Current Reductant Consumption	Consumption Too Low		LSCAN-MR
4213 / 7	-	14275	Diagnostic Function Engine Cranking	Engine Cranking Without Fuel Injection		LSCAN-MR
4332 / 12	-	16293	Aftertreatment 1 SCR System State	Control Module Performance		LSCAN-MR
4334 / 1	-	16770	Reductant Pressure System	Pressure Decrease Too Low (Shut Off Sequence)		LSCAN-MR
4334 / 7	-	14219	SCR Dosing Unit	Air Route Plugged		LSCAN-MR
4334 / 12	-	14220	SCR Dosing Unit	Pressure Route Plugged		LSCAN-MR
4334 / 18	-	16721	Reductant Pressure System	Reductant Pressure Too Low		LSCAN-MR
4335 / 0	-	16820	SCR Air Pressure System	Pressure Too High		LSCAN-MR
4335 / 1	-	16821	SCR Air Pressure System	Pressure Too Low		LSCAN-MR
4335 / 7	-	16883	SCR Air Pressure System	Missing Air Supply		LSCAN-MR
4335 / 14	-	14264	SCR Air Pressure System	Draining Pressure Pipe Not Performed		LSCAN-MR
4336 / 3	-	13707	SCR Air Pressure Control Valve Solenoid	Circuit Low		LSCAN-MR
4336 / 4	-	13706	SCR Air Pressure Control Valve Solenoid	Circuit High		LSCAN-MR
4336 / 5	-	13709	SCR Air Pressure Control Valve Solenoid	Circuit Open		LSCAN-MR
4354 / 3	-	15807	SCR Reductant Pipe Heating	Circuit High		LSCAN-MR
4354 / 4	-	15806	SCR Reductant Pipe Heating	Circuit Low		LSCAN-MR
4354 / 5	-	15809	SCR Reductant Pipe Heating	Circuit Open		LSCAN-MR
4354 / 7	-	15869	SCR Reductant Pipe Heating	Circuit		LSCAN-MR
4360 / 0	-	10797	SCR Catalyst Temperature Before Catalyst	Temperature Too High		LSCAN-MR
4360 / 2	-	13817	Catalyst Temperature Sensors	Range/Performance		LSCAN-MR
4360 / 15	-	10788	SCR Catalyst Temperature	Level 1 Exceeded		LSCAN-MR
4360 / 16	-	10789	SCR Catalyst Temperature	Level 2 Exceeded		LSCAN-MR
4363 / 0	-	10722	SCR Catalyst Temperature Behind Catalyst	Temperature Too High		LSCAN-MR
4364 / 15	-	12971	NOx Emission	Level 1 Exceeded		LSCAN-MR
4364 / 16	-	12972	NOx Emission	Level 2 Exceeded		LSCAN-MR
4375 / 0	-	16777	Reductant Pressure System Pump	Current Too High		LSCAN-MR
4375 / 3	-	13907	Reductant Supply Control	Curcuit High		LSCAN-MR

ADM3 fault code (J1939) SPN / FMI	ADM3 fault code (K-line)	MR2 fault code (K-line)	Fault location	Fault description	Remedial action	Pin
4375 / 4	-	13906	Reductant Supply Control	Curcuit Low		LSCAN-MR
4375 / 5	-	13909	Reductant Supply Control	Curcuit Open		LSCAN-MR
4794 / 14	-	10782	Aftertreatment 1 SCR Catalyst System	Component Not Present		LSCAN-MR
4809 / 3	-	10815	Catalyst Temperature Sensor (Bank 1 Sensor 1)	Circuit High Input		LSCAN-MR
4809 / 3	-	12404	Catalyst Temperature Sensor (Bank 1 Sensor 1)	Circuit High Input		LSCAN-MR
4809 / 4	-	10816	Catalyst Temperature Sensor (Bank 1 Sensor 1)	Circuit Low Input		LSCAN-MR
4809 / 4	-	12405	Catalyst Temperature Sensor (Bank 1 Sensor 1)	Circuit Low Input		LSCAN-MR
4810 / 3	-	10915	Catalyst Temperature Sensor (Bank 1 Sensor 2)	Circuit High		LSCAN-MR
4810 / 4	-	10916	Catalyst Temperature Sensor (Bank 1 Sensor 2)	Circuit Low		LSCAN-MR
520192 / 9	19409	-	Engine Start Stop Signals	Abnormal Update Rate		CAN-J1939
520192 / 19	19419	-	Engine Start Stop Signals	Received Network Data in Error		CAN-J1939
520230 / 0	-	18820	SCR Pressure Accumulator Bubble Pressure	Pressure Too High		LSCAN-MR
520230 / 2	-	14253	SCR Pressure Accumulator Bubble Pressure	Pressure Outside Range		LSCAN-MR
520258 / 7	-	14228	SCRT System Component	Component Not Present		LSCAN-MR
520259 / 2	-	14229	SCRT Temperature Sensors Pair A	Circuit Range/Performance		LSCAN-MR
520260 / 2	-	14230	SCRT Temperature Sensors Pair B	Circuit Range/Performance		LSCAN-MR
520262 / 14	-	16994	SCR System EGA	Disabled Mannheim-Function		LSCAN-MR
520262 / 14	-	16995	SCR System EGA	Disabled Wörth-Function		LSCAN-MR
520263 / 9	-	14272	Automatic Compression Detection Function	Timeout		LSCAN-MR
520263 / 14	-	14271	Automatic Compression Detection Function	Cancelling		LSCAN-MR

8.7.2 Error codes listed by K-line code

ADM3 fault code (K-line)	ADM3 fault code (J1939) SPN / FMI	Fault location	Fault description
10003	1072 / 3	Decompression Brake Valve (MBR_KD)	Open Circuit
10004	1072 / 4	Decompression Brake Valve (MBR_KD)	Short Circuit to Ground
10103	84 / 3	Vehicle Speed (C3 or J1939)	Open Circuit
10109	84 / 9	Vehicle Speed (C3 or J1939)	Abnormal Update Rate
10114	84 / 14	Vehicle Speed (C3 or J1939)	Signal Not Plausible
10119	84 / 19	Vehicle Speed (C3 or J1939)	Received Network Data in Error
10200	91 / 0	Accelerator Pedal (AFPS or J1939)	Not Adjusted
10203	91 / 3	Accelerator Pedal (AFPS or J1939)	Voltage too High
10204	91 / 4	Accelerator Pedal (AFPS or J1939)	Voltage too Low
10209	91 / 9	Accelerator Pedal (AFPS or J1939)	Abnormal Update Rate
10219	91 / 19	Accelerator Pedal (AFPS or J1939)	Received Network Data in Error
10400	98 / 0	Oil Level (from PLD/MR2)	Oil Level too High
10401	98 / 1	Oil Level (from PLD/MR2)	Low Oil Level
10414	98 / 14	Oil Level (from PLD/MR2)	Oil Level too Low
10501	100 / 1	Oil Pressure (from PLD/MR2)	Low Oil Pressure
10514	100 / 14	Oil Pressure (from PLD/MR2)	Oil Pressure too Low
10800	107 / 0	Air Filter Sensor (LF_SE)	Differential Pressure too High
10803	107 / 3	Air Filter Sensor (LF_SE)	Open Circuit
10804	107 / 4	Air Filter Sensor (LF_SE)	Short Circuit to Ground
10914	110 / 14	Coolant Temperature (from PLD/MR2)	Coolant Temperature too High
11001	111 / 1	Coolant Level Sensor (KW_SE)	Low Coolant Level
11003	111 / 3	Coolant Level Sensor (KW_SE)	Open Circuit
11004	111 / 4	Coolant Level Sensor (KW_SE)	Short Circuit to Ground
11014	111 / 14	Coolant Level Sensor (KW_SE)	Coolant Level too Low
11100	158 / 0	Battery Voltage Switched (Terminal 15)	Over Voltage
11101	158 / 1	Battery Voltage Switched (Terminal 15)	Under Voltage
11701	558 / 1	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Both Signals Equal but Should not
11705	558 / 5	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Both Switches Open Circuit
11709	558 / 9	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Abnormal Update Rate
11712	558 / 12	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Both Switches Closed
11719	558 / 19	Accelerator Pedal Idle Switch (GAS1 + GAS2 or J1939)	Received Network Data in Error
11809	599 / 9	Cruise Control Switch CC- (Set + Coast)	Abnormal Update Rate (Set Switch)
11812	599 / 12	Cruise Control Switch CC- (Set + Coast)	Both Switches CC- and CC+ Closed
11814	599 / 14	Cruise Control Switch CC- (Set + Coast)	Plausibility Check Failed (Check Stalk Switch Wiring)
11819	599 / 19	Cruise Control Switch CC- (Set + Coast)	Received Network Data in Error
11909	601 / 9	Cruise Control Switch CC+ (Res + Acc)	Abnormal Update Rate (Resume Switch)
11912	601 / 12	Cruise Control Switch CC+ (Res + Acc)	Both Switches CC+ and CC- closed
11914	601 / 14	Cruise Control Switch CC+ (Res + Acc)	Plausibility Check Failed (Check Stalk Switch Wiring)
11919	601 / 19	Cruise Control Switch CC+ (Res + Acc)	Received Network Data in Error
12002	609 / 2	PLD/MR2 Error	Unknown Cause
12103	620 / 3	Supply Analog Accelerator Pedal (AFP+)	Voltage too High
12104	620 / 4	Supply Analog Accelerator Pedal (AFP+)	Voltage too Low
12202	625 / 2	CAN Link ADM3 – PLD/MR2	No Communication with PLD/MR2
13303	677 / 3	Output Relay 1 (REL 1)	Open Circuit

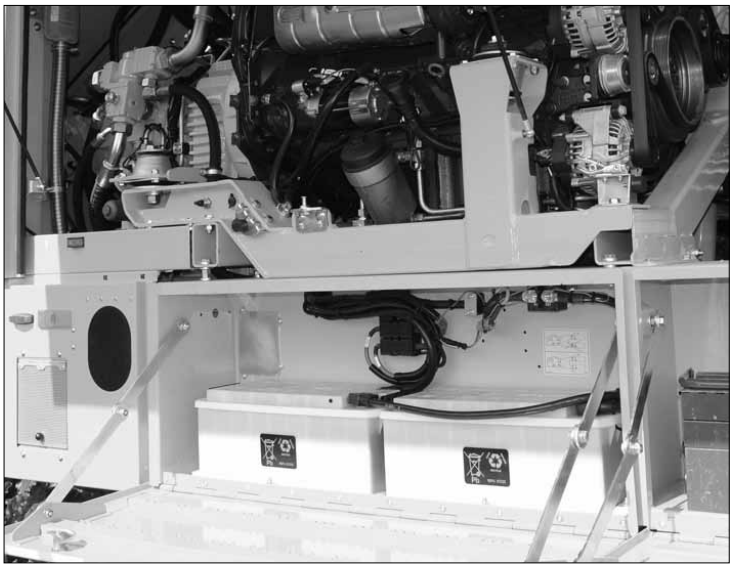
ADM3 fault code (K-line)	ADM3 fault code (J1939) SPN / FMI	Fault location	Fault description
13304	677 / 4	Output Relay 1 (REL 1)	Short Circuit to Ground
13900	730 / 0	Output Relay 2 (REL 2)	Grid Heater: No Increasing Boost Temperature After Activation
13901	730 / 1	Output Relay 2 (REL 2)	Relay Permanently Closed (Grid Heater)
13902	730 / 2	Output Relay 2 (REL 2)	Relay Permanently Open (Grid Heater)
13903	730 / 3	Output Relay 2 (REL 2)	Voltage too High when Activated
13904	730 / 4	Output Relay 2 (REL 2)	Voltage too Low when Activated
14003	729 / 3	Intake Air Heater (MBR_KD)	Open Circuit
14004	729 / 4	Intake Air Heater (MBR_KD)	Short Circuit to Ground
14202	974 / 2	Remote Throttle Pedal (HFG)	Supply Voltage Out of Range (Pin HFG+)
14203	974 / 3	Remote Throttle Pedal (HFG)	Voltage too High
14204	974 / 4	Remote Throttle Pedal (HFG)	Voltage too Low
14403	1004 / 3	Output Relay 4 (REL 4)	Open circuit
14404	1004 / 4	Output Relay 4 (REL 4)	Short Circuit to Ground
14503	1005 / 3	Output PWM Pedal Supply or Transmission (FP+)	Open Circuit
14504	1005 / 4	Output PWM Pedal Supply or Transmission (FP+)	Short Circuit to Ground
14603	1074 / 3	Exhaust Brake Valve (MBR_BK)	Open Circuit
14604	1074 / 4	Exhaust Brake Valve (MBR_BK)	Short Circuit to Ground
14902	639 / 2	SAE J1939 Interface	At Least One J1939 Message is Missing
15001	1015 / 1	PWM Accelerator Pedal (PWM FFG)	No Supply Voltage at Pin FP+
15003	1015 / 3	PWM Accelerator Pedal (PWM FFG)	No Signal at Path 1 (GAS1)
15004	1015 / 4	PWM Accelerator Pedal (PWM FFG)	No Signal at Path 2 (GAS2)
15005	1015 / 5	PWM Accelerator Pedal (PWM FFG)	Not Adjusted
15006	1015 / 6	PWM Accelerator Pedal (PWM FFG)	Idle Position Out of Adjusted Range
15007	1015 / 7	PWM Accelerator Pedal (PWM FFG)	Out of Adjusted Range
16603	171 / 3	Ambient Air Temperature	Voltage too High
16604	171 / 4	Ambient Air Temperature	Voltage too Low
16609	171 / 9	Ambient Air Temperature	Abnormal Update Rate
16619	171 / 19	Ambient Air Temperature	Received Network Data in Error
17309	69 / 9	Two Speed Axle Switch	Abnormal Update Rate
17319	69 / 19	Two Speed Axle Switch	Received Network Data in Error
17409	70 / 9	Parking Brake Switch	Abnormal Update Rate
17419	70 / 19	Parking Brake Switch	Received Network Data in Error
17509	96 / 9	Fuel Level	Abnormal Update Rate
17519	96 / 19	Fuel Level	Received Network Data in Error
17609	161 / 9	Transmission Input Shaft Speed	Abnormal Update Rate
17619	161 / 19	Transmission Input Shaft Speed	Received Network Data in Error
17709	191 / 9	Transmission Output Shaft Speed	Abnormal Update Rate
17719	191 / 19	Transmission Output Shaft Speed	Received Network Data in Error
17809	523 / 9	Transmission Current Gear	Abnormal Update Rate
17819	523 / 19	Transmission Current Gear	Received Network Data in Error
17909	524 / 9	Transmission Selected Gear	Abnormal Update Rate
17919	524 / 19	Transmission Selected Gear	Received Network Data in Error
18009	559 / 9	Accelerator Pedal Kickdown Switch	Abnormal Update Rate
18019	559 / 19	Accelerator Pedal Kickdown Switch	Received Network Data in Error
18109	573 / 9	Transmission Torque Converter Lockup Engaged	Abnormal Update Rate
18119	573 / 19	Transmission Torque Converter Lockup Engaged	Received Network Data in Error
18209	574 / 9	Transmission Shift in Process	Abnormal Update Rate
18219	574 / 19	Transmission Shift in Process	Received Network Data in Error
18309	596 / 9	Cruise Control Enable Switch	Abnormal Update Rate

ADM3 fault code (K-line)	ADM3 fault code (J1939) SPN / FMI	Fault location	Fault description
18319	596 / 19	Cruise Control Enable Switch	Received Network Data in Error
18409	597 / 9	Brake Switch	Abnormal Update Rate
18419	597 / 19	Brake Switch	Received Network Data in Error
18509	598 / 9	Clutch Switch	Abnormal Update Rate
18519	598 / 19	Clutch Switch	Received Network Data in Error
18609	600 / 9	Cruise Control Coast (Decelerate) Switch	Abnormal Update Rate
18619	600 / 19	Cruise Control Coast (Decelerate) Switch	Received Network Data in Error
18709	602 / 9	Cruise Control Accelerate Switch	Abnormal Update Rate
18719	602 / 19	Cruise Control Accelerate Switch	Received Network Data in Error
18809	904 / 9	Front Axle Speed	Abnormal Update Rate
18819	904 / 19	Front Axle Speed	Received Network Data in Error
18909	973 / 9	Engine Retarder Selection	Abnormal Update Rate
18919	973 / 19	Engine Retarder Selection	Received Network Data in Error
19009	1623 / 9	Tachograph Output Shaft Speed	Abnormal Update Rate
19019	1623 / 19	Tachograph Output Shaft Speed	Received Network Data in Error
19109	1624 / 9	Tachograph Vehicle Speed	Abnormal Update Rate
19119	1624 / 19	Tachograph Vehicle Speed	Received Network Data in Error
19209	1633 / 9	Cruise Control Pause Switch	Abnormal Update Rate
19214	1633 / 14	Cruise Control Pause Switch	Plausibility Check Failed (Check Stalk Switch Wiring)
19219	1633 / 19	Cruise Control Pause Switch	Received Network Data in Error
19309	1716 / 9	Retarder Selection, non-engine	Abnormal Update Rate
19319	1716 / 19	Retarder Selection, non-engine	Received Network Data in Error
19409	520192 / 9	Engine Start Stop Signals	Abnormal Update Rate
19419	520192 / 19	Engine Start Stop Signals	Received Network Data in Error

8.8 Jump-starting and charging the battery

Should it be necessary to jump-start **euro-Maus4**, on no account use a mains or generator-bound charger or jump-starting device since, if such devices are used, this will cause irreparable damage to the electronics of **euro-Maus4**.
Only other motor vehicles with a system voltage of 24 V or vehicle batteries with a battery voltage of 24 V and of adequate capacity may be used for jump-starting.

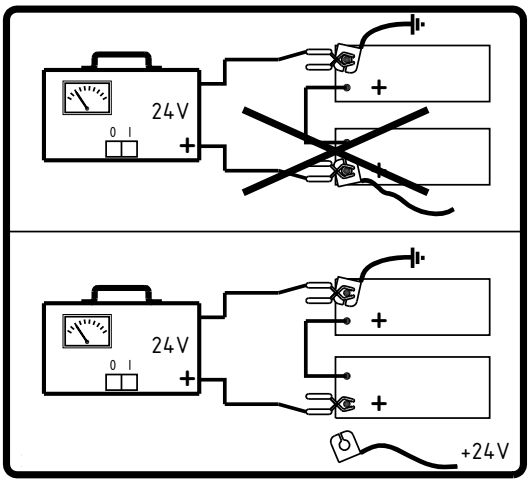
We expressly point out that quick charge devices and mains-connected jump-start devices are expressly prohibited for starting of **euro-Maus4**. Overvoltage damage caused by use of unapproved charging devices or jump-start devices are covered neither by the guarantee nor by the statutory warranty. No goodwill whatsoever is granted in case of such damage.



Charging the battery/jump-starting

The positive poles of the batteries must always be disconnected to charge the batteries. Sequence when disconnecting the battery: Always disconnect the negative pole (ground cable) first and then the positive pole. Switch off the main battery switch. Only normal battery charging devices may be used for charging the battery. **Quick charge devices are expressly prohibited!**

The charging current may at max. amount to one tenth of the nominal capacity of the battery.



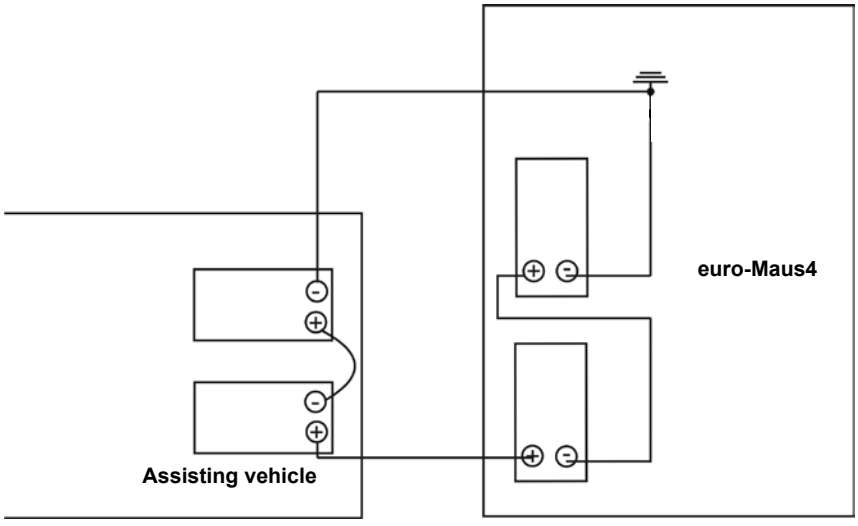
Since damage has been incurred several times in the past due to improper charging of the battery or jump-starting, we expressly want to point out that **euro-Maus4** may only be jump-started using the following method:

Attention

Attention! *Risk of injury. Always follow the safety information of the battery manufacturer when handling acid batteries.*

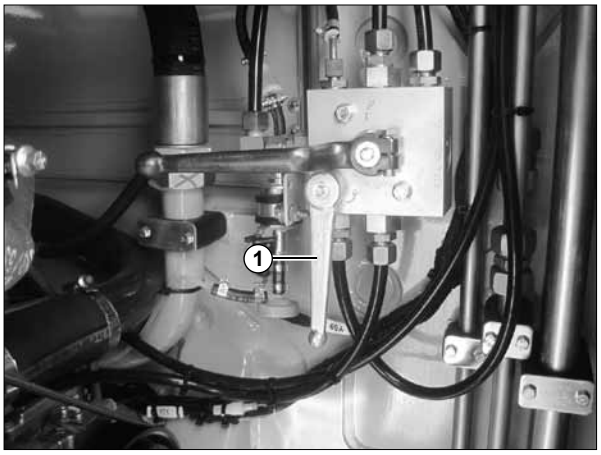
Jump-starting

- Only use standardized jump-starting cables with really adequate cross-section of the electrical conductors.
- Only use batteries with the same nominal voltage (24 V).
- Make sure of sufficient battery capacity of the assisting vehicle.
- Shut off the engines of both vehicles and switch off the ignition.
- Switch off the main battery switch on **euro-Maus4**; comply with a waiting time of 6 minutes. Then check whether the main battery switch has really opened (light in the engine housing may no longer be lit).
- Make sure that the two vehicles do not touch at any point.
- First connect the negative pole of the battery of the assisting vehicle to the negative pole of the battery of **euro-Maus4**. Alternatively, a bare-metal and electrically conductive point (e.g. ground strap of engine block) of the assisting vehicle may also be used with a similar point (ground strap) of the **euro-Maus4** to be started.
- Connect the positive pole of the battery of the assisting vehicle to the positive pole of the battery of **euro-Maus4**.
- Switch on the main battery switch of **euro-Maus4**.
- Start the engine of the assisting vehicle and accelerate this engine to a moderate speed.
- Start the engine of **euro-Maus4** and ensure that any attempt at starting does not last longer than 15 seconds.
- Before removing the jump start cable, in any case shut off the engine of the assisting vehicle, because otherwise the electronic system of the assisting vehicle may be damaged.
- Remove the jump start cable from both vehicles in reverse order (first remove the positive cable, then the negative cable).



8.9 Fuel reserve

euro-Maus4 is fitted with an intermediate tank. A small part of the intermediate tank volume is available to you as reserve quantity. If you have not refueled recently, you still have adequate fuel to swing in the truck conveyor **immediately** and to lower the counterweight arm for refueling **immediately**.



To do this, press the lever 90° downwards (**1**) at the control block of the fuel supply.
In order to do this, refuel the machine and then **immediately** swivel the reserve cock (**1**) back to initial position (horizontal).

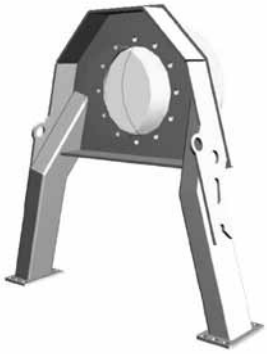
8.10 Jacking up for wheel change

- In order to jack up the vehicle, park **euro-Maus4** on even ground with an adequate load bearing capacity.
- Fold out the pickup. The truck conveyor and counterweight arm remain in transport position.
- Secure the machine against moving off of its own accord by applying the parking brake and with wheel chocks.
- For jacking up, you will require an (hydraulic) car jack with a load bearing capacity of at least 15t.
- Position the jack as shown in the illustrations below.

Lifting euro-Maus4 with an hydraulic car jack

Securing the raised euro-Maus4 by means of a sturdy support

As soon as the machine is jacked up, it must also be secured against falling down with solid squared timbers with an adequate load bearing capacity or with similar materials. When changing wheels, we recommend using the ROPA jack stand (ROPA Item No.: 018680) on the wheel hub.



Warning! *Risk of very severe injuries due to* ***euro-Maus4*** *dropping down! For reasons of safety,* ***euro-Maus4*** *may always be jacked up only at one axle and on one side.*

8.11 Welding work on the machine

When welding on the machine, the batteries must always be disconnected. The ground cable of the welding transformer must be connected as close as possible to the welding position.

Attention

Attention! *Welding work on the machine may only be performed by people sufficiently qualified for the respective work under regional regulations. Welding on structural parts or parts with a safety function may only be performed after enquiry with ROPA, to the extent as it is admissible under the respective applicable regulations. All welding may only be performed as per applicable standards and the recognized rules of engineering. Always observe the increased fire hazard when welding near combustible parts or liquids (fuel oil, oils, greases, tires, etc.).*
We expressly point out that ROPA does not assume any warranty for damage to the machine caused by improper welding work.

8.12 Connecting salvaging aids

Proceed as follows for coupling of salvaging aids (steel wires, chains, ropes, salvaging nooses, belts, etc.):

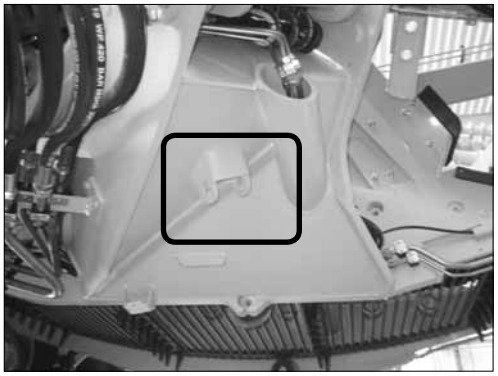
Connecting salvaging aids to the rear of the machine:

– Fasten salvaging aids to to the rear towing lug (**1**) in such a manner that the machine cannot be damaged.

(1) Rear towing lug

Connecting salvaging aids to the front of the machine:

– Fold up both side sections and secure using the securing chains available.
– Connect the salvaging aids at the left and right at the points illustrated.



Hinweis

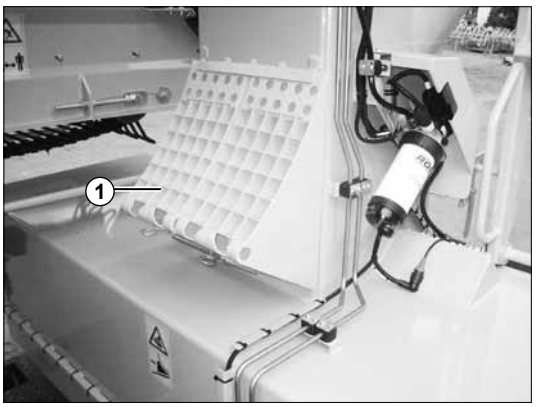
Note! *Always make sure of sufficient stability of the salvaging aids. Consider that the load caused on the salvaging aids during salvaging of a vehicle may amount to several times the normal vehicle weight. When salvaging the machine, call in experts with as much experience as possible and always use devices with sufficient load bearing capacity and suitable vehicles.*

8.13 Towing

If it should be necessary to tow the machine, then always observe the regional regulations on the towing vehicle and on securing of the vehicle combination on public roads and paths.

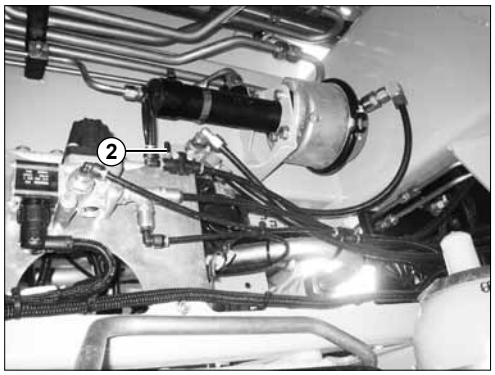
Proceed as follows for towing:

– Shut off the engine.
– Engage the parking brake and additionally secure the machine against inadvertent moving off of its own accord using the two wheel chocks (**1**).



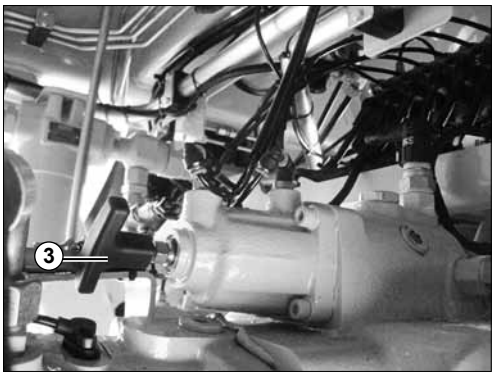
Chocks on the fuel tank

– It is essential that you set the reduction gear to neutral position as described below.
-- Shut off compressed air supply of working pneumatics. For this purpose, turn the red plastic stopcock (**2**) above the transmission crosswise to the course of the line.
– ONLY for operating mode "Turtle".



Stopcock open, turn by 90° to close.

– Pull out the shift rod (**3**) (in the front side of the reduction gear) approx. 26 to 30 mm. Neither of the two gears may be engaged.



*Shift rod (**3**) on the front side of the reduction gear*

***Warning!** When the engine is shut off, the vehicle is very difficult to steer! The emergency steering pump functions correctly only at speeds above approx. 4 km/h. Caution if the brake is not functioning! Only use vehicles with sufficient braking power to tow **euro-Maus4**. For towing, exclusively use load-securing devices with sufficient load-bearing capacity. No other vehicles may be towed or trailers pulled by **euro-Maus4**.*

It is impossible to start up the engine of euro-Maus4 by tow starting or roll/bump-starting. If necessary, the assisting vehicle may inject compressed air via the compressed air coupling. The maximum permitted injection pressure is 8.5 bar.

8.14 Manual release of the parking brake

Sufficient pressure must be available in the compressed air system to release the parking brake. In an emergency, the parking brake may even be released if there is insufficient pressure for the braking system. For this purpose, the spring-loaded cylinder must be released manually.
This may be done only if the diesel engine and traction drive are fully functional and at least a partial braking action can be generated with the traction drive.

STOP
Danger

Danger! *Risk of lethal injury owing to the machine moving off of its own accord. Before releasing the spring-loaded cylinder, the machine must be secured against moving off of its own accord using both chock. Work on the vehicle brakes may only be performed by specialist personnel with corresponding training (for instance, motor vehicle mechanics, agricultural machinery mechanics, brake service, etc.) in compliance with the applicable safety regulations.*

(4) Release screw

Releasing the spring-loaded cylinder:

- Shut off the engine and secure it against inadvertent starting.
- Secure the vehicle against rolling away using the two wedges.
- Using a box wrench SW 24, turn the emergency release bolt (**4**)(hexagonal bolt at the center of the cylinder) counter-clockwise adequately (maximum torque 35 Nm, travel approx. 70 mm) until a fixed stop can be felt.
- The spring-loaded cylinders are released, the vehicle is completely unbraked.
- The vehicle may, in compliance with the corresponding safety regulations and securing measures, be towed to the nearest safe parking location.

STOP
Danger

Danger! *Never park the vehicle unsecured when the spring-loaded cylinders are released. Secure the vehicle against rolling away using chocks of sufficient size. In the field of view of the driver, affix a conspicuous sign bearing the text: "Danger! Vehicle brakes do not work! Spring-loaded cylinders are released". Keep the ignition key in a secure place.*

Working on the spring-loaded cylinders is dangerous and may only be performed by persons trained to do this work and who are familiar with working on preloaded spring assemblies.

Warning! *Danger of severe injuries from parts flung away with great force. Never open the spring-loaded cylinder. The parts inside of the spring-loaded cylinder are preloaded with high spring force and may be flung away and injure persons if the spring-loaded cylinders are opened incorrectly.*

8.15 Readjusting the brake

Work on the vehicle brakes may only be performed by specialist personnel with corresponding training (for instance, motor vehicle mechanics, agricultural machinery mechanics, brake service, etc.) in compliance with the applicable safety regulations.

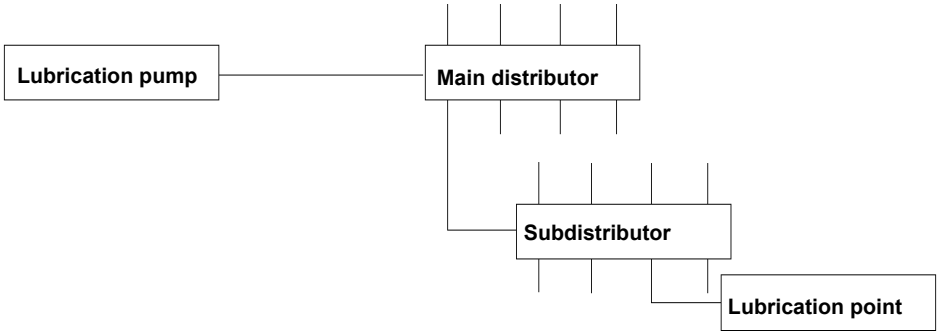
The wedge brake is fitted with an automated readjusting device. Readjusting the brake is therefore not required.

8.16 Hydraulic valves

All hydraulics valves are electrically controlled. Problems on solenoid valves may be located using specific test cables (ROPA Art. Nr. 330197), which are supplied with each machine. These test cables may only be connected to the solenoid valves by trained and instructed specialist personnel.
If an electrically controlled valve should malfunction, then in any case, without exception, call in a specialist. In no case should a try be made, by shaking the solenoid valve concerned, to remedy possible contact problems or a possible line break. If the valve is suddenly opened during such tries, then the person concerned may suffer deadly injuries.

Warning! *Troubleshooting and fault repairs on* ***all*** *components of the hydraulic system are exclusively the task of trained specialists. We expressly warn against attempts to repair or arbitrary tests in unauthorized manner on electromagnetically operated hydraulic valves. If, during such tests or attempts to repair, parts of the hydraulics system are suddenly pressurized, this may lead to unintentional machine movements. This may jam persons or even lead to crush injuries.*

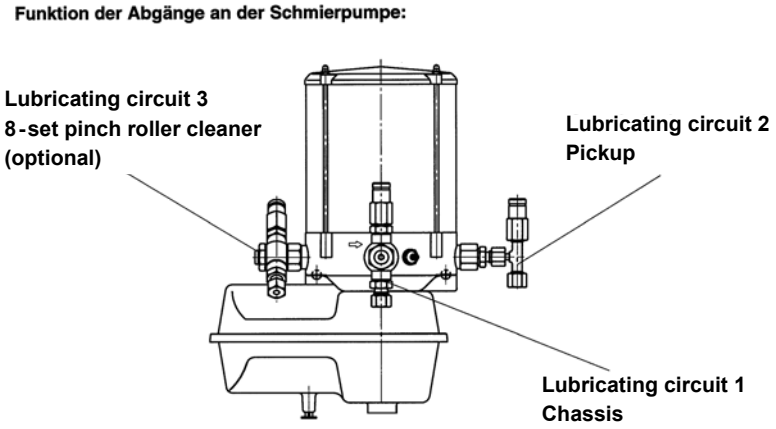
8.17 Central lubrication system – bleeding and removal of blockages



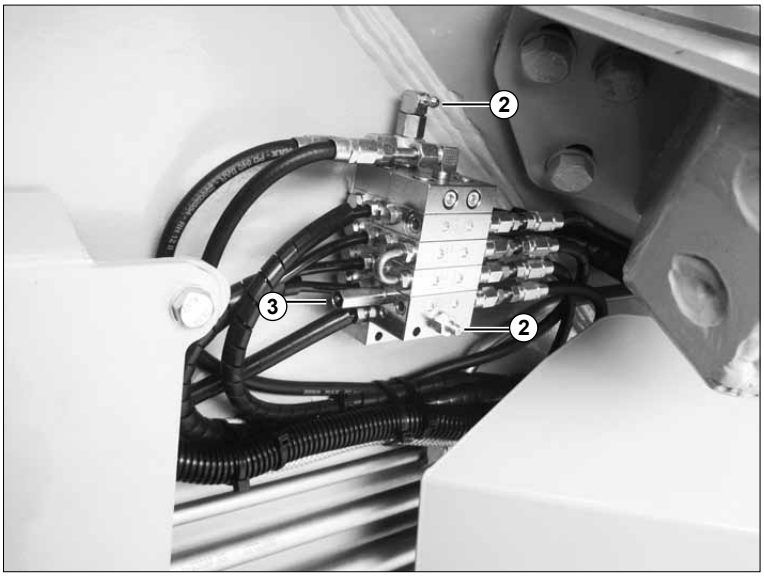
During all work on the central lubrication system, make sure of utmost cleanliness. In no case should dirt enter the lubrication system.
If the grease reservoir should, inadvertently, have been run empty, then the lubricating pump must be bled. For this purpose, remove the main line from the main distributor and switch on the pump until air-free grease escapes from the main line (see "Switching on the pump") Screw a lubricating nipple into the inlet of the main distributor and pump grease or use a hand-lever grease gun to inject grease into the main distributor until the grease escapes at the bearings. Then reconnect all line connections again.
Should the line system be blocked, the grease is ejected at the pressure relief valve (directly at the line outlet of the pump). To remove this block, proceed as follows:

(1) Pressure relief valve

– Search for the blockage in the line system. Follow the more rigid grease line away from the lubricating pump via the main distributor (the blocked line is more rigid because it is under pressure) and on to the corresponding sub-distributor and from there to the blocked lubricating point. Please refer to the illustration below for the design of the central lubrication system. You can find a detailed plan in Chapter 9.
– Unscrew the line from the consumption point and screw a lubricating nipple into the corresponding (sub-) distributor.
– Try to dislodge the blockage by strongly pressing grease into the distributor using the hand lever grease gun.
– Proceed systematically: From the lubricating pump to the main distributor, from there to the sub-distributor, etc.
– When you notice that the line is free again, reconnect the line to the consumption point. Check that the line is unobstructed by performing intermediate lubrication.
– If you should not be successful using the method described here, then contact your ROPA service location.



The following applies to all machine as of model year 2012:
All distributors are provided with a lubricating nipple (**2**). This lubricating nipple is used to facilitate troubleshooting.
All lubricating points of the sub-distributor can be supplied with grease via this lubricating nipple since there is a non-return valve in the outlet of the main distributor.
There is no non-return valve between the lubricating pump and main distributor. You can see the main distributors from the integrated lift-pin indicator (**3**). If you feel only a slight resistance when lubricating the lubricating nipple on the main distributor, the grease can flow unhindered into the grease supply reservoir of the central lubricating pump. In this case, turn the vane in the central lubricating pump through approx. 120° by performing intermediate lubrication.



8.18 Emergency operation - fan drive

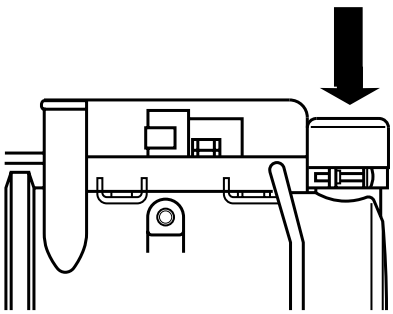
To check if the fan wheel of the radiator system is really running at maximum speed, the plug (**4**) designated (Y 99) may be disconnected from the hydraulic pump as a check. Then, the fan should be running at maximum speed.
If the cooling performance does not improve from this measure, then the machine may only be operated at reduced load.

8.19 Independent heating system (optional) – measures to be taken if errors occur

When errors occur, the fuses and plug-in connections must be checked for perfect condition and tight fit.

If these measures do not serve to remedy the error, then please contact a Webasto servicing outlet (www.webasto.com) stating the model of your independent heating system (Thermo 90 ST.25.D 24V).

Heating is automatically switched off = shutdown due to malfunction	
Cause	**Remedy**
No combustion after starting and repeated starting. Flame goes out during operation.	Switch off heating device and switch it on again. If again the heating system does not work, contact a Webasto servicing outlet.
Voltage drop for longer than 20 seconds.	Check fuses, plug-in connections and charging state of the battery.
Heating device is overheated due to lacl/ loss of coolant liquid.	Fill up coolant as stated in information from the vehicle manufacturer.
Shutdown is caused by temperature limiter (overheating).	Let the device cool down, then depress button (**1**) of the temperature limiter before restarting.



Error code output

When an error occurs, the display of the timer shows an error message.

Error code output on the display of the timer

F--	Heating system is locked Remedy: Switch on the independent heating system and, during the 90 second error delayed switch-off, withdraw fuse F15 (in the central electrical system cabinet) and fuse F43 (in the radio console, at bottom) for a few seconds.
F01	No start (after 2 attempts at starting)
F02	Flame interruption
F03	Undervoltage or overvoltage
F04	Premature flame detection
F05	Flame monitor interruption or flame monitor short circuit
F06	Temperature sensor interruption or temperature sensor short circuit
F07	Dosing pump interruption or dosing pump short circuit
F08	Fan motor interruption or fan motor short circuit or fan motor faulty speed
F09	Glow plug interruption or glow plug short circuit
F10	Overheating
F11	Circulating pump interruption or circulating pump short circuit

Chapter 9

Schedules and Tables/Plans and Diagrams/Maintenance Slips

9 Schedules and Tables/Plans and Diagrams/Maintenance Slips

9.1 Lubricating and operating supplies euro-Maus4 starting from 2010

Component	Lubricant type	Filling volume in liters	Intervals
Diesel engine			
Engine oil	**Engine oil, partially synthetic** multigrade oil as per **MB standard 228.5** MB standard 228.51 is also permitted	about 24-29 (min-max)	every 400 oper. hours, in case of operation using FAME/ RME see maintenance table
Cooling system	Corrosion/antifreeze agent -40° as per **MB standard 325.0 and 326.0**	about 37.5	every 3 years
Fuel tank	**Diesel fuel DIN EN 590** Rape seed methyl ester (FAME or RME) DIN EN14214	1190	when needed
Intermediate tank		(35)	– –
AdBlue® tank	**AdBlue®/DEF DIN 70070 / ISO22241**	95	when needed
Axles			annually
Front axle Differential gears Planetary gear unit (2 units)	**Transmission oil** API GL 5, SAE 90	about 22 ea abt. 3.5	
Rear axle Differential gears Planetary gear unit (2 units)		about 20 ea abt. 3.5	
Pickup			
Gear unit for pickup rollers 2 pcs. Gear unit for conveyor rollers 2 pcs. Gear unit for 4-set pinch rollers Gear unit for 8-set pinch rollers		ea abt. 9.0 ea abt. 3.5 ea abt. 4.3 about 6.0	annually
Other parts			
Manual transmission 4-gear	**Fully synthetic gear oil** API GL5, SAE 75W-90 as per ZF standard TE-ML 05B	about 12.0	annually
Pump distributor gear unit	**ATF gear oil** ATF oil as per Dexron II D	about 10.0	
Hydraulic system	**HVLP 46 hydraulic fluid** (containing zinc) ISO-VG 46 as per DIN51524 part 3	about 190	
Lubricating points	**Lubricating grease** Grease as per DIN 51825, NLGI class 2, type: KP2K-20, at low outdoor temperatures KP2K-30.		According to the lubricating plan

Decisive for the filling capacities are the oil level control bolts and sight glasses!

If the oil varieties stated should not be available, then ONLY oils and greases from the conversion table of ROPA may be used or mediums completely corresponding to those prescribed by ROPA based on international conversion tables.

9.2 Maintenance table for euro-Maus4

Maintenance work	before harvest start	daily	after the first 50 oper. hrs.	Maintenance intervals			when needed	annually
				every 50 oper. hrs.	after the first 400 oper. hrs.	every 400 oper. h		
Diesel engine	also refer to the Mercedes-Benz operating manual							
Check oil level		X						
Change engine oil and oil filter*	X				X*	X*		X
Check valve clearance, if needed, adjust					X*	every 1200 oper. hrs.**		X
Change coolant	every 3 years							
Check coolant level, if needed, fill up	X		X		X	X	X	
Clean radiator fins							X	
Replace air filter main element							X	X
Replace air filter safety cartridge	main element: every 2 years or after 5th service							
Leak and condition test of all pipes and hoses			X		X	X		
Check condition of V-ribbed belt	X				X	X		
Replace V-ribbed belt	see Mercedes-Benz engine maintenance instructions							
Replace AdBlue® filter cartridges					X	During every 2nd engine oil change		
Check/fill up AdBlue® pressure reservoir	Only by MB specialized personnel							X
Pump distributor gear unit								
Check oil level	X	X						
Change oil	X		X					X
Exchange air intake filter and pressure filter	X		X					X
Clean the gear oil cooler							X	
Manual transmission 4-gear								
Check oil level	X			X				
Change oil	X		X					X

* If FAME or RME/biodiesel is used, then an oil change after 200 operating hours is required.

** At least once a year or after each 1200 operating hours at the latest

Maintenance work	before harvest start	daily	Maintenance intervals after the first 50 oper. hrs.	each 50 oper. hrs.	after the first 400 oper. hrs.	every 400 oper. hrs.	when needed	annually
Axes								
Check oil level	X			X				
Change oil	X		X					X
Hydraulics system								
Clean hydraulics fluid cooler	X						X	
Check oil level		X						
Change hydraulics fluid	X							X
Clean air intake strainers inside the oil tank							every 2 years	
Hydraulics fluid filter (2 pieces), replace cartridges	X		X				X	X
Exchange refilling lid hydraulic fluid tank (bleeding filter)							every 2 years	
Check hydraulics lines for damage and chafe marks	X		X			X		X
Pneumatic system								
Replace air dryer cartridge	X							X
Drain water from the air reservoir				X				
Battery								
Check acid level, possibly fill up liquid	X			X			X	
Check voltage, recharge if needed	X						X	
Cabin								
Clean recirculating air filter							X	X
Clean fresh air intake filter				X			X	
Replace fresh air intake filter								X

Maintenance work	before harvest start	daily	after the first 50 oper. hrs.	Maintenance intervals every 50 oper. hrs.	after the first 400 oper. hrs.	every 400 oper. hrs.	when needed	annually
Pickup								
Gear unit for pickup rollers, check oil level		X						
Gear unit for pickup rollers, change oil	X		X					X
Exchanging the radial shaft seal rings (Simmer rings) on pickup roller gear unit	every 300,000t of loading performance						X	
Replace hexagon bolts (M20 x 360) and special M20 nuts on the pickup rollers	X							X
Gear unit for pickup rollers, check oil level		X						
Gear unit for conveyor rollers, change oil	X		X					X
Gear unit for 4-set pinch rollers, check oil level		X						
Gear unit for 4-set pinch rollers, change oil	X		X					X
Infeed conveyor								
Check scrapers and deflecting rollers, retighten if needed				X			X	
Replace the drive wheels	Depending on soil conditions, every 60,000 - 140,000t of loading performance						X	
Check tightness, retighten if needed				X			X	
Recleaner version with sieve conveyor								
Sieve conveyor, check tightness, retighten if needed				X			X	
Replace the drive wheels	Depending on soil conditions, every 100,000 - 140,000t of loading performance						X	

Maintenance work	before harvest start	daily	after the first 50 oper. hrs.	Maintenance intervals every 50 oper. hrs.	after the first 400 oper. hrs.	every 400 oper. hrs.	when needed	annually
Recleaner, version with 8-set pinch rollers								
Gear unit for 8-set pinch rollers, check oil level		X						
Gear unit for 8-set pinch rollers, change oil	X		X					X
Truck conveyor								
Sieve conveyor, check tightness, retighten if needed				X			X	
Replace the drive wheels	Depending on soil conditions, every 80,000 - 180,000t of loading performance						X	
All conveyors, feed ducts and remaining machine parts								
Remove soiling and sticking dirt		X						
Check all rollers (rotate freely?)		X						
Refill grease reservoir		X						
Lubricate lubricating points	According to lubricating plan							
Retighten wheel bolts	After the first 10 and the first 50 oper.hrs.							
Check tire pressure	X			X				
Air conditioning system								
Check air conditioning condenser for cleanliness, clean if needed				X			X	
Check hoses and lines for chafe marks (visual), replace if needed	X			X				X
Check coolant at the sight glass of the collector drier, refill if needed	X							X
Have collector dryer and coolant exchanged	every 2 years							

9.3 Lubricating plan for euro-Maus4 (lubrication using grease gun)

Lubricating point	Number of nipples	Interval (oper. hrs.)
Telescoping unit of pile pickup (cover with grease)	4	as needed
Swivel head of hydraulic cylinder for folding pickup, inside	2	100
Bolts on pickup-folding cylinder	2	100
Swivel joint of hydraulic cylinder for raising pickup, top	2	100
Support foot pivot point, left and right	2	100
Swivel point residual beet pickup	1	100
Swivel heads for pile pickup hydraulic cylinder, right/left	4	100
Swivel heads for pile pickup hydraulic cylinder, up/down	2	100
Self-steering for front additional axle	2	100
Axle support cylinder	4	100
Load cylinder for additional axles, rear/front (4 each)	8	200
Locking lever roller for swivel arm	1	200
Pivot point of locking lever for swivel arm	1	200
Universal joints in front axle and rear axle	8	200
Cardan shafts from transmission to the axles	4	200
Nipple block next to the tank supports	8	200
Intermediate lever - residual beet pickup turning sensor	1	yearly
Counterweight arm locking lever	4	yearly
Pivot point for underride protection	2	yearly
Attachment for recleaner, rear (from model year 2012)	6	200
Cylinder swivel head for swivelling recleaner	1	200

Lubricating grease
Grease as per DIN 51825, NLGI class 2, type: KP2K-20, at low outdoor temperatures KP2K-30.

All lubricating points must also be lubricated after every washing of the machine. After washing of the machine, the central lubrication system must also lubricate using at least 2 intermediate lubrication cycles.

9.4 Filter cartridges, V-belt for euro-Maus4 starting from 2010

Version: 08.2012

Mercedes-Benz engine OM926 LA euroMOT3b/4i, 240 kW	pcs.	ROPA No.
Oil filter cartridge	1	303073
Fuel filter cartridge	1	303013
AdBlue filter cartridge	1	303120
Air filter main cartridge	1	301225
Air filter safety cartridge	1	301226
Fuel prefilter	1	303100
Fuel prefilter, 60µm separator steel sieve (CIS countries only)	1	301231
Fuel filter, independent heating system	1	301106
Hydraulic system		
High-pressure filter element incl. O-ring 79*3, Ropa Item No. 412455	1	270430
Suction return filter element incl. O ring 164.47x5.33 (without Ropa Item No.)	1	270483
Filling lid with integrated bleeding and ventilation filter	1	270389
Pump distributor gear unit (PVG)		
Intake filter PVG, coarse	1	O-40320010
Paper gasket for intake filter PVG	1	O-20350003
Pressure filter element incl. O-ring 46*3, Ropa Item No. 412456	1	270442
Cabin		
Suction filter for cab fresh air	1	352332
Pneumatic system		
Air dryer cartridge (AbBlue®)	1	261081
– only with optional water spray system –		
Filter element, 100 meshes/inch	1	208032
Belt drive, diesel engine		
V-ribbed belt for generator/air cond./water pump	1	226061

Important: use only original parts from Ropa or Mercedes-Benz!

9.5 Maintenance slips

9.5.1 Software updates

Version	Date	Name

9.5.2 Maintenance confirmation

Maintenance after

Plan 50 oper. hrs.

May only be performed by ROPA service personnel.

1. 1st ROPA-Maschine customer service

completely performed on:

performed by:

Signature: _____

Maintenance after

Plan 400 oper. hrs.

May only be confirmed by Mercedes-Benz service.

1. 1st Mercedes-Benz customer service - Engine

completely performed on:

performed by:

Signature: _____

9.5.3 Maintenance slip for oil change + filter change (only for diesel engine)

Date: _____ Date: _____ Date: _____ Date: _____ Date: _____ Date: _____

Oper. hours____ Oper. hours____ Oper. hours____ Oper. hours____ Oper. hours____ Oper. hours____

Diesel engine	ok	ok	ok	ok	ok	ok
Engine oil						
Engine oil filter						
AdBlue filter cartridges						
Fine fuel filter						
Fuel prefilter						
Air filter main cartridge						
Air filter safety cartridge						
Antifreeze checked						
Cooling liquid changed						

Date: _____ Date: _____ Date: _____ Date: _____ Date: _____ Date: _____

Oper. hours____ Oper. hours____ Oper. hours____ Oper. hours____ Oper. hours____ Oper. hours____

Diesel engine	ok	ok	ok	ok	ok	ok
Engine oil						
Engine oil filter						
AdBlue filter cartridges						
Fine fuel filter						
Fuel prefilter						
Air filter main cartridge						
Air filter safety cartridge						
Antifreeze checked						
Cooling liquid changed						

Maintenance slip oil change + filter change

	Date: _____ Oper. hrs._____	Date: _____ Oper. hrs._____	Date: _____ Oper. hrs._____	Date: _____ Oper. hrs._____	Date: _____ Oper. hrs._____	Date: _____ Oper. hrs._____
Axles/gear unit	**ok**	**ok**	**ok**	**ok**	**ok**	**ok**
Front axle						
Planetary gear unit (2 units)						
Differential gears						
Rear axle						
Planetary gear unit (2 units)						
Differential gears						
Gear units						
Pickup rollers, right						
Pickup rollers, left						
Conveyor rollers, right						
Conveyor rollers, left						
4-set pinch rollers, right						
4-set pinch rollers, left						
8-set pinch rollers (optional)						
Pump distrib. gear unit (PVG) oil change						
Pump distrib. gear unit (PVG) oil filter replacement						
Manual transmission, 4-gear						
Hydraulic system						
Hydraulic fluid change						
Hydraulic fluid filter exchange 2 fluid filter elements						
Filling cover for hydraulic fluid tank						

9.6 Torque table for bolts and nuts (Nm)

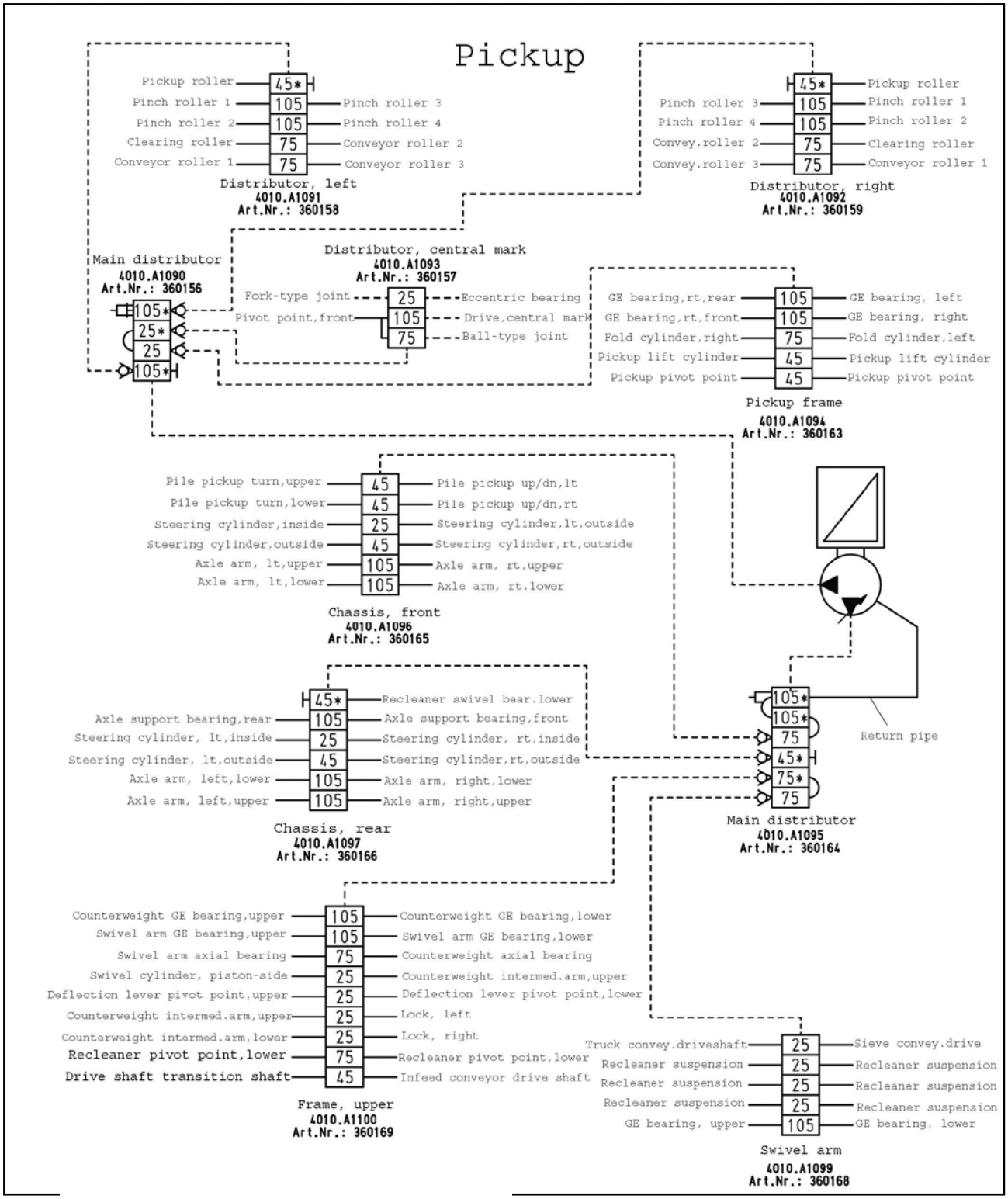
Metric thread DIN 13				
Dimension	**6.9**	**8.8**	**10.9**	**12.9**
M4	2.4	3.0	4.4	5.1
M5	5.0	5.9	8.7	10
M6	8.5	10	15	18
M8	21	25	36	43
M10	41	49	72	84
M12	72	85	125	145
M14	115	135	200	235
M16	180	210	310	365
M18	245	300	430	500
M20	345	425	610	710
M22	465	580	820	960
M24	600	730	1050	1220
M27	890	1100	1550	1800
M30	1200	1450	2100	2450
Metric fine thread DIN 13				
Dimension	**6.9**	**8.8**	**10.9**	**12.9**
M8x1	23	27	39	46
M10x1	43	52	76	90
M12x1.5	76	89	130	155
M14x1.5	125	145	215	255
M16x1.5	190	225	330	390
M18x1.5	275	340	485	570
M20x1.5	385	475	680	790
M22x1.5	520	630	900	1050

Tightening moment wheel nuts

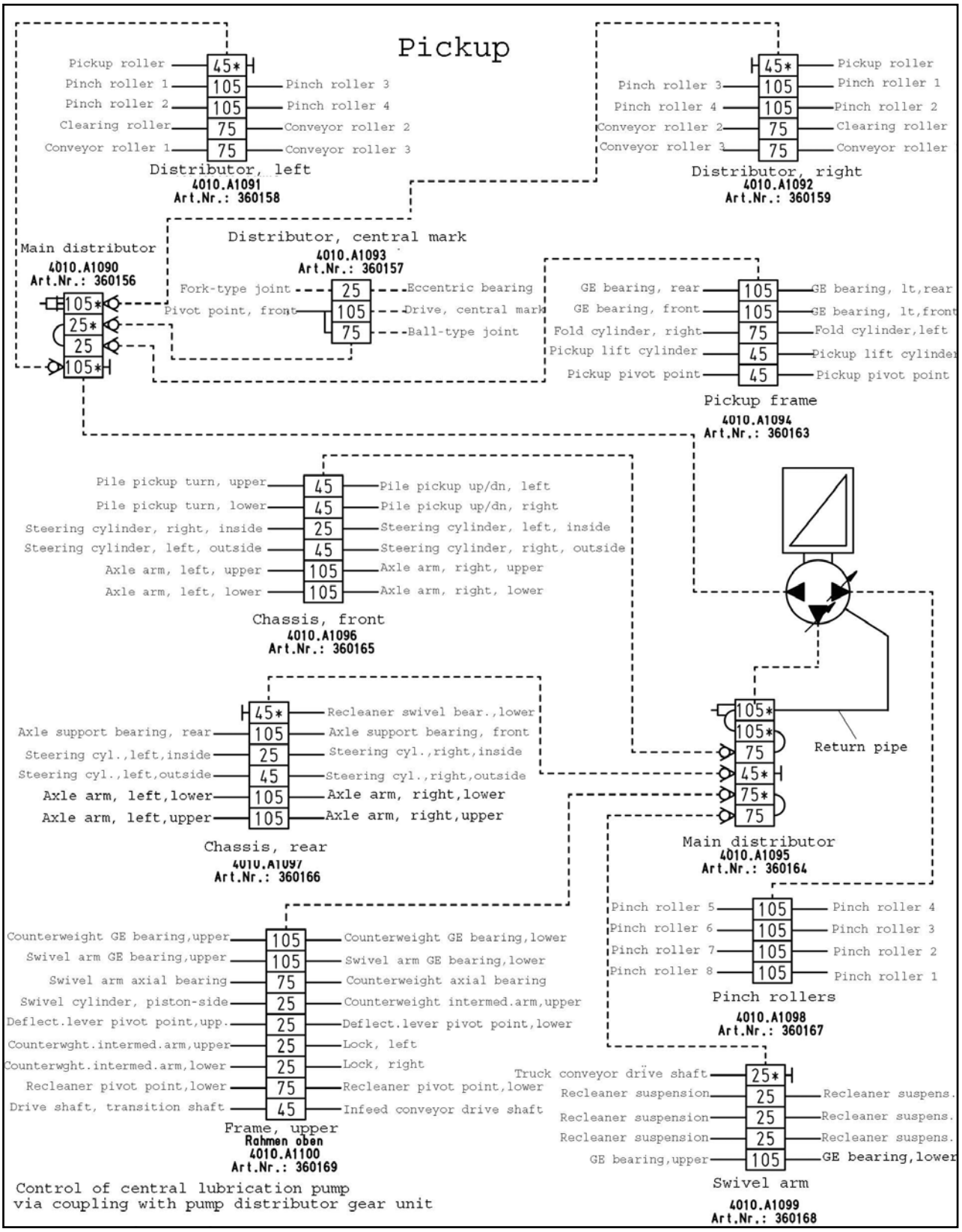
Front axle and rear axle	450Nm
Additional axles	400Nm

9.7 Lubricating plans

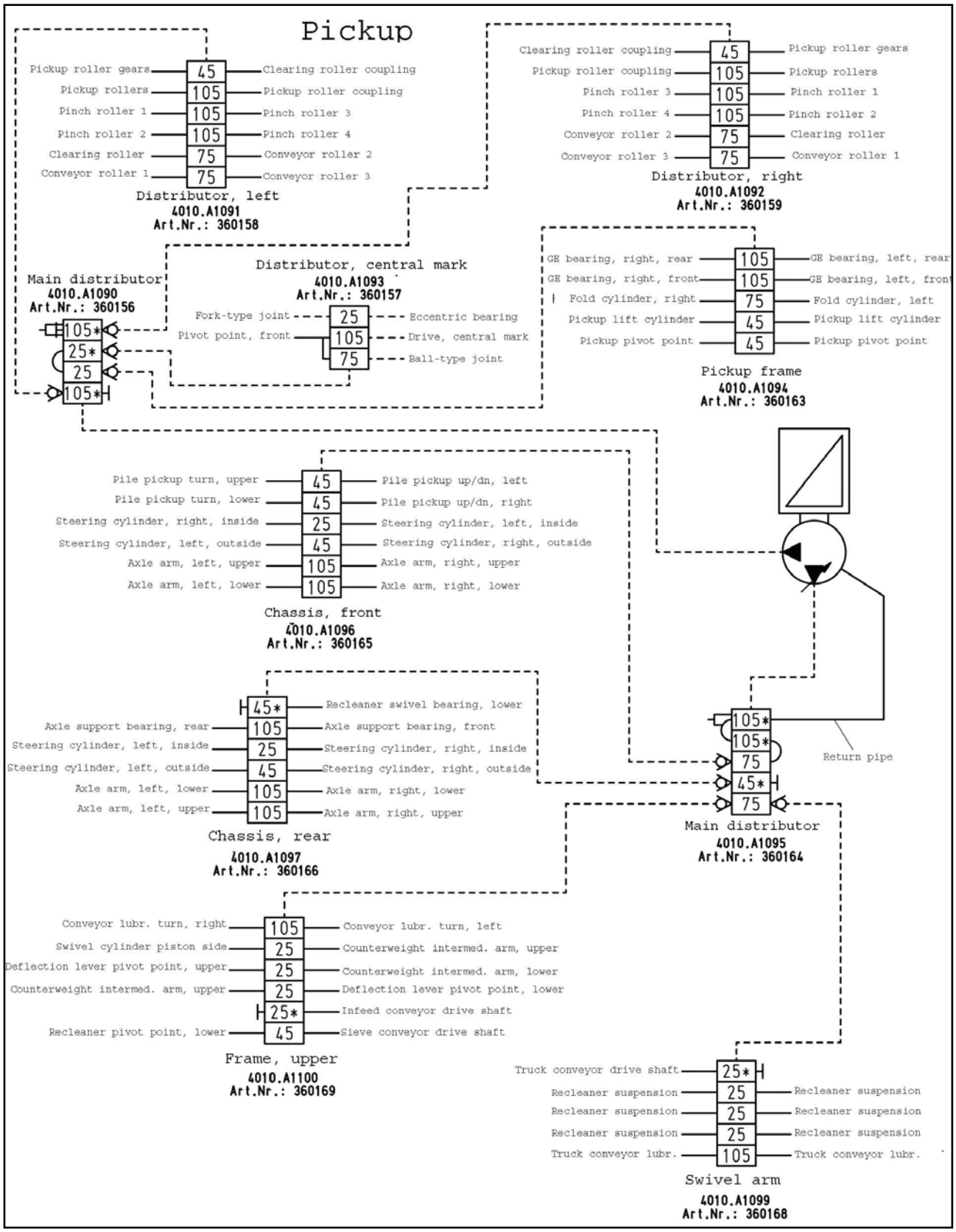
9.7.1 Lubricating plan for euro-Maus4 with sieve conveyor version recleaner, only model year 2010



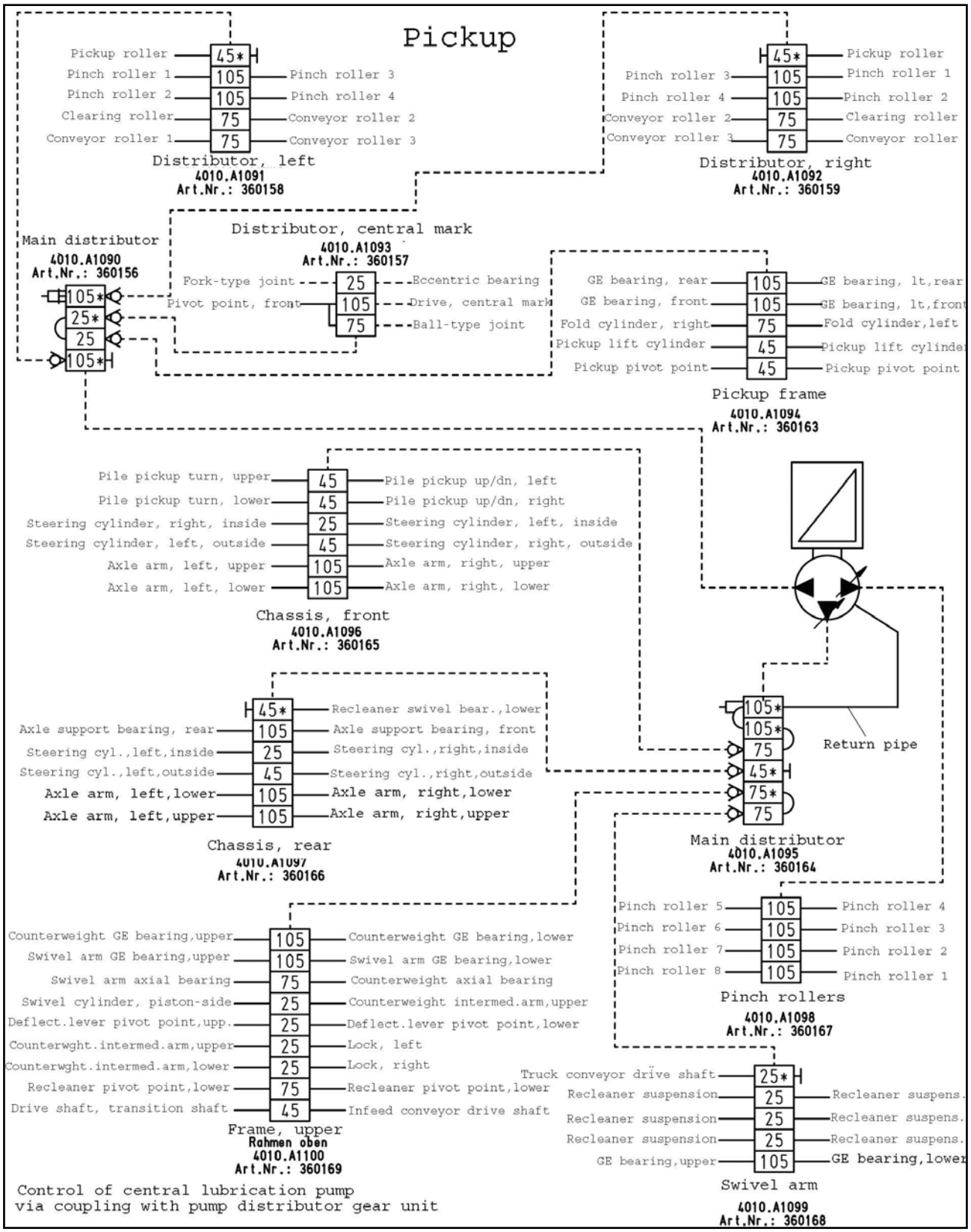
9.7.2 Lubricating plan for euro-Maus4 with pinch rollers version recleaner, only model year 2010



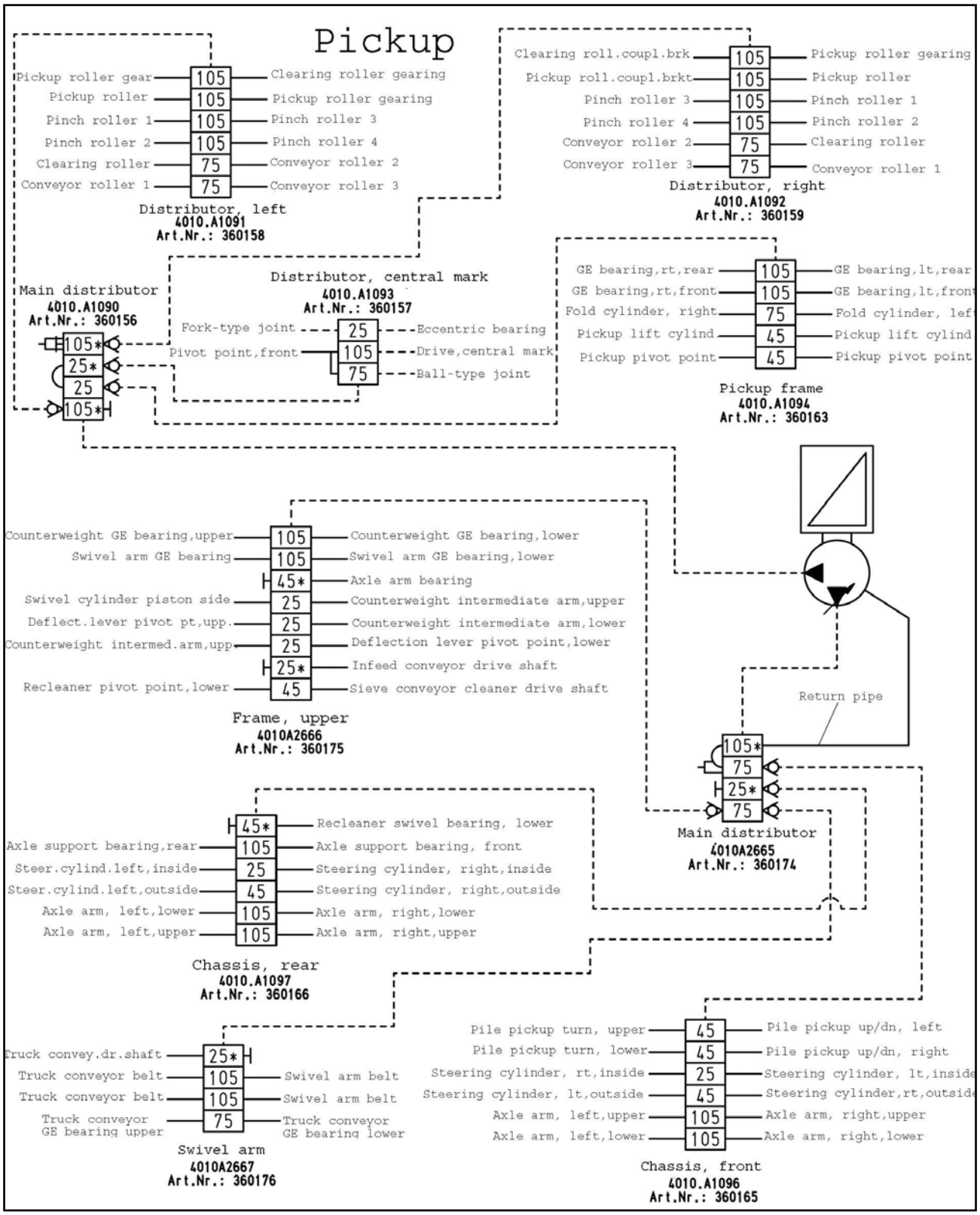
9.7.3 Lubricating plan for euro-Maus4 with sieve conveyor version recleaner, only model year 2011



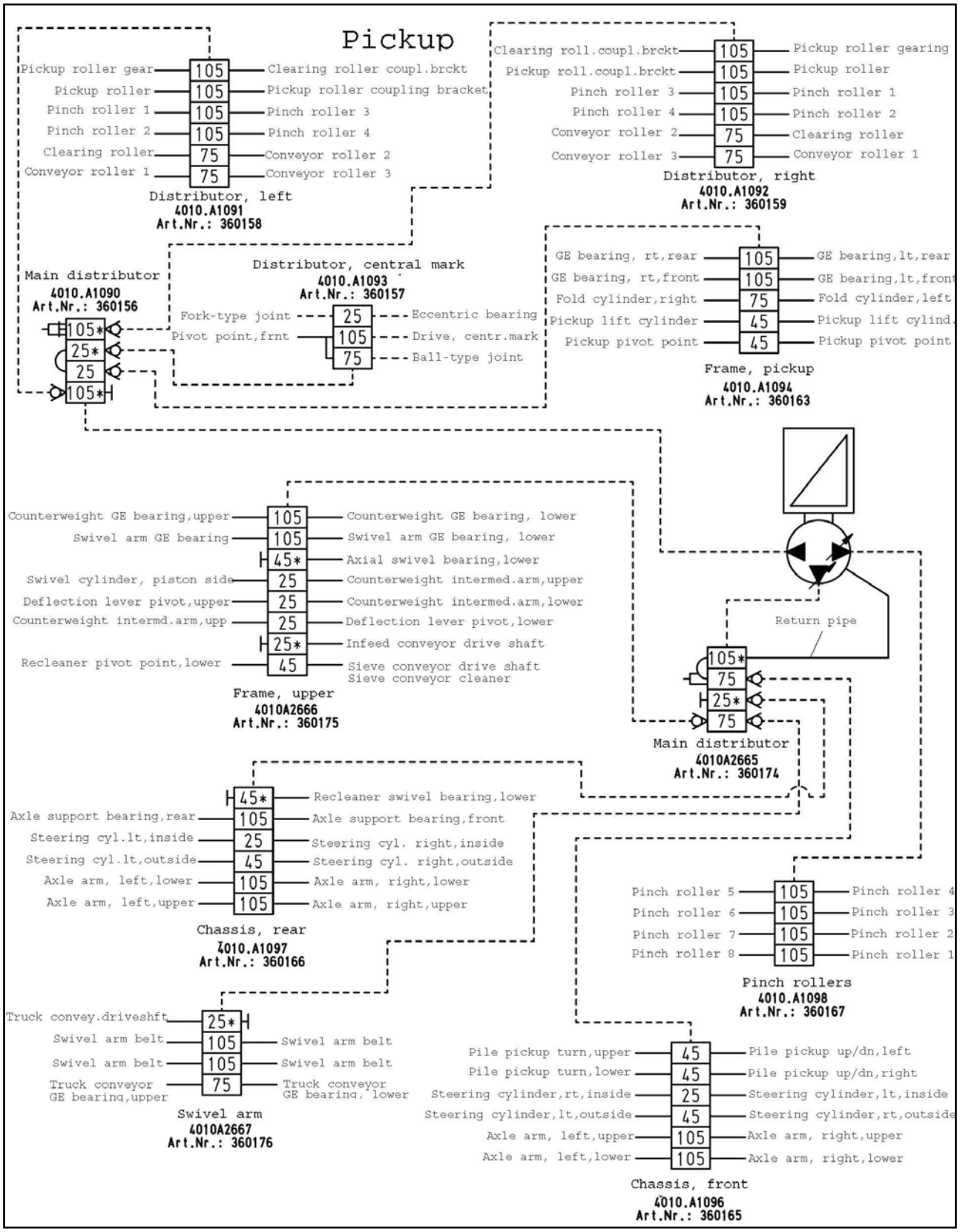
9.7.4 Lubricating plan for euro-Maus4 with pinch rollers version recleaner, only model year 2011



9.7.5 Lubricating plan for euro-Maus4 with sieve conveyor version recleaner, model year 2012



9.7.6 Lubricating plan for euro-Maus4 with pinch rollers version recleaner, model year 2012



9.8 Lubricant conversion table for ROPA euro-Maus4 machines

Version: 21 April 2012	ROPA item No.:	Oil designation according to oil manufacturer:									
		Aral	**Agip/Eni**	**Avia**	**BP**	**Castrol**	**Fuchs**	**Mobile**	**Shell**	**Total**	**Rhenus**
Hydraulic fluid HVLP 46 ISO-VG 46 as per DIN 51524 Part 3 (only use zinc-containing oils!!!!)	435012	No approval for product of this manufacturer! No zinc-containing oils.	Agip ARNICA 46	AVIA FLUID HVI 46	Energol SHF-HV 46	Hyspin AWH-M 46	Renolin B46 HVI	Mobil DTE 10 Excel 46	Tellus S2 V	Equivis ZS 46	
Engine oil, partially synthetic multigrade oil as per MB 228.5	435029	MegaTurboral 10W-40	Agip SIGMA ULTRATFE	AVIATURBOSYNTH HT-E 10W-40	Vanellus Multi-Fleet 10W-40	Enduron 10W-40	TITAN CARGO MCSAE10W-40	Mobil Delvac XHP Extra 10W-40	Rimula R6 M 10W-40	Rubia TIR 8600 SAE 10W-40	
Transmission oil API GL 5, SAE 90	435020	Hyp SAE 85W-90	Agip ROTRA MP	AVIAHYPOID90EP	Energear Hypo90	Axle EPX 85W-90	TITANGEARHYP SAE 90	Mobilube HD-A 85W-90	Spirax S3 AD 80W-90	EP-B 85W-90	
Fully synthetic transmission oil API GL5, SAE 75W-90 as per ZF standard TE-ML 05B	435025	Aral Engine Oil SNA-E	Agip HLX SAE 75W-90	No approval for product of this manufacturer!	Energear SHX-M SAE 75W-90	Syntrax Universal Plus 75W-90	TITAN CYTRAC HSY 75W-90	Mobil Delvac Synthetic Gear Oil LS 75W-90	No approval for product of this manufacturer!	No approval for product of this manufacturer!	
ATF ATF oil as per Dexron II D -Only in pump distributor gears!	435037	ATF 22	Agip DEXRON II Agip ATF D 309	AVIA FLUID ATF 86	Autran DXII	ATF DEX II Multivehicle	TITAN ATF 3000	Mobil ATF 220	Spirax S2 ATF D2	Fluid ATX	
Lubricating grease Grease as per DIN 51825, NLGI class 2, type: KP2K-20, at low outdoor temperatures KP2K-30	435062 = 18kg, 435023 = 25kg	Aralub HLP 2	Agip Longtime Grease 2	AVIALITH 2 EP	Energrease LS-EP2	Spheerol EPL 2	RENOLIT MP	Mobilux EP 2	Gadus S2 V220 2	Multis EP 2 Lical EP 2	r. grea Norlith MZP 2

9.9 Mercedes-Benz works standard operating supplies, engine oils and coolants/antifreeze agents

9.9.1 Multigrade Engine Oils (Specification 228.5)

Stand: 04.03.2012

Product name	10W-30	10W-40	5W-30	5W-40	Principal
ACEITE SINTETICO VOLTRO EUROFLEET		x			Comercial Roshfrans, S.A. de C.V., MÈXICO, D.F./MEXICO
AD SDX 10/40		x			AD Parts, S.L., RIUDELLOTS DE LA SELVA (GIRONA)/SPAIN
ad-Super Cargo Leichtlauf-Oil		x			CARAT Systementwicklungs- u. Marketing GmbH & Co. KG, Mannheim/Deutschland
ADDINOL Commercial 1040 E4		x			Addinol Lube Oil GmbH, Leuna/Deutschland
ADDINOL Super Truck MD 1049		x			Addinol Lube Oil GmbH, Leuna/Deutschland
Addinol Ultra Truck MD 0538			x		Addinol Lube Oil GmbH, Leuna/Deutschland
ADNOC VOYAGER ULTRA SEMI-SYN 10W40		x			Adnoc Distribution, Abu Dhabi/UNITED ARAB EMIRATES
Agip Sigma Super TFE		x			ENI S.p.A. - Refining & Marketing Division, ROM/ITALY
Agip Sigma Trucksint TFE			x		ENI S.p.A. - Refining & Marketing Division, ROM/ITALY
Agip SIGMA ULTRA TFE		x			Eni S.p.A., Refining & Marketing Division, ROME/ITALY
Akros SYNT GOLD 10W-40		x			PETRONAS LUBRICANTS INTERNATIONAL, VILLASTELLONE (Torino)/ITALY
Aktual Synthec		x			PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
Alpine Turbo Plus 10W40		x			Mitan Mineralöl GmbH, Ankum/Deutschland
ARAL MegaTurboral		x			Aral Aktiengesellschaft, Hamburg/Deutschland
ARAL SuperTurboral 5W-30			x		Aral Aktiengesellschaft, Hamburg/Deutschland
Armado Synth NF 10W-40		x			Kroon Oil B.V., EC ALMELO/THE NETHERLANDS
Astris TNX SAE 10W-40		x			Astris S.A., 6745 GIORNICO/Schweiz
AVIA TURBOSYNTH HT-E 10W-40		x			Avia Mineralöl-AG, München/Deutschland
AVIA TURBOSYNTH HT-U		x			AVIA Genossenschaft Schmierstoffe, ZÜRICH/Schweiz
Aviaticon Finko Truck LD 10W/40		x			Finke Mineralölwerk GmbH, Visselhövede/Deutschland
Bizol Diesel Truck Performance			x		Bita Trading GmbH, Berlin/Deutschland
Bizol Super Leichtlauf Truck		x			Bita Trading GmbH, Berlin/Deutschland
Blasol DHP 10W40		x			Blaser Swisslube AG, Hasle-Rüegsau/Schweiz
bp Energol IC MT		x			BP p.l.c., LONDON/UNITED KINGDOM
bp Vanellus Max Drain		x			BP p.l.c., LONDON/UNITED KINGDOM
bp vanellus max drain 5W-30			x		BP p.l.c., LONDON/UNITED KINGDOM
Castrol Elixion HD			x		Castrol Limited, SWINDON/UNITED KINGDOM
Castrol Enduron		x			Castrol Limited, SWINDON/UNITED KINGDOM
Castrol Enduron Plus 5W-30			x		Castrol Limited, SWINDON/UNITED KINGDOM
CEPSA EUROTECH LS 5W30			x		Cepsa Lubricantes, S.A., MADRID/SPAIN
Cepsa Eurotrans SHPD		x			Cepsa Lubricantes, S.A., MADRID/SPAIN
CEPSA PROFESIONAL EUROTECH LS 10W40		x			Cepsa Lubricantes, S.A., MADRID/SPAIN
CLAAS AGRIMOT ULTRATEC 10W-40		x			CLAAS Vertriebsgesellschaft mbH, Hamm-Uentrop/Deutschland
CLASSIC MEDUNA LT 1040		x			CLASSIC Schmierstoff GmbH & Co. KG, Hoya/Deutschland
CLASSIC MEDUNA LT 530			x		CLASSIC Schmierstoff GmbH & Co. KG, Hoya/Deutschland
CYCLON D1 EURO		x			Cyclon Hellas S.A., ASPROPIRGOS/GREECE
CYCLON D1 EURO STD		x			Cyclon Hellas S.A., ASPROPIRGOS/GREECE
DELKOL TURBOSYNTH DPF 10W-40		x			Delek, NATANYA/ISRAEL
Delkol Turbosynth M 10W40		x			Delek, NATANYA/ISRAEL
Delo XLD Multigrade		x			Chevron Global Lubricants, GENT/ZWIJNAARDE/BELGIUM
Divinol Multimax Synth		x			Zeller+Gmelin GmbH & Co. KG, Eislingen/Deutschland
Divinol multimax Truck Star		x			Zeller+Gmelin GmbH & Co. KG, Eislingen/Deutschland
Divinol Multimax USHPD			x		Zeller+Gmelin GmbH & Co. KG, Eislingen/Deutschland
EKO FORZA SYNTHETIC		x			EKO A.B.E.E., MARONSI, ATHENS/GREECE
elf AGRITEC SYN FE 10W30	x				Total Lubrifiants, PARIS la Defense Cedex/FRANCE
elf PERFORM. GALAXY FE 10W-30	x				Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Elf Performance Experty 10W-40		x			Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Elf Performance Experty FE 5W-30			x		Total Lubrifiants, PARIS la Defense Cedex/FRANCE
EMKA Cargo 10W40		x			EMKA Schmiertechnik GmbH, Bretzfeld-Schwabbach/Deutschland
Emo Turbo Max		x			Motor Oil (Hellas), Maroussi/GREECE
Engen Dieselube 4000		x			Engen Petroleum Ltd., JOHANNESBURG 2000/REPUBLIC of SOUTHAFRICA
engine oil synthetic I4 10W-40		x			Sasol Oil (Pty) Ltd, RANDBURG/REPUBLIC of SOUTHAFRICA
eni i-Sigma top MS 10W-40		x			ENI S.p.A. - Refining & Marketing Division, ROM/ITALY
ENOC VULCAN 760X Syntec SAE 10W-40		x			ENOC International Sales L.L.C., DUBAI/UNITED ARAB EMIRATES
ENOC VULCAN 770 SLD 10W 40		x			ENOC International Sales L.L.C., DUBAI/UNITED ARAB EMIRATES
EUROLINE 7		x			HAFA France - SOFRA, YVETOT CEDEX/FRANCE
EUROLUB Multicargo 10W/40		x			Hunold Schmierstoffe GmbH, Eching/Deutschland
EXTRAVIDA XV500		x			YPF S.A. Lubricantes & Especialidades, Buenos Aires/ARGENTINA
Extrol Gold Star (XHPD)			x		Tehnosint d.o.o., LAKTASI 78 250/BOSNIA and HERZEGOVINA

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Product name	10W-30	10W-40	5W-30	5W-40	Principal
Fina KAPPA SYN FE 5W-30			x		Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Fina Kappa Ultra 10W-40		x			Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Fuchs Titan Cargo MC SAE 10W-40		x			Fuchs Petrolub AG, Mannheim/Deutschland
Fuchs Titan Cargo SL SAE 5W-30			x		Fuchs Petrolub AG, Mannheim/Deutschland
G-PROFI GT 10W-40		x			Gazpromneft-Lubricants LTD, MOSCOW/RUSSIA
G-Profi GTS 5W-30			x		Gazpromneft-Lubricants LTD, MOSCOW/RUSSIA
Galp Galáxia Ultra LS		x			Petrogal S.A., LISSABON/PORTUGAL
GALP GALÁXIA ULTRA XHP		x			Petrogal S.A., LISSABON/PORTUGAL
GONHER SUPER FLEET			x		Lubricantes de América, S.A. de C.V., SANTA CATARINA/MEXICO
Gulf Fleet Force Synth			x		Gulf Oil International, London/ENGLAND
Gulf Gulfleet Supreme 5W-30			x		Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Gulf Superfleet ELD 10W-40		x			Gulf Oil International, London/ENGLAND
Gulf Superfleet XLD		x			Gulf Oil International, London/ENGLAND
Gulfleet Highway 10W-40		x			Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Hafa Eurodex		x			HAFA France - SOFRA, YVETOT CEDEX/FRANCE
HEAVY DIESEL 5W30			x		Sonangol Distribuidora, S.A., LUANDA/REPÙBLICA de ANGOLA
HERCULES 100		x			PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
HERCULES S.T.			x		PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
HESSOL DIMO		x			Hessol Lubrication Gmbh, Spergau/Deutschland
IGOL PROTRUCK 130X		x			Igol France, AMIENS CEDEX/FRANCE
INA Super 2000		x			INA Rafinerija nafte Rijeka, RIJEKA/CROATIA
LCM 800		x			Unil Opal, SAUMUR/FRANCE
LIQUI MOLY LKW-LANGZEIT-MOTORÖL		x			Liqui Moly GmbH, Ulm/Deutschland
Liqui Moly LKW-Langzeit-Motoröl FE			x		Liqui Moly GmbH, Ulm/Deutschland
Lubex Premium XT 10W40		x			Belgin Madeni Yaglar Tic. Ve San. A.S., Gebze Kocaeli/TURKEY
LUBRAL DIESEL TURBO			x		Lubricantes de América, S.A. de C.V., SANTA CATARINA/MEXICO
LUBRAX Avante		x			Petrobras Distribuidora S.A., Duque de Caxias/BRAZIL
Lukoil Avantgarde Professional		x			OOO LLK-International, MOSCOW/RUSSIA
LUKOIL AVANTGARDE Professional 5W-30			x		OOO LLK-International, MOSCOW/RUSSIA
mabanol Argon Truck FE 10W-40		x			Mabanol GmbH & Co. KG, Hamburg/Deutschland
mabanol Argon Truck FE Ultra 5W-30			x		Mabanol GmbH & Co. KG, Hamburg/Deutschland
Magnum MOTOROIL ULTRA 10W40		x			United Oils, LLC, RIGA, LV - 1004/LATVIA
Mannol TS-6 UHPD Eco 10W40		x			SCT-Vertriebs GmbH, Wedel/Deutschland
Max Raloy Diesel			x		Raloy Lubricantes, S.A. de C.V., Santiago Tianguistenco/MEXICO
Max Raloy Diesel 3277-M		x			Raloy Lubricantes, S.A. de C.V., Santiago Tianguistenco/MEXICO
MB 228.5 Motorenöl A 000 989 08 01			x		Daimler AG, Stuttgart/Deutschland
MB 228.5 Motorenöl A 000 989 60 01		x			Daimler AG, Stuttgart/Deutschland
MB 228.5 Motorenöl A 000 989 96 01		x			Daimler AG, Stuttgart/Deutschland
megasynt L.D. 10W/40		x			Eurolube, Ottaviano/ITALY
megol Diesel Truck Performance			x		Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis/Deutschland
megol Motorenoel Super Leichtlauf DIMO		x			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis/Deutschland
megol Motorenoel Super LL DIMO Premium		x			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis/Deutschland
megol Motorenoel UHPD Truck			x		Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis/Deutschland
Meisteröl Truck FE			x		EPRO GmbH, Ulm/Deutschland
Meisteröl Truck Super		x			EPRO GmbH, Ulm/Deutschland
Mercedes-Benz 228.5 Van Engine Oil		x			Fujian Daimler Automotive Co., Ltd., QINGKOU, MINHOU, FUJIAN 350119/P. R. of CHINA
Mercedes-Benz NFZ Motorenöl Blatt 228.5 LT			x		Daimler AG, Stuttgart/Deutschland
Mercedes-Benz NFZ-Motorenöl Blatt 228.5 und 235.27		x			Daimler AG, Stuttgart/Deutschland
Midland nova		x	x		Oel-Brack AG, HUNZENSCHWIL/Schweiz
Midland Synqron Diesel		x			Oel-Brack AG, HUNZENSCHWIL/Schweiz
MINERVA LONG TRUCK		x			Minerva Oil, MEUZAC /FRANCE
Misr UHPD		x			Misr Petroleum Co., CAIRO/EGYPT
Mobil Delvac 1 5W-40				x	Exxon Mobil Corporation, FAIRFAX, Virginia/USA
Mobil Delvac 1 LE 5W-30			x		Exxon Mobil Corporation, FAIRFAX, Virginia/USA
Mobil Delvac 1 SHC 5W-40				x	Exxon Mobil Corporation, FAIRFAX, Virginia/USA
Mobil Delvac XHP Extra 10W-40		x			Exxon Mobil Corporation, FAIRFAX, Virginia/USA
Mobil Delvac XHP LE 10W-40		x			Exxon Mobil Corporation, FAIRFAX, Virginia/USA
Mobil Delvac XHP Ultra 5W-30			x		Exxon Mobil Corporation, FAIRFAX, Virginia/USA
MOGUL DIESEL DTT PLUS 10W-40		x			Kuwait Petroleum, ROZENBURG/THE NETHERLANDS
MOL Dynamic Synt Diesel 10W-40		x			MOL-LUB Ltd., ALMÁSFÜZITÖ/HUNGARY
MOL Dynamic Synt Diesel E4 10W40		x			MOL-LUB Ltd., ALMÁSFÜZITÖ/HUNGARY
MOL Dynamic Tornado 5W30			x		MOL-LUB Ltd., ALMÁSFÜZITÖ/HUNGARY
MOTOR GOLD Performance Truck		x			Mineralöl-Raffinerie Dollbergen GmbH, Uetze-Dollbergen/Deutschland
Motor Oil Super UHPD 10W-40		x			Transnational Blenders B.V., BG DORDRECHT/THE NETHERLANDS
Motor Oil Super UHPD 5W-30			x		Transnational Blenders B.V., BG DORDRECHT/THE NETHERLANDS
MOTOREX ECO FS			x		Bucher AG Langenthal, LANGENTHAL/Schweiz
Motorex Focus 4		x			Bucher AG Langenthal, LANGENTHAL/Schweiz
MOTOREX MC POWER PLUS		x			Bucher AG Langenthal, LANGENTHAL/Schweiz
MOTOREX POWER TRIA SAE 10W/40		x			Bucher AG Langenthal, LANGENTHAL/Schweiz
MOTUL TEKMA OPTIMA 5W30			x		Motul , AUBERVILLIERS CEDEX/FRANCE
Motul Tekma Ultima 10W-40		x			Motul , AUBERVILLIERS CEDEX/FRANCE
Neste Turbo Super 10W-40		x			Neste Oil Corporation, NESTE OIL/FINLAND

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Product name	10W-30	10W-40	5W-30	5W-40	Principal
NILS BORA		x			Nils Italia GmbH, BURGSTALL /ITALY
NISOTEC FAVORIT UHPD		x			Petroleum Industry of Serbia, NOVI BEOGRAD/SERBIA
Nordlub XP-HD SAE 10W-40		x			NORDLUB Deutschland GmbH, Buxtehude/Deutschland
Nordlub XP-HD SAE 5W-30			x		NORDLUB Deutschland GmbH, Buxtehude/Deutschland
Oest Dimo HT Super		x			Georg Oest Mineralölwerk GmbH & Co KG, Freudenstadt/Deutschland
Oilfino Econ T 8600 10W-40		x			Carl Harms Mineralöle, Prisdorf/Deutschland
OLMALINE 228.5 SAE 10W-40		x			OLMA d.d., Ljubljana/SLOVENIA
OMV super truck SAE 10W-40		x			OMV Refining & Marketing GmbH, VIENNA/Österreich
OMV super truck SAE 5W-30			x		OMV Refining & Marketing GmbH, VIENNA/Österreich
Opet FullPro HT 10W-40		x			Opet Fuchs Madeni Yag San. ve Tic. A.S., Izmir/TURKEY
PAKELO GOLDENSTAR LA 77-51		x			Pakelo Motor Oil S.r.l., San Bonifacio (Vr)/ITALY
Pakelo Kentron Over 5		x			Pakelo Motor Oil S.r.l., San Bonifacio (Vr)/ITALY
Panolin Diesel HTE 10W/40		x			PANOLIN AG, MADETSWIL/Schweiz
PAZ PERFECT E-4		x			Paz Lubricants & Chemicals Ltd., HAIFA 31000/ISRAEL
Pennasol Performance Truck		x			Mineralöl-Raffinerie Dollbergen GmbH, Uetze-Dollbergen/Deutschland
Petrol Superior		x			Petrol d.d., Ljubljana/SLOVENIA
PETROMIN Turbomaster LD 2285 10W-40 CI-4		x			Petromin Oils, Jeddah/SAUDI ARABIA
Platinum Ultor Max 5W-30			x		Orlen Oil Sp. z o.o., KRAKOW/POLAND
PO MAXIMUS 10W-40		x			Petrol Ofisi Anonim Sirketi, Istanbul/TURKEY
Prista UHPD		x			Prista Oil Holding EAD, RUSE/BULGARIA
Prista Ultra TD, SAE 10W-40		x			Prista Oil Holding EAD, RUSE/BULGARIA
PROFESSIONAL HUNDERT Truck UHPD 10W40		x			Mitan Mineralöl GmbH, Ankum/Deutschland
PROFI-CAR DIESEL POWER TRUCK ACTRON		x			PROFI-TECH GmbH, Gingen/Deutschland
ProFleet SAE 10W-40		x			The Valvoline Company, LEXINGTON, KY/USA
ProFleet SAE 5W-30			x		The Valvoline Company, LEXINGTON, KY/USA
Q8 SUPERTRUCK FE SAE 5W-30			x		Kuwait National Petroleum Company, Kuwait/KUWAIT
Q8 T 860 SAE 10W-40		x			Kuwait Petroleum, ROZENBURG/THE NETHERLANDS
Qualube Extendol, SAE 10W/40		x			Witham Oil & Paint Ltd., LINCOLN, Lincolnshire, LN24ML/UNITED KINGDOM
RAVENOL Performance Truck 10W-40		x			Ravensberger Schmierstoffvertrieb GmbH, Werther/Deutschland
Repsol Diesel Turbo VHPD			x		Repsol YPF Lubricantes y Especialidades, S.A., MOSTOLES - MADRID/SPAIN
Repsol Turbo UHPD		x			Repsol YPF Lubricantes y Especialidades, S.A., MOSTOLES - MADRID/SPAIN
RING FREE XHDS 10W/40		x			Morris Lubricants, SHREWSBURY/UNITED KINGDOM
ROWE TRUCKSTAR 10W-40 HC		x			ROWE Mineralölwerk GmbH, Bubenheim/Deutschland
RTO Extensia RXD 10W-40		x			Huiles Berliet S.A., PARIS/FRANCE
RTO Extensia RXD ECO 5W-30			x		Huiles Berliet S.A., PARIS/FRANCE
RTO Extensia TXD ECO 10W-30	x				Huiles Berliet S.A., PARIS/FRANCE
Shell Rimula R5 M		x			Shell International Petroleum Company, LONDON/UNITED KINGDOM
Shell Rimula R6 M		x			Shell International Petroleum Company, LONDON/UNITED KINGDOM
Shell Rimula R6 ME			x		Shell International Petroleum Company, LONDON/UNITED KINGDOM
Shell Rimula Signia		x			Shell International Petroleum Company, LONDON/UNITED KINGDOM
Shell SL 0807		x			Shell International Petroleum Company, LONDON/UNITED KINGDOM
Spec Diesel UHPD CI-4/CF 10W-40 semisynt		x			SPECOL Sp.Z.O.O., CHORZÓW/POLAND
Speedol S UHPD, SAE 10W40		x			Kocak Petrol Ürünleri San. Ve Tic. Ltd. Sti., GEBZE-KOCAELI/TURKEY
SRS Cargolub TFF		x			SRS Schmierstoff Vertrieb GmbH, Salzbergen/Deutschland
SRS Cargolub TFG plus		x			SRS Schmierstoff Vertrieb GmbH, Salzbergen/Deutschland
SRS Cargolub TFL			x		SRS Schmierstoff Vertrieb GmbH, Salzbergen/Deutschland
Statoil MaxWay Ultra 5W-30			x		Svenska Statoil AB, STOCKHOLM/SWEDEN
SUNOCO HEAVY DUTY EXTRA HPD 10W40		x			Petronas Lubricants Belgium NV, Aartselaar/BELGIUM
SVG Esvaugol Premium SAE 10W-40		x			Handelsges. für Kfz-Bedarf GmbH & Co. KG, Düsseldorf/Deutschland
Swd Rheinol EXPERT XH SAE 10W40		x			Swd Lubricants GmbH & Co. KG, Duisburg/Deutschland
Syntec Premium 228.5		x			Synergy Petroleum & Lubricants (Pty) Ltd., DURBANVILLE/REPUBLIC of SOUTHAFRICA
Tamoil Diesel Premium FE		x			Tamoil Italia S.p.A., MILANO/ITALY
TAMOIL DIESEL TOP PERFORMANCE FE			x		Tamoil Italia S.p.A., MILANO/ITALY
Teboil Super XLD-2 SAE 10W-40		x			LLK Finland Oy, Oy Teboil Ab, HAMINA/FINLAND
TEBOIL SUPER XLD-2 SAE 5W-30			x		LLK Finland Oy, Oy Teboil Ab, HAMINA/FINLAND
TECTROL SUPER TRUCK 1040		x			BayWa AG, München/Deutschland
TECTROL SUPER TRUCK 530			x		BayWa AG, München/Deutschland
Tedex Diesel Truck UHPD Motor Oil		x			TEDEX Production Sp.z o.o., WARSZAWA/POLAND
Texaco Ursa HD		x			Chevron Global Lubricants, GENT/ZWIJNAARDE/BELGIUM
Texaco Ursa Premium FE 5W-30			x		Chevron Global Lubricants, GENT/ZWIJNAARDE/BELGIUM
Texaco Ursa TDX 10W-40		x			Chevron Global Lubricants, GENT/ZWIJNAARDE/BELGIUM
TEXAS TRITON TX8 10W-40 CI-4/SL		x			Texas Petrochemical Asia Pacific Pte Ltd, SINGAPORE 629170/SINGAPUR
TITAN EXTREME		x			Sonol Israel Ltd., NETANYA/ISRAEL
Tor Turbosynth FDL 10W40		x			De Oliebron, ZWIJENDRECHT/THE NETHERLANDS
Tor Turbosynth FE 5W30			x		De Oliebron, ZWIJENDRECHT/THE NETHERLANDS
Tor Turbosynth NF 10W40		x			De Oliebron, ZWIJENDRECHT/THE NETHERLANDS
Total Rubia TIR 8600 10W-40		x			Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Total RUBIA TIR 8600 FE 10W30	x				Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Total Rubia TIR 8800 10W-40		x			Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Total Rubia TIR 9200 FE 5W-30			x		Total Lubrifiants, PARIS la Defense Cedex/FRANCE
TOTAL TRACTAGRI HDX SYNFE10W30	x				Total Lubrifiants, PARIS la Defense Cedex/FRANCE
TRANSPRO 45		x			Yacco SAS, ST PIERRE LES ELBEUF/FRANCE

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Stand: 04.03.2012

Product name	10W-30	10W-40	5W-30	5W-40	/Principal
Triathlon Cargo Super SAE 5W-30			x		Adolf Würth GmbH & Co. KG, Künzelsau/Deutschland
TURDUS POWERTEC 3000 10W40		x			Grupa Lotos SA., GDANSK/POLAND
TURDUS POWERTEC SYNTHETIC SAE 5W/30			x		Grupa Lotos SA., GDANSK/POLAND
Turdus Semisyntetic CF/SL 10W40		x			Grupa Lotos SA., GDANSK/POLAND
UNIL Unimot Truck LD SAE 10W-40		x			Unil Deutschland GmbH, Stuttgart/Deutschland
UNIL Unimot Truck LD SAE 5W-30			x		Unil Deutschland GmbH, Stuttgart/Deutschland
Unimot (R) Synth 51		x			GB Lubricants, GATESHEAD/ENGLAND
UNIMOT 5 10W/40		x			GB Lubricants, GATESHEAD/UNITED KINGDOM
Urania 100K		x			PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
Urania FE			x		PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
URANIA MAXIMO			x		PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
URANIA OPTIMO		x			PETRONAS LUBRICANTS INTERNATIONAL, KUALA LAMPUR/MALAYSIA
Valvoline ProFleet LS SAE 10W-40		x			The Valvoline Company, LEXINGTON, KY/USA
Verkol TD-MAX 10W40		x			Verkol, S.A., BERA/ NAVARRA/SPAIN
VICAM RUNNER TBN 10W40		x			Condat S.A., CHASSE-dur-RHONE/FRANCE
Vigor ULTRA D SAE 10w-40		x			Aeagean Oil S.A., ATHENS/GREECE
winkler Truck Fuel Economy			x		Christian Winkler GmbH & Co. KG, Stuttgart/Deutschland
winkler Truck Langzeit		x			Christian Winkler GmbH & Co. KG, Stuttgart/Deutschland
WOLF MASTERLUBE LONGDRAIN ULTRA 10W40		x			Wolf Oil Corporation N.V., HEMIKSEN/BELGIUM
WOLF MASTERLUBE LONGDRAIN ULTRA 5W30			x		Wolf Oil Corporation N.V., HEMIKSEN/BELGIUM
Wunsch TSL-Diesel		x			Wunsch Öle GmbH, Ratingen/Deutschland
Yacco Transpro 65 SAE 10W-40		x			Yacco SAS, ST PIERRE LES ELBEUF/FRANCE
York 847 10W40		x			Ginouves Georges SAS, TOULON /FRANCE
YORK 847 SAE 5W30			x		Ginouves Georges SAS, TOULON /FRANCE

9.9.2 Corrosion inhibition/antifreeze agents (Specification MB 325.0)

Product name	Principal
Agip Antifreeze Extra D	ENI S.p.A. - Refining & Marketing Division, ROM/ITALY
Agip ANTIFREEZE PLUS	ENI S.p.A. - Refining & Marketing Division, ROM/ITALY
Anticongelante GHD Premium	Lubricantes de América, S.A. de C.V., SANTA CATARINA/MEXICO
Anticongelante LHD Premium	Lubricantes de América, S.A. de C.V., SANTA CATARINA/MEXICO
Anticongelante Voltro®	Comercial Roshfrans, S.A. de C.V., MÈXICO, D.F./MEXICO
Antifreeze RL-Plus	Raloy Lubricantes, S.A. de C.V., Santiago Tianguistenco/MEXICO
ARAL Antifreeze Extra	Aral Aktiengesellschaft, Hamburg/Deutschland
Avia Antifreeze APN	Avia Mineralöl-AG, München/Deutschland
Castrol Antifreeze NF	Castrol Limited, SWINDON/UNITED KINGDOM
Castrol Radicool NF	Castrol Limited, SWINDON/UNITED KINGDOM
Concentrate Coolant (G48) China	Changchun Delian Chemical Co. Ltd., CHANGCHUN/P. R. of CHINA
Concentrate Coolant G48	Changchun Delian Chemical Co. Ltd., CHANGCHUN/P. R. of CHINA
COOLANT G48 CONCENTRATE	Bucher AG Langenthal, LANGENTHAL/Schweiz
Dragon Power Coolant A	S-OIL, Seoul/Rep. of KOREA
EuroPeak Coolant/Antifreeze	Old World Industries, Inc., Northbrook, IL 60062/USA
EVOX Extra G48 Antifreeze concentrate	MOL-LUB Ltd., ALMÀSFÜZITÖ/HUNGARY
Fuchs MAINTAIN FRICOFIN	Fuchs Petrolub AG, Mannheim/Deutschland
Genantin Super	Clariant GmbH, Frankfurt/Main/Deutschland
Glacelf MDX	Total Lubrifiants, PARIS la Defense Cedex/FRANCE
Glidex Extra	CHEMIA-BOMAR, SKOROGOSZCZ/POLAND
Glysantin G 05	BASF SE, Ludwigshafen/Deutschland
Glysantin G 48	BASF SE, Ludwigshafen/Deutschland
Glysantin Protect	BASF SE, Ludwigshafen/Deutschland
Glysantin Protect Plus	BASF SE, Ludwigshafen/Deutschland
INA Antifriz Al Super	Maziva-Zagreb d.o.o., ZAGREB/CROATIA
Krafft Refrigerant ACU 2300	Krafft S.L., ANDOAIN (Guipuzcoa)/SPAIN
LUBEX ANTIFREEZE TSM	Belgin Madeni Yaglar Tic. Ve San. A.S., Gebze Kocaeli/TURKEY
MB 325.0 Korrosion-/Frostschutzmittel A 000 989 08 25	Daimler AG, Stuttgart/Deutschland
MB 325.0 Korrosion-/Frostschutzmittel A 000 989 21 25	Daimler AG, Stuttgart/Deutschland
Mobil GS 333 Extra	Exxon Mobil Corporation, FAIRFAX, Virginia/USA
Motorex Antifreeze G05	Bucher AG Langenthal, LANGENTHAL/Schweiz
OMV coolant plus	OMV Refining & Marketing GmbH, VIENNA/Österreich
OPET ANTIFREEZE SPECIAL	Opet Fuchs Madeni Yag San. ve Tic. A.S., Izmir/TURKEY
PANOLIN ANTI-FROST MT-325	PANOLIN AG, MADETSWIL/Schweiz
PO Özel Antifriz	Petrol Ofisi Anonim Sirketi, Istanbul/TURKEY
Power Cool Off-Highway	Detroit Diesel Corporation, DETROIT, Michigan 48239-4001/USA
PROCAR Kühlerschutz Extra	Hunold Schmierstoffe GmbH, Eching/Deutschland
RAVENOL Alu-Kühlerfrostschutz -exclusiv-	Ravensberger Schmierstoffvertrieb GmbH, Werther/Deutschland
ROWE Hightec Antifreeze AN	ROWE Mineralölwerk GmbH, Bubenheim/Deutschland
VOLTRONIC Coolant AN	Voltronic & ACT GmbH, Bad Boll/Deutschland
York 716	Ginouves Georges SAS, TOULON /FRANCE
Zerex G 05	The Valvoline Company, LEXINGTON, KY/USA
Zerex G 48	The Valvoline Company, LEXINGTON, KY/USA

9.9.3 Premixed corrosion inhibition/antifreeze agents (Specification MB 326.0)

Product name	Principal
Castrol Radicool NF Premix	BP p.l.c., LONDON/UNITED KINGDOM
Coolant (finished goods) G48	Changchun Delian Chemical Co. Ltd., CHANGCHUN/P. R. of CHINA
Fuchs MAINTAIN FRICOFIN -35	Fuchs Petrolub AG, Mannheim/Deutschland
Fuchs MAINTAIN FRICOFIN PREMIX	Fuchs Petrolub AG, Mannheim/Deutschland
Kühlstoff G 05-23/50	BASF SE, Ludwigshafen/Deutschland
Power Cool Off-Highway Premix 50/50	Detroit Diesel Corporation, DETROIT, Michigan 48239-4001/USA
Total Coolelf MDX -37	Total Lubrifiants, PARIS la Defense Cedex/FRANCE

9.9.4 AdBlue® information sheet

AH14.40-N-0001-01A	Information regarding usage, material properties and handling of AdBlue	All engines	

Definition
AdBlue is the trade name for the diesel engine NOx reducing agent AUS32 with the norm designation DIN 70070.

Objectives of AdBlue
AdBlue is used to reduce poisonous nitrogen oxides to water vapor and elementary nitrogen in the exhaust gas of diesel-powered vehicles equipped with BlueTec technology.
Chemical characterization and composition of AdBlue
AdBlue consists of chemically pure urea, without addition of foreign substances, dissolved in demineralized water. The urea content amounts to 32.5 %. AdBlue is not an additive, but rather is supplied separately from an additional tank provided for this purpose on BlueTec technology-outfitted vehicles.

Chemical formula: H2N-CO-NH2
Molar mass (urea): 60.06 g/mol
CAS (Chemical Abstracts Service) No.: 57-13-6

Handling of fuel and lubricants contaminated by AdBlue
It is important to always ensure that AdBlue is kept separate from fuels, lubricants and other process materials, such as coolant, engine oil, gear/transmission oil, fuels, hydraulic fluid and brake fluid, and that the same containers and catch pans are not used. Even the tiniest amounts of AdBlue in the coolant circuit are enough to damage thermostats and temperature sensors. Process materials that contain traces of AdBlue must not be used further.

Handling of AdBlue contaminated by foreign substances
Individual components of the BlueTec SCR system react very sensitively to even the smallest traces of impurities in AdBlue. Therefore when handling AdBlue, it is always necessary to only use clean containers and catch pans that are dedicated for this purpose. AdBlue that contain traces of impurities must not be used further.

Usage period and storage life
During storage, AdBlue decomposes into ammonium hydroxide and carbon dioxide and thereby no longer meets the requirements of the DIN 70070 standard.
If the recommended storage temperature of maximum 25°C is maintained, then AdBlue meets the requirements of this norm for at least 6 months after its date of manufacture. If the recommended storage temperature is exceeded, then this period is shortened. AdBlue freezes and solidifies at temperatures below -11°C. If warmed, frozen AdBlue will again liquefy and can be used again without degradation of quality.
Refer to the Mercedes-Benz Specifications for Operating Fluids (MB BeVo) for information regarding the maximum permitted usage period of AdBlue.
Disposal and degradability
AdBlue only poses a low level of danger to water bodies and soil. It can be further used by microbes and is therefore easily decomposed. Due to this reason, AdBlue is classified in Germany in the lowest risk category of water-hazards WGK 1 (German Water Hazard Classification).

Marking
Supply pumps for dispensing AdBlue are to be marked with norm designation DIN 70070 and/or the trade name AdBlue.
Physical and chemical properties of AdBlue
State: liquid
Color: colorless, clear, light yellow
Odor: slight ammonia odor
pH value: 10 (aqueous solution, 10 %)
Crystallization initiation: -11°C
Boiling point/Boiling range: 103°C
Flash point: -
Self-ignition temperature: not self-igniting
Density: approx. 1.09 g/cm3 at 20°C
Viscosity, dynamic: approx. 1.4 mPas at 25°C

Protection of electrical and electronic components when handling AdBlue
AdBlue leads to corrosion of electrical and electronic components. Due to this reason, all electrical and electronic components in the vicinity must be covered to avoid contact with AdBlue during performance of any tasks in which AdBlue could leak out.

Storage and packaging
In order to avoid crystal precipitation, it is recommended that AdBlue be stored under normal conditions (optimally at up to 25°C). In order to avoid negative effects upon the quality due to contamination, AdBlue should only be handled via storage and filling systems designed for such purposes. Suitable container materials include alloyed steel, aluminum, various plastics as well as plastic-coated metal containers.
Not suited for this purpose are unalloyed steels, copper, copper-containing alloys and zinc-plated steels.

Disposal of smaller quantities:
Due to its easy decomposition, small quantities of spilled AdBlue can be rinsed away without a problem using copious water.

Disposal of larger quantities:
Disposal of larger quantities of AdBlue must be carried out in compliance with applicable recovery and disposal regulations.

The applicable waste treatment classification is location-dependent and is to be carried out in accordance with the European Waste Catalog (EWC) and/or the German Directive on the List of Waste Materials (AAV).

Contaminated packaging:
Packaging on which remnants of AdBlue adhere is to be treated as the substance itself. It is best to empty packaging, clean appropriately and then introduce into the appropriate recycling waste channel.

Regulations
The product does not need to be labeled in accordance with EC directives or respective national laws.

National regulations:
Statutory Ordinance on Hazardous Incidents: not subject to
German Water Hazard Classification: WGK 1, slightly hazardous to water in accordance with German Administrative Regulation Regarding Water Pollutants (VwVwS)

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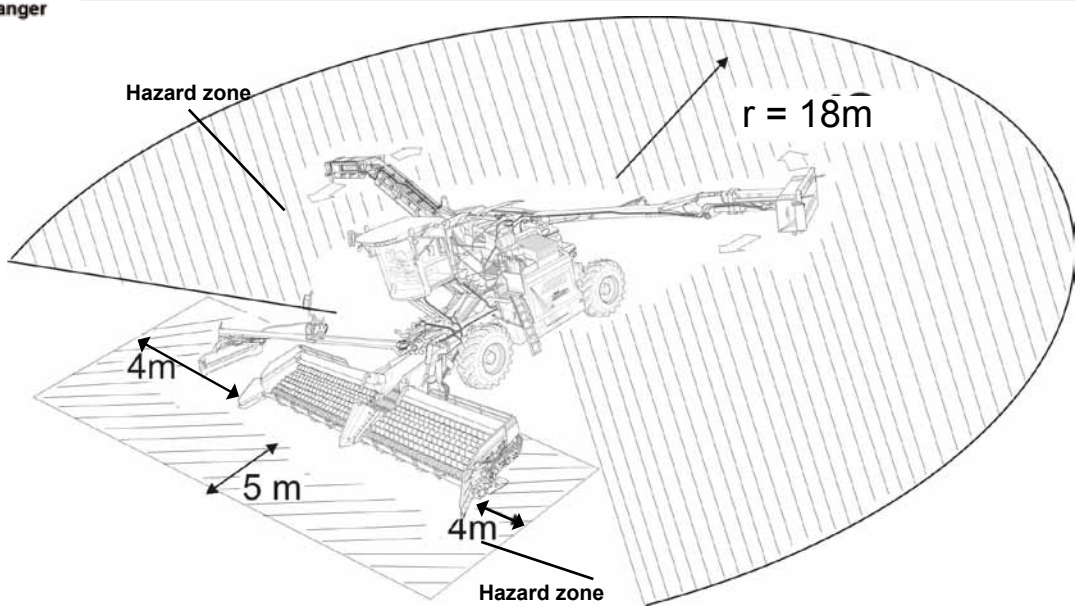
9.10 Safety Information

In the diagram below, the hazard zones of **euro-Maus4** are shown shaded. If people approach these hazard zones, then the driver must immediately and without delay shut down **euro-Maus4** and immediately interrupt the loading process. If the driver does not abide by these instructions, then he must bear all consequences resulting from his actions himself.

STOP
Danger

Danger! *There is acute hazard to life for all people staying within a hazard zone during the loading process!*



I hereby confirm the following .....by my signature:

Name in clearly legible printed letters

I have received this safety information. I was given strict instructions that the driver must immediately interrupt the loading process if people approach the hazard zones.
I have understood where the hazard zones of **euro-Maus4** are located. Should there be children or minors accompanying me, then I will inform these people in a suitable manner, prohibit them from staying in the hazard zones and supervise them accordingly.

I have received the safety instructions from .....

Name in clearly legible printed letters

....

Date Signature of the person having received instructions

I have given these safety instructions and handed a copy of this safety information to the person named above.

.....

Signature

9.11 Confirmation of driver instructions

Mrs./Mr. .....born on .....

Last name and first name

was instructed on ..... ☐ regarding safe handling of **euro-Maus4**

☐ regarding maintenance of **euro-Maus4**

by .....

Last name and first name

Has demonstrated the required knowledge ☐ for safe handling of **euro-Maus4**

☐ for maintenance of **euro-Maus4**

.

She/he was instructed by (last name, first name)..... on (date)..... about the special obligation for safe driving of **euro-Maus4** in traffic and the associated requirements. Subject of these instructions were: The chapter road traffic of the operating manual of **euro-Maus4**, the applicable safety regulations and the specific requirements of the road traffic authority in whose jurisdiction **euro-Maus4** is being moved.

I hereby confirm that I have given the above mentioned instructions to their full extent:

Signature

I hereby confirm that I have received the above mentioned instructions for their full extent and have understood them:

Signature of the driver

I have received, read and understood the operating manual:

.....

Place and date

....

Signature of the vehicle owner Signature of the driver

The following instructions were issued by the Agricultural Social Insurance Lower Bavaria, Upper Palatinate and Swabia for farmers insured by it. We request you to comply with these instructions in your interest:

Driver instructions for self-propelled cleaning loader (loading mouse)

The following is established and is binding for all loading mouse drivers:
If people enter the hazard zone of the pickup shield and the pickup device, then the machine must be immediately shut down.
Startup may only be performed when all people have left the hazard zone. The hazard zone begins at a distance of three meters around the outermost machine components.

.....

(Signature of loading mouse driver)

– Original text agricultural social insurance for occupational accidents Lower Bavaria/Upper Palatinate and Swabia –

Safety instructions for farmers for loading beets

During the loading process, the farmer may not let anybody stay in the hazard zone. People approaching the area must be strictly instructed to maintain a distance. The loading mouse driver must shut down the machine as long as people are staying within the hazard zone. If the people do not leave the hazard zone, then the driver is obliged to interrupt the loading process and to notify the director of operations.

– Original text agricultural social insurance – dept. prevention, Lower Bavaria/Upper Palatinate and Swabia –

9.12 Remarks on beet harvest

Please copy and hand to the loading mouse drivers

9.12.1 Practical hints

During lifting, ensure the correct soil content of the beets. A little soil (soil content around 10-15%) protects the beets during loading. If the soil content is too high the beets cannot be loaded as quickly.
If sugar beets are loaded immediately after lifting, then they should be cleaned as much as possible by the beet lifter. If freshly lifted beets are cleaned during loading, then this will lead to increased damage to the beet body in contrast to beets that been deposited for a while.

In case of very light soil, which can easily be strained, you should include a low soil content in the beet pile at lifting. This soil content has a certain damping effect during loading, which largely protects the beets from damage, but which can be removed without any problem by **euro-Maus4**.
Especially in case of sticky soil, after lifting – in spite of good cleaning – usually a large soil content is still sticking to the beets. These sugar beets should be deposited in piles for at least 3-5 days before loading and kept dry during this period. In case of moist weather, cover these piles, if possible, so that soil residue will start to dry off. Dried soil has a certain damping effect during loading, but can also be excellently cleaned off using **euro-Maus4**.

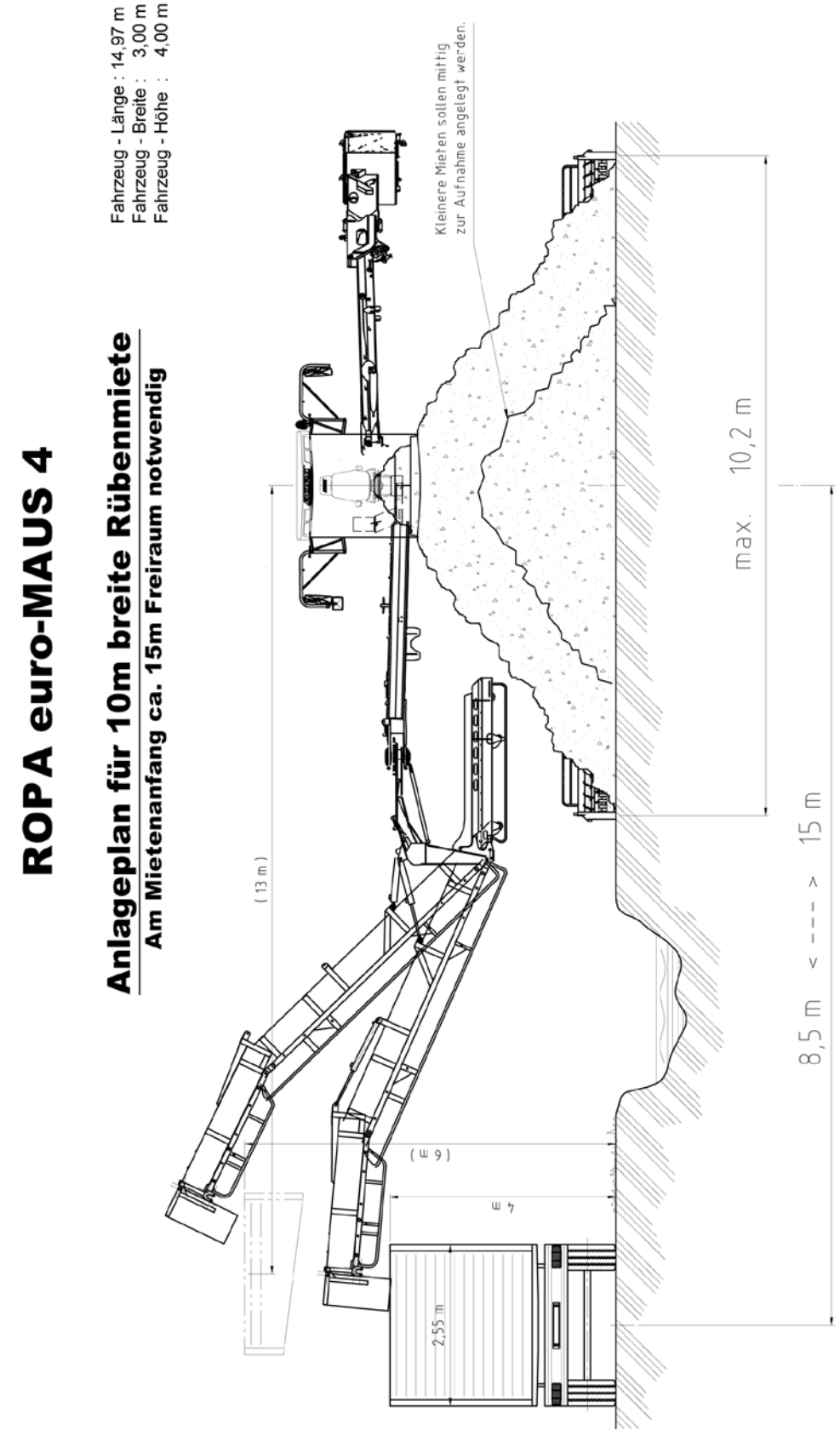
In case of very difficult ground conditions, an optimal cleaning effect may only be achieved if the beets are deposited in piles for at least 5-7 days and are kept dry during this period. The same holds true if the soil content is sticking very much to the beet body after lifting. For these beets, you will only achieve a high throughput during loading and beet-sparing loading if the soil content has started to dry on the beet body.
Only erect beet piles on dry and track-free soil, if possible. The ground should be as free as possible of foreign bodies like stones, wooden parts, etc.

If the estimated soil content of a pile is at 25% or greater, then the pile height should not exceed two meters, if possible. For this pile height, you will achieve high throughput with simultaneous optimum distribution of soil cleaned off during loading. Long and low piles can usually be loaded quicker than short and high ones.

Take note of our plans for erecting piles. In any case, comply with the distance to the transport path.
Make sure that the pile width in no case exceeds eight meters.

Loading is usually performed to the right (reduced time expenditure during swing-in and swing-out). Please consider this when erecting the pile. Due to technologically mature engineering of **euro-Maus4**, loading to the left is also possible, with the same throughput and the same quality.

9.12.2 Erection plan for a beet pile



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