DK GB DE SE FR

GMR
Care for the ground

Original operating Instructions

STAMA Micro EL, Parker EL, Mini EL, Multi EL, Evo EL, Maxi EL

GMR maskiner a/s
Saturnvej 17
DK-8700 Horsens

Tel. +45 7564 3611
www.gmr.dk

Registration of Use

GB

GMR maskiner a/s manufactures quality machines for professional users.
The warranty period on our machines is 12 months from the purchase date, and covers any material or manufacturing defects.
Any parts that have suffered damage as a result of material and production faults will be replaced by GMR maskiner a/s at no charge.
Compensation will not be given for consequential damage or wearing parts.

PLEASE NOTE!
To maintain warranty, the Dealer is obliged to fill in and return the “Registration for use” below to GMR maskiner a/s, not later than one month after delivery to the end user.
A condition for any processing of claims is that this “Registration for use” is submitted timely.

This can be done on our website at www.gmr.dk
or by filling in and forwarding or scanning the form below to:

GMR maskiner a/s
Saturnvej 17
DK-8700 Horsens
stensballe@gmr.dk

Registration for use:

Machine number	
Model	
Delivery date	
End user	
Address	
Dealer	

EC declaration of conformity

Manufacturer: **GMR maskiner a/s**
Saturnvej 17, 8700 Horsens, Denmark
Tel.: +45 7564 3611

hereby declares that

machine: **STAMA**
machine no.:
date:

is in conformity with the applicable requirements of:

Order of 10 June 2013 implementing Directive 2006/42/EC of the European Parliament and of the Council as amended, as well as the EMC Directive 2014/30EU as amended.

Standards applied:

DS/EN ISO 12100:2 011 Safety of machinery - General principles for design - Risk assessment and risk reduction.

Signature:

Niels Kirkegaard
CEO

General information

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General comments

Please read the Operating Instructions before you start to use your new STAMA truck.

The instruction instructions consist of a guide for all Stama vehicles, as well as spare parts drawings for the specific vehicle.
It is recommended that the operating instructions are copied and the original is stored in a safe place. Always keep a copy of the operating instructions available in the vehicle.

The truck may only be operated by persons over 18 years of age who are trained in the truck's operation.

If you are in any doubt, contact the dealer.

Use only original STAMA parts in your electric truck. To order original parts, contact your dealer or GMR maskiner a/s directly.

The truck is fully assembled and tested at the factory. It is ready for use. The design of the supplied truck may not be modified without the written permission of GMR. If the product is altered or if non-original spare parts are used, all rights under the warranty will be rendered void.

The STAMA truck is a product, the design of which is based on the practical experiences of users, e.g. graveyards and housing associations.

GMR maskiner a/s reserves the right to design changes as a result of ongoing technical developments.

Safety warnings

Please note the following safety warnings found in this user manual:

WARNING
Risk of personal injury or death
A technical procedure or similar which may be hazardous and result in personal injury or death.

CAUTION
Damage to machinery or accessories
A technical procedure or similar which may result in damage to the machinery or accessories.

NOTE
Important information
A very important technical procedure or similar.

Acceleration

The truck starts gently and continues to accelerate until it reaches maximum speed.

Maximum speed

Micro	12 km/h
Parker and Mini	15 km/h
Mini	15 km/h
Multi and Evo	20 km/h
Maxi	16 km/h

The top speed is electronically controlled and can be lowered. Contact GMR maskiner.

Intended use

The truck is only intended to carry stone, gravel, soil, branches and waste. Transporting passengers in the truck bed is dangerous and strictly prohibited.

	Total weight	Max load
Micro	740 kg	350 kg
Parker	1125 kg	500 kg
Mini	1350 kg	750 kg
Multi	2200 kg	1200 kg
Evo	2400 kg	1400 kg
Maxi	2480 kg	1200 kg

Depending on the truck's other equipment, the truck's maximum permissible load may be lower. The permissible total weight of the truck must not be exceeded.

Trailer total weight

	Without park brake	With park brake
Micro	175 kg	-
Mini and Parker	350 kg	700 kg
Multi	500 kg	1000 kg
Maxi	500 kg	1000 kg
Evo	970 kg	1500 kg

The specified trailer weights apply only to NOT registered vehicles. Contact GMR regarding driving with vehicles on public road.

Normal use

The operator must sit on the seat when driving. The truck stops if contact with the seat is interrupted for more than 1 second.

Multi and EVO have space for one passenger who must remain seated in the respective passenger seat while driving. Jumping on/off the machine and standing on the truck bed and sides are forbidden!

Light

The operator must ensure that there is sufficient light when driving the truck so that potential obstacles are clearly visible.

Noise

Stama trucks are electrically powered and therefore emit very little noise. The rear axle emits an audible transmission sound and the hydraulic pump also emits an audible pumping sound when activated. The sound level in the cabin has been measured at below 70 dB(A) over 1 minute.

Speed, slopes and inclines

The truck speed should be adapted to the conditions, i.e. reduce speed at corners and in narrow passages. There is a risk that the truck may overturn when travelling on an incline. Never drive on an incline of more than 20° across the direction of travel.

CAUTION
Damage to machinery or accessories
When travelling fully loaded down a steep hill, the truck must travel at very slow speed (turtle mode). Never drive faster downhill than the truck can drive uphill fully loaded.
Make sure that the brakes are in good working condition at all times.

WARNING
Risk of personal injury or death
If you drive too fast downhill, the truck may run out of control.

Max. incline in direction of travel - fully loaded:

Micro	20%
Parker	20%
Mini	20%
Multi	25%
Evo	20%
Maxi	30%

Do not drive unloaded on inclines of more than 30%, neither up nor down.

If the incline is steeper and the truck fully loaded, there is a risk that the truck will stall on the incline and (worst case) may roll backwards.

The truck must not be unloaded when the vehicle is on a slope.

Safety requirements

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WARNING
Moving parts
Take care not to allow people or objects to get crushed when tipping the truck bed.

WARNING
Safety guards
When the truck is in operation, all safety guards must be secured.

WARNING
Maintenance
Before starting maintenance work, bring the truck to a complete standstill to ensure that there is no danger of personal injury due to moving parts.

Vibrations

There are no significant vibrations as the machine is electrically powered.
Seat vibrations have been measured with VibroControl at below 0.16 m/s² on all trucks at top speed.

Disposal

When disposing of the truck, the battery should be recycled. The remainder of the truck should be disposed of by a scrap dealer.

Preparation

Pre-start inspection

Before starting, check that:

- The battery is fully charged
- The battery electrolyte density is correct
- Check tyre pressure.
- The battery is clean
- There is no battery error or operating fault

Stama trucks are fitted with either a main switch or a battery plug with handle. On Micro EL, the main switch is located on the right-hand side under the truck bed. On Mini EL, the battery plug is located beneath the driver's end. On Multi EL, the battery plug is located in the seat box. On Maxi EL the battery plug is located beneath the driver's end. On EVO EL, the battery plug is located in the seat box.
Turn the main switch or connect the battery plug.
Turn and hold the ignition key on the dashboard in that position until the display lights up. The hydraulic pump then accumulates servo pressure. In some trucks, this happens only when the seat switch is activated.

Operating

Direction of travel

Read the "Preparation" section before operating the truck.

Select direction of travel – forward or reverse – using the selector on the dashboard/steering column (depending on model). Regulate speed using the foot pedal. The foot pedal also acts as an engine brake (release pressure on the foot pedal).

Sequence error

For safety reasons, the direction selector must always be in neutral before the seat switch can be activated. Otherwise error 47 (sequence error) will occur. This can be reset by briefly placing the direction selector in neutral.

Stopping

Release the foot pedal. The motor brakes. If you need to brake harder, use the foot brake.

Loading

The permissible total weight of the truck must not be exceeded. When transporting clay soil, spread a thin layer of gravel in the bottom of the truck bed to reduce load friction. The load must be distributed evenly over the truck bed. The truck bed must not be overloaded. No part of the load must be able to fall off, not even when braking. Projecting parts of the load must be marked so that they are always visible.

Unloading/tipping

Before unloading, the driver must ensure that no other persons are in the vicinity. The truck must only be unloaded when standing on a horizontal and stable surface. Unloading on sloping terrain or unstable surfaces may overturn the truck! When tipping to the side with an articulated truck bed, special care must be taken as load displacement may overturn the vehicle! The driver must ensure that the load slides off, typically by loading in small bursts (short activations of the tip button). Occasionally the driver must help the load on its way with a shovel. Activate the switch on the dashboard or steering column. Unloading/tipping starts.

Emergency stop

To stop the truck and all its moving parts, turn the ignition switch to the OFF position.

To prevent unnecessary breakdowns and excessive wear-and-tear, your truck should be maintained at regular intervals.

Electric motor

CAUTION
Damage to machinery or accessories
NEVER use a high-pressure/steam cleaner on electrical components. The water can be pressed into the components or cause condensation which destroys the components.

Instead, use compressed air to clean electrical components.

The truck must be serviced twice a year by a GMR-approved technician.

Error codes

If the truck does not work properly, read the alarm code and contact an authorised technician.

12	Loose connection or short of cables
14	Main relay fault due to parasitic load
17	Severe undervoltage
23	Reduced power due to low voltage
28	Reduced power due to high motor temperature
32 / 92	Park brake disrupted (Check the parking brake button setting)
38	Main Contactor defect
39	Main Contactor did not close
47	Sequencing fault, direction switch must in neutral
51	Reversible seat sensor fault
72	CAN bus communication error

To cancel the error, try switching the forward/reverse selector switch to neutral. Then switch the ignition switch to OFF and restart. If there is an alarm code in the display all the time, you must contact an authorised workshop.
For a full list of error codes in English, contact GMR maskiner.

Towing

All Stama trucks have automatic parking brakes. Some models have a hidden toggle switch labelled “PUSH”. If the button is activated and there is sufficient battery power, the parking brake is released and the truck can be pushed a few meters.

NOTE
Important information
The seat switch must not be activated while the truck is being pushed, otherwise the truck will try to oppose the push and return back to the starting pont.

The truck must not be pulled or towed over a longer distance, as the motor will induce a high voltage which can damage the motor or steering.
The toggle switch must always be in the “AUTO” position, otherwise the battery may discharge or the machine will fail.

Hydraulic system

The hydraulic system is generally maintenance-free. However, you should replace hydraulic fluid once a year or after 500 operating hours. We recommend Shell Tellus Artctic 32 Hydraulic fluid.

Gear motor

Type SAE 80W90 / SHC 75W90 gear oil must be changed after 500 hours of operation or at least once a year.

Micro, Parker and Mini	0.25 litres
Multi, Evo and Maxi	0.50 litres

Lubricating mechanical parts

Grease the ball bearings about six times a year.

Lead-acid batteries

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Lead batteries

WARNING
Risk of personal injury/death
The charging of lead-acid batteries can be hazardous, due to the formation of explosive hydrogen gas.

WARNING
Risk of personal injury/death
Flames and sparks are not permitted in the vicinity of the battery. Power down the mains supply contact before releasing the charger clamp.

WARNING
Risk of personal injury/death
Some internal parts of the charger carry live current and represent a risk of personal injury. The charger frame must therefore only be opened by specially qualified personnel.

COMMENT
Important information
The charger is not suitable for domestic use or for use in offices or similar electrical environments.

General comment

The battery charger is an automatic, microprocessor controlled charging unit, which is intended specifically to charge open lead-acid batteries. Charging specifications according to DIN 41774.

Installation

The charger must be located in a dry, well-ventilated space.

- The charger should be connected to the mains power supply - It must be earthed and fused. Connect in accordance with the specifications on the charger type plate.
- The charger can be adjusted to the appropriate mains voltage. (This may only be performed by an authorised technician. If the charger frame is opened, the guarantee will be considered null and void).
- The charger may only be adjusted when the unit is powered down.

Lead-acid batteries

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Function

Depending on type and production year, your truck will have one of two different types of battery charger.

SMC-HF 600/800

Curtis 1621

Recharging

- Connect the battery. Switch on the mains supply. The POWER ON diode is lit when the unit is charging.
- When the charging level reaches 2.43 V per cell, the charger reduces charging to a pre-programmed voltage charge level and the next diode lamp lights up. The charger charges at constant voltage for about 60% of the main charging period.
- Then the pulsed maintenance charging phase starts. A green diode lights up.

The battery is now fully charged.

Operating errors

- If the battery does not reach 2,43 V per cell after 10 hours of recharging, switch off the charger. The lower red diode lamp lights up. The red diode lamp indicates that there is an error or that charger safety is compromised.
- If the total charging time exceeds 16 hours, the charger switches to maintenance charging.
- In the event of a power cut, the charging timer is interrupted. The timer restarts when the power is resumed. The charger's charging diode lamp is extinguished during a power cut.

Before charging

Drive the machine close to the charger. The charger and battery connectors must be within easy reach of each other.

Turn ignition switch to 0. Cut the power.

Connect the charger connector to the battery connector on the machine.

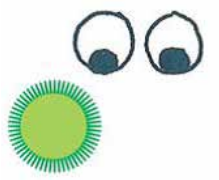
Switch on the charger.

Check that the charger starts to charge. The **Red** lamp lights up (NB: on some chargers, this lamp is **Yellow**).

The charging process is optimal at room temperature. If the battery is to be stored for a longer period of time, it should be fully charged before storage.

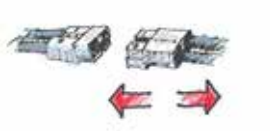
Don't forget to switch the charger off or press the pause button each time you connect or disconnect the battery to/from the charger.
To avoid sparks, power down the charger before disconnecting the charger and battery connectors.

After charging



Check that the charger has fully charged the battery.
The **Green** lamp is lit.

Power down the charger or press the pause button.



Disconnect the charger connector from the battery connector.
COMMENT: Never pull on the cables.

Wipe the battery and close the battery lid.
Connect the battery connector to the truck and drive.

Check battery fluid level **at least every 14 days**. If necessary, top up the battery fluid.

ALWAYS top up after charging.

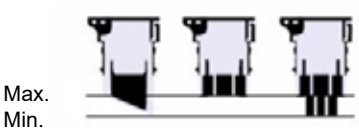
NEVER top up before charging.

Don't forget to switch off the charger or press the pause button each time you connect or disconnect the battery to/from the charger.
To avoid sparks, power down the charger before disconnecting the charger and battery connectors.

Manual top-up with battery fluid

COMMENT: NEVER add acid to the battery, only battery fluid.

Do not store battery fluid in a metal container. To top up, use equipment made of plastic or other non-conductive material, which can also withstand contact with water and acid.



Boards and separators must always be covered by the acid. Never top up with more battery fluid than indicated on the drawing.

If the acid level is too high, there is a risk that it will spill over during charging, which may damage the battery or underlay.
If the battery has toppled or if acid has leaked from it, contact GMR maskiner a/s.

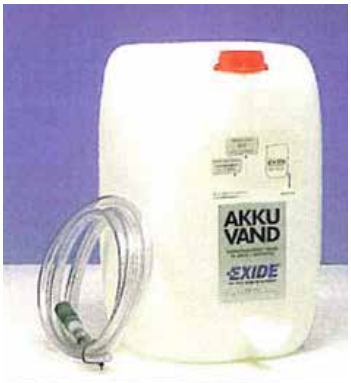
Always keep the battery clean and avoid acid spills. If metal parts are tainted with acid, clean them. To protect them from further adverse effects, lubricate with acid-free Vaseline.

Automatic top-up with a BFS and water caniste

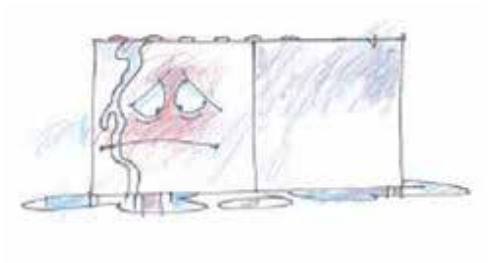
The battery filling system (BFS) caps work best when water pressure is 0.3-2.0 bar, which corresponds to water column pressure when pouring from a height of 3-20 metres.

If the pressure is too low, the caps may fail to close at the correct level in the cells and continue to fill. The battery will then overflow, which affects electrolyte density and may damage the battery box and underlay.

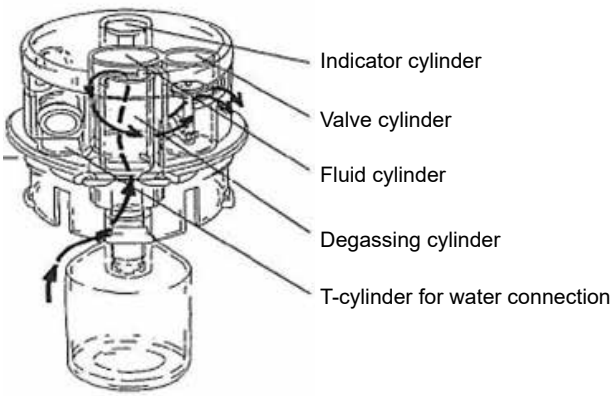
COMMENT
Important information
If a battery has overflowed, the electrolyte level must be regulated. This must be only be done by Exide Batteriservice, Motive Force. Call +45 702 78 702. Contact GMR maskiner a/s to order electrolyte regulation



The canister must be placed at least three metres above the cell caps, preferably higher.



Position the canister at the correct height and check the BFS system regularly. If you do not, your battery may get damaged.



Lithium batteries

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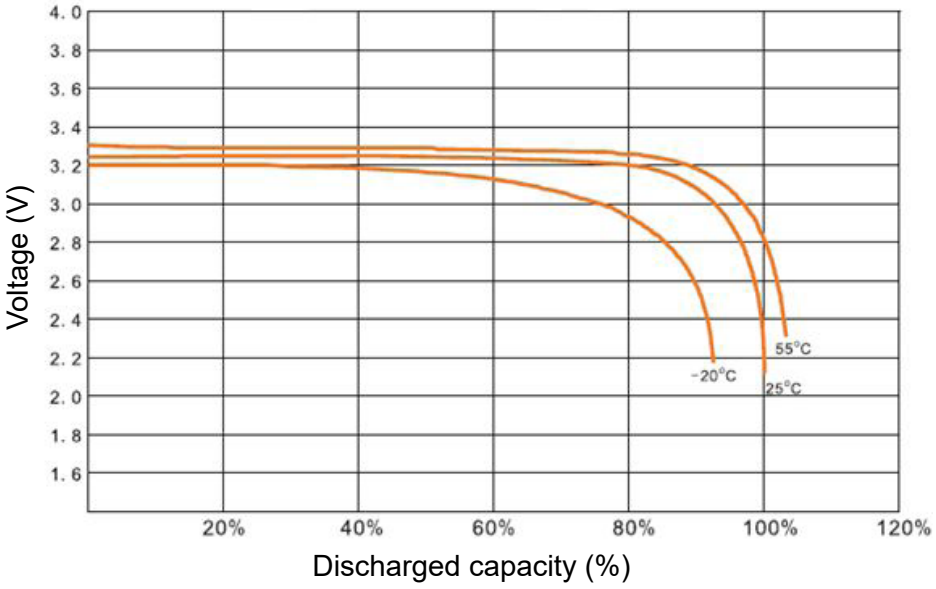
The battery pack (LFP = Lithium Ferro phosphate)

The lithium battery pack contains a number of individual LFP cells. The pack has a nominal voltage of about 3.3 V per cell. This is the safest type of lithium battery on the market.

LFP batteries have a flat discharge curve, i.e. the voltage remains at about 3.2 V until the battery is about 80% discharged, after which the voltage diminishes sharply. To minimise the risk of damage and prolong the lifetime of the batteries, we recommend that they are never more than 80% discharged.

LFP battery discharge curve at different temperatures



Battery lifetime

LFP batteries have a longer lifetime than conventional lead-acid batteries. They can withstand more than 3,000 70% depth of discharge (DOD) cycles. The voltage of LFP batteries must not fall under 2.6 V per cell. If voltage falls below this level, the cells may be irreparably damaged.

Lithium battery types

Until 2017, GMR manufactured its own lithium battery packs. The use of lithium batteries made by other manufacturers will be phased in from 2017.
If you have a question or need more information material, contact GMR maskiner a/s.

Lithium batteries

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Battery management system
BMS = Battery Management System, GMR type

The lithium-ion battery pack is fitted with BMS, a system which monitors the voltage in each individual battery cell. A combined battery sensor/ balancing unit is fitted to the top of each cell.

The PCB is fitted directly onto the cell's + and - terminals and has two functions:

1. The board constantly monitors cell voltage so that it remains within the permitted range (2.6-4 V). If voltage is within the permitted range, a green diode lamp lights up, The unit's output signals to the main monitoring system that everything is in good working order.

2. The unit also helps to balance the cells while the battery pack is recharging. When the charge voltage exceeds 3.6 V, the unit starts to deduct balancing energy from + to - , increasing to 1 ampere when maximum voltage (4.0 CV) is achieved. When the PCB is balancing (deducting power), a red diode lamp lights up (at the same time as the green one). The red diode lamp on the sensors does not signal that there is an error.

Stama trucks with no reset button (after 2014)

Stama trucks which do not have a reset button are fitted with a simple BMS, in which the MCU is replaced by a simple timer relay which requires no resetting. If all the battery sensors light up green, the BMS relay is activated and the machine can be started. If just one of the sensors does not light up green, the relay is not activated and the batteries will not be excessively discharged.

Lithium batteries

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Lithium-ion battery charger

The battery charger charges all the batteries serially and simultaneously to a charge voltage of 3.65 V per cell. The charger charges constantly until the desired voltage level is achieved. Then the charge voltage is reduced until full starting voltage is achieved. The starting voltage is maintained until the charger is switched off.

Before the charge voltage is reached, all the cell sensors' red diode lamps should light up.
The battery pack is fully charged in seven hours.

COMMENT
Important information
Lithium-ion batteries should not be subjected to charge voltage over a prolonged period of time because constant high charge voltage reduces battery capacity. Disconnect the charger when the batteries are fully charged.

COMMENT
Important information
To avoid irreparable damage, NEVER allow lithium batteries to discharge completely
The batteries self-discharge over time and **must** therefore be charged at least every month to prevent them from becoming completely discharged. Lithium batteries are maintenance-free.

CAUTION
Damage to machinery or attachments
Do not open the cells as this can ultimately (worst case) cause irreparable damage.

- If they are corroded, clean cell terminals with a dry brush.
- Keep electrical connections dry at all times.

If you have a question or need more information material, contact GMR maskiner a/s.

Lithium batteries

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Cold

Lithium batteries can withstand frost, and can be used down to minus 20° C, though with reduced capacity.

> **CAUTION**
> **Damage to machinery or attachments**
> Lithium batteries must be at least +5 ˚C before they may be recharged. If colder batteries are charged they can be permanently damaged.

GMR type lithium battery indicator

Like an electricity meter, the battery indicator measures power entering and leaving the lithium-ion battery. The battery indicator also calculates power reserves. The indicator is always connected to the battery – even when the main switch is OFF.

If the SYNC icon flashes in the display, the battery charge level reading is invalid. This happens if the indicator has been disconnected from the battery. Fully recharge the battery to ensure that the indicator measures correct battery charge level. SYNCHRONISE disappears from the display.

Displays

The + and - buttons allow access to different displays:

Battery power (voltage)	Current power consumption or charging. Minus - is consumption	Ampere hours used since charging	Battery power remaining (%)	Remaining operating hours at current consumption

Battery alarm

The battery indicator is set to the relevant size of battery. This must not be changed except by agreement with GMR.

When the batteries have only a few percent of full power remaining, the indicator triggers an alarm (The alarm icon is displayed), and the truck runs at reduced speed. The truck should be recharged.

The truck is marked with various labels and signs. These must remain on the truck at all times. If labels and signs are damaged or obscured by paint, they must be replaced.
New labels and signs are available from the manufacturer or contact your dealer.

Type plate

The machine carries warning signs.

CE label

The CE label indicates that the machine complies with the EC Machinery Directive, the year of manufacture.

Machine number

The machine number is unique and clearly identifies the individual machine.
The first two digits of the serial number indicate the year of manufacture.
Always remember to state the machine number when contacting GMR.

Other labels

The truck also carries the manufacturer's own labels (logos, etc.).

Customer services and claims

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Service

It is the dealer's responsibility to deliver the machine (and assemble if required), to start it on delivery or first use, and to instruct the operator about the use and maintenance of the machine (including tightening nuts and bolts).

The dealer is also obliged to make sure that the ser manual and spare parts list is delivered to the customer and that the registration for use is completed correctly and sent to GMR maskiner a/s no later than 1 month after delivery to the user. (See page 3)

Claims

The warranty period on STAMA is 12 months from the purchase date, and covers any material or manufacturing defects. These parts will be replaced by GMR maskiner a/s free of charge. Consequential damage and wear and tear will not be replaced.

Any components which are not manufactured by GMR maskiner a/s are included under the terms of the warranty to the extent authorised by the supplier of the parts in question.
GMR maskiner a/s reserves the right to assign a claim of this kind to the relevant supplier and not to reach a decision until the relevant supplier has responded.

The following must be observed when working on a claim:

- report the claim to GMR maskiner a/s before the repair is started
- agree a time period with GMR maskiner a/s for qualified technicians to carry out the repair
- any labour costs will only be approved at a fixed net price.

If GMR maskiner a/s has not authorised repair work in advance, any invoice submitted for repair work will not be approved.

At GMR maskiner a/s' request, before the claim can finally be handled, any parts that were replaced must be sent carriage paid to the factory.

GMR maskiner a/s retains the exclusive right to determine the extent to which a part shall be replaced or repaired.

The warranty does not cover:

- normal wear and tear or damage which has resulted from inadequate maintenance.
- damage caused by collision.
- non-compliance with the product's technical specifications or if the product is used for a purpose other than that described in the ser manual.

If the product is altered or if non-original spare parts are used, all rights under the warranty will be rendered void.

The purchaser does not have the right to require that design changes on future models are implemented in a pre-existing machine.

In the event of a complaint

Complaints must be registered directly with GMR maskiner a/s. Complete a complaint report, stating the machine type, production number and date of its delivery to the customer, and send it to us. This is done via the dealer login on our website www.gmr.dk.
If questions arise about claims on imported machines, we reserve the right to present the claim to the manufacturer before making any decision about whether the claim can be accepted.

Our machinery is subject to the EC Machinery Directive and quality assured within the European Union. We make every effort to comply with these requirements and do our utmost to supply high quality machinery.

Horsens, 01.06.2017
GMR maskiner a/s

GMR

Care for the ground

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