GROENEVELD-BEKA
LUBRICATION SYSTEMS BY TIMKEN

Grease lubrication pump GMA GMA+

Design versions: FW 03.XX

Original operating and assembly manual

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1. Technical data

General:

Available reservoir sizes: . . . . . 1, 2, 3, or 5 liter
Pressure connection: Ø4
Control & Monitoring: . . . . . GMA without control unit (can be controlled externally)
. . . . . GMA+ with integrated control unit (in the reservoir cover)
Filling connection: . . . . . lubrication zerk fitting acc. to DIN 71412
. . . . . filling coupling for filling with mobile or stationary filling pumps
Filling level monitoring: . . . . . optional
Lubricant: . . . . . oil SAE 80/90 up to greases of NLGI 2
Operating pressure: . . . . . max. 120 bar (1740 psi, 12 MPa)
Weight: . . . . . ca. 2,8 kg up to ca. 3,6 kg, depending on reservoir size (for 18 outlets)
Operating temperature: . . . . . -20° up to +70°C (-4 up to 158°F) with use of Greenlube EP-2
Sound pressure level: . . . . . <60 db(A)

Pump:

Materials: . . . . . aluminium, steel and plastics
Number of outlets: . . . . . 12, 18, 36 or 72 (depending on pump body)
Pump type: . . . . . electrically driven multi-line piston pump
Delivery rates (cm^3): . . . . . depending on pump element 0,010, 0,015, 0,025, 0,040, 0,060 or 0,100
Drive type: . . . . . Electric motor
Motor power: . . . . . +/- 3,2 W (rated value at 20°C)
Motor speed: . . . . . max. 0,9 rpm (depending on used lubricant, amient temperature
. . . . . and the backpressure
Motor voltage: . . . . . 12 or 24 V DC
Degree of protection: . . . . . reservoir: IP 54 integrated control unit: IP 69K, voltage connection of pump: IP 69K
Connection type (voltage connection): . . . . . Connector/Socket Tyco 776494
Connection cable: . . . . . 10 m (cable, 8 contacts)

Level switch:

Switching voltage: . . . . . max. 140 VAC / 200 VDC (25°C)
Contact type: . . . . . NO (normally open contact)
Contact function: . . . . . prewarning, empty signal
Degree of protection: . . . . . IP 67

Certificates: . . . . . Type Approval Certificate GM E4-10R06_01-4897-00
. . . . . ECE-R10, rev 6 Automotive directive of the United Nations
. . . . . ISO 13766: 2006 Earth Moving Machinery standard
. . . . . ISO 14982: 2009 Agriculture and Forestry Machinery standard
. . . . . EN 12895: 2015 Industrial Truck standard
. . . . . EN 13309: 2010 Construction Machinery standard
. . . . . EN 50498: 2010 After Market Electronic Equipment in vehicles
. . . . . UL 778: 2016 Certification
. . . Vibration resistance, according to GTE vibration standard for complete units which is comparable to ISO 16750-3
. . . . . EN 6100-6-2: 2005 - Generic standards - Immunity for ind. environments
. . . . . EN 6100-6-4: 2007 + A1: 2011 - Generic standards - Emission standard
. . . . . Our OEM quality standards are compliant with IATF & SPICE regulations

The **GMA / GMA+** grease lubrication pump is hereinafter referred to as the **device.**

2. Explanation of symbols and abbreviations

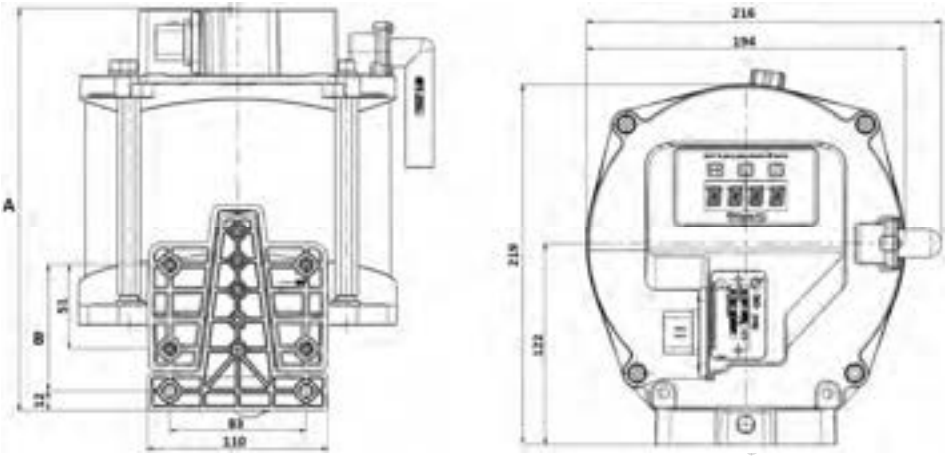
Abbreviatiion	Explanation
UP button	button on display 
DOWN button	button on display 
Enter button	button on display 

Please see the individual chapters with functional descriptions and the adjustment instructions for the codes indicated on the display.

Abbreviation	Explanation
TKR	**TR**uc**K** mode of the control unit for trucks (continuous voltage required)
TRL	**TR**ai**L**er mode of the control unit for trailers and semi-trailers (continuous voltage not required)
GIV	**G**reasing **I**nter**V**alue Time interval from one lubrication to the next. Comprises the lubrication time and the remaining pause time until another lubrication is started.
PUMP-CYCLE	Time required by the device for one complete pump revolution.
PAUSE-TIME (DWELL-TIME)	Remaining time when one lubrication (PUMP-CYCLE) is completed to the start of the new one.

3. Dimensional drawings GMA and GMA+

Fig. 1:



Capacity and outlets	Dimension A (mm)	Dimension B (mm)
1 liter with 12 outlets	190,5	76,5
1 liter with 18 outlets	190,5	76,5
1 liter with 36 outlets	208,5	94,5
1 liter with 72 outlets	244,5	130,5
2 liter with 12 outlets	245	76,5
2 liter with 18 outlets	245	76,5
2 liter with 36 outlets	263	94,5
2 liter with 72 outlets	299	130,5
3 liter with 12 outlets	286	76,5
3 liter with 18 outlets	286	76,5
3 liter with 36 outlets	304	94,5
3 liter with 72 outlets	340	130,5
5 liter with 12 outlets	366	76,5
5 liter with 18 outlets	366	76,5
5 liter with 36 outlets	384	94,5
5 liter with 72 outlets	420	130,5

4. General safety instructions

All persons that are charged with assembly, start-up, maintenance and operation of the device must carefully read these operating manual before assembly and commissioning of the device on the machine! Furthermore this manual must permanently be available at the site of operation.
The following contains basic information that must be observed for operation and maintenance.

4.1 Safety instructions

Observe the general safety instructions in this main chapter as well as the special safety instructions in other chapters of this operating and assembly manual.

Warning of electrical voltage.

Safety instructions which in case of non-observance might cause hazards to persons are marked with the general danger symbol.

This symbol warns of hot surfaces.

Warning of suspended loads.

Warning of material damage due to electrostatic discharge! Marks potential risks which may result in material damage if not avoided.

Caution!

Caution! We use this heading if improper or general non-observance of the operating manual, work instructions, specified work flows and the like might result in damage of the device.

Notice!

Notice!
We use this term to point out particular details.

Strictly observe any instructions that are directly attached to the device and keep them in readable condition!

4.2 Personnel qualification and training

The personnel for operation, maintenance, inspection and assembly must have the appropriate qualification for this work. The operator must clearly define compentence, responsibilites and supervision of staff. In case the personnel does not have the necessary knowledge, they have to be trained and instructed accordingly. The operator is obliged to ensure that the personnel fully understands the contents of this user information.

4.3 Hazards in case of non-observance of the safety instructions

Non-observance of the **safety instructions** can result in **hazards to persons**, the environment and for the device. Non-observance of the safety instructions may further result in the loss of any liability claims. In detail, non-observance can entail the following hazards:

- Failure of important device functions.
- Failure of prescribed methods for maintenance and repair.
- Danger to persons by electrical, mechanical and chemical effects.
- Danger to the environment by leakage of hazardous substances.

4.4 Obligations of the operator / user

- If movable, rotating, hot or cold machine parts bear risks, the customer must protect these parts against contact. This protection must not be removed.
- Drain any leakages of hazardous substances in a way that no risks for persons or the environment arise. Please also observe the data sheets or safety data sheets of the respective manufacturers.
- Keep to all legal provisions.
- Exclude any hazards due to electrical energy.
- The examinations of pipes or hoses for safe provision, use, proper assembly and function have to be carried out according to regionally applicable directives. Inspection intervals must not be exceeded.
- Replace defective pipes or hoses immediately and professionally.
- Hydraulic hoses and polyamide pipes are subject to a natural aging process and thus have to be exchanged in regular intervals according to the manufacturer's specifications.
- Provide a safety data sheet of the currently uses lubricant at the device.
- Observe the generally applicable Ordinance on Hazardous Substances in its latest version.

4.5 Safety instructions for maintenance, inspection and assembly

All **maintenance, inspection** and **assembly work** may only be carried out by **qualified personnel** who is sufficiently informed by thorough reading of the user information.

Generally any work at the device may only be done **at complete standstill** and in **pressureless and disconnected condition.** Use appropriate **personal protective equipment** (goggles among others). The shutdown procedure of the device as described in the operating manual must be strictly followed.

Secure the device against intentional or unintentional recommissioning during maintenance and repair. Put all safety and protection arrangements back in place again immediately when the work is finished.

Dispose of environmentally hazardous media professionally and in accordance to the relevant official provisions. **Clean polluted and contaminated surfaces** before maintenance. Wear protective equipment to that purpose. Observe the lubricant manufacturer's data sheets and safety data sheets, respective the data sheets provided by the manufacturers of used auxiliaries and working materials.

Check the surface temperature of the device as a possible heat transfer bears the **risk of burns**. Wear heat-resistant protective gloves!

Open light and fire are **strictly forbidden** during any maintenance, inspection and repair **due to fire hazard.**

4.6 Unauthorized modification and production of spare parts

Modification, repair and alterations of the device are only accepted after consultation with the manufacturer. **Original spare parts** and authorized accessories from the manufacturer contribute to **safety.** The use of other parts can result in the loss of any liabilities for the resulting consequences. Groeneveld-BEKA will not assume liability for parts retrofit by the operator.

4.7 Inadmissible modes of operation

Operational safety of the device is only guaranteed for appropriate use as stated in the operating manual. Never exceed or fall below the limit values as stated in the technical data.

4.8 Electrostatic discharge

Avoid electrostatic discharge! There are electronic components integrated into the devices which you can destroy by electrostatic discharge when you touch them. Observe the safety precautions against electrostatic discharge acc. to DIN EN 61340-5-1/-3. Ensure that the environment (persons, workplace and packaging) is well grounded when handling the devices.

4.9 General hazard warning - residual risk

All components of the device are designed according to valid regulations for the construction of technical systems regarding operational safety and accident prevention. Independently thereof the use can lead to hazards for the user or third parties and for other technical facilities. Therefore the device may only be used for its intended purpose in **technically faultless condition** and in compliance with the relevant safety regulations and the operating manual. **Inspect** the device and its attachment parts **regularly** and check them for possible **damage or leakages. Fluids** could **escape under high pressure** from pressurized components which become **leaky.**

5. Intended use

Caution!

The device, as part of a central lubrication system, serves to **convey lubricant for the lubrication** of machines as described in this operating manual. The device is approved for **industrial** and **commercial** use **only.**
The device may only be put into operation if it is installed in / attached to another machine and is operated together with it.
Only lubricant according to the specifications of the machine manufacturer may be conveyed.
The device may only be used as specified in the technical data (see chapter 1 „Technical data“).
Never exceed or fall below these values. Never run the device without lubricant.
Unauthorized **structural modifications** of the device are **not permitted.** Groeneveld-BEKA will not assume liability for damage of persons or the machine resulting thereof.

The device has been manufactured in compliance with the Machinery Directive 2006/42/EG. The customer has to check whether further directives apply for the specific field of application and site of operation. The device may not be put into operation if it is not conformant with these directives.

Use as intended also includes:

- Observance of all chapters and instructions of the operating manual.
- Carrying out all maintenance work.
- **Observance** of all regulations concerning **work safety** and **accident prevention** during all life cycles of the device.
- Having the necessary professional training and authorization of your company to operate the device and to carry out the necessary work.

Another use or a use beyond this is deemed improper.

6. Scope of warranty

Warranties regarding operational safety, reliability and performance will only be granted by the manufacturer if the device is used as intended and under the following conditions:

- Assembly, connection and maintenance are carried out by authorized professional staff.
- The device is used according to the operating manual.
- The limit values as stated in the technical data must never be exceeded or fallen below.
- Modifications and repairs of the device may only be done by Groeneveld-BEKA.
  Please note! Guarantee and warranty for any damage at the device caused by improper lubricant (e.g. wear of pistons, piston jamming, blockades, brittled seals, etc.) will expire.

Caution!

Groeneveld-BEKA will generally not assume guaranty claims for any damage caused by lubricants, although those have been laboratory tested and released by Groeneveld-BEKA, as such damage (e.g. by over-stored or incorrectly stored lubricants, batch fluctuations, etc.) cannot be reconstructed later.

7. Transport and storage

Use suitable lifting devices for transport.
Do not **throw** the device or impose it to shocks.
Secure the device against falling over or slipping during transport.
Only transport the device when it is completely empty.

Observe all valid safety and accident prevention regulations for the transport. Wear suitable **protective equipment** if necessary! Keep **adequate distance to suspended loads.** The transport help or the elevating device must have the **adequate carrying capacity**.

Notice!

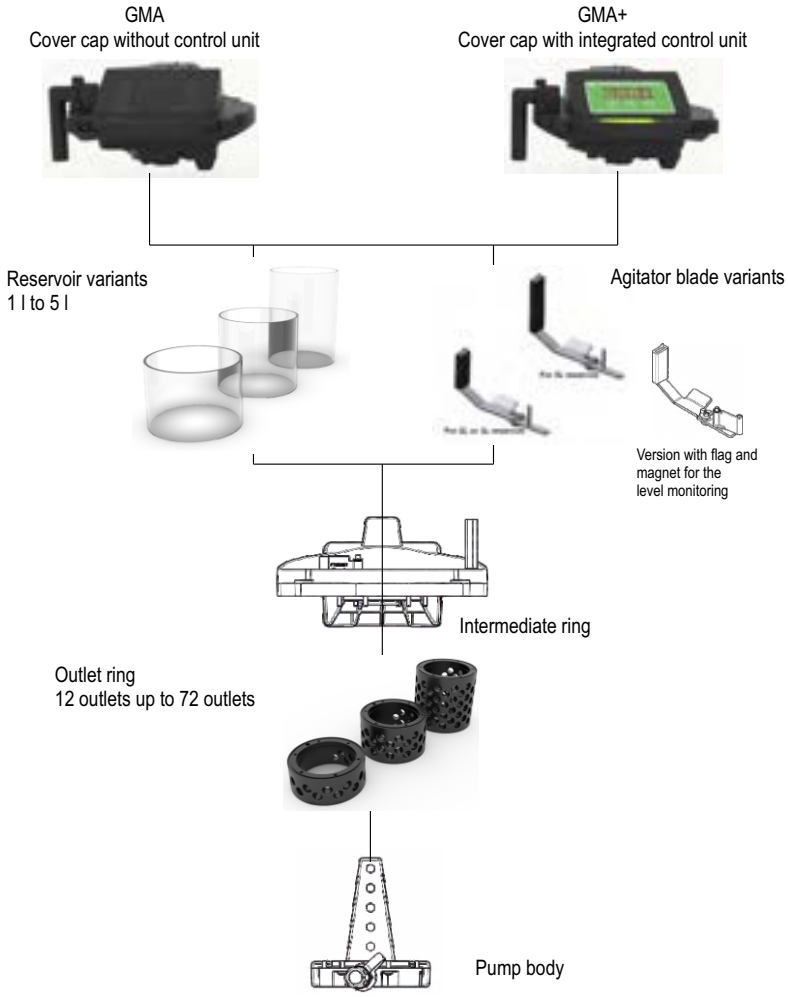
Store the device at a cool and dry location to avoid corrosion of individual parts of the device. Mind also the storage properties of the lubricant in lubricant-filled devices. Replace the lubricant when it is overstored (separation of oil and soap).

8. Device structure

8.1 Basic structure

The device comprises 5 basic modules which can be combined or adapted as required.

Fig. 2:



Notice! The modular design of the device enables easy maintenance and ensures the lifetime replacement of individual device components, so that the device can be adapated to all conditions.

8.2 Further installation and attachment parts

The GMA / GMA+ devices can be differently configurated and equipped with various installation and attachment parts.

8.2.1 Gear motor

The device can be operated with 12 V DC with 24 V DC operational voltage.

Fig. 3:

Gear motor with
12 V DC
operational voltage

Gear motor with
24 V DC
operational voltage

8.2.2 Filling level sensor

The device can be equipped with a level sensor, which emits a signal when the filling level in the reservoir falls below a certain limit.

Fig. 4:

Level sensor
Variants from 1 l to 5 l

Notice!

Please see chapter 18 Spare parts for the article numbers of the individual components or assemblies.

8.2.4 Pump elements

The lubricant is conveyed by means of pump elements.
Depending on the used outlet ring, up to 72 pump elements can be installed.
Each lube point requires a separate pump element.

The pump elements can be delivered in 6 variants with delivery rates from 10 mm^3 up to 100 mm^3.
The pump elements can be differentiated by colored rings (see table below).

The pump elements are delivered with a plug-type connection with pipe connection-Ø4
Fig. 6:

Notice! Please see chapter 9.2.2 Functional description of the pump elements for a functional description and installation instructions.

Caution! Close idle outlets with a screw plug.

Notice! Please see chapter 18. Spare parts list for the individual components and assemblies.

Color	Delivery rate / Piston stroke
red	10 mm^3
green	15 mm^3
yellow	25 mm^3
blue	40 mm^3
gray	60 mm^3
black	100 mm^3

9. Device description

9.1 Basic function

9.1.1 General

The device serves to provide the lube points of an automatic multi-line central lubrication system with lubricant.

The device functions can either be controlled and monitored by

- a PLC or the on-board system of the attachment **(GMA)**, provided by the customer

or

- a control unit **(GMA+)** integrated in the cover cap of the device

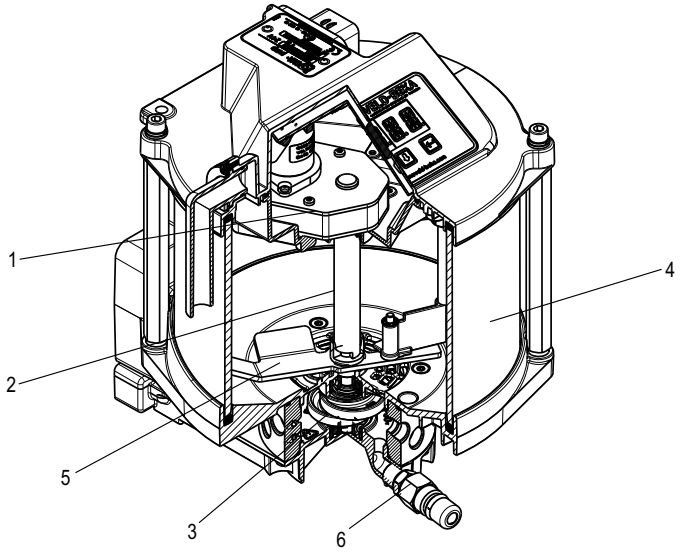
9.1.2 Functional description of the device

A DC gear motor (pos. 1, fig. 7) (optionally 12 V DC or 24 V DC operational voltage) drives a pump shaft (pos. 2, fig. 7), which generates the rotary movement of the eccentric (pos. 3, fig. 7). The rotary movements and the eccentricity move the delivery pistons of the installed pump elements. Compression springs place the delivery pistons back into their original position (delivery stroke), so that a new delivery stroke is generated with the next revolution of the device (see chapter 9.2 Function of the pump elements).

The agitator blade (pos. 5, fig. 7) installed in the reservoir of the device (pos. 4, fig. 7) presses the lubricant into the intake chamber of the pump elements and thus minimizes possible air bubbles. The agitator blade also ensures a uniform filling level in the reservoir.

The device is filled via a filling connection (pos. 6, fig. 7) (see also chapter 12.2 Lubricant filling).

Fig. 7:



9.2 Function of the pump elements

9.2.1 General

The pump elements serve to deliver and meter the lubricant.

9.2.2 Functional description of the pump elements

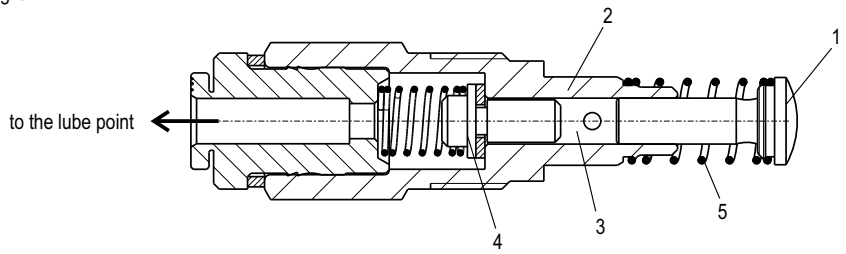
The pressure and intake stroke is realized by the eccentric.

When the larger side of the eccentric passes the pump element, it presses the delivery piston (pos. 1, fig. 8) into the pump element housing (pos. 2, fig. 8). The lubricant in the intake chamber (pos 3, fig. 8) is thereby displaced and by the integrated non-return valve (pos. 4, fig. 8) delivered into the lubrication line.

With the further movements of the eccentric is the delivery piston (pos. 1, fig. 8) pushed back by a spring (pos. 5, fig. 8) and the intake chamber (pos. 3, fig. 8) is again filled with lubricant.

The next device revolution starts this procedure anew.

Fig. 8:



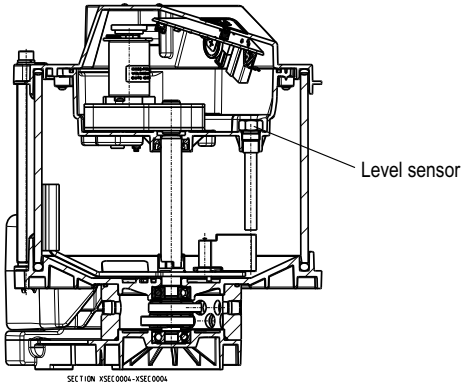
9.3 Function of the level monitoring

9.3.1 General

The filling level of the device can be monitored electronically.

For this purpose a level sensor will be installed in the sensor and a magnet will be attached to the agitator blade.

Fig. 9:



9.3.2 Functional description

A magnet with a flag will be attached to the agitator blade of the device.

The incoming lubricant pushes this flag towards the reservoir center during the rotary movements of the agitator blade, i.e. away from the level switch.

With the falling the lubricant level in the reservoir the force which pushes the flag inwards, also decreases. The magnet continuously moves outwards.

When the min. level is reached, the magnet has approached the level switch so close that it contacts on the level switch with each revolution.

Consequently the level switch emits a signal with each revolution of the pump.

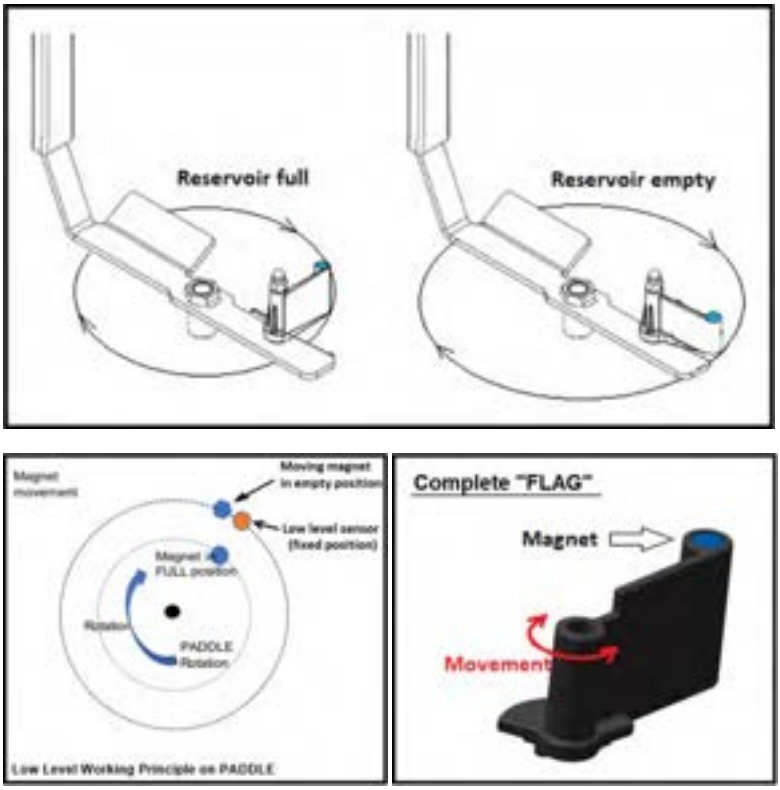
This signal can be evaluated.

The first signal is a prewarning that the filling level in the reservoir is too low.

The further signals can be counted. When a certain number of signals (empirical value) is reached, you should switch the device off to avoid that air gets into the lubrication lines.

You can find the different functions of the control unit in the evaluation of the level monitoring signals under chapter 10.1.5 Level error

Fig. 10:



With the GPA+ the signals can also be evaluated with the integrated control unit.

Notice! Please see chapter 10. Functions of the integrated control unit for a functional description.

10. Functions of the integrated control unit GMA+

10.1 Control unit description

The control unit is installed into the cover cap of the device.

It has a display and four function buttons. You can have the current functions and possibly occuring malfunctions displayed or do all settings with it.

The control unit has a database in which setting changes and error messages are stored with date and time and can be retrieved.

10.1.1 General

The control unit distinguishes in two different basic functions.

The TRK (Tuck-Modus) function requires continuous current and is intended for the installation in trucks.

The TRL (Trailer-Modus) function is intended for the installation in trailers and semi-trailers; continuous function is not required.

10.1.2 General functional description for the TKR application

The integrated control unit automatically regulates the number and duration of the lubrication intervals.

A lubrication interval always comprises the pump operating time (duration of the pump revolutions) and the remaining pause time.

The pump operating time corresponds to one pump revolution. Duration of the pump operating time depends on various impacts, like e.g. the ambient temperature, backpressure and the number of installed pump elements.

Duration of the lubrication interval is set in minutes.

If the voltage is switched off (ignition off), the current data for the cycle or a possibly running lubrication sequence are written in the data memory.

10.1.3 General functional description for the TRL application

The integrated control unit automatically regulates the number of lubrication intervals.

The pump operating time corresponds to one pump revolution. Duration of the pump operating time depends on various impacts, like e.g. the ambient temperature, backpressure and the number of installed pump elements. Futhermore, the pump operating time in the TRL mode also depends on how often and how long the brakes are operated, as the device can only work when voltage is on.

Control of the cycle sequence:

The number of lubrication intervals can be determined in two different ways.

The control unit is connected to the brake light. The control unit receives a signal with each braking. These signals are counted and with reaching the set number of signals, a lubrication sequence is initiated.

The control unit can also be connected with the taillight (if available). With that you can control the number of lubrication intervals also time-dependent. When the time has expired, the control unit initiates a lubrication sequence.

If both control modes are active, the one which is counted first, alway initiates the lubrication sequence. The other parameter is reset and counting starts anew.

Control of a lubrication sequence:

Duration of the lubrication sequence corresponds to one pump revolution.

It is possible that the previous lubrication cycle is not yet completed when the new one is reached. This could occur as the device can only operate as long as the brake is applied and also when the brake is often actuated at short intervals. The remaining pump revolution is then written to the data memory and the lubrication process starts anew. The pump revolutions stored in the data memory will then be executed after the end of the lubrication process.

If the number of pump revolutions is not reached several times, the remaining pump revolutions will be added in the data memory. However, not more than two revolutions in order to avoid over-lubrication.

Initiate an additional lubrication process (see chapter 10.3.2 Reset of the lubrication cycle). The brake or taillight must be on during that time. You can also connect the device temporarily to a permanent power supply to that purpose (terminal15) .

10.1.4 Monitoring functions of the control unit

Level monitoring:

The control unit monitors the reservoir level and signals if the lubricant falls below a certain level. The control unit also detects a missing or defective level switch (depending on the connection type, see chapter 10.4 Error and warning codes).

Pump motor:

The control unit will signal error in case of short circuit of the device motor or if the pump motor receives no voltage or overvoltage.

The control unit monitors the motor. If the motor does not rotate or rotates too slow, it will signal a fault.

Monitoring of the lubrication function (pump operating time):

The control unit monitors the revolutions of the device. A sensor is installed in the device which emits a signal with each revolution. There is a sensor installed in the device for that purpose, which emits a signal with each revoluition of the device. If there is no signal during a set monitoring time, the control unit will signal a fault.

Electrical connection:

The control unit can also detect and signal a faulty electrical connection, overvoltage at the motor, too high current at the output of the signal or a missing signal lamp. Further too low or too high ambient temperatures, too low battery voltage (RTC), RTC error and Checksum error.

Notice! Please see chapter 10.4 Error and warning codes for a detailed descripton of errors and error codes.

10.1.5 Level error

If the lubricant in the reservoir falls below a certain level, the control unit will signal a level error. The device continues operation and counts the incoming signals of the level sensor.

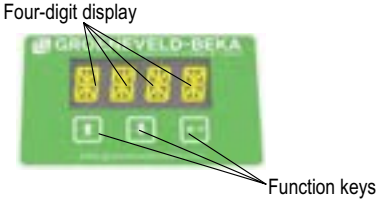
After a number of signals, the control unit will switch off the device to prevent that air is pumped into the lubrication system. This state is reached after approx. 3 days.

10.2 Display functions

The display has an indication with four digits by which the functional condition or occuring faults are displayed with codes during operation.

The display provides three integrated function keys with which you can adjust and change any function of the control unit.

Fig. 11:



10.2.1 Display at power on

The function at power on differs depending on TKR and TLR mode.

In TKR mode, the display is always on. At power on (switching on the ignition), the display will show the code MA.03 for the current software version for 10 s.

In TLR mode, the display is off. Activate it by briefly pressing one of the function keys. The code MA.03 will also be displayed for 10 s.

10.2.2 Functional sequence of the control unit and readouts on the display

Basic functions in TKR mode:

After power on of the device (switching on the ignition), the data will be read out from the memory. The lubrication sequence will be continued from that point where it has been interrupted previously. When the code for the software version disappears, the display will show the current function status of the control unit.

When the cycle phase is currently active, you will see a „W“ (**W**orking mode) at the first position of the 4-digit display. angezeigt. In the third and fourth position of the display jumps a dot [.] alternately back and forth.

Display during cycle phase:

Fig. 12:

When the lubrication phase is currently active, you will see a „W“ (**W**orking mode) at the first position of the 4-digit display. In the third and fourth position of the display is a dash [-] running clockwise.

Display during lubrication phase:

Fig.13:

When the control unit has detected an error, the display will indicate the code for a fault.

Notice!

Please see chapter 10.4 Error and warning codes for a detailed descripton of errors and error codes.

Basic functions in TRL mode:

When the control unit detects a signal input from the brake light of the trailer or semi-trailer, it will continue to count from that point on where it has been interrupted when the device was stopped. When the cycle duration is also controlled time-dependent, the control unit will continue counting where it has been interrupted.

If a lubrication has been active when the trailer or semi-trailer was parked, the control unit continues to process the remaining pump revolutions.

After activating the display by pressing one of the function keys, the display readouts are identical to those in the TRK mode.

10.3 Use of the function keys and code explanation

10.3.1 General

You can call up various information or change the device settings with different key combinations.

Those key combinations are the same for the TRK and TRL mode.

Fig. 14:

Notice!

If an error is active, you have to skip it with the Enter key before any further input. When there are several errors active, continue this procedure until all faults are skipped.

10.3.2 Reset of the lubrication cycle

Press the UP-, DOWN and the ENTER key at the same time for more than 10 s.

The device will immediately start with a new lubrication (GIV). The CYCLE TIME will be reset and starts anew.

You will see the letter „R“ on the display for 0.5 s.

10.3.3 Calling up the Info menu

In the info menu you can call up the control unit data and the performed working hours and pump revolutions.

Press the DOWN key for more than 10 s. With the UP and the DOWN key you can scroll through the menu.

10.3.4 Explanation of the codes in the Info menu

Code Code	Beschreibung Description	Mögliche Anzeigen Available values
THRS	Anzahl der Arbeitsstunden **T**otal working **H**ou**RS** counter	□NNN. // .NNN□ (bis zu 999.999 Stunden) □NNN. // .NNN□ (up to 999.999 hours)
TCY	Anzahl der Pumpenumdrehungen **T**otal **CY**cles counter	□NNN. // .NNN□ (bis zu 999.999 Umdrehungen □NNN. // .NNN□ (uo to 999.999 revolutions)
PCA	**PCA** Model / Code PCA model / code	FXXX//XXX□
FW	**F**irm**W**are Freigabe / Version **F**irm**W**are release / version	01.ZZ (01 Hauptversion, ZZ Unterversion) 01.ZZ (01 major release, ZZ minor release)
SN	PCA Seriennummer PCA **S**erial **N**umber	YYWW.//.NNNN (YY Produktionsjahr, WW Produktionswoche, NNNN laufende Nummer von 0000 bis 9999, beginnt jede Woche neu) (YY fiscal year, WW fiscal week, NNNN increasing number from 0000 to 9999, resets at each week change of YYWW)
EXIT	Menü verlassen (Springt in den Arbeitsmodus zurück). Exit menu (Jumps back to work mode).	

10.3.5 Calling up the Setup menu

Press the UP and DOWN key at the same time for more than 10 s.

You will be directed to the setup menu.

You can make basic settings of the control unit in this menu, like e.g. the type of activation, the level sensor or the signal lamp.

Please see chapter 10.6 Basic settings of the control unit for a detailed explanation on the settings.

Fig. 15:

10.3.6 Calling up the settings menu

Press and hold the UP key (>10s).

You will be directed to the user menu.

You can make the settings for cycle duration and lubrication duration in this menu, as well as the monitoring functions.

Please see chapter 10.7 Lubrication settings of the control unit for a detailed explanation on the settings.

Fig. 16:

10.4 Error and warning codes

Detected faults are indicated on the display with codes.

The control unit differentiates between errors and warnings.

In case of errors is the pump motor switched off, i.e. no further lubrication takes place. Eliminate the fault as quickly as possible.

Switch the ignition on and off again after remedy of the error to start the function sequence again.

In case of warnings, the pump motor will continue running and the device continues operating. Eliminate the fault as soon as possible.

The warning is automatically reset after remedy of the fault.

If several errors and warnings are present at the same time, you will only see the warning with the highest priority on the the display (see table). After removal of the fault, the following error or the following warning will be displayed.

Priorität *Priority*	**Fehlercode** *Error code*	**Fehler-grund** *Alarm*	**Beschrei-bung** *Des-cription*	**Fehler wird im Display angezeigt** *Error shown on display*	**mit Motor-abschal-tung** *with motor cutoff*	**Abhilfe / Bemer-kungen** *Remedy / Remarks*
1	E1	Kurz-schluss an der Pumpe *Pump short circuit*	Wenn ein Kurzschluss am Motor erkannt wird *When short circuit is detected at the motor*	Ja *Yes*	Ja *Yes*	Der Fehler wird nach 5 Versuchen die Pumpe zu starten dauerhaft angezeigt Die Versuche können durch das Aus- und Einschalten der Spannung neu gestartet werden *The error is displayed permanently after 5 attempts to start the pump The attempts can be restarted by switching the voltage off and on*
2	E2	Motor nicht erkannt *Motor not detected*	Pumpen-motor nicht angeschlos-sen o durchge-brannt I ass=0A *Motor not connected or burnt out I ass=0A (open load)*	Ja *Yes*	Ja *Yes*	siehe Fehler E1 *see error E1*
3	E3	Überstrom am Pumpen-motor *Overcurrent at pump motor*	Stromauf-nahme vom Motor zu hoch *Motor current consumption too high*	Ja *Yes*	Ja *Yes*	siehe Fehler E1 *see error E1*

Priorität ***Priority***	**Fehlercode** ***Error code***	**Fehler-grund** ***Alarm***	**Beschrei-bung** ***Des-cription***	**Fehler wird im Display angezeigt** ***Error shown on display***	**mit Motor-abschal-tung** ***with motor cutoff***	**Abhilfe / Bemer-kungen** ***Remedy / Remarks***
4	E4	Das Gerät bzw. der Getriebemot or blockiert *Pump / gear motor blocked*	Nach dem Timeout wurde keine Umdrehung erkannt (oder zu langsam). *No revolution detected after timeout (or too slow)*	Ja *Yes*	Ja *Yes*	siehe Fehler E1 *see error E1*
5	E5	Der Vorratsbe-hälter ist leer *Empty reservoir*	Der Vorratsbe-hälter ist leer *Empty reservoir*	Ja *Yes*	Ja *Yes*	Füllen Sie den Behälter sofort auf Nachdem Sie den Behälter gefüllt haben, müssen Sie den Fehler durch das Auslösen einer Testschmierung zurücksetzen *Refill the reservoir immediately. Reset the error by initiating a test lubrication after refilling*
6	E6	Der Vorratsbe-hälter wird bald leer *The reservoir will soon be empty*	Der Vorratsbe-hälter wird bald leer *The reservoir will soon be empty*	Ja *Yes*	Nein No	Das Gerät läuft noch eine Umdrehung weiter u zeigt dann einen Fehler „Behälter leer (E5)“ an *The device will continue one revolution and then show „reservoir empty (E5)“ error*
7	E7	Überspan-nung *Overvoltage*	Fehlermel-dung erscheint, wenn: 12 V Version = >18 V 24 V Version = > 32 V *Error signal if: >18 V for 12 V version >32 V for 24V version*	Ja Yes	Nein No	Bei einer Spannung von >35 V fährt das Steuergerät herunter. *Shut down when voltage >35 V*

Priorität ***Priority***	**Fehlercode** ***Error code***	**Fehler-grund** ***Alarm***	**Beschrei-bung** ***Des-cription***	**Fehler wird im Display angezeigt** ***Error shown on display***	**mit Motor-abschal-tung** ***with motor cutoff***	**Abhilfe / Bemer-kungen** ***Remedy / Remarks***
8	E8	Unter-spannung Under-voltage	Fehlermeldung erscheint wenn: 12 V Version = <10 V 24 V Version = 20 V *Alarm if: <10V for 12V version <20V for 24V version*	Ja *Yes*	Nein No	Bei einer Spannung von <9,0 V fährt das Steuergerät herunter. *Shut down when voltage <9V*
9	E9	Lampe ist nicht vorhanden *Lamp is not available*	Die Lampe ist nicht vorhanden, ist defekt oder das Kabel zur Lampe ist defekt *Lamp not available, defective or lamp cable defective*	Ja *Yes*	Nein No	Prüfen Sie die Lampe und ersetzen sie, bauen Sie gegebenenfalls eine Lampe ein oder deaktivieren Sie den Ausgang im Steuergerät *Check and replace the lamp, install a lamp if necessary, or disable the output at the control unit*
10	E10	Überstrom *Overcurrent*	Kurzschluss o zuv. Strom am Ausgang Signallampe *Short circuit o overcurrent at signal lamp output*	Ja *Yes*	Nein No	Keine *None*
11	E11	Unbelegt *Unassigned*				Nicht genutzt *Unassigned*
12	E12	Unbelegt *Unassigned*				Nicht genutzt *Unassigned*
13	E13	Temperatur über dem Limit *Temperature above limit*	Umgebungs-temperatur ist höher als das obere Limit *Ambient temperature above the upper limit*	Ja Yes	Nein No	Keine *None*
14	E14	Temperatur unter dem Limit *Temperature below limit*	Umgebungst emperatur ist niedriger als das untere Limit *Ambient temperature below the lower limit*	Ja Yes	Nein No	Keine *None*

Priorität ***Priority***	**Fehlercode** ***Error code***	**Fehler-grund** ***Alarm***	**Beschrei-bung** ***Des-cription***	**Fehler wird im Display angezeigt** ***Error shown on display***	**mit Motor-abschal-tung** ***with motor cutoff***	**Abhilfe / Bemer-kungen** ***Remedy / Remarks***
15	E15	Unter-spannung RTC Batterie *RTC battery low*	Spannung der Batterie für die RTC zu niedrig *RTC battery voltage low error*	Ja *Yes*	Nein No	Keine *None*
16	E16	Fehler der RTC *Real Time Clock Error*	Die Zeitangabe der RTC ist auffällig *RTC error*	Ja *Yes*	Nein No	Keine *None*
17	E17	Speicher Fehler *Checksum Error*	Der Speicher ist defekt EEPROM Checksum error	Ja *Yes*	Nein No	Keine *None*

10.5 Signal lamp

You can connect an external signal lamp to the control unit.

Install the signal lamp within field of vision of the driver or the machine operator. Install it protected from direct sunlight ton ensure visibility of the signals.

Fig. 17:

Signals of the external lamp:

The signal lamp indicates the functional sequence and possibly occuring errors by different flashing codes.

- The lamp is off while the cycle duration is counted down (pause).
- With the initiation of a lubrication, the lamp starts flashing every second.
- If the lubricant in the reservoir falls down to the level at which the level switch is triggered, the lamp will flash at 0.5 second interval.
- If the lubricant in the reservoir runs out and the pump is switched off, the lamp will glow permanently.
- The lamp will also glow permanently in case of other errors as the above mentioned.

The signal lamp must be activated in the control unit (see chapter 10.6.3 External signal lamp).

If the lamp is activated in the control unit but there is no lamp connected, the control unit will signal the error **E9**. You will find the list of error codes in chapter 10.4 Error and warning codes.

10.6 Basic settings of the control unit

Press and hold the UP and the DOWN key (>10 s).

The code **APTY** will appear on the display.

You can scroll through the menu by briefly pressing the UP and the DOWN key.

10.6.1 Selecting the lubrication medium

When the code **LBTY** appears on the display, you can set with which lubrication medium you want to operate the device.

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN** key. Confirm the value with the ENTER key.

OIL = oil

GRS = grease

Caution!

Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER**.

If you forget to confirm the changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again) , your settings will be deleted.

10.6.2 Truck or trailer control

As soon as the code **APTY** appears on the display, you can set whether you want to use the truck mode of the control unit (continuous current required) or the the trailer mode (continuous current not required).

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN key**. Confirm the value with the ENTER key.

TKR = truck version

TRL = trailer version

Caution!

Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER.**

If you forget to confirm the changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again) , your settings will be deleted.

10.6.3 Level monitoring

Activate or deactivate level monitoring

Select the code **LLS**, using the UP and DOWN keys.

You can activate or deactivate the level monitoring with this code.

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN key**. Confirm the value with the ENTER key.

LLSD = level monitoring deactivated

LLSE = level monitoring activated

Caution!

Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER.**

If you forget to confirm the changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off an on again), your settings will be deleted.

Switching mode of the level switch:

Select the code **LLC** using the UP and the DOWN key.

You can set the switching mode of the level switch with this code (NO or NC contact).

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN key**. Confirm the value with the ENTER key.

LLCO = NO contact

LLCC = NC contact

Notice!

Please mind to connect the level switch accordingly. You will find a connection diagram for GMA unit in chapter 11.1.1 and for GMA+ units in chapter 11.1.2

Caution!

Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER.**

If you forget to confirm your changes with ENTER when you exit, the settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

10.6.4 External signal lamp

Activate or deactivate the output of the external signal lamp

Select the code **LMP**, using the UP or the DOWN key.

You can activate or deactivate the external lamp with this code.

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN** key. Confirm the value with the ENTER key.

LMPD = output of the external signal lamp not activated

LMPE = output of the external signal lamp activated

Notice!

Please notice that an error will be signalled (**E9**) if the output of the signal lamp is activated but no signal lamp is connected.

Caution!

Select the menu item **EXIT** using the the UP or the DOWN key and accept the set values by pressing **ENTER.**

If you forget to confirm the changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your setttings will be deleted.

10.6.5 Setting the signals of the external signal lamp

You can now set which signals should you want to be output on the external signal lamp.

Signal indication for a lubrication in progress

Select the code **PCL** using the UP or the DOWN key.

You can select whether you receive a signal on the signal lamp for an ongoing lubrication.

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN key**. Confirm the value with ENTER.

PCLD = lubrication in progress is not indicated

PCLE = lubrication in progress is indicated by the lamp flashing every second

Caution!

Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER**.

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off an on again (ignition off and on again), your settings will be deleted.

Signal indication for low filling level

Selet the code **LLW** using the UP or the DOWN key.

You can select whether you want to receive a signal when the lubricant in the reservoir falls below a certain level (prewarning).

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN key**. Confirm the value with ENTER.

LLWD = low filling level is not indicated

LLWE = low filling level is indicated by the lamp flashing every 0.5 s (**E5**).
When the reservoir is completely empty, the lamp will glow permanently (**E6**).

Caution!

Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER.**

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off an on again (ignition off and on again), your settings will be deleted.

Signal indication for pulse signal during lubrication

Select the code **SPIO** with the UP or the DOWN key.

With this code you can set whether you want to be informed when a lubrication process starts.

Press **ENTER** to access the settings menu. You can see the currently set value now.

You can change the value by pressing the **UP** or the **DOWN** key. Confirm with **ENTER.**

DISB = no signal when the lubrication process starts

RTTN =start of the lubrication process is signalled by a short lighting up (1 sec) .

Caution!

Select the menu item **EXIT** with the UP or the DOWN key and confirm your set values with **ENTER.**

If you forget to confirm your changes with ENTER when you **EXIT** , your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

Signal indication for too high current at the motor of the device

Select teh code **OC** using the UP or the DOWN key.

You can select whether you want to receive a signal on the external lamp if the current at the device motor exceeds a certain value (**E3**).

You can also choose how high the current at the motor may rise before you receive a signal.

Notice! The device will be switched off when the selected parameter is reached.

Press **ENTER** to access the settings menu. You can now see the currently set value.

You can change the value by pressing the **UP** or the **DOWN key**. Confirm the value with ENTER.

OC-A = automatic setting (1,5 A)

OC-0.5 = signal at 0,5 A

OC-1 = signal at 1 A

OC-1.5 = signal at 1,5 A

....

OC-5 = signal at 5 A

Caution! Select the menu item **EXIT** using the UP or the DOWN key and accept the set values by pressing **ENTER.**

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off an on again (ignition off an on again), your settings will be deleted.

Grundeinstellungen / Basic settings			
Code Message	**Beschreibung Meaning**	**Mögliche Einstellungen Available values**	**Standard (Beispiel) Default (example)**
LBTY	Schmiermedium **LuBrication TYpe**	OIL (Öl / **OIL**) GRS (Fett / **GR**ea**S**e)	GRS
APTY	Funktion **AP**plication **TY**pe	TKR (Truck-Version) TRL (Trailer-Version)	TKR
LLS	Füllstandsschalter aktiv / nicht aktiv **L**ow **L**evel **S**ensor active / inactive	LLSD (nicht aktiv /inactive) LLSE (aktiv / active)	LLSD
LLC	Schaltungsart /Switching mode **L**ow **L**evel **C**ontact	LLCO (Schließer / normally open) LLCC (Öffner (/ normally closed)	LLCO
LMP	Ausgang Signallampe aktiv / nicht aktiv **LaMP** output active / inactive	LMPD (nicht aktiv / inactive) LMPE (aktiv / active)	LMPD
PCL	Signal Schmierung aktiv (nur bei Lampe aktiv) **P**ump **C**yc**L**e active signal (only with lamp active)	PCLD (nicht aktiv / inactive) PCLE (aktiv / active)	PCLD
LLW	Signal Füllstand niedrig (nur bei Lampe aktiv) **L**ow **L**evel **W**arning (only with lamp active)	LLWD (nicht aktiv / inactive) LLWE (aktiv / active)	LLWE
SPIO	Impulssignal für Schmierung **SP**are **I**nput **O**utput Impulse signal for lubrication	DISB (nicht aktiv / inactive) RTTN (Impulssignal je Rotation / impulse signal per rotation)	DISB

Grundeinstellungen / Basic settings			
Code Message	**Beschreibung Meaning**	**Mögliche Einstellungen Available values**	**Standard (Beispiel) Default (example)**
OC	Zu hoher Strom am Motor des Gerätes (A) (Einstellungen bei automatisch OC_A = 1,5 A) **O**ver**C**urrent at motor (A) (settings for automatic: OC_A = 1,5 A)	OC_A oder OC_0,5 (0,5 A) bis OC_5 (5 A) OC_A or OC_0,5 (0,5 A) up to OC_5 (5 A)	OC_A
EXIT	Speichert sämtliche Einstellung ab. Saves all settings.		

10.7 Lubrication settings on the control unit

Press and hold the UP key (>10s).

The code GIV will appear on the display.

You can scroll through the menu by briefly pressing the UP and the DOWN key.

10.7.1 Setting the cycle time GIV in TKR mode (APTY)

The cycle time comprises the period which the device needs for processing the lubrication (number of pump revolutions) and the remaining time until a new lubrication interval is initiated (pause).

The cycle time is set in minutes.

The code **GIV** will appear on the display.

Press the UP key (>10s) to access the settings menu. Adjust the required time with the UP or the DOWN key and confirm with ENTER.

001 = 1 minute

002 = 2 minutes

...

999 = 999 minutes

Select the menu item **EXIT** using the UP or the DOWN key and accept the set value by pressing ENTER.

Caution!

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

10.7.2 Activating or deactivating the control CTR in TRK mode (APTY)

Select the code **CTR** using the UP or the DOWN key.

You can set whether you want the device to be controlled via an external input (control input). When this control is active, the device will only operate with detected release signal or if the locking signal is removed. Please see chapter 10.7.3 for setting and a description of the signal type.

Press the UP key (>10s) to access the settings menu. Select the required parameter with the UP or the DOWN key and confirm with ENTER.

CTRD = control not activated

CRTE = control activated

Select the menu item **EXIT** using the UP or the DOWN key and accept the set value by pressing ENTER.

Caution!

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

10.7.3 Setting the signal type CI in TKR mode (APTY) with activated control (CTR)

Select the code **CI** using the UP or the DOWN key.

You can set whether the control signal for the device is evaluated as release signal or as blocking signal.

If you choose the code **CI_H** (release signal), the device will only operate as long as voltage (+12 V or + 24 V) is present at the control input (see connection diagram PIN 3).

If you choose the code **CI_L** (blocking signal), the device will only operate if the the voltage (+12 V or + 24 V) at the control input (see connection diagram PIN 3) is cut off.

Press the UP key (>10s) to access the settings menu. Select the required time with the UP or the DOWN key and confirm with ENTER.

CI_L = blocking signal

CI_H = release signal

Select the menu item EXIT using the UP or the DOWN key and accept the set value by pressing ENTER.

Caution!

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

10.7.4 Setting the number of braking impulses for determination of the cycle time in TRL (APTY)

Select the code **NBRK** using the UP or the DOWN key.

You can set the number of braking impulses after which a lubrication cycle (pump operating time) is started.

Press the UP key (>10s) to access the settings menu. Select the required time with the UP or the DOWN key and confirm with ENTER.

B001 = 1 braking impulse

B002 = 2 braking impulses

...

B999 = 999 braking impulses

Select the menu item EXIT using the UP or the DOWN key and accept the set value by pressing ENTER.

Caution!

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

10.7.5 Activating and setting the cylce time-dependent in TRL mode (APTY)

Select the code **TGIV** using the UP and the DOWN key.

You can determine the duration of the cycle in minutes and automatically activate the combined function (see chapter 10.1.3 General functional description for the TRL mode).

If you do not want to determine the cycle duration combined, set the cycle time on B000 here.

Press the UP key (>10s) to access the settings menu. Select the required time with the UP or the DOWN key and confirm with ENTER.

B001 = 1 minute

B002 = 2 minutes

...

B999 = 999 minutes

Select the menu item **EXIT** using the UP or the DOWN key and accept the set value by pressing ENTER.

Caution!

If you forget to confirm your changes with ENTER when you exit, your settings will be taken over for the moment and can also be tested. However, when the voltage is switched off and on again (ignition off and on again), your settings will be deleted.

Settings of the lubrication process Menu USER MODE SETUP (Programming)			
Code Message	**Beschreibung Meaning**	**Mögliche Einstellungen Available values**	**Standard Default**
GIV	Schmierintervalle (Minuten) **G**reasing **I**nter**V**al (minutes)	**GIV**n (n=000 ... 999)	30
CTR (bei APTY Einstellung TRK) **CTR** (@APTY=TRK)	• nur möglich bei der Einstellung TKR (siehe Kapitel 10.1.2) • Überwachung aktiviert oder nicht aktiviert • Available only if TRK selected on APTY (see 10.1.2) • **C**on**TR**ol Input active/inactive	**CTRD** = Überwachung deaktiviert **CTRE** = Überwachung aktiviert **CTRD** (inactive) **CTRE** (active)	CTRD
CI (bei APTY Einstellung TRK) **CI** (@APTY=TRK)	• nur möglich bei Einstellung TRK (siehe Kapitel 10.1.2) • nur möglich bei Einstellung CTRE (siehe CTR oben) • Available only if TKR selected on APTY (see 10.1.2) • **C**ontrol **I**nput active (@CTRE)	**CI_L** kurze Überwachungszeit **CI_H** = lange Überwachungszeit **CI_L** (short monitoring time) **CI_L** (long monitoring time)	CI_H

Einstellungen des Schmierablaufes Menu USER MODE SETUP (Programming)			
Code **Message**	**Beschreibung** **Meaning**	**Mögliche Einstellungen** **Available values**	**Standard** **Default**
NBRK (bei APTY Einstellung TRL) **NBRK** (@APTY=TRL)	• nur möglich bei Einstellung TRL (siehe Kapitel 10.1.3) • Aktiviert die Schmierintevalle abhängig von der Anzahl der Bremsimpulsen *(nur Bremsimpulse)* • Available only if TRL selected in APTY (see 10.1.3) • Activates the cycle after defined # of braking impulses *(only braking impulses)*	**B000 ... B999**	B050
TGIV (bei APTY Einstellung TRL) **TGIV** (@APTY=TRL)	• nur möglich bei der Einstellung TKR (siehe Kapitel 10.1.3) • Aktiviert die Schmierintervalle abhängig von der eingestellten Zykluszeit *(Bremsimpulse oder Zyklusdauer, was eher erreicht ist)* • Available only if TRL selected on APTY (see chapter 10.1.3) • Activates the cycle after defined # of braking impulses (NBRK) **OR** at defined cycle duration *(what comes first)*	B000 ... B999	TBD

10.8 Test function

With active test function, the automatic program sequence of the lubriccation cycle is stopped and saved.

This allows you to e.g. vent the device or this function can also be used for diagnostics.

Press and hold the **ENTER key** (>10s).

The letter **T** will appear on the display.

The device starts to lubricate (pump is running).

Notice!

If you have selected the trailer control (TRL), you must ensure that the brake light is on so that the device is supplied with voltage.

If the pump is in the test function (T) and no action is carried out / button is pressed for 10 min, the pump automatically returns to the working mode (W) and continues lubrication as set.

You can switch between lubrication and rest by briefly pressing the **ENTER** key.

To exit the test function, press and hold the **ENTER key** again (>10 s).

11. Assembly instructions

Check the device for possible transport damage and for completeness before assembly.

Remove any attached devices for transportation safety.

The following conditions must be fulfilled when you assemble the device so that it can be properly mounted and form with other parts a complete machine in environmentally friendly manner and without compromising the safety and health of persons:

- Mount any devices with agitator blade in balance on both sides with the reservoir upright to ensure safe operation!
- Mind also the information on the fastening bores indicated on the dimensional drawing (see chapter 3. Dimensional drawing).
- Select the mounting position for the device so that it is best possible protected against environmental and mechanical influences. Ensure full access, for example for lubricant refilling.
- Special measures for noise prevention and vibration reduction are not required.
- Observe the information and instructions of the vehicle or machine manufacturer for any assembly work!

Notice!

Different mounting plates are available for mounting the device (see chapter 18.8 Holder plates).

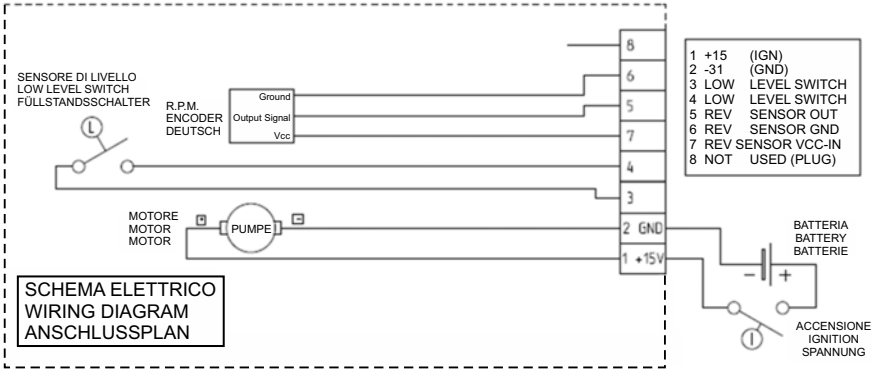
11.1 Electrical connection

- Have the power supply done by a person trained for that purpose.
- The electrical components of the device must be wired properly.
- Compare the voltage information of the device with the existing mains voltage.
- Potential equalization must be provided professionally by the user via an appropriate ground connection!
- Wire the device according to the electrical connection diagram (see the following pages)

Avoid electrostatic discharge. There are electronic components integrated in the device that you could destroy by electrostatic discharge when touching them. Comply with the safety measures against electrostatic discharge acc. to DIN EN 61340-5-1/-3. When handling with the devices, ensure that the environment (persons, workplace and packaging) are well grounded.

11.1.1 Connection diagram for GMA devices

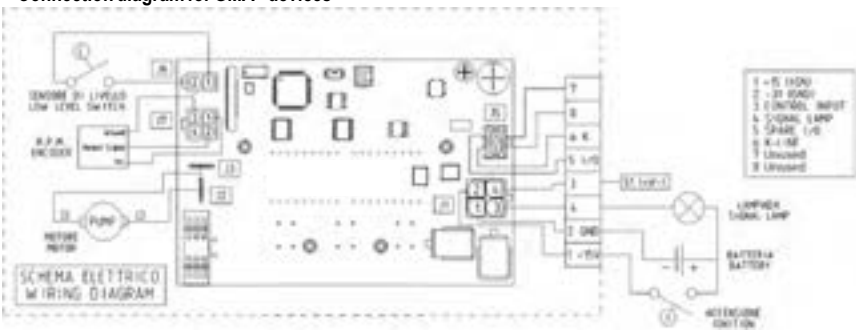
Fig. 18:



PIN#	GMA Standardversion
1	+15 (Zündung) +15 (Ignition)
2	-31 (Masse) -31 (Ground)
3	Füllstandsschalter MIN Level switch MIN
4	Füllstandsschalter MIN Level switch MIN
5	
6	
7	
8	nicht genutzt (Stecker) not used (plug)

11.1.2 Connection diagram for GMA+ devices

Fig. 19:



PIN	Version for trucks (TRK)	Version f trailers + semi-trailers (TRL)	Cable-Ø (mm^2)
1	Voltage, terminal 15	Taillight	1,5
2	Ground, terminal 31	Ground, terminal 31	1,5
3	Input control unit	Brake light	1,5
4	Output signal lamp	Output signal lamp	1,5
5	Spare I/O	Spare I/O	0,5
6	K-Line*	K-Line*	0,5
7	not assigned	not assigned	
8	not assigned	not assigned	

* K-Line: Interface implemented for the communication with diagnosis and FCT production tools.

PIN	Function	Remark
1	Current supply gear motor +	10 V DC or 24 V DC (depending on motor), max. current... 2 A
2	Current supply gear motor -	
3	Level sensor #1 (if installed)	NO contact (signal for reservoir level ok), switching current 1 A / voltage max. 200 V DC
4	Level sensor #2 (if installed)	
5	Sensor gear motor OUT	Switching current max. 25 mA
6	Current supply sensor gear motor -	Operational voltage 5 to 24 V DC (do not exceed the max. value)
7	Current supply sensor gear motor +	
8	not assigned	

11.2 Electrical lines / Fuses

To avoid damage to the electrical system of the vehicle or the machine, the appropriate fuses must be installed into the power supply circuit (+15). This does not apply for systems with a GMA + trailer pump, as these systems use the vehicle's brake and taillight circuits, which are already sufficiently fused. See the wiring diagrams or the following tables for the correct fuse values.

Please always check whether the system which you intend to install and the planned procedures meet the requirements of the intended application:

- Components (e.g. pump, wiring and switches).
- Positioning of the components at the vehicle.
- How the lubrication system is to be connected with the vehicle's electrical system.

Further:

Carry out the wiring only after the main components of the lubrication system have been assembled (e.g. pump unit, signal lamp, monitoring switch on the distributor blocks).

- Try to run the electrical wiring along the lubrication lines where possible and fix the wiring together with the lubrication lines.
- Connect the trailer pump with the supply line and the potential connection (do not interchange these connections). Make these connections in a waterproof terminal box on the trailer and ensure that the cable is properly directed into the terminal box (waterproof).

Operational voltage	Fuse	Fuse type
12 V	2 A	time-lag vehicle fuse
24 V	2 A	time-lag vehicle fuse

11.3 Installation of the pump elements

Up to 72 pump elements can be installed into the device. To that purpose the ring with outlet bores is exchangeable.
The outlet ring is available with 12, 18, 36 or 72 boreholes.
fig. 20:

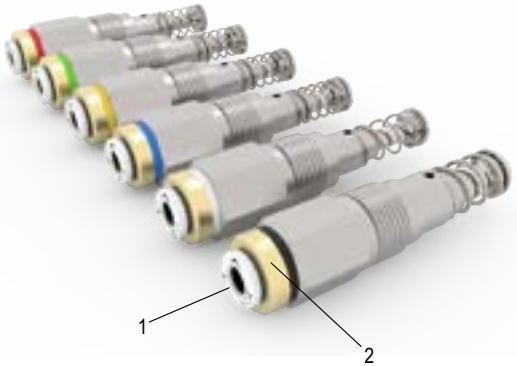
Notice! Please see chapter 18.7 for the article number of outlet ring and eccentric unit.

Remove possibly installed screw plugs.
Screw the pump elements in in the requested order. Mind the sequence of the lube points.
Tighten the pump elements with a drawing torque of 6 Nm.

11.4 Connection of the lines with the pump elements

The pump elements are delivered with a plug-type connection for connection to the hoses.
Check the connection by once pulling the hose firmly.

The plug-type connection can also be detached again.
Pess the ring (pos. 1, fig. 21) into the bushing (pos. 2, fig. 21). You can now pull out the hose.



11.5 Line assembly

- Professional layout!
- When using piping, observe that they are clean, seamless and of precision steel!
- Assemble the pipes professionally and free from distortion!
- Pay attention to pressure tightness of fittings!
- All components must be approved for max. operating pressure (see chapter 1. „Technical Data“).

The line ring should be made of semirigid nylon hose Groeneveld-BEKA Ø4 mm (see chapter 18.7 nylon hoses for article no.). If possible, use a lubricant-filled hose, which you do not have to fill before the device is put in operation.

Fig. 22:

Locate the best mounting route for connection of the individual lube points.
Cut the hoses to the required length. Pay attention to have a clean and straight cut.
Mind the appropriate hose length for movable bearing points, like e.g. springs, steering, lifts, etc.
Mark the hoses at both ends with sleeves for identification so that you can later see which hose must be connected to which lube point or pump element.

To strengthen the hose ring, connect the pipe firmly to each other using hose ties or tape. The hoses should firmly connect all 6 pump elements.
The hose ring should be worked as shown in the picture fig. 21.
It should be made with a distance of approx. 60 mm to the device and run clockwise.
Start with the lowest ring of pump elements and then work upwards, ring by ring.
If necessary, also several line rings can be created.

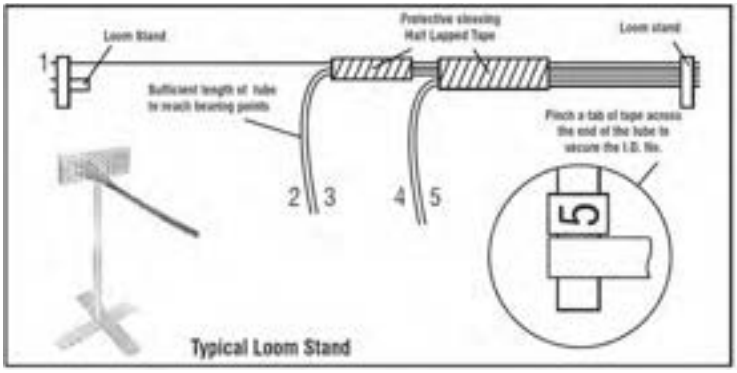
You can select the starting point for the individual hose bundles leading to lubrication points located close to each other (lube point groups), as required.

Group the lines to hose bundles when the lube points are located close to each other (lube point groups), like e.g. all lube points of a truck or trailer axle.

Also include those lube points located along the mounting route of the hose bundle.

The hose bundle can contain lines with different lengths. The indivdual lines can be branched off from the hose bundle at the appropriate point (see drawing).

Fig. 23:



Connect the hoses to hose bundles using cable ties or tape. Protect and connect the lines using protective and spiral hoses.

If available, use a hose stand.

Locate the best mounting route for the hose bundles.

Lay the hose bundles stress-free and away from hot parts (max. 70°C).

12. Start-up

12.1 Lubricants

The device is designed for filling with oil SAE 80/90 and multi-purpose greases up to NLGI 2.

Please only use lubricants of the same saponification type.

Do not use lubricants with solids content (lubricants with solids only on request, like e.g. graphite or MoS_2)

12.2 Lubricant filling

Before the first start-up (except you have received the device already filled with lubricant) and when the minimum level is reached, fill the device at the filling connection with clean lubricant, free of air inclusions and contamination.

- Clean the device and its immediate surroundings first to prevent contamination.
- Fill the device as a maximum up to the level indicated on the reservoir.
- Avoid filling the device above the indicated max. lubricant level to prevent possible damage.
- Observe the lubricant specifications of the machine manufacturer. Only use lubricants acc. to the specifications.
- Collect outcoming lubricant in a suitable receptacle and dispose of it professionally and environmentally friendly.
- Observe the safety data sheet of the lubricant manufacturer.
- Please mind that the lubricant viscosity changes with the ambient temperature.
- Pay attention to utmost cleanliness when you fill the device.
- Check the reservoir level several times at equal intervals during the first hours of operation.

12.2.1 Filling the device with multi-purpose grease up to NLGI 2

The device is equipped with a lubrication zerk fitting (standard) to make this more convenient. You can place a commercially available grease gun on this zerk.
For filling the device with a filling pump, you can also attach a filling coupling (see chapter 18.2.19 Filling connection for article no.).
You can then place different filling pumps onto this coupling, which you can also obtain from Groeneveld-BEKA.

Procedure:

- Remove the dust cover from the lubrication zerk fitting or the filling coupling.
- Clean the lubrication zerk fitting or the filling coupling and the immediate surroundings using a clean cloth.
- Clean the filler hose at the grease gun or the filling pump.
- Fill the hose with lubricant until a small amount of lubricant comes out the end.
- Place the hose on the lubrication zerk fitting or the filling coupling.
- Fill the reservoir up to the indicated max. level.
- Remove the filler hose.
- Clean the lubrication zerk fitting or the filling connection from lubricant residues.
- Clean the dust cover and place it on the lubrication zerk fitting or the filling coupling again.
- Dispose of spilled lubricant residues and the cloth in a professional and environmentally friendly manner.

12.2.2 Filling the device with oil SAE 80/90

Fig. 24:

- To fill the device with oil, turn the pipe on the side of the reservoir cover upwards.
- Fill in the oil.
- Pay attention that no dirt gets into the reservoir.
- Turn the pipe downwards again so that the filling port is closed.

12.3 Venting the device

Venting the device is done during depressurized operation and with open device outlets.

Actuate the device until bubble-free lubricant comes out of all pump elements.

12.4 Venting the system

Venting the system is done during depressurized operation and with open device outlets.

Actuate the device until bubble-free lubricant comes out of all lubrication line ends. This is especially important for systems that have been made with unfilled hose lines.

13. Maintenance and servicing

Disconnect the device **from voltage** before **any maintenance** or **repair**. Carry out any **maintenance and repair** only at **complete standstill** and under **pressureless condition**. Check the surface temperature of the device, as there is the **risk of burns** due to heat transfer. Wear heat-resistant gloves and safety goggles! Clean soiled or contaminated surfaces before maintenance, wear protective equipment if necessary. Protect the device against recommissioning during maintenance/repairs!

13.1 General maintenance and servicing

- Retighten all fittings ca. 6 weeks after start-up.
- Check all components for leakages and damage at least every 4 weeks!
- Check the device for operating and functional reliability. Carry out a test run and check all lubricant outlets.
- When you use a high-pressure cleaner to clean the vehicle or the machine, do not expose the device directly to the jet to prevent that water gets into the device (e.g. at the vent hole). During normal operation of the device, no water can enter.
- If you have a GPA+, check the device regularly for function (additional lubrication cycle) and check all used lubricant outlets for function and tightness. Read out the fault memory!

If leakages are not repaired, lubricant might escape there under high pressure. Remove possible puddles of lubricant immediately.

13.2 Lubricant change

Caution! Pay attention to utmost cleanliness when refilling the lubricant!

- Check the level in the reservoir of the device regularly and refill clean lubricant if necessary. Proceed as described under 12.2 Lubricant filling.
- Carry out the lubricant change according to the specifications of the lubricant manufacturer. Environmental influences like increased temperature or pollution can shorten the intervals!
- Please mind to only use lubricants which are suitable for the device as well as the machine to be lubricated and which meet the requirements of the respective operating conditions!
- When the used lubricants are from different suppliers, make sure that the lubricant quality corresponds to the quality of the previously filled lubricant! As a precaution, the lubricant reservoir should be properly drained and cleaned!

14. Repair

14.1 Repair of the central lubrication system

A blocking of the system can have several reasons:

- a squeezed or blocked line
- an overfilled or clogged bearing
- a blocked pump element
- a lubricant unsuitable for the central lubrication system

Finding the blocked point:

Disconnect line by line from the respective pump element and initiate an additional lubrication cycle.

The pump element at which the device operates again is the reason for the blockade.

Check now whether the corresponding hose line is unobstructed.

Reconnect the line to the pump element to that purpose and disconnect the connection at the lube point.

Initiate an additional lubrication cycle.

If the line blocks, the line is defective. Replace the line.

If the device does not block, the lube point is defective. Repair the lube point.

Finding the defective pump element:

If you do not detect anything when searching for the defective line / lube point, unscrew each pump element individually from the housing.

The pump element at which the device operates again is the defective one. Replace the pump element.

To be sure, please also check the lubricant

If you find that an unsuitable lubricant has been filled, exchange it. Proceed as described under chapter 13.2 (Lubricant change) .

15. Shutdown

- Relieve the device from pressure!
- Turn off the electrical power supply!
- Have the device disconnected from power supply by a qualified electrician!
- Remove all pipes and hoses!
- Detach the device fastenings!

16. Disposal

Notice!

Observe the disposal instructions of the lubricant manufacturer when lubricant is changed!

Collect lubricants or cloths contaminated with lubricant or similar in specially marked receptacles and dispose of properly!

Dispose of the device professionally and properly and in accordance with national and international laws and regulations.

Moreover, Groeneveld-BEKA devices could contain batteries. Professionally and properly disposed batteries will be recycled. They contain important raw materials.

17. Troubleshooting

17.1 General troubleshooting for GMA and GMA+

Malfunction	Possible cause	Possible remedy
The device does not operate	Fuse defective	Renew fuse
	Electrical line defective or incorrectly connected	Check electrical connection and renew if necessary
	Device defective	Repair or replace device
	A lube point does not receive lubricant, the system blocks	See instructions on repair under 14.1 Repair of the central lubrication system
The device operates but does not convey lubricant	Air bubles in the reservoir	Vent the device
	Reservoir empty	Refill the reservoir and vent the device
	Poor or wrong lubricant	Exchange lubricant
The device operates but conveys less lubricant	The device turns slower	See fault „Device operates with reduced number of revolutions“
	Poor or wrong lubricant	Exchange lubricant
	The relevant pump element is worn	Replace pump element
Device operates with reduced number of revolutions	Low ambient temperature	No damage Initiate one or two lubrication processes
	High backpressure	Check the central lubrication system If you do not detect any damage, initiate one or two additional lubrication processes
	Incorrect power supply	Compare the available voltage with the voltage specification on the device

Malfunction	Possible cause	Possible remedy
The conveyed lubricant contains air bubbles	Air came in during filling of the reservoir	Vent the device
	The reservoir device ran completely empty	Refill the reservoir and vent the device
	The relevant pump element is worn	Replace pump element
	Poor or wrong lubricant	Exchange lubricant
No or little lubricant at all lubrication points	The device does not operate	See malfunction „the device does not operate“
	Reservoir empty	Refill the reservoir and vent the device
	The device operates but does not convey lubricant	See malfunction „The device operates but does not convey lubricant“
	The device operates but conveys less lubricant	See malfunction „The device operates but conveys less lubricant“
	The device operates with a reduced number of revolutions	See malfunction „Device operates with reduced number of revolutions“
No or little lubricant at several lubrication points	The associated hose assembly is blocked or torn off	Replace the hose assembly
No or little lubricant at one lubrication point	The associated hose line is burst or leaky	Replace the lubrication line
	The associated fittings are leaky	Retighten the fittings or replace them
	The relevant pump element is worn	Replace the pump element
	The lube point has been connected to the wrong pump element	Compare the central lubrication system with the according lubrication plan
	The delivery rate of the relevant pump element is too low	Replace the pump element with one with larger delivery rate

Malfunction	Possible cause	Possible remedy
Too much lubricant at some lubrication points	The lube points have been connected to the wrong pump elements	Compare the central lubrication system with the according lubrication plan
	The according pump elements are incorrectly dimensioned	Replace the pump elements with elements with lower dosage

17.2 Troubleshooting for the GMA+ in TRK mode

Notice! Please also see chapter 17.1 General troubleshooting for GMA and GMA+ !

Malfunction	Possible cause	Possible remedy
The device does not operate	There is an error in the system	Check the device display. You will find an explanation of the error codes in chapter 10.4 Error and warning codes
No or little lubricant at all lubrication points	The lubrication interval GIVt is too long	Shorten the lubrication interval GIVt, see chapter 10.7.1 Setting the cycle time GIV in TRK mode (APTY)
Too much lubricant at all lubrication points	The lubrication interval GIVt is too short	Extend the lubrication interval GIVt, see chapter 10.7.1 Setting the cycle time GIV in TRK mode (APTY)

17.3 Troubleshooting for GMA+ in TRL mode

Notice! Please see also chapter 17.1 General troubleshooting for GMA and GMA+ !

Malfunction	Possible cause	Possible remedy
Display does not show anything	No malfunction Display is on standby	Press one of the function keys to activate the display
The device does not operate	There is an error in the system	Check the device display. You will find an explanation of the error codes in chapter 10.4 Error and warning codes
No or little lubricant at all lubrication points	The number of set braking intervals GBRK is too high	Reduce the number of braking intervals GBRK, see chapter 10.7.4.
	The braking interval GB+T ist is too long	Shorten the braking interval GB+T, see chapter 10.7.5.
	The pump revolutions could not be completed several times	Initiate one or two additional lubrication cycles Make sure that the power supply of the device is ensured during this time, see chapter 10.3.2 Reset of the lubrication cycle
Too much lubricant at all lubrication points	The number of set braking intervals GBRK is to small	Increase the number of braking intervals GBRK, see chapter 10.7.4.

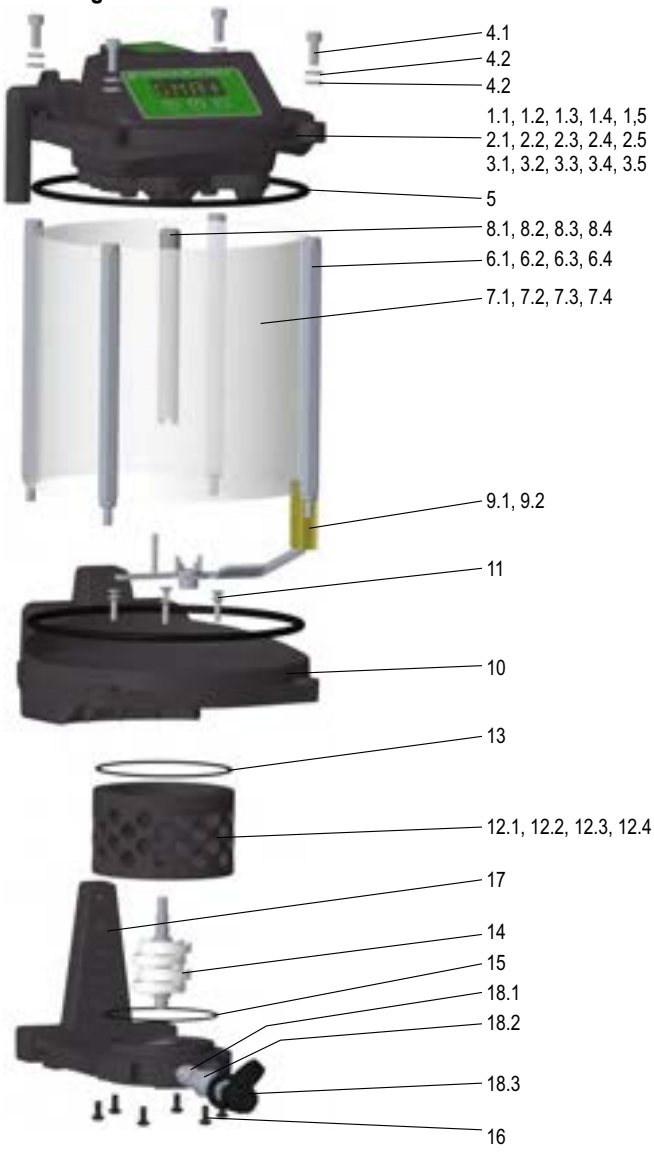
If there is an error which is not described here, please read out the error memory.

If you still cannot remedy the problem then, please contact the Groeneveld-BEKA customer service.

18. Spare parts

18.1 Spare part drawing

Fig. 25:



18.2 Spare parts list

18.2.1 Reservoir cover for GMA pumps for 12 V operational voltage

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
1.1	ohne Füllstandsüberwachung without level monitoring	1		
1.2	mit Füllstandsüberwachung für 1 Liter Behälter with level monitoring for 1 liter reservoir	1		
1.3	mit Füllstandsüberwachung für 2 Liter Behälter with level monitoring for 2 liter reservoir	1		
1.4	mit Füllstandsüberwachung für 3 Liter Behälter with level monitoring for 3 liter reservoir	1		
1.5	mit Füllstandsüberwachung für 5 Liter Behälter with level monitoring for 5 liter reservoir	1	F774849	F774849

18.2.2 Reservoir cover for GMA pumps for 24 V operational voltage

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld P/N	BEKA P/N
1.1	ohne Füllstandsüberwachung without level monitoring	1		
1.2	mit Füllstandsüberwachung für 1 Liter Behälter with level monitoring for 1 liter reservoir	1		
1.3	mit Füllstandsüberwachung für 2 Liter Behälter with level monitoring for 2 liter reservoir	1	F820130	
1.4	mit Füllstandsüberwachung für 3 Liter Behälter with level monitoring for 3 liter reservoir	1	F820128	
1.5	mit Füllstandsüberwachung für 5 Liter Behälter with level monitoring for 5 liter reservoir	1	F820160	

18.2.3 Reservoir cover for GMA+ pumps for 12 V operational voltage, with integrated control unit

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
2.1	ohne Füllstandsüberwachung without level monitoring	1	F774849	F796693
2.2	mit Füllstandsüberwachung für 1 Liter Behälter with level monitoring for 1 liter reservoir	1	TBD	TBD
2.3	mit Füllstandsüberwachung für 2 Liter Behälter with level monitoring for 2 liter reservoir	1	F798043	F798066
2.4	mit Füllstandsüberwachung für 3 Liter Behälter with level monitoring for 3 liter reservoir	1	F798048	F798068
2.5	mit Füllstandsüberwachung für 5 Liter Behälter with level monitoring for 5 liter reservoir	1	F798048	F798071

18.2.4 Reservoir cover for GMA+ pumps for 24 V operational voltage, with integrated control unit

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
3.1	ohne Füllstandsüberwachung without level monitoring	1	F727220	F796691
3.2	mit Füllstandsüberwachung für 1 Liter Behälter with level monitoring for 1 liter reservoir	1	TBD	TBD
3.3	mit Füllstandsüberwachung für 2 Liter Behälter with level monitoring for 2 liter reservoir	1	F792670	F796686
3.4	mit Füllstandsüberwachung für 3 Liter Behälter with level monitoring for 3 liter reservoir	1	F792677	F796689
3.5	mit Füllstandsüberwachung für 5 Liter Behälter with level monitoring for 5 liter reservoir	1	F797795	F798036

18.2.5 Fastening material for reservoir covers

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
4.1	Schraube M6x16 Screw M6x16	4	F750308	
4.2	Sicherungring M6 Retaining ring M6	4	F604905	
4.3	Scheibe M6 Washer M6	4	F110870	

18.2.6 O-ring for sealing between reservoir and cover or pump body

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
5	O-Ring O-ring	2	F110151	

18.2.7 Tie rods

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
6.1	für 1 Liter Behälter for 1 liter reservoir	4	F748889	
6.2	für 2 Liter Behälter for 2 liter reservoir	4	F727224	
6.3	für 3 Liter Behälter for 3 liter reservoir	4	F727225	
6.4	für 5 Liter Behälter for 5 liter reservoir	4	F727226	

18.2.8 Reservoirs

Zeichnungsposition Drawing position	Behältergröße reservoir quantity	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
7.1	1 Liter 1 liter	1	F731354	
7.2	2 Liter 2 liter	1	F600770	
7.3	3 Liter 3 liter	1	F103061	
7.4	5 Liter 5 liter	1	F11410	

18.2.9 Pump shafts

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
8.1	für 1 Liter Behälter for 1 liter reservoir	1	F724887	
8.2	für 2 Liter Behälter for 2 liter reservoir	1	F727529	
8.3	für 3 Liter Behälter for 3 liter reservoir	1	F727530	
8.4	für 5 Liter Behälter for 5 liter reservoir	1	F727531	

18.2.10 Agitator blades

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
9.1	ohne Magnet für die Füllstandsüberwachung without magnet for level monitoring	1	F748889	
9.2	mit Magnet für die Füllstandsüberwachung with magnet for level monitoring	1	F727224	

18.2.11 Pump body

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
10	Pumpenkörper Pump body	1	F750226	

18.2.12 Screw for fastening the outlet ring

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
11	Schraube / Screw M4x10-8.8	6	F725371	

18.2.13 Outlet ring

Zeichnungsposition Drawing position	Behältergröße reservoir quantity	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
12.1	mit 12 Auslässen with 12 outlets	1	F796688	
12.2	mit 18 Auslässen with 18 outlets	1	F723223	
12.3	mit 36 Auslässen with 36 outlets	1	F709238	
12.4	mit 72 Auslässen with 72 outlets	1	F724711	

18.2.14 O-ring for sealing between outlet ring and pump housing

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
13	O-Ring O-ring	1	F724747	

18.2.15 Eccentric unit

Zeichnungsposition Drawing position	Behältergröße reservoir quantity	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
14.1	für 12 und 18 Auslässe for 12 and 18 outlets	1	F726696	
14.2	für 36 Auslässe for 36 outlets	1	F727228	
14.3	für 72 Auslässe for 72 outlets	1	F727229	

18.2.16 O-ring for sealing between outlet ring and lower pump housing

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
15	O-Ring O-ring	1	F636329	

18.2.17 Screws for fastening the outlet ring at the lower pump housing

Zeichnungsposition Drawing position	Behältergröße reservoir quantity	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
16	Schraube M4x10-8.8 Screw M4x10-8.8	6	F777422	

18.2.18 Pump body bottom

Zeichnungsposition Drawing position	Beschreibung Description	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
17	Pumpenkörper unten Pump body bottom	1	F750231	

18.2.19 Filling connection

Zeichnungsposition Drawing position	Behältergröße reservoir quantity	Anzahl Qty.	Groeneveld	BEKA
			P/N	P/N
18.1	Sechskant-Adapter R1/4" - R1/4" Hex. adapter R1/4" - R1/4"	1	F618084	
18.2	Schnellverschlusskupplung gerade R1/4" Quick fastener coupling, straight R1/4"	1	F100056	
18.3	Staubkappe für Schnellverschlusskupplung Dust cap for quick fastener coupling	1	F100258	

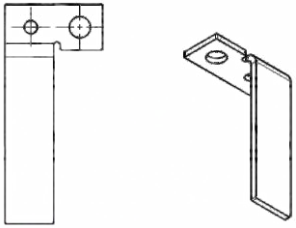
18.3 Scraper

Notice!

Only necessary if there is no level monitoring integrated in the device!

To change the lubricant reservoir you will need a reservoir, 4 tie rods, 1 pump shaft, 1 scraper and an agitator blade.

Fig. 26:



Behältergröße Reservoir size	Artikel-Nummer Article number
1 Liter 1 liter	---
2 Liter 2 liter	F775429
3 Liter 3 liter	F775452
5 Liter 5 liter	F775452

18.4 Level sensor

Fig. 27

Beschreibung Description	Artikel-Nummer Article number
	P/N
Verschlussschraube M12x1 Zn/Ni Screw plug M12x1 Zn/Ni	F604860
Füllstandssensor für 1 Liter Behälter Level sensor for 1 liter reservoir	F722933
Füllstandssensor für 2 Liter Behälter Level sensor for 2 liter reservoir	F636405
Füllstandssensor für 3 Liter Behälter Level sensor for 3 liter reservoir	F757659
Füllstandssensor für 5 Liter Behälter Level sensor for 5 liter reservoir	F784440

18.5 Gear motor

Fig. 28:

Beschreibung Description	Artikel-Nummer Article number
	P/N
Getriebemotor 12 V DC - 0,9 U/min Gear motor DC 12 V - 0.9 rpm	F775401
Getriebemotor 24 V DC - 0,9 U/min Gear motor DC 24 V - 0.9 rpm	F775444

18.6 Pump elements

Fig. 29:

Fördermenge Delivery rate	Farbring Color ring	Groeneveld-BEKA-Nr. Groeneveld-BEKA-no.	Interlube-Nr. Interlube-no.
		P / N	P / N
10 mm^3	rot red	F800091	78033
15 mm^3	grün green	F800092	78034
25 mm^3	gelb yellow	F800093	78035
40 mm^3	blau blue	F800094	78036
60 mm^3	grau gray	F800095	78037
100 mm^3	schwarz black	F800096	78038
Verschlussschraube Screw plug	---	F800108	34237-402

18.7 Nylon hose for connecting the lube points

Fig. 30:

Schlauch-Ø Hose-Ø	Füllung Filling	Länge Length	Groeneveld-BEKA-Nr. Groeneveld-BEKA-no.
4 mm	Fett der NLGI-Kl. 000 Grease NLGI 000	25 m	F800100
4 mm	Fett der NLGI-Kl. 000 Grease NLGI 000	50 m	F800101
4 mm	Fett der NLGI-Kl. 2 Grease NLGI 2	25 m	F800099

18.8 Holder plates

GM pumps are interchangeable with AC pumps.

For this reason, some holder plates have been designed for the GM pumps.

This allows to simply mount a GM pump where an AC pump was previously mounted.

18.1 Holder plates for GM pumps with 12, 18 or 36 outlets

Fig. 31:

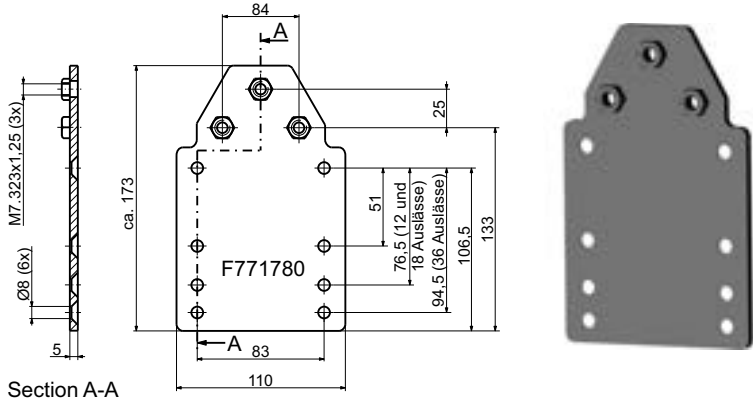
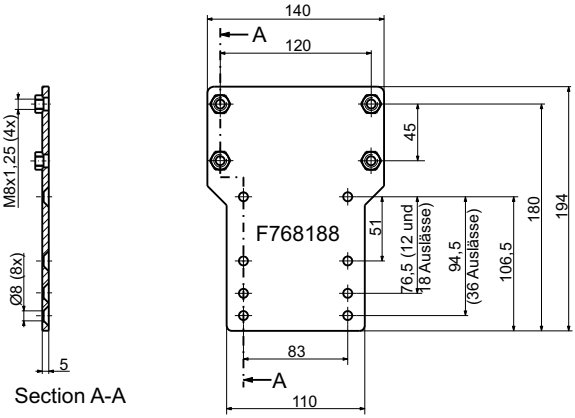


Fig. 32:



18.2 Holder plate for GM pumps with 72 outlets

Fig. 33:

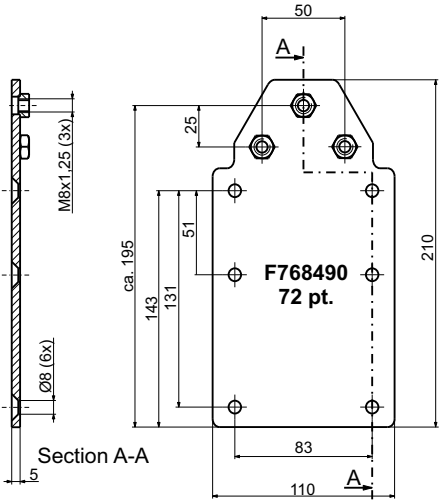
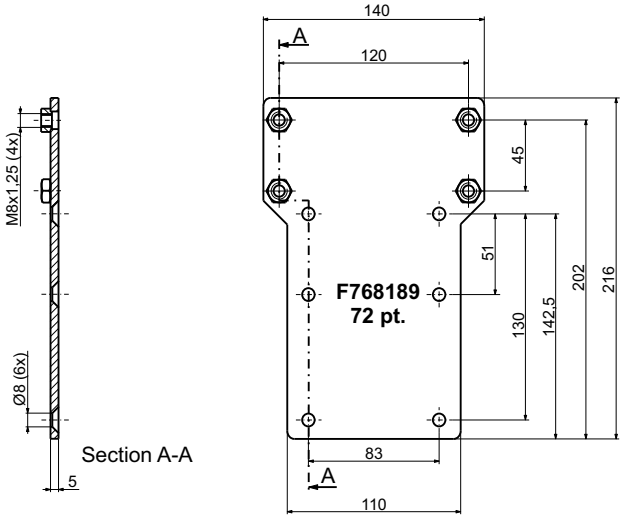


Fig. 34:



18.9 GMA+ Product Matrix

Spannung (V) Voltage (V)	Inhalt (L)* Capacity (l)*	FS** LS**	Schmierstellen*** Lubrication points***	Groeneveld P/N	BEKA P/N
12 V	1	N	12		
			18		
			36		
			72		
	2	N	12		
			18	F776378	F796696
			36	F775125	
			72		
	3	N	12		
			18		
			36	F775129	
			72		
	5	N	12		
			18		
			36		
			72		
	1	Y	12		
			18		
			36		
			72		
	2	Y	12		
			18	F792668	
			36		
			72		
	3	Y	12		
			18	F792706	
			36		
			72		

Spannung (V) Voltage (V)	Inhalt (L)* Capacity (l)*	FS** LS**	Schmierstellen*** Lubrication points***	Groeneveld P/N	BEKA P/N
12 V	5	Y	12		
			18		
			36		
			72		
24 V	1	N	12		
			18		
			36		
			72		
	2	N	12		
			18	F786971	F796713
			36	F726557	
			72		
	3	N	12		
			18		
			36	F757647	
			72		
	5	N	12		
			18		
			36		
			72		
	1	Y	12		
			18		
			36		
			72		
	2	Y	12		
			18	F792669	F796706
			36		
			72		

Spannung (V) Voltage (V)	Inhalt (L)* Capacity (l)*	FS** LS**	Schmierstellen*** Lubrication points***	Groneveld P/N	BEKA P/N
24 V	3	Y	12		
			18	F792686	F796720
			36		
			72		
	5	Y	12		
			18		
			36		
			72		

* = Behälterinhalt / Reservoir capacity

** = Füllstandssensor eingebaut / Level sensor installed

*** = Anzahl der Schmierstellen / Number of lubrication points

19. Details of the manufacturer

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