GROENEVELD-BEKA
LUBRICATION SYSTEMS BY TIMKEN

Gear pump unit

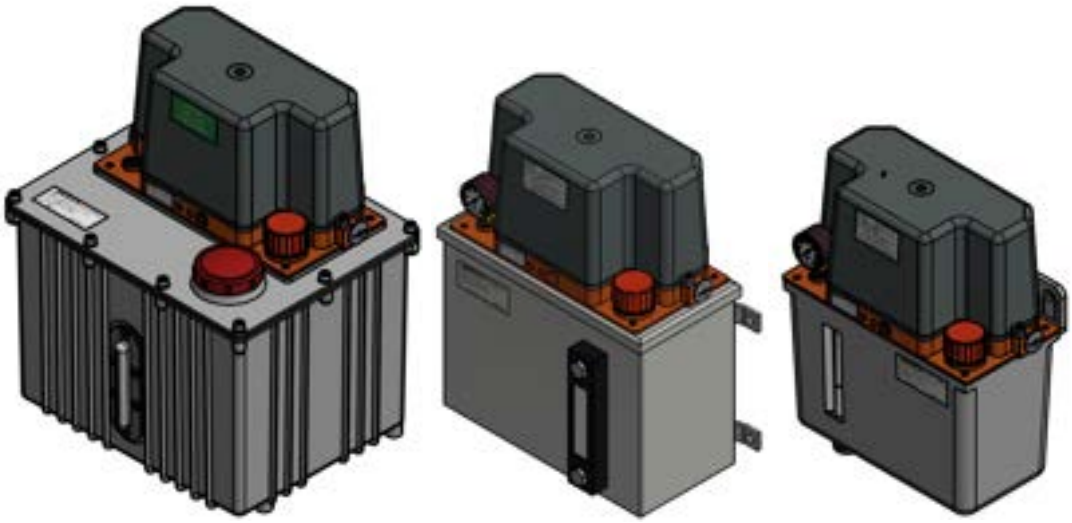
Super

Super EA-tronic

Code 2800 …

Issue 09-2020

Original operating and assembly manual



BAL2800_Gear_pump_unit_Super_EA-tronic_0920EN

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1. Technical data

General:

Kind of system: ..... single-line
Reservoir capacity: ..... 3, 6 or 13 liter
Pressure connection: ..... G1/4 internal
Conveying medium: ..... oil, 20 - 700 mm²/s (purity class ISO 4406: ≤ 19/17/14)
..... fluid grease, NLGI-Kl. 000-00 (acc. to release list)
Temperature range: ..... lubricant 0°C to +70°C
..... ambient 0°C to +40°C
Operating pressure: ..... max. 35 bar
Degree of protection: ..... IP 54
Sound pressure level: ..... <70dB(A)

Gear pump:

Pump type: ..... gear pump
Delivery volume: ..... 0,4 l/min
Drive: ..... electromotive
Power: ..... 185 / 210 W
Operating voltage and nominal current: ..... 115 V AC; 50 / 60 Hz; 1,6 / 1,9 A
..... 230 V AC; 50 / 60 Hz; 0,8 / 1,0 A
..... 24 V DC; 3,9 A
Three-phase current: ..... 200 – 240 / 345 – 420 V; 50 Hz; 0,44 / 0,25 A
..... 254 – 277 / 440 – 480 V; 60 Hz; 0,44 / 0,25 A

Level monitoring version oil (optional):

Voltage: ..... max. 250 V AC/DC
Switching current: ..... max. 0,5 A
Power: ..... max. 10 VA
Contact type optional: ..... standard normally open contact (normally closed contact by turning the float switch)
Contact functions: ..... 1x empty warning contact

Level monitoring version fluid grease (optional):

Voltage: ..... 10 to 65 V DC
Switching current: ..... ≤ 200 mA
Switching type: ..... positive switching NC contact / NO contact
Contact functions: ..... 1x empty warning contact

Pressure switch (optional):

Voltage: ..... max. 42 V
Power: ..... 100 VA

All technical data stated refer to the standard versions. Technical data of special versions may deviate.
Please see the dimensional drawing or connection diagram for missing data.

The **gear pump unit** is subsequently called a **device**.

2. Code

2800.02.1.9.1.2.000

Capacity	4 l	6 l	13 l	
Code-no.	02	03	06	
Level monitoring	without	with, for oil	with, for fluid grease	
Code-no.	0	1	2	
Control unit	without	standard	special function pressure red. monitoring	
Code-no.	0	9	A	
Pressure gauge	without	with		
Code-no.	0	1		
Voltage	115 V AC	230 V AC	24 V DC	3~/400 V
Code-no.	1	2	3	4
Special models				

3. Applicable documents

Dimensional drawing AZ…
Connection diagram ES…
Declaration of incorporation

4. General safety instructions

Everybody who is in charge of the assembly, start-up, maintenance and operation of the device must read these instructions carefully prior to assembly and start-up of the device at the machine! Furthermore, this manual must always be available at the site of operation!

Basic instructions for setup, operation and maintenance can be found below.

4.1 Safety instructions

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

Warning of electrical voltage.

Safety instructions, which might cause hazards to persons in case of non-observance, 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!	This heading is used if improper or general non-observance of the operating and assembly manual, instructions, specified workflow and the like might result in damage.
Notice!	This term is used to point out particular details.

Instructions and notes directly attached to the device have to be strictly observed and kept in readable condition!

4.2 Qualification and training of staff

The staff in charge of operation, maintenance, inspection and assembly have to be qualified accordingly. Competence, responsibilities and supervision of staff must be clearly defined by the operator. In case the staff does not have the necessary knowledge, it has to be instructed and trained accordingly. The operator is obliged to ensure that the staff fully understands the contents of this user information.

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

Results of **non-observance** of the **safety instructions** can be **hazards to persons**, for the environment and the device. Non-observance of the safety instructions may result in the loss of any liability claims. The non-observance could more specifically result in the following hazards (for example):

- Failure of important device functions.
- Failure of prescribed methods regarding 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 parts of the device bear risks, the customer must protect these parts against contact. This protection must not be removed.
- Any leakages of hazardous substances must be drained in a way that no risks for persons or the environment arise. Please also refer to the data or safety data sheets of the respective manufacturers.
- Observe all legal provisions.
- Hazards due to electricity are to be excluded.
- Examination of pipes and hoses regarding safe provision, use, proper assembly and function has to be carried out according to regionally applicable directives. Inspection intervals may not be exceeded.
- Defective pipes or hoses must be replaced immediately and professionally.
- Hydraulic hoses and polyamide pipes are subject to natural aging and have to be exchanged in regular intervals according to the manufacturer's specifications.
- A safety data sheet of the currently used lubricant must be provided at the device.
- Observe the universally valid 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.

Any work at the device may generally only be carried out at **complete standstill** and in **pressureless** as well as **disconnected condition**. Furthermore, appropriate **personal protective equipment** (goggles among others) is necessary. The shutdown procedure of the device as described in the manual must be strictly followed.

Secure the device against intentional or unintentional recommissioning during maintenance or repair. All safety and protection arrangements have to be put back in place again immediately after completion of the work.

Environmentally hazardous media must be disposed of professionally and according to the relevant legal provisions. **Polluted** and **contaminated surfaces** have to be cleaned before maintenance. Please wear protective equipment to that purpose. See the lubricant manufacturers' safety data sheets hereto, respectively the data sheets provided by the manufacturers of 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 flame and fire are strictly forbidden during 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 manufacturer feedback. **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. BEKA does not assume liability for parts that are retrofit by the operator.

4.7 Inadmissible modes of operation

Operational safety of the device is only guaranteed when it is appropriately applied as indicated in the operating and assembly 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 might be destroyed by electrostatic discharge. Observe the safety precautions against electrostatic discharge according to DIN EN 61340-5-1/-3. Ensure that the environment (persons, workplace and packing) is well grounded when handling these devices.

4.9 General hazard warning – residual risk

All components are designed according to valid regulations for the construction of technical systems with regard to operational safety and accident prevention. Nevertheless, their use can lead to hazards for the user or third parties as well as other technical facilities. Therefore, the device may only fulfill its intended purpose in a **technically perfect and faultless condition**. This has to happen in adherence to the relevant safety regulations as well as the operating and assembly manual. **Inspect** the device and its attachment parts **regularly** and **check** them for possible **damage** or **leakages**. **Liquids** could **escape under high pressure** from pressurized components which become **leaky**.

5. Intended use

Caution!

The device is **only** approved for the **industrial use.**
Only operate the device if it is installed in/at another machine and operated together with it.
Only lubricants which comply with the machine manufacturer's specifications may be conveyed.
The device must only be used according to the technical data (see chapter 1 "Technical data"). The values may never exceed or fall below the values mentioned in the technical data. Never operate the device without lubricant.

Unauthorized modifications of the device are **not permitted**. BEKA is not liable for personal injury or damage of machine resulting thereof.

The intended use also includes:

- paying attention to all chapters and notes in the operating and assembly manual.
- carrying out all maintenance work.
- **observing** all relevant instructions for **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 on the device.

Caution! **Another use or a use beyond this scope 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 according to the regulations and under the following conditions:

- Assembly, connection and maintenance are only carried out by authorized and qualified staff.
- The device is only used according to the operating and assembly manual.
- Never exceed or fall below the limit values as defined in the technical data.
- Modifications and repairs at the device may only be done by BEKA.

Caution!

Guaranty and warranty will expire for any damage of the device caused by improper lubricant (e.g. wear of piston, piston jamming, blockades, brittled sealings etc.).
BEKA will generally not accept guaranty claims for any damage caused by lubricants, even though those have been laboratory tested and released by BEKA, as such damage (e.g. by over-stored or incorrectly stored lubricants, batch fluctuations, etc.) cannot be verified or reconstructed later.

7. Transport and storage

Use suitable lifting devices for transport.
Do not **throw** the device or expose it to **shocks**.
Secure the device against toppling down or slipping during transport.
The device may only be transported 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!

When storing the device pay attention that the storage area is cool and dry in order to avoid corrosion of the individual parts of the device.
Observe the storability of the contained lubricant for devices which are filled with lubricant. Exchange the lubricant when it is over-stored (separation of oil and soap).

8. Assembly instructions

Check the device for possible transport damage and for completeness before the assembly. Any installed equipment for transportation safety has to be removed.

Comply with the following conditions when assembling a complete machine from this device and other components. Mind a proper and eco-friendly assembly without impairment of persons' health and safety:

Assemble the device in balance on the installation location in order to ensure safe operation. Observe the information on the fastening holes given in the dimensional drawing. When selecting the set-up location, please mind that the device should be protected against ambient and mechanic influences. Ensure full access, e.g. for filling with lubricant.
Special measures concerning noise prevention or oscillation reduction do not have to be taken.

8.1 Connection of lines

- Professional layout!
- When using pipes, 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 technical data).

8.2 Power connection

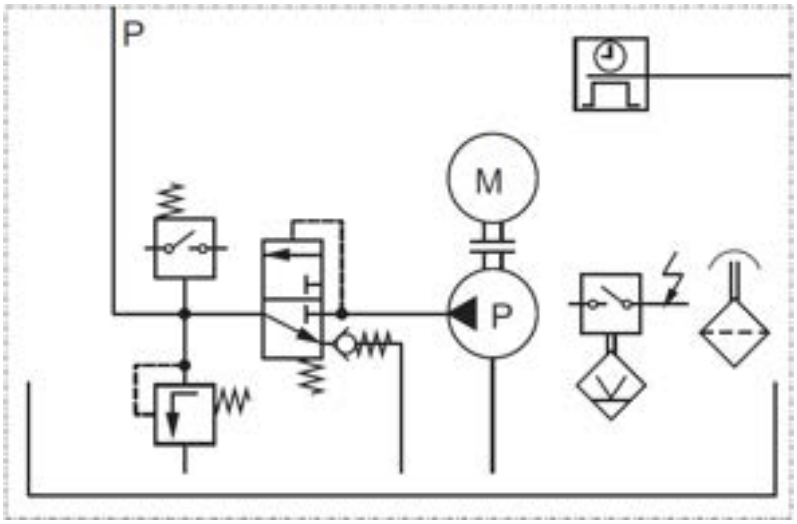
- Electrical energy supply must be done by a professional electrician!
- Electrical device components must be wired professionally!
- Compare voltage details with the existing mains voltage!
- Equipotential bonding must be done professionally by the operator via an according ground connection!
- Wire the device according to the connection diagram!

8.2.1 Connection diagram with and without control

Caution!

The **connection diagram** for the terminals is located **under the cover hood** of the device.
Open the cover hood and wire the **electrical connections according to this connection diagram**.

8.3 Hydraulic diagram



9. Start up

9.1 Filling with lubricant

- Fill the reservoir with clean lubricant at the ventilation filter!
- Observe the machine manufacturer's lubricant details! Only use lubricants according to machine manufacturer's specifications!
- Collect leaking lubricant in a suitable reservoir and dispose it professionally!
- Observe the safety data sheet of the lubricant manufacturer!
- The lubricant viscosity changes with the operating temperature.
- Check the level several times in equal intervals during the first hours of operation and refill lubricant, if necessary.
- Pay attention to utmost cleanness when refilling the reservoir!

9.2 Control

- Set the desired operational mode as described in chapter 11 "Control".

Notice! This chapter is only valid for devices with integrated control.

9.3 Ventilation of the lubrication system

- Ventilate the whole lubrication system on initial start-up and after each change of lubricant!
- Ventilation is done by pressureless operation with open system outlets!
- Loosen the lubrication line from the device fitting.
- Put the device into operation until lubricant comes out of the screw joint without air bubbles:
  - For devices with control, actuate the button for intermediate lubrication for venting.
  - For devices without control, apply voltage to the device for venting.
- Collect the lubricant which comes out at the screw joint in a suitable receptacle (environmental protection, occupational safety).
- Properly dispose of the collected lubricant!
- Connect the lubrication line to the fitting again.
- Make a visual inspection of the connections for tightness.
- Refill clean lubricant if necessary.

Caution! The lines and other components after the fitting also have to be vented.

9.4 Fault signals of the control (optional) during commissioning

LED displays

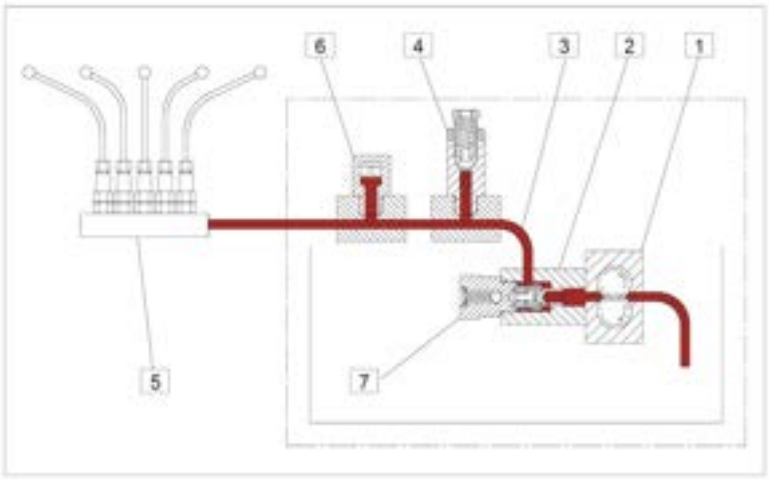
Flashing frequency 1“ = 1 second pulses
Flashing frequency 0,1“ = 0,1 second pulses

LED H1 green or white	LED H2 red	Cause	Remedy
flashes 0,1“	flashes 0,1“	Program for pressure reduction monitoring preselect, but pressure switch B§ is not installed or connected.	Check installation, connection or contact type of pressure switch B3. If installation of this pressure switch is not required – change the program (see chapter 11 „Control“).
Starting via Reset **not** possible			
on	off	Program for lubrication pulse lock is preselected and contact of lubrication pulse lock B3 is closed.	Operate machine unitl contact opens.
No start of the device		Program for lubrication pulse lock is preselected and pressure switch for pressure reduction monitoring is installed.	Disconnect the pressure switch or change the program (see chapter 11“Control“).
flashes 1“	off	Insufficient lubricant in the reservoir.	Fault can only be remedied by refilling lubricant (no reset possible). Device starts automatically.
Starting via Reset **not** possible		Level switch has wrong contact type or is not connected.	Check contact type and connection of the level switch. If there is no level switch installed at all, install a bridge +24V DC to B4 instead.

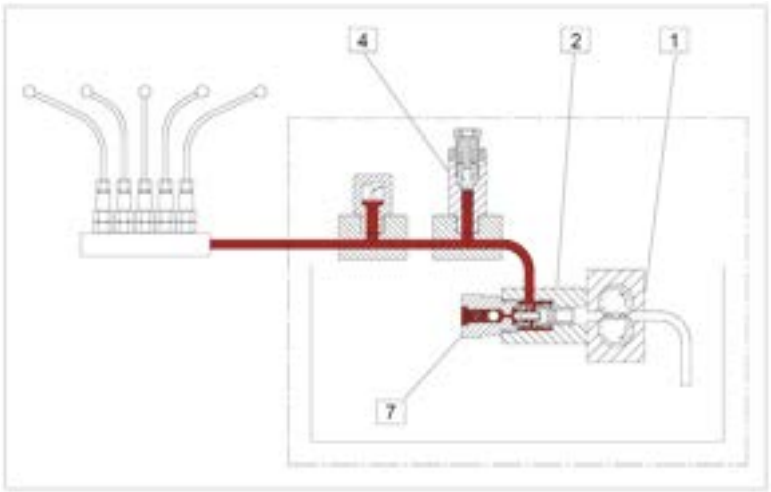
10. Functional description

10.1 General

The gear pump (1) in the device supplies the lubricant into the main pressure line (3) via the pressure valve (2) when the lubrication cycle is ushered in. Simultaneously, the access to the pressure relief valve (7) is closed by the pressure valve.
Activated by the pressure build-up in the line, a metered amount of lubricant is delivered to the lube points by the metering elements (5), which are connected to the pressure line.
When the operating pressure that is necessary for the metering elements has been reached, the contact of the pressure switch (6 – NO contact - optional) closes and the pressure limiting valve (4, set to 35 bar) opens.
The delay time of the device is ushered in when the pressure switch contact is closed. The pulse-off time is ushered in when the delay time has finished. When the signal of the pressure build-up is not sent by the pressure switch, an error message occurs. The next lubrication process can be ushered in when the relief pressure of approx. 1 bar has been reached.
The length of the pulse-off time complies with the ambient conditions and the system's design.



After switching off the motor - the lubricant no longer flows through the pressure valve (2) - the spring presses the piston back into its initial position and opens up the access to the pressure relief valve (7). The pressure line relieves to the residual pressure, which is dependent on the device, via the pressure relief valve (7). The metering element pistons are set back to their initial position by spring force when the pressure is reduced. The lubricant volume at the side that was pressurized earlier is redistributed into the metering chamber, which is located on the spring's side.
A new lubricant cycle takes place after the set pulse-off time or when the number of machine pulses has been counted. An error message occurs when the second pressure switch contact (NC contact – optional) did not open during the pulse-off time.



10.1.1 Special function information

The device is not zero voltage proof. When the voltage is switched off and on again, the device starts a lubrication cycle, also when the reset button / push-button for intermediate lubrication has been pushed. The version with memory module differs from this (see chapter 11.4 “Memory operation”).

10.2 Intermediate lubrication

If necessary, an intermediate lubrication can be actuated with the intermediate lubrication button. Lubrication will be continued as long the button is kept pressed. The button for intermediate lubrication is only installed in the variant with control.

10.3 Level monitoring

The device can be ordered with a level monitoring optionally, see chapter 2 “Code”.
The level monitoring monitors the level in the device’s reservoir. A level switch is used for the level monitoring when the conveying medium is oil; a capacitive proximity switch is used when the conveying medium is fluid grease.

10.3.1 Level switch version oil

The level switch is equipped with a fixed switching point. The contact of the level switch opens or closes when the level in the reservoir falls below the switching point, depending on the device’s configuration. The switching point is used as empty signal.
The signal emission of the level switch can be used for switching off the device, for visual or acoustic warning or for an individual use by the customer.

10.3.2 Proximity switch version fluid grease

The capacitive proximity switch is equipped with a fixed switching point. The proximity switch emits a PNP output signal when the level falls below the switching point. The switching point is used as empty signal.
The signal emission of the proximity switch can be used for switching off the device, for visual or acoustic warning or for an individual use by the customer.

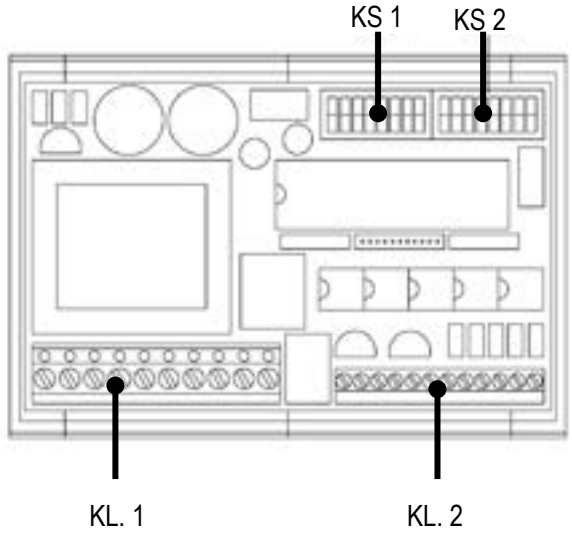
11. Control

The device can be ordered optionally with or without integrated control (see chapter 2 “Code”).

Notice! The chapter 11 “Control” and its subchapters are only valid for devices with integrated control.

11.1 Settings at the control

- Disconnect the power from the device
- Remove cover hood from the device
- Set the operational modes at KS 1 and KS 2 as required



11.2 Operational modes

The operational modes have to be set before commissioning the device. The setting is done at the coding switches of KS 2.

11.2.1 Interlock of lubrication impulses

When connecting the inputs B3 - KL. 2, terminal 11, 12 or 13 (24 V DC) on terminal 20, the switching-on of the pump after the pulse-off time remains locked as long as the contact is opened.

Switch position KS 2

1 - 4 OFF

Alternative see chapter 11.2.2 „Monitoring of pressure reduction“

11.2.2 Monitoring of pressure reduction

For this operational mode, the pressure reduction is monitored via a seconds (minimal) pressure switch (contact closes at falling pressure). The connecting takes place on input B3. When this pressure switch is built in, the coding switch 4 of KS 2 has to be set to ON.

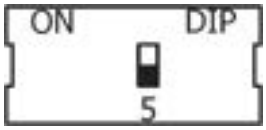
Switch position KS 2

1 - 3 OFF
4 ON

11.2.3 Monitoring time

When the device builds up no pressure within the monitoring time, an error message occurs.

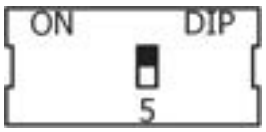
Switch position KS 2



5 OFF

Monitoring time 20 s

Switch position KS 2



5 ON

Monitoring time 60 s

11.2.4 Relubrication time

The relubrication time is the delay time of the device after the pressure build-up signal of the maximum pressure switch B2 (KL. 2, terminal 11, 12 or 13 on terminal 19). By this, it is made sure that the operating pressure, which is necessary for moving the metering pistons, is upheld long enough even for remotely built in metering elements.

Switch position KS 2

0 s | 2 s | 4 s | 8 s | 2 + 4 + 8 = 14 s

11.2.5 Addition of pulse-off time

In the option “time-dependent pulse-off time”, the pulse-off time is stopped during the connecting of the input B1 - KL. 2, terminal 11, 12 or 13 on terminal 18.

11.2.6 Cycle time

The cycle time, i.e. the pulse sequence, in which the lubrication impulses are triggered, is added up from pulse-off time, the pressure build-up time until the pressure signal from the pressure switch and the relubrication time.

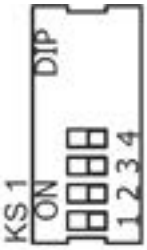
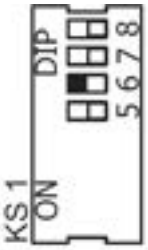
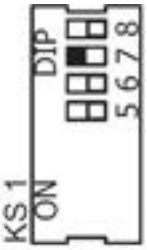
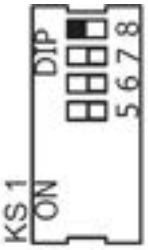
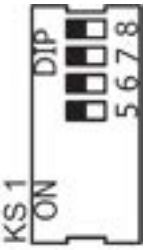
11.2.7 Time-dependent pulse-off time

The pulse-off time is set by placing the switches 2 to 8 of KS 1. Switch 1 has to remain at OFF. The setting of the pulse-off time (basic time) takes place in 8 time ranges at the switches 2 to 4 of KS 1. The pulse-off time only applies when the switches 5 to 8 are set to OFF. If other pulse-off times than this basic time are required, this is possible by individually placing the switches 5 to 8 to ON. By this, the range of the pulse-off time can be extended. The single pulse-off times of the switches 5 to 8 have to be added then and result in the total time.
Refer to chapter 11.2.9 “Setting table of time operation (pulse-off time)” for the setting of this pulse-off time.

11.2.8 Load-dependent pulse-off time

When switch 1 of KS 1 is set to ON, the lubrication impulses are triggered load-dependently after the number of machine pulses, set at KS 1, has been counted. The counting of the machine pulses is done at the input B1 - KL. 2, terminal 11, 12 or 13 (24V DC) to terminal 18.
Refer to chapter 11.2.10 “Setting table of pulse operation (pulses)” for the setting of this pulse-off time.

11.2.9 Setting table of time operation (pulse-off time)

Selection for time operation	Time step	Basic time	Time value		Time value		Time value		Time value	Total time
										
2 + 3 + 4 OFF		5 s	10	+	20	+	40	+	80	150 s
2 ON		15 s	30	+	60	+	120	+	240	450 s
3 ON		2,5 min	5	+	10	+	20	+	40	75 min
2 + 3 ON		7,5 min	15	+	30	+	60	+	120	225 min
4 ON		0,5 h	1	+	2	+	4	+	8	15 h
2 + 4 ON		2,0 h	4	+	8	+	16	+	32	60 h
3 + 4 ON		4,0 h	8	+	16	+	32	+	64	120 h
2 + 3 + 4 ON		6,0 h	12	+	24	+	48	+	96	180 h

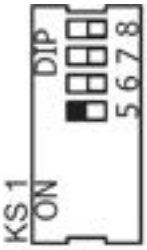
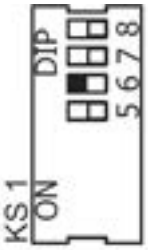
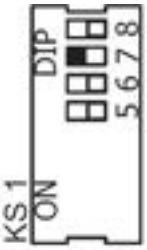
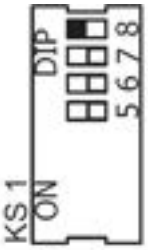
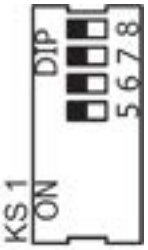
Setting example

Pulse-off time / switch position at KS 1

Switch	ON / OFF	Meaning
1	OFF	Time operation
2	ON	Time step 15 - 450 s
3	OFF	---
4	OFF	---
5	ON	Time value 30 s
6	OFF	---
7	ON	Time value 120 s
8	ON	Time value 240 s
By addition:		**Total pulse-off time 390 s**

Notice! The basic time of the various ranges is only valid if switches 5, 6, 7 and 8 are in **OFF** position.

11.2.10 Setting table for pulse operation (pulses)

Selection for pulse operation	Pulse step	Basic pulses	Pulse value		Pulse value		Pulse value		Pulse value		Total pulses
											
2 + 3 + 4 OFF		1*	2	+	4	+	8	+	16		30*
2 ON		5*	10	+	20	+	40	+	80		150*
3 ON		15*	30	+	60	+	120	+	240		450*
2 + 3 ON		50*	100	+	200	+	400	+	800		1500*
4 ON		150*	300	+	600	+	1200	+	2400		4500*
2 + 4 ON		500*	1000	+	2000	+	4000	+	8000		15000*
3 + 4 ON		1500*	3000	+	6000	+	12000	+	24000		45000*
2 + 3 + 4 ON		5000*	10000	+	20000	+	40000	+	80000		150000*

* pulse / pulses

Setting example

Pulses / switch position at KS 1

Switch	ON / OFF	Meaning
1	ON	Pulse operation
2	ON	Pulse step 5 - 150 pulses
3	OFF	---
4	OFF	---
5	ON	Pulse value 10 pulses
6	OFF	---
7	ON	Pulse value 40 pulses
8	ON	Pulse value 80 pulses
By addition:		**Total number of pulses 130 pulses**

Notice! The basic pulses for the various ranges are only valid of switches 5, 6, 7 and 8 are in **OFF** position.

11.3 Operational mode with prelubrication

In the operational mode with prelubrication, 4 to 28 prelubrication impulses (preselectable) in shortened time intervals are triggered when the device is switched on. The alarm relay switches to release only after the prelubrication and the device continues to work in the cycle of the set pulse-off time (time- or load-dependent). When the reset input is operated on B5, the prelubrication is reinitiated - the signal of the alarm relay is terminated. The operational mode with prelubrication is set with the code switches 1 - 3 of KS 2.

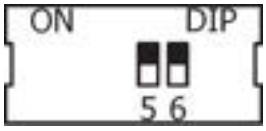
11.3.1 Number of prelubrication impulses

The number of prelubrication impulses is set by placing the switches 1 to 3 of KS 2.

Switch position KS 2	Prelubrication impulses	Switch position KS 2	Prelubrication impulses
	4 lubrication impulses		16 lubrication impulses
	8 lubrication impulses		20 lubrication impulses
	12 lubrication impulses		24 lubrication impulses
			28 lubrication impulses

11.3.2 Pulse-off time between prelubrication impulses

The pulse-off time between the lubrication impulses is set by placing the switches 5 and 6 of KS 2. In the pulse-off time, the pressure in the main line is built up to the residual pressure, which is dependent on the device, via the pressure relief valve. The lubricant is redistributed in the metering elements.

Switch position KS 2	Pulse-off time	Switch position KS 2	Pulse-off time
	2 s		8 s
	4 s		12 s

11.3.3 Relubrication time in operational mode with prelubrication

The relubrication time is the time in which the device remains switched on when the operating pressure, signaled by the pressure switch, has been reached. By this, it is made sure that the operating pressure, which is necessary for moving the metering pistons, is upheld long enough even for remotely built in metering elements.
The relubrication time is set by placing the switches 7 and 8 of KS 2.

Switch position KS 2	Relubrication time	Switch position KS 2	Relubrication time
	0 s		4 s
	2 s		6 s

Notice! The set lubrication time is valid for the prelubrication operation and the following normal operation.

11.3.4 Interlock of lubrication impulses in operational mode with prelubrication

The interlock of lubrication impulses takes effect only after the prelubrication. When B3 is connected during the prelubrication, the next lubrication impulse of the prelubrication is locked after the pulse-off time.
Refer to chapter 11.2.1 “Interlock of lubrication impulses” for setting and operating procedure.

11.3.5 Monitoring of pressure reduction in operational mode with prelubrication

The monitoring of the pressure reduction is also active during the prelubrication.
Refer to chapter 11.2.2 “Monitoring of pressure reduction” for setting and operating procedure.

11.3.6 Monitoring time in operational mode with prelubrication

The monitoring time is 20 s in the operational mode with prelubrication and is unchangeable.

11.4 Memory operation

The device can be ordered with control and without memory operation or with control and without memory operation, optionally (see chapter 2 “Code”).
At the version without memory module, all operational sequences are reset when the device is switched off. When it is switched on again, the device starts with a lubrication impulse or with the prelubrication.
In contrast, the pulse-off time (time- or load-dependent), which has been reached until switching the device off, is stored at the version with memory module. When the device is switched on again, the remaining pulse-off time (time- or load-dependent) runs down. Error messages are also stored and can only be deleted with the reset button.
At a power cut during the prelubrication, a prelubrication is retriggered when the power returns. At a power cut in the lubrication cycle, a new lubrication cycles takes place when the power returns.

11.5 Error messages of the control

The alarm output, KL. 1, terminals 8; 9 and 10 with potential-free contact, is closed in a powerless state or in error message state from 8 - 9 and opened from 8 - 10. The contact 8 - 10 closes at release.
A protective circuit (RC - element) has to be established at an indictive load on the contact.

LED displays

Flash frequency 1" = 1-second interval
Flash frequency 0.1" = 0.1-second interval

LED H1 Green or white	LED H2 red	Cause	Remedy
On	Off	Device in operation - The control can be reset and restarted using the reset button, except when the interlock of lubrication impulses is active	
Off	On	no pressure build-up within the monitoring time	Check gear pump and valves Renew defective components
Start via reset possible		Pressure build-up time too long: pressure line unfavorably dimensioned or not ventilated	Ventilate pressure line Set the monitoring time to 60 s at unfavorable line dimensioning
		Pressure switch B2 (NO contact) or B3 (NC contact) defective	Renew pressure switch
Flashes 1"	Off	Lack of lubricant in reservoir	Refill lubricant Device starts independently
Start via reset **not** possible			
Flashes 1"	Off	Pressure drops within the relubrication time because the gear pump or the valves are defective or polluted	Check components and renew them if necessary
Start via reset possible		Pressure drops within the relubrication time because the pressure line is ruptured	Repair pressure line
Flashes 1"	Flashes 1"	Contact of pressure switch B2 does not open within the pulse-off time because the pressure is not reduced by the pressure relief valve	Check pressure relief valve and renew it if necessary
Start via reset **not** possible		Contact of pressure switch B2 does not open within the pulse-off time because the pressure switch B2 is defective	Check pressure switch and renew it if necessary
Flashes 0.1"	Flashes 0.1"	Contact of pressure switch B3 does not close within the pulse-off time because the pressure does not reduce to the admissible residual pressure (approx. 1 bar)	Check pressure relief valve and renew it if necessary
Start via reset **not** possible		Contact of pressure switch B3 does not close within the pulse-off time because the pressure switch B3 is defective	Check pressure switch and renew it if necessary
Off	Flashes 0.1" or flashes 1"	Delayed pressure relief in the pulse-off time because the pressure relief valve is defective or polluted	Send device to BEKA for repair
Start via reset possible		Delayed pressure relief in the pulse-off time because the lubricant viscosity is too high	Fill in lubricant with lower viscosity or extend pulse-off time. If H2 flashes 1", a big change is necessary. if H2 flashes 0.1", a small change is necessary.

Notice!

Lack of lubricant - error can only be remedied by refilling lubricant (no reset possible). If switching on at a error message (except for lack of lubricant) is impossible with reset, a wrong operational mode together with a faulty, optional connecting is chosen (e.g. interlock of lubrication impulses in option monitoring of pressure reduction).

12. Maintenance

Disconnect the device from electrical energy supply before **maintenance or repairs.**
Only carry out **maintenance and repair** in **complete device standstill** and **pressureless condition**.
Check the surface temperature of the device to avoid the **risk of burns** by radiant heat. Wear heat-resistant gloves and safety goggles! Clean soiled or contaminated surfaces before maintenance, wearing protective equipment if necessary! Secure the device against recommissioning during maintenance and repair work!

12.1 General maintenance

- Retighten all fittings 6 weeks after start up!
- Check all components for leakages and damage at least every four weeks!

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

12.2 Lubricant change

Caution! Pay attention to utmost **cleanness** when refilling lubricant!

- Check the level regularly and refill clean lubricant as necessary, see chapter 9 “Start up”.
- Change the lubricant according to the specifications of the lubricant manufacturer. Environmental influences like increased temperature or pollution may shorten these intervals!
- Please make sure to only use lubricants that are suitable for the device as well as the lubricated machine and that comply with the requirements of the particular operating conditions.
- In case of **different lubricant manufacturers**, ensure that the lubricant **quality** corresponds to the quality of the previously used one! As precautionary measure, drain the lubricant reservoir properly and clean it!

13. Shutdown

- Relieve the device from pressure!
- Turn off electrical energy supply!
- A qualified electrician has to disconnect electrical components from the electrical energy supply!
- Remove all pipes and hoses from the device and loosen all fastenings for disassembly!

14. Disposal

Notice!

Observe the disposal instructions of the lubricant manufacturer when lubricant is changed! Lubricants or cloths contaminated with lubricant, etc. must be collected in specially marked reservoirs and disposed of accordingly.
Disposal of the device must be done properly and professionally and according to the national and international laws and regulations.

15. Troubleshooting

Malfunction	Possible cause	Possible remedy
Gear pump does not aspirate	Suction line leaky	Retighten fitting; seal thread
	Level too low	Refill lubricant
	Lubricant cannot be conveyed	Fill in lubricant with correct viscosity
Supply interrupts but drive is ok	Coupling defective	Renew coupling
	Suction line leaky	Retighten fitting; seal thread
	Lack of lubricant in reservoir	Refill lubricant
Gear pump supplies without or with low pressure	Burst pipe under reservoir cover	Repair damage
	Suction connection not tightened	Retighten fitting of suction line
	Heavy gear pump wear	Renew device
	Suction line aspires air	Retighten fitting; seal thread
	Pressure limiting valve does not close	Exchange pressure limiting valve
Device is too noisy	Gear pump aspires air	Retighten fitting of suction line; seal thread
	Coupling defective	Renew coupling
	Gear pump defective	Renew device
	Shaft sealing ring defective	Renew shaft sealing ring
	Cavitation in gear pump	Seal suction line Check lubricant level, refill lubricant if necessary

16. Spare part list and drawing

Spare part lists and drawings are available on request.
Please indicate the article number of your device for this.

17. Dimensional drawing

You will find a dimensional drawing or a data sheet enclosed.

18. Details of the manufacturer

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