FAG

FAG Motion Guard CONCEPT6 CONTROL

Automatic single-point and multiple-point lubrication system

User manual

SCHAEFFLER GROUP
INDUSTRIAL

FAG Motion Guard CONCEPT6 CONTROL

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Features

This user manual describes how to work safely on and with the automatic lubricator FAG Motion Guard CONCEPT6 CONTROL.

The safety guidelines must be observed.

Attention! Any persons working on and with the lubricator must have the user manual available for their work and must observe the relevant information and guidelines.

The user manual must always be complete and in a fully legible condition.

The relevant disposal guidelines must be observed.

From this point onward, the FAG Motion Guard CONCEPT6 CONTROL is referred to as the lubricator and the lubricant cartridge as the LC unit.

Application

The lubricator is clearly identified by a sticker on the drive unit and the LC unit. It is intended for machinery and plant where lubrication is to be carried out continuously over a precalculated period, during running and feedback to the machine is required.

It supplies the lubrication point with grease at a pressure up to max. 25 bar substantially constantly, precisely and irrespective of temperature and can also be activated and deactivated under machine control.

Characteristic areas of application include the lubrication points on rolling and plain bearings, drive and conveyor chains, guidance systems, open gearboxes and seals.

Attention! The lubricator must only be used for the purposes stated in the order and confirmed by Schaeffler KG and in accordance with the conditions of use, settings and variations described in this user manual.

It must be ensured that the correct power supply and connection to the plant or controller (for example a PLC) are provided.

Connection should only be carried out using the original connection cable.

Connection should only be made by qualified skilled personnel and installation must comply with national standards such as IEC or VDE.

The lubrication system must only be equipped with connections and pressure-resistant feed lines from Schaeffler KG.

The lubricator must be protected against chemically aggressive ambient media.

Scope of delivery

Lubricator, *Figure 1*.

Figure 1
Delivery scope of lubricator (lubricator with holder, connection cable with plug, cover and user manual)

LC unit:

The lubricator can be used with two LC units of different sizes. The volume of the LC unit and the grease fill correspond to the specific order.

The delivery should be checked as soon as it is received. Schaeffler KG accepts no liability for any defects that are the subject of retrospective complaints. The packaging and the device should be checked immediately for any damage during transit. The carrier should be informed of any damage without delay and the damage should be photographed if necessary.

Attention! The LC unit with the suitable grease must be ordered separately.

Figure 2
LC unit
(available in two sizes)

Legal requirements

Liability

The information, data and guidelines given in the user manual were current at the time of editorial approval. The data, illustrations and descriptions cannot be used as grounds for any claims relating to lubricators that have already been delivered.

Attention! Schaeffler KG accepts no liability for any damage or operational malfunctions that occur as a result of improper use or unauthorised changes to the drive unit or LC unit.

This also applies to incorrect work on or with the lubricator, errors in use or adjustment or incorrect variation sizes of the lubricator or a failure to observe the user manual.

Safety guidelines

Responsible persons

Operator

The operator is the natural or juristic person that uses the lubricator or on whose instruction the lubricator is used.

Attention! The operator or his safety co-ordinator are responsible for compliance with all relevant specifications, guidelines and regulations.

All work on and with the lubricator may only be carried out by qualified personnel.

Qualified personnel

Persons that are authorised by the person responsible for safety of the plant, on the basis of their experience and knowledge, to carry out the activities required in the specific case.

Principles

The lubricator must be filled with the correct grease and adjusted such that, when it is correctly adjusted and mounted and used as specified, it functions without defects and does not cause any hazards. This also applies to the interaction with the complete plant and the points to be lubricated.

Material damage that could arise due to failure of the lubricator must be prevented by suitable measures.

Attention! All retrofitting, modification and conversion of the lubricator is prohibited.

While working on machinery and plant, the safety guidelines and user manuals of the manufacturers must be observed.

The LC unit must not be opened or refilled under any circumstances.

Keep grease away from eyes, skin and clothing.

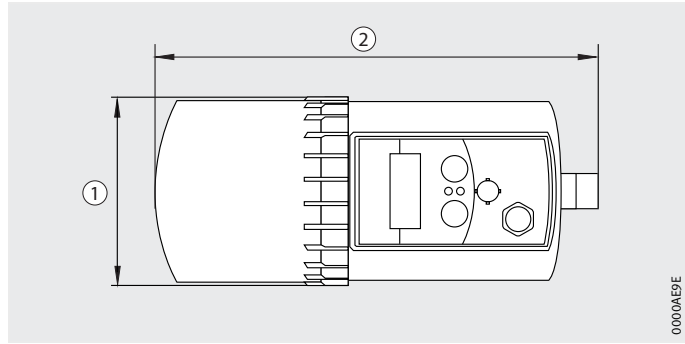
The safety data sheets for the greases must be observed.

Only original LC units from Schaeffler KG may be used.

Technical data

Key data

Designation	CONCEPT6 CONTROL 250	CONCEPT6 CONTROL 500
Volume of LC unit	250 cm^2	500 cm^2
Length (L)	210 mm	260 mm
Diameter (D)	92 mm	92 mm
Weight when empty	approx. 1,30 kg	approx. 1,37 kg
Weight when filled with Arcanol MULTITOP	approx. 1,53 kg	approx. 1,82 kg
Dispensing time	1 day to 24 months	
Dispensing quantity per lubrication impulse	0,5 cm^3	
Operating temperature	–20 °C to +60 °C	
Maximum pressure build-up	25 bar	A combination of these maximum values is only achievable at temperatures > 20 °C. Application is restricted at lower temperatures, see *Diagram 1*, page 9
Hose length (5 mm inside diameter)	max. 5 m	
Lubricants	Greases up to consistency class NLGI 2	
Supply voltage	15 V DC to 30 V DC	
Typical current consumption	120 mA	
Maximum switching current	1 A for the fault output	
Connection cable	4 pin, standard length 5 m	
Threaded connector	$G^3/_8$ external – $G^1/_8$ internal	



① Diameter
② Length

Figure 3
Lubricator

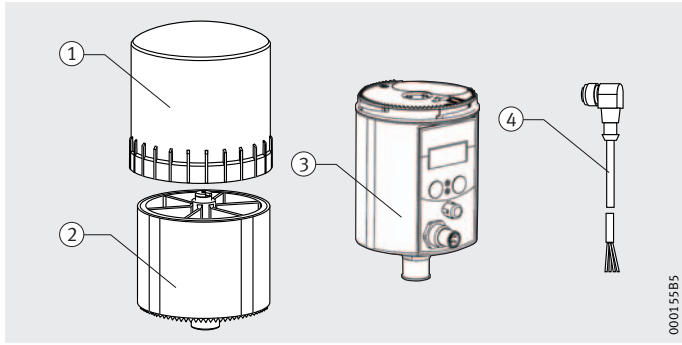
Design

The lubricator components correspond to the state of technology at the time of delivery and are always regarded as operationally reliable.

The components, see *Figure 4*:

- Cover for the drive system ①,
- LC unit LC250 or LC500 with lubricant ②,
- Drive system ③, comprising a geared motor, pump, plug for the optional lubricant distributor C6-MP-DISTRIBUTOR and the electronic unit,
- Connection cable ④ for connecting the lubricator to the machine controller.

With the exception of the LC unit, all of the components can be reused several times.



① Cover
② LC unit
③ Drive system
④ Connection cable

Figure 4
Main components of the FAG lubricator

Attention! The cable is suitable for use in chain link trunking, the minimum bending radius is 60 mm.

Function

When the lubricator is continuously connected to the power grid, it dispenses an adjustable quantity in a defined time interval.

The lubricant is transported from the LC unit into the drive unit by a spindle-driven piston. The pump in the drive unit transports the lubricant to the lubrication point at a pressure up to a maximum of 25 bar.

The size of the LC unit and the dispensing time can be configured in the drive unit.

Operating conditions

Operating temperature

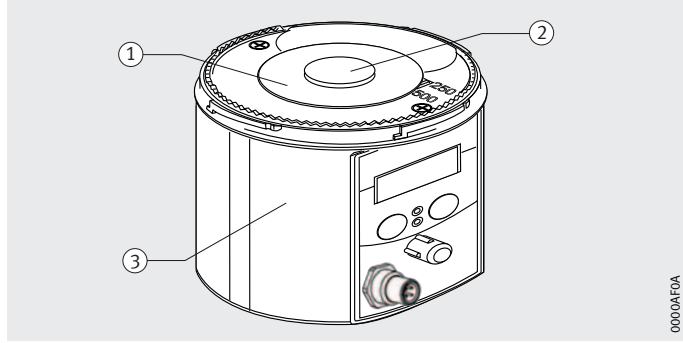
A uniform dispensing pattern and the build-up of pressure to a maximum of 25 bar can only be ensured in the temperature range from –20 °C to +60 °C, see *Diagram 1*, page 9.

Ambient conditions

If the individual components are fitted together correctly, the lubricators are resistant to dust and spray water. However, the sealing rings and plastics may be attacked by ambient media.

Storage

Lubricators must only be stored in interior rooms that are dry, dust-free and protected against sunlight, at a storage temperature of +15 °C to +25 °C. Under no circumstances should the cover disk ① and the stopper ② be removed from the drive ③ permanently, *Figure 5*, as this will run down the internal back-up battery. The cover disk and the plug may only be removed immediately prior to initial operation.



① Cover disk
② Plug
③ Drive

Figure 5
Drive unit

The LC unit can be stored for up to two years; the lubricant fill date should be taken as the controlling factor. All other components should be replaced after a maximum of two years.

Attention! Do not store the drive and cover disk separately.

Specifications

① Range of application, standard grease
② Range of application, low-temperature grease
③ Impermissible, outside of the specifications

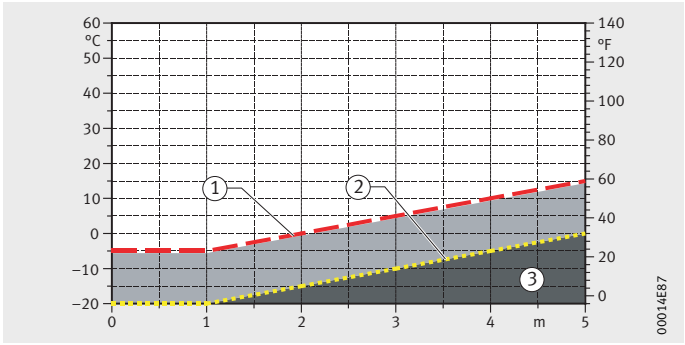


Diagram 1
Relationship between hose length and operating temperature

Hose length between 0 m and 5 m (inside diameter 5 mm), operating temperature between –20 °C and +60 °C; based on standard greases at Schaeffler KG.

Example

Examples of calculated values from *Diagram 1*:

- The operating temperature is +5 °C. Maximum hose lengths?
  - Working across to the right from the “+5 °C” mark gives a maximum hose length of 3 m for standard grease and a maximum hose length of 5 m for low-temperature grease.
- Hose feed line length 4 m. Maximum operating temperatures?
  - Working upwards from the “4 m” mark gives a maximum of +10 °C for standard grease and a maximum of –5 °C for low-temperature grease.

From this it is also visible that the maximum hose length of 5 m can be used with standard grease within a temperature range of +15 °C to +60 °C and with low-temperature grease between 0 °C and +15 °C.

Attention! Schaeffler KG accepts no liability for applications which fall outside of the specifications.

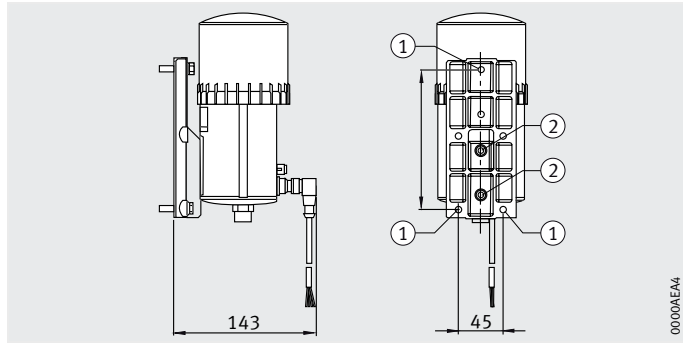
Schaeffler Customer Service must be contacted if the application falls outside of the specifications in *Diagram 1*.

Mounting and assembly
Wall-mounting the drive

Procedure for cases where direct fixing at the lubrication point is not possible:

- Screw the holder and drive to a carrier assembly on the machine. In the event of a metallic base material, use a minimum of three hexagon head screws M6×25; hole pattern for the three fixing screws in accordance with *Figure 6* and the attached hole template.
- The lubrication points and the entire lubricant feed line must be pre-greased using the same lubricant as is contained in the LC unit (lubricant cartridges for manual grease guns are available as accessories, page 25).
- Connect the lubricant feed line ($G^3/_8$ external or $G^1/_8$ internal) to the drives outlet and lay to the lubrication point. If the thread does not match the connecting thread at the lubrication point, use an appropriate reducer.
- Length of the lubricant feed line, see *Diagram 1*, page 9.

Attention! Unwanted leakages can only be prevented by fitting connections and lubricant feed lines correctly and securely.

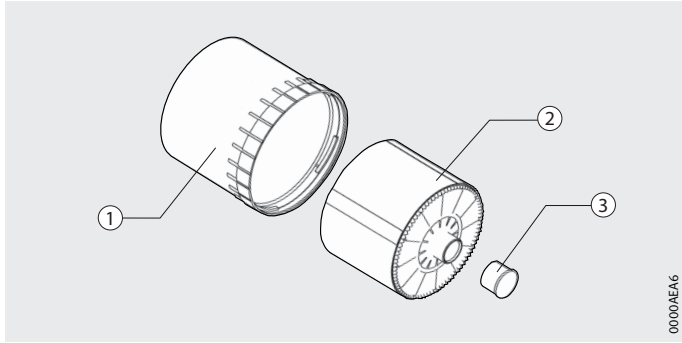


① 3 hexagonal head screws M6×25 for wall-mounting
② 2 hexagonal head screws M6×16 for lubricator and holder (maximum torque 3 Nm)

Figure 6
Wall-mounting the drive

Assembling the lubricator

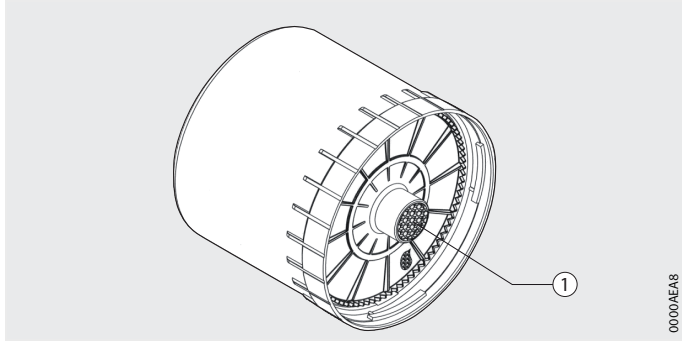
Insert the LC unit into the cover and remove the sealing cap, *Figure 7*.



① Cover
② LC unit
③ Sealing cap

Figure 7
Assembling the LC unit

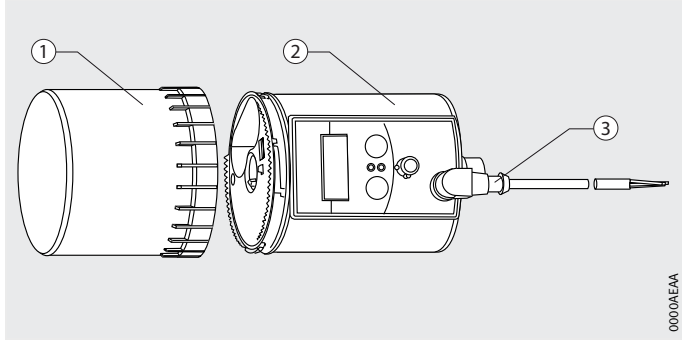
Push the LC unit into the cover until the grease escapes, *Figure 8* ①.



① Outlet opening

Figure 8
Preparing the LC unit

Position the LC unit and cover on the drive so that the catch locks into place and the teeth engage with each other. Rotate the cover in a clockwise direction until the bayonet catch locks into place, see *Figure 9*.



① Cover with LC unit
② Drive
③ Connection cable for the machine controller

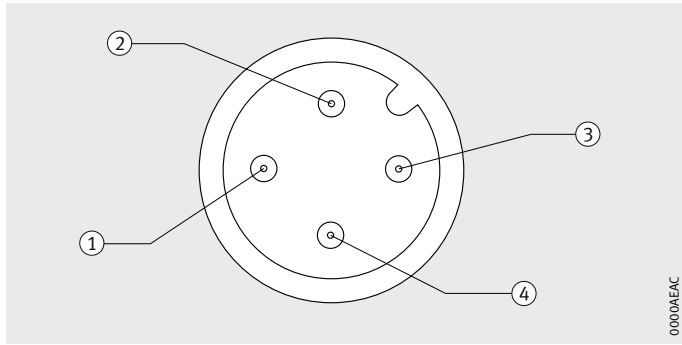
Figure 9
Connecting the drive and LC unit

Attention! The LC unit must be connected to the drive immediately after removing the cover disk and the sealing cap.

Designation of the connection cable

Connect and properly isolate the four cords of the connection cable to the machine controller (for example PLC). Pay attention to the assignment and numbering of the pins on the plug of the lubricator, see *Figure 10*.

Insert the plug of the connection cable and screw onto the jack socket of the lubricator.



① Brown – not assigned
② White – fault (low-active, negative logic)
③ Blue – earth
④ Black – live (15 V DC to 30 V DC)

Figure 10
Pin assignment of plug on connection cable

Attention!

Make connections precisely in accordance with the user manual. An incorrect connection can lead to destruction of the electronics.

Sparking and fire risk due to short circuit.

Do not work on live parts of the electrical device.

Protect live parts of the electrical device in accordance with the voltage, frequency and type of application by means of isolation, position and arrangement.

Display and controls

The operating condition of the lubricator can be determined from the green and red LEDs and from the display on the control unit, see *Figure 11*.

The settings for the lubricator can be performed using the keys ③ and ⑥ and monitored on the display. Error messages generated when there is excessive pressure in the lubricant feed line, for example, are also displayed.

① LC display
② Red LED
③ “SELECT” key
④ FAG C6-MP-DISTRIBUTOR connector (for up to 6 lubrication points)
⑤ Green LED
⑥ “MODE SAVE” key

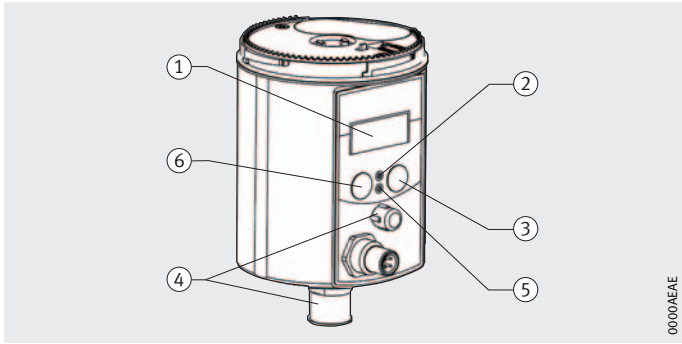


Figure 11
Display and control keys on the drive

Function displays

Display

The “--” display cannot be deactivated, irrespective of the mains voltage. After connection to mains voltage, the settings, operating conditions and error messages relating to the lubricator are shown on the display, *Figure 11* ①.

During defect-free operation, the display shows the remaining volume of the fitted LC unit in percent volume (% vol.).

LED signals

The LEDs on the drive, *Figure 11* ② and ⑤, are interpreted as follows:

LED lit	Signal		Description
Green	Flashing	every 10 seconds	System running
Red	Flashing	every 3 seconds	Error or malfunction
Green and red	Flashing	every 3 seconds	Replace LC unit immediately
Green	Continuous		Motor running; dispensing operation

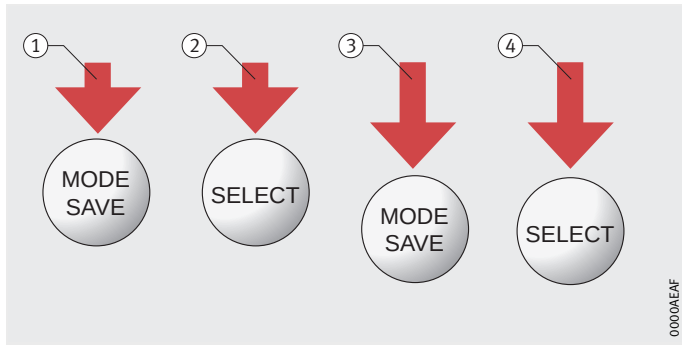
Connection to controller

The controller on your machine only allows an indication as to whether the lubricator is operating or is in malfunction mode. The controller receives a high signal during operation and a low signal in a malfunction.

Menu control keys

There are two keys on the control unit, *Figure 11* ③ and ⑥, page 13, for setting and menu navigation.

- The key “MODE SAVE” accesses the configuration menu, changes the mode and saves the modified settings for further operation.
- The key “SELECT” is used to increase the dispensing time in days or weeks or months by one calendar unit per keystroke, to change the LC unit, to configure the outlets and to set the PIN.



① Short: Selection
② Short: Change values
③ Long > 4 s: Switch to new mode, store set values
④ Long > 4 s: back to previous mode, delete last change

Figure 12
Functions of control keys (short or long keystroke)

Pulse operation

The dispensing process can also be initiated by the connected machine controller. The lubricator must first be set to pulse operation in accordance with the configuration menu (page 18). In setting mode, a value in days must be selected, *Figure 13*.

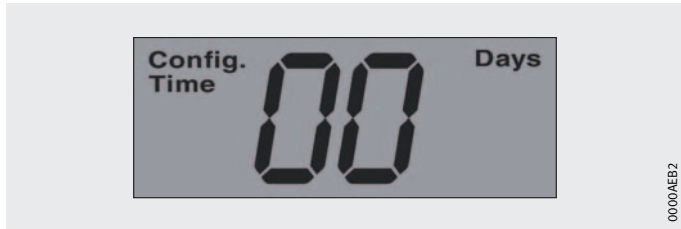


Figure 13
Setting mode “Days” for pulse operation

The supply voltage via the controller must be activated for at least 1 minute and then deactivated for at least 20 seconds.

Each time the machine starts operation, the lubricator now delivers 0,5 cm^3 lubricant to the lubrication point.

If a distributor FAG C6-MP-DISTRIBUTOR is installed, the supply voltage must remain activated for at least 14 minutes and must then be deactivated for at least 20 seconds.

Calculation of the dispensing time – no pulse operation

The dispensing time is set at six months by the factory. The dispensing time for the lubrication point is based on the information provided by the equipment manufacturer for the lubrication quantity required in cubic centimetres (cm^3/100 h) for 100 operating hours. The dispensing time can then be calculated using the table.

Average dispensing quantity in cm^3, given in each case for 100 operating hours for the respective LC unit						
Setting parameter	Setting mode					
Dispensing time	LC250 (250 cm^3)			LC500 (500 cm^3)		
	Days	Weeks	Months	Days	Weeks	Months
1	1041,7	148,8	34,3	2083,3	297,6	68,5
2	520,8	74,4	17,1	1041,7	148,8	34,3
3	347,2	49,6	11,4	694,4	99,2	22,8
4	260,4	37,2	8,6	520,8	74,4	17,1
5	208,3	29,8	6,9	416,7	59,5	13,7
6	173,6	24,8	5,7	347,2	49,6	11,4
7	148,8	21,3	4,9	297,6	42,5	9,8
8	130,2	18,6	4,3	260,4	37,2	8,6
9	115,7	16,5	3,8	231,5	33,1	7,6
10	104,2	14,9	3,4	208,3	29,8	6,9
11	94,7	13,5	3,1	189,4	27,1	6,2
12	86,8	12,4	2,9	173,6	24,8	5,7
13	80,1	11,4	2,6	160,3	22,9	5,3
14	74,4	10,6	2,4	148,8	21,3	4,9
15	69,4	9,9	2,3	138,9	19,8	4,6
16	65,1	9,3	2,1	130,2	18,6	4,3
17	61,3	8,8	2,0	122,5	17,5	4,0
18	57,9	8,3	1,9	115,7	16,5	3,8
19	54,8	7,8	1,8	109,6	15,7	3,6
20	52,1	7,4	1,7	104,2	14,9	3,4
21	49,6	7,1	1,6	99,2	14,2	3,3
22	47,3	6,8	1,6	94,7	13,5	3,1
23	45,3	6,5	1,5	90,6	12,9	3,0
24	43,4	6,2	1,4	86,8	12,4	2,8
25	41,7	–	–	83,3	–	–
26	40,1	–	–	80,1	–	–
27	38,6	–	–	77,2	–	–
28	37,2	–	–	74,4	–	–
29	35,9	–	–	71,8	–	–
30	34,7	–	–	69,4	–	–

The remaining running time of the lubricator must be recalculated following one or more special dispensing processes (see page 21). This also applies to deactivation in the event of extended machinery downtime. It is imperative that the remaining running time calculation be recorded in the lubrication and maintenance plan. The software FAG Motion Guard SELECT MANAGER makes this even easier. This can be downloaded free of charge from the website www.fis-services.com.

Initial operation and use

Ensure before initial operation:

- Is the lubricator outwardly intact?
- Is the right grease in the LC unit?
- Is the connection cable to the machine controller in place and is the correct supply voltage (15 V DC to 30 V DC) present?
- Has the cover disk with stopper been removed from the drive?
- Have all of the components been correctly fitted together and secured?

Attention! Always check the settings of the lubricator before initial operation and make corrections as necessary.

Work exactly to the user manual.

Upon initial operation, the pump system in the drive unit is pre-filled with a universal grease. After approximately ten dispensing processes, this fill is drained off and replaced with the grease from the LC unit; perform special dispensing processes where necessary.

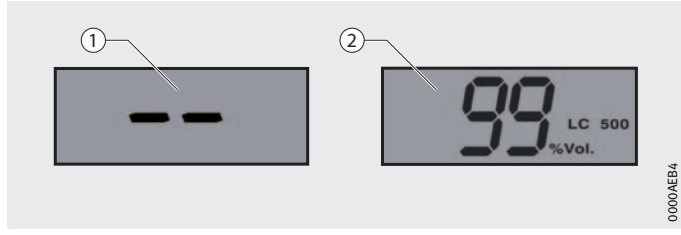
Further steps to be taken:

- Fit the connection cable and attach the cords to the machine controller.
- Apply the supply voltage – the lubricator is ready for operation.

Set the volume of the LC unit, the dispensing time, the outlets for any connected C6-MP-DISTRIBUTOR and the PIN using the keys on the display. Alternatively, configure the lubricator for pulse operation.

Operation

Activate the supply voltage. The reading ①, *Figure 14*, on the display is replaced with the remaining volume reading ②, for example “99 % VOL” for a new LC unit. The green LED flashes and the fault output supplies a high signal (system running) to the connected controller.



① Prior to applying the voltage
② After applying the voltage

Figure 14
Readings upon activation

Then perform a one-off special dispensing process. The starting up of the drive motor and the illumination of the green LED indicate that the dispensing process has begun. The remaining volume of the LC unit appears on the display, ②.

During operation

Check regularly:

- Seal integrity of the lubricator, the feed lines and the connections,
- Lubricant fill level,
- Correct position and finger tight screw mounting of all components.

Special dispensing processes

Machinery downtime

Calculate the modified dispensing time and incorporate this into the remaining running time of the lubricator and into the lubrication and maintenance plan.

Malfunctions

If the controller is showing a malfunction, the reason will appear on the display. Further information is contained in the defect table on page 24.

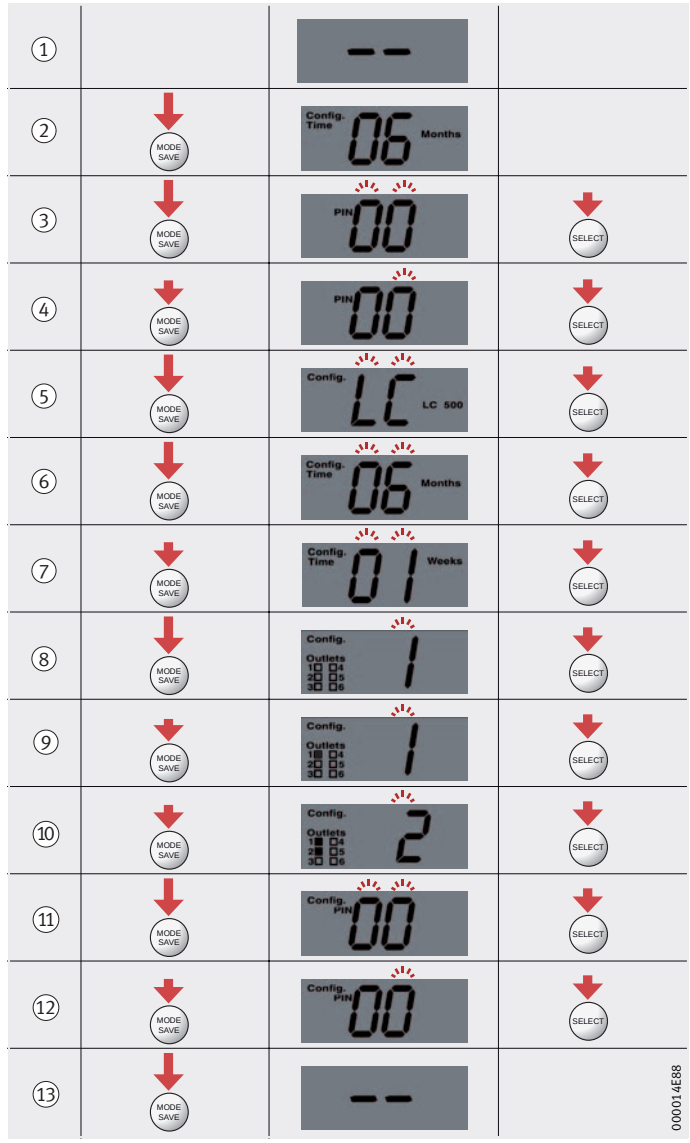
Deactivation

Deactivate the supply voltage; the remaining volume display ②, *Figure 14*, page 16, is extinguished and is replaced by the display ①. All lubricator settings remain stored so that, upon reactivation, the program can continue from the point at which it was stopped.

The fault output delivers a low signal
(system not running) to the controller.

Display settings and contents

The configuration menu should be worked through from top to bottom and from left to right and corresponds to the process for a deactivated lubricator. Configuration is also possible in an activated state.



① Delivered condition of fitted LC unit
② Time-setting and PIN-reset display
③ PIN entry, first digit
④ PIN entry, second digit
⑤ Select volume of the LC unit
⑥ Set months, weeks or days
⑦ Changing over to days or weeks
⑧ Set outlets (with distributor only)
⑨ Outlet 1 activated
⑩ Outlet 2 activated
⑪ Change PIN, first digit (for initial configuration or following PIN reset only)
⑫ Change PIN, second digit (for initial configuration or following PIN reset only)
⑬ Configuration complete

Figure 15
Configuration menu settings and displays

Configuration sections

Function	Short keystroke	Long keystroke	Signal	Go to
Symbol	Arrow pointing downwards	Longer arrow	Symbol	⇒

INTRO
INTRO provides information (INFO) and asks for the current PIN (PIN entry). Changes are made in the configuration menu and its sections (LC, time, outlets, PIN).

LC unit
Key “SELECT” key for setting LC250 or LC500.

Time
Setting in either months, weeks or days. Once the maximum setting parameter has been reached, the count always starts with the digit 01 (except where days “00” = pulse operation, see page 14). The last screen contents displayed are adopted by holding down the “MODE SAVE” key for a long period.

Outlets
The activation of outlets 1 to 6 is indicated by the filled squares. If no FAG C6-MP-DISTRIBUTOR is connected, the configuration of the outlets will have no effect.

PIN
A personal PIN protects the settings from unauthorised access. The PIN can only be changed during the very first configuration or following a PIN reset. The PIN reset (brief pressing of the keys: left-left-right-right-left in the INTRO info menu) returns the personal PIN to its delivered state of “00”. If the time display goes out briefly, the reset has been successful. All other settings remain unchanged.

Non-adoption of changes in the respective configuration section
If the settings in the currently displayed configuration section (LC, time, outlets, PIN) are not to be adopted, the “SELECT” key must be held down until the symbol (“--”) for “OFF” or the remaining volume in the LC unit “% VOL” appears. All other settings and any changes already adopted remain unaffected.

Automatic termination of the configuration mode
If, during a period of 180 seconds, no key is activated in a configuration section, the control system automatically reverts to the previously set mode (“ON” or “OFF”), without adopting the changes. All previously implemented settings and changes already adopted remain unaffected.

Special dispensing process
The option exists to carry out a special dispensing process in order to supply a lubrication point with additional lubricant.

The special dispensing process can only be carried out while the supply voltage of the lubrication system is activated (display of remaining volume) by simultaneously holding down both keys for a long period, *Figure 16* ②, page 20.

Special dispensing process

① Activated lubricator
② To carry out the special dispensing process, hold down both keys simultaneously

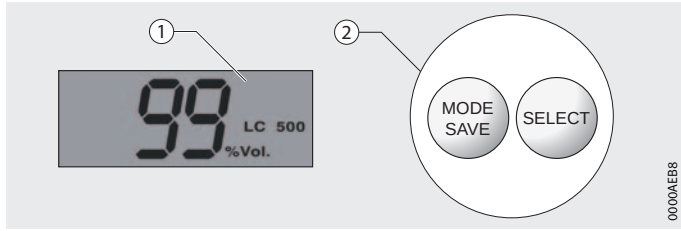


Figure 16
"Special dispensing process"

The special dispensing process can only take place at a temperature of more than 0 °C (ice crystal, *Figure 17*, is not visible) if the lubricator is not dispensing at the exact same time.

There is a minimum period of 30 seconds between two special dispensing processes. Each time both keys are held down for a long period, *Figure 16* ②, during this time is registered and leads to further special dispensing processes. A maximum of 5 special dispensing processes are recorded by the system.

Attention! The remaining running time, which has been shortened as a result of the dispensed lubricant quantity, must be included in the lubrication and maintenance plan.

Low-temperature deactivation

The permissible temperature range of 0 °C to –19 °C is indicated by a flashing ice crystal symbol, *Figure 17*.

Attention! Special dispensing processes cannot be performed within this temperature range.

Flashing ice crystal indicates 0 °C to –19 °C (shown here with 89 % Vol. as an example)

Figure 17
"Low-temperature deactivation" function

If the temperature drops to –20 °C or less, the lubricator shuts down. The ice crystal symbol appears permanently; the remaining quantity in "% vol." is still displayed.

Attention! No further lubricant is dispensed from this point onwards.

Damage may occur if appropriate measures are not taken.

If the temperature rises back to –19 °C, or higher to 0 °C, the lubricator reactivates and the ice crystal symbol flashes.

Calculating the remaining running time

Attention!

All dispensing processes which have accumulated during deactivation (with the exception of special dispensing processes) are made good, whereby up to two additional dispensing processes are performed for each planned dispensing process.

The remaining running time must be recalculated and recorded following each special dispensing process and deactivation.

Remaining running time

$$R_{LZ} = \frac{SZ \cdot RV}{100}$$

Definitions:

SZ: Set dispensing time of the lubricator (days, weeks, months)

RV: Displayed remaining volume (% Vol.)

R_{LZ}: Remaining running time (days, weeks, months, dependent on SZ)

Calculation example for remaining running time

The lubrication point requires a dispensing quantity of 4,3 cm^3 of grease after every 100 hours. The lubricator and LC250 (250 cm^3) are set to a dispensing time of eight months, as prescribed.

After two months at a remaining volume of 75 %, operation is interrupted; the equipment and consequently the lubricator remain deactivated for six weeks.

Once the equipment has been reactivated, when should the LC unit be replaced?

Example

$$R_{LZ} = \frac{SZ \cdot RV}{100} = \frac{8 \cdot 75}{100} = \frac{600}{100} = 6$$

According to the formula, the changeover should be made after six months.

If the lubricator is configured for pulse operation, the remaining running time cannot be calculated since the value for the set dispensing time is not present.

In this case, calculation is carried out using the information on the display and the machine controller.

Changing the LC unit

The simultaneous flashing of the red and green LED combined with the empty level reading on the display, *Figure 18*, indicate that the empty LC unit must be replaced immediately.
The connected machine controller receives a low signal.

Attention!

The LC unit must not be opened or refilled under any circumstances.

Only new, completely filled FAG LC units should be used.

Protect the drive system and control circuit board against moisture. The unit should only be changed in dry conditions.

When changing the LC unit for a different size, the appropriate cover should be used.

If the setting on the display does not correspond to the size of the fitted LC unit, this will lead to incorrect dispensing quantities and displays.

Dispose of old parts in accordance with the applicable regulations.

Figure 18
Changing the LC unit
Display “00 % Vol.”

Setting the volume

The volume of the LC unit is selected in the configuration menu (page 18) by using the two control keys on the drive.
Two settings are possible, *Figure 19*.

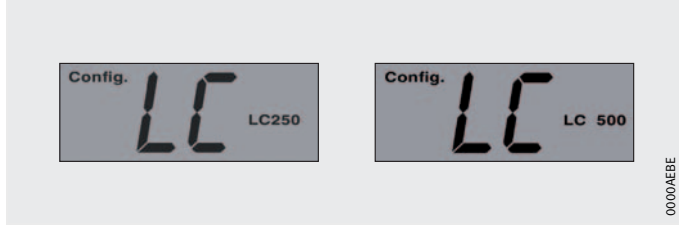


Figure 19
LC unit with volume of 250 cm^3 or 500 cm^3

Procedure for replacing the LC unit

Work steps:

- Rotate the cover on the drive in an anti-clockwise direction and remove.
- Remove the LC unit; the reading “LC” will appear on the display and the red LED will flash.
- Remove the cover disk from the new LC unit, *Figure 7*, page 11.
- Push the LC unit into the cover until the lubricant works its way out of the outlet (*Figure 8*, page 11).
- Fit the LC unit, rotate until the catch locks into place and the teeth of the LC unit and the drive engage with each other. The lubricators control system automatically detects the new LC unit. “--” appears in the display if the device was previously deactivated, or “99 % Vol.” if the device was activated prior to the changeover.
- If the lubricator was activated, it will continue to work with the previous running time setting. If this not the case, start again by applying the supply voltage.
- Where necessary, change the configuration of the lubricator (page 18).

Error messages and troubleshooting

Any function defects are detected by the electronic control system and shown on the display. During a defect display, the system will shut down until the defect has been eliminated and the error message has been acknowledged.
Exception: Displays F1 to F6 for connected distributor, see user manual for FAG C6-MP-DISTRIBUTOR.
The error messages are acknowledged and removed by pressing the “SELECT” key.

Error message due to machine controller

Due to a low signal from the lubricator, the connected controller recognises that there is a malfunction. For any malfunction display via the controller, the cause must be determined directly via the display on the drive.

For each error message shown on the display, the red LED will also flash.

Troubleshooting

Localise and eliminate possible defect sources using the table.

Reading on the display	Defect	Possible cause	Remedy
E1	Lubricator has been deactivated	Excessive motor current, outlet is blocked	Remove blockage, acknowledge defect by holding down the “SELECT” key for a long period
E4	Lubricator has been deactivated	Drive mechanism defective	Replace drive
LC	System is not detecting an LC unit	LC unit missing	Fit new LC unit

Schaeffler Customer Service will provide assistance if a problem occurs which is not included in the overview.

Accessories and service

Due to the high pressure of up to 25 bar, only original replacement parts should be used. This applies in particular to lubricant feed lines.

Replacement parts

All FAG replacement parts comply with technical requirements.

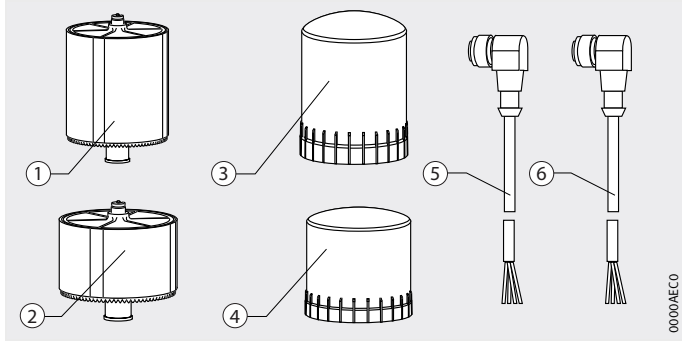


Figure 20
Replacement parts

No.	Designation	Ordering designation
①	LC250 with 250 cm³ of special lubricant Arcanol MULTITOP	ARCALUB-C6.LC250-MULTITOP
	LC250 with other Arcanol greases or special greases	Available by agreement
②	LC500 with 500 cm³ of special lubricant Arcanol MULTITOP	ARCALUB-C6.LC500-MULTITOP
	LC500 with other Arcanol greases or special greases	Available by agreement
③	Cover for LC250 made from transparent plastic	ARCALUB-C6.CAP250
	Cover for LC250 made from aluminium (for lubricants containing ester)	Available by agreement
④	Cover for LC500 made from transparent plastic	ARCALUB-C6.CAP500
	Cover for LC500 made from aluminium (for lubricants containing ester)	Available by agreement
⑤	Connection cable 5 m, M12 angled (standard)	ARCALUB-C6.CABLE-CONTROL-5M
⑥	Connection cable 10 m, M12 angled (accessory)	ARCALUB-C6.CABLE-CONTROL-10M

Accessories All accessory parts must comply with technical requirements.

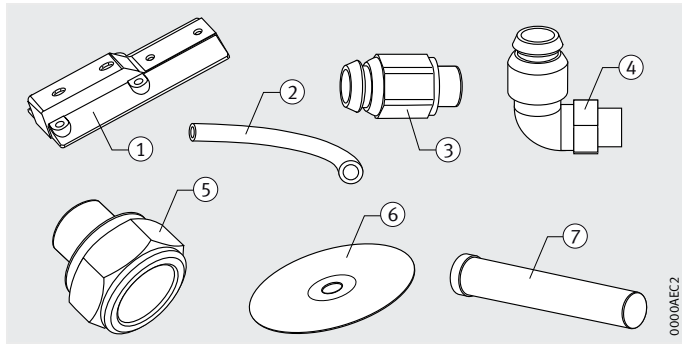


Figure 21
Accessories

No.	Designation	Ordering designation
①	Holder for FAG Motion Guard CONCEPT6 CONTROL	ARCALUB-C6.HOLDER
②	Special lubricant feed line 5 m (inside diameter 5 mm)	ARCALUB-C6.TUBE-5M
③	Straight hose connector $G^1/_8$ for lubricant feed line	ARCALUB-C6.JOINT-MP-0-SET
④	Angled hose connector $G^1/_8$ for lubricant feed line	ARCALUB-C6.JOINT-MP-90-SET
⑤	Adapter $G^3/_8$ to $G^1/_4$	ARCALUB-C6.NIPPLE-G3/8-G1/4
⑥	Grease cartridge 400 g for prelubrication with a grease gun, filled with Arcanol MULTITOP	Available by agreement
	Grease cartridge 400 g for prelubrication with a grease gun, filled with other lubricants	Available by agreement

A CD-ROM containing FAG Motion Guard SELECT MANAGER software (lubricant quantity calculation), lubrication and maintenance plan and the user manual in PDF format can be obtained on request.

Service The operator has the option of returning the empty lubricator to Schaeffler KG for

- disposal of the used parts in an environmentally-friendly manner,
- replacement of the LC unit,
- implementation of the required settings (dispensing time, LC unit and outlets).

EU Declaration of Conformity

EU Declaration of Conformity

In accordance with EG Machinery Directive 98/37/EG

and EMC Directive 89/336EWG

We hereby declare that the product described below is in conformity with the applicable health and requirements of the EU Directive in terms of its design and type and in the execution we have brought into circulation.
This declaration shall cease to be valid if any modification is made to the product without our agreement.

Product description:	Automatic lubricator
Product name:	FAG Motion Guard CONCEPT6-CONTROL
Type:	LC250 and LC500

Applicable harmonised standards:

EN ISO 12100-1:2003	Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology and methodology
EN ISO 12100-2:2003	Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles
EN 60204-1:1998	Electrical equipment of machines

Signatures:

Schaeffler KG
F'IS - FAG Industrial Services
Georg-Schäfer-Str. 30
97421 Schweinfurt

i.V. A. K...
Armin Kempkes
General Manager F'IS

i.A. Michael F...
Michael Fassbinder
Product Manager
F'IS Lubrication Products

Date:
Schweinfurt, 31.01.2008

This declaration certifies conformity with the stated directives but does not represent a guarantee of characteristics.
The safety guidelines in the user manual must be observed.

Schaeffler KG • Georg-Schäfer Straße 30 • D-97421 Schweinfurt • Tel.: +49/2407/9149-99

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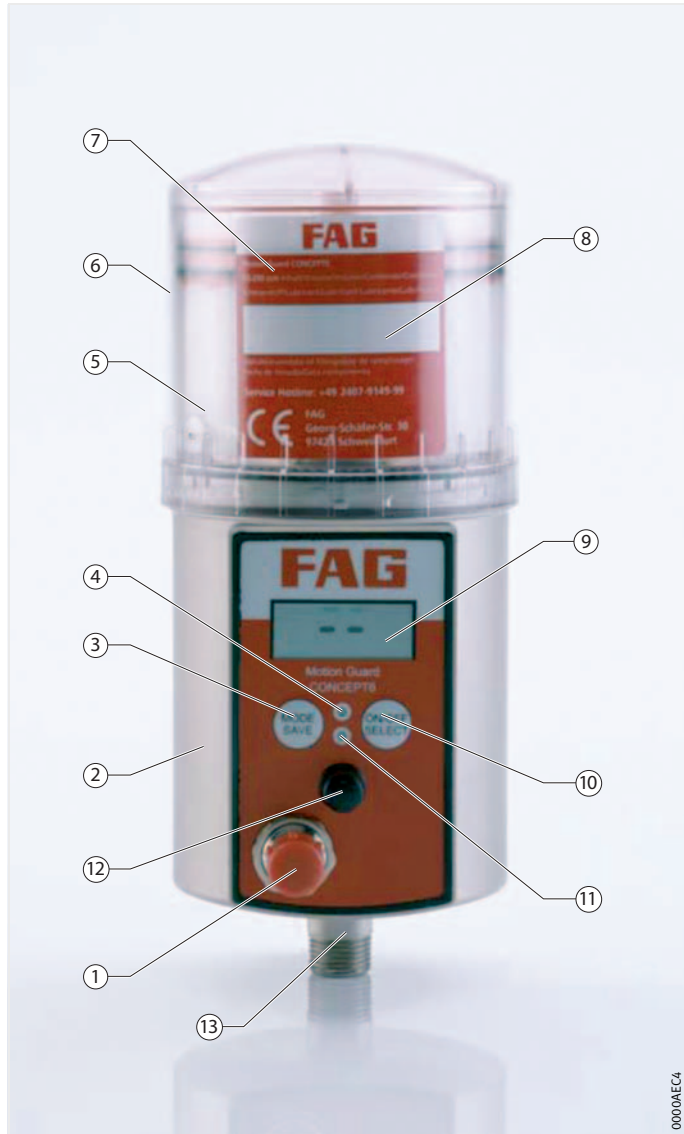
Quick guide to function and operation

This brief overview contains some important guidelines on how to set the lubricator and how to operate it rapidly and easily. It is not a substitute for the detailed user manual.

Attention!

It is imperative that the safety guidelines and extensive information in the detailed user manual be observed.

This brief overview only applies to the lubricator FAG Motion Guard CONCEPT6 CONTROL in combination with lubricant cartridges LC250 or LC500.



① Plug for the connection cable to the controller
② Drive including electronic system, motor and pump
③ "MODE SAVE" key, configuration menu and settings
④ Red LED, additional malfunction display
⑤ LC unit (lubricant cartridge)
⑥ Cover with bayonet catch
⑦ Type of LC unit with lubricant volume in cm³
⑧ Type of lubricant and filling date
⑨ Display of operating modes
⑩ "SELECT" key for settings
⑪ Green LED, function display
⑫ Distributor connector for FAG C6-MP-DISTRIBUTOR
⑬ Connector for lubrication point or lubricant feed line ($G^3/_8$ external or $G^1/_8$ internal)

Figure 22
Lubricator

① Teeth for positioning the LC unit
② Contact bridge, no function
③ Drive catch for spindle drive

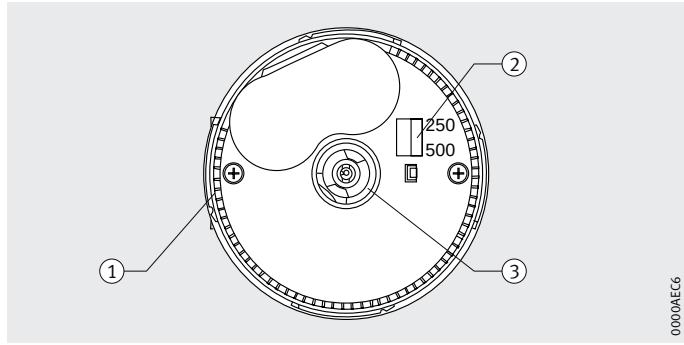


Figure 23
Underside of the drive

① Brown – not assigned
② White – fault
③ Blue – earth
④ Voltage 15 V to 30 V DC

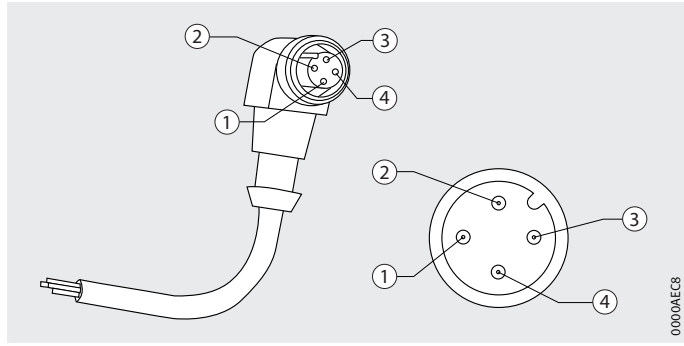


Figure 24
Connection cable for the machine controller

Installing and replacing the lubricant cartridge (LC unit)

Install the lubricators drive directly at the lubrication point using the enclosed holder.
The lubricant feed line must not exceed 5 m in length.

- Remove the cover disk from the LC unit and place the LC unit in the cover.
- Push the LC unit into the cover until grease escapes from the outlet opening.
- Position the cover with LC unit on the drive; the catch must lock into place and the teeth of the LC unit and the drive must engage with each other.
- Rotate the cover in a clockwise direction until the bayonet catch locks into place.
- Make the connection to the machine controller.

Calculating the dispensing time

The required grease quantity in cubic centimetres per 100 operating hours is based on the data supplied by the manufacturer for the point to be lubricated.

The detailed user manual contains all of the information on the required lubricant quantities, the dispensing time which is dependent on the volume of the LC unit and the setting mode.

The software FAG Motion Guard Select Manager provides a simple way of calculating the dispensing time. This can be downloaded from the website www.fis-services.com or requested free of charge in the form of a CD-ROM.

Activating the lubricator

Apply the supply voltage (15 V DC to 30 V DC) via the machine controller.

The remaining volume of the LC unit will appear on the display as a percentage and the green LED will flash.

① Remaining lubricant volume display, dispensing time, outlet numbers, PIN and error recognition
② Outlets 1 to 6, activated outlets (FAG C6-MP-DISTRIBUTOR)
③ Configuration menu
④ Setting mode, selected time dimension
⑤ Volume of connected LC unit
⑥ Ice crystal as flashing signal in the permissible minus temperature range and as permanent signal at less than –20 °C (low-temperature deactivation)
⑦ Remaining lubricant volume as a percentage

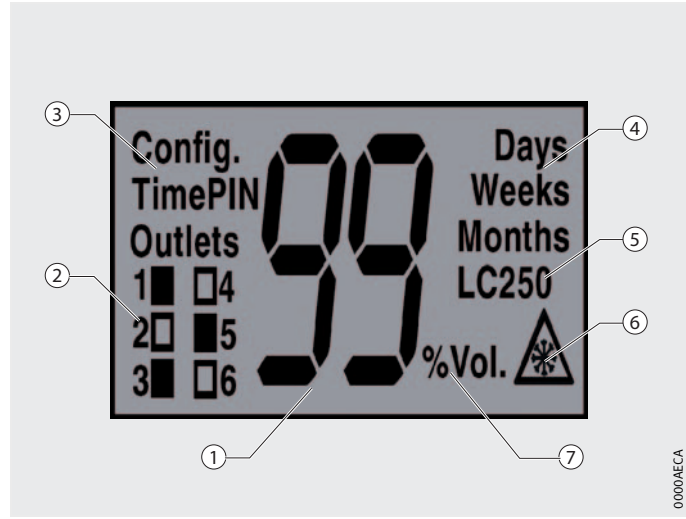


Figure 25
Display

Settings on the drive

The two keys are used to configure the volume of the LC unit, the dispensing time, the outlets and the PIN.

- Hold down “MODE SAVE” until the set time appears (days, weeks or months).
- Hold “MODE SAVE” down again for a long period until the request for entry of the current pin is visible (the PIN cannot be changed in this instance, the display PIN “00” represents the delivered state).
- Hold “MODE SAVE” down as often as required for long periods until the respective configuration menu is reached (volume of LC unit, dispensing time, outlets or PIN change). Make the required settings within the menu by briefly holding down “MODE SAVE” or “SELECT”.

Adoption of settings	Hold down “MODE SAVE” until “--” appears on the display.
Pulse operation via the connected controller	Select pulse operation: In the configuration menu, change the setting mode Days to the numerical value “00”. Activate the supply voltage for at least 14 minutes; the lubricator will start the first dispensing process with a lubricant quantity of 0,5 cm^3. The minimum deactivation period between two dispensing processes is 20 seconds.
Deactivating the lubricator	Deactivate the supply voltage, “--” is shown on the display.

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