2.1EN-38033-H12

Single-Line Pump 603 S with Control Unit

B-P603S-000a09

810-53021-1H

Subject to modifications

Manufacturer:
SKF Lubrication Systems Germany GmbH
Heinrich Hertz-Str. 2-8 D-69190 Walldorf
Tel. +49(0) 6227 33-0 Fax: +49 (0) 6227 33-259
E-Mail: Lubrication-germany@skf.com

Table of Contents

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Introduction

Explanation of Symbols Used

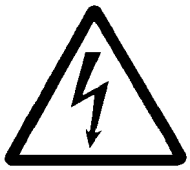
The following description standards are used in this manual:

Safety Instructions

Structure of safety instructions:

- Pictogram
- Signal word
- Danger text
  - Danger note
  - How to avoid danger

The following pictograms are used in this manual and are combined with the corresponding signal words:

 1013A94	 4273a00	 6001a02
- ATTENTION **- CAUTION** **- WARNING**	**- ATTENTION** **- CAUTION** **- WARNING**	**- NOTE** **- IMPORTANT**

The signal words give the seriousness of danger if the following text is not observed:

ATTENTION	refers to faults or damages on machines.
CAUTION	refers to bad damages and possible injuries.
WARNING	refers to possible dangerous injuries.
NOTE	indicates improved operation of the device.
IMPORTANT	indicates special operating features of the device.

Example:


1013A94

ATTENTION!

When making use of other than the tested spare parts, serious damage may affect your device.

Furthermore, you will find the following text symbols in this manual:

- Listing of applicable statements
  - Subpoint of applicable statements

1. Determination of the number or sequence of contents

➲ Procedural instruction

User's Responsibility

To ensure the safe operation of the unit, the user is responsible for the following:

1. The pump / system shall be operated only for the intended use (see next chapter "Safety Instructions") and its design shall neither be modified nor transformed.
2. The pump / system shall be operated only if it is in a proper functioning condition and if it is operated in accordance with the maintenance requirements.
3. The operating personnel must be familiar with this User Manual and the safety instructions mentioned within and observe these carefully.

The correct installation and connection of tubes and hoses, if not specified by SKF, is the user's responsibility. SKF will gladly assist you with any questions pertaining to the installation.

Environmental Protection

Waste (e.g. used oil, detergents, lubricants) must be disposed of in accordance with relevant environmental regulations.

Service

The personnel responsible for the handling of the pump / system must be suitably qualified. If required, SKF offers you full service in the form of advice, on-site installation assistance, training, etc. We will be pleased to inform you about our possibilities to support you purposefully.
In the event of inquiries pertaining to maintenance, repairs and spare parts, we require model specific data to enable us to clearly identify the components of your pump / system. Therefore, always indicate the part, model and series number of your pump / system.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Safety Instructions

Appropriate Use

The single-line pump 603 S (S = Single) has been designed for automatic lubrication of commercial vehicles, construction machines, agricultural devices, wind power plants as well as for applications in the general industry.
The 603 S pump has been designed for intermittent operation and is not suitable for continuous operation. It can be operated only in combination with single-line metering devices (e.g. QSL).
The system is able to supply lubricants up to NLGI grade 2 (see List of Lubricants 2.0-40001-A06).

Misuse

Any use of the 603 S pump that is not expressly mentioned in this User Manual will be regarded as misuse.
If the 603 S pump is used or operated in a different manner other than specified, any claim for warranty or liability will be null and void.

6001a02

NOTE

If personal injury or material damage occurs as a result of inappropriate operation, e.g. if the safety instructions are ignored or resulting from an incorrect installation of the 603 S pump, no claims or legal actions may be taken against SKF.
.

Exclusion of Liability

The manufacturer of the 603 S pump will not accept any liability for damages caused by:

- a lack of lubricant due to an irregular refilling of the pump
- the use of contaminated lubricants
- the use of greases which are not or only conditionally pumpable in the 603 S pump
- inadequate disposal of used or contaminated lubricants as well as of components that have been in touch with lubricant
- unauthorized modification of the system components
- the use of unapproved parts
- an operation without adhering to the minimum pause time an respectively the maximum lubrication time (see chapter “Technical Data“)

General Safety Instructions

- Lincoln Quicklub centralized lubrication systems
  - are designed state-of-the-art.
  - can be assembled for safe operation
- Incorrect use may result in bearing damage caused by poor or over-lubrication.
- Unauthorized modifications or changes to an installed system are not admissible. Any modification must be subject to prior consultation with the manufacturer of the lubrication system.

Regulations for Prevention of Accidents

- To prevent accidents, observe all city, state and federal safety regulations of the country in which the product will be used.
- Avoid the operation with
  - unapproved parts.
  - insufficient or contaminated lubricants.

Operation, Maintenance and Repair

1013A94

ATTENTION!

Before carrying out any maintenance or repair works on the 603 S pump, make sure that the pressure lines towards the single-line metering devices are depressurized.

1013a94

CAUTION!

… with reservoir and follower plate:

Inside the reservoir, the reservoir cover is still under spring tension to feed the follower plate back.
When removing the reservoir cover avoid any sudden spring release.
Wear protective glasses.

Operation/Maintenance

Pumps 603 S

- must be operated with a pressure relief valve [1)] installed.
- must be refilled in regular intervals with clean lubricant recommended by the manufacturer without air entrapments.
- operate automatically. However, a regular check (approx. every 2 days) should be made to ensure that lubricant is emerging from all lubrication points.

1) to be ordered separately

4273a00

WARNING!

Before maintenance or repair of pumps switch off their power supply.

1013A94

CAUTION!

It is not allowed to use the pump in potentially explosive fields.

Repair

Repairs should only be performed by authorized personnel who are familiar with the repair instructions.
Pack defective p.c.b.s properly and send it back to the factory.

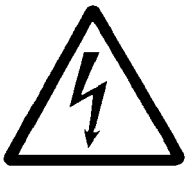
Disposal

Dispose of used or contaminated lubricants as well as of parts that were in touch with lubricant according to the legal regulations pertaining to environmental protection. Make sure to observe the safety data sheets of the lubricants used.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Safety Instructions, continuation

Dangers due to alternate current VAC


4273a00

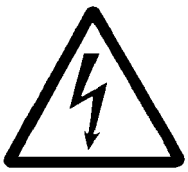
CAUTION!

The pump must be installed only by qualified personnel. The connection (N/L/PE) of the supply voltage must be done according to VDE 0100 and VDE 0160. Install a protective and lock out device for isolating and disconnecting the pump. ***Before installing or work on the pump, disconnect and lock out the incoming power.***

WARNING!

Failure to observe the safety instructions, e. g. touching electrically charged parts when the pump is opened, or improper handling of the pump may cause serious injury or ***death****. If the values specified in the Technical Data are exceeded, the device may overheat. It may damage the pump and thus impair the electric safety.*

Dangers due to direct current VDC


4273a00

CAUTION!

The centralized lubrication system may be installed and started up by authorized personnel only.
Non-observance of the safety indications [1] may result in injuries and destroy connected electrical components.

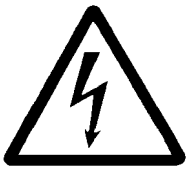
Pumps that are provided with power via a ***bayonet plug*** *may be operated with safety extra-low voltage* ***SELV*** *only.*

Pumps that are provided with power via a ***square plug*** *including grounding (PE) can be operated as follows:*
- ***PELV*** *protective extra-low voltage; with protective separation*
- ***FELV*** *functional extra-low voltage[2]:*
..... without protective separation

[1] *e. g. by touching live components while the centralized lubrication system is open or by handling the centralized lubrication inappropriately*

[2] *In the case of FELV the protective conductor of the square plug must be connected to the protective conductor of the primary system in order to warrant protection by cutoff.*

Operation with bayonet plug


4273a00

CAUTION!

If the protective-conductor terminal is not connected or interrupted, dangerous touch voltages may occur on the equipment!

Protective measures to be applied for appropriate operation with bayonet plugs:
"Functional extra-low voltage with safe isolation" /
"Protective Extra-Low Voltage" (PELV)
Standards:
DIN EN 60204 Part 1: 2007-07 / IEC 204-1 /
DIN VDE 0100 Part 410: 2007-06 / IEC 364-4-41

Installation

- Any safety equipment already fitted to the vehicle should only be removed for the purpose of fitting the system and must be replaced afterwards. It may not be modified or made ineffective.
- Use only original spare parts or parts approved by SKF.
  .
- Mount the 603 S pump vertically with the pump reservoir showing to the top.
  Observe the admissible tolerance of smoothness (// max. 1,0 mm) between the upper and lower mounting surface for pumps with 10, 15 and 20 liter reservoirs (see fig. 47 & 48).
- Modifications or changes to an installed system are not admissible. Any modification must be subject to prior consultation with the manufacturer of the lubrication system.
- Install the components of the 603 S pump in such way that the driver can always see the low-level position of the pump reservoir.


6001a02

IMPORTANT

Adhere to:
- the installation instructions of the vehicle manufacturer as regards all drilling and welding procedures.
- the specified minimum distances between the bores and the upper/lower rim of the frame or between two bores.


6001a02

IMPORTANT

- ➲ *Route supply lines professionally.*
- ➲ *Firmly bolt together pressurized components.*
- ➲ *Consider the torsion torques.*

Installation and Maintenance of Hydraulic Hoses


1013A94

ATTENTION!

Operational safety of the pump can only be ensured in the case of a professional installation and maintenance of the hose lines. Make sure to observe the following recommendations!

Hydraulic hose lines
- may never be subjected to torsion
- must be installed twist-free
- must not rub against metal components or edges
- are to undergo regular visual checks and must be exchanged in the case of wear (at the latest 2 years after installation)

When installing the lubrication line make sure to allow a large bending radius always. Avoid kinks of the line. In case of tight spaces use a hose spiral or a spring coil in order to avoid damages downstream of the hose connector. Use high pressure hydraulic hose for lubrication lines.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Description

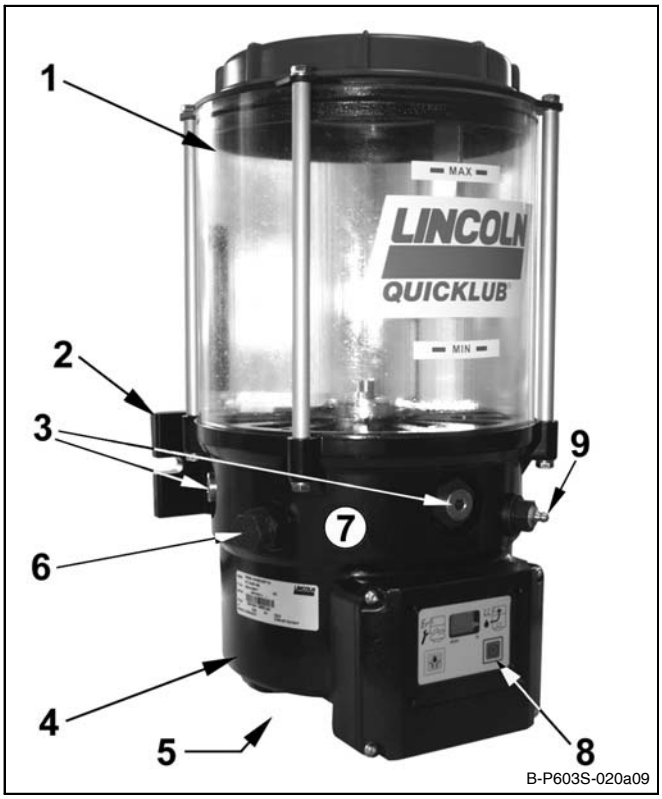


Fig. 1 Components of the single-line system with pump 603 S (with stirring paddle)

1 - Reservoir
2 - Mounting plate
3 - Pump elements
4 - Control housing
5 - Electrical Connection
6 - Relief line
7 - Pump housing
8 - Membrane key pad
9 - Filling nipple

Fig. 2 Single-line pump 603 S with follower plate

Pump 603 S

- is consisting of the following components:
  - pump 603 with housing, integrated motor and automatic venting element
  - reservoir with fixed and stirring paddle or follower plate
  - integrated pressure sensor or switch
  - external pressure sensor or switch (optional)
  - Accessories (to be ordered separately):
    - pressure and relief line (steel tube 16 x 2 mm)
    - lubricant feed lines (plastic tube 4.1 x 2.3 mm)
    - filling device for manual filling procedure
    - pressure relief valve
- can be mounted right from the beginning or as a retrofit kit
- can supply lubricant for up to 100 lubrication points depending on the line lengths
- is driven by a 24 VDC direct current motor
- operates according to operating cycles (pause and lubricating times)
- automatically dispenses lubricant during the lubricating time through the main tube line via the connected metering devices (e. g. QSL) to the respective lubrication points
- can combine the output of 3 pump elements (approx. 12 ccm/min) to only one outlet internally
- does not need any additional external relief valve
- is designed for the delivery of greases up to NLGI 2 at temperatures from –40 °C to + 70 °C and a max. pressure of 300 bar.

Reservoir sizes

- 4-l transparent plastic reservoir
- 8-l transparent plastic reservoir
- 10-l transparent plastic reservoir
- 15-l transparent plastic reservoir
- 20-l transparent plastic reservoir

Electrical connection

- The 603 S pumps with VDC design come generally equipped with a 7-core cable with bayonet plug (cable length 10 m).
- In the VAC version, for the voltage supply pumps 603 S generally dispose of a square plug.
- Optionally, for an external pressure sensor or pressure switch the 603 S pumps are equipped with a 4-core cable with bayonet plug (cable length 10 m).

Low-level control (optional)

- The pump model 603 S can be ordered with a low-level control for grease.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Identification Code – Single-Line Pump 603S


6001a02

NOTE

Any pumps combinations other the above standard pumps can be com-posed and ordered in accordance with the valid model identification code.

Code examples:

P603S	-	4	X	L	BO	-	3Z	7	-	24	-	2A	7.	16	S03	DS
P603S	-	8	X	L	F1	-	3Z	7	-	24	-	3A	7.	16	SR16	SE
P603S	-	15	X	L	F	-	3Z	7	-	AC	-	4A	1.	01	BR08	SE

P603S
Basic pump model for grease
with control printed circuit board

Reservoir version
4 >> 4 l transparent plastic reservoir
8 >> 8 l transparent plastic reservoir
10 >> 10 l transparent plastic reservoir
15 >> 15 l transparent plastic reservoir
20 >> 20 l transparent plastic reservoir

X = Reservoir for grease

Available combinations		Decoding
I II	**I**	**N** = Standard design **L** = with Low-level control
N BO **L BO** **L F** [1] **L F1** [2]	**II**	**BO** = Filling from the top **F** = Reservoir with follower plate **F1** = Reservoir with follower plate

[1] electrical connection with square-type plug (filling from the bottom)
[2] electrical connection with bayonet plug (filling from the bottom)

Pump elements
3Z >> 3 pump elements Z7 combined to one outlet

7 >> Piston diameter 7 mm

Supply voltage
12 >> 12 V**DC**
24 >> 24 V**DC**
AC >> 110-240V AC ± 10%, 50-60Hz ± 5%
- with 24V DC direct current motor

Electric connecting possibilities [3]

DC	>> **1A** …7.16 >> **2A** …7.16 [4] >> **3A** …7.16 [4]	>> **2B** …7.16 [4]		
AC	>> **2A** …1.01 >> **3A** …1.01 [4] >> **4A** …1.01 [4]	>> **2B** …1.01 >> **3B** …1.01 [4]	>> **3C** …1.01 [4]	>> **2D** 1.01 [5] -…- K2 oderK3 [6]

[3] see “Connection Diagrams” & Decoding (under „Technical Data)
[4] incl. 10 m cable (4-wire); precondition jumper position “2S”: see chapter “Jumper Configuration”
[5] Indication via M12 plug
[6] 2 or 3 coupling relay

Type of connection
1 >> Square-type plug (power supply AC)
7 >> Bayonet plug, 7/7-pole

Connection outside the pump
01 >> Square-type socket without cable
16 >> Bayonet socket with 10 m cable (7-core)

Control p.c.b.
S01-S24 [7] Microprocessor control with different adjustment variants (jumper positions) [8]
B01-B24 [7] Microprocessor control with different adjustment variants (jumper positions) [8]
- Terminals 15/30 connected pcb-internally
S**R/BR**… [7] Additional relay control

[7] **S:** standard p.c.b. / **B:** „**S**“ + terminals 15/30 bridged / **R:** additional relay p.c.b.
[8] see chapter “Jumper Configuration”

Pressure switch / Pressure sensor
SE >> Pressure sensor adjustable via key pad
- from 100 bar up to 320 bar with 10 bar steps [9]
DS >> Pressure switch

[9] Observe system pressure (max. 300 bar)! Factory settings: see chapter “Technical Data”

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Mode of Operation

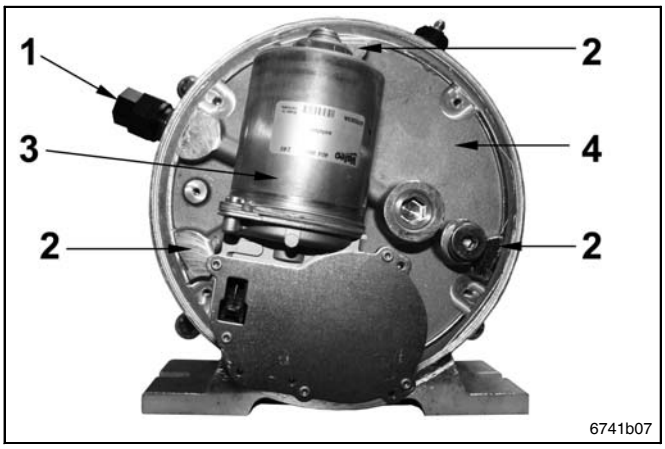


Fig. 3 Disassembled control housing - view from the bottom

1 - Venting element
2 - Pump elements Z7
3 - Pump motor
4 - Pump housing

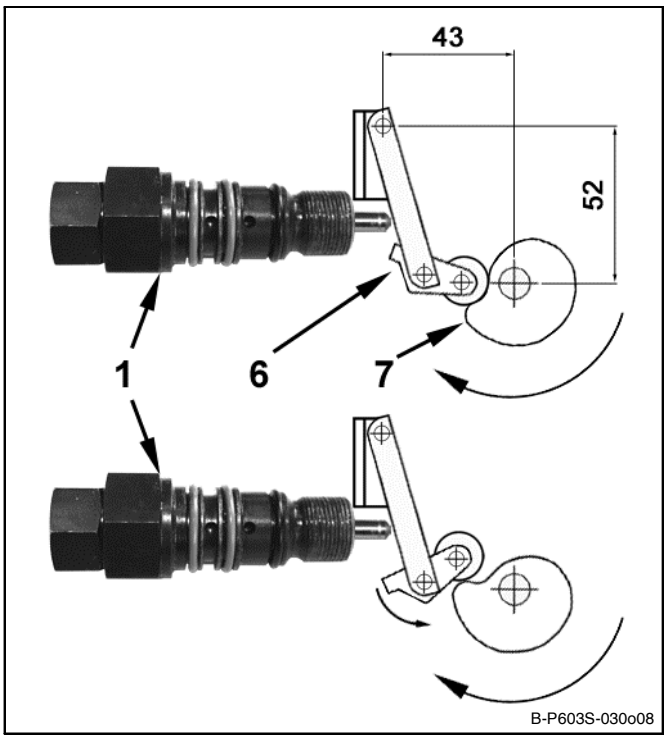


Fig. 4 Idle run of the switch joint on the venting element

1 - Inactive venting element
6 - Switch joint
7 - Eccentric disk (driven clockwise by the motor)

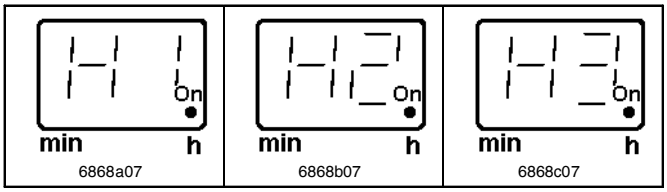


Fig. 5 Display of the current holding times

Functional Description

- Flowcharts (see page 15 et seq.)
- Schematic of single-line pump (see fig. 46).

Drive

- The power supply for the motor is provided via an external control unit 3 (fig. 3).
- The motor turns the eccentric disc 7 (fig. 4) clockwise.

Pressurization

- During operation the motor 3 (fig 3) builds up pressure until it reaches the **operating pressure**.
  The monitoring time (max. 20 minutes) starts in parallel.
- Thereby three pump elements 4 are driven (functional procedure see fig 11).
- The outputs of the pump elements are combined and are led to the single-line metering devices via a mainline.

- As soon as the operating pressure has been reached, the pressure sensor or switch integrated in the pump switches the motor off.

Pressure Balance

Internal pressure sensor or switch

- As soon as the operating pressure has been reached, the holding time (2 minutes) starts. In the meantime pressurization takes place.
  - Pressure within hysteresis…… immediate relief
  - Pressure below hysteresis ….. re-pressurization

Internal and external pressure sensors or switches

Either:

- As soon as both pressure sensors or switches have reached the operating pressure, the pressure relief starts immediately.

Or:

- The operating pressure of at least one pressure sensor or switch is not reached during pressurization. The first holding time “ H1 “ starts. Then, the pump again tries to build up the operating pressure.
- This procedure repeats until the third holding time or until the operating pressure could be maintained within the hysteresis. In the display after the first holding time there appears " H1 ", after the second holding time " H2 " and after the third " H3 " (see fig. 5).
- Otherwise, this procedure is terminated by the lapsing of the monitoring time. Then there appears a functional fault E1 or E2 (see fig. 23 & 24).

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Mode of Operation, continuation

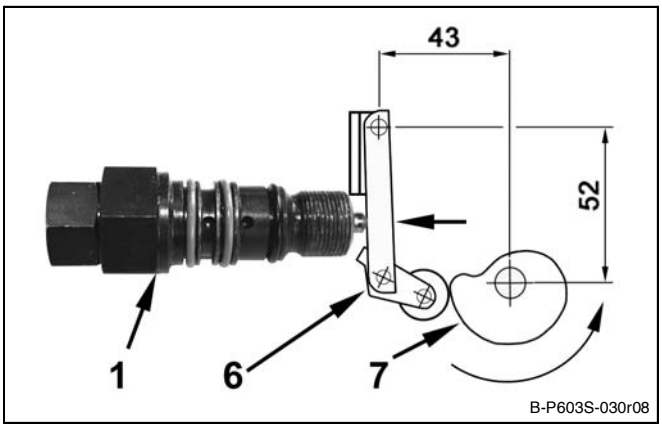


Fig. 6 Activated switch joint on the venting element

1 - activated venting element
6 - activated switch joint
7 - eccentric (driven by the motor counterclockwise)

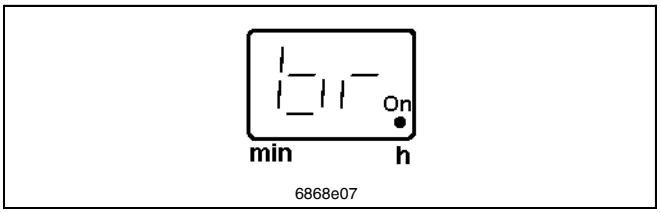


Fig. 7 Display at the end of the depressurization (break)

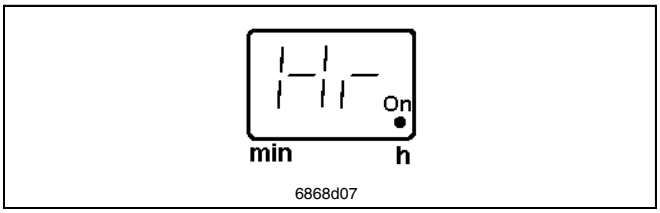


Fig. 8 Display before change of moving direction of pump motor (holding time)

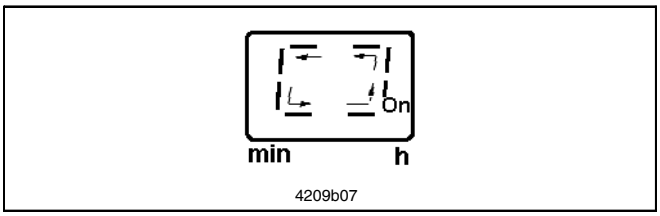


Fig. 9 Rotating segmented display during pressure relief (counterclockwise)

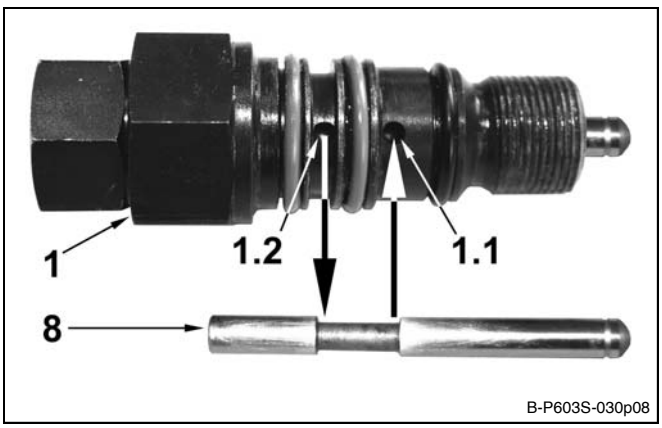


Fig. 10 Venting in the venting element

Functional Description, continuation

During pressurization the pump motor with eccentric 7 moves clockwise so that the venting element cannot be activated (fig. 4).

At the end of the depressurization, the display shows " br " (fig. 7).

To change the moving direction the pump motor stops. In the display there appears shortly " Hr " (fig. 8).

Pressure Relief

- For pressure relief of the single-line system the pump motor moves counterclockwise. In the display of the membrane keypad there appears a segment moving counterclockwise (fig. 9).
- The venting element 1 (fig. 6) is activated.
- Thereby, the mainline of the lubrication system is depressurized by the venting element (see fig. 10). The lubricant can flow back into the reservoir from the mainline. This means, by the redirection of the eccentric 7 (fig. 6) the switch joint 6 presses the slide 8 into the venting element. This allows for the pressure relief between the inlet and the outlet bore 1.1 & 1.2 to the reservoir.
- Thus the complete lubrication system is vented. The single-line metering devices (e. g. SL) can now shift the premetered lubricant for the next lubrication procedure.
- Pressure relief persists during the pause time and will be reviewed before prepressurization.

1 - venting element
1.1 - inlet bore
1.2 - outlet bore
8 - slide position in the venting element

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Mode of Operation, continuation

Pump element with fixed lubricant output

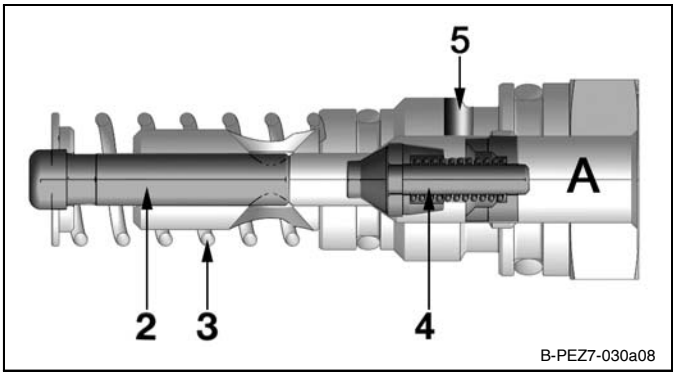


Fig. 11 Pump element Z7 for internal lubricant cross-porting

A - Connection $G^1/_4$" for main line or closure screw
2 - Piston
3 - Return spring
4 - Check valve
5 - Lateral inlet / outlet for lubricant cross-porting

- The electric motor 5 (fig. 3) drives the eccentric 1 (fig. 12 & 13).
- During the lubricating time:
  - piston 2 sucks in lubricant from the reservoir (fig. 12).
  - piston 2 dispenses the lubricant through the mainline via the single-line metering device to the connected lube points (fig. 13).
- Available design:
  - Piston diameter Z7 ..... 7 mm
    Lubricant output ..... approx. 4 ccm/min

NOTE

Z7 pump elements are combined to one outlet pump element (max. output approx. 12 ccm/min).

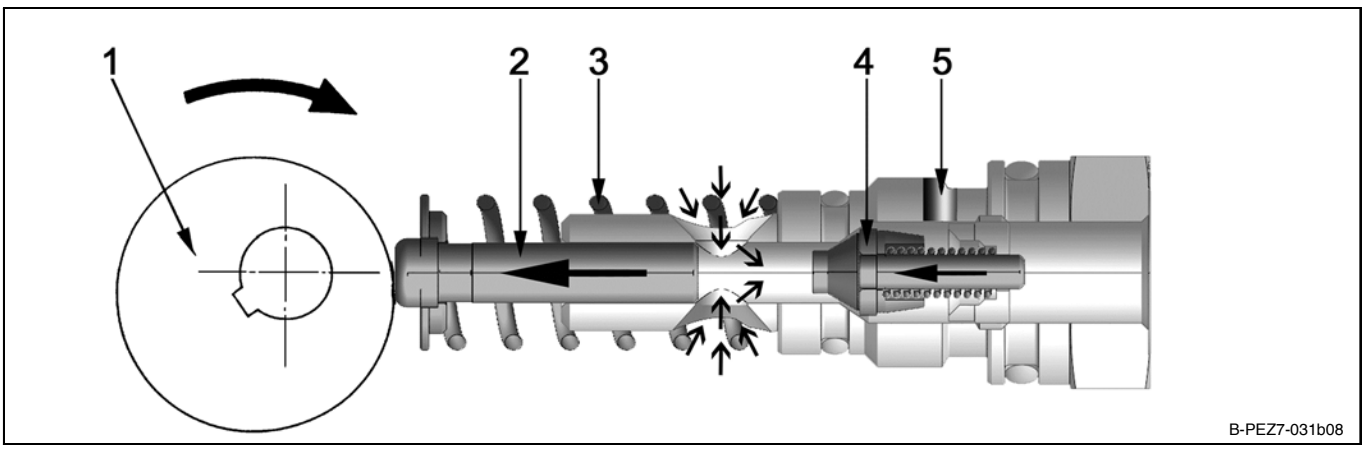


Fig. 12 The pump element sucks in lubricant

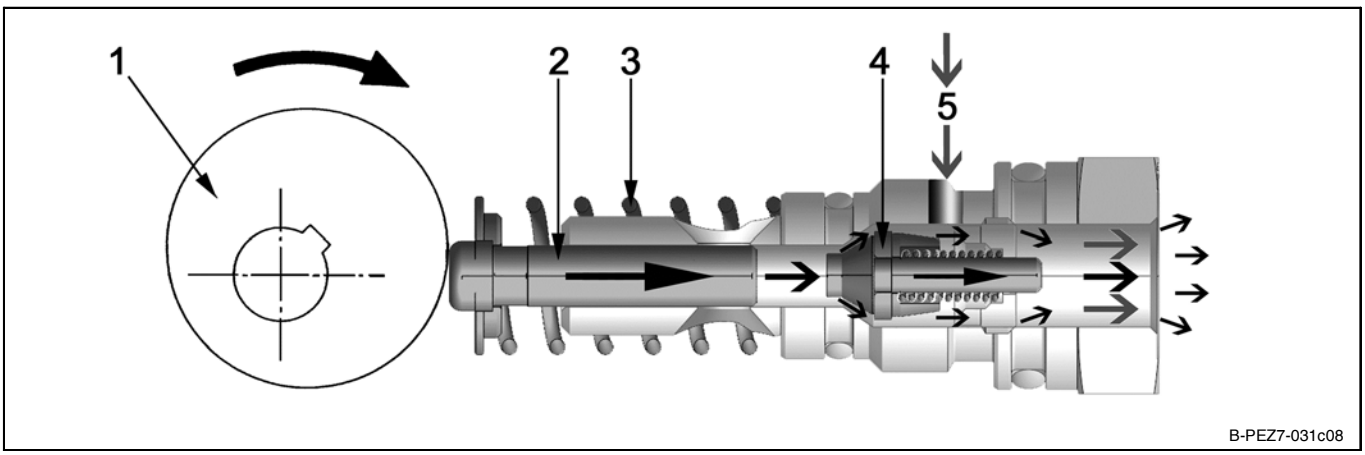


Fig. 13 The open pump element (without closure screw) receives (pos. 5) and dispenses lubricant

1 - Eccentric
2 - Piston
3 - Spring
4 - Check valve
5 - Lateral inlet for lubricant cross-porting

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Mode of Operation, continuation

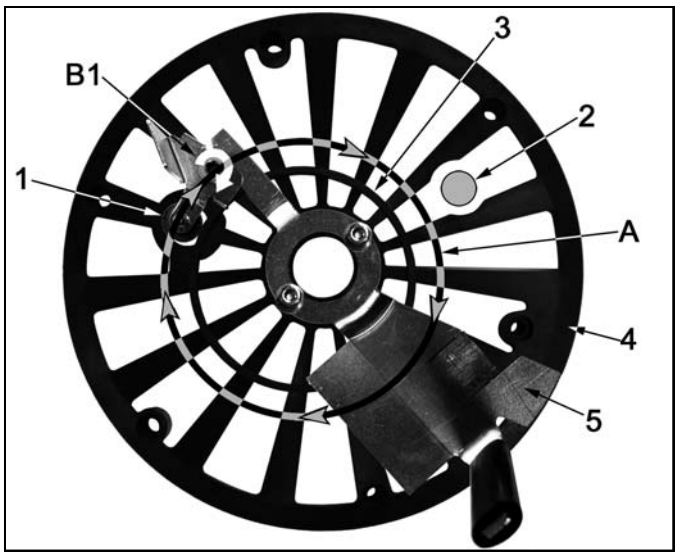


Fig. 14 Switching parts of the low-level control for grease (when reservoir is filled) B-P603S-030a08

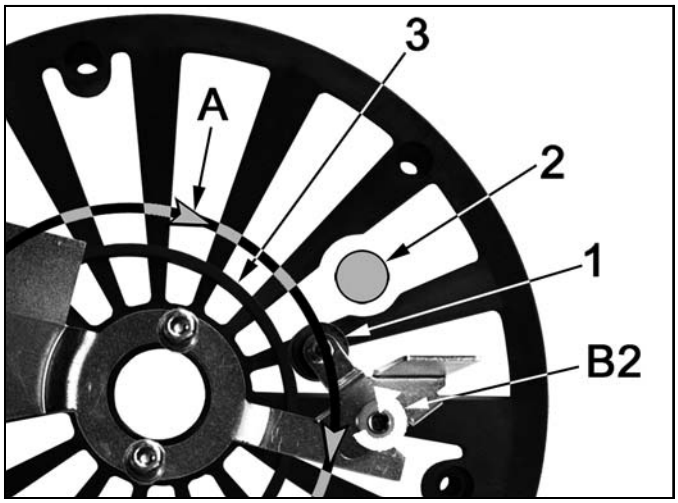


Fig. 15 Switching parts of the low-level control for grease B-P603S-030b08

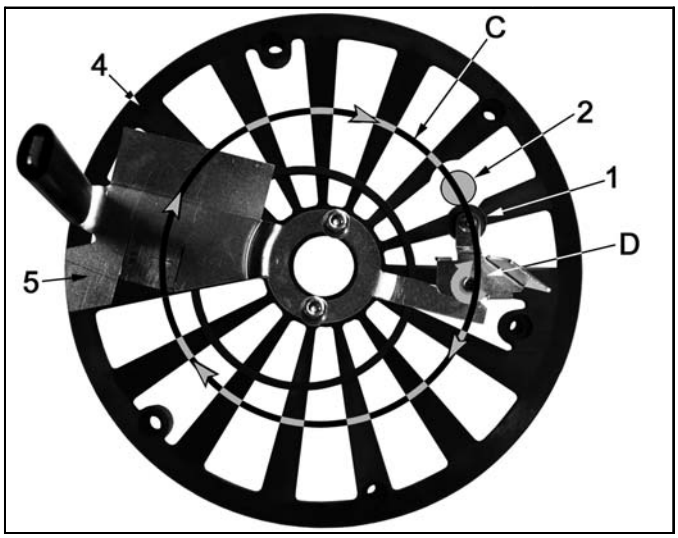


Fig. 16 Switching parts of the low-level control for grease (when the reservoir is empty) B-P603S-030c08

Low-level control for reservoirs with stirring paddle

Grease reservoir full

- The stirring paddle 5 (Fig. 14) rotates **clockwise** during the lubricating time. Thereby, the pivoted guide plate is deflected by the eccentric 3 and the round solenoid 1 (B1).
- In the further course of the eccentric guide 3 the deflected guide plate B1 is turned in again by the backpressure of the lubricant (B2).
- Thus the round solenoid 1 moves on the inner course A, so that a contact-free activation of the magnetic switch 2 **can not** happen.

1 - Guide plate with round solenoid
2 - Solenoid switch
3 - Eccentric guide on intermediate bottom
4 - Intermediate bottom
5 - Stirring paddle

A - Inner course of the round solenoid
B1 - Position of the guide plate (deflected)
B2 - Position of the guide plate (turned in)

Grease reservoir empty

- As soon as there is no lubricant to counteract against the deflected guide plate, the guide plate remains in the deflected condition B1 (Fig. 14) respectively D (Fig. 16).
- The round solenoid 1 can ride over the magnetic switch 2 on the outer course C and activate it contact-free.
- A low-level signal is triggered.

1 - Guide plate with round solenoid
2 - Magnetic switch
3 - Eccentric shaft on intermediate bottom
4 - Intermediate bottom
5 - Stirring paddle

C - Outer course of the round solenoid
D - Position of the guide plate (deflected)

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Mode of Operation, continuation

Membrane Keypad

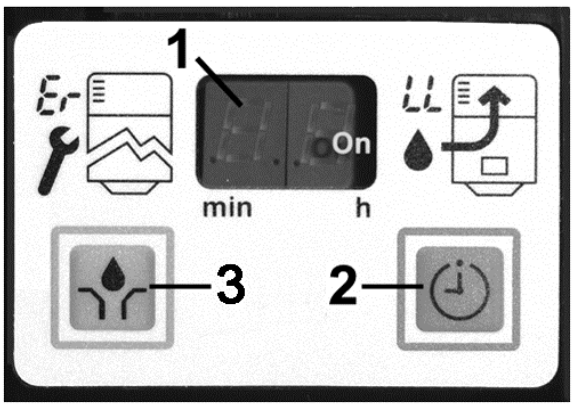


Fig. 17 P603 S membrane keypad

1 - Display
2 - Key for acknowledgment of fault indications and setting of time (shift key)
3 - Key for triggering an additional lubrication and for setting the time values (setting key)

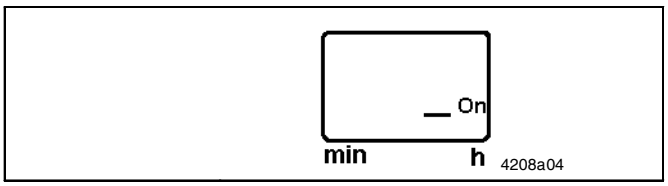


Fig. 18 Green segment right, supply voltage switched on

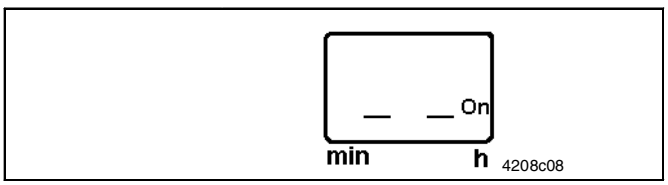


Fig. 19 Green segment left,
Machine contact/ ignition switched on

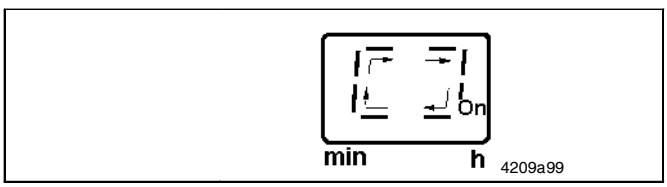


Fig. 20 Green circulating illuminated segment (clockwise), lubricating time

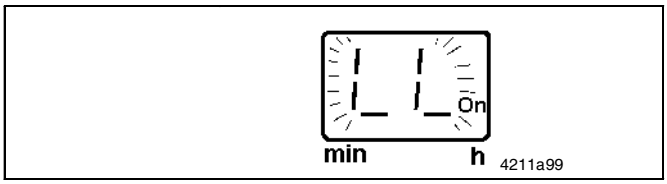


Fig. 21 Display of a low-level indication

Display of the membrane key pad

Operation

- As soon as voltage is applied (On), the lower right-hand segment in the display window flashes (fig. 18).
- As soon as contact 15 [1] (e. g. ignition in vehicles, or machine contact) is connected, the left-hand segment in the display window lights up (fig. 19). The pause time lapses.

[1] see connection diagrams

6001a02

IMPORTANT

The pump's voltage supply may be interrupted only after depressurization of the single-line system.

– ***Mobile application:*** *If contact 15 [2] (e. g. ignition switch) is interrupted, the lubricating cycle already started is interrupted and the single-line system is relieved.*
– ***Industrial application:*** *If contact 15 [2] (e. g. machine contact) is interrupted, the lubricating cycle already started will be completed including pressurization and relief.*

[2] The supply voltage (terminal 30) is still applied.

- While the pump motor is running, in the display window of the membrane keypad there appears a circulating light segment (fig. 20).

Low-level control

- In the case of a low-level signal, in the display of the membrane keypad, *** LL *** (fig. 21) will appear as a flashing signal.

6001a02

IMPORTANT

If a low-level signal occurs during the lubricating time, the current operating cycle will still be completed. However the pump does not switch on automatically any more. It can only be switched on again via an additional lubrication cycle.

- If during the pause time the machine contact/ ignition is interrupted, after reconnecting the supply voltage the pause time continues from where it had been interrupted.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Mode of Operation, continuation

Display of the membrane key pad, continuation

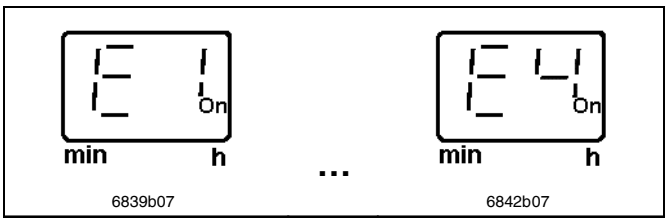


Fig. 22 Display of poss ble malfunctions

Malfunctions

6001a02

IMPORTANT

*If a malfunction is present, *** E1 ***, *** E2 ***, *** E3 *** or *** E4 *** will be displayed as flashing lights. The pump does not switch on automatically any longer. It can only be triggered via an additional lubrication cycle.*

- If there is no feedback from the pressure sensor or switch within the monitoring time from completion of the pause time or from triggering an additional lubrication, the pump switches off immediately. One of the fault signals *** E1 *** to *** E4 *** (Error, fig. 23 to 26) will be displayed as a flashing light in the display of the membrane key pad.

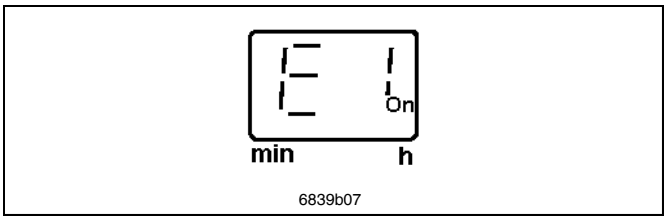


Fig. 23 Display of the malfunction E1

Monitoring time of pressure sensor or switch **1** (internal):

- no pressurization
- Monitoring time exceeded

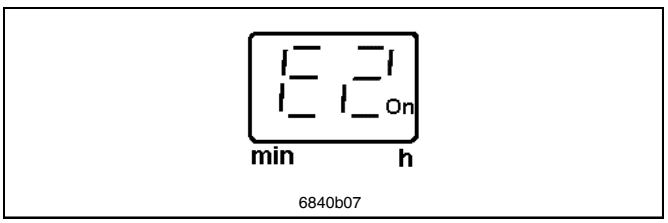


Fig. 24 Display of the malfunction E2

Monitoring time of pressure sensor or switch **2** (external):

- no pressurization
- Monitoring time exceeded

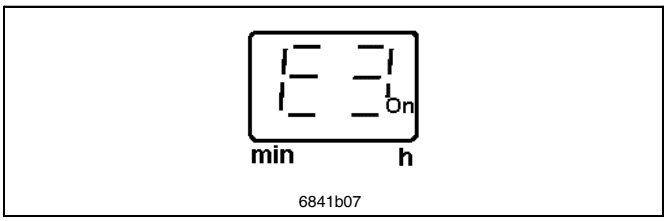


Fig. 25 Display of the malfunction E3

Monitoring time of pressure sensor or switch **1** (internal):

- no depressurization
- Relief time (10 sec) exceeded

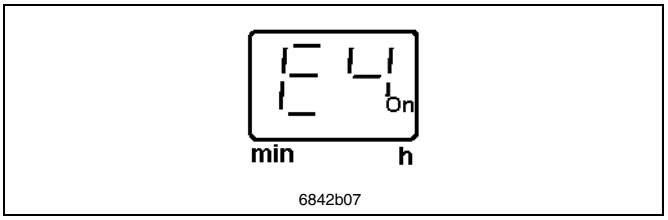


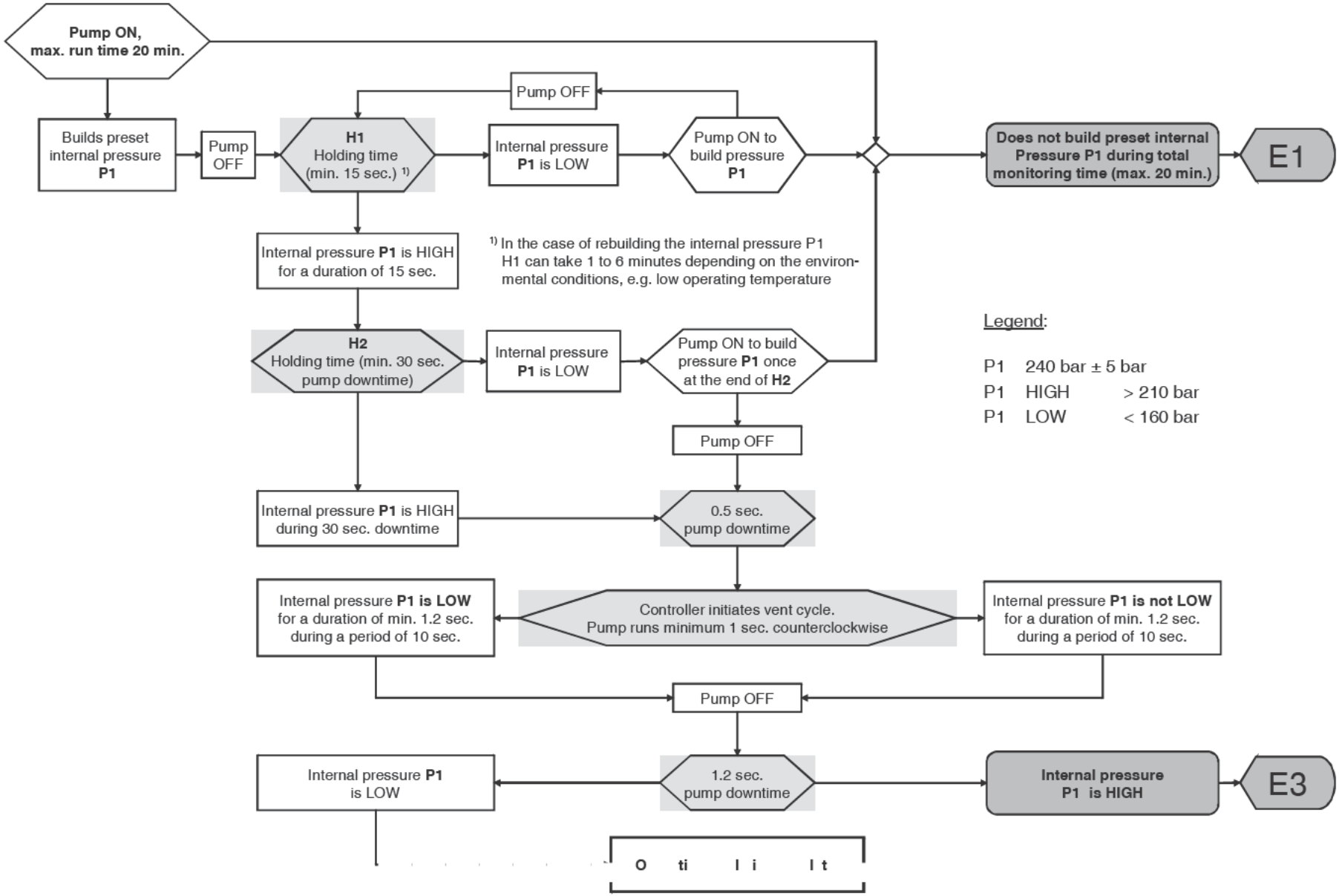
Fig. 26 Display of the malfunction E4

Monitoring time of pressure sensor or switch **2** (external):

- no depressurization
- Relief time (10 sec) exceeded

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

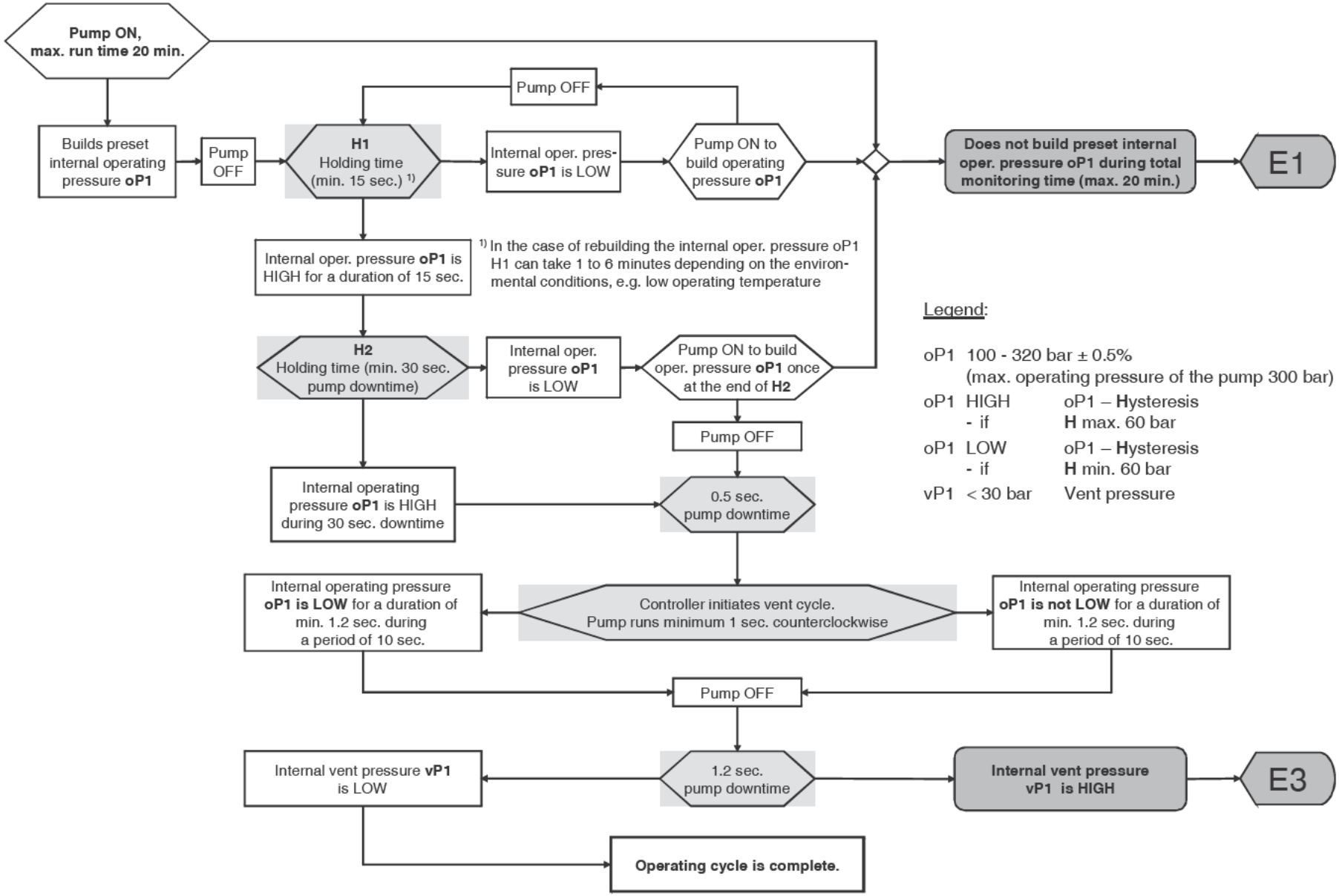
P603S version with only internal pressure switch



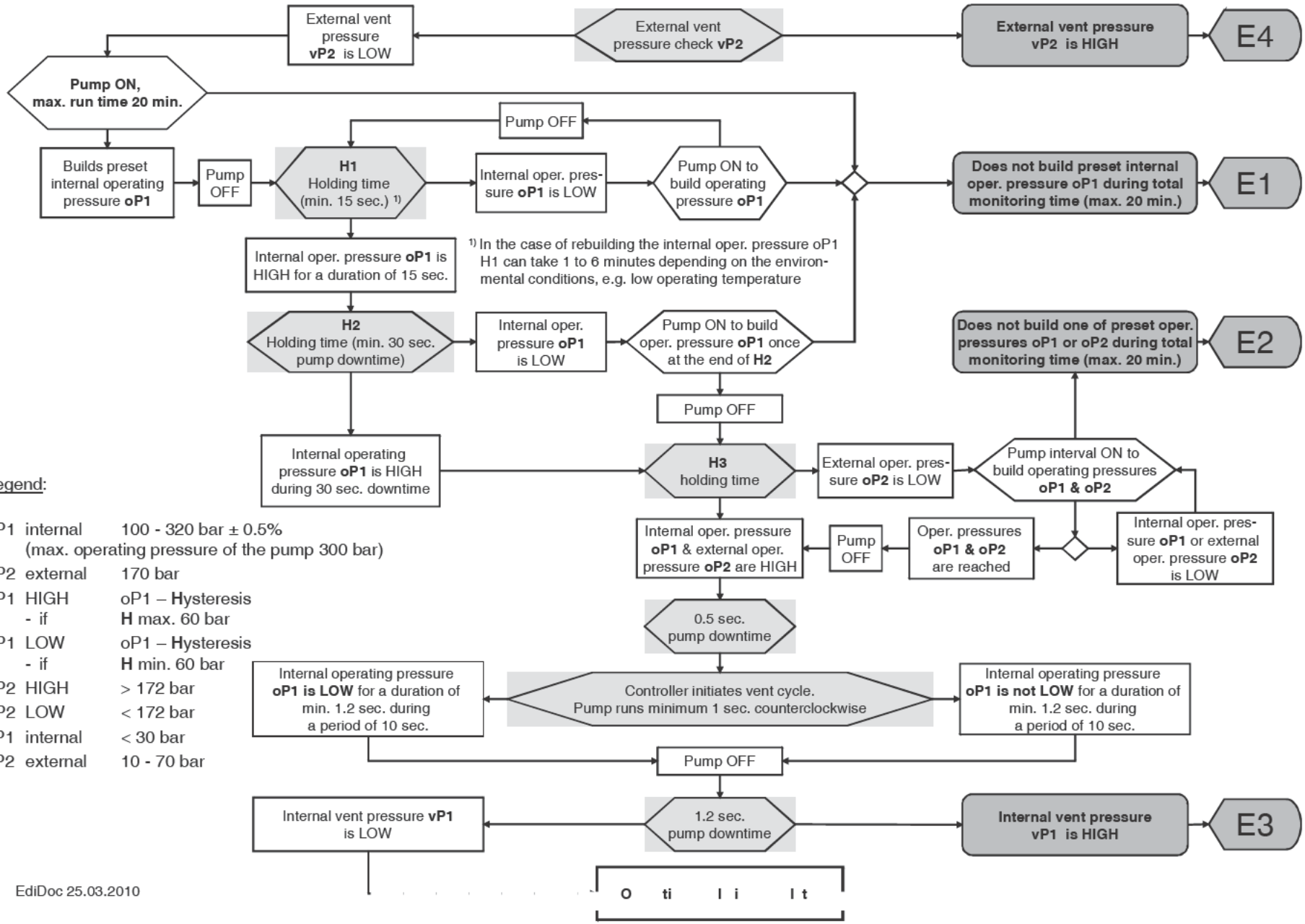
SKF Lubrication Systems Germany GmbH • Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 • Fax: +49 (0) 6227 33-259

Mode of Operation, continuation

P603S version with only internal pressure transducer



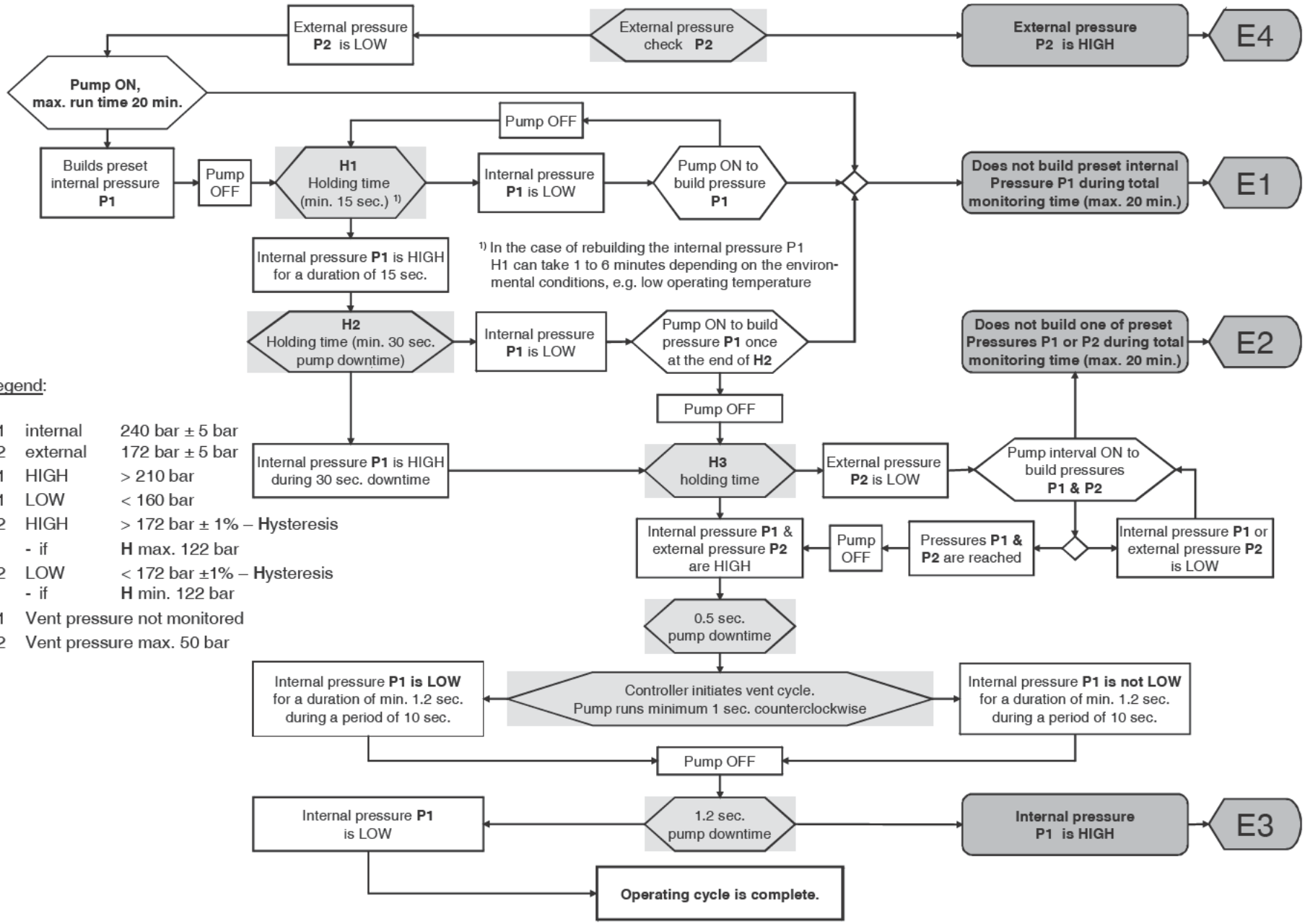
P603S version with internal and external pressure transducer



Legend:

oP1	internal	100 - 320 bar ± 0.5% (max. operating pressure of the pump 300 bar)
oP2	external	170 bar
oP1	HIGH - if	oP1 – Hysteresis **H** max. 60 bar
oP1	LOW - if	oP1 – Hysteresis **H** min. 60 bar
oP2	HIGH	> 172 bar
oP2	LOW	< 172 bar
vP1	internal	< 30 bar
vP2	external	10 - 70 bar

P603S version with internal and external pressure switch



Legend:

P1	internal	240 bar ± 5 bar
P2	external	172 bar ± 5 bar
P1	HIGH	> 210 bar
P1	LOW	< 160 bar
P2	HIGH	> 172 bar ± 1% – Hysteresis
	- if	H max. 122 bar
P2	LOW	< 172 bar ±1% – Hysteresis
	- if	H min. 122 bar
P1	Vent pressure not monitored	
P2	Vent pressure max. 50 bar	

Subject to modifications

Mode of Operation, continuation

Multifunctional Pushbutton

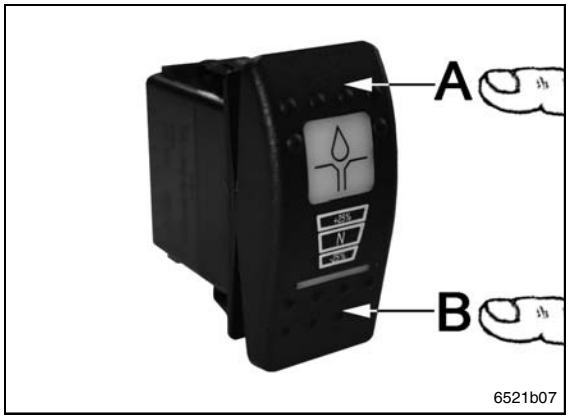


Fig. 27 Multifunctional Pushbutton
- 12 VDC ..... part no. 236-10580-5
- 24 VDC ..... part no. 236-10280-9

Trigger additional operating cycles externally


6001a02

NOTE

To change the setting from mobile "M" to stationary "S" applications, see chapter "Jumper Configuration".

- In the case of mobile applications it is possible to trigger additional lubrication cycles externally by pressing the multifunction pushbutton (fig. 27):
  - Mobile "M" without ignition ..... up to two times
  - mobile "M" with ignition ..... infinite

➲ Press upper pushbutton A (fig. 27) min. 2 seconds.


6001a02

IMPORTANT

If the single-line system is still under pressure a depressurization can be triggered manually with the button.

- In the case of stationary applications, it is possible to trigger additional lubrication cycles externally several times.

➲ To trigger an additional lubrication cycle press the pushbutton > 2 seconds.

Function display

- Lubrication and hold time: ..... green LED, top
- Fault signals (malfunctions & low-level signals)
  - factory setting ..... red LED, bottom
- Fault signals (differentiation, see P5, fig. 34)
  - Low-level signal ..... red flashing LED, bottom
  - Malfunction..... red flashing LED, bottom

➲ Press bottom pushbutton B (fig. 27) in order to confirm fault signals. However, this is not compulsory. Confirmed fault signals that have not been remedied, will become active again when switching on the ignition.

Adjustment of the lubricant volume ± 25 %


6001a02

IMPORTANT

To activate this function, set the jumper to the „mobile (M)" position (S/B01-S/B04, see chapter "Jumper Configuration").


6001a02

NOTE

The adjustment of the lubricant volume by ± 25 % is achieved by modifying the pause time:

- *Increasing of the **lubricant volume (+ 25 %)** by shortening the pause time*
- *Reduction of the **lubricant volume (– 25 %)** by extension of the pause time*

➲ **Press A** + upper pushbutton (fig. 27):
… to increase lubricant volume by ..... + 25 %

➲ **Press B** – lower pushbutton (fig. 27):
… to reduce the lubricant volume by ..... – 25 %

➲ Switch ignition on while pushbutton is activated (A or B):
A + 25 % ..... upper LED shortly lights up **green**
B – 25 % ..... lower LED shortly lights up **red**

➲ As soon as you release the pushbutton, the adjustment will be completed.

- The adjustment will remain active only until ignition is switched off again. Then the adjustment will be cancelled.
- The increase of the lubricant output is represented in the display of the membrane keypad shortly by " 25 ", then by the right-hand decimal point " – – **.**" (fig. 28):

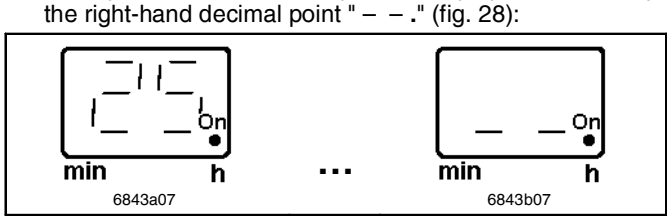


Fig. 28 Display + 25 % increased lubrication (A)

- Reduction of the lubricant output is represented in the display of the membrane keypad shortly by " 75 ", then by the left-hand decimal point "**.** – – " (fig. 29):

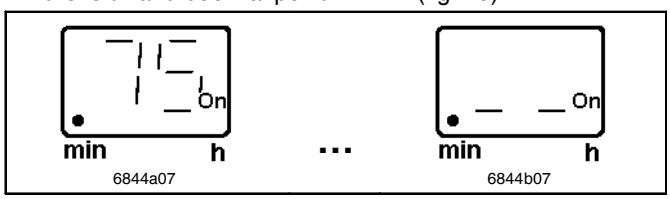


Fig. 29 Display – 25 % reduced lubrication (B)

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation

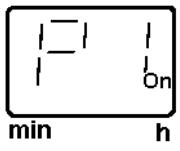
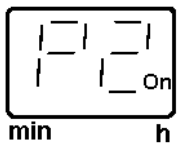
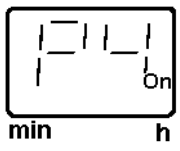
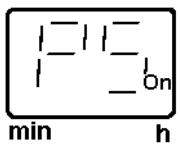
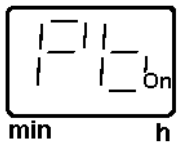
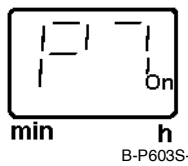
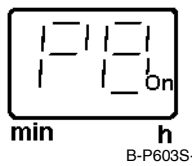
Factory Settings


6001a02

NOTE

- CC Cycle Control
- TC Time Control
- 2S 2 Pressure Sensors or switches (Qty)

see chapter "Jumper Configuration"

Programming steps	Factory Settings		Description			Page
 4215a99	**CC** **00**	**TC** **06**	Pause time CC: TC:	00 06	CC: factor x 100 / TC: hours 0 pulse 6 hours	32/33
 4217a99	**CC** **10**	**TC** **00**	Pause time CC: TC:	10 00	CC: factor 1 / TC: minutes 10 pulses 0 minute	32/33
 6252b04	**no** **nc**		Signal output of the fault relay Signalizing during the low-level or failure signal (ON): - no for reservoirs with stirring paddle - nc for reservoirs with follower plate			34
 6255b04			Differentiation external fault signal: no (P4) - Setting of signals …….. normally open - Low-level control (LL) …… intermitting signal - Malfunction (E1–E4) …….. permanent signal			35
 4299a00	**SP**		Start phase SP Start with pause time			36
 B-P603S-030e08	1S & 2S **24**		**Only** with internal pressure sensor! (pressure switch: operating pressure fix) 24 Operating pressure ("24"corresponds to 240 bar)			37
 B-P603S-030f08	2S **03**		**Only** with external pressure sensor (optional) 03 admissible residual pressure ("03" corresponds to 30 bar)			38

Operator Keys

Key	Function		Key	Function
 4222a99	**Key for modifying the parameters in the programming step**		 4214a99	**Key for switching to the next programming step**

Fig. 30 Functions of the operator keys in the programming mode (see fig. 32 to 39)

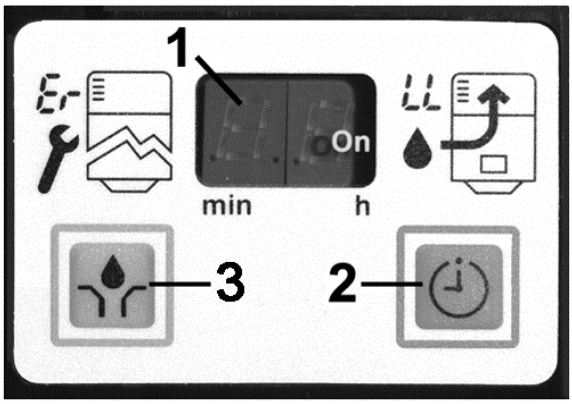
SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Three possible modes of operation and settings can be selected on the keypad.

- **Display mode**
- **Programming mode (fig. 32 ff)**
- **Operating mode (fig. 40 & 41)**

Display Mode

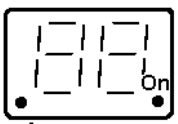


4360b07

- **In the display mode** the user receives information on functions and malfunctions.
- As soon as voltage is applied to the pump, the keypad is automatically in "**display mode**". The **right-hand segment** is illuminated on the display.
- Normally, the display is dark. Only the functions (segment, rotating segment display) or malfunctions (* **E1 * to * E4 * & * LL ***) are displayed.

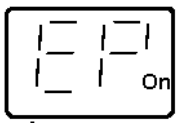
1 - Display
2 - Operator key to acknowledge malfunctions and for time setting (shift key)
3 - Operator key to trigger an additional operating cycle (setting key)

Display

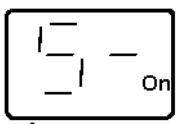


4207a99 2 sec.

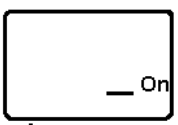
- A test display is made when voltage is applied: all segments and decimal points are illuminated for 2 seconds.



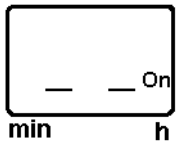
4227a99



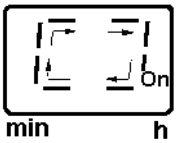
B-P653-030b09



4208a04



4208c08



4209a99

NOTE

*If *** EP *** is displayed after the display test, this indicates that the button or the keypad is defective.*

6001a02

When power is applied to the pump the display will indicate if a pressure switch or pressure transducer is connected to the pump. The example indicates an internal pressure switch. There are four possibilities:

S– Internal pressure switch	**T–** Internal pressure transducer
SS Internal and external pressure switch (must be connected)	**TT** Internal and external pressure transducer (must be connected)

- When switching on the supply voltage, the right-hand segment in the display is lit.
- **In the display mode** the two segment displays (On) are visible during pause time and if the machine contact/ ignition is switched on. As soon as another message is displayed, the segments turn off.
- The lubricating time is displayed as a rotating segment.

Fig. 31 Display Mode (continuation next page)

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Display Mode, continuation

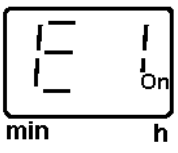
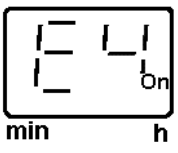
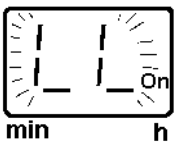
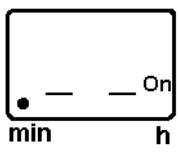
Press	Display	
	 6839b07	· **In the display mode**, * **E1** *, * **E2** *, * **E3** * or * **E4** * is displayed for a malfunction that had not been confirmed.
	 6842b07	
	 4211a99	· **In the display mode**, * **LL** * is displayed for a low-level signal that had not been confirmed.
 < 2 sec. 4214a99		<u>To acknowledge a malfunction</u>: · The flashing display changes into continuous light by pressing the button **(acknowledging).** To **acknowledge**, press the button only briefly (< 2 sec.). · Acknowledging receipt of a malfunction is not forcingly required. If acknowledging a malfunction, however, make sure that the cause of the malfunction has been remedied before. Otherwise the signal lamp will flash again, as soon as the supply voltage has been switched off and on again. - Fault indication as normally closed contact „nc“: P4 (see fig. 34) After the start-up the signal lamp is on and turns off in case of a malfunction. Upon acknowledging receipt of the fault, the signal lamp will turn on again. - Fault indication as normally open contact „no“: P4 (see fig. 34) After the start-up the signal lamp is off and turns on in case of a malfunction. Upon acknowledging receipt of the fault, the signal lamp will turn off again.
	 6843b07	<u>Adjustment of lubricant volumes</u>: · Lubricant volumes can be adjusted (see fig. 27) by pressing the multifunctional pushbutton and switching on the ignition.
	 6844b07	· Right point display for adjusted increased lubrication (+ 25 %) by reduction of pause time. · Left point display for adjusted reduced lubrication (– 25 %) by extension of pause time.

Fig. 31 Display mode

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Programming Mode, time-controlled

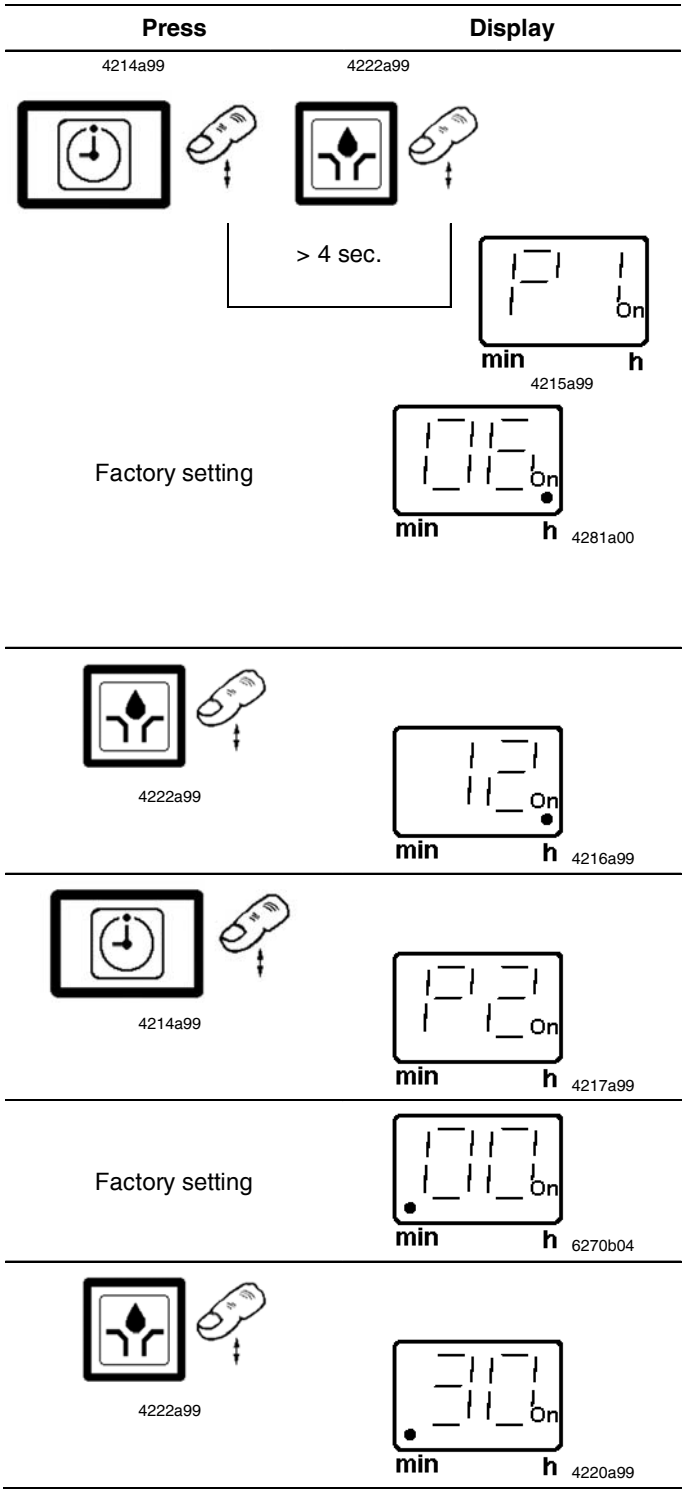


Fig. 32 Programming Mode, time-controlled (continuation fig. 34 … P4)

Setting of Pause Time P1 and P2

➲ To access to the programming mode, **press both buttons** at the same time **> 4 seconds**, so that "P1" appears in the display (autom. abort in 30 seconds).

Time Control (TC)


6001a02

IMPORTANT

To activate the time control, the jumper must be positioned at "Time (TC)" (S01-S/B04 & S/B13-S20, see chapter "Jumper Configuration").

Programming options:	Pause time:
- P1	0 - 59 hours
- P2	0 – 59 minutes
- Min. pause time	4 minutes
- Max. pause time	59 hours 59 minutes

Setting of hours

When releasing the two buttons, the currently set value appears.
Expl.: factory-set value …….…….. 6 hours
The field "hour" is indicated by a **decimal point** on the **right-hand side**.

➲ Press button (autom. abort in 30 seconds).

➲ Settings are made into one direction:
…… 0, 1, 2, 3,....59 hours
Button pressed once ..... increase by 1 hour
Button pressed continuously ..... quick sequence
Expl.: ……..…… 12 hours

P2: Setting minutes

➲ Press button, so that "P2" appears in the display (autom. abort in 30 seconds).

When releasing the button, the currently set value appears.
Expl.: factory-set value …… 0 minutes
The field "minute" is indicated by a **decimal point** on the **left-hand side**.

➲ Press button (autom. abort in 30 seconds).

➲ Settings are made into one direction:
…… 0, 1, 2, 3, 4, 5, ... 59 min
Button pressed once ..... increase by 1 minute
Button pressed continuously ..... quick sequence
Expl.: ……..… 30 minutes


6001a02

HINWEIS

*The minimum pause time is 4 minutes. For settings < 4 respectively < 20 minutes (without input of hours) there automatically appears "**. 04**" in the display. Precondition: Programming sequence has been completed (see fig. 39).*

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Programming Mode, cycle-controlled

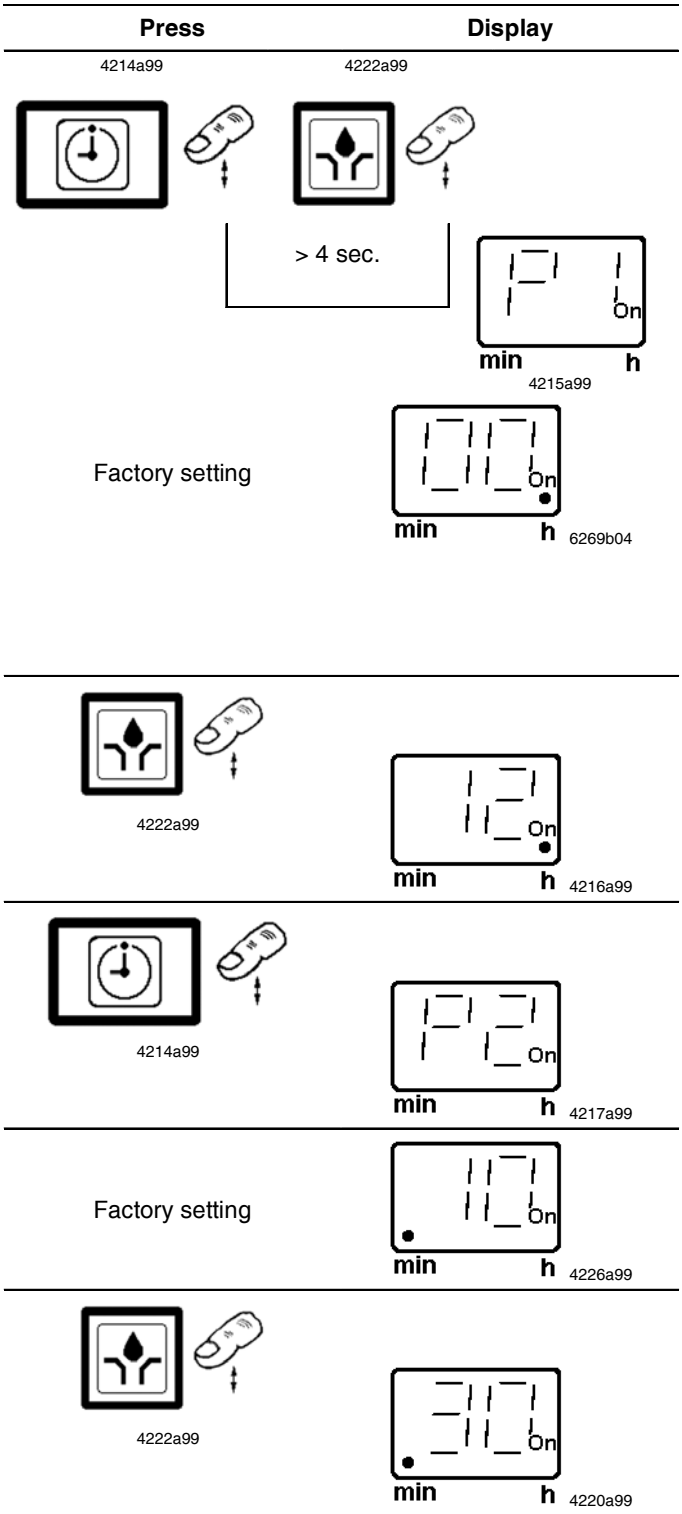


Fig. 33 Programming Mode, cycle-controlled
(continuation fig. 34 … P4)

Setting of Pulses (Pause Time P1 and P2)

➲ To access to the programming mode, **press both buttons** at the same time **> 4 seconds**, so that “P1” appears in the display (autom. abort in 30 seconds).

Cycle Control (CC)


6001a02

IMPORTANT

To activate the cycle control, the jumper must be positioned at “Cycle (CC)” (S/B05-S/B12, see chapter “Jumper Configuration”).
In the case of mobile applications (S/B01-S/B04) a pulse control is not possible.
Minimum length of pulse …….…….. 200 ms

Programming options:	Pulses (pause time):
- P1	0000 - 9900 pulses
- P2	00 - 99 pulses

P1: Set pulses (factor 100)
When releasing the two buttons, the currently set value appears.
Expl.: factory-set value: ……. 00 pulses x 100
The field "Pulses **x 100"** is indicated by a **decimal point** on the **right-hand side**.

➲ Press button (autom. abort in 30 seconds).
➲ Settings are made into one direction:
……..……..... 00, 01, 02, 03, ... 99 pulses x 100
Button pressed once ……..... increase by 100 pulses
Button pressed continuously ..... quick sequence
Expl.: ……..…….. 1200 pulses

P2: Set pulses (factor 1)
➲ Press button, so that “P2“ appears in the display (autom. abort in 30 seconds).

When releasing the button, the currently set value appears.
Expl.: factory-set value: ……..…….. 10 pulses
The field "**Pulses x 1"** is indicated by a **decimal point** on the **left-hand side**.

➲ Press button (autom. abort in 30 seconds).
➲ Settings are made in one direction:
……..... 00, 01, 02, 03, ... 99 pulses
Button pressed once ……..... increase by 1 pulse
Button pressed continuously ……..... quick sequence
Expl.: …… 30 pulses

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Programming Mode, Signal Output of Fault Relay

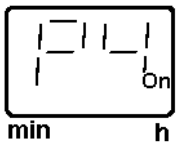
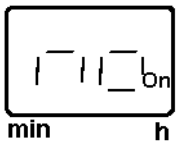
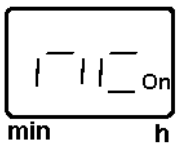
Press	Display	
 4214a99		**P4: Programming of the output signal on the monitoring relay (potential-free contact)** ➲ Press button so that “P4“ appears in the display (autom. abort in 30 seconds).
	 6252b04	
Factory setting in the case of a low-level signal with stirring paddle "no" normally open	 6254b04	When releasing the button, the currently set value appears in the display.
 4222a99		➲ Press button (autom. abort in 30 seconds).
Factory setting in the case of a low-level signal with follower plate "nc" normally closed	 6253b04	The external fault contact is modified by programming it as **NC** **n**ormally **c**losed contact.

Fig. 34 Programming Mode, signal output of fault relay (continuation next page … P5)

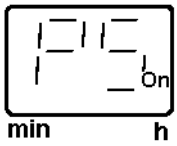
SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Programming Mode, Signal Output of Fault Relay, continuation

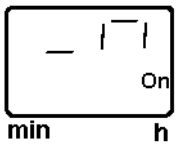
Press	Display

4214a99

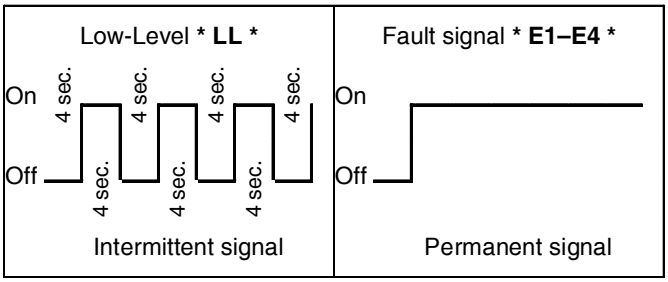


6255b04

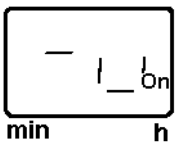
Factory setting
"no" normally open



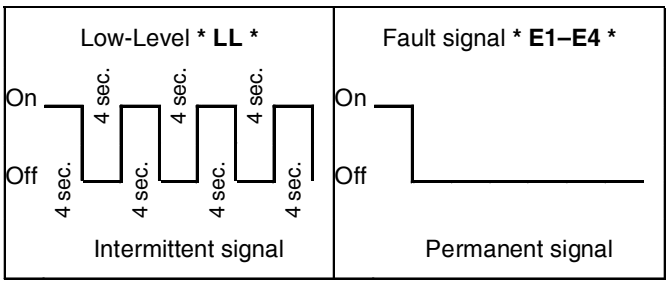
6257b04



"nc" normally closed



6258b04



4222a99

Differentiation OFF

6256b04

Fig. 35 Programming Mode, signal output of fault relay
(continuation next page … P6)

P5: Program external display for fault indications

➲ Press button so that “P5“ appears in the display (autom. abort in 30 seconds).

When releasing the operating key there appears the display symbol “external fault no".
The signal on the monitoring output for the external fault signal “**P4**“(see fig. 34) is set as a normally open contact (**no**).

Then, low-level signals are visible as intermittent signals and functional faults have priority as permanent signals (On), where by functional faults have priority.

If the signal on the monitoring output for external fault signals “**P4**“ (see fig. 34) has been set as normally closed contact (**nc**), there appears the display symbol “external fault nc”.

Then, low-level signals are visible as intermittent signals and functional faults have priority as permanent signals (Off).

Differentiation external fault signal

➲ Press key to on or off the differentiation of the external fault signal (autom. abort in 30 seconds):

- ON (factory setting)
  - Low-level ……..…….. intermittent signal
  - Fault signal …… permanent signal
- OFF
  - Low-level & Fault signal …… permanent signal

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Programming Mode, start phase

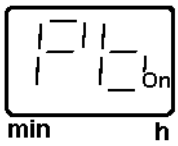
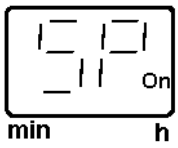
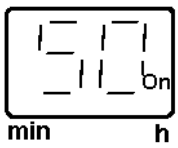
Press	Display
 4214a99	
	 min h 4299a00
Factory setting	 min h 6259b04
 4222a99	
	 min h 6260b04

Fig. 36 Programming mode, start phase

P6: Program start phase

Pre-selection for starting pause or lubrication time

➲ Press button, so that “P6“ will appear in the display (autom. abort in 30 seconds).

The pump is set as a standard to start with a pause time **SP** (**Start Pause time**).

➲ Press button (autom. abort in 30 seconds).

Each time the pump is switched on, it will start with the lubricating time **SO** (**Start Operation**). The preset pause time will be valid when the first lubricating time has lapsed.

Programming Mode, Operating Pressure

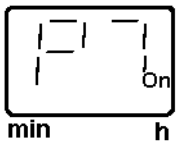
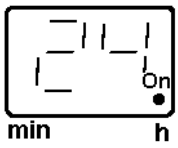
Press	Display
 4214a99	
	 min h B-P603S-030e08
Factory setting	 min h B-P603S-030g08
 4222a99	

Fig. 37 Programming Mode, Operating Pressure

P7: only with internal pressure sensor

Pre-selection of the operating pressure

➲ Press pushbutton so that “P7” will appear in the display (autom. abort in 30 seconds).

When releasing the pushbutton the currently set value will be displayed.

Example: factory-set value …….. 24 (for 240 bar)

➲ Press the pushbutton to increase the operating pressure in steps of 10 bar (autom. abort in 30 seconds):
Setting range …..…….. 10 to 32 (Factor 10)
for ……... 100 to 320 bar

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Programming Mode, relief pressure

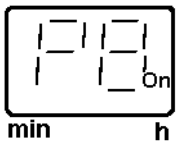
6001a02

IMPORTANT

To activate the external pressure sensor, jumper position "2S" is required (S/B02, 04, 07, 08, 11, 12, 15, 16, 19 & 20, see chapter "Jumper Configuration").

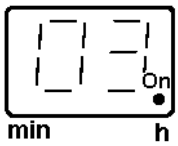
Press	Display

4214a99



B-P603S-030f08

Factory setting



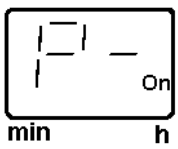
B-P603S-030h08

4222a99

Fig. 38 Programming Mode, Relief Pressure

Completing the programming

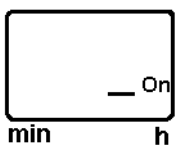
4214a99



4221a99

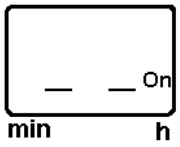
4222a99

Display without ignition



4208a04

Display with ignition



4208c07

Fig. 39 Completing the programming

P8: only with external pressure sensor

6001a02

NOTE

Program step P8 will be displayed automatically if an external pressure sensor has been detected.

Pre-selection of the relief pressure

➲ Press pushbutton so that "P8" will appear in the display (autom. abort in 30 seconds).

When releasing the pushbutton the currently set value will be displayed.

Example: factory-set value …… 03 (for 30 bar)

6001a02

IMPORTANT NOTE

Adapt this setting by taking the relief pressure of the connected injectors as a basis.

➲ Press the pushbutton to increase the relief pressure in steps of 10 bars (autom. abort in 30 seconds):
Setting range ……..…... 01 to 07 (factor 10)
for …….. 10 to 70 bar

➲ Press button. **„ P -"** is displayed (end of programming).

6001a02

IMPORTANT

In order to avoid a wrong program, make sure to always carry out the programming order completely, i. e. setting from P1 (hours / pulses x 100) to P– (programming end).

· Press this key to complete the programming and to save the entered parameters.

6001a02

NOTE

Autom. abort in 30 seconds:

If the button "additional lubrication" is not pressed within 30 seconds, the changed parameters will not be saved and the previous programming remains valid.

IMPORTANT

After completion of the programming, check the parameter settings in the operating mode once again (see fig. 40).

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Setting and Operation, continuation

Operating Mode, additional lubrication

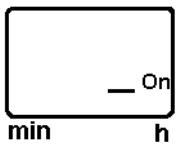
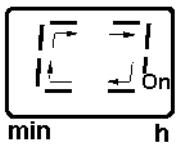
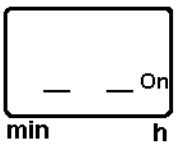
Press	Display
Display with ignition switched off	 4208a04
 > 2 sec. 4222a99	 4209a99
Display with ignition switch switched on	 4208c07

Fig. 40 To trigger an additional lubrication

Operating Mode, calling up

Press	Display
 4214a99	

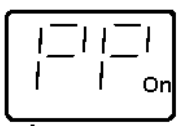
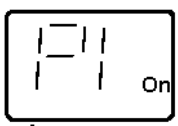
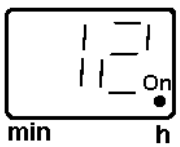
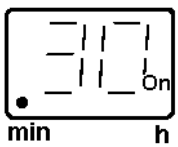
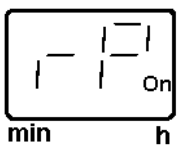
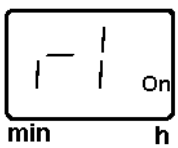
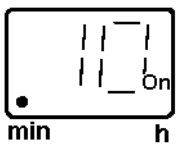
Display	
after two sec.  4223a99	after two sec.  6858b07
after two sec.  4216a99	after two sec.  4220a99
after two sec. with TC (Time Control)  4224a99	with CC (Cycle Control)  6859b07
after two sec.  4225c07	after two sec.  4226a99

Fig. 41 Operating Mode (continuation next page)


6001a02

IMPORTANT

The operating mode is accessible only during the pause time, and cannot be operated during the running time (pump lubricating time).

- Precondition: When voltage is applied, the segment (On) is lit.

Triggering an additional operating cycle

Without ignition ..... max. 2 times
With ignition ..... unlimited

➲ Press the button (> 2 sec.). The elapsed pause time is reset. The lubricating time starts. A rotating segment is visible on the display during the whole operating time.


6001a02

IMPORTANT

If the single-line system is still under pressure a depressurization can be triggered manually with the button.

Operating option: Calling up of set parameters and data determined

Here: Display of the factory setting

➲ Press the button.

PP / PI set pause time


6001a02

NOTE

*The following display sequence is shown **once** and is cancelled after 40 seconds. The change of display occurs every two seconds. Example:*

Time Controlled TC (see fig. 32):
PP = 06h 00 min **rP = 5h 10 min**
Cycle Controlled CC (see fig. 33):
PI = 0010 pulses **rI = 510 pulses**

12 . TC: 12 hours / CC: 1200 pulse (factor 100)
. 30 TC: 30 minutes / CC: 30 pulses (factor 1)

rP remaining pause time
or
rI remaining pulses

05 . TC: 5 hours / CC: 500 pulses (factor 100)

. 10 TC: 10 minutes / CC: 10 pulses (factor 1)

Setting and Operation, continuation

Operating Mode, continuation

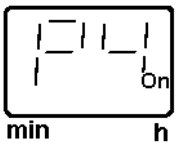
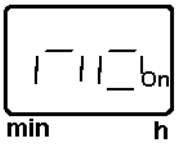
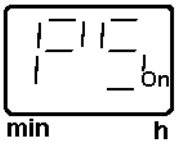
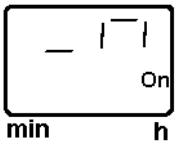
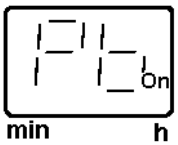
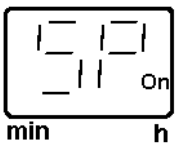
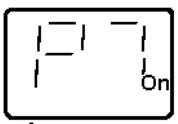
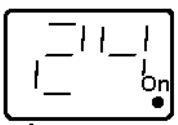
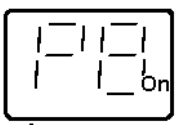
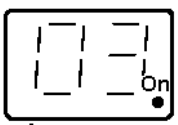
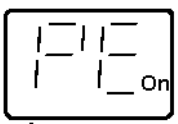
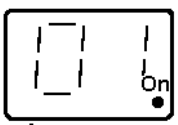
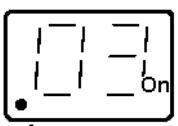
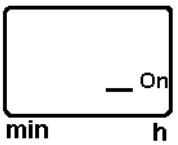
Display		
after two sec.  6252b04	after two sec.  6254b04	**P4** Programming of the output signal **no** Display of the output signal “normally open“ (no) - in the case of low-level signal with stirring paddle
after two sec.  6255b04	after two sec.  6257b04	**P5** Differentiation between low-level signal and fault signal Differentiation active (malfunction / low-level)
after two sec.  4299a00	after two sec.  6259b04	**P6** Programming of the start phase **SP** Display of the start phase with “start pause time“ (SP)
after two sec.  B-P603S-030e08	after two sec.  B-P603S-030g08	**P7** Pre-selection of the operating pressure **24 .** Display of internal operating pressure 240 bar
after two sec.  B-P603S-030f08	after two sec.  B-P603S-030h08	**P8** Pre-selection of the relief pressure **03 .** Display of external operating pressure 30 bar - P8 only with external pressure sensor
after two sec.  B-P603S-030i08	after two sec.  B-P603S-030k08	**PE** Program edition (Example 01.03) **01 .** Program main version
after two sec.	 B-P603S-030m08	**. 03** Program sub-version
after approx. 40 sec.  4208c08	 4208a04	Termination of the operating mode _ _ - with ignition or _ - without ignition

Fig. 41 Operating Mode

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Maintenance, Repair and Tests

Maintenance

- The maintenance is essentially limited to refilling the reservoir with clean lubricant in good time. However, check regularly whether the lubricant is really dispensed to all the lubrication points.
- Also check the main lines and lubricant feed lines for damage and replace them, if necessary.

How to fill the pump

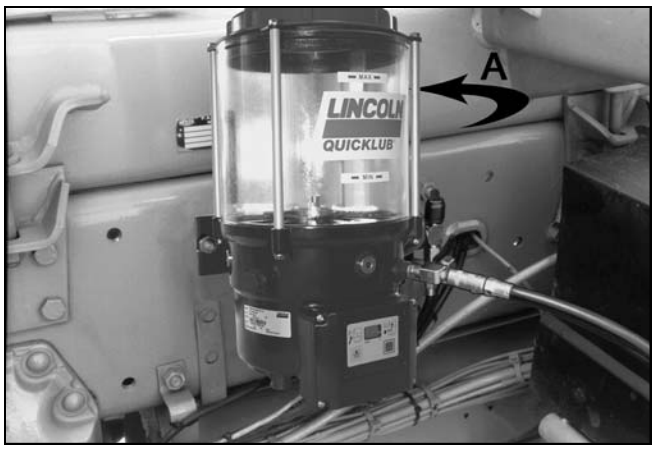


Fig. 42 Filling of P603S reservoir (from bottom via filler fitting) B-P603S-040b09

A - Vent bore

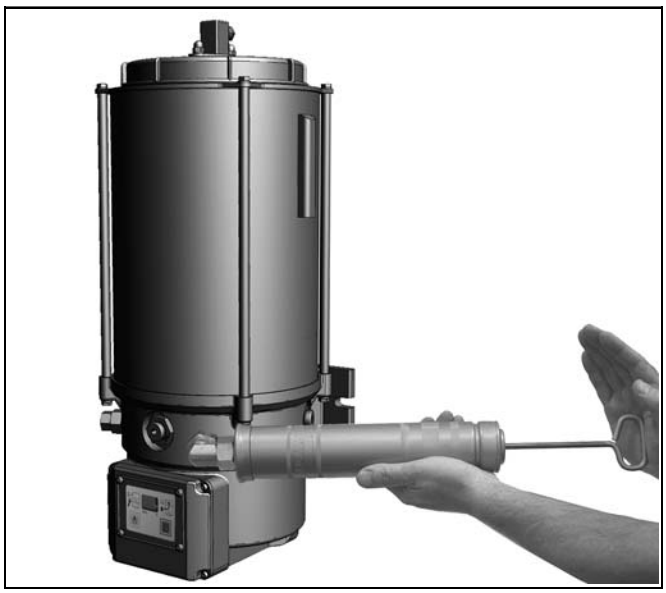


Fig. 43 Manual filling of P603 S reservoir (from bottom via filler fitting) B-P603S-040c09

6001a02

NOTE

Whenever work is done on the centralized lubrication system, particular attention should be paid to absolute cleanliness. Dirt in the system will cause problems.

- For cleaning the system use benzine or petroleum. Do not use tri-, perchloroethylene or similar solvents.
  Also do not use polar organic solvents such as alcohol, methylacohol, acetone or similar.

➲ Fill reservoir via filler fitting or via filling port from top up to the “Max.” marking.
As an alternative, instead of the filler fitting also other connections (R 1/8 “) can be used for filling.

➲ It is possible to use greases up to penetration class NLGI 2.

- Each time the reservoir has been refilled, make sure that the pump supplies lubricant.

6001a02

IMPORTANT

When filling the reservoir, vent bore A must not be closed:
- in order to enable the escape of air
- in order not to impede the proper suction behaviour of the pump during operation

6001a02

IMPORTANT

The grease or oil must be free from impurities and must not be liable to change its consistency in the course of time.

6445b05

CAUTION!

Danger of squeezing in case of pumps to be filled from the reservoir top:
Never put your hand into the open reservoir while pump is running!

1013A94

ATTENTION!

Risk of bursting if the reservoir is overfilled! *When filling the reservoir by means of* ***pumps with a large delivery volume do not exceed the max. filling mark.***

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Maintenance and Repair, continuation

How to fill the pump, continuation

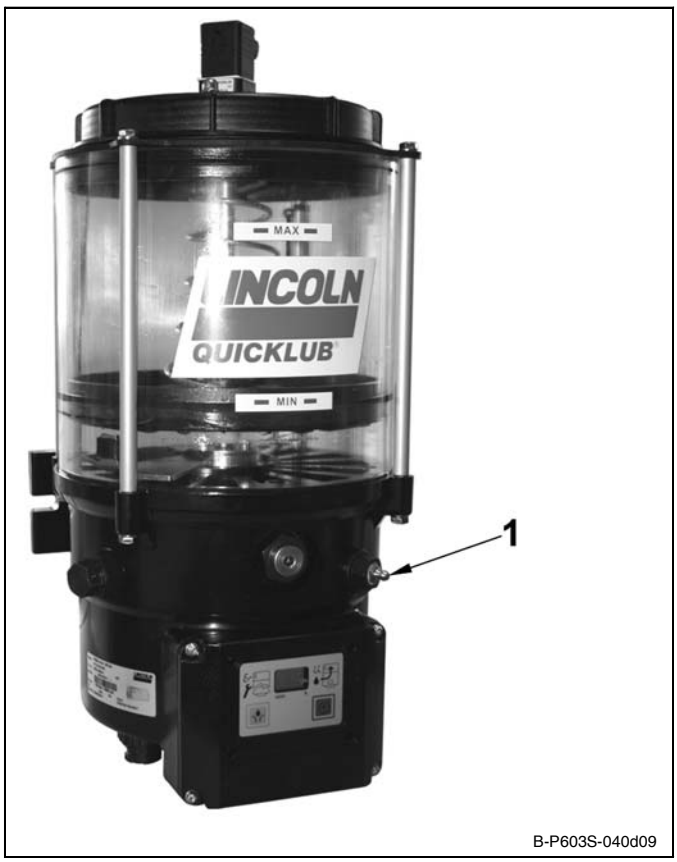


Fig. 44 Filler fitting for bottom filling at P603M with follower plate

6001a02

NOTE

Filling from the bottom is possible for reservoirs with stirring paddle as well as for reservoirs with follower plate.

Filling from the top is only possible for reservoirs with stirring paddle.

6001a02

IMPORTANT

To prime the reservoir with follower plate please observe the Maintenance Instrucitons "2.0-38009".

Reservoir with follower plate

- Filling is possible only via the bottom filler fitting 1 (fig. 44). As an alternative to the filler fitting, also other filling connections (R 1/8 ") may be used.

➲ When filling the reservoir, make sure that air may escape from below the follower plate:

- When reaching the upper filling level position, the sealing lip of the follower plate gets in contact with the upper venting bore at the reservoir wall. At this point of time, fill in some more lubricant to make sure that the air below the follower plate has escaped.

1 - Filler fitting

Repair

- Use only original spare parts for repair on the pumps.
- The pump should be returned to the factory for warranty work or major repairs.

1013A94

CAUTION!

… with reservoir and follower plate:

Inside the reservoir, the reservoir cover is still under spring tension to feed the follower plate back.
When removing the reservoir cover avoid any sudden spring release.
Wear protective glasses!

Replace pump element

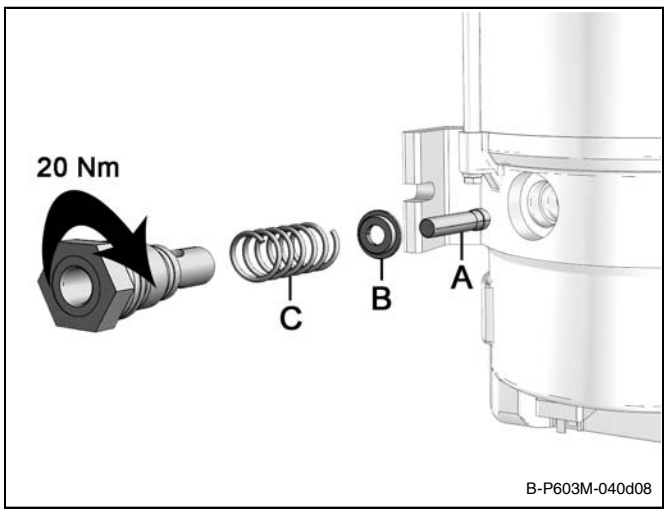


Fig. 45 Replace pump element

➲ Remove the connection parts from the pump element.

➲ Unscrew the pump element.

6001a02

IMPORTANT

Take care that the piston A, the pull-back spring C and the washer B are not left lying in the grease. If these parts remain in the lubricant, the motor may seize. In the case of a later removal of the parts, the reservoir will have to be disassembled.

➲ Install a new pump element and a new sealing ring.

A - Piston
B - Washer
C - Pull-back spring

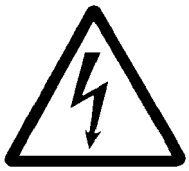
SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Maintenance and Repair, continuation

Replace Printed Circuit Boards

- ➲ Note all jumper positions of the defective p.c.b. (comp. chapter “Jumper Configuration”).
- ➲ Defective printed circuit boards should be suitably packed and returned to the factory.
- With substitution of a p.c.b. the type S00/B00 (see chapter “Jumper Configuration”) is always delivered.
- ➲ Configure at the new p.c.b. the noted jumper positions of the old p.c.b.

Electrical Connection


4273a00

WARNING!

Before maintenance or repair of pumps switch off their power supply.

Consider the safety instructions (page 5 and 6)!

CAUTION!

Before starting, make sure that the general power supply is off. The device must never be connected or disconnected when the power is on. The protective conductor must always be connected. Take care that this line section is undamaged and conforms to standards and the contacts are safe.


6001a02

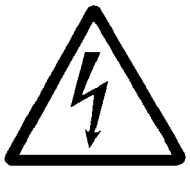
NOTE

The protection IP6K9K is guaranteed when the socket (X1:, X2: & X3:) is tightened on the housing cover with flat packing.

NOTE

Consider the contact protection measures for connecting the high- or low-level control (see chapter “Mode of Operation” / paragraph „Low- or High-level Control”).

- ➲ Make sure of the connection and the type of construction of your pump.
  - type of connection (VDC / VAC)
  - low-level indication
  - type of connection plug
- ➲ Connect the electrical wires according to the following electrical connecting diagrams (see chapter „Technical Data“).

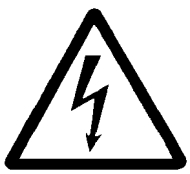

4273a00

ATTENTION!

Control p.c.b. and motor always work with 24 VDC even if the pump is connected to alternating current.

Consider residual ripple of max. ±5 % when connecting motor and control p.c.b. (in relation to the operating voltage acc. to DIN 41755).

Operation with bayonet plug


4273a00

CAUTION!

If the protective-conductor terminal is not connected or interrupted, dangerous touch voltages may occur on the equipment!

Protective measures to be applied for appropriate operation with bayonet plugs:
"Functional extra-low voltage with safe isolation" /
"Protective Extra-Low Voltage" (PELV)
Standards:
DIN EN 60204 Part 1: 2007-07 / IEC 204-1 /
DIN VDE 0100 Part 410: 2007-06 / IEC 364-4-41

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Maintenance, Repair and Tests, continuation

Tests

**Operational Test /
Triggering an Additional Lubrication**

- To check the pump operation it is possible to perform an additional test (see Fig. “27 or 40“).

To Check the Pressure Relief Valve

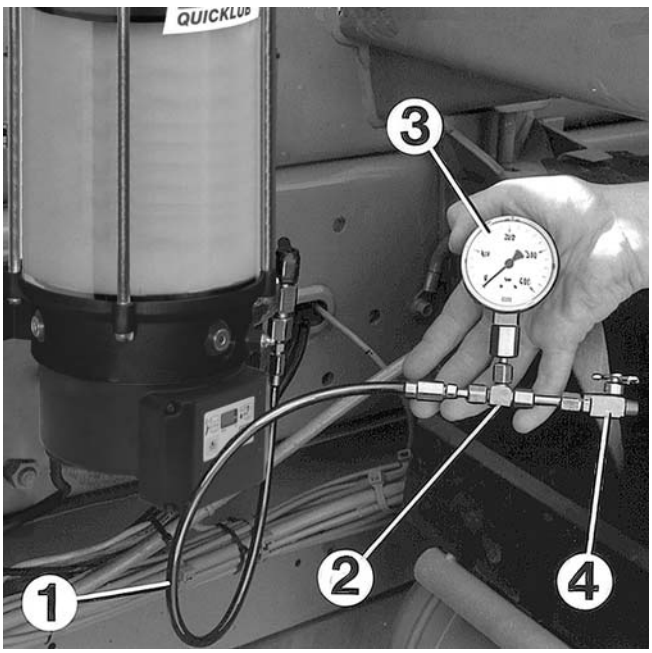


Fig. 46 To Check the Pressure Relief Valve B-P603S-040e11

1 - Hose line, min. length 1m
2 - T piece
3 - Pressure gauge
4 - Relief cock

1st option

➲ Connect the pressure gauge 3 (Fig. 46) to the pressure relief valve.

6001a02

IMPORTANT

Do not connect the pressure gauge directly to the pump element. High pressure may exceed the above mentioned range, causing the motor to stall. The motor is designed in such a way that it can stall for about 30 minutes without being damaged.

➲ Trigger an additional operating cycle.

2nd option

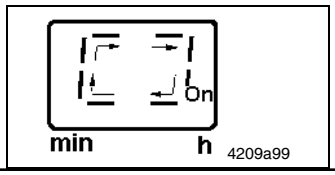
➲ Connect the manual pump of the pressure and checking set 604-36879-1 to the pressure relief valve and check the opening pressure by means of the manual pump.

- The pressure relief valve should open at a pressure of 200, 270 or 350 bar depending on its design.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Troubleshooting

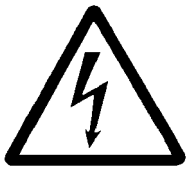
Pump 603 S



- The green rotating segment indicates that the pump operates properly.

Fig. 47 Rotating segment during lubrication

Fault:	**Pump motor doesn't run**

Cause:	**Remedy …** **by service personnel**
· Power supply interrupted. Green rotating segment on display is not lit.	 4273a00 **WARNING!** *Disconnect the power supply of pumps before starting any maintenance or repair works.*
	➲ Check the voltage supply to the pump/fuses. If necessary, eliminate the fault or replace the fuses.
	➲ Check the feed line from the fuses to the plug of the pump and then to the printed circuit board.
· Power supply from printed circuit board to motor interrupted. Electric motor defective.	➲ Trigger an additional operating cycle (fig. 27 or 40). Check voltage supply from the printed circuit board to the motor.
· Printed circuit board defective	➲ Replace printed circuit board.
· Keypad or button is defective. **"EP"** display at the keypad flashes.	➲ Replace housing with keypad.

Fault:	**Pump does not deliver lubricant**

Cause:	**Remedy …** **by operator personnel**
· Reservoir is almost empty. **"LL"** display at the keypad is flashing.	➲ Fill up the reservoir with clean grease. Let the pump run (initiate an additional operating cycle, fig. 27 or 40) until lubricant shows at all lube points.
· Pump lost prime and **"E1–E4"** display at the keypad is flashing (fig. 22-26).	 6001a02 **NOTE** *Dependent on the ambient temperature and/or sort of lubricant output. Therefore, trigger several additional operating cycles.*

Cause:	**Remedy …** **by service personnel**
· Air pockets in lubricant.	➲ Trigger an additional operating cycle (fig. 27 or 40). Lubricant must dispense without air bubbles.
· Unsuitable lubricant has been used	➲ Renew the lubricant (see User Manual „Lubricants", 2.0-40001-).
· Suction hole of the pump element clogged	➲ Remove pump element. Check suction hole for foreign particles. If there are any, remove them.
· Pump piston worn	➲ Replace pump element.
· Check valve in the pump element defective or clogged	➲ Replace pump element.
· Other damages	➲ For repair return the pump to the factory.

Continuation:	Pump does not deliver lubricant
or:	Pump delivers but no lubricant appears out of the lubrication points

· Error E3	➲ For additional lubrication cycle press pushbutton > 4 seconds Motor turns into relief direction (10 sec.). When relief is effected, fault E3 will have been remedied.
	➲ If there is still no relief, reduce system pressure or extend pause time and press pushbutton for additional lubrication cycle once again > 4 seconds.
	➲ Should fault E3 still be existent, check relieving device.
· Error E4	➲ Reduce system pressure and trigger additional lubrication cycle (fig. 27 or 40).

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data

Rating [1)]

Single Line System with Pump 603 S

Operating pressure ..... max. 300 bar
- Pressure sensor, adjustable ..... 100 to 320 bar
- Pressure switch, fix ..... 240 ± 5 bar
Depressurization
(single line metering device, e. g. QSL) ..... ≤ 60 bar [3)]

[3)] If any, observe the special values of other metering devices.

Pump 603 S

Admissible operating temperature [2)] ..... –40 °C to +70 °C
Number of outlets 1
Filling volume ..... 4l, 8l, 10l,15l or 20l
Filling ..... via hydraulic lubrication fitting [4)]
Lubricant ..... lubricants up to NLGI grade 2
Protection ..... IP6K 9K acc. to DIN 40050 T9
Connections:
- Main line ..... R $^1/_4$"
- Lubrication fitting ..... R $^1/_4$"

[4)] Option: Other connections (R$^1/_8$") on request.

Pump elements K7

Piston diameter ..... 7 mm
Lubricant output per pump element ..... approx. 4 cm^3/min
max. admissible operating pressure ..... 350 bar
Connecting thread ..... G $^1/_4$"
- adequate for tube diameter ..... 6 mm

6001a02

[1)] **IMPORTANT**
The rating listed refers to grease of NLGI grade 2 measured at 20°C, backpressure 100 bar and nominal voltage 12/24 V (motor). Any differing pressures or temperatures result in different lubricant outputs. Any system design must be based on the above values compete.

6001a02

[2)] **IMPORTANT**
The specified "admissible operating temperature" refers to the pump and the components of the entire lubrication system, but not to the lubricant to be supplied.

Therefore, please observe that the transportation of the lubricant in a system depends on the lubricant's flow properties. The "admissible operating temperature of the lubricant" may differ from the system operating temperature and has to be verified separately! For applicable lubricants also see User Manual 2.0-40001, chapter "Approved lubricants".

Tightening torques

Install pump ..... 18 Nm
Electric motor on housing ..... 12 Nm
Pump element in housing ..... 20 Nm
Closure plug in housing ..... 12 Nm
Return line connector on housing ..... 10 - 12 Nm
Tie rods for reservoir ..... 5 Nm

Settings

Pause time

TC, time controlled
- min. ..... 4 minutes
- max. ..... 59 hours 59 minutes
- Interval ..... 1 minute
- factory setting ..... 6 hours
CC, cycle controlled
- min. ..... 1 pulse
- max. ..... 9999 pulses
- Interval ..... 1 pulse
- factory setting ..... 10 pulses

Operating pressure, internal

Pressure sensor 1
- min. ..... 100 bar
- max. ..... 320 bar
- Interval ..... 10 bar
- factory setting ..... 240 bar
Pressure switch 1..... normally open or normally closed
- operating pressure ..... fix 240 ±5 bar

Operating pressure, external

Pressure sensor 2 ..... 170 bar
Pressure switch 2 ..... normally open
- operating pressure ..... fix 172 bar ±1%

Relief pressure, internal

Pressure sensor 1 or
w/o optional pressure sensor 2 ..... fix 30 bar

Relief pressure, external

Pressure sensor 2
- min. ..... 10 bar
- max. ..... 70 bar
- Interval ..... 10 bar
- factory setting ..... 50 bar
Pressure switch 2 ..... fix 50 bar

Setting and time storage:
..... via EEPROM unlimited

Other factory settings

- Signal output ..... NO (normally open), flashing
- Start phase ..... SP (with pause time)
- Holding time..... 2 minutes
- Monitoring time ..... 20 minutes

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Electrical Data [1)]

PUMP

Input AC

Input voltage ..... 100-240 VAC ±10% ; 47/63 Hz ±5%
Input current
- with 115 VAC ..... 1,6 A
- with 230 VAC ..... 1,0 A
Starting current impact ..... 50 A at 230 VAC
Fuse ..... T 2,0 A/250 V external
Power P ..... 60 VA

Output

Output voltage, internal ..... 24 VDC ±1%

Input DC

Input voltage ..... 12 VDC / 24 VDC ±1%
Fuse:
12 VDC ..... 10 A
24 VDC ..... 6 A

Protection and monitoring

Current limiting ..... resistant to sustained short circuit
Overload-proof ..... yes
Idling-proof ..... yes

EMC [2)]

Radio interference suppression ..... VDE 0875 T11
.....EN 55011 class A
EMC 2009/19/EC (vehicles)
EMC 2004/108/EC
a) for industrial environment:
- Emitted interference acc. to ..... [3)] DIN EN 61000-6-4
- Noise immunity acc. to ..... DIN EN 61000-6-2

b) for residential, commercial and light industry:
- Emitted interference acc. to ..... [3)] DIN EN 61000-6-3
- Noise immunity acc. to ..... DIN EN 61000-6-1

Pressure sensor

Output signal ..... 0.5 to 4.5 V
Response time ..... ≤ 1 ms
Operating temperature ..... –40 °C to +70 °C


6001a02

[1)] **IMPORTANT**
The rating listed refers to grease of NLGI grade 2 measured at 20°C, backpressure 100 bar and nominal voltage 12/24 V (motor). Any differing pressures or temperatures result in different lubricant outputs. Any system design must be based on the above values compete.

Motor [4)]

DC gear motor (interference-suppressed)
Operating voltage ..... 24 VDC
Max. current input
- 24 VDC ..... 2,4 A
Speed, depending on backpressure ..... approx. 17 rpm
Noise emission ..... < 70 dB(A)
Power P ..... 72 VA

CONTROL P.C.B. [5)]

Rated voltage ..... 12 VDC / 24 VDC
Operating voltage ..... 9 to 30 V
Residual ripple in relation
- With the operating voltage ..... ±5% acc. to DIN 41755
  Output motor ..... Transistor 7A/ short-circuit proof
  Reverse voltage protection ..... Operating voltage inputs
  .....are protected against reverse polarity
- Output fault / readiness for service
  .....transistor 1A / short-circuit proof

Class of protection:
Printed circuit board installed in housing ..... IP 6 K 9 K
Pause time with cycle control CC:
Minimum length of pulse ..... 200 ms


6001a02

[2)] **NOTE**
The pumps correspond to the following EMC directives:
- for vehicles [A)] ……. EMC 2009/19/EC
- for industry …….. EMC 2004/108/EC

[A)] *marked with the EC approval symbol (e-icon) on the type identification plate.*


6001a02

[3)] **NOTE**
The emitted interference meets the requirements for the industrial sector, if used in the residential sector this may possibly lead to interference.


6001a02

[4)] **IMPORTANT**
The pump motor is suitable for intermittent operation only.


6001a02

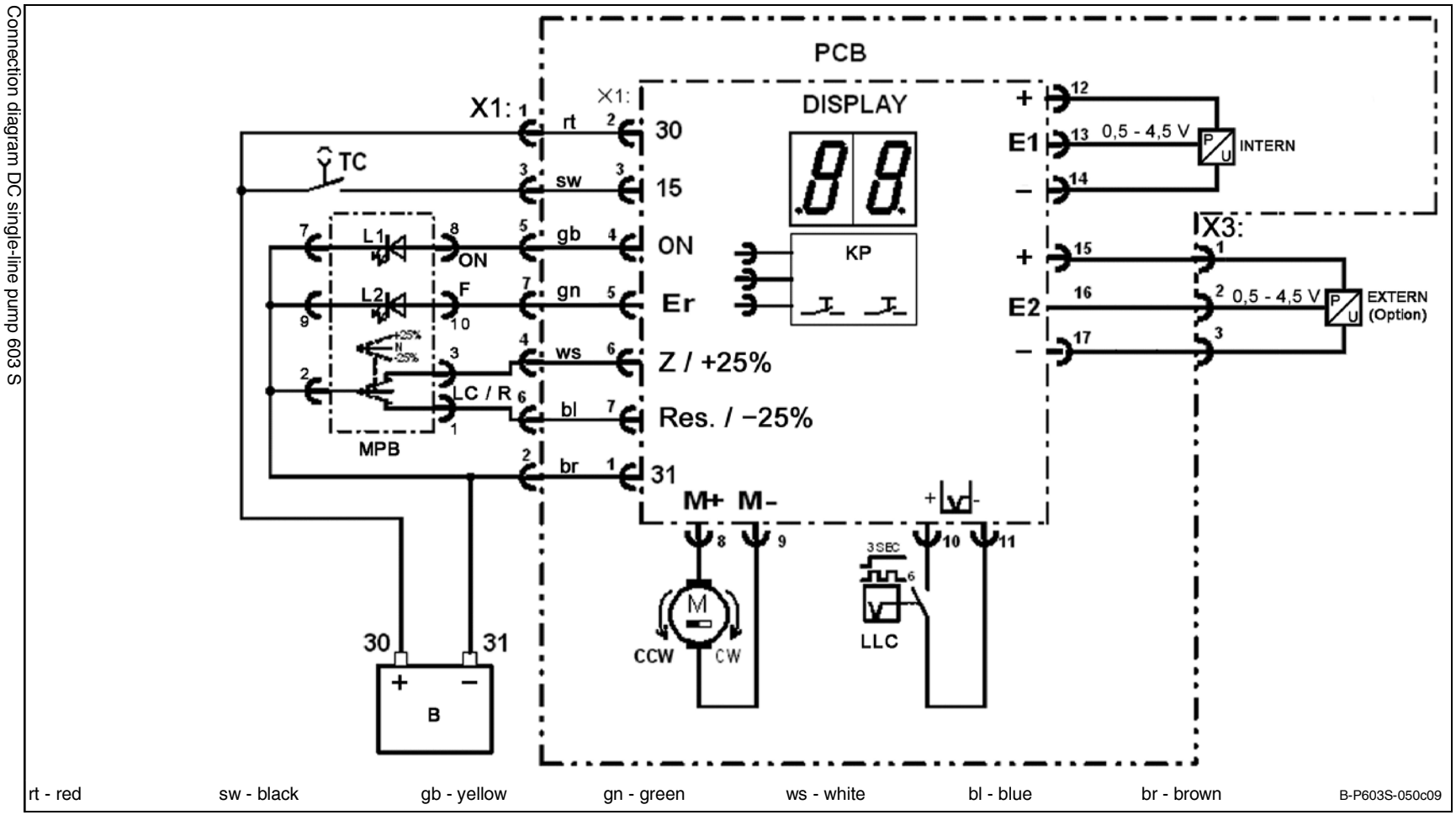
[5)] **NOTE**
In order to protect the printed circuit board against condensation, it has been covered with a protective varnish.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Connection Diagram DC

for mobile applications



Connection diagram DC single-line pump 603 S

X1:	Bayonet plug, 7-pole	X3:	Bayonet plug, 4-pole		
				± 25%	temp. increased or reduced lubrication
30 -	Battery +	Z/LC -	Additional Lubrication	E1 -	Pressure sensor / switch internal
31 -	Battery –	Res./R -	Reset	E2 -	Pressure sensor / switch external (Option)
B -	Battery 24 VDC	KP -	Membrane key pad	P/U -	Pressure sensor / switch, internal (option: external)
15/TC -	Driving switch	MPB -	Multifunction Push Button ± 25% – modification of lubricant volumes		
ON -	ON	PCB -	Printed Circuit Board		
L1 -	Green LED	M -	Motor		
Er/F -	Error (E1–E4), Low-level (LL)	CW -	ClockWise		
L2 -	Red LED	CCW -	CounterClockWise		
		LLC -	Low-Level Control		

6001a02

NOTE
For connection of the 603 S pump observe the safety instructions of this User Manual.

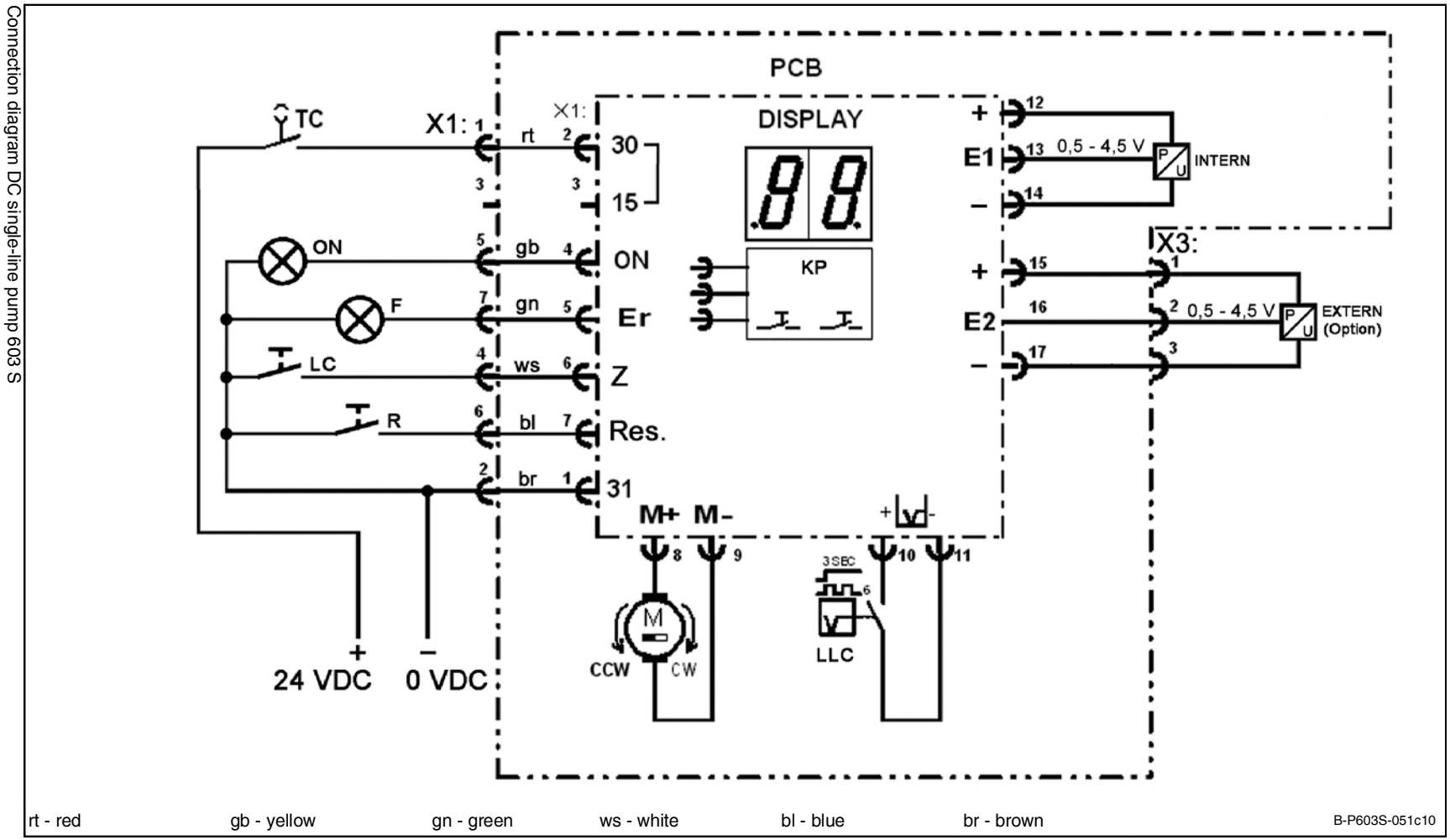
SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Connection Diagram DC

for industrial application

Connection diagram DC single-line pump 603 S



X1:	Bayonet plug, 7-pole	X3:	Bayonet plug, 4-pole
15 -	Bridged with terminal 30		
30 -	24 VDC +	Z/LC -	Additional Lubrication
31 -	0 VDC –	Res./R -	Reset
TC -	Machine contact (e. g. of machine or time control)	PCB -	Printed Circuit Board
		KP -	Membrane key pad
ON -	ON	M -	Motor
Er/F -	Error (E1–E4), Low-level (LL)	CW -	ClockWise
LLC -	Low-Level Control	CCW -	CounterClockWise

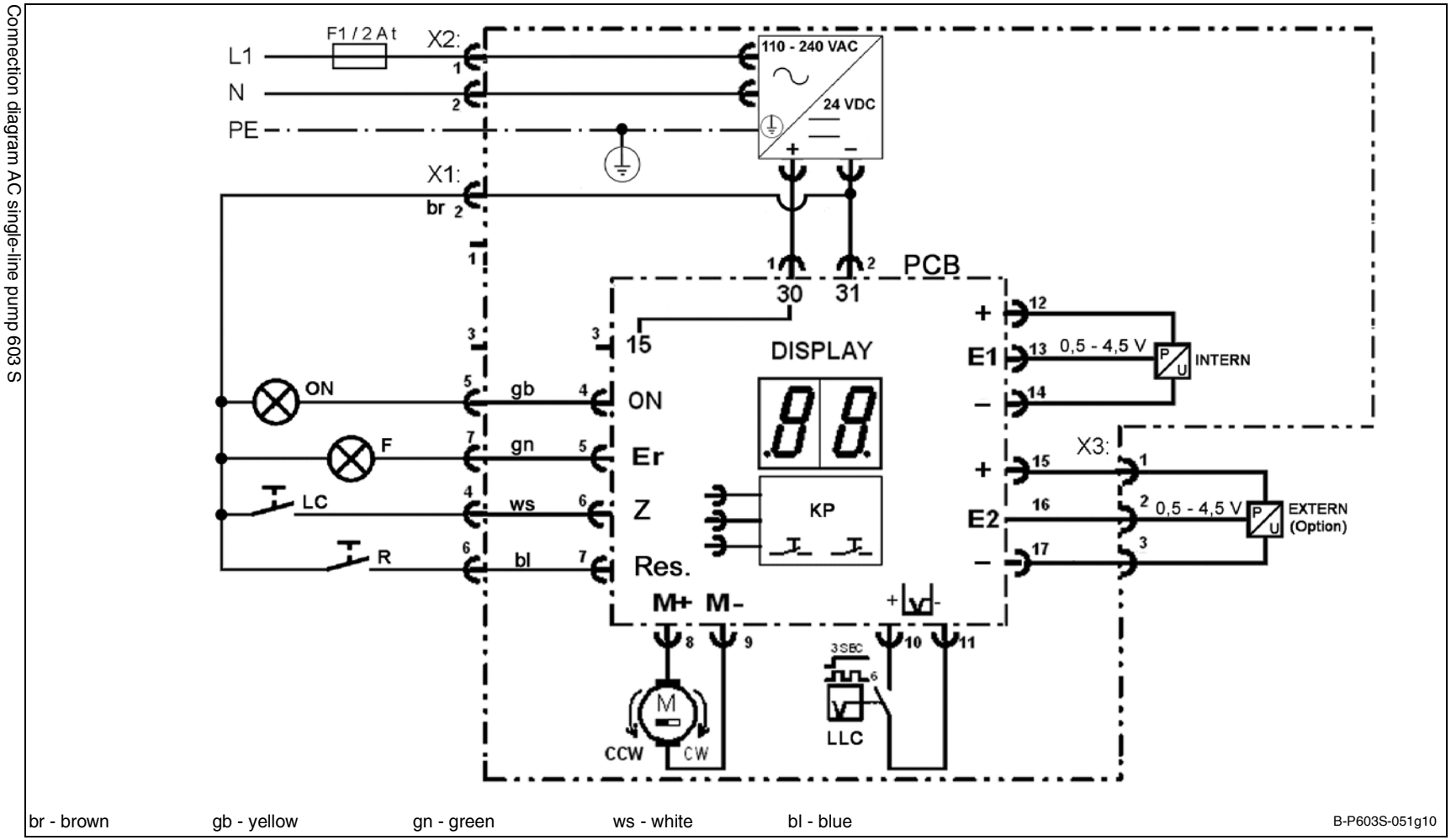
E1 - Pressure sensor / switch internal
E2 - Pressure sensor / switch external (Option)
P/U - Pressure sensor / switch, internal (option: external)

NOTE
For connection of the 603 S pump observe the safety instructions of this User Manual.

Technical Data, continuation

Connection Diagram AC

for industrial application



X1:	Bayonet plug, 7-pole	X2:	Square-type plug, 3-pole	X3:	Bayonet plug, 4-pole
L1 / N	Power supply 110-240 VAC ±10%, 50/60 Hz ±5%	Z/LC -	Additional Lubrication	E1 -	Internal pressure sensor / switch
15 -	Bridged with terminal 30	Res./R -	Reset	E2 -	External pressure sensor / switch (Option)
30 -	+ 24 VDC	PCB -	Printed Circuit Board	P/U -	Internal pressure sensor / switch (option: external)
31 -	– 0 VDC	KP -	Folientastatur		
F1 -	Fuse 2A (by system operator)	M -	Motor		
ON -	ON	CW -	ClockWise		
Er/F -	Error (E1–E4), Low-level (LL)	CCW -	CounterClockWise		
		LLC -	Low-Level Control		

6001a02

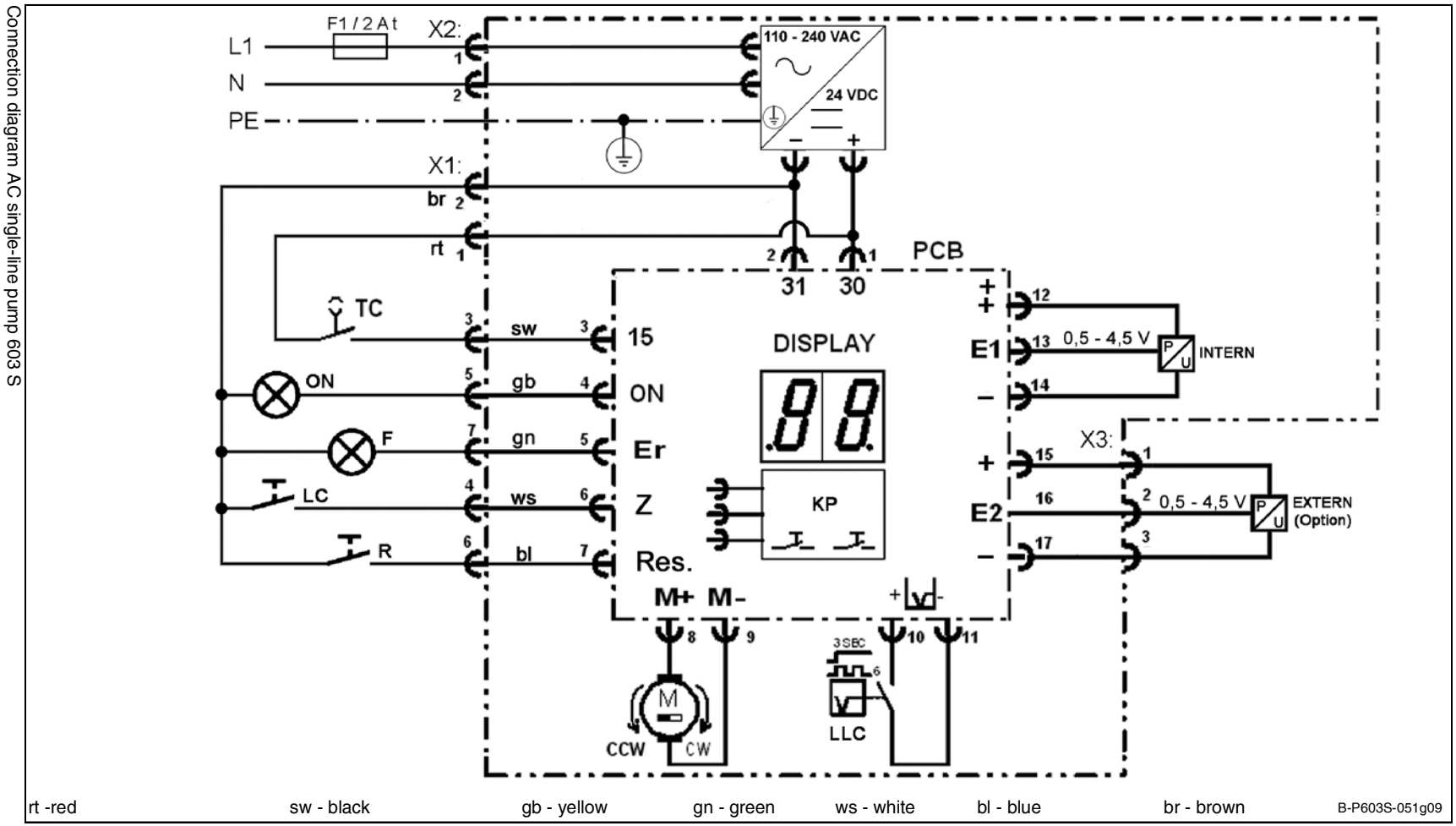
NOTE
For connection of the 603 S pump observe the safety instructions of this User Manual.

Subject to modifications

Connection Diagram AC

for industrial application

Technical Data, continuation



X1 - Bayoent plug, 7-pole

X2: Square-type plug, 3-pole

X3: Bayonet plug, 4-pole

L1/N Power supply 110 VDC ±10%, 50/60 Hz ±5%
30 - + 24 VDC
31 - – 0 VDC
F1 - Fuse 2A (by system operator)
15/TC - Machine contact (e. g. of machine or time control)
ON - ON
Er/F - Error (E1–E4), Low-level (LL)

Z/LC - Additional Lubrication
Res./R - Reset
Display - Display
KP - Keypad
M - Motor
CW - ClockWise
CCW - CounterClockWise
LLC - Low-Level Control
PCB Printed Circuit Board

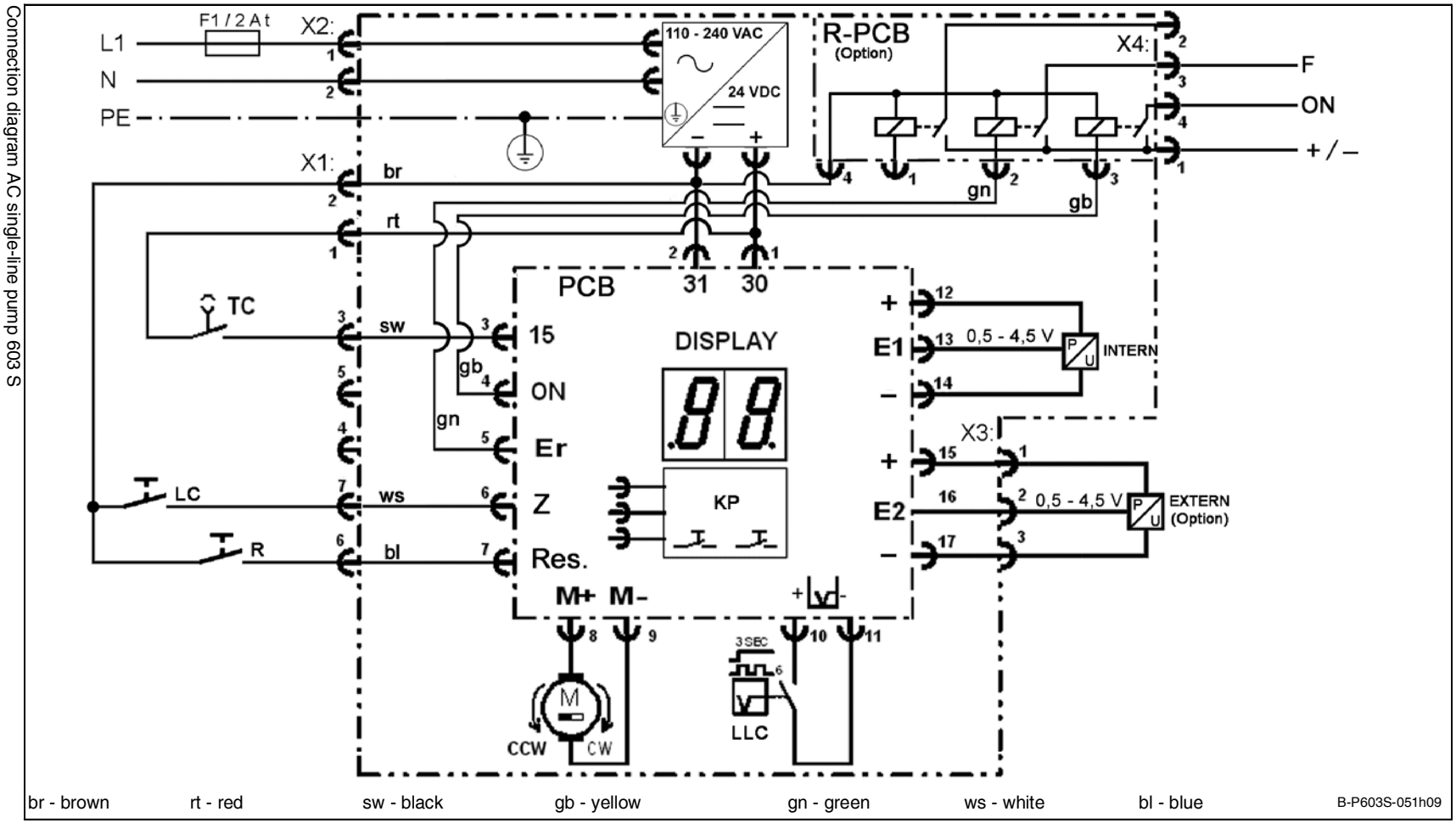
E1 - Internal pressure sensor / switch
E2 - External pressure sensor / switch (Option)
P/U - External pressure sensor / switch (option: external)

NOTE
For connection of the 603 S pump observe the safety instructions of this User Manual.

Technical Data, continuation

Connection Diagram AC

with relay p.c.b. (optional) for industrial application



Connection diagram AC single-line pump 603 S

X1:	Bayonet plug, 7-pole	X2:	Square-type plug, 3-pole	X3:	Bayonet plug, 4-pole
				X4:	Bayonet plug, 4-pole (optinal)
L1 / N	Power supply 110-240 VAC ±10%, 50/60 Hz ±5%	Res./R -	Reset		
30 -	+ 24 VDC	PCB -	Printed Circuit Board	E1 -	Internal pressure sensor / switch
31 -	– 0 VDC	R-PCB -	Relay printed circuit board (optional)	E2 -	External pressure sensor / switch (Option)
F1 -	Fuse 2A (by system operator)	**+ / –**	Customer's feed in potential	P/U -	Internal pressure sensor / switch (option: external)
ON -	ON	KP -	Keypad		
15/TC -	Machine contact (e. g. of machine or time control)	M -	Motor		
		CW -	ClockWise		
Er/F -	Error (E1–E4), Low-level (LL)	CCW -	CounterClockWise		
Z/LC -	Additional Lubrication	LLC -	Low-Level Control		

6001a02

NOTE
For connection of the 603 S pump observe the safety instructions of this User Manual.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Identification Code, continuation

Decoding: Electric connecting possibilities [3]

… for power supply 12 VDC or 24 VDC:

		Power supply VDC	Low-level (LL) & Error indication (Er)	Pressure switch or Pressure sensor [4]	Relay control (optionally for LL & Er)
Type of connection	**1A7.16**	Bayonet plug 7-pole, left			
	2A7.16	Bayonet plug 7-pole, left		Bayonet plug 4/3-pole, right	
	2B7.16	Bayonet plug 7-pole, left			Bayonet plug 4-pole, right
	3A7.16	Bayonet plug 7-pole, left		Bayonet plug 4/3-pole, right	Bayonet plug 4-pole, right

… for power supply 110 – 240 VAC:

		Power supply VAC	Low-level (LL) & Error indication (Er)	Pressure switch or Pressure sensor [4]	Relay control (optionally for LL & Er)	Coupling relay (prompt via 2 or 3 relays)
Type of connection	**2A1.01**	Square-type plug, left	Bayonet plug 7-pole, left			
	2B1.01	Square-type plug, left			Bayonet plug 4-pole, right	
	3A1.01	Square-type plug, left	Bayonet plug 7-pole, left	Bayonet plug 4/3-pole, right		
	3B1.01 [8]	Square-type plug, left	Bayonet plug 7-pole, left		Bayonet plug 4-pole, right	
	3C1.01	Square-type plug, left		Bayonet plug 4/3-pole, right	Bayonet plug 4-pole, right	
	4A1.01 [9]	Square-type plug, left	Bayonet plug 7-pole, left	Bayonet plug 4/3-pole, right	Bayonet plug 4-pole, right	
	2D1.01	Square-type plug, left				M12 plug, 4-pole right

[3] see „Connection Diagrams“
[4] incl. 10 m cable (4-wire); precondition: jumper position “2S” (see chapter “Jumper Configuration”)
[8] Precondition: Pump with control p.c.b. model S
[9] Precondition: Pump with internal pressure switch

Schematic of Single-line Pump 603 S

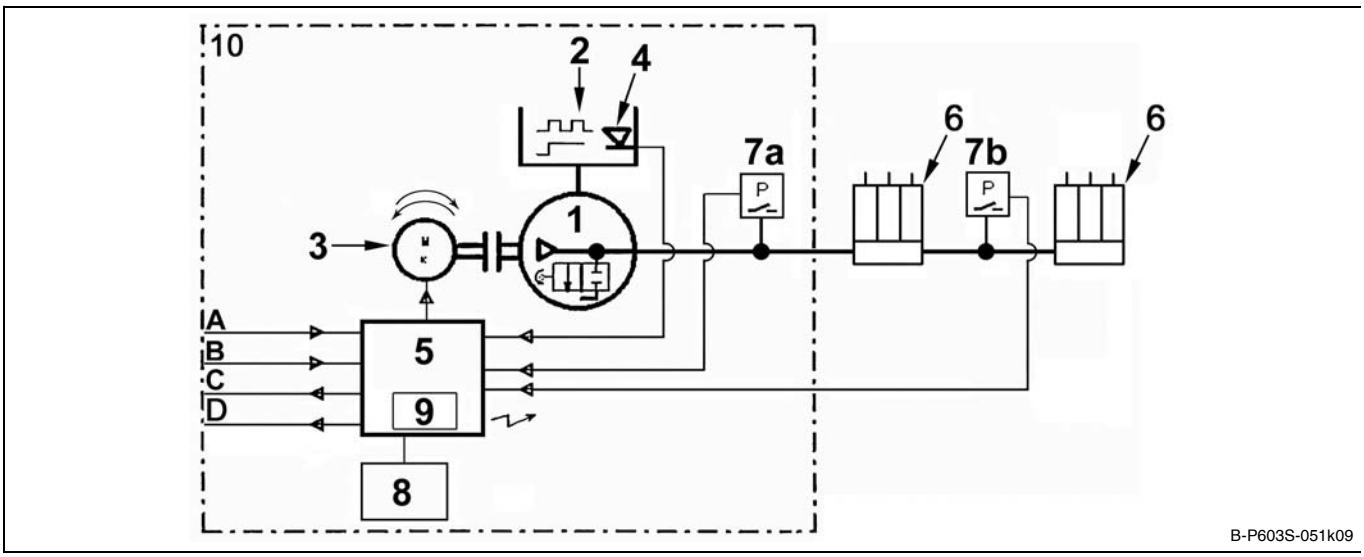


Fig. 46 Schematic of Single-line Pump 603 S

1 - Single-line pump 603 S
2 - Reservoir
3 - Motor with moving direction counterclockwise and clockwise
4 - Low-level control
5 - Control p.c.b.
6 - Single-line metering device (QSL)

7a - Internal pressure sensor
- Operating pressure, adjustable ……..… 100 … 320 bar
- Relief pressure ……..…….... 30 bar, fix
Internal pressure switch …….. normally open
- Operating pressure ……..... 240 ±5 bar, fix

7b - Option:
External pressure sensor
- Operating pressure ……..…… 170 bar, fix
- Relief pressure, adjustable ……..... 10 … 70 bar
External pressure switch …… normally open
- Operating pressure ……..... 172 bar, fix

8 - Membrane key-pad
9 - Display
10 - Pump
A - Power supply
B - Start
C - Alarm contact / signals
D - Relay control (option)

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Dimensions: 4- & 8-liter reservoir

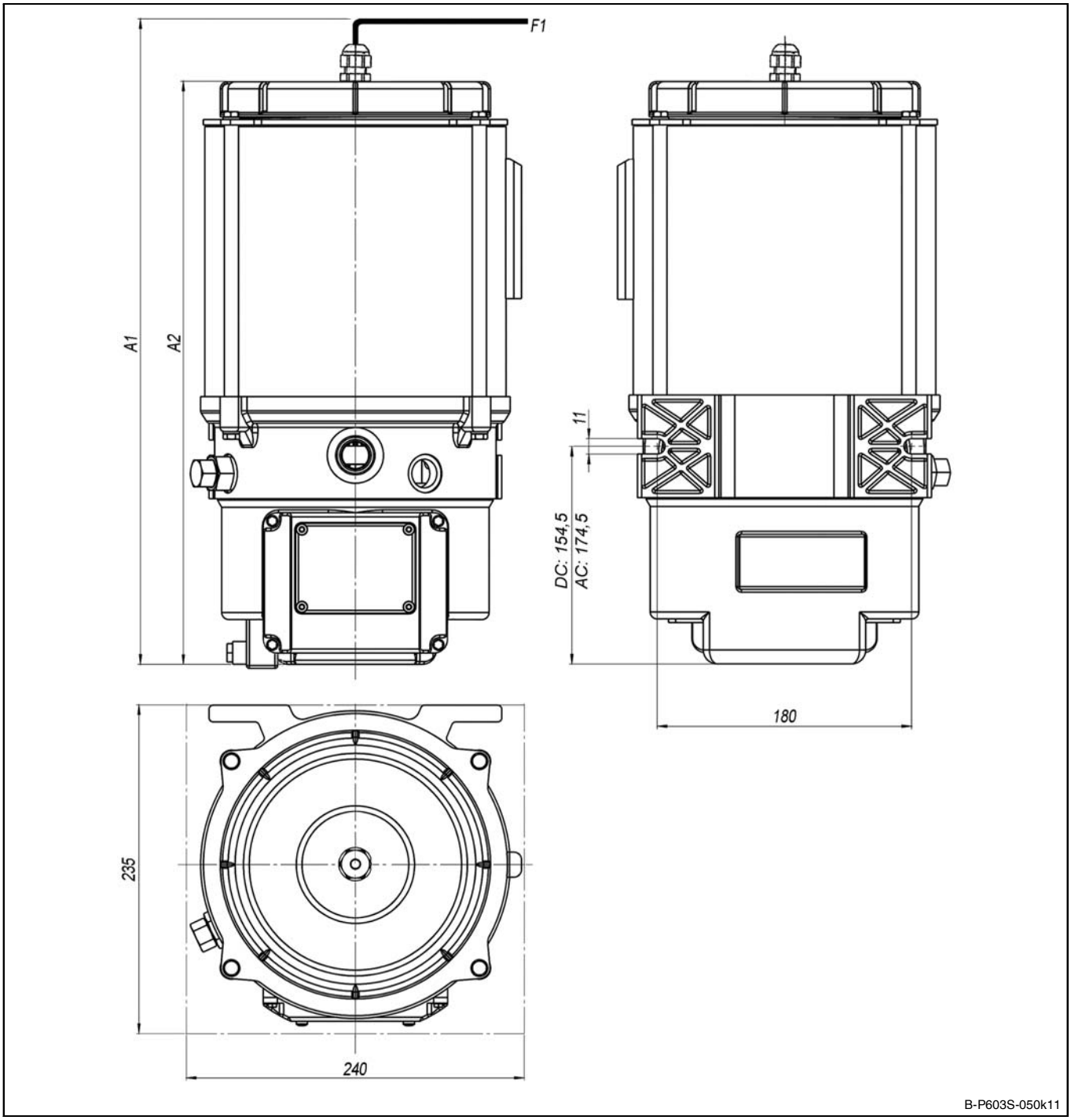


Fig. 47 Dimensions P 603; 4- & 8- liter reservoir

F1 - external connection for low-level control

		4-liter reservoir	8- liter reservoir
		DC pumps	
A1 -	Reservoir with follower plate:	**471 mm**	**571 mm**
A2 -	Reservoir with stirring paddle:	**415 mm**	**515 mm**
		AC pumps	
A1 -	Reservoir with follower plate:	**491 mm**	**591 mm**
A2 -	Reservoir with stirring paddle:	**435 mm**	**535 mm**

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Dimensions: 10-, 15- & 20-liter reservoir

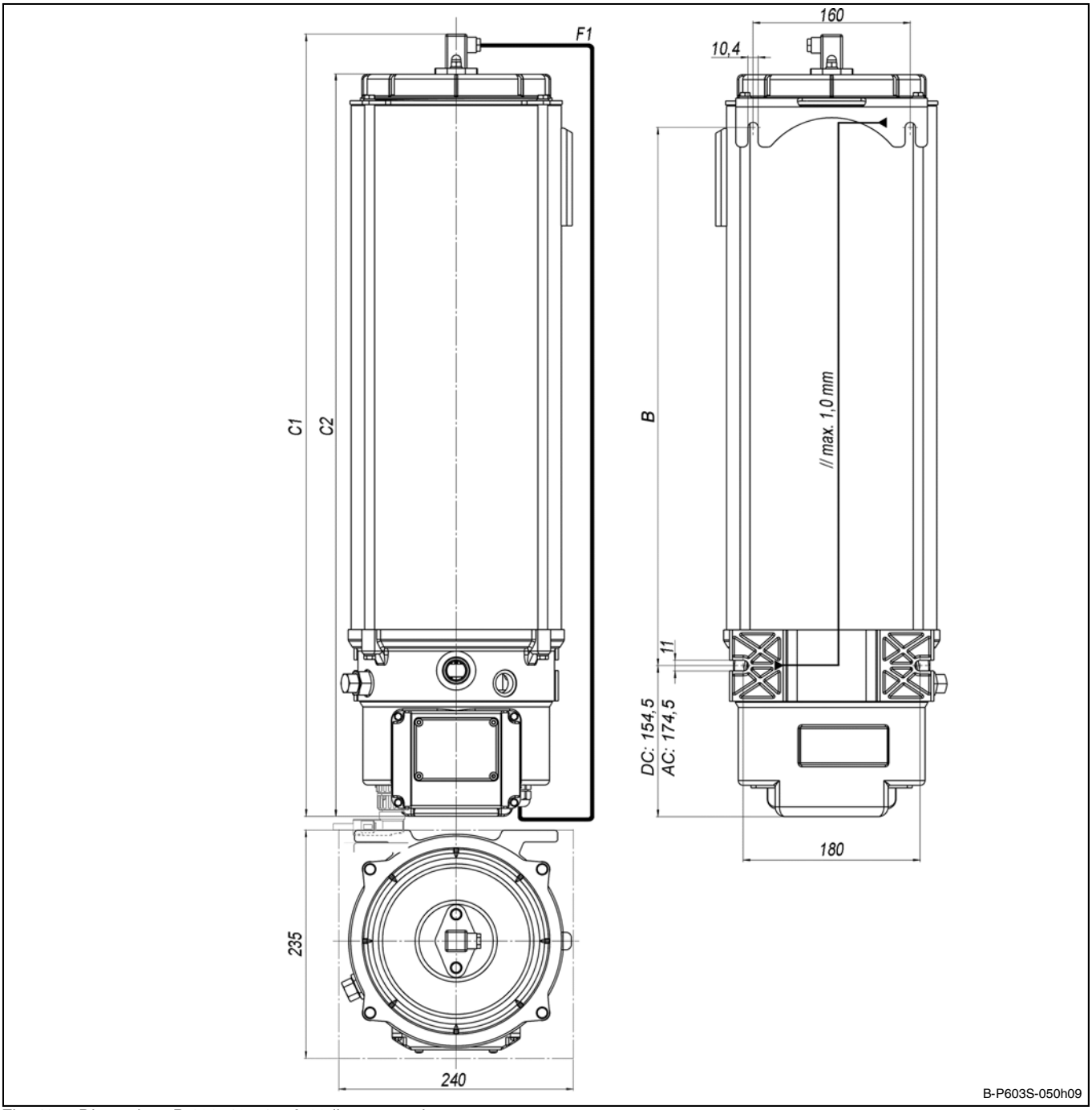


Fig. 48 Dimensions P 603; 10-, 15- & 20-liter reservoir

F1 - external connection for low-level control

		10-liter reservoir		15-liter reservoir		20-liter reservoir	
B -	Bore distance of mounting plates	**367,5** $_{-10}$	**mm**	**550,5** $_{-10}$	**mm**	**685,5** $_{-10}$	**mm**
			DC pumps		DC pumps		
C1 -	Reservoir with follower plate:	**633**	**mm**	**814**	**mm**	**949**	**mm**
C2 -	Reservoir with stirring paddle:	**577**	**mm**	**758**	**mm**	**893**	**mm**
			AC pumps		AC pumps		
C1 -	Reservoir with follower plate:	**653**	**mm**	**834**	**mm**	**969**	**mm**
C2 -	Reservoir with stirring paddle:	**597**	**mm**	**778**	**mm**	**913**	**mm**

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Technical Data, continuation

Drilling template

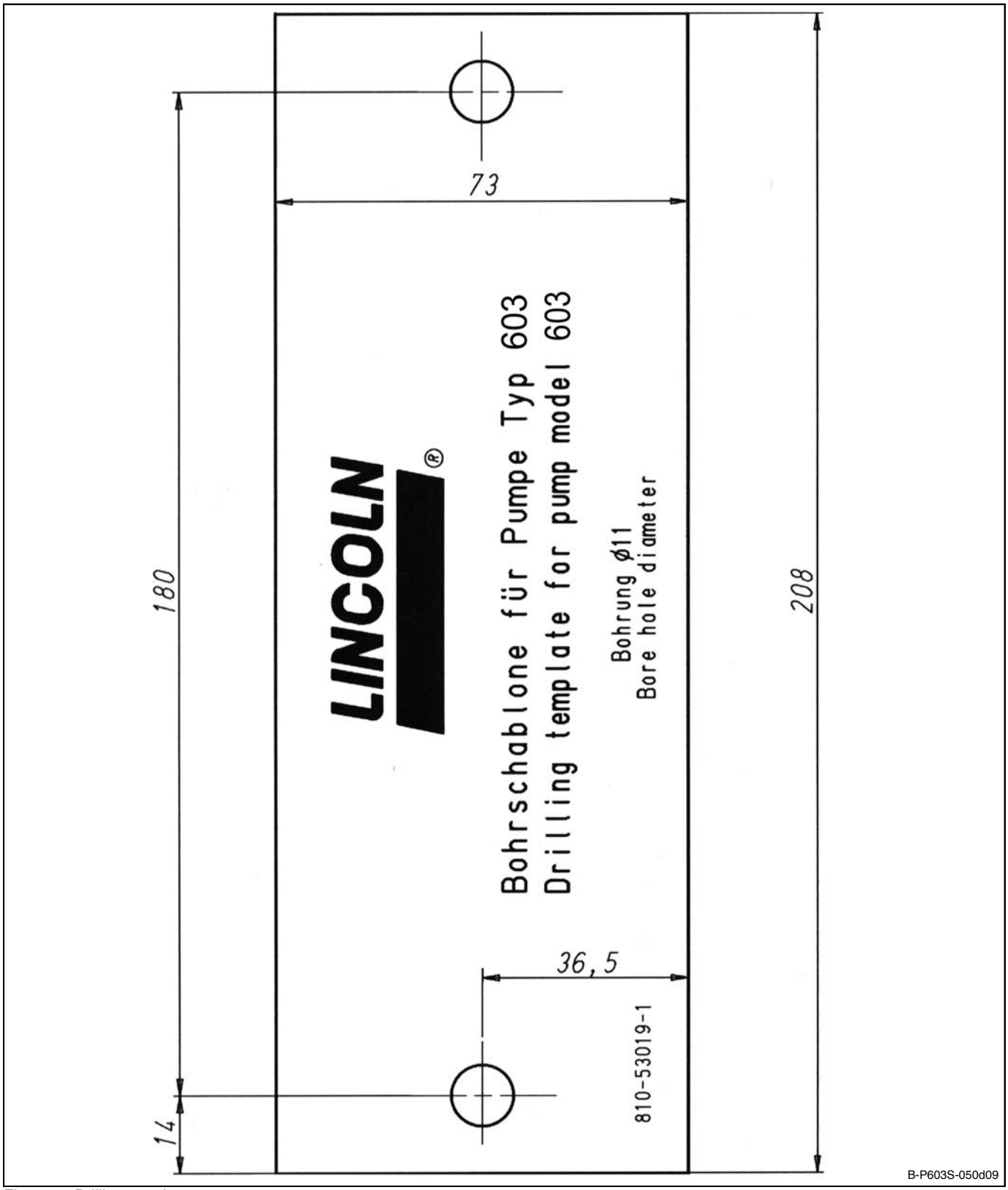


Fig. 49 Drilling template
(attaching boreholes of the pump housing)

- Observe the admissible tolerance of smoothness (// max. 1,0 mm) between the upper and lower mounting surface for pumps with 10, 15 and 20 liter reservoirs (see fig. 48).

6001a02

IMPORTANT

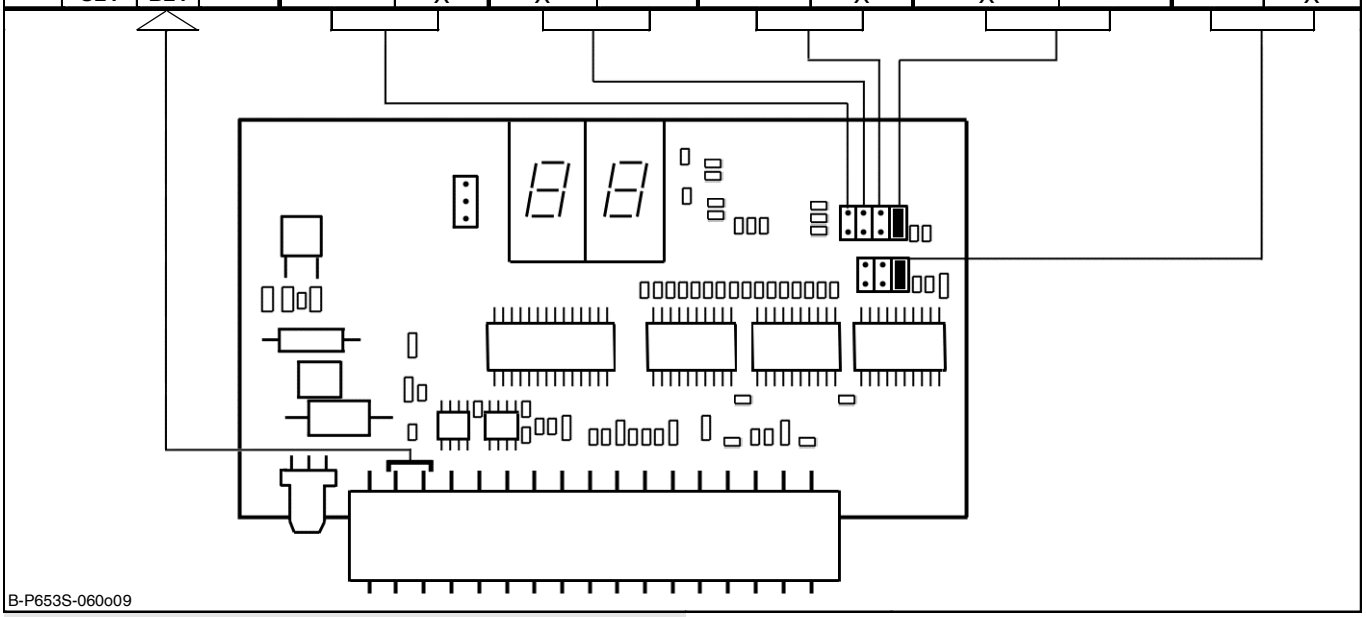
Please observe the page scaling of 100 % to print the drilling template on a scale of 1 : 1 .

Subject to modifications

Jumper-Configuration P603S

Control p.c.b.
- **S00–S24: Standard (part no. 236-10890-2)**
- **B00–B24: Terminals 15/30 connected PCB internally (part no. 236-10892-2)**

Possibilities of setting			Application		Cycle- or time-controlled		Number of pressure sensors / switches		Low-level control		Programming lock [3]	
[a] - without low-level control XNBO or - with stirring paddle XLBO [b] - with follower plate XLF/1			stationary	mobile	Time	Cycle	1	2	dynamic Normally Open	Normally Closed	without	with
			S	M	TC	CC	1S	2S	NO [a]	NC [b]	U	L
Jumper position			removed	plugged	removed	plugged	removed	plugged	removed	plugged	removed	plugged
Combination no.	S00	B00 [2]		X		X		X		X		X
	S01	B01		X	X		X			X	X	
	S02	B02		X	X			X		X	X	
	S03	B03		X	X		X			X		X
	S04	B04		X	X			X		X		X
	S05	B05	X			X	X			X	X	
	S06	B06	X			X	X			X		X
	S07	B07	X			X		X		X	X	
	S08	B08	X			X		X		X		X
	S09	B09	X			X	X		X		X	
	S10	B10	X			X	X		X			X
	S11	B11	X			X		X	X		X	
	S12	B12	X			X		X	X			X
	S13	B13	X		X		X			X	X	
	S14	B14 [1]	X		X		X			X		X
	S15	B15	X		X			X		X	X	
	S16	B16	X		X			X		X		X
	S17	B17	X		X		X		X		X	
	S18	B18	X		X		X		X			X
	S19	B19	X		X			X	X		X	
	S20	B20	X		X			X	X			X
	S21	B21		X	X		X		X			X
	S22	B22		X	X		X		X		X	
	S23	B23		X	X			X	X		X	
	S24	B24		X	X			X	X			X



B-P653S-060o09

[1] Example B14:
Schematic view of the control p.c.b. 236-10892-2

[2] S00/B00 = delivery configuration (spare parts version)
[3] Programming lock (L) allows display and operating mode, only.

6001a02

IMPORTANT

Changes of the jumper configuration will only be detected after the pump has been disconnected from the power supply.

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

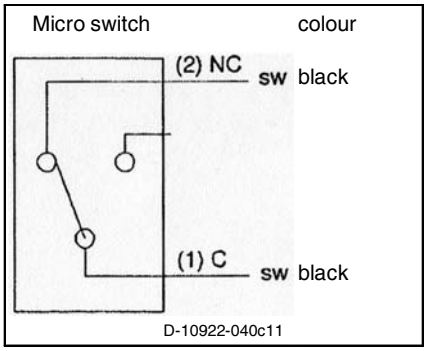
Annex

Technical data sheet of internal pressure switch

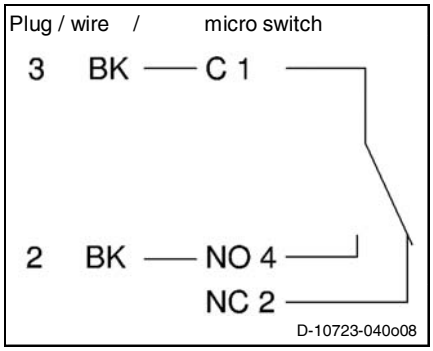
Part numbers

Wiring diagrams

234-10922-6



234-10723-8



Technical data

Switching function			**Normally closed contact (NC) or Normally open contact (NO)**
Type of pressure			Positive overpressure
Pressure connection			G 1/4
Measuring principle			Spring-loaded piston
Material	- measuring element		Steel piston
	- pressure connection		Brass
	- housing		Brass
Load cycle			1 million pressure cycles
Switching outputs	- number		1 change-over contact
	- switching elements		Gold-plated contacts
Switching capacity at ≤ 30 V		[mA]	≤ 4
- DC	U_{xl}	[VA]	max. 0.12
Working pressure [1]	-factory-set	[bar]	240 ±5 (switches between 160 and 210 bar)
	- max.	[bar]	300
	- test pressure (shortly)	[bar]	450
Hysteresis		[%]	25 … 36 (from preset value)
Reproducibility [1]		[bar]	± 5
Temperature range		[°C]	–40 … +85 (shortly 135 °C)
Electrical connection (see wiring diagram)			AMP plug with gold contacts
Weight		[kg]	~ 0.180
Max. switching frequency			1/sec.
Tightening torque		[Nm]	30 ±5
Position of installation			any

[1] Switch position at room temperature;
Switch points and tolerances measured after test run at 20 °C

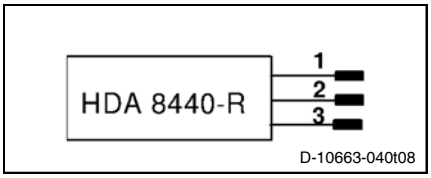
SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Annex, continuation

Technical data sheet of the internal pressure sensor

Part number 234-10663-6

Wiring diagram



1 - 0 V
2 - Signal
3 - + U_B

Technical data

Input ratings		
- Measuring range	[bar]	400
- Overload range	[bar]	800
- Burst pressure (FS [1)])	[%]	400
- Mechanical connection (DIN 3852)		G 1/4
- Tightening torque	[Nm]	20
- Material wettened by lubricant		Stainless steel, FPM

Output ratings		
- Output signal	[VDC]	0.5 … 4.5
- Deviation from rating (FS [1)]) at Limit point setting following DIN 16086	[%]	≤ 0.5 typical ≤ 1.0 max.
- max. temperature compensation Zero point (FS [1)])	[%]	≤ 0.025
- max. temperature compensation Range (FS [1)])	[%]	≤ 0.025
- Repeatability (FS [1)])	[%]	≤ 0.1
- Slew rate	[ms]	2
- Long-term drift (FS [1)])	[%/a]	0.3

Environmental conditions		
- Nominal temperature range	[°C]	–25 … +85
- Lubricant temperature range	[°C]	–40 … +125
- Ambient temperature range	[°C]	–40 … +100
- Storing temperature range	[°C]	–40 … +100
- CE-marking		DIN EN 6100-6-1, DIN EN 6100-6-2, DIN EN 6100-6-3, DIN EN 6100-6-4
- Vibration resistance following DIN EN 60068-2-6 at 5 2000 Hz	[g]	25
- Shock resistance following DIN EN 60068-2-37		500 g / 1 ms / half sine
- Type of protection following DIN 40050		IP 67

Further ratings		
- Supply voltage (radiometric)	[V]	5 ±5%
- Residual ripple of the supply voltage	[%]	≤ 5
- Electrical connection 300 m ribbon cable with AMP plug		Pin1: 0 V / Pin2: Signal / Pin3: +U_B
- Reverse voltage protection of the supply voltage, overload protection, Load short circuit strength		available
- Endurance		> 10 million load cycles
- Weight	[g]	about 55

[1)] FS = (Full Scale) referring to the full measuring range

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

Notes:

SKF Lubrication Systems Germany GmbH ● Heinrich Hertz-Str. 2-8 D-69190 Walldorf Tel. +49(0) 6227 33-0 ● Fax: +49 (0) 6227 33-259

EC Declaration of Conformity

(in the sense of the Machinery Directive 2006/42/EC, Annex II Part 1 B)

The manufacturer
SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, D - 69190 Walldorf

hereby declares that the incomplete machine

Designation:	Pump for pumping lubricants
Type:	**P603S**
Item number:	645-xxxxx- x
Year of construction:	See type plate

satisfies all basic health & safety requirements of the Machinery Directive 2006/42/EC listed below

1.1.2 ○ **1.1.3** ○ **1.3.2** ○ **1.3.4** ○ **1.51** ○ **1.56** ○**1.58** ○**1.59** ○ **1.61** ○ **1.71** ○ **1.7.3** ○ **1.7.4**

when launched.

The special technical documents according to Annex VII Part B of this Directive have been compiled. We undertake to transmit, in response to a reasoned request by the national authorities, the special documents for this partly completed machine. The head of standardisation is the authorised agent for the technical documentation. For the address, please refer to the manufacturer.

The following standards were also applied in the respective applicable areas:
2011/65/EU RoHS II
2014/30/EU Electromagnetic Compatibility | Industry

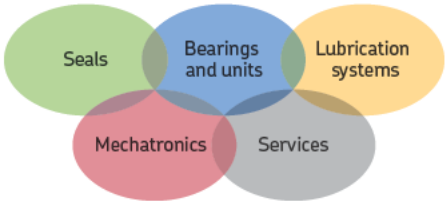
Harmonised / other standards:

DIN EN ISO 12100	2011	DIN EN 60947-5-1	2010	DIN EN 61000-6-2	2006	DIN EN 61000-6-4	2011
DIN EN 809	2012	DIN EN 61131-2	2008	Amendment	2011	DIN EN 60947-5-1	2010
DIN EN 60204-1	2007	Amendment	2009	DIN EN 61000-6-3	2011		
Amendment	2010	DIN EN 60034-1	2011	Amendment	2012		
DIN EN 50581	2013	DIN EN 61000-6-1	2007				

The incomplete machine may only be commissioned once it has been established that the system into which the incomplete machine is to be installed satisfies all provisions of the Machinery Directive 2006/42/EC and all other applicable guidelines.

Walldorf
2016-02-15

Jürgen Kreutzkämper
Manager R&D Germany
SKF Lubrication Business Unit



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

Important information on product usage

All products from SKF may be used only for their intended purpose as described in this brochure and in any instructions. If operating instructions are supplied with the products, they must be read and followed.

Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

Status of information:
07/2014

Manufacturer:
SKF Lubrication Systems Germany GmbH
Werk Walldorf
Heinrich Hertz-Str. 2-8
D-69190 Walldorf
Tel. +49(0) 6227 33-0
Fax: +49 (0) 6227 33-259
E-Mail: Lubrication-germany@skf.com