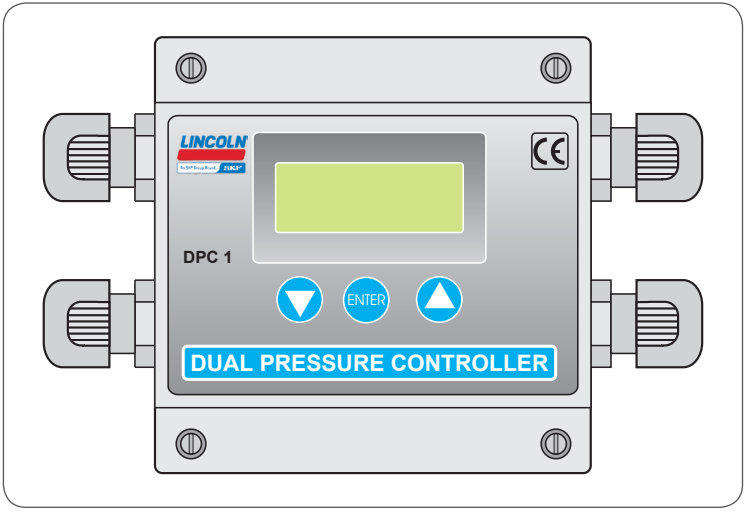
Intelligent end-of-line pressure switch unit DPC 1 for DuoFlex dual-line systems

Operating Instructions
following EMC directive 2004/108/EC

EN



Version 02

SKF

EC Declaration of conformity following EMC directive 2004/108/EC, Annex IV Part 2

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

hereby declares the conformity of the following device

Designation: Intelligent end-of-line pressure switch unit / dual pressure controller
Type: DPC 1
Part number: 234-10723-3

with the basic requirements of the mentioned directive when first being launched in the market.

Harmonized and other standards:

DIN EN 60204-1	2011:01	DIN EN 61000-6-3	2011:09
DIN EN 61000-6-1	2007:10	DIN EN 61000-6-4	2011:09
DIN EN 61000-6-2	2006:03	DIN EN 61000-6-6	2012:11

Walldorf, December 10, 2013

Dr.-Ing. Zdravko Paluncic
Director Research & Development
SKF Lubrication Business Unit

Legal Disclosure

The instructions following EMC Directive 2004/108/EC are part of the described product and have to be kept for further use.

Warranty

The instructions do not contain any information on the warranty. This can be found in the general terms and conditions. To view these go to: www.skf.com/lubrication.

Copyright

Manufacturer

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Table of contents

Explanation of symbols and signs

You will find these symbols, which warn of specific dangers to persons, material assets, or the environment, next to all safety instructions in these operating instructions.

Please read these instructions completely and heed the instructions and warning and safety notes. Please make all warnings available also to other users.

Warning level	Consequences	Probability
DANGER	Death/ serious injury	Imminent
WARNING	Serious injury	Possible
CAUTION	Minor injury	Possible
ATTENTION	Property damage	Possible

Symbols	
Symbol	Meaning
●	prompts an action
○	Used for itemizing
☞	Refers to other facts, causes, or consequences
→	Provides additional information within procedures

Symbols used	
Symbol	Meaning
	General warning
	Electrical component hazard Electrical shock hazard
	Slipping hazard
	Hazard from hot surfaces
	Crushing hazard
	Pressure injection hazard
	Wear personal protective equipment (goggles)
	Note
	Environmentally sound disposal
	Collect electric and electronic devices separately and dispose of in an environmentally sound manner

Abbreviations and conversion factors

Abbreviations

re.	regarding	oz.	Ounce
approx.	approximately	psi	pounds per square inch
°C	degrees Celsius	rh	relative humidity
cu.in	cubic inch	s	second
dB (A)	sound pressure level	sq.in.	square inch
i.e.	that is	e.g.	for example
etc.	et cetera	>	greater than
poss.	possibly	<	less than
°F	degrees Fahrenheit	±	plus or minus
fl.ou	fluid once	Ø	diametre
fpsec	feet per second	mph	miles per hour
gal.	gallon	assy.	assembly
hp	horse power		
in.	inch		
incl.	including		
K	Kelvin		
kg	kilogram		
kp	kilopond		
kW	kilowatt		
l	litre		
lb.	pound		
max.	maximum		
min.	minimum		
min	minute		
ml	millilitre		
ml/d	millilitre per day		
mm	millimeter		
N	Newton		
Nm	Newtonmeter		

Conversion factors

Length	1 mm = 0.03937 in.
Area	1 cm^2 = 0.155 sq.in
Volume	1 ml = 0.0352 fl.oz.
	1 l = 2.11416 pints (US)
Mass	1 kg = 2.205 lbs
	1 g = 0.03527 oz.
Density	1 kg/cm^3 = 8.3454 lb./gal(US)
	1 kg/cm^3 = 0.03613 lb./cu.in.
Force	1 N = 0.10197 kp
Speed	1 m/s = 3.28084 fpsec.
	1 m/s = 2.23694 mph
Acceleration	1 m/s^2 = 3.28084 $ft./s^2$
Pressure	1 bar = 14.5 psi
Temperature	°C = (°F-32) x 5/9
Power	1 kW = 1.34109 hp

1. Safety instructions

1.1 General safety instructions

In addition, the owner must also ensure that the relevant personnel are fully familiar with and have understood the contents of the assembly/ operating instructions.
These instructions must be kept together with the product at an accessible location for further use.
The instructions are part of the product and must accompany the product when selling it.
The described product was manufactured according to the state of the art.
Risks may, however, arise from its usage and may result in harm to persons or damage to material assets.

Any malfunctions which may affect safety must be remedied immediately. In addition to the lifecycle manual, general statutory regulations and other regulations for accident prevention and environmental protection must be observed and applied.
.

1.2 General behaviour when handling the product

- The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in these instructions.

- Technical personnel must familiarize themselves with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- Any unclear points regarding proper condition or correct assembly/ operation must be clarified. Operation is prohibited until issues have been clarified.
- Unauthorized prsons must be kept away from the product.
- Any safety indications and internal operational instructions relevant for the respective work must be adhered to.
- Responsibilities for different acitvities must be clearly defined and observed. Uncertainty seriously endangers safety.
- Protective and safety mechanisms must not be removed, modified, or disabled during operation andmust be checked for proper function and completeness at regular intervals.
  If protective and safety mechanisms must be removed, they must be re-installed immediately following conclusion of work and then be checked for proper function.
- Any malfunctions that occur must be resolved according to responsibility. The operator of the system or machine must be notified in case of lamfunctions outside the scope of responsibility.
- Wear personal protective equipment.
- Observe the particular safety data sheets when handling lubricants.

1.3 Qualified technical personnel

Only qualified technical personnel may install, maintain, and repair the product described in this document.
Qualified technical personnel are persons who have been trained, assigned, and instructed by the operator of the final product into which the described product is incorporated.
Such persons are familiar with the relevant standards, rules, accident prevention regulations, and assembly conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid any potential hazards.
The definition of qualified personnel and the prohibition against employing non-qualified personnel are laid down in DIN VDE 0105 and IEC 364.

Relevant country-specific definitions of qualified technical personnel apply for countries outside the scope of DIN VDE 0105 or IEC 364.
The core principles of these country-specific qualification requirements for technical personnel cannot be below those of the two standards mentioned above.
The operator of the final product is responsible for assigning tasks and areas of responsibility and for the responsibility and monitoring of the personnel. These areas must be precisely specified by the operator.
The personnel must be trained and instructed if they do not possess the requisite knowledge.
Product training can also be performed by SKF in exchange for costs incurred.

1.4 Electrical current hazard

WARNING

Electric shock
Working on products not disconnected from the power supply may cause personal injury and damage to property.
Assembly, maintenance and repair works may be performed by qualified and authorized personal only on products previously disconnected from the power supply.

Electrical connection may be carried out only by a qualified electrician authorized by the operator under consideration of the local connection conditions and legal prescriptions (e.g. VDE/ IEC).

1.5 System pressure hazard

WARNING

System pressure
During operation the product is pressurized. Before any assembly, maintenance or repair works make sure to depressurize the product.

1.6 Operation

The following must be observed during commissioning and operation:

- All information within this manual and the information within the referenced documents.
- All laws and regulations that the operator must observe.

1.7 Assembly, maintenance, malfunctions, shutdown, disposal

- All relevant persons (e.g., operating personnel, supervisors) must be informed of the activity prior to the start of work. Precautionalry operational measures and work instructions must be observed.
- Ensure through suitable measures that moving or detached parts are immobilized during the work and that no body parts can be crushed by unintended movements.
- Assemble the product only outside the operating range of moving parts, at an adequate distance from sources of heat or cold.
- Prior to performing work, the product and the machine or system in which the product is or will be integrated must be depressurized and secured against unauthorized activation.
- Carry out works on electrical components with voltage isolated tools only.
- Ensure proper earthing of the product.
- Drill required holes only on non-critical, non-load bearing parts.
- Other units of the superior machine must not be damaged or impaired in their function by the installation of the product.
- No parts of the centralized lubrication system must be subjected to torsion, shear, or bending.
- Use adequate lifting devices when working with heavy components.
- Avoid mixing up or wrong assembly of disassembled parts. Mark parts accordingly.

1.8 Intended use

The intelligent end-of-line pressure switch unit DPC 1 is designed to control and monitor DuoFlex dual-line systems with change-over devices (e.g. EM-U2, EM-U3, MP, MA) in industrial systems.
For details regarding the use, see chapter 3.1 Functions of the end-of-line pressure switch unit DPC 1 on page 18.

1.9 Foreseeable misuse

Any usage of the product differing from the aforementioned conditions and stated purpose is strictly prohibited.
Particularly prohibited is:

- the use in an explosive atmosphere.

1.10 Disclaimer of liability

The manufacturer shall not be held responsible for damages:

- caused by inappropriate usage.
- resulting from improper assembly, configuration, or programming.
- resulting from improper response to malfunctions.
- caused by unauthorized modification of system components.
- caused by the installation of non-original components or spare parts.

1.11 Referenced documents

In addition to these instructions, the following documents must be observed by the respective target group:

- Operational instructions and approval rules
- Instructions of the suppliers of the purchase parts
- Safety data sheet (MSDS) of the lubricant used
- Project planning documents and other relevant documents.

The operator must supplement these documents with applicable national regulations for the country of use. In the event of sale or transfer these documents have to be attached to the product.

1.12 Residual risks

Residual risk	Remedy
Life cycle: Assembly, malfunction, troubleshooting, repair, maintenance	
Electrical shock due to defective connection cable	• Check connection cable for damages
People slipping due to floor contamination with spilled or leaked lubricant	• Exercise caution when disconnecting the product's hydraulic connections • Promptly apply suitable binding agents to remove the leaked/ spilled lubricant • Follow operational instructions for handling lubricants and contaminated parts
Tearing or damaging of lines when installed on moving machine parts	• If possible, do not install on moving parts; if this cannot be avoided, use flexible hose lines
Life cycle: Start-up, operation	
Electrical shock due to defective connection cable	• Check connection cable for damages
Spilling of lubricant due to faulty connection of components or lines	• Use hydraulic fittings and lines that suit the indicated pressures. Check the fittings and lines for correct connection and damages before the start-up.
Life cycle: Adjustment, shutdown, disposal	
People slipping due to floor contamination with spilled or leaked lubricant	• Exercise caution when disconnecting the product's hydraulic connections • Promptly apply suitable binding agents to remove the leaked/ spilled lubricant • Follow operational instructions for handling lubricants and contaminated parts

2. Lubricants

2.1 General information

ATTENTION

All products may be used only for their intended purpose and in accordance with the lifecycle instructions.

Intended use is the use of the products for the purpose of providing centralized lubrication/ lubrication of bearings and friction points with
lubricants within the physical usage limits which can be found in the documentation for the device, e.g., operating instructions and the product descriptions, e.g. technical drawings and catalogs. Particular attention is called to the fact that hazardous materials of any kind, especially those materials classified as hazardous by EC Directive 67/548/ EEC, Article 2, Para. 2, may only be filled into Lincoln centralized lubrication systems and components and delivered and/ or distributed with such systems and components after consulting with and obtaining written approval from Lincoln.
No products manufactured by Lincoln are approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors, or such fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible temperature.
Other media which are neither lubricant nor hazardous substance may only be fed after consultation with and written approval from Lincoln.
SKF considers lubricants to be an element of system design and must always be factored into the selection of components and the design of centralized lubrication systems. The lubricating properties of the lubricants are critical.

2.2 Selection of lubricants

ATTENTION

Observe the instructions from the machine manufacturer regarding the lubricants that are to be used. The amount of lubricant required at the lube point is specified by the bearing or machine manufacturer. It must be ensured that the required lubricant volume is provided to the lubrication point. The lubrication point may otherwise not receive adequate lubrication, which can lead to damage and failure of the bearing.

Selection of a lubricant suitable for the lubrication task is made by the machine/ system manufacturer and/or the operator of the machine/ system in cooperation with the lubricant supplier.
When selecting a lubricant, the type of bearings or friction points, the expected load during operation, and the anticipated ambient conditions must be taken into account. All economic and environmental aspects must also be considered.

2.3 Approved lubricants

ATTENTION

If required SKF can help customers to select suitable components for feeding the selected lubricant and to plan and design their centralized lubrication system

Please contact SKF if you have further questions regarding lubricants. It is possible for lubricants to be tested in the company's laboratory for their suitability for pumping in centralized lubrication systems (e.g. „bleeding"). You can request an overview of the lubricant tests offered by SKF from the company's service department.

ATTENTION

Only lubricants approved for the product may be used. Unsuitable lubricants can lead to failure of the product and to property damage.

ATTENTION

Different lubricants must not be mixed. Doing so can cause damage and require costly and complicated cleaning of the product/ lubrication system. It is recommended that an indication of the lubricant in use be attached to the lubricant reservoir in order to prevent accidental mixing of lubricants.

The product described here can be operated using lubricants that meet the specifications in the technical data. Depending on the product design, these lubricants may be oils, fluid greases, or greases.
Mineral, synthetic, and/ or and rapidly biodegradable oils and base oils can be used.
Consistency agents and additives may be added depending on the operating condi tions.
Note that in rare cases there may be lubricants whose properties are within permissible limit values but whose other characteristics render them unsuitable for use in centralized lubrication systems. For example, synthetic lubricants may be incompatible with elastomers.

2.4 Lubricants and the environment

ATTENTION

Lubricants may pollute ground and waters. Lubricants have to be handled and disposed of properly. Relevant applicable regulations and laws regarind the disposal of lubricants must be observed.

It is important to note that lubricants are environmentally hazardous, flammable substances which require special precautionary measures during transport, storage, and processing. Consult the safety data sheet from the lubricant manufacturer for information regarding transport, storage, processing, and environmental hazards of the lubricant that will be used.
The safety data sheet for a lubricant can be requested from the lubricant manufacturer.

2.5 Lubricant hazards

WARNING

Risk of slipping and injury
Leaking lubricant represents a potential source of danger.
Leaks must be sealed off without delay.

3. Overview/ functional description

Item Description

2 Display
Display of parameters and fault indications. Display is switched on by pressing a key and switches off automatically 30 minutes after the last key activation. The display has backlighting.

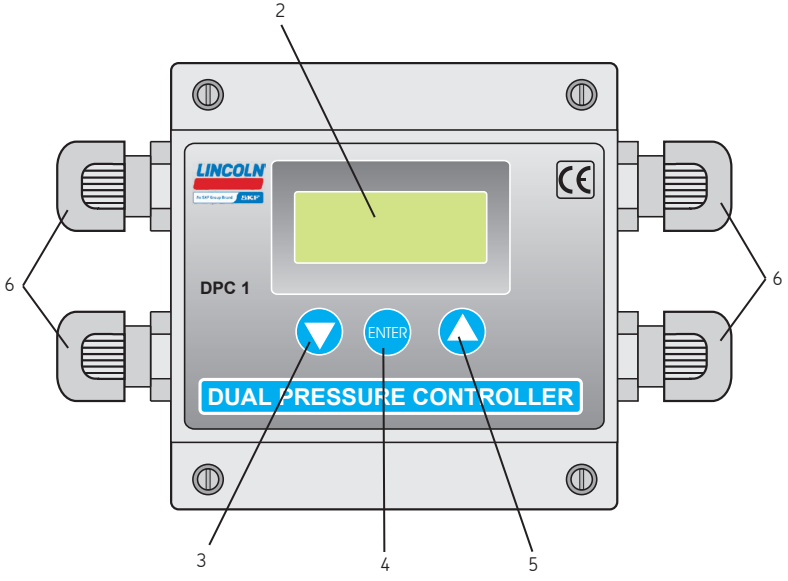
3 Down key
Serves to change the counter value.
Pressing short: counter value - 1
Keeping pressed: speedy run

4 ENTER key
Serves to confirm an entry.

5 Up key
Serves to change the countervalue.
Pressing short: counter value + 1
Keeping pressed: speedy run

6 Cable ducts
Connection of the pressure transducers, the power supply and the learning sensor.

Overview Fig. 1



3.1 Functions of the end-of-line pressure switch unit DPC 1

The intelligent end-of-line pressure switch unit DPC 1 determins the optimum absolute and differential pressures for the DuoFlex dual-line systems and adjusts these independently within the released operating limitations.

To determine the pressures a pressure transducer has to be mounted into each pressure line.

The change-over device in the dual-line system can be controlled directly by the output signal of the DPC1. A superior control unit is not required, but can be connected to allow further functions.

Due to its high shock resistance and IP protection class, the DPC 1 is preferably used for applications in harsh environments, like e.g. in the paper, steel, beverage or heavy industry.

The DPC 1 contributes to increased efficiency and reduced operating costs, as the motor of the pump continues running only as long as it is actually required for pressurization of the system. This is time- and energy-saving. In case of pneumatically driven pumps less compressed air is needed.

3.2 Operating modes of the end-of-line pressure switch unit DPC 1

The intelligent end-of-line pressure switch unit DPC 1 determins the optimum absolute and differential pressures for the DuoFlex dual-line systems and adjusts these independently within the released operating limitations. The DPC 1 can be operated in the following operating modes:

PU:0 PX:0
as an analysis and evaluation device for absolute and differential pressures, e.g. for control of dual-line systems by a superior controller
(see schematic 3.2 page 20).

PU:0 PX:1
as a learning analysis and evaluation device e.g. for control of dual-line systems by a superior controller in combination with a learning sensor on a critical lubricant metering device
(see schematic 3.3 page 21).

PU:1 PX:0
as a controller for cycle, monitoring and holding time in dual-line systems for:

- the direct control of pneumatic and hydraulic pumps and the corresponding change-over devices.
- the indirect control of a three-phase current pump with motor starter and the corresponding change-over devices

(see schematic 3.4 page 22).

PU:1 PX:1
as a controller for cycle, monitoring and holding time in dual-line systems for:

- the direct control of pneumatic and hydraulic pumps and the corresponding change-over devices
- the indirect control of a three-phase current pump with motor starter and the corresponding change-over devices
- use with a learning sensor on a critical lubricant metering device.

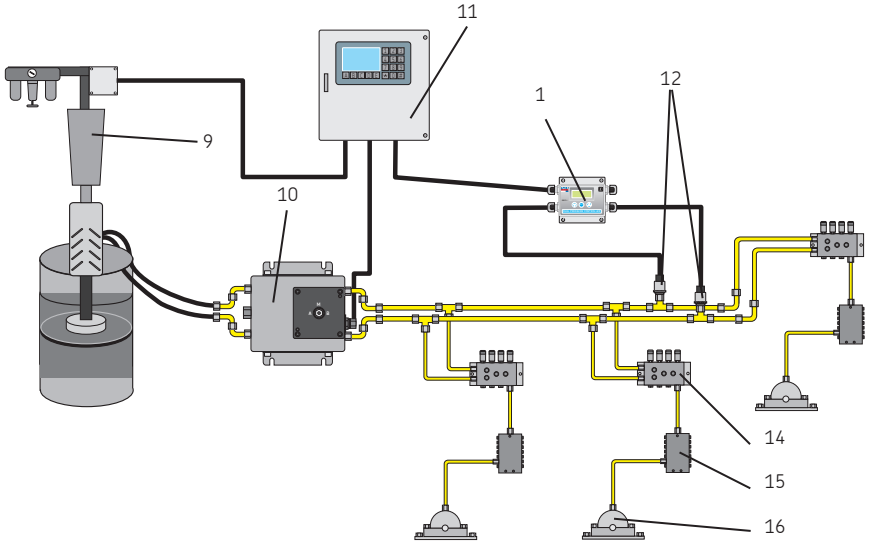
(see schematic 3.5 page 23).

3.2 Schematic of a DuoFlex dual-line system with intelligent end-of-line pressure switch unit DPC 1 in the operating mode PU:0 PX:0

Item Description

- 9 Pump in dual-line system
- 10 Change-over device
- 11 External controller
- 1 DPC 1
- 12 Pressure transducer
- 13 Sensor (proximity switch)
- 14 Main metering device
- 15 Secondary metering device
- 16 Lubrication point

Schematic of a DuoFlex dual-line system with DPC 1 in operating mode PU:0 PX:0, Fig. 2

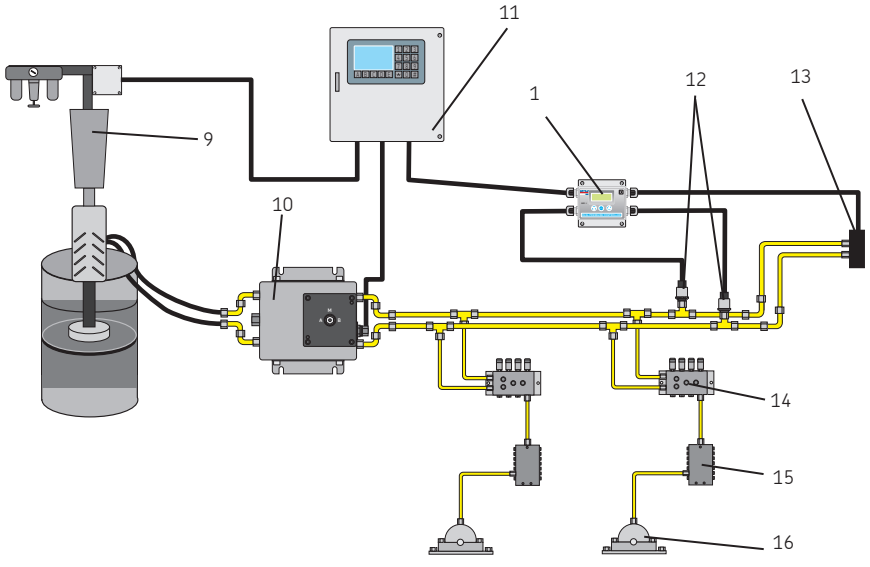


3.3 Schematic of a DuoFlex dual-line system with intelligent end-of-line pressure switch unit DPC 1 in the operating mode PU:0 PX:1

Item Description

9 Pump of the dual-line system
10 Change-over device
11 External controller (option)
1 DPC 1
12 Pressure transducer
13 Sensor (proximity switch)
14 Main metering device
15 Secondary metering device
16 Lubrication point

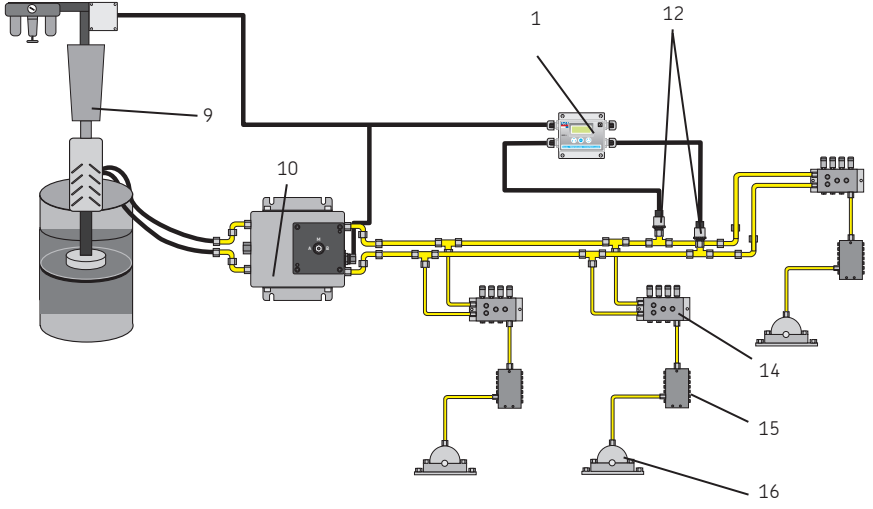
Schematic of a DuoFlex dual-line system with DPC 1 in the operating mode PU:0 PX:1, Fig. 3



3.4 Schematic of a DuoFlex dual-line system with intelligent end-of-line pressure switch unit DPC 1 in the operating mode PU:1 PX:0

Item	Description
9	Pump of the dual-line system
10	Change-over device
1	DPC 1
12	Pressure transducer
14	Main metering device
15	Secondary metering device
16	Lubrication point

Schematic of a DuoFlex dual-line system with DPC 1 in the operating mode PU:1 PX:0 Fig. 4

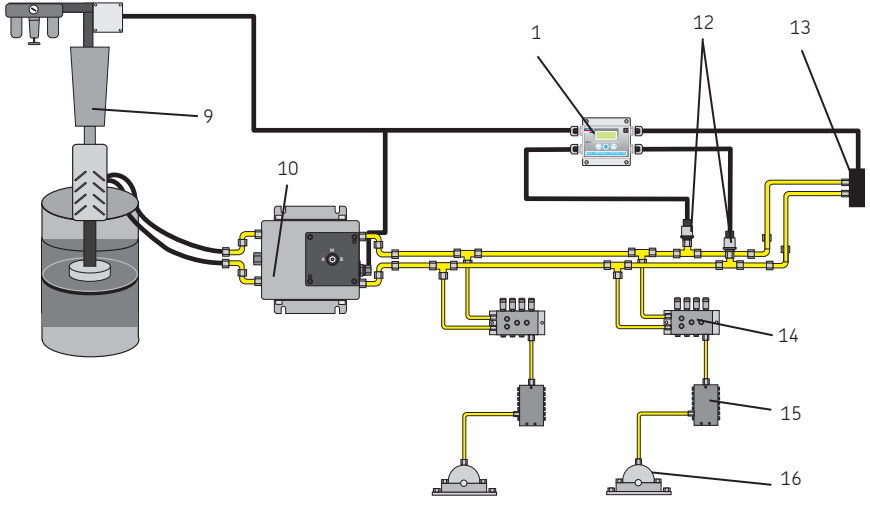


3.5 Schematic of a DuoFlex dual-line system with intelligent end-of-line pressure switch unit DPC 1 in the operating modePU:1 PX:1

Item Description

9 Pump of the dual-line system
10 Change-over device
1 DPC 1
12 Pressure transducer
13 Sensor (Proximity switch)
14 Main metering device
15 Secondary metering device
16 Lubrication point

Schematic of a DuoFlex dual-line system with DPC 1 in the operating mode PU:1 PX:1 Fig. 5



4. Technical data

4.1 End-of-line pressure switch unit DPC 1

Technical data

Admissible operating temperature	min. -25 °C	max. 70 °C		Interference suppression	A VDE 0875 T 11
Operating pressure	max. 400 bar			Interference resistance	DIN EN 61000-6-1
Differential pressure	max. 400 bar			Emitted interference	DIN EN 61000-6-3
Mounting position	any				
Protection class	IP 65			Cycle time	
Shock resistance				min.	max
Shock (IEC 60068-2-27)	50 g (11 ms)			1 minute	99 hours 59 minutes
Vibration (IEC 60068-2-6)	20 g (10-500 Hz)			Monitoring time	
				min.	max
Supply voltage	24 VDC (6-27 VDC)		1 second	99 minutes 59 seconds	
Overload protection	max. 40 V			Time-storing via EEPROM (unlimited)	
Max. power consumption	≤ 2A			Display	LED display with backlighting
Protection classes	SELV, PELV FELV				
Residual ripple	± 5 % (DIN 41755)				

Inputs

Protected against reverse polarity, short-circuit proof and non-isolated

Outputs

SW	24 VDC non-isolated
PU	24 VDC non-isolated
Error	Change-over contact, floating

4.2 Pressure transducer

Technical data

Input characteristics	
Metering range	0-400 bar
Overload limit	800 bar
Burst pressure	2000 bar
Output characteristics	
Output signal	10-90 UV (0.5-4.5 VDC)
Deviation from characteristic at	≥ ± 0.5 % typ.
Limit value setting (DIN 16086)	≥ ± 1.0 % max.
Repeatability	≤ ± 0.1 %
Rise time	≤ 2 ms
Long-term drift	≤ ± 0.3 %
Shock resistance	
Vibration (DIN EN 60068-2-6)	025 g (5-2000 Hz)
Shock (DIN EN 60068-37)	500 g (1ms)
Service life	>10 million load reversals
Weight	55 g
Total length	50 mm
Screw-in depth	12 mm
Mechanical connection	G1/4 A
Tightening torque	20 Nm
Materials with lubricant contact	Stainless steel, FPM

Temperature ranges	
Nominal temperature	-25 °C to + 85 °C
Lubricant temperature	-40 °C to +125 °C
Ambient temperature	-40 °C to +100 °C
Bearing temperature	-40 °C to +100 °C
Temperature compensation (max.)	≤ ± 0.025 %
Zero point / span	≤ 0.025 % / ≤ ± 0.025 %
Electrical characteristics	
Supply voltage	5 VDC ± 10 %
Residual ripple	≤ 5 %
Panel connector	3-pole (DIN 72585)
(Pin 1: + Ub / Pin 2: Signal Pin 3: 0 V)	
Type of protection	IP 67
Reverse polarity protection	available
Supply voltage	available
Loard short circuit	available

5. Delivery, returns, and storage

5.1 Delivery

The products are packaged in accordance with standard commercial practice according to the regulations of the recipient's country. During transport, safe handling must be ensured and the product must be protected from mechanical effects such as impacts. The transport packaging must be marked „Do not drop!".
There are no restrictions for land, air, or sea transport.

After receipt of the shipment, the product must be inspected for damage and for completeness according to the shipping documents. Transport damages must be reported to the forwarding agency immediately. Keep the packaging material until any discrepancies are resolved.

5.2 Storage

For storage there apply the following conditions:

5.3 Electrical devices

- Dry and dust-free surroundings, storage in a well-ventilated and dry area
- Storage time: max. 24 months
- Admissible relative humidity: < 95%

Storage temperature:
min. - 25 °C / max. + 70 °C

- Avoid direct exposure to sun or UV rays
- Shield nearby sources of heat and coldness.

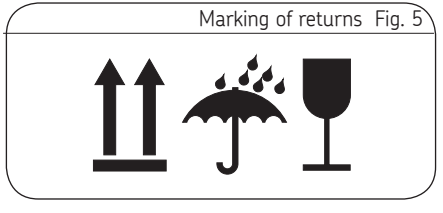
5.4 General notes regarding the storage

- The product can be wrapped in plastic film to avoid low-dust storage.
- Protection against ground moisture by storing on a shelf or wooden pallet.

5.5 Returns

Clean contaminated parts and pack them properly before returning them. There are no restrictions for land, air or sea transport. Send your returns to our Service Department, address see manufacturer.
Returns have to be marked as follows on the packaging.

Marking of returns Fig. 5



6. Assembly

6.1 Allgemeines

Only qualified technical personnel may install, operate, maintain, and repair the SKF MonoFlex pre-lubrication metering devices described in the lifecycle manual. Qualified technical personnel are persons who have been trained, assigned, and instructed by the operator of the final product into which the SKF MonoFlex pre-lubrication metering devices are incorporated.
Such persons are familiar with the relevant standards, rules, accident prevention regulations, and operating conditions as a result of their training, experience, and instruction. They are qualified to carry out the required activities and in doing so recognize and avoid potential hazards.

Before assembling/setting up the product, the packaging material as well as possible transport locks must be removed.
Keep the packaging material until any discrepancies are resolved.

ATTENTION

Observe the technical data (chapter 4).

6.2 Attachment

The product should be protected against humidity and vibration and should be installed in an easily accessible position to ensure all other installations can be carried out without any problem. For indications on the maximum admissible ambient temperature see the technical data.

During assembly and during any drilling work for the base plate, always pay attention to the following:

- Other units must not be damaged during assembly.
- The product must not be installed within the range of moving parts.
- The product must be installed at an adequate distance from sources of heat and coldness.
- Maintain safety clearances and comply with local regulations for assembly and accident prevention.

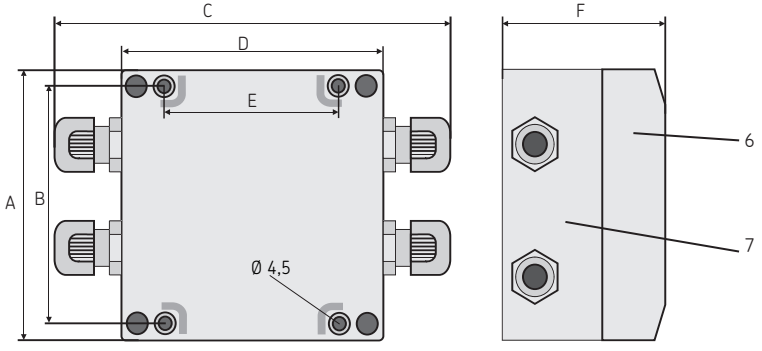
6.3 Installation dimensions and mechanical assembly

- Unscrew cover (6).
- Use pen to mark hole pattern on place of assembly or mark pattern following the adjacent indications.
- Provide cover with bores (D 4.0 mm).
- Fasten housing (7) again.

Installation dimensions Fig. 3

Installation dimensions	
A = Height	100 mm
B = Hole distance	85 mm
C = Total width	150 mm

Installation dimensions	
D = Width	100 mm
E = Hole distance	63 mm
F = Depth	62 mm



6.4 Electrical connection

WARNING

Electrical shock
Electrical connection may be carried out only by the operator or authorized personnel. Local connection conditions and legal prescriptions (e.g. DIN, VDE) must be adhered to.

Electrical connections must be provided in such way that no tensile forces affect the product (tension-free connection).
For details regarding the electrical characteristics, see chapter 4, Technical data.

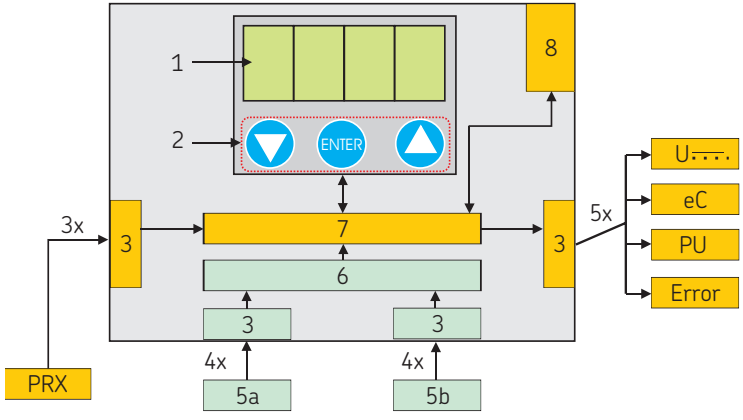
- Connect supply lines and pressure transducer to the device.
- Mount cover of DPC 1 again. Make sure there are no contaminations inside of the device (e.g. drilling chips, etc.).
- Now the DPC 1 can be used with the factory settings or be adapted to individual requirements by changing of the operating mode or parameters
  (see chapters 6.6 - 6.9).

Circuit diagram 4

6.5 Block diagram

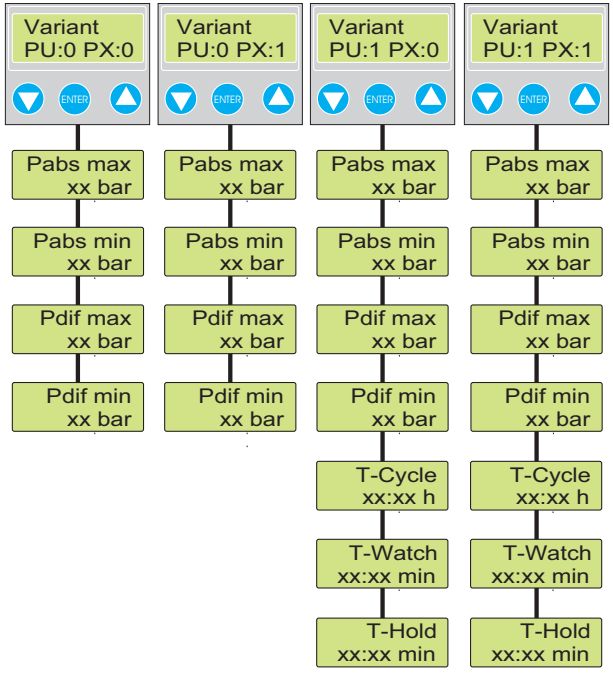
1	Display
2	Operator panel
3	Cable ducts
3x	3-core cable
4x	4-core cable
5x	5-core cable
5a	Pressure transducer line A
5b	Pressure transducer line B
6	Signal processing
7	Processor
8	Base for wireless (optional)
U	Input voltage 24 VDC
eC	Change-over device
PU	Pump
Error	Fault signal
PRX	Proximity switch

Block diagram Fig. 5



6.6 Overview of parameters

Overview of parameters Fig. 6



6.7 Explanation of displays

Explanation of displays Fig. 7

PU	Pump
PX	Learning sensor
:0	without
:1	with
Pabs	Absolute pressure
Pdif	Differential pressure
S1	Sensor 1
S2	Sensor 2
T-Cycle	Cycle time
T-Watch	Monitoring time
T-Hold	Holding time
A-xx	Absolute pressure
D-xx	Differential pressure
A / B	Active line A or B
ERROR	Fault
WARNING	Warning
WAIT	Pause mode

6.8 To display a parameter

To display the parameters of the adjusted operating mode, proceed as follows:

- Press ▼ or ▲.
- The next parameter is displayed.
- Repeat pressing ▼ or ▲ until all parameters have been displayed (continuous display).

6.9 To change the password

To change an existing password, proceed as follows:

- Press ENTER.
- Enter current password by pressing ▼ or ▲ and confirm with ENTER.
- The display changes to a parameter.
- Press ▼ or ▲until the password reappears in the display.
- Press ENTER.
- In the display there appears EDIT and the pre-set value of the password.
- Change password by pressing ▼ or ▲.
- Confirm the change by pressing ENTER.
- Change the display by pressing ▼ or ▲.

Note: The entry 0000 means that no password has been assigned.

6.10 To change a parameter

To display the parameters of the adjusted operating mode, proceed as follows:

- Press ENTER.
- Enter the password and confirm it by pressing ENTER.
- Press ▼ or ▲ until the parameter to be changed is displayed.
- Press ENTER.
- In the display there appears EDIT and the pre-set value of the parameter.
- Press ▼ or ▲ to change the value of the parameter.
- Press ENTER to confirm the changed value.
- The next parameter is displayed.

6.11 To change the operating mode

To change the adjusted operating mode, proceed as follows:

- Press ENTER.
- Enter the password and confirm it by pressing ENTER.
- Press ▼ or ▲ until the current operating mode is displayed.
- Press ENTER.
- In the display there appears Edit and the adjusted operating mode.
- Press ▼ or ▲ to change the operating mode.
- Press ENTER to confirm the changed operating mode.
- First the adjusted operating mode will be displayed shortly, then INIT will be displayed shortly.

NOTE
To confirm the changes, ENTER must be pressed within 30 seconds.

7. Start-up

7.1 General information

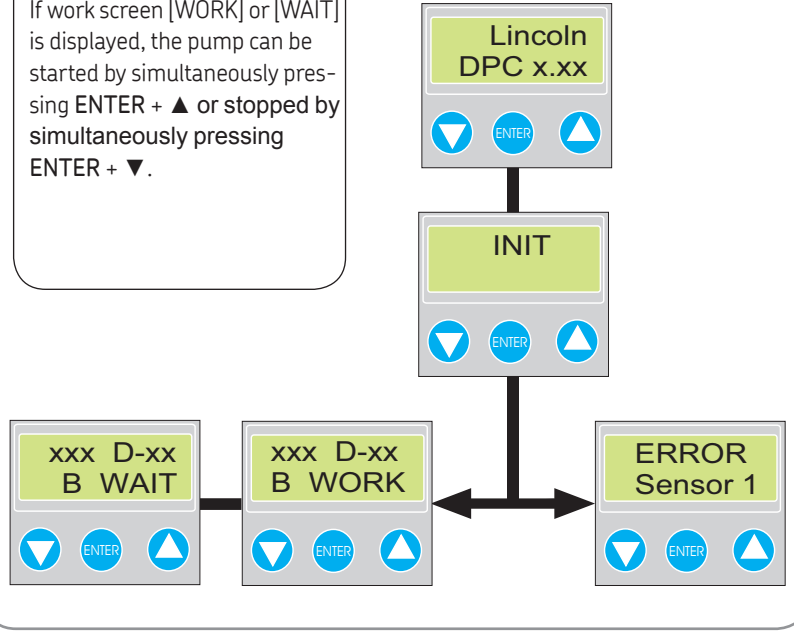
Start-up of the DPC 1 is effected after assembly by connecting it to the operator's network respectively to the power supply of the superior machine.
After correct electrical connection respectively after switching on the superior machine, the DPC 1 is ready for operation.

The following information is displayed shortly one after the other:
- version no. [DPC.x.xx]
- Initialization [INIT]
- work screen [WORK] or
- work screen [WAIT]

Should there have been arising faults during initialization, instead of the work screens [WORK] or [WAIT] a fault will be displayed.
Troubleshooting, see chapter 10.

Displays during the start-up Fig. 8

Pump start/stop
If work screen [WORK] or [WAIT] is displayed, the pump can be started by simultaneously pressing ENTER + ▲ or stopped by simultaneously pressing ENTER + ▼.



7

8. Operation, shutdown and disposal

8.1 General information

After correct electrical connection the DPC 1 is ready for operation.
Start-up respectively shutdown is effected by switching the superior machine on or off.

8.2 Temporary shutdown

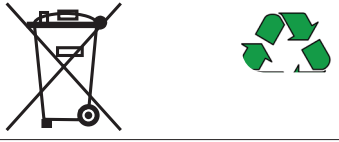
The DPC 1 can be shutdown temporarily by disconnecting it from the power supply.

8.3 Final shutdown and disposal

If the product will be permanently shut down, the local regulations and laws regarding the disposal of contaminated equipment must be observed.

The product can also be returned to the manufacturer for disposal, in which case the customer is responsible for reimbursing the costs incurred. The parts are recyclable.

Disposal Fig. 9



9. Maintenance and cleaning

9.1 General information

The warranty does not apply for defects arising from improper maintenance, repair or cleaning.

9.2 Cleaning

- Thoroughly clean all outer surfaces. Do not use any aggressive cleaning agents. Normally inside cleaning is not required.

9.3 Maintenance

- There are no user serviceable parts.

10. Troubleshooting

10.1 Faults

Fault	Possible cause	Remedy	Reset
Supply	Over- or undervoltage	• Switch off consumers and sensors. • Switch off sensor evaluation. • Measure supply voltage on the DPC 1 and correct if necessary.	Keep **ENTER** pressed until display goes off
SNS Power	Sensor current is too high	• Check sensor current and correct if necessary.	
Sensor A Sensor B	Sensor A / B outside the admissible range of values Sensor A / B missing or defective	• Check sensor A / B and correct if necessary.	
Pump	Pump current is too high	• Check pump and, if applicable, motor starter.	
Switch	Current of change-over device is too high	• Check change-over device and replace if necessary.	
PxSwitch	Current of learning sensor too high	• Check learning sensor and replace if necessary.	

10.1 Faults

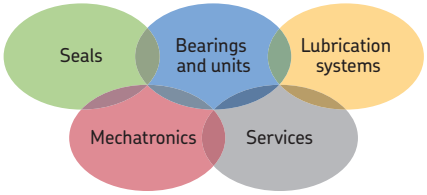
Fault	Possible cause	Remedy	Reset
PDif exc	Maximum differential pressure has been exceeded	• Change-over / continue operating cycle.	Keep **ENTER** pressed until display goes off
Pabs exc	Maximum absolute pressure has been exceeded	• Change-over / continue operating cycle.	
Timeout	Monitoring time has lapsed	• Switch off pump / stop operating cycle.	
Blockage	Change-over process will be effected within 5 seconds	• Stop operating cycle.	

11. Spare parts

End-of-line pressure switch unit DPC 1
Part no. 234-10723-3
consisting of:
- End-of-line pressure switch unit DPC 1 assy.
  including 2 x cable for pressure transducer

Pressure transducer
Part no. 234-10663-7
consisting of:
- Pressure transducer
  without connecting cable

Notes



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.

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