SKF ST-102P-XX-XX CONTROLLER

(Original Operating and Service Manual according to EU Directive 2014/30)



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Read this manual before installing or commissioning the product and keep it at hand for later reference.

EU Declaration of Conformity in accordance with Directives 2014/30/EU, Annex IV

The manufacturer declares under its sole responsibility that the product described below conforms to all the European Union's applicable harmonised legislation at the time of placing on the market.
Description: Controller for lubrication systems
Type: ST-102P-XX(-XX)
Year of construction: See the rating plate

The following directives and standards were applied in the applicable areas:
2011/65/EU: ROHS II, including the addition (EU) 2015/863
2014/30/EU: Electromagnetic compatibility:

EN 61000-6-4:2011, for emissions EN 61000-6-2:2005, for immunity

Muurame, 21 September 2021
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UK Declaration of Conformity in accordance with Electromagnetic Compatibility Regulations 2016 No. 1091

The manufacturer declares under its sole responsibility that the product described below conforms to all the United Kingdom's applicable harmonised legislation at the time of placing on the market.

Technical documentation has been drawn up in accordance with Part B of Annex VII. The manufacturer undertakes to deliver the technical documentation to national authorities in electronic format when so requested. The company authorised to compile the technical documents is SKF (U.K.) Limited, 2 Canada Close, Banbury, Oxfordshire, OX16 2RT, GBR.

Description: Controller for lubrication systems
Type: ST-102P-XX(-XX)
Year of construction: See the rating plate

The following regulations and standards were applied in the applicable areas:
• The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032
• Electromagnetic Compatibility Regulations 2016 No. 1091:

EN 61000-6-4:2011, for emissions EN 61000-6-2:2005, for immunity

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Masthead

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Warranty
The instructions contain no statements regarding the warranty or liability for defects. That information can be found in our General Terms of Payment and Delivery.

Training
We conduct detailed training in order to enable maximum safety and efficiency. We recommend taking advantage of this training. For further information, contact your authorised SKF dealer or the manufacturer.

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Safety alerts, visual presentation, and layout

While reading these instructions, you will encounter various symbols, illustrations, and text layouts intended to help you navigate and understand the instructions. Their meaning is explained below.

Safety alerts:
Activities that present specific hazards (to life and limb or possible damage to property) are indicated with safety alerts. Always be sure to follow the instructions given in the safety alerts.

⚠ WARNING

These safety alerts indicate an imminent danger. Ignoring them will result in death or serious injury.

⚠ WARNING

These safety alerts indicate potentially imminent danger. Ignoring them could result in death or serious injury.

⚠ WARNING

These safety alerts indicate potentially imminent danger. Ignoring them could result in minor injury.

CAUTION

These safety alerts indicate a potentially harmful situation. Ignoring them could result in damage to property or malfunctions.

Figures:
The illustrations used depict a specific product. For other products, they may have the function of a diagram only. This does not alter the basic functions and operation of the product.
Text layout:

- **First-order list**: the entries in the list begin with a black dot and indentation.
  – **Second-order list**: if the list of sub-items continues, a second level of the list shall be used.

1 Explanation of annotations: A legend explains the numbered contents of an illustration, presented as a numbered list. Items in a legend start with a number (without a dot) and an indent.
– Second-order legend: in some cases, the numbered contents of an image represent more than just one object. A second-order legend is then used.

1. Instruction steps: these indicate a chronological sequence of instruction steps. The numbers of the steps are in bold and are followed by a period. If a new activity follows, the numbering starts again at “1.”
– **The second-order instruction steps**: in some cases, the step needs to be divided into a few sub-steps. A sequence of second-order instruction steps is then used.

1. Safety instructions

1.1 General safety instructions

- Putting the products into operation or operating them without having read the instructions is prohibited. The operator must ensure that the instructions are read and understood by all persons who work with the product or who supervise or instruct such persons. Retain the instructions for further use.
- The product may only be used in awareness of the potential dangers, in proper technical condition, and according to the information in this manual.
- Any faults that could affect safety must be remedied according to responsibility. The supervisor must be notified immediately in the event of malfunctions outside one's individual scope of responsibility.
- Unauthorised changes may have unexpected effects on the safety and performance of the product, which is why making such changes is prohibited. Only original SKF spare parts and SKF accessories may be used.
- Any unclear points regarding proper condition or correct assembly/operation must be clarified. Operation is prohibited until issues have been clarified.
- The components used must be suitable for the intended use and the applicable operating conditions, e.g. max. operating pressure and ambient temperature range, and must not be subjected to torsion, shear, or bending.

1.2 General electrical safety instructions

- Electrical devices must be kept in proper condition. This must be ensured by periodic inspections in accordance with the relevant applicable standards and technical rules. The type, frequency, and scope of the inspections must be determined in accordance with the risk assessment to be carried out by the operator. Work on electrical components may only be performed by qualified electricians. Connect the electrical power only in accordance with the valid terminal diagram and in observance of the relevant regulations and the local electrical supply conditions.
- Work on electrical components may be performed only in a voltage-free state and using tools suitable for electrical work. Do not touch cables or electrical components with wet or moist hands.
- Fuses must not be bridged. Always replace defective fuses with fuses of the same type.
- The proper connection of the protective conductor must be ensured for products of protection class I. The specified enclosure class must also be taken into account.
- The operator must implement appropriate measures to protect vulnerable electrical devices from the effects of lightning during use. The electrical device is not furnished with a grounding system for the dissipation of the electric charge and does not have the voltage strength necessary to withstand the effects of lightning.

1.3 General behaviour when handling the product

- Familiarise yourself with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- Keep unauthorised persons away.
- Always wear personal protective equipment.
- Precautionary operational measures and instructions for the work must be observed.
- In addition to these Instructions, general laws and regulations for accident prevention and environmental protection must be observed.
- Precautionary operational measures and instructions for the work must be observed. Uncertainty seriously endangers safety.
- Safety-related protective and safety equipment must not be removed or modified, and its function must not be altered and its condition and operation must be checked at regular intervals.
- If protective and safety equipment must be dismantled, it must be reassembled immediately after finishing the work, and then checked for correct function.
- Remedy any faults that are within the scope of your responsibilities. Immediately inform your superior in the case of faults beyond your competence.
- Never use parts of the centralised lubrication system or of the machine as standing or climbing aids.

1.4 Intended use

Supply of lubricants.
The product is intended solely for installation in another machine.
Use is only permitted within the scope of commercial or economic activity by professional users, in compliance with the specifications, technical data, and limits specified in this manual.

1.5 Persons authorised to use the product

Operator
A person who is qualified by training, knowledge, and experience to carry out the functions and activities related to normal operation. This includes avoiding possible hazards that may arise during operation.
Mechanical specialist
Person with appropriate professional education, knowledge, and experience to detect and avoid the hazards that may arise during transport, installation, start-up, operation, maintenance, repair and disassembly.
Electrician
Person with appropriate professional education, knowledge, and experience to detect and avoid the hazards that may arise from electricity.

1.6 Foreseeable misuse

Any use of the product other than as specified in this manual is strictly prohibited. Particularly prohibited are:
- Use of non-specified consumables, contaminated lubricants, or lubricants with air inclusions
- Use of C3 versions in areas with aggressive, corrosive substances (e.g., high salt load)
- Use of plastic parts in areas with high exposure to ozone, UV light, or ionizing radiation
- Use to supply, convey, or store hazardous substances and mixtures as defined in the CLP Regulation (EC 1272/2008) or GHS with acute oral, dermal, or inhalation toxicity or substances and mixtures that are marked with hazard pictograms GHS01-GHS06 and GHS08
- Use to supply, convey, or store Group 1 fluids classified as hazards as defined in the Pressure Equipment Directive (2014/68/EU) Article 13 (1) a)
- Use to supply, convey, or store gases, liquefied gases, dissolved gases, vapours, or fluids whose vapor pressure exceeds normal atmospheric pressure (1013 mbar) by more than 0.5 bar at their maximum permissible operating temperature
- use in an explosion protection zone
- Use without proper protection against excessively high pressures, in the case of pressurized products
- Use outside of the technical data and limits specified in this manual.

1.7 Referenced documents

In addition to this manual, the following documents must be observed by the target group:
- Company instructions and approval rules

If applicable:
- Safety data sheet of the lubricant used
- project planning documents
- additional information on the pump's specific plans, which can be found in the system's special documentation
- Instructions for other components for setting up the centralised lubrication system.

1.8 Prohibition of certain activities

- Replacement of or modifications to the pistons of the pump elements
- Repairs or modifications to the drive

1.9 Painting plastic components and seals

The painting of the plastic components and seals of the products described is prohibited. Completely cover or remove plastic components before painting the main machine.

1.10 Safety markings on the product

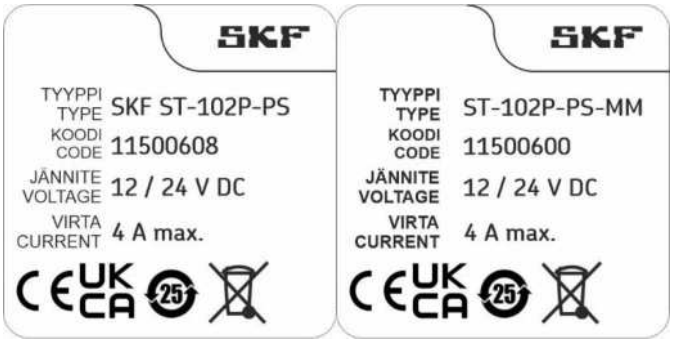
NOTE

Further to the findings of the workplace risk evaluation the operating company has to attach additional markings (e. g. warnings, signs giving orders, prohibition signs or labelling as specified by CLP / GHS), where appropriate.

1.11 Notes on the type plate

The type plate provides important data such as the type designation, order number, and sometimes regulatory characteristics. To avoid loss of this data in case the type plate becomes illegible, it should be entered in the manual.

Figure 1.



type plate

1.12 Note on Pressure Equipment Directive

Due to its performance characteristics, the product does not reach the limit values defined in Article 4, Paragraph 1, Subparagraph (a) (ii) and is excluded from the scope of Pressure Equipment Directive 2014/68/EU in accordance with Article 1, Paragraph 2 Subparagraph (f).

1.13 Notes concerning CE marking

CE marking is affected following the requirements of the applied directives requiring a CE marking:

- 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS II).

1.14 Notes related to the UKCA marking

The UKCA conformity marking confirms the product's conformity with the applicable legal provisions of Great Britain.

1.15 Note on China RoHS mark

The China RoHS marking confirms that there is no danger to persons or the environment from the regulated substances contained within the intended period of use (number in the circle) of the product.

1.16 Assembly, maintenance, fault, repair

Prior to the start of this work, all relevant persons must be notified of it. At a minimum, the following safety measures must be taken before any work is done:

- Unauthorised persons must be kept away
- Mark and secure the work area
- Cover adjacent live parts
- Dry any wet, slippery surfaces or cover them appropriately
- Cover hot or cold surfaces appropriately

Where applicable:

- Depressurise
- Isolate, lock, and tag out
- Check to ensure live voltage is no longer present
- Ground and short-circuit

The product should be protected as much as possible from humidity, dust, and vibration, and should be installed so that it is easily accessible. Ensure an adequate distance from sources of heat and cold surfaces. Any visual monitoring devices present, such as pressure gauges, min./max. markings, or oil level gauges must be clearly visible. Observe the mounting position requirements.

Drill required holes only on non-critical, non-load-bearing parts of the operator's infrastructure. Use existing holes where possible. Avoid chafe points. Immobilise any moving or detached parts during the work. Adhere to the specified torques.

If guards or safety devices need to be removed, they must be reinstalled immediately following conclusion of work and then checked for proper function.

Check new parts for compliance with the intended use before using them.

Avoid mixing up or incorrectly assembling disassembled parts. Label parts. Clean any dirty parts.

1.17 First start-up, daily start-up

Ensure that:

- All safety devices are fully present and functional
- All connections are properly connected
- All parts have been correctly installed
- All warning labels on the product are fully present, visible, and undamaged
- Illegible or missing warning labels are immediately replaced.

2. Delivery, return & storage

2.1 Delivery/receipt

After receipt of the shipment, check the shipment for transport damage and completeness by comparing it to the shipping documents. Immediately report any damage suffered in transport to the forwarding agent. Keep the packaging material until any discrepancies are resolved.

⚠ WARNING

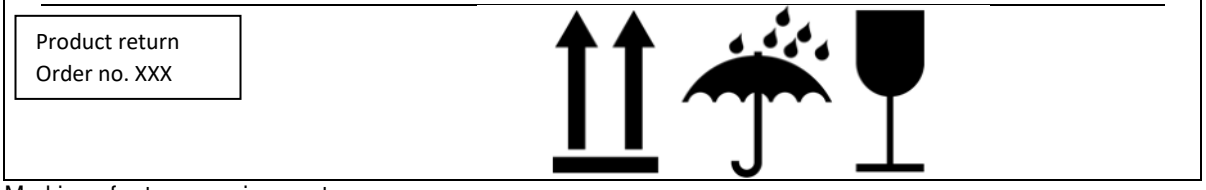


Always comply with the lifting and transport markings on the packaging to eliminate the risk of injury and damage.

2.2 Return consignments

Before returning the product, all dirty parts must be cleaned. However, if this is not feasible or practical, for example, because it would prevent the detection of the defect in connection with a complaint, the transport company must be notified of the chemical used.
On return consignments, at least the following information must be marked on the packaging:

Figure 2.



Marking of return consignments

2.3 Storage

SKF products are subject to the following storage conditions:
- Storage indoors in a dry, vibration-free environment with a low level of dust and ambient temperate of a room temperature.
- No corrosive, aggressive substances or factors permitted in the storage space (e.g., UV radiation, ozone)
- Keep the products in the original, unopened packaging before the first use.
- If temperature fluctuations or humidity in the storage space are significant, take the appropriate steps to prevent condensation.
- For long-term storage or in corrosive storage conditions, consider the use of anti-corrosion materials (VCP).

CAUTION



Inspect the products before use for any damage that may have occurred during storage. This applies especially to plastic components (as they may become brittle).

3. Inspections, maintenance, and cleaning

- Perform maintenance and inspections in accordance with the instructions provided in this manual. Note that maintenance intervals may be shorter in challenging applications.
- We recommend annual inspections by the nearest factory-authorised warranty and maintenance centre.

⚠ WARNING



Risk of electric shock



The product can be cleaned once power supply has been disconnected. When you clean electric devices, only use non-flammable detergents designed for electric components and take the device IP class into consideration.

	Read and follow the safety precautions and general instructions in this manual and in the SKF manual "*Safety and general instructions for lubrication systems*." Failure to follow these instructions may result in a serious injury or damage to the lubrication system or the lubricated equipment.

4. Controller ST-102P-PS / ST-102P-PS-MM



ST-102P-PS



ST-102P-PS-MM

4.1 Operation

The ST-102P-PS controller is used to control a single-line lubrication system (MonoFlex) connected to it, the pump 40PGxx is controlled by the system. The ST-102P-PS-MM controller is used to control a single-line (MonoFlex), a progressive (ProFlex) or a dual-line (DuoFlex) lubrication system connected to it, whether the pump is Multilube or Minilube.

The ST-102P-PS / ST-102P-PS-MM circuit board is configured for use in the relevant lubrication system using selector switches on its circuit board.

The ST-102P-PS / ST-102P-PS-MM controller also includes a function button for controlling and monitoring the lubrication system. There are three LED indicators above the function button. The indicators 1 and 2 and the pump indicator P that indicate the current stage of the lubrication program. The lubrication system's timing functions, such as lubrication cycle and maximum pressurisation time, are set with the controller's rotary switches SW1 and SW2 when the controller ST-102P-PS is used. Timing functions for the ST-102P-PS-MM controller are set with the function button.

The ST-102P-PS / ST-102P-PS-MM controllers are equipped with a memory function for power outages. Therefore, if there is a power outage, the program will continue from the stage at which it was when the outage occurred. Furthermore, if the controller is in alarm mode during the outage, the line which generated the alarm will automatically be lubricated.

This way, the system can recover automatically from alarm status without being reset by the user.

4.1.1 Indicators above the function button

Status	**Meaning**
Indicator 1 is lit	Lubrication interval – line 1 was pressurised last
Indicator 2 is lit	Lubrication interval – line 2 was pressurised last
Indicators 1 and P are lit	Line 1 is being pressurised
Indicators 2 and P are lit	Line 2 is being pressurised
Indicators 1 and 2 are lit	30-second waiting period between an extra lubrication cycle in line 1 and pressurisation of line 2 or, if the user pushes the button in order to start an extra lubrication immediately after an automatic lubrication cycle:
Indicator 1 is flashing	Pressure alarm in line 1 or pulse alarm in the ProFlex system
Indicator 2 is flashing	Pressure alarm in line 2
Indicator P is flashing	Reservoir low level alarm
None of the indicators are lit	Controller receives no power or cable fault
Indicators 1, 2 and P flash in succession	Error mode: Wrong lubrication system settings on the circuit board

When the system is powered on, one of the line indicators (1 or 2) is always lit. During pressurisation, the relevant line indicator indicates which line is being pressurised. If a line indicator is flashing, the lubrication program is in pressure alarm mode. The single-line (MonoFlex) and progressive (ProFlex) lubrication systems only have 1 line in use.

In the single-line (MonoFlex) and dual-line (DuoFlex) lubrication systems, a pressure switch monitors pressure increases and decreases in each header line. The pressure switch should close when the relevant lubrication line is pressurised (acknowledge the pressure increase) and open during the lubrication interval (acknowledge the pressure decrease).

If the pressure switch does not close within the set maximum pressurisation time, the lubrication program will restart pressurisation. If the pressure switch does not close during pressurisation, the relevant line's indicator will start flashing and the system will stop operating. A pressure alarm is also generated when the pressure switch stays closed during line pressurisation.

To reset the pressure alarm and initiate lubrication in the line generating the alarm, press the function button.

In ProFlex systems, the number of pulses generated by the progressive distributor piston detector is monitored instead of pressure levels. Once a pre-set pulse count is reached, pressurisation will be stopped. If this pulse setpoint is not reached within the pre-set maximum pressurisation time, pressurisation will be restarted. If, even after repressurisation, the pulse setpoint is not reached, the system will stop and generate an alarm. The alarm can be reset from the function button. Resetting the alarm will restart lubrication.

Indicator P is always lit during pump operation/pressurisation. Indicator P starts flashing when the lubricant reservoir low level switch generates an alarm, indicating that the lubricant has run out. When an alarm is given, the controller will stop lubrication and thus prevent the pump from pumping air into the header. Once the lubricant reservoir has been refilled, reset the alarm using the function button. Resetting the alarm will restart lubrication.

4.1.2 Function button functions

Pressing the function button when the lubrication program is calculating the lubrication interval will immediately initiate an extra lubrication cycle, bypassing the pre-set lubrication interval value. In DuoFlex systems, the two lines will be lubricated successively. The lubrication cycle following the extra lubrication will be initiated after the pre-set lubrication interval is complete.

The function button is also used to recover the system from alarm status after clearing the cause of the alarm. Acknowledging the alarm will restart lubrication in the line generating the alarm.

Pressing the function button when the program has started pressurisation will interrupt pressurisation. The program will continue as if pressurisation had been completed as normal.

Lubrication programme status	**Action**
Lubrication interval	Initiate extra lubrication
Pressurisation	Interrupt pressurisation
Alarm	Reset alarm

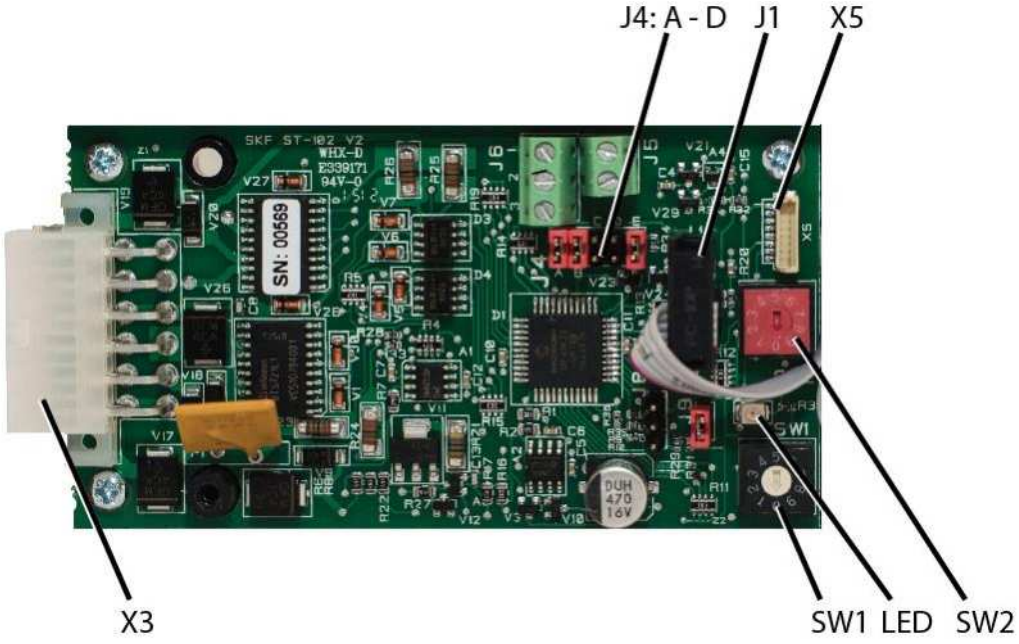




ST-102P-PS / ST-102P-PS-MM Function button

The button is protected by the controller casing's cover.

4.2 ST-102P-PS / ST-102P-PS-MM controller components



ST-102P-PS / ST-102P-PS-MM controller components

Symbol	Component	Function
J1	Connector	Function button connector
J4A	Selector switch	Program selector switch
J4B	Selector switch	Program selector switch
J4C	Selector switch	Program selector switch
J4D	Selector switch	Programme selector switch
SW1	Rotary switch	Lubrication interval setting
SW2	Rotary switch	Pressurisation time setting
LED	LED indicator	Indicator
X3	Connector	Operating voltage and control inputs/outputs.
X5	Connector	Programming connector

4.3 Changing lubrication system settings from the circuit board

Changes in the ST-102P-PS and ST-102P-PS-MM controllers' circuit board settings will take effect once the system has been restarted. It is recommended to change the settings when the controller is unplugged, which means that the changes will take effect when the controller is plugged back in.

Selector switch J4A, lubrication system selection

4.3.1 11500608 ST-102P-PS

Selector switch J4A	**Meaning**
Closed	SKF MonoFlex, single-line operation

Selector switches J4B, J4C and J4D:

J4B	**J4C**	**J4D**	**Meaning**
Closed	Open	Open	Electric pump. Pressure is maintained in the header line throughout the entire pressurisation time. The pump will stop when the pressure switch acknowledges.
Open	Closed	Open	40PGA - Pneumatic pump. The pump will keep the line pressurised throughout the entire pressurisation time. The pressure switch must acknowledge pressurisation (i.e., close) at the end of pressurisation.
Open	Open	Closed	Electric pump. Pressurisation stops when the pressure switch acknowledges.

Factory settings:

J4:A (Single-line operation)	Closed
J4:B (40PGA - Pneumatic pump.)	Open
J4:C (40PGA - Pneumatic pump.)	Closed
J4:D (40PGA - Pneumatic pump.)	Open
J4:E	Open (jumper in a single pin)
J9 (Settings with rotary switches)	Open (jumper in a single pin)
SW1 - Lubrication cycle	Position 3 (20 min)
SW2 - Maximum pressurisation time	Position 1 (1 min)

4.3.2 11500600 ST-102P-PS-MM

Selector switch J4A	**Meaning**
Closed	SKF MonoFlex, single-line operation
Open	SKF DuoFlex, a dual-line system

Selector switches J4B, J4C and J4D:

J4B	**J4C**	**J4D**	**Meaning**
Closed	Open	Open	Multilube/Minilube pump control. The main line is maintained pressurised throughout the entire pressurisation time. The pump will stop when the pressure switch acknowledges. ”E1/E2”
Open	Open	Closed	Multilube/Minilube pump control. Pressurisation stops when the pressure switch acknowledges.”G1/G2”
Closed	Closed	Open	Multilube/Minilube pump control. Progressive lubrication system, ProFlex. ”P1”

Selector switch J4E, pump control selection:

Selector switch J4E	**Meaning**
Closed	The heating control operation and use of the directional valve of Multilube pump’s dual-line lubrication system (DuoFlex). Minilube control operation.
Open	40PGxx control operation.

When the selector switch J4E is closed, the selector switch J9 must also be closed.

Selector switch J9:

Selector switch J9	**Meaning**
Closed	Lubrication system settings can be changed using the function button.
Open	Lubrication system settings can be changed using rotary switches. Not compatible with the progressive (ProFlex) lubrication system.

NOTE!

When the selector switch J9 is closed, only the function button can be used for setting lubrication parameters. Circuit board rotary switches SW1 and SW2 must be set to zero (0). If not, all indicators in the control panel will flash in succession and the lubrication program will not start.
If the selector switches are set incorrectly, the indicators will also flash in succession and the lubrication program will not start.

Factory settings:

J4:A (Single-line operation)	Closed
J4:B (Pressure maintenance Multilube / Minilube)	Closed
J4:C (Pressure maintenance Multilube / Minilube)	Open
J4:D (Pressure maintenance Multilube / Minilube)	Open
J4:E (Multilube / Minilube operation)	Closed
J9 (Settings with the function button)	Closed
SW1 (Not in use)	Position 0
SW2 (Not in use)	Position 0
Lubrication cycle	5 flashes / 30 min
Maximum pressurization time	5 flashes / 5 min
Number of pulses	6 flashes / 5 pulses

4.4 Changing lubrication parameter settings using rotary switches – 1150608 ST-102P-PS

4.4.1 Lubrication interval (SW 1)

Lubrication cycle refers to the time in which all lubrication points get lubricated. The lubrication cycle includes the time spent on pressurisation. Lubrication cycle =lubrication interval (SW 1) + max. pressurisation time (SW 2).

In the single-line (MonoFlex) lubrication systems, the pump is activated once per lubrication cycle.

Example: The lubrication interval setting is set to 10 minutes and pressurisation time to 2 minutes. This means that the pump will start every 6 minutes. All lubrication points receive lubrication every 12 minutes.

4.4.2 Maximum pressurization time (SW 2)

Set the system's pressurisation time to match the minimum time required for increasing the entire system's pressure to the pressure switch acknowledgment level.

Selector switch numbers and the corresponding time settings:

Selector switch position/number	**Selector SW 1 Lubrication interval (min)**	**Selector SW 2 Maximum pressurisation time (min)**
0	5	1
1	10	2
2	15	3
3	20	4
4	30	5
5	45	6
6	60	7
7	80	8
8	100	9
9	120	10

4.4.3 Controller setting example

SKF MonoFlex, single-line system with pneumatic pump:

- J4A and J4C on, other selection switches off
- Lubrication interval 15 min = SW 1 position 2
- Maximum pressurization time 4 min = SW 2 position 3

In the example, lubrication time max. 19 min.

4.5 Changing lubrication parameter settings using the function button – 1150600 ST-102P-PS-MM

The function button allows users to set the lubrication interval, maximum pressurisation time and, in progressive systems, the required number of lubrication pulses.

4.5.1 Lubrication cycle setting

Lubrication cycle refers to the time in which all lubrication points get lubricated.
Press the function button for approximately 5 seconds. Once indicator 1 starts flashing rapidly, release the function button. The control centre is now in lubrication cycle setting mode.
Indicator P indicates the current value of the lubrication cycle. The indicator will flash 1–10 times. After this, there will be a 2 second pause and indicator P will again flash 1–10 times. The current set value of the lubrication cycle can be found in the following table.

Number of flashes	Lubrication cycle (min)
1	5
2	10
3	15
4	20
5	30
6	45
7	60
8	80
9	100
10	120

To increase the lubrication cycle setting by one increment, briefly press the function button. When the highest setting is reached, the setting cycle starts from the beginning.
To exit the lubrication cycle setting and save it in the circuit board memory, hold the function button for approximately 5 seconds, after which all three indicators will light up.

4.5.2 Setting the maximum pressurisation time

Set the system's maximum pressurisation time to match the minimum time required for increasing the entire system's pressure to the pressure switch acknowledgment level.
Press the function button until indicator 2 starts flashing rapidly (approximately 10 seconds).
Now the maximum pressurisation time can be set.
Indicator P will flash several times. The number of flashes corresponds to the current maximum pressurisation time setting, see the following table.

Number of flashes	Maximum pressurisation time (min)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	15
12	20

To increase the maximum pressurisation time setting by one increment (see the table), press the function button. When the highest settings is reached, the setting cycle starts from the beginning. To exit the setting mode and save the changes in the circuit board memory, press and hold the function button until all three indicators light up (approximately 5 seconds).

NOTE!
If the pulse count setting is set to zero (0), the pump will always run for the set maximum pressurisation time. In other words, the pulse sensor monitoring is not in use.

4.5.3 Saving the set values and exiting the setting mode

Saving the set values and exiting the setting mode is carried out by pressing the function button for approx. 5 seconds. If the function button is not pressed for 5 seconds within 3 minutes, the new settings are not saved, and the setting mode is exited automatically.
Correspondingly, if the controller’s power is turned off in the setting mode, the changes will not be saved.

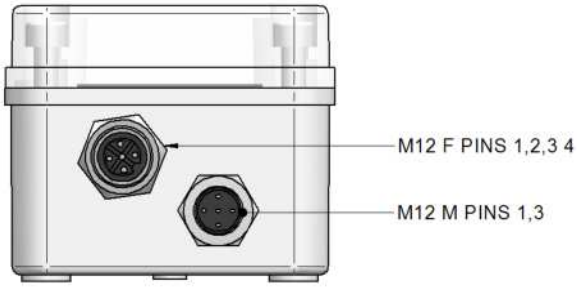
4.6 Electrical connections

4.6.1 11500608 ST-102P-PS operating voltage connection and 40PGxx lubrication pump connection

Connection M12 F (female) - Lubrication pump unit connection. Cable M12 connector 4x0.34 10m

Connection M12 M (male) – ST-102P-PS operating voltage connection. 2 x 0.75 cable. The wire colours and the operating voltage polarity can be checked from the table below in line with the cable delivered with the controller.

The cable and M12 are delivered with the 11500608 ST-102P-PS controller. The separate M12 connectors are counterparts of the controller connectors.



M12 connectors on the side of the housing

M12 F – Pump connection	**PIN**		**Cable wire colours**	**Signal**
	1		Brown	Low limit +
	2		White	Valve control +
	3		Blue	Pressure switch +
	4		Black	Valve control -
M12 M - Operating voltage	**PIN / 2 x 0.75**		**Cable wire colours**	**Signal**
	1	/ /	brown / black / red	Operating voltage +
	3	/ /	blue / grey / yellow	Operating voltage -

4.6.2 11500600 ST-102P-PS-MM operating voltage connection and Minilube lubrication pump connection

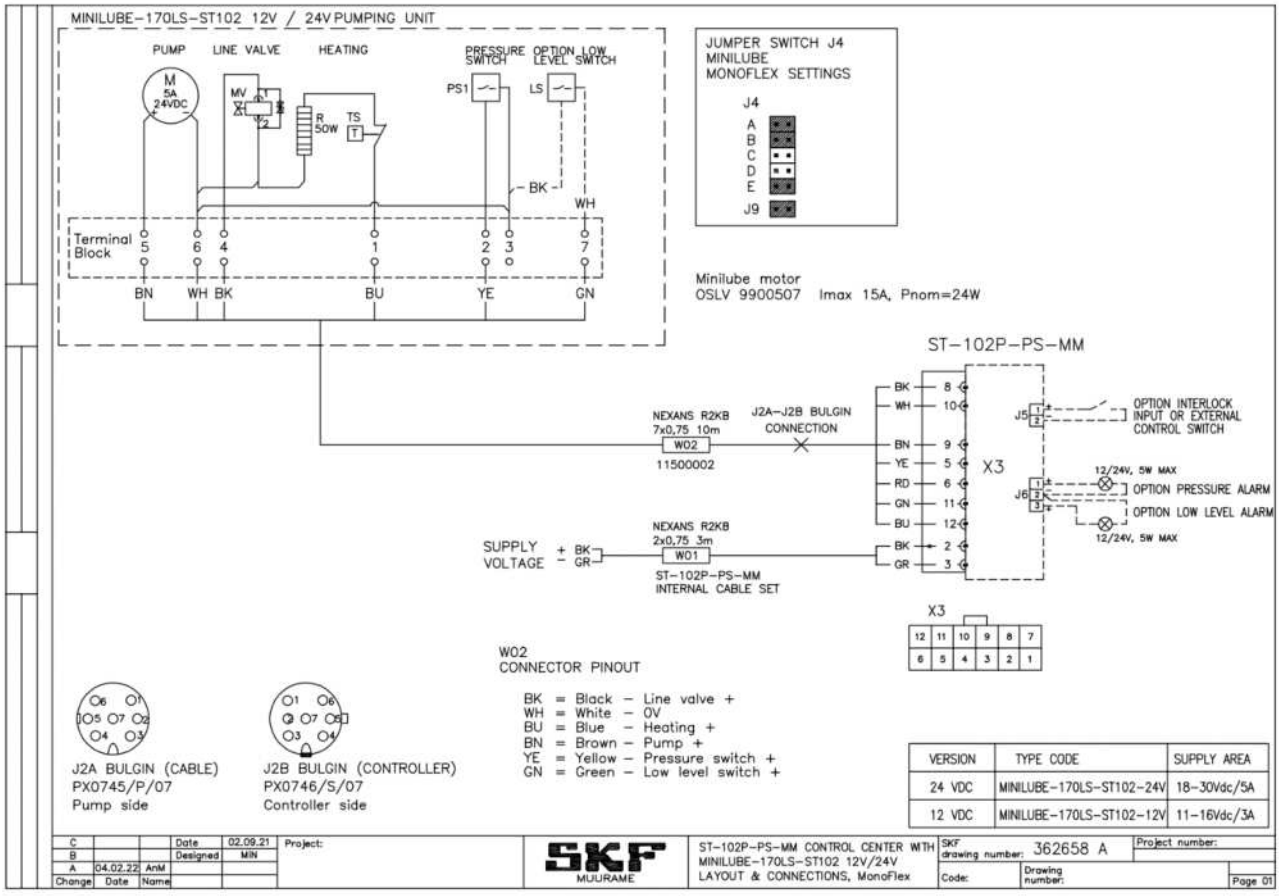
The 11500002 CABLE SET MINI ST102PMM L=10m cable is used for the connection.

On the side of the pump, the cable has open wires for connection to the pump's terminal block.

The controller side is equipped with a Bulgin male connector.

The controller operating voltage connection wire: The controller has a fixed 2x0.75mm² L=3m cable.

NOTE! If the operating voltage cable colours differ from those in the connection diagram below, see the table in section 2.6.1 for cable colours and operating voltage polarity.



4.6.3 11500600 ST-102P-PS-MM operating voltage connection and Multilube lubrication pump connection

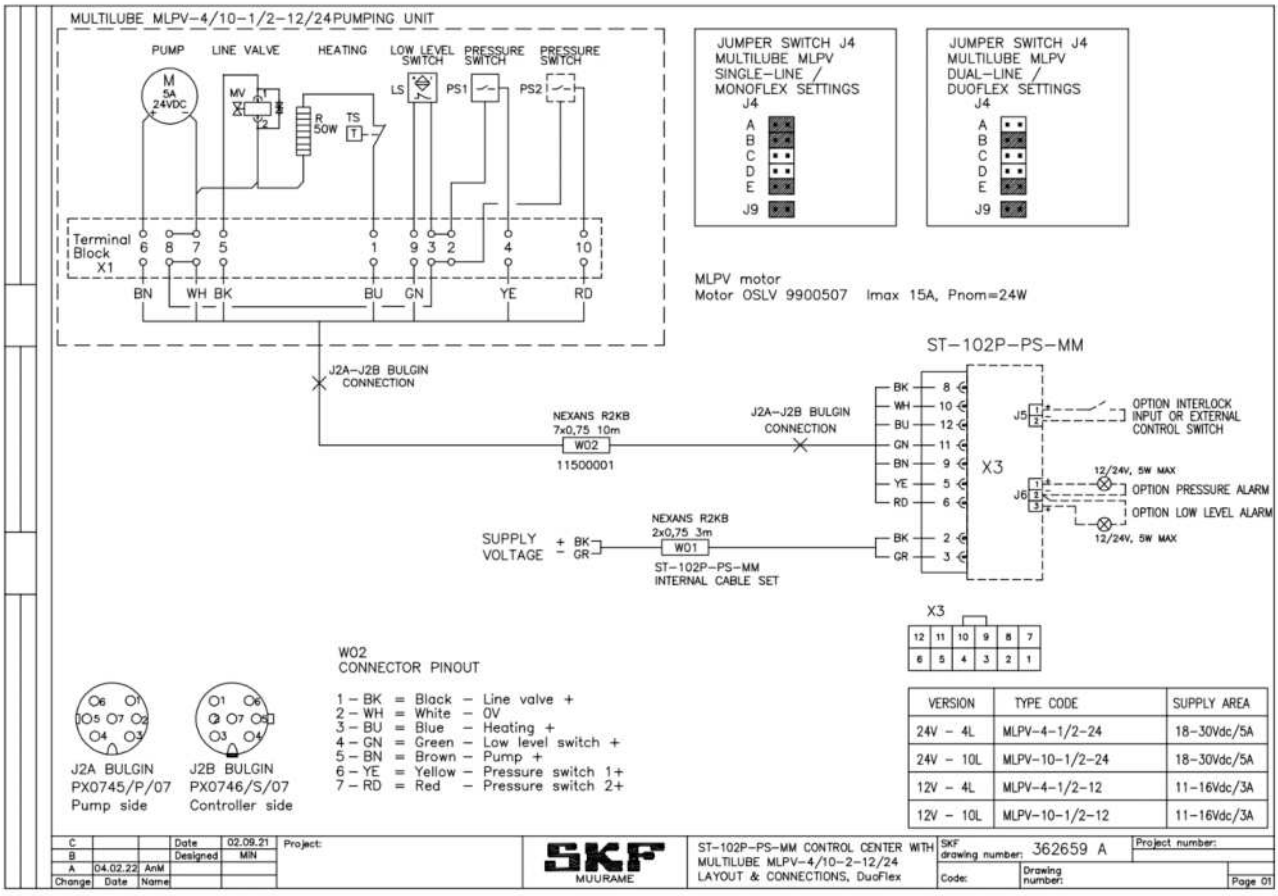
The 11500001 CABLE SET MLP-ST102PMM L=10m cable is used for the connection.

On the side of the pump, the cable is equipped with a Bulgin female connector for connection to the pump's Bulgin male connector.

A separate Bulgin male connector is delivered with the cable set, which is connected to the wire on the side of the controller after cable installation; a 20 mm heat-shrink tubing is included in the delivery for use when necessary.

The controller operating voltage connection wire: The controller has a fixed 2x0.75mm² L=3m cable.

NOTE! If the operating voltage cable colours differ from those in the connection diagram below, see the table in section 2.6.1 for cable colours and operating voltage polarity.



4.7 Technical specifications

	Value
Operating temperature range	-30…+80°C
Protection class	IP66
Dimensions (W x H x D)	67 x 80 x 170 mm (W x H x D)
Weight	350 g
Operating voltage	12 or 24 VDC (10.5V … 32VDC)
Power consumption	Depends on the lubrication system being controlled, 0...4 A
Fuse	Self-resetting fuse, 4 A, on the circuit board
Control inputs	Pressure switch input, lubricant reservoir low level switch 10 to 32 VDC, 12 mA max.
Control outputs	Valve/pump control, 6.5A max.
Electrical connections	5-pole M12 female, control inputs and outputs 4-pole M12 male, operating voltage
Control panel	Function button and three indicators: 1, 2 and P
Alarms	Alarms are indicated with indicators above the function button Pressure alarm and reservoir low level alarm.
Lubrication control programmes	11500608 ST-102P-PS Single-line (MonoFlex) 11500600 ST-102P-PS-MM Single-line (MonoFlex), Dual-line (DuoFlex) and Progressive (ProFlex)
System configuration	Using selector switches on the circuit board
Lubrication parameter setting	11500608 ST-102P-PS Settings adjusted with rotary switches – Lubrication cycle duration and maximum pressurisation time 11500600 ST-102P-PS MM Settings adjusted with the function button – Lubrication cycle duration and maximum pressurisation time
Power failure memory	Lubrication parameters, lubrication programme status
EMC tests	EN61000-6-4, EN61000-6-2 CISPR 25, 30...1000 MHz ISO 11452-2, 100...2000 MHz ISO 11452-4, 20...200 MHz ISO7637-2: 1, 2a, 2b, 3a, 3b, 4

4.8 Troubleshooting table

Description of malfunction	Cause of malfunction	Solution
User interface indicators do not light up.	The controller does not receive operating voltage. Keyboard LED indicators have gone. Circuit board thermal fuse has been activated.	Check the operating voltage. Replace the function button. Turn off the power for a while and turn the power back on.
All user interface indicators are continuously lit.	Insufficient controller supply voltage (<10.5 V). The controller does not start.	Check the operating voltage. Replace the controller.
All user interface indicators flash in succession.	Selector switches J4:A-D are incorrectly set.	Check the settings indicated in the section *Lubrication system settings on the circuit board*.
Indicator LED 1 flashes on the single-line (MonoFlex) or the dual-line (DuoFlex) lubrication system. .	Pressure alarm in line 1 Alarm at the start of pressurisation: -pressure switch is closed. Alarm at the end of pressurisation: -pressure switch does not close during pressurisation.	Check the lubrication system's troubleshooting instructions.
Indicator LED 1 is flashing in the ProFlex system (only 11500600 ST-102P-PS-MM)	Pulse alarm – insufficient number of pulses from the progressive distributor during pressurisation	Check the lubrication system's troubleshooting instructions.
Indicator LED 2 is flashing. In dual-line (DuoFlex) system. (only 11500600 ST-102P-PS-MM)	Pressure alarm in line 2 Alarm at the start of pressurisation: – Switch stays closed. Alarm at the end of pressurisation: – Switch does not close during pressurisation.	Check the lubrication system's troubleshooting instructions.
Indicator P is flashing.	Reservoir low level alarm Lubricant reservoir empty.	Fill the lubricant reservoir and set the alarm by pressing the function button.

5. Appendices

5.1 China RoHS Table

部件名称 (Part Name)	有毒害物质或元素 (Hazardous substances)					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
用钢和黄铜加工的零件 (Components made of machining steel and brass)	X	O	O	O	O	O

本表格依据SJ/T11364的规定编制 (This table is prepared in accordance with the provisions of SJ/T 11364.)

O：表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。
(Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.)

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572标准规定的限量要求。
(Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.)