MAXILUBE CHANGEOVER VALVE UNIT

Date:	**25.3.2025**
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Version:	**01**

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

Original EC Declaration of Incorporation in accordance with Directive 2006/42/EC, Appendix II Part 1 B

The manufacturer hereby declares at its sole responsibility that the partly completed machinery conforms to the essential health and safety requirements of the Machinery Directive 2006/42/EC, Annex I, marked in the Annex to the EC Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documents were prepared following Annex VII part B. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The authorized company for the compilation of the technical documentation is the manufacturer.

Designation: Changeover valve unit
Type SKF Maxilube MAX-X-X-230-IF105-X-X, SKF Maxilube MAX-X-X-115-IF105-X-X

Furthermore, the following directives and standards were applied in the respective applicable areas:
2011/65/EU: ROHS II including the addition (EU) 2015/863
2014/30/EU: Electromagnetic Compatibility
2014/35/EU: Low Voltage Directive
EN ISO 12100-1/A1 EN ISO 12100-2/A1 EN 61000-6-4:2011 EN 61000-6-2:2006
IEC 61010-1:2010

The partly completed machinery must not be put into service until it has been established that the machinery into which it is to be incorporated is in compliance with the provisions of the Machinery Directive 2006/42/EC and all other applicable Directives.

Muurame, 24.5.2022
Juha Kärkkäinen
Design Office Manager
SKF Lubrication Management
Manufacturer: Oy SKF Ab Finland Teollisuustie 6 40951 Muurame FINLAND

Original UK Declaration of incorporation according to the Supply of Machinery (Safety) Regulations 2008 No. 1597 Annex II

The manufacturer hereby declares under sole responsibility that the partly completed machinery complies with the essential health and safety requirements of UK legislation Supply of Machinery (Safety) Regulations 2008 No. 1597 Annex I, marked in the Annex to the EC Declaration of Incorporation as applicable and fulfilled at the time of placing on the market.
The special technical documents were prepared following Annex VII part B. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The authorized company for the compilation of the technical documentation is SKF (U.K.) Limited, 2 Canada Close, Banbury, Oxfordshire, OX16 2RT, GBR.

Designation: Changeover valve unit
Type SKF Maxilube MAX-X-X-230-IF105-X-X, SKF Maxilube MAX-X-X-115-IF105-X-X

Furthermore, the following regulations and standards were applied in the respective applicable areas:
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 No. 3032
- Electromagnetic compatibility Ordinance 2016 No. 1091
- Electrical Equipment (Safety) Regulations 2016

EN ISO 12100-1/A1 EN ISO 12100-2/A1 EN 61000-6-4:2011 EN 61000-6-2:2006
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Designation: Changeover valve unit
Type SKF Maxilube MAX-X-X-24-X-X-X

Furthermore, the following directives and standards were applied in the respective applicable areas:
2011/65/EU: ROHS II including the addition (EU) 2015/863

EN ISO 12100-1/A1 EN ISO 12100-2/A1

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Appendix to Declaration of Incorporation in accordance with 2006/42/EC, Annex II, No. 1 B
Description of the essential health and safety requirements according to 2006/42/EC, Annex I, which have been applied and fulfilled. Any essential health and safety requirements not listed here are not relevant to this product

Table 1

Appendix to Declaration of Incorporation
Valid for: MAXILUBE changeover valve units

No.:	Essential health and safety requirement	Applicable:	Fulfilled:
1.1.1	Definitions	Yes	Yes
1.1.2	Principles of safety integration	Yes	Yes
1.1.3	Materials and products	Yes	Partially[1)]
1.1.5	Design of machinery to facilitate its handling	Yes	Yes
1.2	Control systems	Yes	Yes
1.2.1	Safety and reliability of control systems	Yes	Yes
1.2.2	Control devices	Yes	Yes
1.2.3	Starting	Yes	Yes
1.2.4	Stopping	Yes	Yes
1.3	Protection against mechanical hazards	Yes	Yes
1.3.2	Risk of break-up during operation	Yes	Yes
1.3.4	Risks due to surfaces, edges or angles	Yes	Yes
1.5	Risks due to other hazards	Yes	Yes
1.5.1	Electricity supply	Yes	Yes
1.6	Servicing		
1.6.1	Machinery maintenance	Yes	Yes
1.6.3	Isolation of energy sources	Yes	Yes
1.6.4	Operator interventions	Yes	Yes
1.7	Information	Yes	Yes
1.7.1	Information and warnings on the machinery	Yes	Yes
1.7.2	Warning of residual risks	Yes	Yes
1.7.3	Marking of machinery	Yes	Yes
1.7.4	Operating instructions/assembly instructions	Yes	Yes

1) Not completely fulfilled: Hazards due to the lubricant used must be assessed by the operator on the basis of the Safety Data Sheet (SDS) and, if necessary, protective measures must be taken.

Masthead

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www.skf.com/lubrication

Authorized local distributors
- Great Britain -
SKF (U.K.) Limited,
2 Canada Close, Banbury, Oxfordshire,
OX16 2RT, GBR.

- North America -
SKF Lubrication Business Unit
Lincoln Industrial
5148 North Hanley Road, St. Louis,
MO. 63134 USA

- South America -
SKF Argentina Pte. Roca 4145,
CP 2001 Rosario, Santa Fe

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 authorized SKF dealer or the manufacturer.

Table of contents

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 by safety alerts. Always be sure to follow the instructions given in the safety alerts.

⚠ DANGER

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

⚠ CAUTION

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

NOTICE

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

Illustrations:
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 workings and operation of the product.
Text layout:

- **First-order bulleted lists:** Items on a bulleted list start with a solid black dot and an indent.
  - **Second-order bulleted lists:** If there is a further listing of subitems, the second-order bulleted list is used.

1 Legend: A legend explains the numbered contents of an illustration, presented as a numbered list. Items in a legend start with a number (with no 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.”
  - **Second-order instruction steps**: In some cases, it is necessary to divide up a step 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 tasked with working on 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 case of malfunctions outside one's individual scope of responsibility.
- Unauthorized modifications and changes can have an unpredictable effect on safety and operation. Unauthorized modifications and changes are therefore 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 be performed only 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.
- Ensure proper connection of the protective conductor for products with protection class I. Observe the specified enclosure rating.
- 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 respective electric charge and does not have the voltage strength necessary to withstand the effects of lightning.

1.3 General behaviour when handling the product

- Familiarize yourself with the functions and operation of the product. The specified assembly and operating steps and their sequences must be observed.
- Keep unauthorized persons away.
- Wear personal protective equipment always.
- Precautionary operational measures and instructions for the respective work must be observed.
- In addition to these Instructions, general statutory regulations for accident prevention and environmental protection must be observed.
- Precautionary operational measures and instructions for the respective work must be observed. Uncertainty seriously endangers safety.
- Safety-related protective and safety equipment must not be removed, modified or affected otherwise in its function and is to be checked at regular intervals for completeness and function.
- If protective and safety equipment has to be dismantled, it must be reassembled immediately after finishing the work, and then checked for correct function.
- Remedy occurring faults in the frame of responsibilities. Immediately inform your superior in the case of faults beyond your competence.
- Never use parts of the centralized 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 authorized 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.
Specialist in mechanics
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.
Specialist in electrics
Person with appropriate professional education, knowledge and experience to detect and avoid the hazards that may arise from electricity.

1.6 Foreseeable misuse

Any usage 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, vapors, 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 securing 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 respective target group:
- Company instructions and approval rules

If applicable:
- Safety data sheet of the lubricant used
- Project planning documents
- Supplementary information regarding special designs of the pump. This you will find in the special system documentation.
- Instructions for other components for setting up the centralized 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 any plastic components and seals of the products described is prohibited. Completely mask or remove plastic components before painting the main machine.

1.10 Safety markings on the product

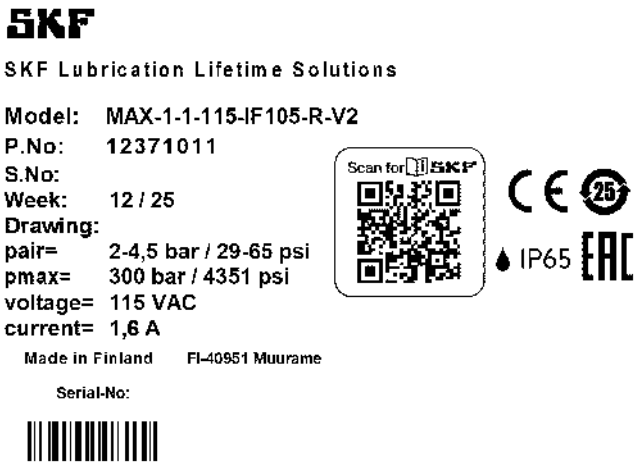
NOTE

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.

Fig. 1



Type identification plate (example)

1.12 Note on Low Voltage Directive

The protection objectives of the Low Voltage Directive 2014/35/EU are met in accordance with Annex I, No. 1.5.1 of the Machinery Directive 2006/42/EC.

1.13 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).

1.14 Notes on CE marking

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

- 2014/30/EC Electromagnetic Compatibility
- 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS II)

1.15 Notes related to the UKCA marking

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

1.16 Note on EAC marking

The EAC conformity marking confirms the product's conformity with the applicable legal provisions of the Eurasian customs union.

1.17 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.

1.18 Emergency shutdown

This is done by a course of action to be defined by the operator.

1.19 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:

- Unauthorized 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:

- Depressurize
- 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 or cold. 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. Immobilize 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.

1.20 First start-up, daily start-up

Ensure that:

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

1.21 Residual risks

Table 2

Residual risks

Residual risk	Possible in life cycle									Prevention/ remedy
Personal injury/ material damage due to falling of raised parts	A	B	C				G	H	K	Keep unauthorized persons away. No people may remain under suspended loads. Lift parts with adequate lifting devices.
Personal injury/ material damage due to tilting or falling of the product because of non-observance of the stated tightening torques		B	C				G			Observe the specified tightening torques. Fix the product to components with adequate load-bearing capacities only. If no tightening torques are stated, apply tightening torques according to the screw size characteristics for 8.8 screws.
Personal injury/ damage to material due to spilled or leaked lubricant		B	C	D		F	G	H	K	Be careful when connecting or disconnecting lubricant feed lines. Always use suitable hydraulic screw connections and lubrication lines for the stated pressures. Do not mount lubrication lines to moving parts or friction points. If this cannot be avoided, use spring coils respectively protective conduits.
Fire hazard or damage to the pump due to an operation with defective electrical components, e.g. Connection cables and plugs.		B	C	D	E	F	G	H		Check the electrical components with regard to damages before the first usage and then at regular intervals. Do not mount cable to moving parts or friction points. If this cannot be avoided, use spring coils respectively protective conduits.
Damage to the pump due to non-observance of the admissible relative duty cycle.			C	D						Operate the pump within the admissible relative duty cycle only.
Damage to the pump due to an installation at the place of use without the mounting brackets and washers provided for this purpose.		B	C	D			G			Mount pump only with the mounting brackets and washers provided for this purpose.

Life phases: A = transport, B = installation, C = initial start-up, D = operation, E = cleaning, F = maintenance, G = fault, repair, H = shutdown, K = disposal

2. Lubricants

2.1 General information

Lubricants are selected specifically for the relevant application. The manufacturer or operator of the machine should ideally make the selection in consultation with the supplier of the lubricant. If you have no or little experience in selecting lubricants for lubrication systems, please contact us. We would be happy to assist you in selecting suitable lubricants and components to build a lubrication system optimized for your application. Consider the following points when selecting/using lubricants. This will spare you potential downtime and damage to the machine or lubrication system.

2.2 Material compatibility

The lubricants must generally be compatible with the following materials:
- Plastics: ABS, CR, FPM, NBR, NR, PA, PET, PMMA, POM, PP, PS, PTFE, PU, PUR
- Metals: steel, gray cast iron, brass, copper, aluminum

2.3 Temperature properties

The lubricant used must be suitable for the specific ambient temperature of the product. The viscosity approved for proper functioning must neither be exceeded at low temperatures nor fall too low at high temperatures. For the approved viscosity, see the “Technical data” chapter.

2.4 Aging of lubricants

Based on experience with the lubricant used, checks should be conducted at regular intervals defined by the operator, to determine whether the lubricant needs to be replaced due to aging processes (oil separation). In case of doubt regarding the continued suitability of the lubricant, it must be replaced before the system is started up again. If you do not yet have any experience with the lubricant used, we recommend conducting a check after just one week.

2.5 Avoidance of faults and hazards

To avoid faults and hazards, please observe the following:
- When handling lubricants, observe the relevant safety data sheet (SDS) and any hazard labeling on the packaging.
- Due to the large number of additives, some lubricants that meet the pumpability requirements specified in the manual are not suitable for use in centralized lubrication systems.
- Whenever possible, always use SKF lubrication greases. They are ideal for use in lubrication systems.
- Do not mix lubricants. This can have unpredictable effects on the properties and usability of the lubricant.
- Use lubricants containing solid lubricants only after technical consultation with SKF.
- The lubricant’s ignition temperature has to be at least 50 Celsius above the maximum surface temperature of the components.

2.6 Solid lubricants

Solid lubricants may only be used after prior consultation with SKF. When solid lubricants are used in lubrication systems, the following rules generally apply:

Graphite:

- Maximum graphite content 8%
- Maximum grain size 25 µm (preferably in lamellar form)

MoS2:

- Maximum MoS2 content 5%
- Maximum grain size 15 µm

Copper:

- Lubricants containing copper are known to lead to coatings forming on pistons, bore holes, and mating surfaces. This can result in blockages in the centralized lubrication system.

Calcium carbonate:

- Lubricants containing calcium carbonate are known to lead to very heavy wear on pistons, bore holes, and mating surfaces.

Calcium hydroxide:

- Lubricants containing calcium hydroxide are known to harden considerably over time, which can lead to failure of the centralized lubrication system.

PTFE, zinc, and aluminum:

- For these solid lubricants, it is not yet possible to define any limit values for use in lubrication systems on the basis of existing knowledge and practical experience.

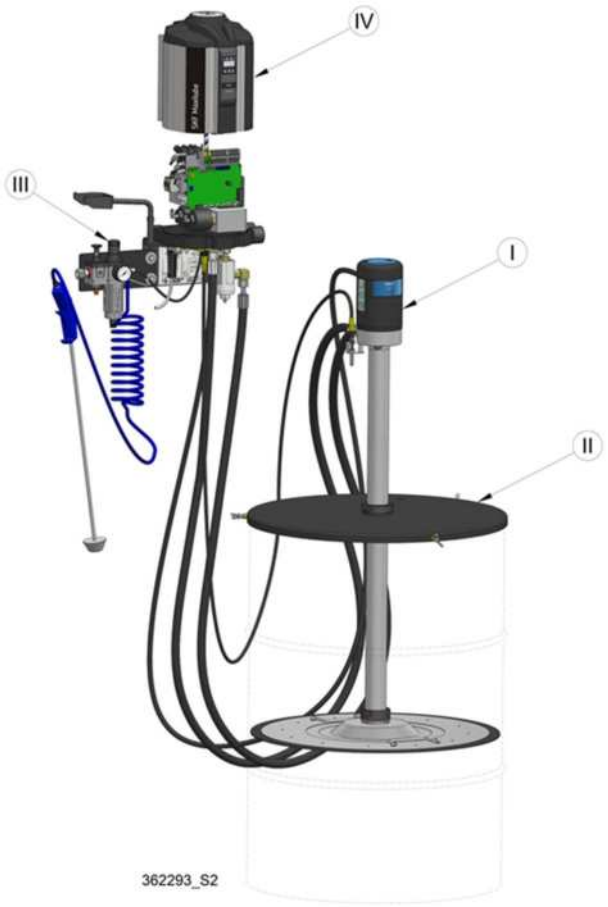
3. General description

3.1 Maxilube pumping centre

The pumping centre of the SKF MaxiLube central lubrication system is designed for pumping lubricant into a centralised lubrication system. The pumping centre can be controlled and monitored using a control unit integrated in the changeover valve unit, by sending SMS messages or by means of external control.

The Maxilube pumping centre consists of a pump (I), a lid set (II), a pressure air regulator (III) and a changeover valve unit (IV) with accessories.

Fig. 2 Design of the SKF Maxilube pumping centre



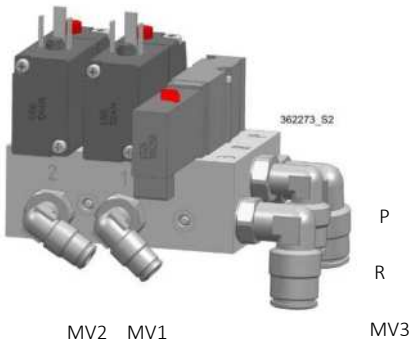
Position	Description
I	Pump
II	Lid set (ECO or STA)
III	Pressure air regulator
IV	Changeover valve unit

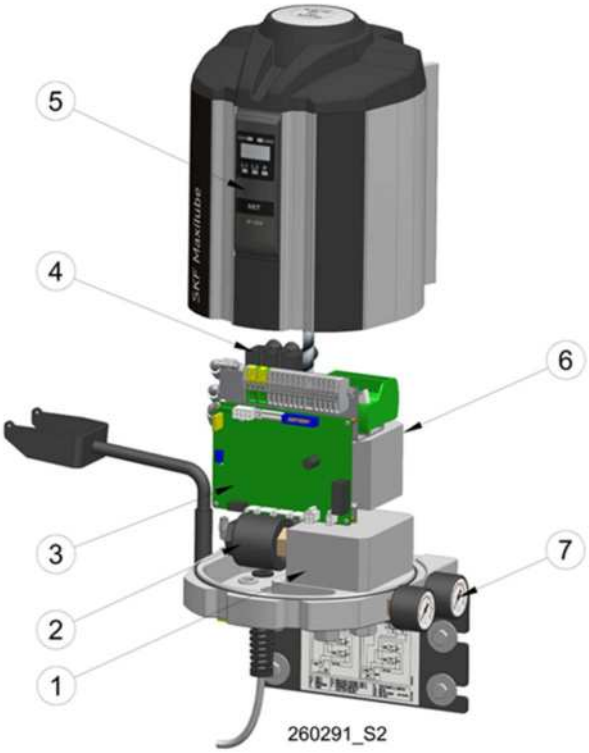
3.2 SKF Maxilube changeover valve unit

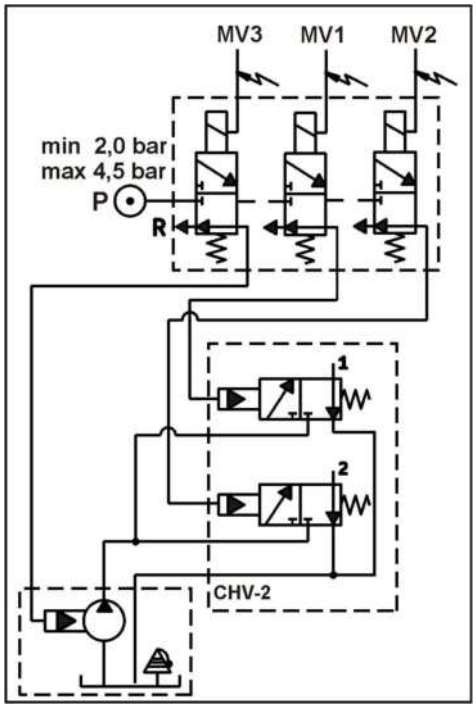
The changeover valve unit includes a solenoid valve group (4) and a control valve group (2), pressure gauges (7) and a wall mounting plate which contains a bracket for the pump during the changing of the barrel. A Maxilube changeover valve unit with control includes a user interface (5) and a circuit board (3).

Fig. 3 Design of Maxilube and PI diagram

Position	Description
1	Control valve
2	CHV-100 control cartridge (1 or 2 pcs)
3	Circuit board ST105A
4	Solenoid valve 24 V
5	User interface IF-105
6	Power supply unit 115/230 VAC
7	Pressure gauge







4. Operation

4.1 Operation of the pumping centre

When pressurisation starts, control unit opens both the line to be pressurised and the pump solenoid valves. The pneumatic system starts the pump and opens the line control valve. Pressurisation continues until the pressure at the pressure monitoring unit reaches a pre-set acknowledgement level. After acknowledgement, the control unit closes the solenoid valves, the pump stops and pressure discharges from the line to the lubricant barrel.

If the lubricant level in the barrel reaches the low limit level during pumping, the low level switch sends an alarm to the control unit and pumping is stopped. The alarm can be reset by replacing the lubricant barrel and resetting the alarm at the control unit.

4.2 Commissioning

⚠ WARNING

Electric shock
Electrical connections must only be made by qualified electricians. Minimise the risk of electric shock by making sure that the pumping centre is de-energised before making any connections. Power must be turned off before any work involving the handling of conductive parts or opening any pos. of the system or product.

⚠ WARNING

Pressurised lubricant
Make sure that the system is depressurised. Depressurise the grease filter before opening it with the help of a bleed screw located in the filter plug (11, Figure 5). Turn off the air supply by lifting the shut-off valve button (1, Figures 7 & 8) or set air pressure to 0 bar using the pressure regulator (2, Figures 7 & 8) and the pressure gauge (3, Figures 7 & 8). Disconnect the M12 cable (7, Figures 5 & 6) from the pump. Any residual pressure in the system when opening or disconnecting components may cause components to be thrown or lubricant to spray, causing injury to people or damage to the environment.

⚠ WARNING

Pressurised lubricant
The pressure in the pneumatic system must be regulated so that the pressure at the pumping centre cannot exceed 300 bar (4,350 psi/30 MPa) under any circumstances. A higher pressure could damage the system components and cause injury to people or damage to the environment.

4.2.1 Connections

Lubricant connections:

- lubricant outlets (1 or 2 pcs; line 1 out, line 2 out), G3/8”, hose Ø 12 mm or Ø 1/2” (**L1, L2**)
- pressure inlet from the pump (G3/8), DIN 2353 shear ring coupling for a Ø 12 mm pipe (**P**)
- tank outlet for the pump (G3/8), DIN 2353 shear ring coupling for a Ø 12 mm pipe (**T**)

Compressed air connections:

- compressed air supply from the pressure air regulator to the changeover valve unit, (G1/8) pin plug ø8 mm (**A1**)
- compressed air supply for the pump, (G1/8) pin plug ø8 mm (**A2**)
- exhaust air outlet (**A3**)

Electrical connections:

- pumping centre 2 or shut-off valve (2 pcs), connector M12 (**S**) (M14x1)
- low level switch, female connector M12 (**D**) (M14x1)
- pressure control (2 pcs), connector M12 (**P1**/channel 1, **P2**/channel 2) (M14x1)
- power supply, cable bushing **M20 x 1.5** 1 pcs
- accessories (e.g. external alarm, interlocking), **M16 x 1,5** cable sleeve, **4 pcs**, cable ø4–10 mm

Fig. 4 Maxilube connections

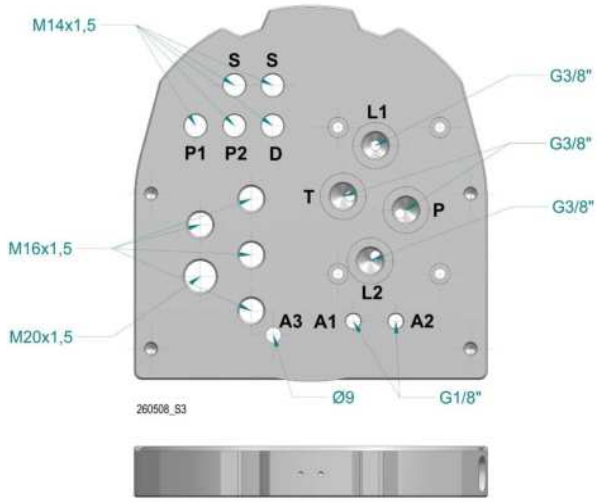


Fig. 5 MPB connections

4.2.2 Commissioning with Maxilube ECOlid set and MPB pump

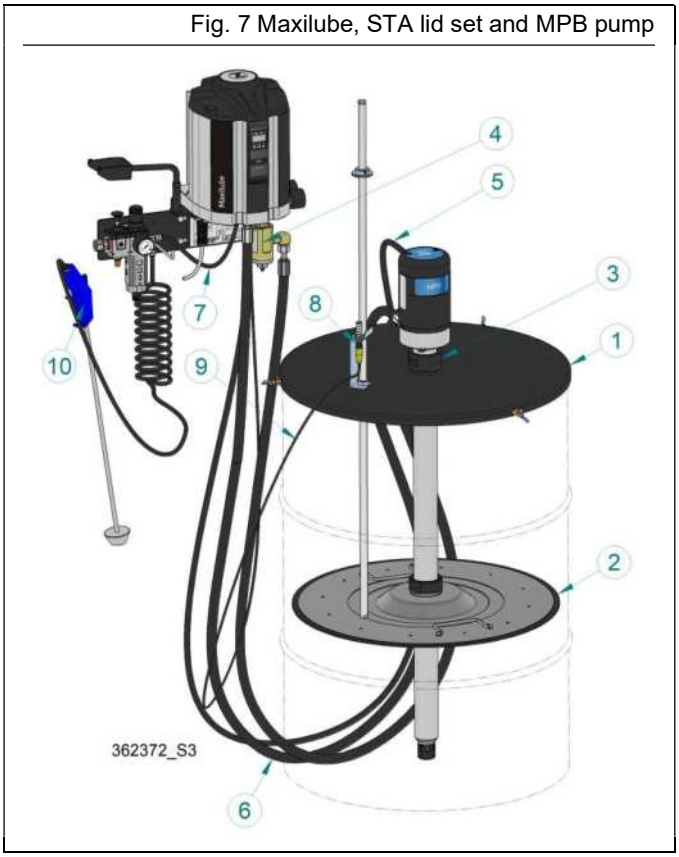
Fig. 6 Maxilube, ECO lid set and MPB pump

1. Ensure that the surroundings of the pumping centre are clean. Impurities in the system will prevent trouble-free operation and cause damage at the lubrication point.
2. Reserve a container for excess grease.
3. Check the condition of the lubricant barrel. Any damage on the surface of the barrel will prevent the follower plate from being lowered (Fig. 6, pos. 2).
4. Remove the barrel's original lid and press the follower plate (Fig. 6, pos. 2) tightly against the lubricant in the barrel. Make sure that air is removed from below the follower plate and that the central hole of the follower plate starts to fill with lubricant.
5. Place the lid (Fig. 6, pos. 1) on top of the lubricant barrel. Fasten the lid onto the lubricant barrel with wing screws.
6. Pass the pump through the lid onto the middle hole of the follower plate. Make sure that the pump is firmly attached to the follower plate.
7. Connect the grease filter (Fig. 6, pos. 4) to the bottom plate connection P (Fig. 4).
8. Connect the compressed air hose (Fig. 6, pos. 5) to the pressure air regulator's pin plug and the pump's compressed air connection.
9. Connect a 3/8 grease hose (Fig. 6, pos. 6) to the pump's connection P (Fig. 5). Make sure that the other end of the hose is in the container reserved for excess grease.
10. Start the pump by opening the pressure air regulator's valve. When the hose has filled up, stop the pump by closing the pressure air regulator's valve and detach the hose from the pump's connection P.

11. Connect the filled hose to the pump's connection T (Fig. 5) and Maxilube's connection T (Fig. 4).
12. Connect another 3/8 grease hose (Fig. 6, pos. 6) to the pump's connection P and the grease filter (Fig. 6, pos. 4).
13. Detach the compressed air hose from the pressure air regulator and connect it to Maxilube's connection A2 (Fig. 4).
14. Connect a ø8 mm plastic hose between the pressure air regulator and Maxilube's connection A1 (Fig. 4).
15. Attach the low level switch (Fig. 6, pos. 8) to the pump and the low level switch cable (Fig. 6, pos. 9) to the switch.
16. Connect the low level switch cable (Fig. 6, pos. 9) to Maxilube's bottom plate connection D (Fig. 4) and the cables of the channel pressure control units and shut-off valves to the pumping centre as described in the wiring diagram.
17. Set the pressure of the pumping centre to 4 bar (60 psi) with the pressure air regulator's pressure control device (Fig. 2, pos.III).
18. When you have completed these actions, you can fill/bleed the manifold/branch piping.

4.2.3 Commissioning with Maxilube STA lidset and MPB pump

Fig. 7 Maxilube, STA lid set and MPB pump



1. Ensure that the surroundings of the pumping centre are clean. Impurities in the system will prevent trouble-free operation and cause damage at the lubrication point.
2. Reserve a container for excess grease.
3. Check the condition of the lubricant barrel. Any damage on the surface of the barrel will prevent the follower plate (Fig. 7, pos. 2) from being lowered.
4. Remove the barrel's original lid and press the follower plate (Fig. 7, pos. 2) tightly against the lubricant in the barrel. Ensure that air is being removed under the follower plate.
5. Place the lid (Fig. 7, pos. 1) on top of the lubricant barrel. Fasten the lid onto the lubricant barrel with wing screws.
6. Pass the pump through the barrel lid and follower plate into the barrel. Lock the pump with a barrel nut (Fig. 7, pos. 3) so that the lower pos. of the pump is approximately 2 cm above the bottom of the barrel.
7. Connect the grease filter (Fig. 7, pos. 4) to the bottom plate connection P (Fig. 4).
8. Connect the compressed air hose (Fig. 7, pos. 5) to the pressure air regulator's pin plug and the pump's compressed air connection (Fig. 5).
9. Connect a 3/8 grease hose (Fig. 7, pos. 6) to the pump's connection P (Fig. 5). Make sure that the other end of the hose is in the container reserved for excess grease.
10. Start the pump by opening the pressure air regulator's valve. When the hose has filled up, stop the pump by closing the pressure air regulator's valve and detach the hose from the pump's connection P.
11. Connect the filled hose to the pump's connection T (Fig. 5) and Maxilube's connection T (Fig. 4).
12. Connect another 3/8 grease hose (Fig. 7, pos. 6) to the pump's connection P and the grease filter (Fig. 7, pos. 4).
13. Detach the compressed air hose from the pressure air regulator and connect it to Maxilube's connection A2 (Fig. 4).
14. Connect a ø8 mm plastic hose between the pressure air regulator and Maxilube's connection A1 (Fig. 4).
15. Push the low level switch (Fig. 7, pos. 8) through the hole in the lid on top of the follower plate.
16. Connect the low level switch cable (Fig. 7, pos. 9) to Maxilube's bottom plate connection D (Fig. 4) and the low

level sensor, and the cables of the channel pressure monitoring units and channel valves (if any) to the pumping centre as described in the wiring diagram.

17. Set the pressure of the pumping centre to 4 bar (60 psi) with the pressure air regulator's pressure control device (Fig. 2, pos.III).
18. When you have completed these actions, you can fill/bleed the manifold/branch piping.

4.3 Replacing the lubricant barrel

⚠ WARNING

Pressurised lubricant
Ensure that the system will not start during barrel replacement. Shut off the compressed air supply by lifting up the shut-off valve button (Fig. 8, pos. e) or set the compressed air pressure to 0 bar with the pressure regulator and the pressure gauge (Fig. 8). Any residual pressure in the system when opening or disconnecting components may cause components to be thrown or lubricant to spray, causing injury to people or damage to the environment.

Fig. 8 Shut-off valve button (e), grease filter (10) and bleed screw (11)

4.3.1 Maxilube ECO with lid set and MPB pump

1. Ensure that the surroundings of the pumping centre are clean. Impurities in the system will prevent trouble-free operation and cause damage at the lubrication point.
2. Switch off the power at the pumping centre when replacing the barrel.
3. Lift the pump out of the lubricant barrel and place it on the pump bracket or on a clean base. Be careful not to damage the suction inlet at the bottom of the pump.
4. Remove the lid (Fig. 6, pos. 1) from the top of the barrel.
5. Remove the follower plate (Fig. 6, pos. 2) from the bottom of the barrel with an air gun (Fig. 6, pos. 10). Loosen the follower plate by feeding compressed air under the follower plate through the middle hole.
6. Use the handles to lift the follower plate out of the barrel.
7. Replace the lubricant barrel.
8. Press the follower plate tightly against the lubricant in the barrel. Make sure that air is removed from below the follower plate and that the central hole of the follower plate starts fills with lubricant.
9. Place the lid on top of the lubricant barrel. Fasten the lid onto the lubricant barrel with wing screws.
10. Pass the pump through the lid onto the middle hole of the follower plate. Make sure that the pump is firmly attached to the follower plate.
11. Depressurise the grease filter (Fig. 8, pos. 10) by opening the bleed screw (Fig. 8, pos. 11) in the filter plug.
12. Clean the grease filter and the filter cartridge (Fig. 9, pos. A), or replace the filter cartridge if necessary.
13. Switch on the pumping centre. Reset any low level alarm by pressing the "Alarm acknowledgement" button in the control unit.
14. Make a pumping centre operation test run by pressing the "Extra lubrication" button on the control unit.

4.3.2 Maxilube STA with lid set and MPB pump

1. Ensure that the surroundings of the pumping centre are clean. Impurities in the system will prevent trouble-free operation and cause damage at the lubrication point.
2. Switch off the power at the pumping centre when replacing the barrel.
3. Lift the low level switch rod (Fig. 7, pos. 8) from the barrel.
4. Lift the pump out of the lubricant barrel and place it on the pump bracket or on a clean base. Be careful not to damage the suction inlet at the bottom of the pump.
5. Remove the lid (Fig. 7, pos. 1) from the top of the barrel.
6. Lift the follower plate (Fig. 7, pos. 2) from the bottom of the barrel.
7. Replace the lubricant barrel.
8. Press the follower plate (Fig. 7, pos. 2) tightly against the lubricant in the barrel. Ensure that air is being removed under the follower plate.
9. Place the lid (Fig. 7, pos. 2) on top of the lubricant barrel. Fasten the lid onto the lubricant barrel with wing screws.
10. Pass the pump through the barrel lid and follower plate into the barrel. Lock the pump with a barrel nut (Fig. 7, pos. 3) so that the lower pos. of the pump is approximately 2 cm above the bottom of the barrel.
11. Pass the rod of the low level switch (Fig. 7, pos. 8) through the hole in the lid, placing it on top of the follower plate.
12. Depressurise the grease filter (Fig. 8, pos. 10) by opening the bleed screw (Fig. 8, pos. 11) in the filter plug.
13. Clean the grease filter and the filter cartridge (Fig. 9, pos. A), or replace the filter cartridge if necessary.
14. Switch on the pumping centre. Reset possible low level alarm by pressing the "Alarm acknowledgement" button on the control unit.
15. Make a pumping centre operation test run by pressing the “Extra lubrication” button on the control unit.

Fig. 9 Grease filter

4.4 Manual operation

SKF Maxilube pumping centre can be operated by a manual procedure in the event of an electrical malfunction or when commissioning before electrification. Pressurise the system by using the manual control screws of the pumping centre's solenoid valve group (Fig. 3).

If the system is channelled with shut-off valves, the shut-off valve of the channel to be pressurised must be before the pressurisation of the piping so that the lubricant can be distributed to the lubrication points downstream the shut-off valve. *See SKF CLV-2 shut-off valve.*

⚠ WARNING

Electric shock
Ensure that the pumping centre/control centre is turned off during manual operation. Power must be turned off before any work involving the handling of conductive parts or the opening of any pos. of the system or product.

A lubrication cycle is performed in manual operation as follows (Fig. 3)

1. Turn the manual control screw of solenoid valve MV**1** 90° clockwise so that the control valve will direct the pressure to line 1.
2. Turn the manual control screw of solenoid valve MV**3** 90° clockwise as well: the pump will start.
3. When the pressure reading in line 1 pressure gauge of the pumping centre has increased to 200–250 bar (3,000–3,600 psi), turn the manual control screw of solenoid valve MV**3** to its initial position (90° counter-clockwise). This will stop the pump.
4. Let the pressure act in line 1 for a couple of minutes so that all the dosers have sufficient time to operate.
5. Turn the manual control screw of solenoid valve MV**1** to its initial position (90° counter-clockwise). This will discharge the pressure from line 1.
6. Line 2 can be pressurised after the pressure reading has fallen below 50 bar (700 psi) in the pressure gauge of the line 1 pressure control unit.
7. Turn the manual control screw of solenoid valve MV**2** 90° clockwise so that the control valve will direct the pressure to line 2.
8. Turn the manual control screw of solenoid valve MV**3** 90° clockwise as well: the pump will start.
9. When the pressure reading in line 2 pressure gauge of the pumping centre has increased to 200–250 bar (3,000–3,600 psi), turn the manual control screw of solenoid valve MV**3** to its initial position (90° counter-clockwise). This will stop the pump.
10. Let the pressure act in line 2 for a couple of minutes so that all the dosers have sufficient time to operate.
11. Turn the manual control screw of solenoid valve MV**2** to its initial position (90° counter-clockwise). This will discharge the pressure from line 2.
12. If necessary, line 1 can be repressurised after the pressure reading of the line 2 pressure control unit has fallen below 50 bar (700 psi).
13. Repeat the steps 1–5.

5. IF-105 user interface

5.1 General description

IF-105 is the user interface for the internal control unit of the SKF Maxilube changeover valve unit.

Lubrication programming, alarm resetting and lubrication event monitoring can be performed with the user interface.

5.2 Main components

Figure 9 illustrates the structure of the IF-105 user interface. It includes a display (1), LEDs for pressurisation (2), browsing buttons (3), a setting/function button (SET; 4) and LEDs for the lubrication channels (5).

Figure 10. IF-103 user interface

5.3 Channel LEDs

The LEDs **CH1** and **CH2** for the lubrication channels are only used in dual-channel systems.

LED	Description
CH1	The red LED lights up when channel 1 is in alarm mode. The green LED lights up when channel 1 is in normal mode. The LED blinks when channel 1 is selected on the display.
CH2	The red LED lights up when channel 2 is in alarm mode. The green LED lights up when channel 2 is in normal mode. The LED blinks when channel 2 is selected on the display.

5.4 Function LEDs

The LEDs indicate the operation of the channel which is selected on the display.

LED	Description
L1	The green LED lights up when main line 1 is being pressurised. The green LED is on during the interval when main line 1 was pressurised last. The red LED blinks when main line 1 is in pressure alarm mode.
L2	The green LED lights up when main line 2 is being pressurised. The green LED is on during the interval when main line 2 was pressurised last. The red LED blinks when main line 2 is in pressure alarm mode.
P	The green LED lights up when the pressurisation phase is in progress. The red LED blinks when the pumping centre is in low level alarm mode.

5.5 Buttons

The operation of the buttons is targeted to the channel which is selected on the display.

Button	Description
	In normal operation mode, the button is used to browse setpoints on the display. In setting mode, the button is used to change the value on the display.
	In normal mode, the button is used to browse line pressure displays in single- and dual-line systems. In normal mode in a progressive system, the button is used to show the pulse counter in the display. In setting mode, the button is used to move to the next character of the display. When browsing the setpoints, the button is used to return to normal mode.
SET	In normal operation mode, the button is used to start extra lubrication, to stop pressurisation or to reset an alarm. In setting mode, the button is used to save the changed value. When browsing the setpoints, the button is used to go to the setting mode.

When a button is pressed, all green LEDs light up for a moment. This indicates that the information about a button being pressed has been transmitted forward.

5.6 Display

The display indicates the operation of the channel which is selected on the display.

User interface has a display of 3 characters and 3 decimal points.

The display shows the time and, in pressure transmitter operation, also the pressure.

Time and pulse display

The setpoint for the lubrication cycle and the elapsed interval are shown on the display as hours and minutes. A decimal point is used to separate hours and minutes.

Time displayed	Display format	Example
0 min - 59 min	**H.MM**	12 min = **0.12**
1 h - 9 h 59 min	**H.MM**	1 h 20 min = **1.20**
10 h -99 h 50 min	**HH.M**	12 h 50 min = **12.5**
100 h – 999 h	**HHH.**	120 h = **120.**

The setpoint for the maximum pressurisation time and elapsed pressurisation time are shown on the display as seconds without the decimal point.

The set pulse amount and the counted pulses are shown on the display as integers, without a decimal point.

5.7 Operation of IF-105

5.7.1 Normal mode

Functions

Display power saving mode

In normal mode, the display will switch to power saving mode when no buttons have been pressed for ten (10) minutes. In power saving mode only the decimal points are blinking on the display. Lubrication events are performed according to the setpoints. The display returns to the normal mode if any button is pressed or if there is an alarm.

Interval counting

In normal mode, the display shows the time elapsed since the last pressurisation in hours and minutes. A green LED for line **L1** or **L2** shows which line was pressurised last.

The interval is always calculated, except when

- The channel is in alarm mode
- The channel interlocking switch is closed
- The channel is closed (maximum pressurisation time = 0)

Pressurisation

The pressurisation time is shown on the display in seconds. The green LED for line **L1** or **L2** shows the line being pressurised. The green LED **P** indicates that pressurisation is in progress.

The pressurisation can be interrupted by pressing **SET**.

Pressurisation time display and setting can be changed from seconds to minutes with factory setting parameter **Prt**. When the pressurisation time is displayed as minutes, all the decimal points on the display are lit.

Extra lubrication

Extra lubrication can be started if the channel is not currently in alarm mode, turned off or pressurising.

Extra lubrication is started in normal mode by pressing **SET** when the display shows the time elapsed since the last pressurisation.

In a dual-line system, both lines are pressurised once. The next line in the set pressurisation sequence is pressurised first. In a single-line and progressive system, the line is pressurised once.

The extra lubrication can be stopped by pressing **SET**.

In pressure transmitter operation, the line pressure discharge is measured. A new pressurisation will not start until the pressure has fallen below the set low limit value.

In pressure switch operation, the system will wait for line pressure discharge. A new pressurisation will not start until after a set delay.

During the pressure discharge, the display shows the phase code **dC**.

5.7.2 Phase codes for normal mode and alarm mode

In normal or alarm mode, the phase code corresponding to the program phase is shown on the display.

Phase code	Description
dC	Waiting for pressure discharge (**d**is**C**harge)
Loc	The interlocking switch is closed (**Loc**ked)
OFF	The channel is closed
AGr	Lubricant reservoir low level alarm (**A**larm, **Gr**ease)
ALP	Pressure low alarm (the line pressure does not rise high enough during the pressurisation time) (**A**larm, **L**ow **P**ressure) Pulse alarm (progressive system) (**A**larm **L**ow amount of **P**ulses)
AHP	Alarm, high pressure (the line pressure has not dropped low enough when the pressurisation phase starts) (**A**larm, **H**igh **P**ressure)
AIn	An alarm from the SKF Doser monitor doser operation indicator. The code is used only if SKF Doser monitors are in use. (**A**larm, **In**dicator)
Air	An alarm from the air pressure switch of the grease spray system. The code is used only if an air pressure switch is in use. (Alarm, **Air**)
APC	A warning of a pump change when a dual pumping centre (Dualset) is in use. (**A**larm, **P**ump **C**hanged)

5.7.3 Normal mode displays, single and dual line lubrication systems

Normal mode displays, which show lubrication program setpoints, can be browsed with ↑.

Display codes change in the following order when ↑ is pressed.

Display code	Description
CH	The lubrication channel selected on the display. The code is used only in dual-channel systems. Press **SET** to switch to another channel when the code is displayed. (**Ch**annel)
Cou	Lubrication cycle counter. (Cycle **Cou**nter) The counter reading increases by one unit when lubrication ends. A decimal point is used to separate thousands.
C	The lubrication cycle setting value as time [h.mm] or pulses, depending on the factory setting parameter **CYC**. Can be set in the range of 0 min – 999 h or 000…999 pulses. (Lubrication **C**ycle)
P	The maximum pressurisation time setpoint [s]. Can be set in the range of 0...999 s. The setpoint can be changed to minutes with factory setting parameter **Prt**. Can be set in the range of 0...999 min. (Lubrication, **P**ressurization time)
PLo	The low limit pressure setpoint [bar/psi]. Can be set in the range of 0...200 bar/0...2,900 psi. (**P**ressure, **Lo**w limit) The code is used in pressure transmitter operation only.
PHi	The high limit pressure setpoint [bar/psi]. Can be set in the range of 0...200 bar/0...2,900 psi. (**P**ressure, **Hi**gh limit) The code is used in pressure transmitter operation only.
dEL	Pressure discharge delay multiplier [n] (**DEL**ay) Delay = P * n [s] The code is used in pressure switch operation only.
HL	Manual operation setting **On**: Manual operation mode **OFF**: Automatic operation mode
PU	The pump is currently in use when the dual pumping centre (Dualset) is in use: 1: Pump 1 in use. 2: Pump 2 in use. This parameter is only displayed when **YES** has been set as the value of the **dUA** factory setting parameter.

Decimal points are used to separate thousands in the lubrication cycle counter reading. The counter's max. reading is **49.9 =** 49999.

Depending on the lubrication system's factory setting parameter **Pre**, the pressure unit on the display is bar or psi. In the psi reading, decimal points are used to separate thousands. For example, **1.02 =** 1020 psi.

5.7.4 Normal mode displays, progressive lubrication system

Normal mode displays, which show lubrication program setpoints, can be browsed with ↑.
Display codes change in the following order when ↑ is pressed.

Display code	Description
CH	The lubrication channel selected on the display. Press **SET** to move to another channel when the code is displayed.
Cou	The lubrication cycle counter. (Cycle **Cou**nter) The counter reading increases by one unit when lubrication ends. A decimal point is used to separate thousands.
C	The lubrication cycle setting value as time [h.mm] or pulses, depending on the factory setting parameter **CYC**. Can be set in the range of 0 min – 999 h or 000…999 pulses. (Lubrication **C**ycle)
P	The maximum pressurisation time setpoint [s]. Can be set in the range of 0...999 s. The setpoint can be changed to minutes with factory setting parameter **Prt**. Can be set in the range of 0...999 min. (Lubrication, **P**ressurization time)
PP1	The pulse count setting (PP1) can be 000…999. If PP1 is set to 0, the maximum pressurisation time is always used. The pulse sensor does not need to be connected. Alarms will not be received, except for the low limit alarm. (**P**ulses **p**er **1** pressurization)
HL	Manual operation setting **On**: Manual operation mode **OFF**: Automatic operation mode
PU	The pump is currently in use when the dual pumping centre (Dualset) is in use: 1: Pump 1 in use. 2: Pump 2 in use. This parameter is only displayed when **YES** has been set as the value of the **dUA** factory setting parameter.

Decimal points are used to separate thousands in the lubrication cycle counter reading. The counter's max. reading is **49.9 =** 49999.

5.7.5 Pressure and pulse displays for lines

Pressure transmitter operation

In pressure transmitter operation, line pressure displays can be selected with □. Pressing the button will show the line 1 pressure display first. Code **P1** and line 1 pressure display are displayed in turn. Pressing the button again will show the line 2 pressure display. Code **P2** and line 2 pressure display are displayed in turn. If line 2 does not exist, the program will return to show the phase code. From line 2 pressure display, the program will return to display the phase code when □ is pressed. The display will automatically return to display the phase code if no buttons have been pressed in four minutes.

If a signal from the pressure transmitter is not detected, the code **_ _ _** is displayed.

Pressure switch operation

In pressure switch operation, the status of the line pressure switches can be displayed with □. Pressing the button will display the status of the line 1 pressure switch first. Code **P1** and line 1 pressure switch status are displayed in turn. Pressing the button again will display the status of line 2 pressure switch. Code **P2** and the status of line 2 pressure switch are displayed in turn. The display will automatically return to display the phase code if no buttons have been pressed in four minutes.

The closed contact status of the pressure switch is shown with the code **on** and the open contact status with the code **oF**.

Pulse counter display in a progressive system

The counted sensor pulses can be displayed by pressing ➔. Code P1 and the pulse counter of the selected channel are displayed in turn. You can return to the time display by pressing ➔.

5.7.6 Power failure

The setpoints and program status are preserved in the memory also during a power failure. Once the power is back on, the operation will resume from the status where it was in before the power failure. Any interrupted pressurisation will restart for the same line. The interval time is not counted during power failures.

5.7.7 Alarms

System with one channel:

- The system is in alarm mode when the red LED for line **L1**, line **L2** or pressurisation **P** is blinking.

Dual channel system:

- The system is in alarm mode when the red LED for channel **CH1** or **CH2** is lit.
- When the channel selected on the display is in alarm mode, the red LED for line **L1**, line **L2** or pressurization **P** is blinking.

Low level alarm

The channel will trigger a low level alarm, stop pressurisation and go into alarm mode if the lubricant reservoir is empty. This means that the reservoir's low level switch is closed. In such a case, the code **AGr** is blinking on the display and the red LED **P** for pressurisation is blinking. Pressurisation will restart for the same line when the low level switch has been opened and the alarm has been acknowledged by pressing **SET**.

Pressure alarm, single and dual line lubrication systems

The channel will trigger a pressure alarm and go into alarm mode if the line pressure is not low enough when pressurisation starts or if the line pressure does not rise high enough during the pressurisation time.

Alarm, high pressure

If the line pressure is not low enough at the beginning of pressurisation, the code **AHP** will be blinking on the display and the red LED **L1** or **L2** of the line that triggered the alarm will be blinking.

In pressure transmitter operation, an alarm is triggered if the line pressure is above the set low limit when pressurisation starts. Pressurisation will restart for the same line when the pressure level has fallen below the low limit value and the alarm has been acknowledged by pressing **SET**.

In pressure switch operation, an alarm is triggered if the pressure switch is closed when pressurisation starts. Pressurisation will restart for the same line when the pressure switch opens and the alarm has been acknowledged by pressing **SET**.

Alarm, low pressure

If the line pressure does not rise high enough during pressurisation, the code **ALP** will be blinking on the display and the red LED **L1** or **L2** of the line that triggered the alarm will be blinking.

In pressure transmitter operation, an alarm is triggered if the line pressure does not reach the set high limit within the set maximum pressurisation time. Pressurization will restart for the same line when the alarm has been acknowledged by pressing **SET**.

In pressure switch operation, an alarm is triggered if the line pressure switch does not close within the set maximum pressurisation time. Pressurization will restart for the same line when the alarm has been acknowledged by pressing **SET**.

Pulse alarm, ProFlex lubrication system

The channel will trigger the pulse alarm **ALP** (**A**larm **L**ow amount of **P**ulses) and go into the alarm mode if the number of pulses is not reached within the set maximum pressurisation time.

Alarm from SKF Doser monitor operation indicator

The SKF Doser monitors are in use when the factory setting parameter **LGI** has been set to **YES**.

An alarm will be triggered when the SKF Doser monitor does not recognise doser operation during a lubrication cycle. The code **AIn** will be displayed. Lubrication continues normally despite the alarm. This feature is different from any other alarms. The alarm can be acknowledged by pressing **SET**.

Alarm from the air pressure switch of the grease spray system

Air pressure control is in use when the factory setting parameter **AC** has been set as **YES**.

NOTE

In a progressive system, the channel spray control starts always when the pump is running. The pump stops when the pulse amount has been reached. The spray control remains on for 10 seconds

An alarm will be triggered if the air pressure switch is not open when pressurisation starts or closed when pressurisation has stopped. The code **Air** will be displayed. Pressurisation will restart for the same line when the alarm has been acknowledged by pressing **SET**.

Warning of pump change (Dualset)

When a dual pumping centre (Dualset) is in use, the display will show the warning message **APC** when the pump has been automatically changed. Lubrication will continue normally regardless of the warning. The warning can be acknowledged by pressing **SET**. The alarm output will not be activated in this case.

5.7.8 Manual operation

A transfer to manual operation mode in the selected channel will take place when the parameter **HL** has been set to **On**.

The return to the automatic mode can take place in one of the following ways:

- set the parameter **HL** to **OFF**

or

- automatically when 60 minutes have elapsed since the transfer into manual operation mode

or

- by restarting the SKF Maxilube hydraulic pos. or the SKF ST-1240-IF CONTROL CENTRE

In manual operation mode, the **SET** button is used to:

- start pumping
- stop pumping
- transfer pumping to another line

The lubrication program will retain the pressure within the set high limit value in the line being pumped. An oil lubrication system (lubrication system operating mode **01** or **02**) and a progressive system have no pressure monitoring.

5.8 IF-105 settings

General

Setpoints are lubrication channel basic values, such as lubrication cycle and maximum pressurisation time. The setpoints are channel specific.

All settings are password protected.

Entering password

1. Select the code for the setting to be changed on the display with ↑.
2. Press **SET**.
3. The display will show the code **PPP**.
4. In a moment, the first character of the display will start to blink.
5. Select with ↑ the first number of the password on the display.
6. Move to the next character by pressing →.
7. When you have entered all three numbers of the password, press **SET**.
8. Once the password has been entered correctly, the code **ACC** will be displayed and the setpoints can be changed during the next 10 minutes.
9. If the password has not been entered correctly, the code **Err** will be displayed and the display will return to normal mode.

NOTE

The password for setpoints is 105.

Entering settings

1. Select the code for the setting to be changed on the display with ↑.
2. Press **SET**.
3. The first number of the value to be set will be blinking on the display.
4. Select the desired number by pressing ↑.
5. Move to the next number by pressing →.
6. Save the setpoint by pressing **SET**.
7. Exit the setting mode by pressing →. The display will automatically return to normal mode after four minutes if no buttons have been pressed.

Lubrication counter

The lubrication cycle counter can be reset when needed.

1. Select the code **Cou** for lubrication cycle counter by pressing ↑.
2. Reset the counter by pressing **SET**.

Lubrication cycle

The lubrication cycle setpoint is displayed as hours and minutes. A decimal point is used to separate hours and minutes. The decimal point of the setpoint can be moved in the manner described below.

1. Select the code for the setting to be changed by pressing ↑.
2. Press **SET**.
3. Set the desired value by pressing ↑ and →.
4. Press →.
5. The decimal point will start to blink.
6. Move the decimal point to the desired location by pressing ↑.
7. Save the setpoint by pressing **SET**.

5.9 IF-105 technical specifications

Value	Unit	Description
-10…+50 14…122	°C °F	Ambient temperature range
45 x 140 x 17 (w x h x d)	mm	Dimensions
Polycarbonate		Material, casing
IP67		Protection class

5.9.1 Legend

IF-105	Abbreviation	Description
IF:	IF	Interface
105:	105	model

6. Modbus RTU fieldbus interface

6.1 Features

Protocol: Modbus RTU (Slave), 9600 baud, 8 bits, no parity. Function codes FC03 & FC16
Hardware: RS422 or RS232, selectable by IF-105 interface panel.

Modbus allows to read and set the lubrication system parameters of Maxilube. The same functions as with user interface of the control centre are available:

- lubrication status can be read
- lubrication parameters can be set and read
- user can send commands extra/stop lubrication & reset alarm

6.2 Parameters

Modbus related parameters need to be set by IF-105 interface panel.

Parameter		
SEr:	232	RS232 port active
	422	RS422 port active
Add	1…7	Modbus address 1…7

(parameters are accessible with password 222)

6.3 Connections

Terminal	**Signal**
XC: 15	RxD, RS232C
XC: 16	TxD, RS232C
XC: 14	0V, RS232C

Connect X11 & X14 short-circuit pieces or jumpers (when RS-422 used)

XC: 20	RxD+, RS422 (Kytkentäristiin TxD+)
XC: 18	RxD- ,RS422 (Kytkentäristiin TxD-)
XC: 19	TxD+, RS422 (Kytkentäristiin RxD+)
XC: 17	TxD- , RS422 (Kytkentäristiin RxD-)

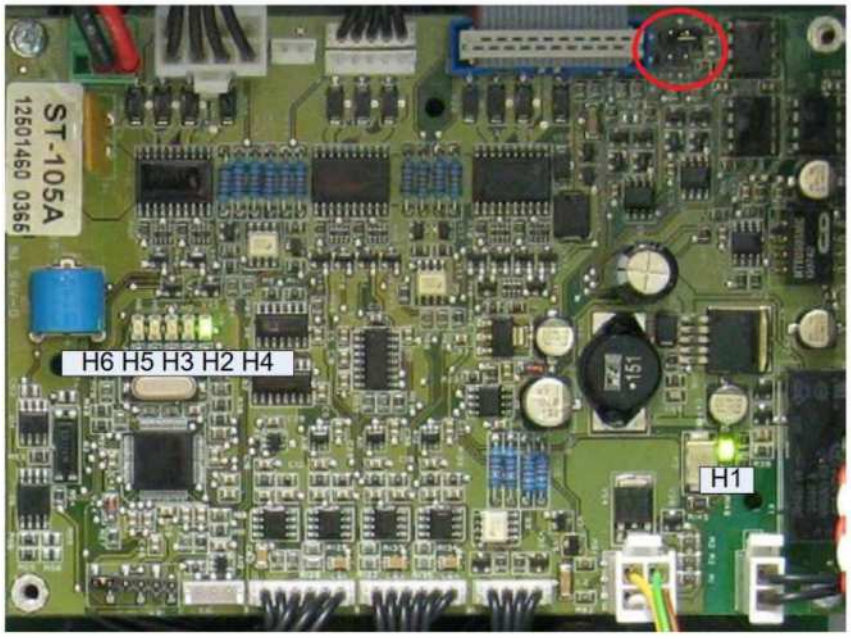


Figure 11: *X11 & X14 short-circuit pieces or jumpers*

6.4 Modbus registers

Lubrication status Modbus function code (FC3)

> NOTE
> FC3 might give time-out response after writing a value

REGISTER [channel1]	REGISTER [channel2]	R/ W	TYPE	PARAMETER
2065	**2081**	R	Integer	Current status of the lubrication channel 0= not configured 1= lubrication interval 21= pressuring line 1 22= pressuring line 2 3= interlocking 4= closed 5= discharge delay 6= low level alarm 71= pressure alarm line 1 72= pressure alarm line 2 8= discharging 9= waiting another channel to complete 60= doser indicator alarm 62= air alarm in grease spray
2066,2067	**2082,2083**	R	Longint	Elapsed time of current status [s]
2068	**2084**	R	Integer	Current pressure in bars in line 1
2069	**2085**	R	Integer	Current pressure in bars in line 2
2070	**2086**	R	Integer	Lubrication counter

6.4.1 Settings

Lubrication settings Modbus function code (FC16)

REGISTER [channel1]	REGISTER [channel2]	R/ W	TYPE	PARAMETER
34-38	**66-70**	R/ W	String	free name of the channel
40	**72**	R/ W	Integer	Lubrication cycle in minutes or in pulses
41	**73**	R/ W	Integer	Maximum pressuring time in seconds
42	**74**	R/ W	Integer	Low limit pressure in bars
43	**75**	R/ W	Integer	High limit pressure in bars
44	**76**	R/ W	Integer	Configured lubrication mode 1= OS (oil) 2= SG1 (single line grease) 3= SG2 (dual line grease) 5= SG2E (dual line hold) 7= ML1 (single line MultiLube) 8= ML2 (dual line MultiLube) 9= SG1E (single line hold) 10=S1 (single line grease spray) 11=S2 (dual line grease spray) 12=P1 (progressive system) 13=P2 (dual channel progressive system) 14=O2 (dual line oil)
48	**80**	R/ W	Integer	Pressure switch=0 or pressure transmitter =1 in use
49	**81**	R/ W	Integer	Discharge delay factor when pressure switches are in use
50	**82**	R/ W	Integer	Lubrication cycle counted as time=0 or pulses =1
51	**83**	R/ W	Integer	LG-IND doser indicators in use 0=NO 1=YES
52	**84**	R/ W	Integer	Air control in use in grease spray system 0=NO 1=YES

6.4.2 Commands

Lubrication settings Modbus function code (FC16)

> NOTE
> FC 16 might give time-out response after writing a value

REGISTER [channel1]	REGISTER [channel2]	R/ W	TYPE	PARAMETER
1554	**1555**	R/ W	Integer	1= start extra lubrication/ interrupt lubrication 2= acknowledge alarm

7. Maxilube troubleshooting table

Description of malfunction	Cause of malfunction	Solution
If internal control unit of SKF Maxilube is in use: The user interface display and the LEDs are not lit.	No supply voltage to the pumping centre.	Check the supply voltage.
If an external control centre is in use: The green POWER LED of the control centre is not lit and the user interface is dark.	The control centre's main switch is in the OFF position. The fuse has operated.	Turn the main switch to the ON position. Check the fuse.
The user interface displays a lubricant barrel low level alarm in a lubrication channel.	The lubricant barrel is empty.	Replace the lubricant barrel. Reset the alarm.
The user interface displays a low pressure alarm for the lubrication channel. The pressure at the pressure control unit is below the set pressure high limit value during pressurisation.	The lubricant has stiffened in the piping because of the operating conditions (e.g. cold, heat). Header piping is leaking. There is air in the header piping.	Set the maximum pressurisation time longer or replace the lubricant with an appropriate type. Locate and repair the damage. Remove air from the header and branch piping. Reset the alarm.
Considerable grease leakage at the lubrication point. The temperature of the bearing rises.	The lubrication cycle has been set too short.	Check the correct lubrication cycle from the doser setting table of the lubrication system or contact Oy SKF Ab.
The pump does not start.	Compressed air supply has been cut off. Insufficient air pressure.	Turn on the compressed air supply by pressing down the shut-off valve button. (Fig. 8/e). Check that the pressure at the pressure air regulator is 3.5–4.5 bar. Check the air supply hoses for leaks.
The pump starts but pressure does not increase.	Insufficient air pressure.	Check that the pressure at the pressure air regulator is 3.5–4.5 bar. Check the air supply hoses for leaks.

Description of malfunction	Cause of malfunction	Solution
The user interface displays an alarm for high pressure in a lubrication channel. The pressure at the pressure control unit is above the set pressure low limit value when pressurisation starts.	The lubricant has stiffened in the piping because of the operating conditions (e.g. cold, heat). The control valve of the changeover valve unit is not working.	Set the lubrication cycle longer or replace the lubricant with one appropriate for the operating conditions. Reset the alarm. Check that the setpoints for high and low limit pressure are correct. If necessary, contact Oy SKF Ab. Check the pressure of the compressed air. Check the operation of the solenoid valves MV1 and MV2.

⚠ WARNING

Before addressing the following malfunctions, turn off the power from the control and pumping centre. Turn off the compressed air supply by lifting up the shut-off valve button (Fig. 8, pos. e). Remove pressure from the grease filter before opening it with the bleed screw located in the filter plug (Fig. 8, pos. 11). Any residual pressure in the system when opening or disconnecting components may cause components to be thrown or lubricant to spray, causing injury to people or damage to the environment.

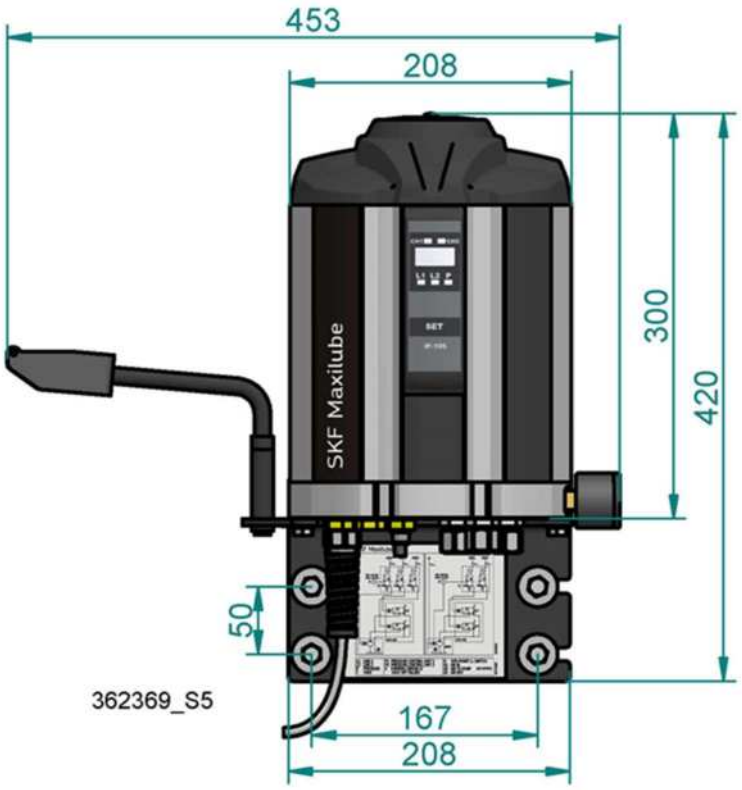
Description of malfunction	**Cause of malfunction**	**Solution**
The pump starts but pressure does not increase.	The grease filter is clogged.	Clean or replace the grease filter cartridge.
	There is air in the suction piping.	Bleed the pump by opening the grease filter bleed screw (Fig. 8, pos. 11) or the pump's pressure connection (P). Check that only grease and no air comes out of the bleed screw or the pressure connection.
	There are impurities in the pump's suction inlet.	Contact Oy SKF Ab.

8. Maxilube technical specification

8.1 Technical specification Maxilube changeover valve unit

Quantity	Value	Unit	Description
t	0…+50 +32…+122	°C °F	Ambient temperature range
p	2–4.5 40–65	bar psi	Operating air pressure range
U	24 ±10%	V DC	Control voltage
U	115 ±10%; 50/60 230 ±10%; 50/60	V AC; Hz V AC; Hz	Power input
P	150	W	Max. power consumption
m	13	kg	Weight

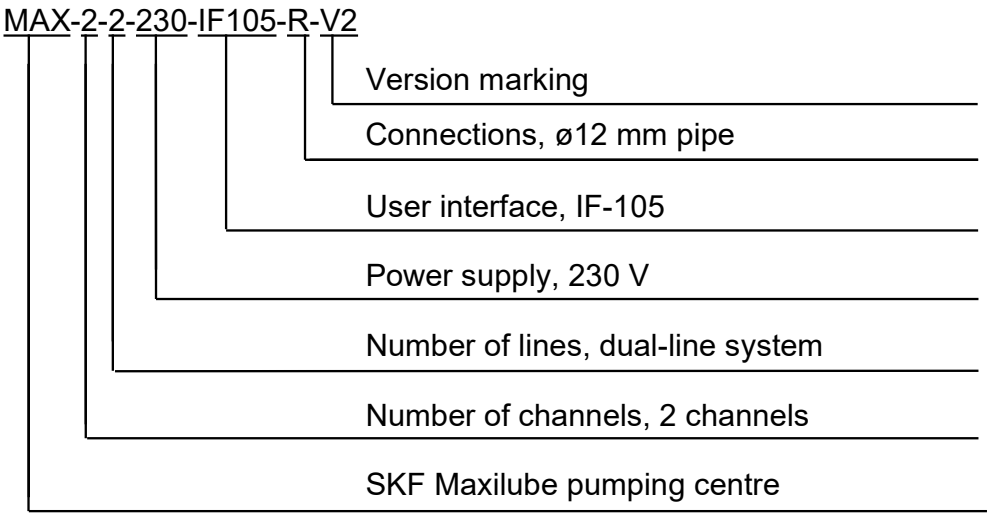
Fig. 12 Maxilube dimensional drawing



8.2 Symbols Maxilube changeover valve unit

MAX-A-B-C-D-E-F	Abbreviation	Description
MAX:	MAX	SKF Maxilube changeover valve unit
A:	1	Number of channels (1 channel)
	2	Number of channels (2 channels)
B:	1	Number of lines (single-line system)
	2	Number of lines, dual-line system
C:	24	Control voltage, 24 V
	115	Power supply: 115 V
	230	Power supply: 230 V
D:	IF105	User interface (IF-105)
	X	External control
E:	R	Lubrication line outlets, DIN 2353 shear ring coupling for a ø 12 mm pipe
	U	Lubrication line outlets, DIN 2353 shear ring coupling for a ø 1/2” pipe
F:	V2	Version marking

Example:



8.3 Order codes, SKF Maxilube changeover valve unit

Order code	Type marking	Description
12371171	MAX-1-2-230-IF105-R-V2	One channel, dual line, 230 V, with control, ø12 mm line outputs
12371501	MAX-1-2-230-IF105-U-V2	One channel, dual line, 230 V, with control, ø1/2” line outputs
12371041	MAX-1-2-115-IF105-R-V2	One channel, dual line, 115 V, with control, ø12 mm line outputs
12371371	MAX-1-2-115-IF105-U-V2	One channel, dual line, 115 V, with control, ø1/2” line outputs
12371175	MAX-1-2-24-IF105-R-V2	One channel, dual line, 24 V, with control, ø12 mm line outputs
12371231	MAX-2-2-230-IF105-R-V2	Two channel, dual line, 230 V, with control, ø12 mm line outputs
12371561	MAX-2-2-230-IF105-U-V2	Two channel, dual line, 230 V, with control, ø1/2” line outputs
12371101	MAX-2-2-115-IF105-R-V2	Two channel, dual line, 115 V, with control, ø12 mm line outputs
12371431	MAX-2-2-115-IF105-U-V2	Two channel, dual line, 115 V, with control, ø1/2” line outputs
12371141	MAX-1-1-230-IF105-R-V2	One channel, single line or progressive, 230 V, with control, ø12 mm line outputs
12371471	MAX-1-1-230-IF105-U-V2	One channel, single line or progressive, 230 V, with control, ø1/2” line outputs
12371011	MAX-1-1-115-IF105-R-V2	One channel, single line or progressive, 115 V, with control, ø12 mm line outputs
12371341	MAX-1-1-115-IF105-U-V2	One channel, single line or progressive, 115 V, with control, ø1/2” line outputs
12371201	MAX-2-1-230-IF105-R-V2	Two channel, single line or progressive, 230 V, with control, ø12 mm line outputs
12371531	MAX-2-1-230-IF105-U-V2	Two channel, single line or progressive, 230 V, with control, ø1/2” line outputs
12371071	MAX-2-1-115-IF105-R-V2	Two channel, single line or progressive, 115 V, with control, ø12 mm line outputs
12371401	MAX-2-1-115-IF105-U-V2	Two channel, single line or progressive, 115 V, with control, ø1/2” line outputs
12371271	MAX-1-2-24-X-R-V2	One channel, dual line, 24 V, no control, ø12 mm line outputs
12371601	MAX-1-2-24-X-U-V2	One channel, dual line, 24 V, no control, ø1/2” line outputs

9. Maintenance

9.1 Cleaning

9.1.1 Basics

Cleaning should be carried out in accordance with the operator's own company rules, and cleaning agents and devices and the personal protective equipment to be used should likewise be selected in accordance with those rules. Only cleaning agents compatible with the materials may be used for cleaning. Completely remove any cleaning agent residue left on the product and rinse with clear water. Unauthorized persons must be kept away. Use signage to indicate wet areas.

9.1.2 Interior cleaning

The interior normally does not need to be cleaned. The interior of the product must be cleaned if incorrect or contaminated lubricant accidentally enters the product. Please contact our Service department.

9.1.3 Exterior cleaning

Do not allow any cleaning fluid to enter the interior of the product during cleaning.

⚠ WARNING

Risk of fatal electric shock

Cleaning work may only be performed on products that have been de-energized first. When cleaning electrical components, be mindful of the IP enclosure rating.

⚠ WARNING

Serious injury from contact with or inhalation of hazardous substances

Wear personal protective equipment. Observe the safety data sheet (SDS) of the hazardous substance. Avoid contaminating other objects or the environment during cleaning.

9.2 Periodic inspections

Monthly inspections

- Inspect the pressure air regulator and drain it of water
- Check the pump’s operation.
- Check the pump and lubrication system for leaks.

When replacing the barrel (in addition to the above):

- Clean the grease filter and the filter cartridge and replace them if necessary.

10. Decommissioning and storage

10.1 Temporary shutdown

The system can be temporarily shut down by disconnecting it from electrical, pressurised air and hydraulic outlets. If you wish to shut down the product temporarily, see also Section *Storage*. For further information, please refer to relevant components' operating and service manuals in Section *General description*. When recommissioning the equipment, please refer to sections *Commissioning* and *Technical specification* in the relevant components' operating and service manuals.

10.2 Final decommissioning

Used equipment filled with lubricant must be decommissioned and disposed of in accordance with national legislation and the procedures indicated in this operating and service manual.

NOTICE

Lubricants can contain chemicals that can contaminate the soil and the water system. Lubricants must be disposed of appropriately. Observe any local laws and regulations concerning disposal and recycling.

You can also return the product to Oy SKF Ab for disposal. Oy SKF Ab reserves the right to recover any costs arising from the disposal.

10.3 Storage

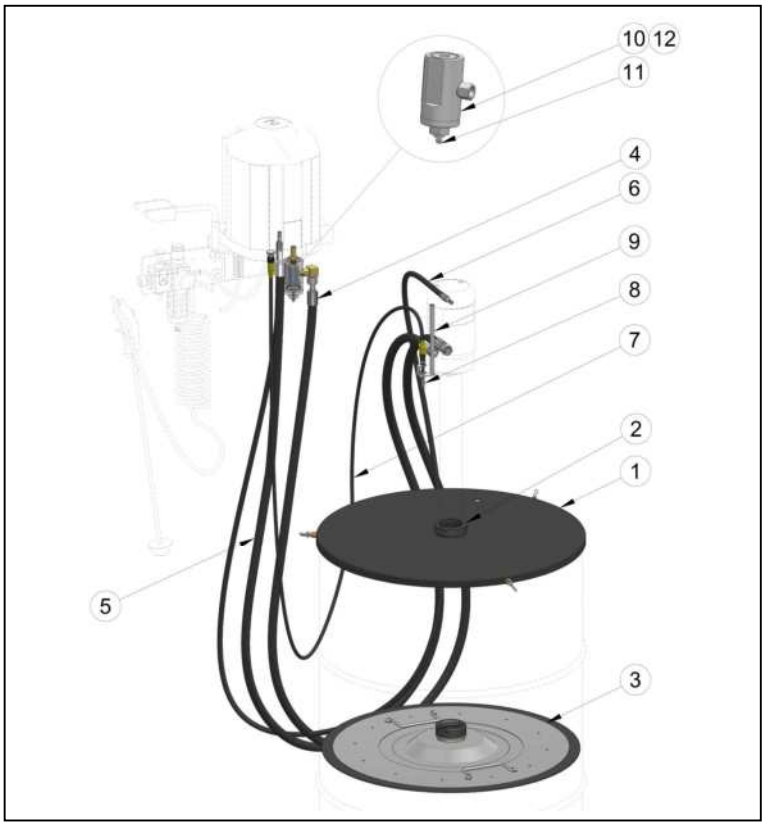
The products must be stored as follows:

- Store in a dry, dust-free and well-ventilated space.
- Do not store the product for more than 24 months.
- Storage temperature range is +10...40 °C.
- Avoid direct sunlight and heat radiation.
- Store the products clear of the ground or floor.
- Protect the products against impacts, corrosion and dust.

11. Lidsets, codes & spareparts

11.1 MAXV2 lidset ECO

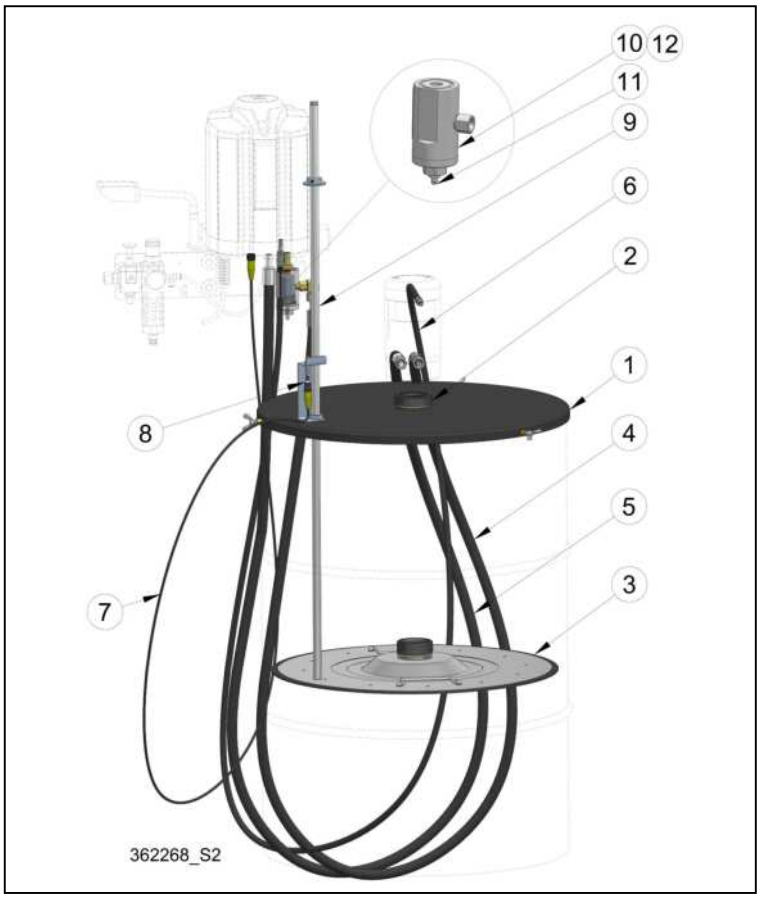
MAXV2-LIDSET-1/1-ECO-MPBP, order code 12381381
MAXV2-LIDSET-1/4-ECO-MPBP, order code 12381382
MAXV2-LIDSET-1/8-ECO-MPBP, order code 12381383



Part no.	Description	Order code
1	Barrel lid 1/1 (180 kg) Barrel lid 1/4 (50 kg) Barrel lid 1/8 (18 kg)	12603700 12603750 12603775
2	Barrel nut	12381056
3	Follower plate 1/1-ECO (180 kg) Follower plate 1/4-ECO (50 kg) Follower plate 1/8-ECO (18 kg)	12603804 12603802 12603800
4	Pressure hose	12651232
5	Tank hose	12351232
6	Pressure air hose	12389728
7	M12 intermediate cable	12502336
8	Low level sensor	10543516
9	Low level fastener	12404291
10	Grease filter	12386250
11	Bleed screw	12407848
12	Grease filter cartridge 400 micr.	12606550

11.2 MAXV2 lidset STA

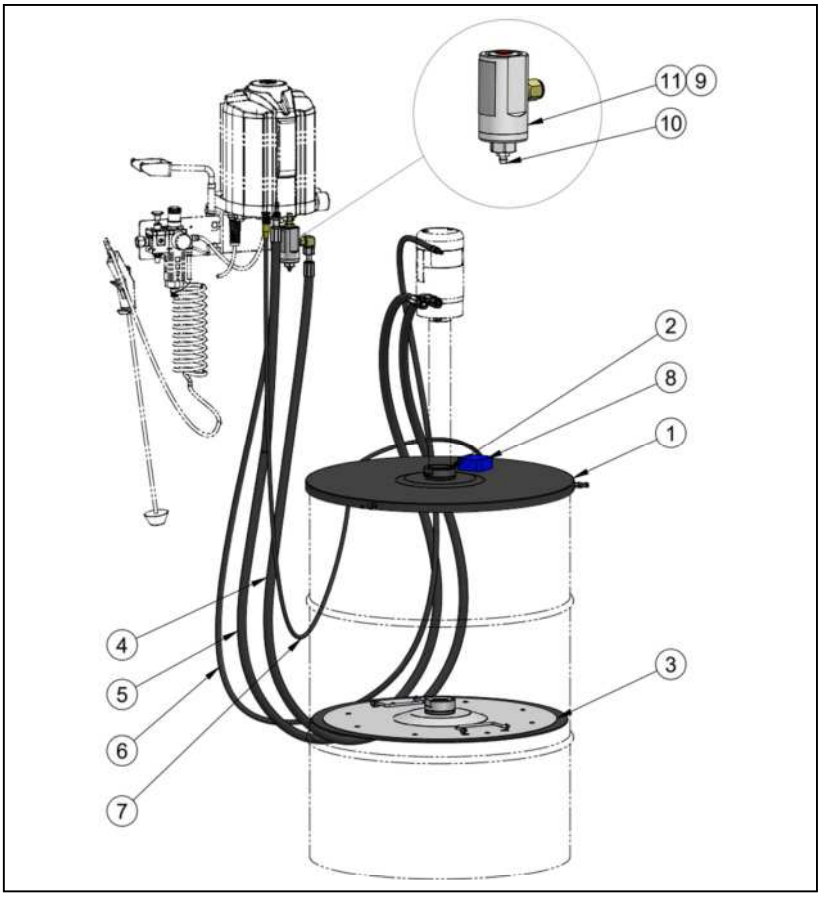
MAXV2-LIDSET-1/1-STA-MPBP, order code 12381384
MAXV2-LIDSET-1/4-STA-MPBP, order code 12381385
MAXV2-LIDSET-1/8-STA-MPBP, order code 12381386



Part no.	Description	Order code
1	Barrel lid 1/1 (180 kg) Barrel lid 1/4 (50 kg) Barrel lid 1/8 (18 kg)	12603700 12603750 12603775
2	Barrel nut	12381057
3	Follower plate 1/1-STA (180 kg) Follower plate 1/4-STA (50 kg) Follower plate 1/8-STA (18 kg)	12603925 12603922 12603921
4	Pressure hose	12651232
5	Tank hose	12351232
6	Pressure air hose	12389728
7	M12 intermediate cable	12502336
8	Low level sensor	10543516
9	Grease level switch 1/1 Grease level switch 1/4 Grease level switch 1/8	12381073 12381072 12381071
10	Grease filter cartridge 400 micr.	12606550
11	Bleed screw	12407848
12	Grease filter	12386250

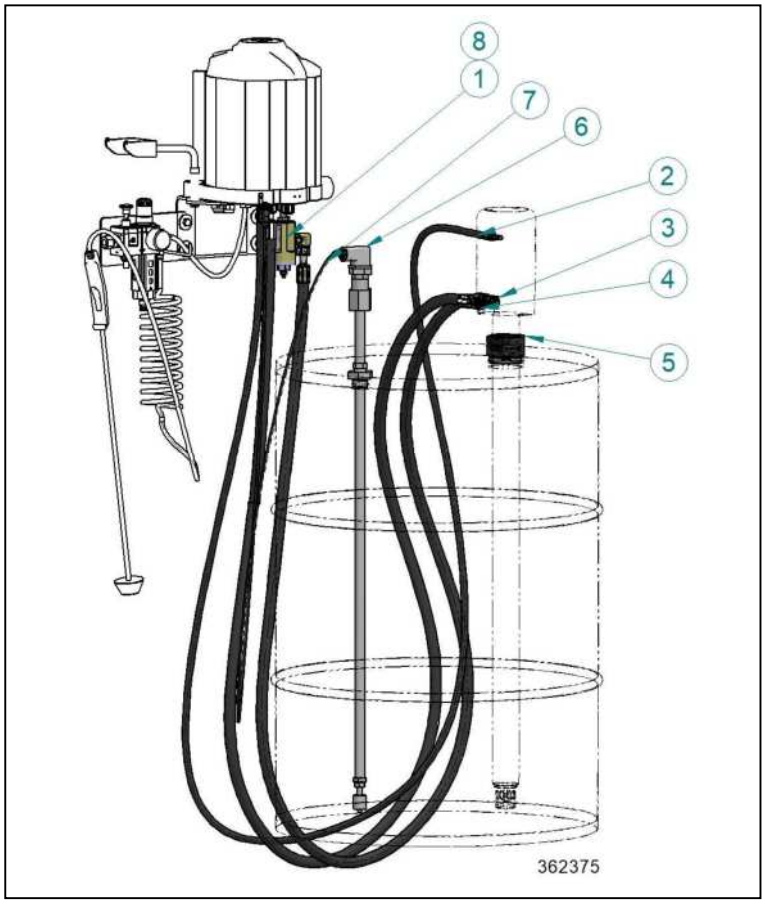
11.3 MAXV2 lidset US

MAXV2-LIDSET-1/1-STA-MBP-US, order code 12381389. MAXV2-LIDSET-1/1-ECO-MBP-US, order code 12381391.
MAXV2-LIDSET-1/4-STA-MBP-US, order code 12381376. MAXV2-LIDSET-1/4-ECO-MBP-US, order code 12381395.
MAXV2-LIDSET-1/8-STA-MBP-US, order code 12381379. MAXV2-LIDSET-1/8-ECO-MBP-US, order code 12381378.



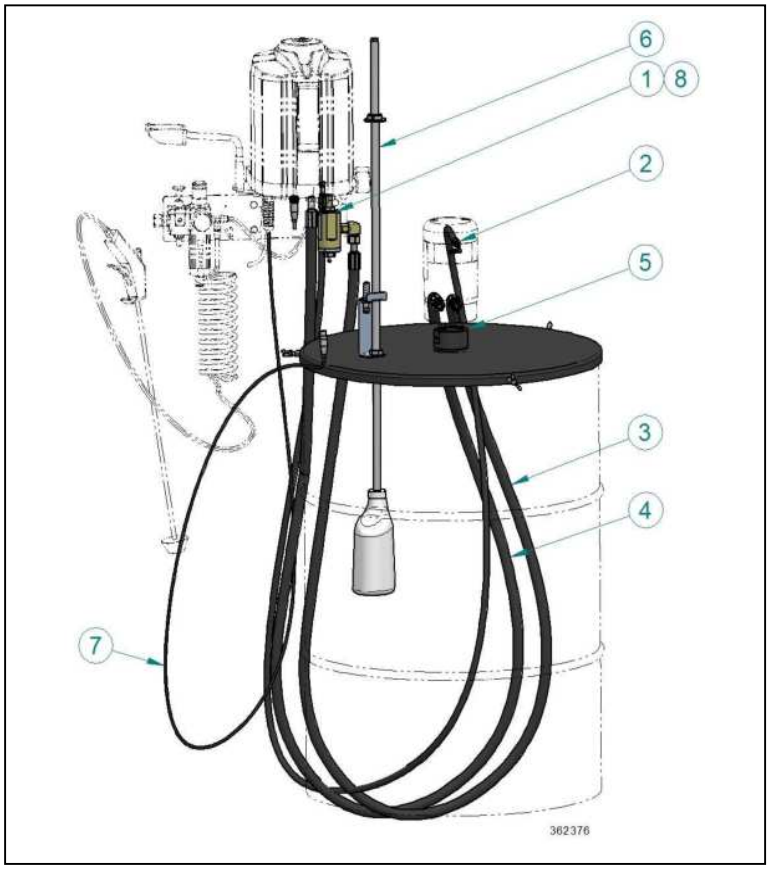
Part no.	Description	Order code
1	Barrel lid 1/1 US (180 kg) Barrel lid 1/4 US (50 kg) Barrel lid 1/8 US (18 kg)	12603701 12603751 12603771
2	Barrel nut STA Barrel nut ECO	12381057 12381056
3	Follower plate 1/1-STA (180 kg) Follower plate 1/1-ECO (180 kg) Follower plate 1/4-STA (50 kg) Follower plate 1/4-ECO (50 kg) Follower plate 1/8-STA (18 kg) Follower plate 1/8-ECO (18 kg)	12603925 12603804 12603922 12603802 12603921 12603800
4	Pressure hose	12651232
5	Tank hose	12351232
6	Pressure air hose	12389728
7	M12 intermediate cable	12502336
8	Ultrasonic sensor 500mm (For 1/8) Ultrasonic sensor 1000mm (For 1/1, 1/4)	2370-00000312 2370-00000308
9	Grease filter cartridge 400 micr.	12606550
10	Bleed screw	12407848
11	Grease filter	12386250

11.4 MAXV2-LIDSET-1/1-OS-MPB (12381387)



Part no.	Description	Order code
1	Lubricant filter LF-250	12386251
2	Pressure air hose	12389728
3	Pressure hose	12651232
4	Tank hose	12651232
5	Barrel nut	12381057
6	Low level switch	13395980
7	M12 intermediate cable	12502336
8	Grease filter cartridge 250 micr.	12386251

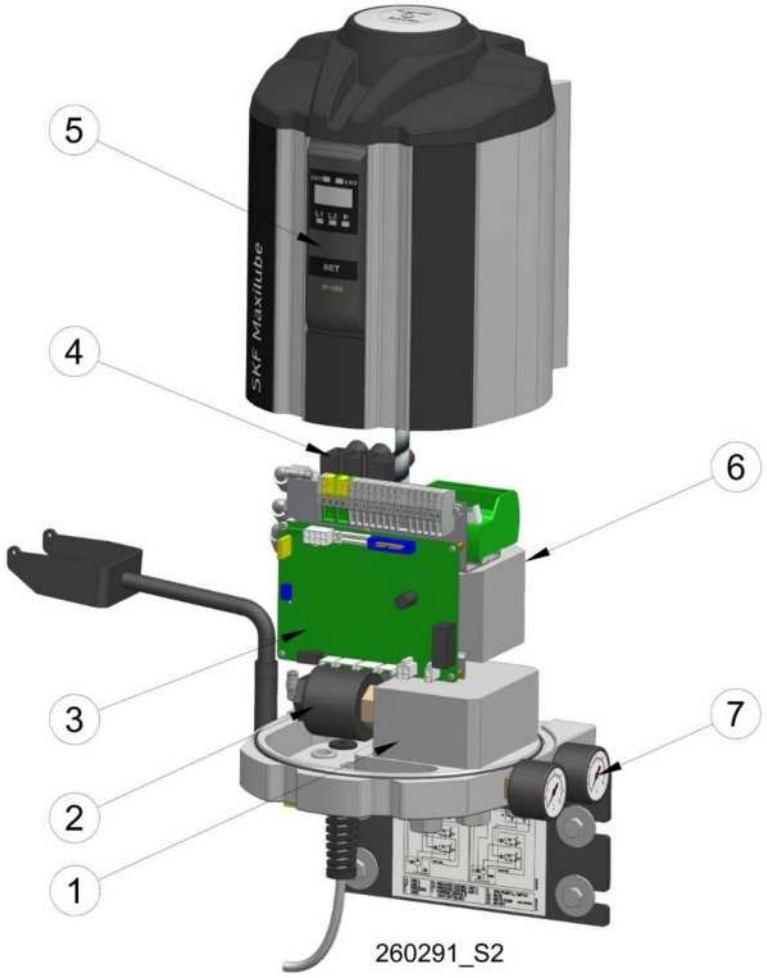
11.5 MAXV2-LIDSET-1/1-LG-MPB (12381388)



Part no.	Description	Order code
1	Lubricant filter GF-400	12386250
2	Pressure air hose	12389728
3	Pressure hose	12651232
4	Tank hose	12651232
5	Barrel nut	12381057
6	Low level switch	12381074
7	M12 intermediate cable	12502336
8	Grease filter cartridge 400 micr.	12606550

12. Spare parts

Fig. 13 Maxilube spare parts



Part no.	Description	Order code
1	CHV-1-MAX Assembly CHV-2-MAX Assembly	12386090 12386100
2	CHV-100 control cartridge (1 or 2 pcs)	12386245
3	Circuit board ST105A-V2	12501461
4	Pneumatic valve system V2	12400100
5	User interface IF-105	12501480
6	Power supply unit 115/230 VAC	11501000
7	Pressure gauge	12600850

13. Appendix

13.1 China RoHS Table

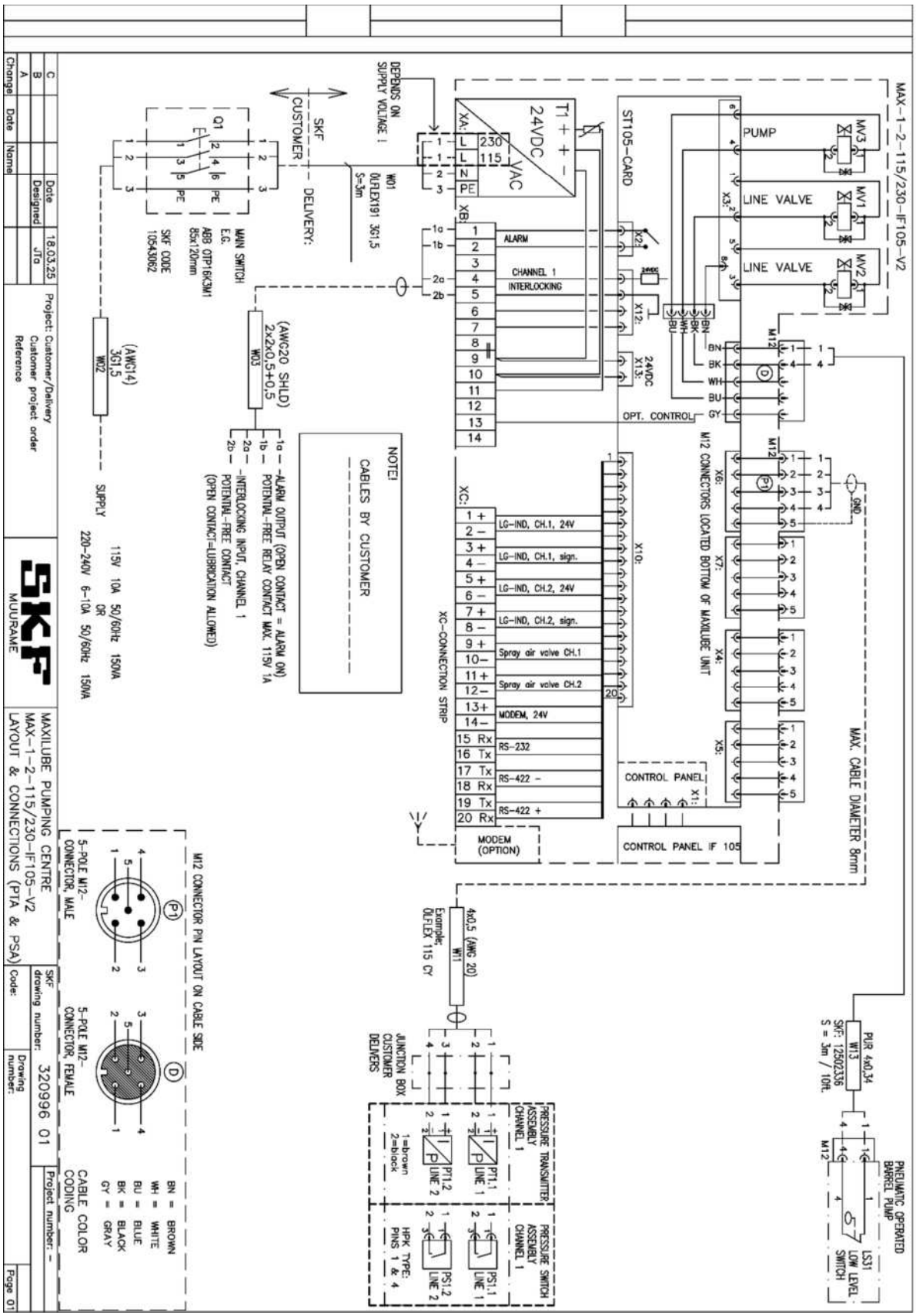
部件名称 (Part Name)	有毒害物质或元素 (Hazardous substances)					
	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
用钢和黄铜加工的零件 (Components made of machining steel and brass)	X	0	0	0	0	0

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.)

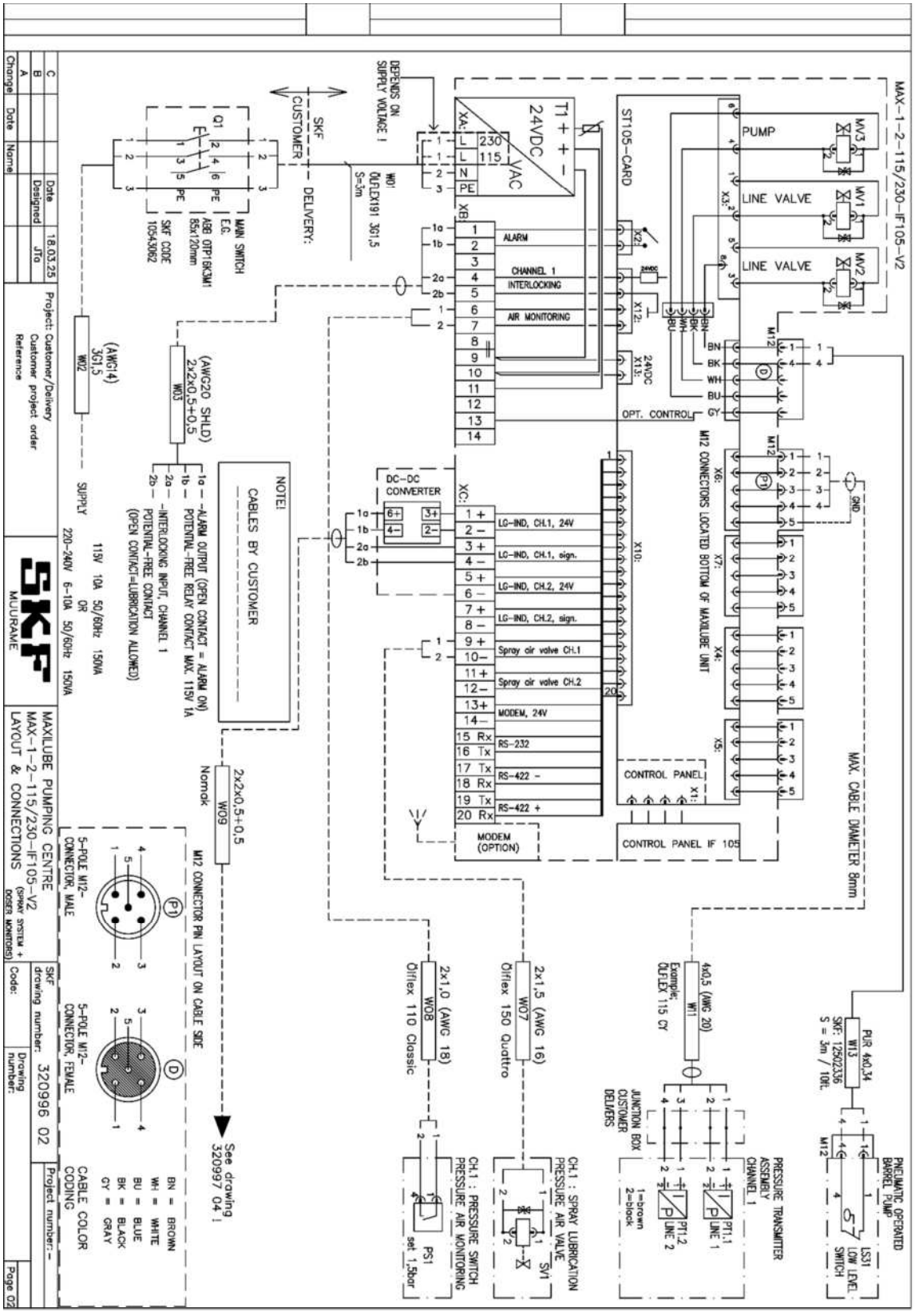
O：表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。
(Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.)

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.)

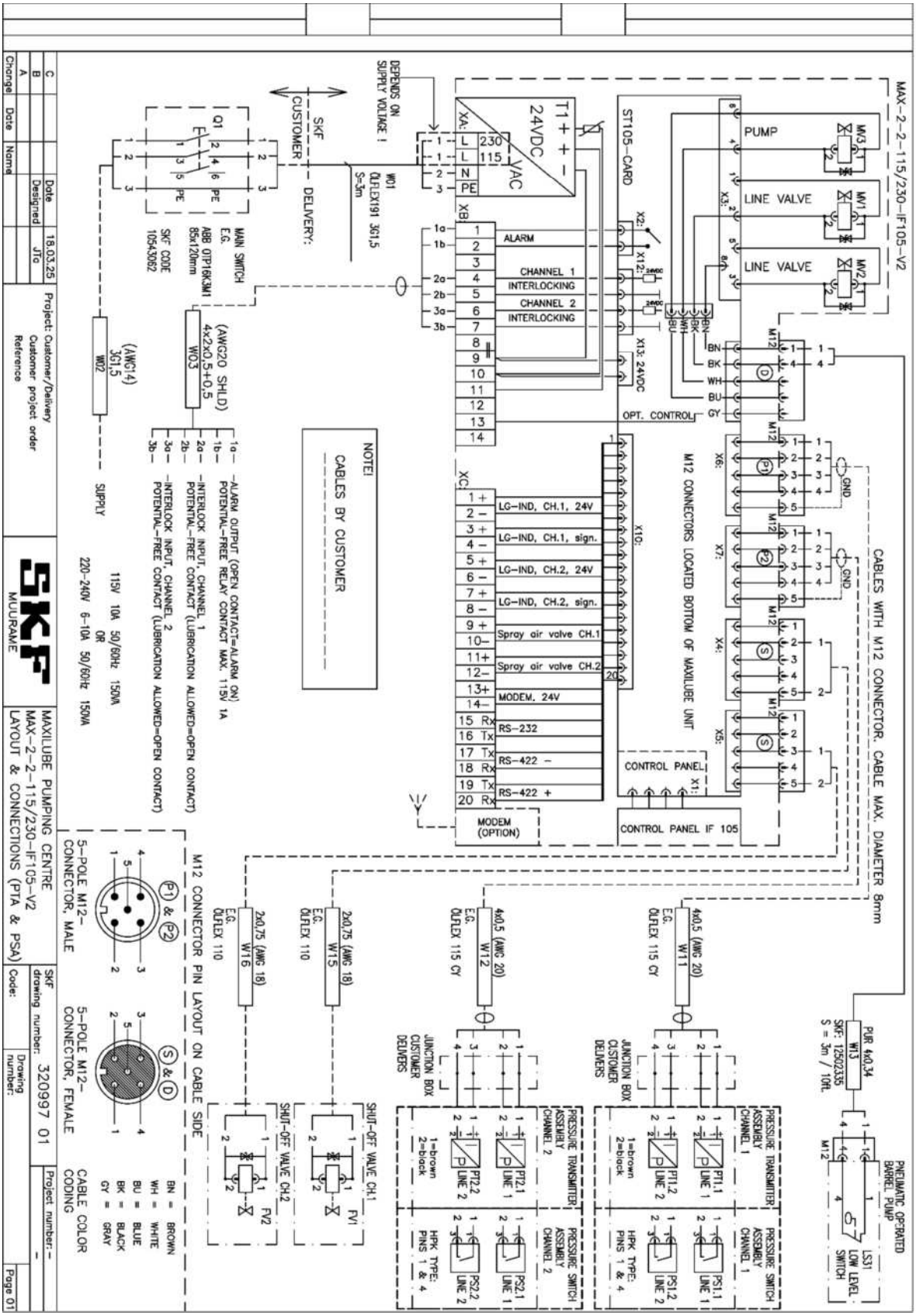
13.2 ELECTRIC CONNECTIONS 320996.01



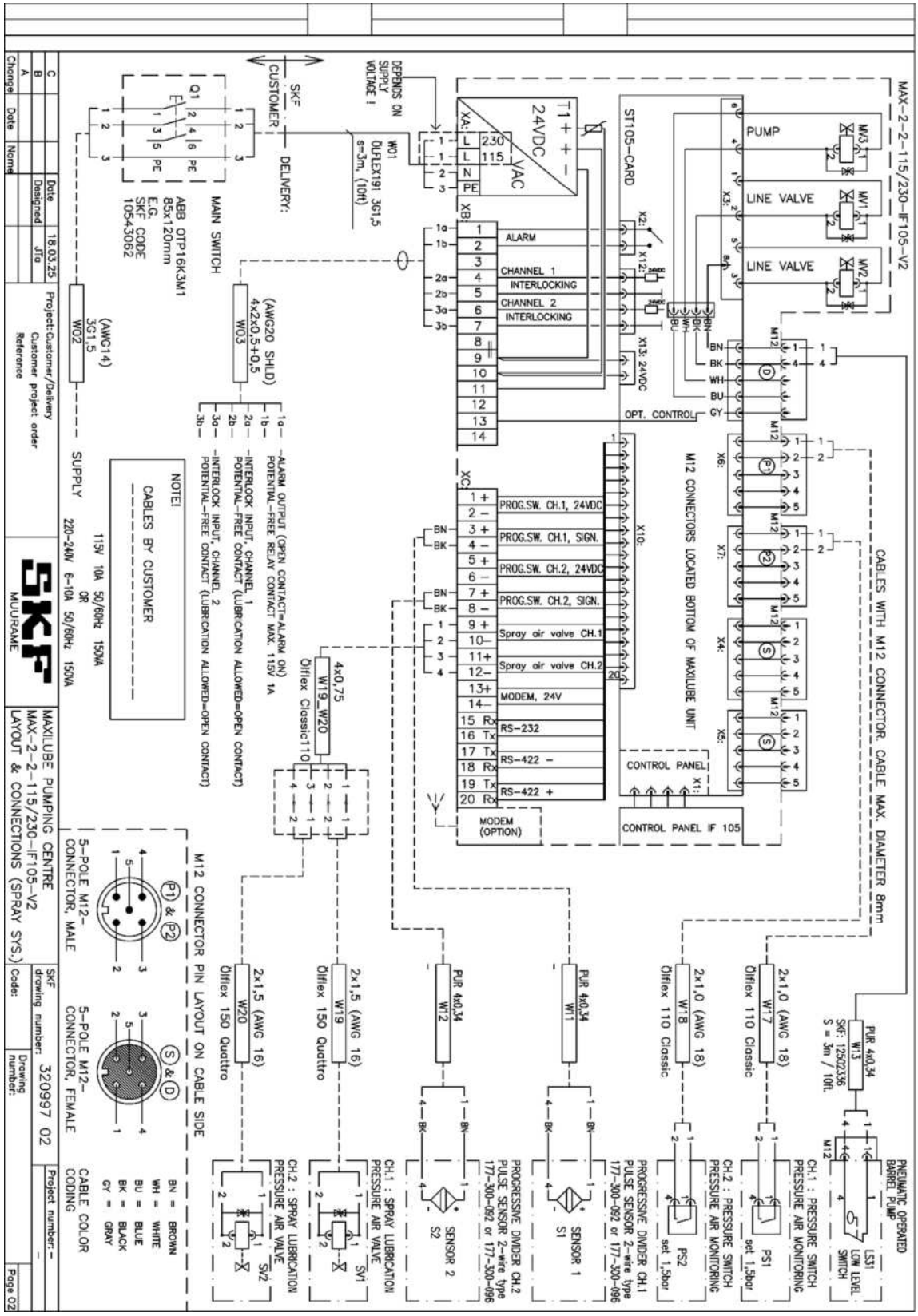
13.3 ELECTRIC CONNECTIONS 320996.02



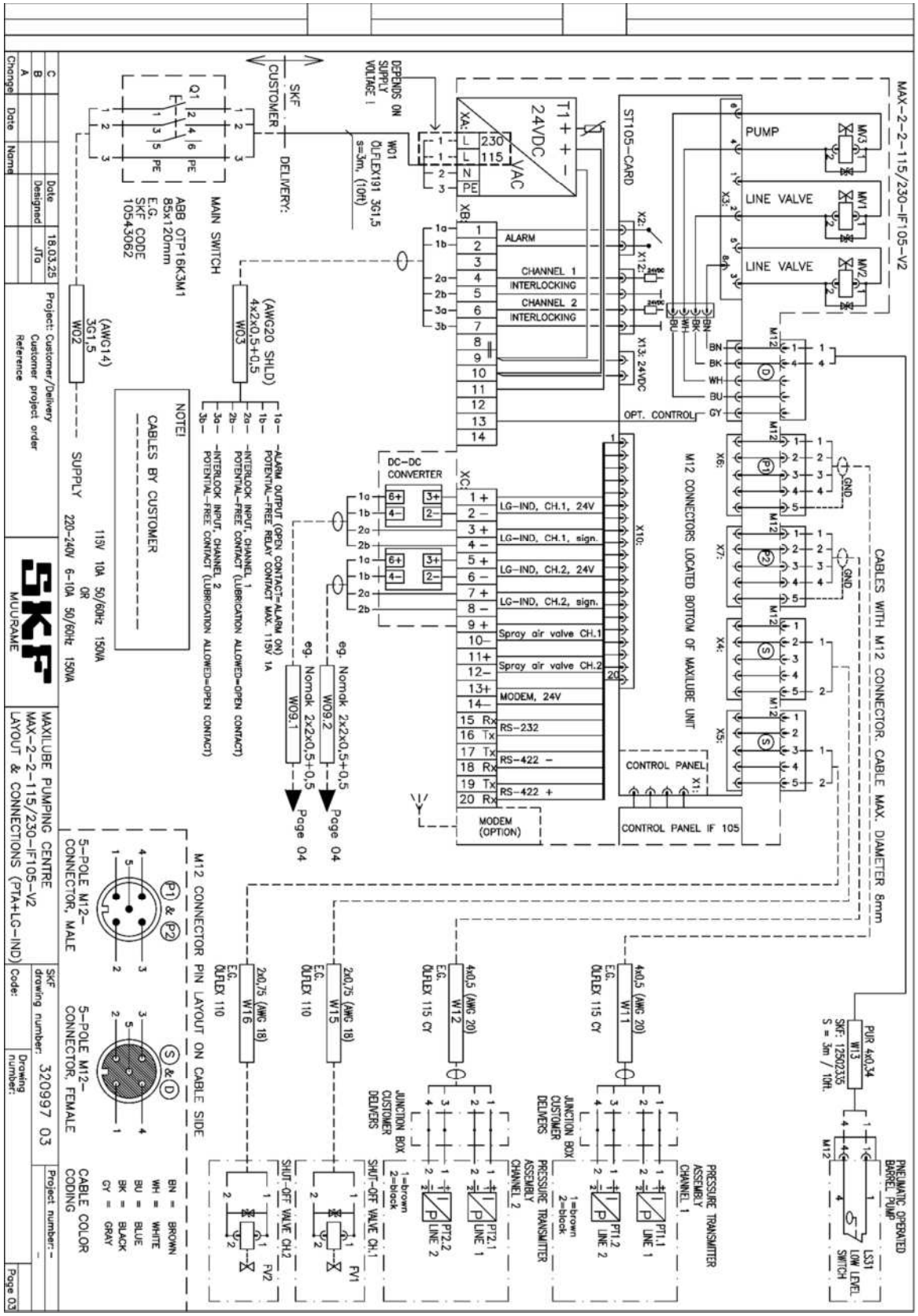
13.4 ELECTRIC CONNECTIONS 320997.01



13.5 ELECTRIC CONNECTIONS 320997.02



13.6 ELECTRIC CONNECTIONS 320997.03



13.7 ELECTRIC CONNECTIONS 320997.04