

P 243



Declaration of Incorporation

(according to Machinery Directive 2006/42/EC, Attachment II Part 1 B)

The manufacturer

SKF Lubrication Systems Germany GmbH, Heinrich-Hertz-Str. 2-8, D - 69190 Walldorf
hereby declares that the partly completed machinery:

Designation: Pump for supplying lubricants in a centralized lubrication system

Type: P 243

Part no. 644-XXXXX-X

Year of construction See type identification plate

complies with the following basic requirements of the EC Machinery Directive 2006/42/EC at the time when first being launched in the market.

1.1.2 ○ 1.1.3 ○ 1.2.1 ○ 1.3.2 ○ 1.3.4 ○ 1.3.8.1 ○ 1.5.8 ○ 1.5.9 ○ 1.5.10 ○ 1.7.1

The special technical documents were prepared following attachment VII part B of this directive. Upon justifiable request, these special technical documents can be forwarded electronically to the respective national authorities. The person empowered to assemble the technical documentation on behalf of the manufacturer is the head of standardization; see manufacturer's address.

Furthermore, the following directives and harmonized standards were applied in the respective applicable areas:

Directives:

2004/09/EC EMC Directive

Harmonized and other standards:

DIN EN ISO 12100:2011 DIN EN 61000-2

DIN EN 809-1:2011 DIN EN 60204-1

DIN 40050-9:1993-5 DIN EN 55011

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the EC Machinery Directive 2006/42/EC and any other applicable directives.



Walldorf
2012/20/09

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Declaration of Incorporation

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1. Guidelines

As you read this documentation, you will notice a number of depictions and symbols which are to facilitate the navigation and understanding of this documentation. For reasons of better legibility, in this documentation we mainly use the male form for general references. Of course, the female form is also always intended. In the following the different meanings are explained.

| Text representations | Meaning |
|----------------------|---|
| Bold type | Highlighting of particularly important words / passages |
| • List 1 | Marks lists |
| ○ List 2 | Marks lists |
| (parenthesis) | Item numbers |
| ➤ Instructions | Instructions to personnel. Always given in chronological order. |

1.1 Warnings

Activities with concrete risks (for live and limb or possible damage of the machine) are marked by warnings. Definitely observe the instructions given in the warnings! The following warnings are possible:

| Warning stage | Effect | Probability |
|--|------------------------|-------------|
|  DANGER | Death / serious injury | imminent |
|  WARNING | Serious injury | possible |
|  CAUTION | Minor injury | possible |
| ATTENTION | Damage to property | possible |

1.2 Illustrations

The illustrations used refer to a specific product. In the case of other products they may have a schematic character only. The basic function and operation, however, do not change.

1.3 Abbreviations

The following abbreviations may be used in these instructions.

| | | | |
|---------|-------------------|---------|----------------------|
| max. | maximal | Nm | Newton meter |
| min. | minimal | incl. | including |
| min | minutes | i.e. | this means |
| s | seconds | rh | relative humidity |
| etc. | and so on | approx. | approximately |
| e. g. | for example | Ø | diameter |
| ml | millilitre | ® | registered trademark |
| mm | millimetre | © | copyright |
| °C | degree Celsius | TM | trademark |
| °F | degree Fahrenheit | % | per cent |
| K | Kelvin | dB (A) | sound level |
| In or “ | inch | > | greater than |
| Kg | kilogramme | < | less than |
| L | litre | ± | plus minus |
| | | AF | across flat |

1.4 Manufacturer's and Service's address

| Manufacturer | Service |
|--|--|
| SKF Lubrication Systems Germany GmbH Heinrich-Hertz-Str. 2-8 D - 69190 Walldorf | SKF Lubrication Systems Germany GmbH Central Customer Service Dept. P.O. Box 1263 D - 69183 Walldorf |

1.5 *Warranty*

The Instructions make no statement regarding warranty. To learn more about our warranty, see our General Terms and Conditions.

1.6 *Copyright / Integration of Instructions*

© SKF. All rights are reserved.

These Instructions are protected by copyright. It is explicitly allowed to use the contents of these Instructions for the purpose of integrating them into the documentation provided by the machine manufacturer, into whose machine the pump shall be integrated. This also includes the creation of training documents for internal, non-commercial purposes. Any other use without the written consent of the rights holder – irrespective of its nature – is prohibited and represents a violation of copyright.

2. Safety Information

Safety information is to be read and observed by any persons entrusted with works on the machine or by those persons who supervise or instruct the before mentioned group of persons. It is prohibited to commission or operate the machine prior to reading the Instructions. These Instructions must be kept at an accessible location for further use.

2.1. *Exclusion of liability*

Following these Instructions is essential for safe operation and to achieve the product properties and performance characteristics. The manufacturer is not liable for damages, irrespective of their nature, arising from the non-observance of these Instructions.

2.2. *Emergency stopping of pump*

In case of an emergency, the pump can be shut down by:

- Disconnecting the pump from the power supply.
- Switching off the machine / vehicle in which the pump is integrated.
- Actuating the emergency-off device of the machine.

2.3. ***Intended use***

Supply of lubricants within a centralized lubrication system operating at intervals and following the specifications made in these Instructions:

- For use within a progressive system
- As a multi-line pump for the direct provision of single lubrication points with lubricant.

2.4. ***Pump operation***

Operation is permitted only, if in compliance with:

- all indications given in these Instructions or stated in the applicable documents.
- laws and regulations to be complied with by the user.

2.5. ***Foreseeable misuse***

Any other use and purpose of the machine than the ones described before are strictly prohibited. The use is expressly forbidden:

- in a potentially explosive atmosphere.
- for the supply / transport / stockpiling of hazard group I fluids following Directive 67/548/EC.
- for the supply / transport / stockpiling of gases, liquefied gases, dissolved gases, steams or fluids that will reach a steam pressure of more than 0.5 bar above the normal atmospheric pressure (1013 mbar) at the maximum admissible temperature.
- for the supply / transport / stockpiling of oils and greases containing glycol or polyglycol.

2.6. *Prohibition of certain activities*

The following activities may be carried out by SKF specialists only due to potential sources of faults that may not be visible for the user:

- Replacement of or modifications on the pistons of the pump elements
- Modifications on the power printed circuit board exceeding a replacement in the case of defects.
- Modifications on the control printed circuit board exceeding adjustments of lubrication and pause times or exceeding a replacement in the case of defects.

2.7. *Modifications and changes*

Unauthorized modifications and changes may result in unforeseeable impacts on safety. Therefore, any unauthorized reconstructions or changes are expressly prohibited.


2.8. *Tests*

The following tests were carried out before delivery:

- Electrical tests following EN 60204
- Functional tests.

2.9. **Warning label on the machine**

Only for pumps with reservoir lid

| | |
|---|--|
|  | Warning of hand injuries During pump operation never remove reservoir lid to grasp into reservoir. Fingers and hand might be crushed or cut. |
|---|--|

2.10. **Applicable documents**

Further to these Instructions the following documents are to be considered by the respective target group:

- Manual of the QUICKDATA 2.0 configuration and diagnostics software.
- Operational instructions / release provisions by the owner
- Safety data sheet of the applied lubricant
- Manuals of the applied metering devices
- Manuals of the supplier's purchase parts

Where appropriate:

- Project planning documents
- Further relevant documents for the integration of the pump into the machine.

The user must supplement these documents by the respective valid regulations of the country, in which the machine shall be used. If the machine is sold or transferred, any associated documents must be passed on to the subsequent user as well.

2.11. Sources of hazard

The pump has been designed, built and tested using state-of-the-art technology. It will have left our company only after having passed stringent safety and reliability tests. Like for all complex machines, also for the P 243 pump there may still be involved potential sources of hazard, for example:

2.12. Moving rotary parts

- Drive / stirring paddle

2.13. Energy

- Electricity
- Temperature (hot / cold surfaces)
- Position energy (raised components)
- Parts subject to (operating) pressure
- Parts subject to spring load
- Bursting of container due to using a high-performance filler pump

2.14. Consumables

- Greases / Oils

2.15. Existing residual risks

| Residual risk | Remedy |
|--|--|
| Life cycle - transport / assembly / maintenance / repair | |
| Falling of raised parts / tools | Ensure that all personnel maintain an adequate safety distance from raised parts. Keep unauthorized persons away. Secure raised parts with appropriate lifting equipment (e. g. belts, tapes, ropes, etc.) |
| Falling of parts due to insufficient fastening to the machine | Fasten parts only to machine parts with sufficient load-carrying capacity. Observe the weights. Adhere to specified tightening torques for screw fittings. If no tightening torques have been specified, apply tightening torques corresponding to the screw size for 8.8 screws → Literature, see screw manufacturer. |
| Electric shock when connecting the pump | Before connecting the pump, disconnect all relevant electric components of the machine from the power supply. Observe potential discharge times. Electric connection must be carried out by authorized and qualified electrical technicians always adhering to the connecting diagram. |
| Bursting of container due to using a high-performance filler pump | Monitor the filling procedure and stop it when reaching the MAX marking. |
| Contact with stirring paddle during "trial operation" without reservoir after repair | Make sure to operate pump only with reservoir installed. |

| Residual risk | Remedy |
|---|--|
| Life cycle - transport / assembly / maintenance / repair | |
| Risk of accident due to spilled lubricant | Exercise care during filling procedure. Immediately remove or absorb lubricant with suitable means. Observe operational instructions regarding the handling of oils, greases and contaminated parts. |
| Tearing or damaging of lines when mounting them to moving machine parts (e. g. swivel arms) | Never mount lines to moving parts. If no other position is possible, use flexible hose lines. |
| Tearing or damaging of lines when mounting them so that they are chafed by contact surfaces or mounting them with too little bending radius | Use protective tubes, protective hoses or spring coils. |
| Life cycle – commissioning / operation | |
| Squirting of lubricant due to incorrect screwing of components or faulty connection of lines | Tighten all parts with the corresponding torques. Use adequate hydraulic fittings and lines corresponding to the specified pressures. Verify the fittings with regard to correct connection and possible damages before commissioning. |
| Contact to corrosive or toxic materials that may be released from a defective battery | Wear protective clothes. Ensure sufficient ventilation. Store or dispose of defective batteries according to the relevant safety data sheets for lithium batteries. |
| Life cycle – failure | |
| Strong heating of the motor due to blocking > 60 minutes | Switch the pump off. Let parts cool down. Eliminate cause. |
| Life cycle - disposal | |
| Contamination of the environment by lubricant and wetted parts | Dispose of used lubricant or parts wetted with lubricant following the valid legal / operational regulations. |
| Contamination of the environment by used battery of control printed circuit board | Dispose of used battery following the valid legal / operational regulations. |

2.16. *Persons authorized to operate the pump*

2.17. *Operator*

A person who is qualified by training and experience to carry out the functions and activities related to normal operation, including avoiding possible hazards that may arise during machine operation.

2.18. *Maintenance and service specialist*

A person who is qualified by training and experience to identify and assess possible risks and hazards during works / assembly / maintenance or service on the machine, and to initiate suitable measures to prevent such risks.

2.19. *Protection of special groups of persons*

The respective legal restrictions of employment do apply.

2.20. *Safety recommendations to be complied with*

2.21. *General behaviour when handling the machine*

- Only operate the pump if it is in perfect technical condition, according to its intended use, in awareness of safety and risks and in adherence to these Instructions.
- Familiarize yourself with the functions and operating methods. Always keep to the order of the indicated assembly and operating steps.
- If there are uncertainties regarding the proper condition or the correct assembly / operation, ensure clarification. The machine / pump must not be put into service until all uncertainties will have been clarified.
- Keep unauthorized people away from the pump.
- All safety rules and in-house operational instructions applicable to the respective activity must be adhered to.
- The responsibilities for the different tasks on the machine must be clearly defined and observed as uncertainty concerning the same may endanger user safety to a great extent.
- Safety-related protective and emergency devices must not be removed, modified or affected otherwise in their function and are to be checked at regular intervals for completeness and function.
- Occuring faults are to be remedied in the frame of the responsibilities. Inform your superior in the case of faults beyond your competence.
- Wear personal protective equipment always.
- When handling lubricants etc., adhere to the respective safety data sheets.
- Never use parts of the pump as a standing support, ladder or climbing aid.

2.22. *Assembly / maintenance / repair / upkeep*

- Before starting with any works, inform all relevant persons (e. g. operating personnel, superiors) on the execution. Adhere to operational work instructions and preventive measures.
- Safety and protective devices that have been removed for mounting work must be put in place again immediately after completion of the work and be checked for proper function.
- Ensure by means of adequate measures that moving or detached parts are blocked during work to prevent limbs from being crushed inadvertently.
- Pump assembly only outside the operating range of moving parts with sufficiently large distance to sources of heat or cold.
- Make sure to dry wet or slippery surfaces and to cover sharp-edged surfaces adequately.
- Cover hot or cold surfaces correspondingly.
- Before starting work depressurize and deenergize the pump and protect it against unintended reconnection. Works on electrical components must be performed by qualified electricians only. Observe possible waiting times due to a discharging of the capacitors.
- Install the electrical connection always following the indications given in the valid connection diagram and in accordance with the relevant regulations as well as the local regulations governing electrical connections.
- Never touch cables or electrical components with wet or moist hands.
- At low respectively high temperatures, maintenance or repair works can be subject to functional limitations (e. g. changed flow properties of the lubricant / embrittlement of plastics). Therefore carry out maintenance and repair works at room temperature preferably.

- Works on electrical components are to be carried out with insulated tools only.
- Never bridge fuses. Replace defective fuses by the same type of fuse always.
- Make sure to properly earth the electrical system.
- Make necessary drillings on uncritical and non-structural parts only. Use existing drillings. Do not damage lines and cables when drilling.
- Pay attention to possible points of abrasion. Protect the parts accordingly.
- Other units of the machine / vehicle must not be impacted in their functioning, nor must they be damaged by the installation of a centralized lubrication system.
- All components used must be designed for the:
 - maximum system pressure
 - maximum / minimum temperature
 - lubricant to be supplied
 - operating / ambient conditions at the place of use.
- Make sure that none of the components of the centralized lubrication system are subjected to torsion, shearing or bending.
- Before use, check all parts with regard to contamination and clean them if necessary. Lubrication feed lines must be filled with lubricant before assembly to facilitate later venting of the system.
- Observe the indicated tightening torques. Use a calibrated torque wrench for tightening.
- When working with heavy parts, use suitable lifting tools.
- Avoid mixing up or wrong reassembly of disassembled parts. Mark parts accordingly.

2.23. *Initial commissioning / daily commissioning*

Ensure that:

- all safety devices are properly fitted and fully functional.
- all connections are connected properly.
- all parts are installed correctly.
- all warning signs and information plates on the machine are complete and in a perfectly legible condition.
- Illegible or missing warning signs and information plates are replaced immediately.

2.24. *Cleaning*

- Risk of fire due to using flammable cleaning agents. Use non-flammable cleaning agents only which suit the respective purpose.
- Do not use steam cleaners or high-pressure cleaners. Electrical components could be damaged. Adhere to the IP class of protection.
- Cleaning works on energized components must be carried out by qualified electricians always.
- Do not touch cables or electrical components with wet or moist hands.
- Mark and secure wet areas accordingly.

2.25. Battery / Change of battery

The battery must never be:

- charged
- short-circuited
- damaged by opening, drilling or crushing it
- manipulated, i. e.:
 - no lines, sheet metal straps or connecting wires should be attached

Disposal

Undamaged batteries:

- Dispose of used batteries following the valid legal and operational regulations.
- Keep in a closed polyethylene bag until their disposal in order to avoid damages.

Damaged batteries:

- Wear personal protective equipment.
- Do not touch the battery with bare hands. Risk of skin burns.
- Do not breathe in fumes. Thoroughly ventilate affected areas.
- In case of contact to eyes or skin, rinse with water and seek medical advice.

2.26. *Training*

To provide a maximum in safety and economic efficiency, SKF organizes detailed product trainings.


We recommend you to participate in these trainings. For more information, please contact SKF's Customer Service.

2.27. *Inspection of delivery*

Check delivery with regard to completeness by means of the shipping documents. Immediately inform the shipping agency of transport damages, if any. The packaging material should be kept until possible discrepancies will have been clarified.

2.28. *Returns*

Before returning a part, make sure to clean and pack it adequately. Returns have to be marked on the packaging as:

| | |
|---|---|
|  | Do not burden |
| | Protect from moisture |
| | Fragile, handle with care. Do not throw |

2.29. *Disposal*

Disassemble the pump professionally at the end of its life cycle and dispose of it in an environment-friendly manner and following the respective legal prescriptions.

It is prohibited to reuse any parts of a pump to be disposed of in other pumps, or to reassemble used parts to a new pump.

3. Lubricants

Lubricants are used specifically for certain application purposes. In order to fulfil their tasks, lubricants must fulfil various requirements to varying extents:

The most important requirements for lubricants are:

- Reduction of abrasion and wear
- Corrosion protection
- Noise minimisation
- Protection against contamination / penetration of foreign particles
- Cooling
- Longevity (physical / chemical stability)
- Compatible with as large a number of materials as possible.
- Economic and ecological aspects

3.1. Selection of lubricants

The selection of a suitable lubricant takes place during design of the machine, and forms the basis for the planning of the centralized lubrication system.

The selection is made by the manufacturer / operator of the machine, preferably together with the lubricant supplier based on the requirement profile defined through the specific application purpose.

3.2. Specification

Lubricants of the following consistencies can in principle be conveyed using SKF centralized lubrication systems.

- Lubricating greases up to NLGI 2
- Solids content up to max. 5 %
- Mineral oils with a viscosity of at least 40mm²/s at + 40 °C

The lubricants must be compatible with the following materials:

- Steel / brass / copper / aluminium
- NBR / FKM / PU

ATTENTION

Risk of damage to machine / system

Do not mix lubricants. This may have unforeseeable effects on the usability and therefore on the function of the centralized lubrication system.

Due to the multitude of possible additives, it is possible that individual lubricants, which - according to the manufacturer's data sheets - fulfil the necessary specification, are not in fact suitable for use in centralized lubrication systems (e.g. incompatibility between synthetic lubricants and materials). In order to avoid this, always use lubricants which have been tested by SKF.

Please contact the Service Department for an overview of lubricants tested by SKF.

3.3. Ageing of lubricants

After a prolonged downtime, the lubricant must be inspected prior to recommissioning as to whether it is still suitable for use due to chemical / physical ageing. We recommend that you undertake this inspection already after a machine downtime of 1 week. If doubts arise as to the suitability of the lubricant, please replace it prior to recommissioning and if necessary undertake initial lubrication manually.

4. Technical Data

4.1. *Operating temperature*

The operating temperature can be set individually by means of the QUICKDATA 2.0 configuration and diagnostics software within the following range:

Lowest temperature - 40 °C (ambient temperature)

When the motor reaches the preadjusted value, it will be switched off. As soon as the temperature rises above the adjusted value again, the pump will restart automatically.

Highest temperature + 80 °C (motor temperature)

When the motor reaches the preadjusted value, it will be switched off. The pump goes into a fault state and has to be started manually again after remedying the cause.

When setting the temperature range, make sure to observe the maximum/minimum values of possible components, if any.

4.2. *Operating pressure*

Max. 350 bar

All system components must be designed for the maximum operating pressure. Each pump element must be provided with a pressure relief valve to protect it against higher pressures.

4.3. *Installation position*

| | |
|----------------|---|
| Upright | Reservoir lid on top |
| Other position | In the case of rotating installation make sure to use a follower plate. |

4.4. *Minimum space requirement*

| Reservoir size | Width | Height |
|----------------|--------|--------|
| 2 L | 250 mm | 370 mm |
| 2 L flat | 250 mm | 290 mm |
| 4 L | 250 mm | 400 mm |
| 8 L | 250 mm | 500 mm |
| 15 L | 250 mm | 800 mm |

The actual space requirement depends on the dimensions of possibly installed safety equipment and also on the connection fittings and supply lines that are used. It is recommended that a minimum of 100 mm are allowed in each direction for maintenance and repair work.

4.5. *Sound pressure level*

< 70 dB(A)

4.6. *Weight*

The weight of the empty pump is between about 7.5 kg and 15 kg depending on the equipment variants, e. g. the number of installed pump elements, size of the mounted reservoir, etc.

4.7. **Tightening torques**

| Component | Tightening torque to be adhered to | |
|--|------------------------------------|----|
| Pump element to housing | 20 | Nm |
| Pressure relief valve in pump element | 8 | Nm |
| Closure screws on housing lid | 0.8 | Nm |
| Connection of cartridge / return line | 10 | Nm |
| Pump with socket | 18 | Nm |
| Lubrication fitting / adapter for lube fitting | 10 | Nm |
| Return line connection to housing | 12 | Nm |
| Counternut on adjustable pump element | 12 | Nm |

4.8. **Connections / outlets**

1 x filling connection

M 22 x 1.5

(with adapter changeable to G1/8" or G1/4")

3 x outlet

G1/4" for lubricant feed lines
Ø 6 mm or Ø 8 mm

4.9. **Filling options**

- Hydraulic lubrication fitting
- Cartridge with lubrication fitting

4.10. *Delivery rates*

Fixed output

| | | |
|----|--------------|-------------------------|
| K5 | Piston Ø 5mm | about 0.12 ccm / stroke |
| K6 | Piston Ø 6mm | about 0.18 ccm / stroke |
| K7 | Piston Ø 7mm | about 0.24 ccm / stroke |
| B7 | Piston Ø 7mm | about 0.10 ccm / stroke |

Used for delivery in strongly contaminated environment

| | | |
|--|--------------|-------------------------|
| C7 | Piston Ø 7mm | about 0.24 ccm / stroke |
| Delivery of silicone containing lubricants | | |

Adjustable output per pump element

| | | |
|----|---------------|--------------------------------|
| KR | Piston Ø 7 mm | about 0.06 – 0.18 ccm / stroke |
|----|---------------|--------------------------------|

Indications apply to grease of NLGI class 2 at +20 °C and 100 bar backpressure. Deviating conditions, like other NLGI classes, temperatures, counterpressures, power grid frequencies, etc., may result in delivery rates deviating by up to $\pm 20\%$. This must be considered when laying out the lubrication points.

4.11. *Lubrication times and pause times*

Lubrication times and pause times can be set individually by means of the QUICKDATA 2.0 configuration and diagnostics software.

Factory settings:

Lubrication time 6 minutes

(Position 3 of the red rotary switch on the pcb)

Pause time 6 hours

(Position 6 of the blue rotary switch on the pcb)

Low-level signal for reservoir

Setting: normally open contact = flashing signal

4.12. Storage until the first use

- In the original packing
- In a dry location with low dust level
- No direct exposure to sun or UV rays
- No aggressive or corrosive materials at the place of storage
- Without vibrations and shocks
- Protected against damage by animals (insects, rodents, etc.)

| | | |
|-----------------------|---------|-----------|
| Range of temperature: | minimum | - 40 °C* |
| | maximum | + 40 °C |
| Relative humidity: | maximum | 90 % |
| Storage time | maximum | 24 months |

*Storage of the battery of the control printed circuit board up to minimum 0 °C. In case of lower temperatures, remove battery.

ATTENTION

Risk of damage to the machine or system:

Before the first use respectively at the end of the storage period the pre-filled components must be checked due to possible changes in the properties of the lubricant which cannot reasonably be excluded. If necessary, replace the components or fill them with a lubricant suitable for the purpose.

4.13. *Motor / pump*

Speed of stirring paddle: 21 ± 4 rpm

4.14. *VDC – version*

Operating voltage 12 V / 24 V
Max. power consumption 6.5 A / 3 A
SELV Protection class 1



4.15. *VAC - version*

Input voltage 110 – 230 V ± 10 %
 150 – 280 V ± 10 %
(Input voltage depending on the type of power printed circuit board used)
Nominal current 350 mA at 230 V
Switch-on current < 18 A
Frequency 50 / 60 Hz. ± 5 %
Fuse protection T 1.25 A
Bridging time / power failure > 15 ms
Sustained short circuit-protected
Overload-proof and open-circuit-proof

4.16. *IP classes of protection*

Bayonet plug IP 6K9K
Square plug IP 65
M 12 plug IP 67

5. Assembly / Commissioning

| | |
|---|---|
|  |  DANGER |
| | <p>Electric shock Before carrying out any work on the electrical equipment, disconnect the pump from the power grid.</p> <p>Pump connection may be realized via a safe galvanic isolation only (PELV).</p> |

5.1. Brief description of the pump

The P 243 pump is a compact and powerful multi-line pump with integrated data logger. The data logger logs the operating states and fault messages of the pump, if any.

Pump parameters can be modified by means of the QUICKDATA 2.0 configuration and diagnostics software.

The P 243 pump consists of the following main components:

- (1) Reservoir with stirring paddle or follower plate
- (2) Pump element
- (3) Pressure relief valve with
- (4) Filler fitting (emergency lubrication)
- (5) Connection 2 A
- (6) Hydraulic lubrication fitting for reservoir filling
- (7) Pump housing (1) with motor and printed circuit boards
- (8) Connecting plug A1
- (9) Return line / quick-filling coupler

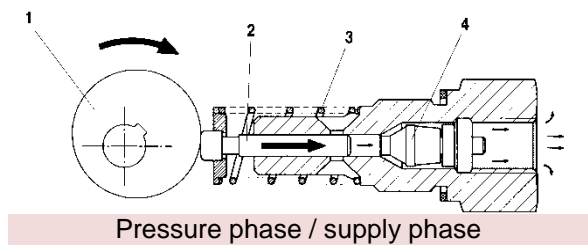
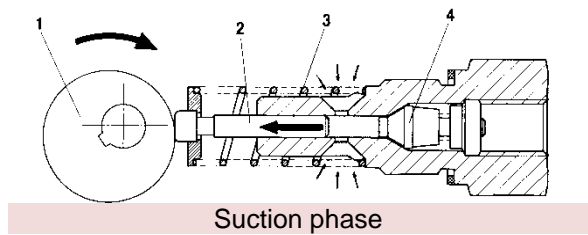


Operating method:

The motor drives the eccentric (1) which then makes the pistons (2) of the pump elements move.

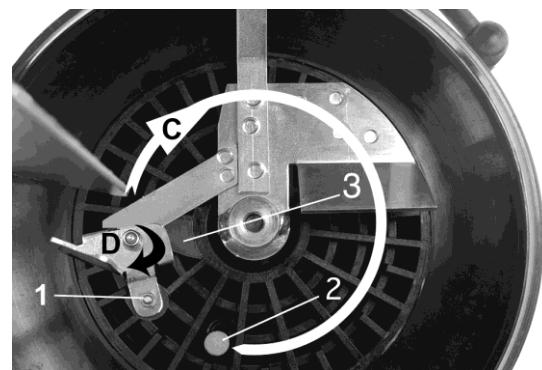
Lubricant is sucked in and then transported to the feed line.

The integrated check valve (4) prevents the supplied lubricant from flowing back.



Low-level indication:

The low-level indication is effected contactless by means of a solenoid or magnetic switch. The solenoid (1), which is moveably supported on the stirring paddle, is guided towards the inside by the lubricant's resistance during operation. As soon as the minimum level in the reservoir is reached, i.e. the lubricant's resistance lacks, the solenoid remains in the outer track (C) and actuates the magnetic switch (2).



5.2. Mounting the pump elements

Note:

Make sure to use the pump elements together with the corresponding sealing ring (4) always.

One pump element

Installation position (1-3) is freely selectable.

Several pump elements

Observe installation order (see Fig.).

- Remove closure screw and screw in pump elements (A) in the corresponding order.

Tightening torque = 20 Nm



5.3. Adjusting the adjustable pump elements

Note:

In the case of already mounted pump elements, the lubrication feed line must be disconnected first. Then adjust the output as follows:

- Remove counternut (1).
- To adjust the output, turn the spindle (2).

↺ = smaller output

↻ = larger output

Measure R indicates the approximate output.

| | |
|-------------|------------------------|
| R = 29.0 mm | $\frac{4}{4}$ delivery |
|-------------|------------------------|

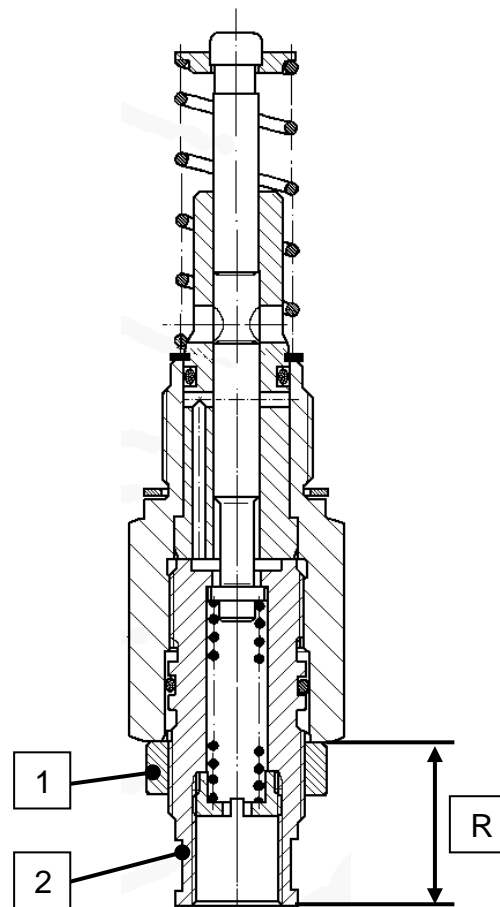
| | |
|-------------|------------------------|
| R = 27.8 mm | $\frac{3}{4}$ delivery |
|-------------|------------------------|

| | |
|-------------|------------------------|
| R = 26.7 mm | $\frac{1}{2}$ delivery |
|-------------|------------------------|

| | |
|-------------|------------------------|
| R = 25.5 mm | $\frac{1}{4}$ delivery |
|-------------|------------------------|

- After adjusting the output make sure to tighten the counternut (1) again.
- Reinstall the lubrication feed line, if applicable.

Tightening torque = 12 Nm



5.4. Mounting the pressure relief valves

Note:

For reservoir sizes 4 L, 8 L, and 15 L, a distance piece (part no. 226-14105-5) is required to mount the pressure relief valve.

- Select pressure relief valves (1) according to the maximum operating pressure.
- Remove blind plug from pump element (3).
- Screw pressure relief valves (1) into pump elements (3).

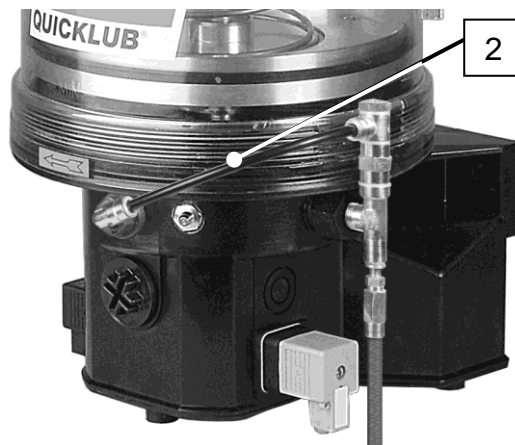
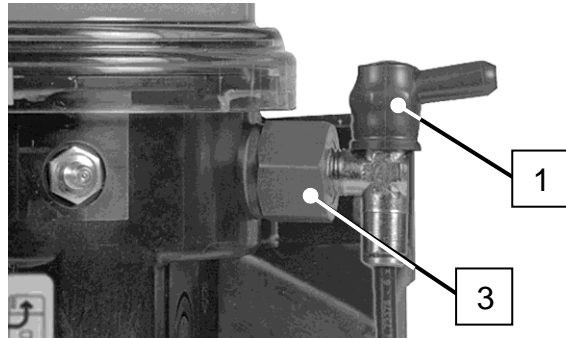
Tightening torque = 8 Nm

- Repeat procedure with each pump element.



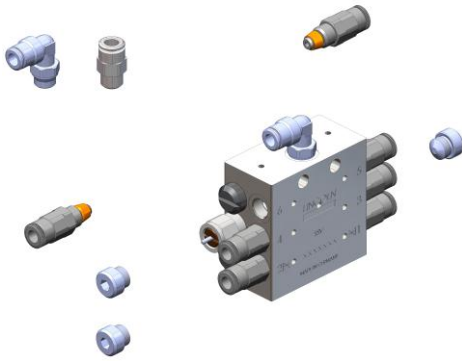
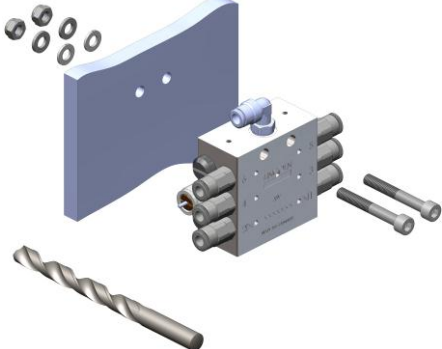
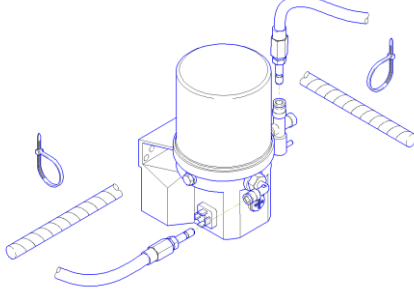
Pressure relief valve with grease return

In the case of overpressure the red indicator pin is pressed upward and signals the fault. The penetrating grease volume is led back to the reservoir via the return line connection (2):

- Remedy the fault and then press the red indicator pin back into its initial position.



5.5. Mounting the centralized lubrication system

| | |
|---|--|
|  <p>Drill hole pattern Use drill template</p>  <p>Fasten pump to base</p> |  |
| Fasten pump | Assemble metering device |
|  |  |
| Fasten metering device | Tailor and fasten supply lines |

5.6. Filling the reservoir

ATTENTION

Damages to the machine or the vehicle are possible

- Make sure to prevent dirt from entering the reservoir when filling it.
- Do not overfill reservoir. Keep vent bore (2) free.

Filling via lubrication fitting

- Connect filling connection to hydraulic lubrication fitting (1) or quick-filling coupler and
- Fill reservoir up to the MAX marking.

Filling via cartridge connection

- Remove closure screw.
- Screw in cartridge connection.
- Fill reservoir up to the MAX marking.
- Screw in closure screw.

Tightening torque = 10 Nm

Filling via reservoir lid

(for 4 L, 8 L, and 15 L reservoirs)

- Disconnect pump from voltage supply (e. g. remove plug from pump).
- Remove reservoir lid.
- Fill in lubricant up to the MAX marking.
- Close reservoir lid again
- Reconnect pump to voltage supply.



5.7. *Inadvertent filling with wrong lubricant*

Should wrong lubricant have been filled in inadvertently, proceed as follows:

- Switch the pump off and protect it against unintentional restart.
- Remove reservoir (1) with suitable tool by turning it against the direction indicated by the arrow (2). When doing so, make sure not to distort stirring paddle and fixed paddle.
- Remove lubricant.
- Clean or replace the reservoir and pump housing as well as the line system, if necessary.
- Re-install reservoir.
- Fill pump with lubricant to specification.
- Switch the pump on.
- Inform your superior to avoid similar mistakes organisationally in future.



5.8. *Checks before the first commissioning*

ATTENTION

Damages to the centralized lubrication system
Fill supply lines with lubricant and lubricate lubrication points by hand. Otherwise the bearing points may happen to be damaged due to lacking lubrication.
Verify that the total system corresponds to the intended purpose and the project documentation.
Check whether all parameters and characteristics are correctly adjusted and all means of production are available.
Should you identify any deviations, make sure to remedy them before the first commissioning.

To ensure function and safety, the person assigned by the Owner is obliged to check certain areas of the centralized lubrication system before the first commissioning. Any defects identified have to be remedied and reported to the superior immediately. Only authorized and trained personnel are allowed to remedy a defect.

Check the following points before the first commissioning:

- Loose or missing parts (e. g. pressure relief valves, supply lines),
- Damages, deformations and cracks,
- Burnt and smoky points,
- Staining, soiling and corrosion,
- Untypical accumulation of moist
- Untypical smells or vibrations,
- Lubricant leaking from joints and lines.

5.9. *Pump activation*

Pump is activated when

- installing it into a machine
 - by activating the machine contact.
- installing it into a vehicle
 - by activating the drive switch
- Positioning of the software bridge, terminal 15 (see instructions in the QUICKDATA 2.0 configuration and diagnostics software)

5.10. *Control printed circuit board*

The control pcb's are equipped with an EEPROM, thus protecting them against data loss. If the pump has been switched off, when switching it on again, the pause time respectively the lubrication time will continue from the point of interruption.

5.11. *Additional lubrication / pump test*

The pump starts with a pause time. Therefore, after connecting the pump and setting the required lubrication and pause times, a lubrication cycle should be triggered to verify correct pump connection.

NOTE: Triggering an additional lubrication cycle or acknowledging receipt of a fault can be effected via the QUICKDATA 2.0 configuration and diagnostics software, directly on the printed circuit board, or via an external pushbutton.

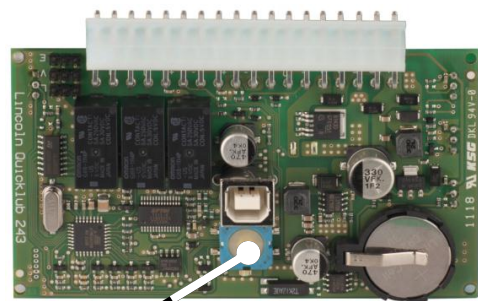
- Remove closure lid (1) and O-ring (see page 40).
- Press pushbutton (2) (> 2 seconds).

If a fault indication is pending, this will be acknowledged first.

- If necessary, press pushbutton (2) again to trigger an additional lubrication cycle.

The pump starts with a lubrication cycle.

- Reinstall closure lid (1) and O-ring.



2

5.12. USB interface

To connect the pump via the integrated USB interface with a laptop, proceed as follows:

- Remove reservoir lid (1).
- Connect USB cable to USB interface.
- Connect laptop to USB cable (Form A/B).
- Start QUICKDATA 2.0 configuration and diagnostics software.

Functions of the QUICKDATA 2.0 configuration and diagnostics software: see corresponding Manuals.

Having done the configuration and diagnostics works:

- Remove USB cable.
- Reinstall closure lid (1).

If parameters have been changed:

- Check functions of the pump.



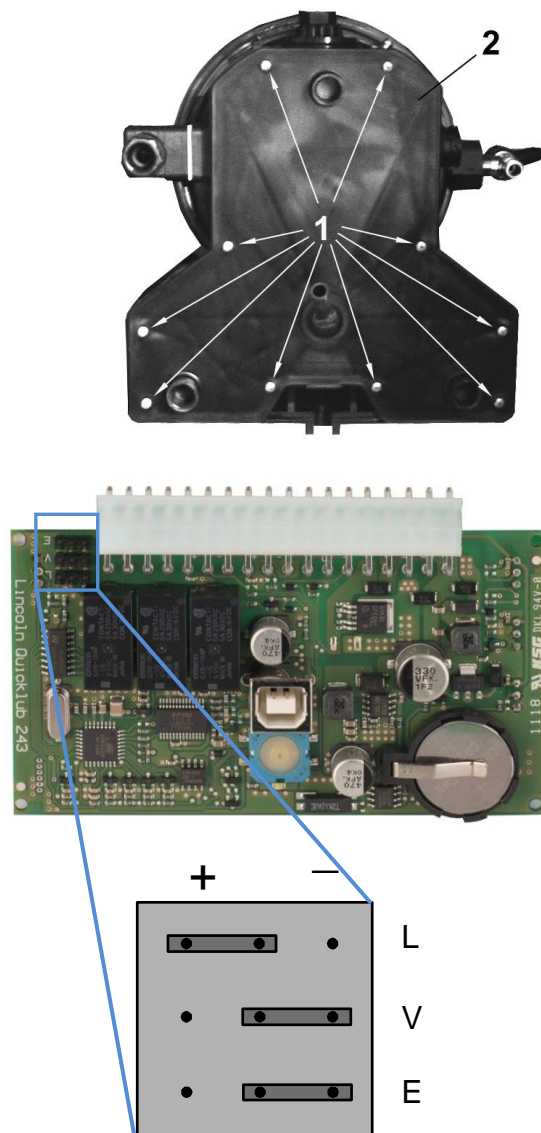
5.13. Change jumper configuration - control PCB MD 20

ATTENTION

Only remove the jumpers from the control pcb's MD 20 for changing the configuration only.

Never use control pcb MD 21 with jumper. Risk of damages to the pump or to connected aggregates.

- Disconnect pump from the power grid.
- Remove screws (1).
- Remove and dispose of housing cover (2).
- Dismount control pcb.
- Set jumper for low-level signal (L), high-level signal (V) or fault signal (E) following the new situation of connection to Plus or Minus.
- Install control pcb again.
- Close pump with new housing cover (sealing integrated in the housing cover).
- Reconnect pump to the power grid.



6. Standard operation

6.1. *Daily commissioning*

The activities to be done during standard operation are listed in the following.

6.2. *Daily checks*


It is the User's obligation to define adequate inspection frequencies for the actions listed below "Checks before the first commissioning" depending on the actual operating situation of the pump.

6.3. *Filling the reservoir during pump operation*

Fill the reservoir as described in the chapter "Assembly / Commissioning".

6.4. Cleaning

With regard to execution, required protective clothes, cleaning agents, and devices, see the corresponding valid operation regulations by the User.

| | |
|---|---|
|  | <div style="background-color: red; color: white; padding: 5px; display: flex; align-items: center;"> DANGER </div> <p>Danger of life</p> <p>Risk of fire due to using inflammable cleaning agents. Use non-flammable cleaning agents only which suit the respective purpose.</p> <p>Use steam cleaners or high-pressure cleaners only in accordance with the IP class of protection of the pump. Electrical components could be damaged.</p> <p>Do not touch cables or electrical components with wet or moist hands.</p> <p>Cleaning works on energized components must be carried out by qualified electrical technicians always.</p> <p>Always wear personal protective equipment.</p> |
| <div style="display: flex; justify-content: space-around; align-items: center;"> </div> | |



External cleaning

- Thorough cleaning of all surfaces.
- Marking and securing of wet areas.

Internal cleaning

- Normally, internal cleaning is not required.

7. Maintenance

| | | |
|---|---|---------------|
|  |  | DANGER |
| | Electric shock Before carrying out any work on the electrical equipment, disconnect the pump from the power grid. | |

The pump is nearly maintenance-free. Still, at regular intervals the following components should be checked and replaced, if necessary:

- Pressure-relief valves
- Check valves
- Pump elements
- Battery of the control printed circuit board.

7.1. Battery change

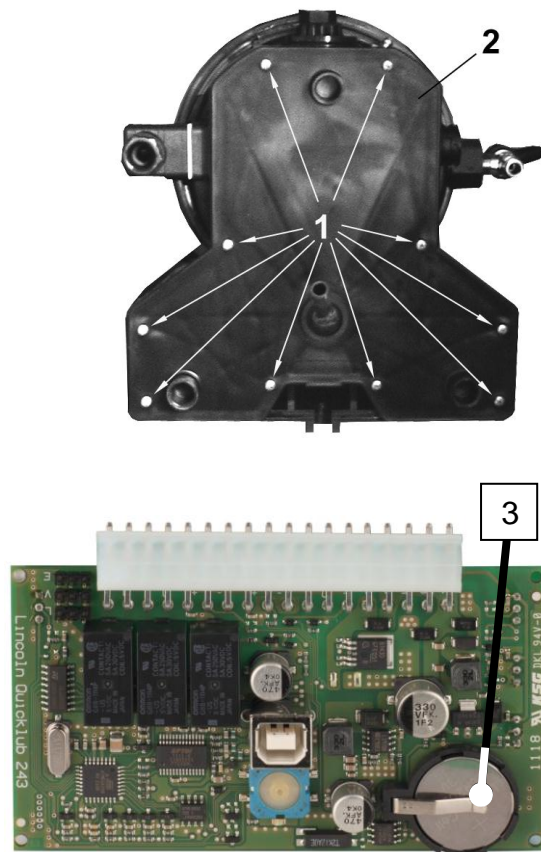
ATTENTION

Change battery every 5 years. Replace battery by battery of the same type always! Specification: 3 V CR2032 button cell

Depending on the ambient temperature a battery change may be required earlier.

The QUICKDATA 2.0 configuration and diagnostics software will warn if the battery falls below the minimum capacity.

- Disconnect pump from the electrical grid.
- Remove screws (1)
- Open housing cover (2).
- Remove the control pcb.
- Remove battery (3) by means of plastic tweezers and insert new battery.
- Reinstall control pcb.
- Close pump with new housing cover (sealing integrated in the housing cover).
- Reconnect pump to the electrical grid.





8. Troubleshooting

After remedying the fault, the pump will not start automatically, but needs to be checked by triggering an additional lubrication cycle. If the fault cannot be determined or remedied, please contact the SKF Customer Service.

| Possible cause | Recognizable by | Remedy |
|---|---|---|
| Mechanical faults | | |
| Reservoir empty | Visual check | Refill reservoir |
| Air entrapment in the lubricant | Bubbles in the lubricant | Vent |
| Suction bore of pump element is clogged | Disassembling the pump element | Disassemble and clean pump element |
| Pump piston is worn | Too low pressurization / no lubricant supply | Replace pump element |
| Check valve of pump element is defective | Too little pressurization / no lubricant supply | Replace pump element |
| Clogged air outlet of reservoir | Visual check | Find cause and clean |
| Defective pressure-relief valve; fault on the lubrication point | Grease leaking from the pressure-relief valve | Clean lubrication point, determine cause, and replace pressure-relief valve |
| Follower plate is stuck | Visual check | Find cause and eliminate |
| Electrical faults | | |
| Electrical faults are primarily determined by the QUICKDATA 2.0 configuration and diagnostics software. | | |

9. Repair

9.1. Replacement of the control printed circuit board

| | | |
|---|---|---------------|
|  |  | DANGER |
| | Electrical shock Before carrying out any work on the electrical equipment, disconnect the pump from the power grid. | |

ATTENTION

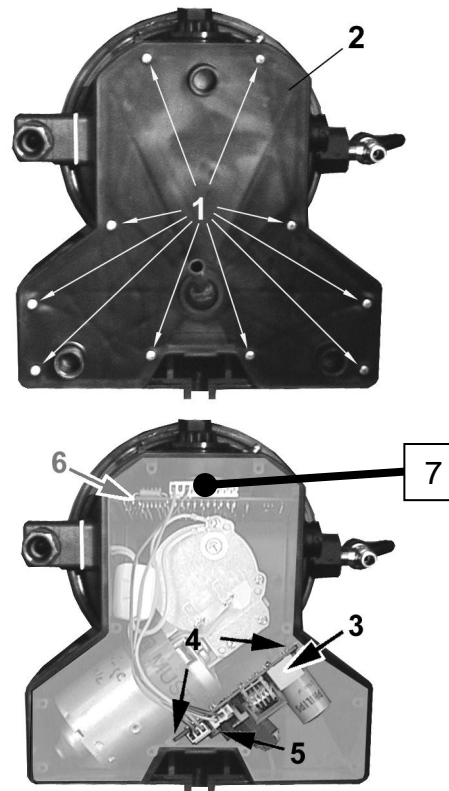
Damages to the pump are possible

Mark loose plugs on the printed circuit boards to protect them from being swapped or twisted during assembly.



- Disconnect pump from power supply.
- Remove screws (1).
- Remove and dispose of housing cover (2).
- Remove plug (7).
- Pull control printed circuit board (6) out of guide.
- Insert new control printed circuit board.
- Reconnect plug (7).
- Close pump with new housing cover (sealing integrated in the housing cover).

Tightening torque = 0.8 Nm

- Reconnect pump to the electrical grid.



9.2. Replacement of the power printed circuit board

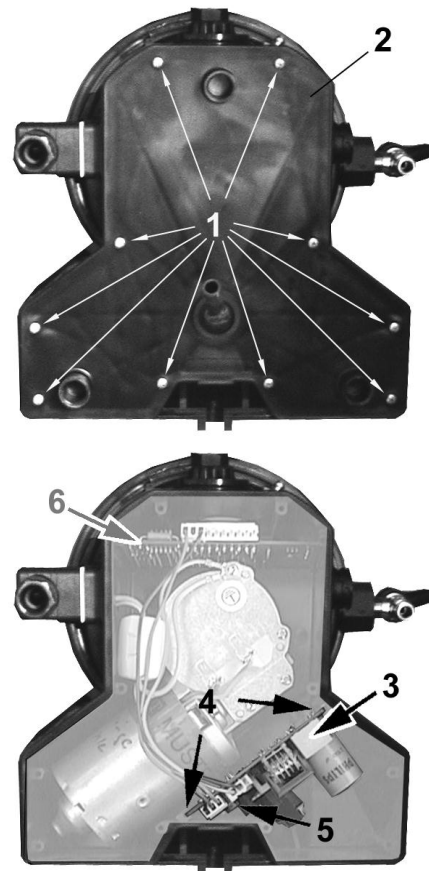
| | |
|---|---|
|  |  DANGER |
| | Electrical shock Before carrying out any work on the electrical equipment, disconnect the pump from the power grid. |

| |
|--|
| ATTENTION |
| Damages to the pump are possible Mark loose plugs on the printed circuit boards to protect them from being swapped or twisted during assembly. |

- Disconnect pump from power supply.
- Remove screws (1).
- Remove and dispose of housing cover (2).
- Remove plug (3).
- Pull power printed circuit board (4) out of guide.
- Insert new power printed circuit board.
- Reconnect plug (3).
- Close pump with new housing cover (sealing integrated in the housing cover).

Tightening torque = 0.8 Nm

- Reconnect pump to the electrical grid.



9.3. Replacement of pump elements

ATTENTION

When removing the pump elements, ensure that no parts remain in the pump, as otherwise pump may be damaged.

Before reassembly, thoroughly clean all parts and check them with regard to possible damages.

When installing the pump element, make sure that the eccentric with its largest deflexion does not get in touch with the pump element directly.

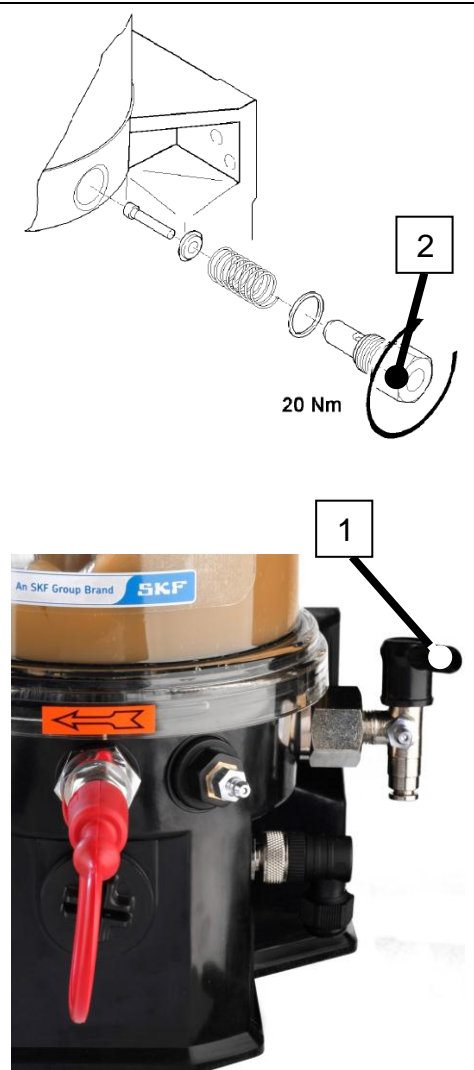
Adjust any adjustable pump elements to the required output volume before the assembly:

- Switch pump off.
- Remove pressure-relief valve (1).
- Remove pump element (2).
- Screw in new pump element and new sealing ring.

Tightening torque = 20 Nm

- Install pressure-relief valve.

Tightening torque = 8 Nm



10. Spare parts

See Quickclub parts catalogue


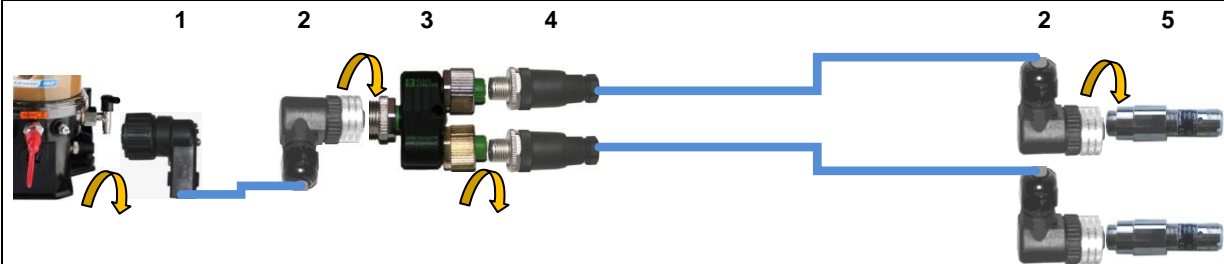
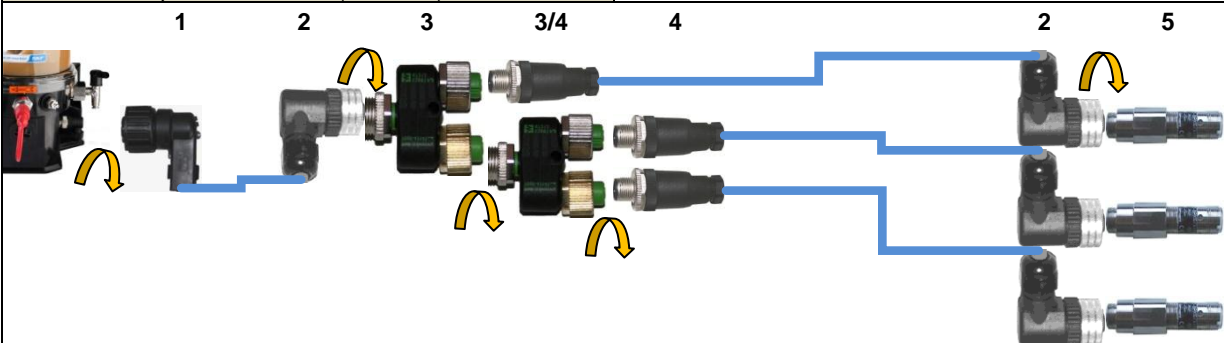
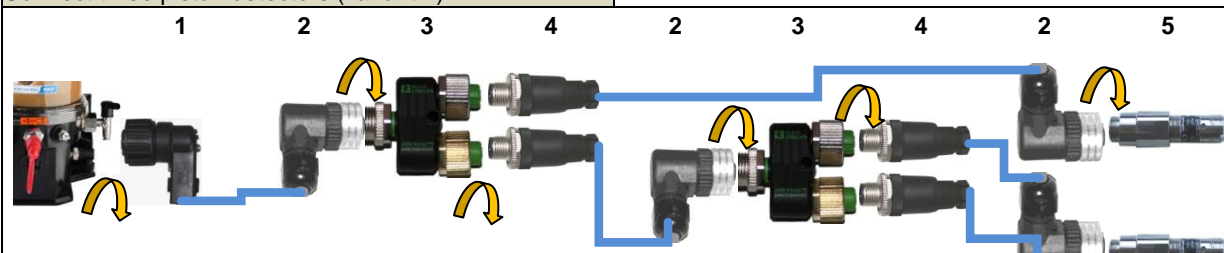


11. Electrical connection diagrams

11.1. Connecting possibilities for piston detectors

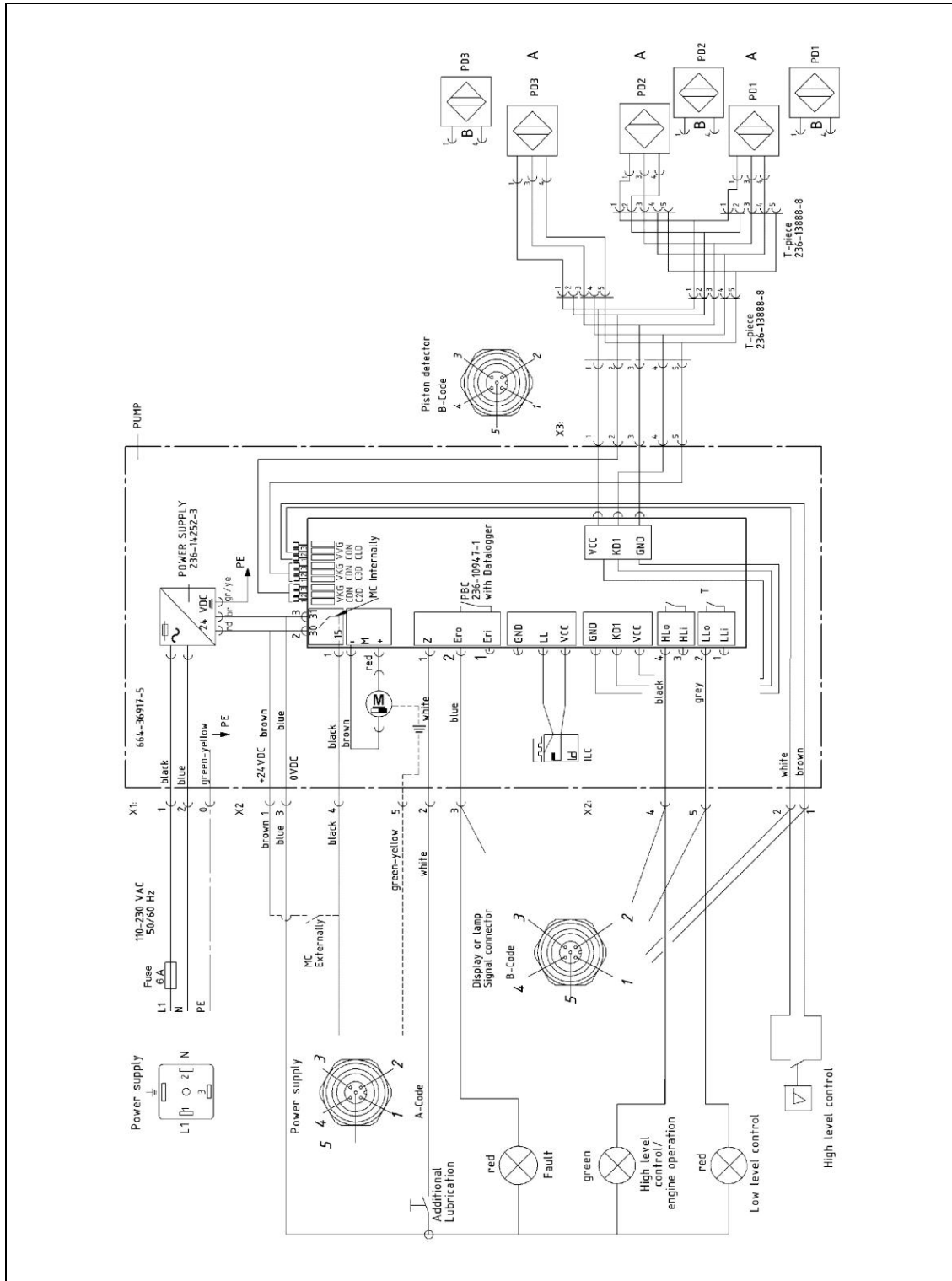
| Type of connection: M 12 plug | | | | |
|--|----------------------------------|----------|----------------|-------------|
| Connect one piston detector | | | | |
| | 1 | | 2 | 5 |
| Connect two piston detectors | | | | |
| | 1 | 2 | 3 | 4 |
| Connect three piston detectors (variant 1) | | | | |
| | 1 | 2 | 3 | 3/4 |
| Connect three piston detectors (variant 2) | | | | |
| | 1 | 2 | 3 | 4 |
| No. | Designation | | Code Part no.: | |
| 1 | Coupling plug | straight | B | 236-11087-4 |
| | Coupling plug | 90° | B | 236-11003-8 |
| 2 | Coupling bushing | 90° | A | 236-10022-6 |
| | Coupling bushing with cable 5 m | 90° | A | 237-10319-5 |
| | Coupling bushing With cable 10 m | 90° | A | 237-10022-7 |
| 3 | T-piece | | A | 236-13888-8 |
| Legend | | | | |
| | Screwing of parts | | | |
| | Connecting parts with cable | | | |
| No.: | Designation | | Code Part no.: | |
| 4 | Coupling plug | straight | A | 236-10518-7 |
| | Coupling plug | 90° | A | 236-11003-7 |
| 5 | Piston detector | | | 519-34339-5 |

Assembly Instructions

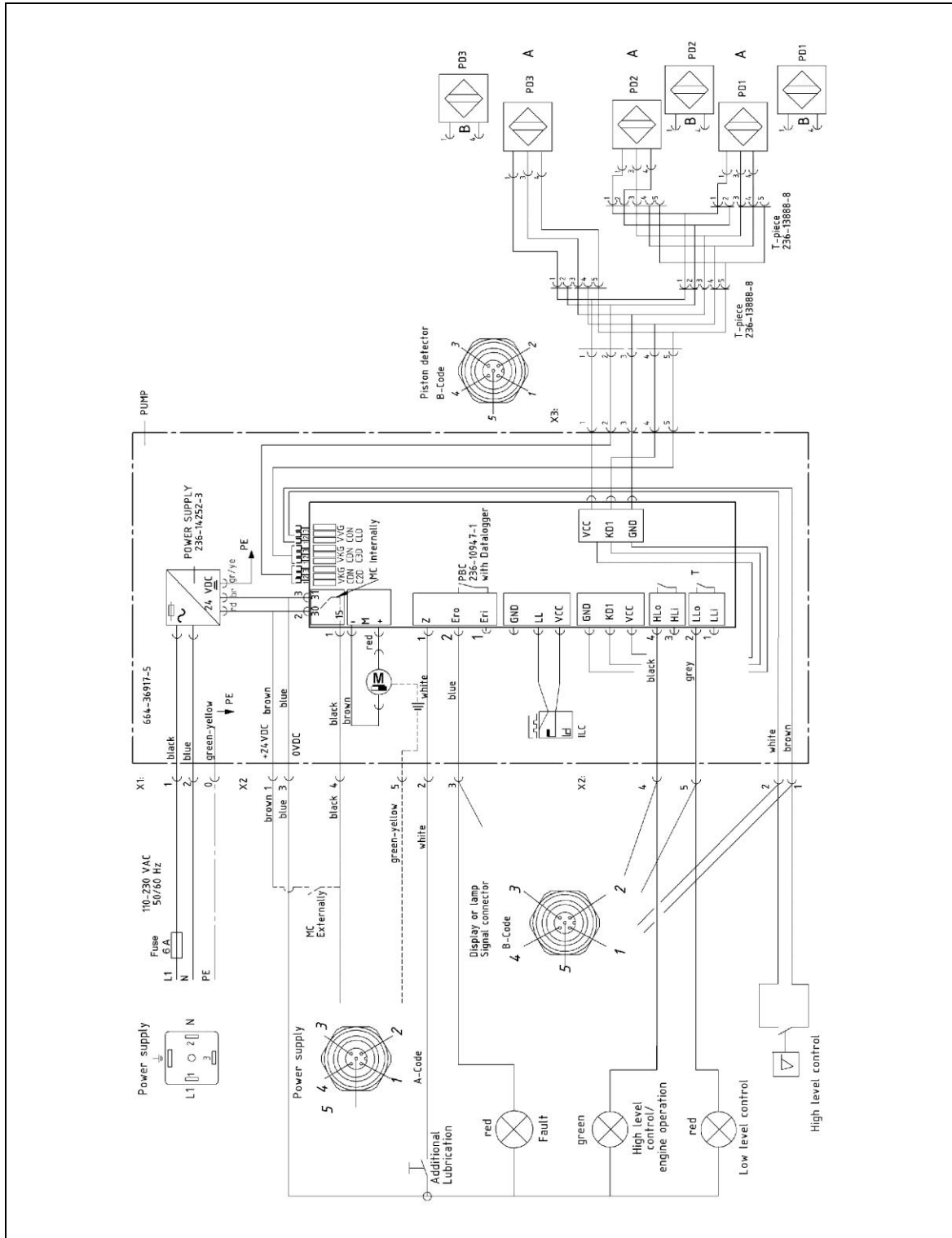
Pump P 243

| Type of connection: Bayonet plug 7/5 | | | | |
|--|---|----------------|-------------|--|
| Connect one piston detector | | | | |
| 1 | | | 2 | 5 |
|  | | | | |
| Connect two piston detectors | | | | |
| 1 | 2 | 3 | 4 | 2 5 |
|  | | | | |
| Connect three piston detectors (variant 1) | | | | |
| 1 | 2 | 3 | 3/4 4 | 2 5 |
|  | | | | |
| Connect three piston detectors (variant 2) | | | | |
| 1 | 2 | 3 | 4 2 3 4 | 2 5 |
|  | | | | |
| No.: | Designation | Code Part no.: | | Legend |
| 1 | Bayonet plug 7/5 with cable 5 m (5x 0.5 mm ²) | 664-34846-1 | |  Screwing of parts |
| 2 | Coupling bushing 90° | A | 236-10022-6 |  Connecting of parts with cable |
| | Coupling bushing 90° with 5 m cable | A | 237-13442-6 | |
| 3 | Coupling bushing 90° with cable 10 m | A | 237-10319-5 | |
| | T-piece | A | 236-13888-8 | |
| No.: | | Designation | | Code Part no.: |
| 4 | Coupling plug | straight | A | 236-10518-7 |
| | Coupling plug | 90° | A | 236-11003-7 |
| 5 | Piston detector | | | 519-34339-5 |

11.2 4A2 - MD20 (110 - 230 VAC)



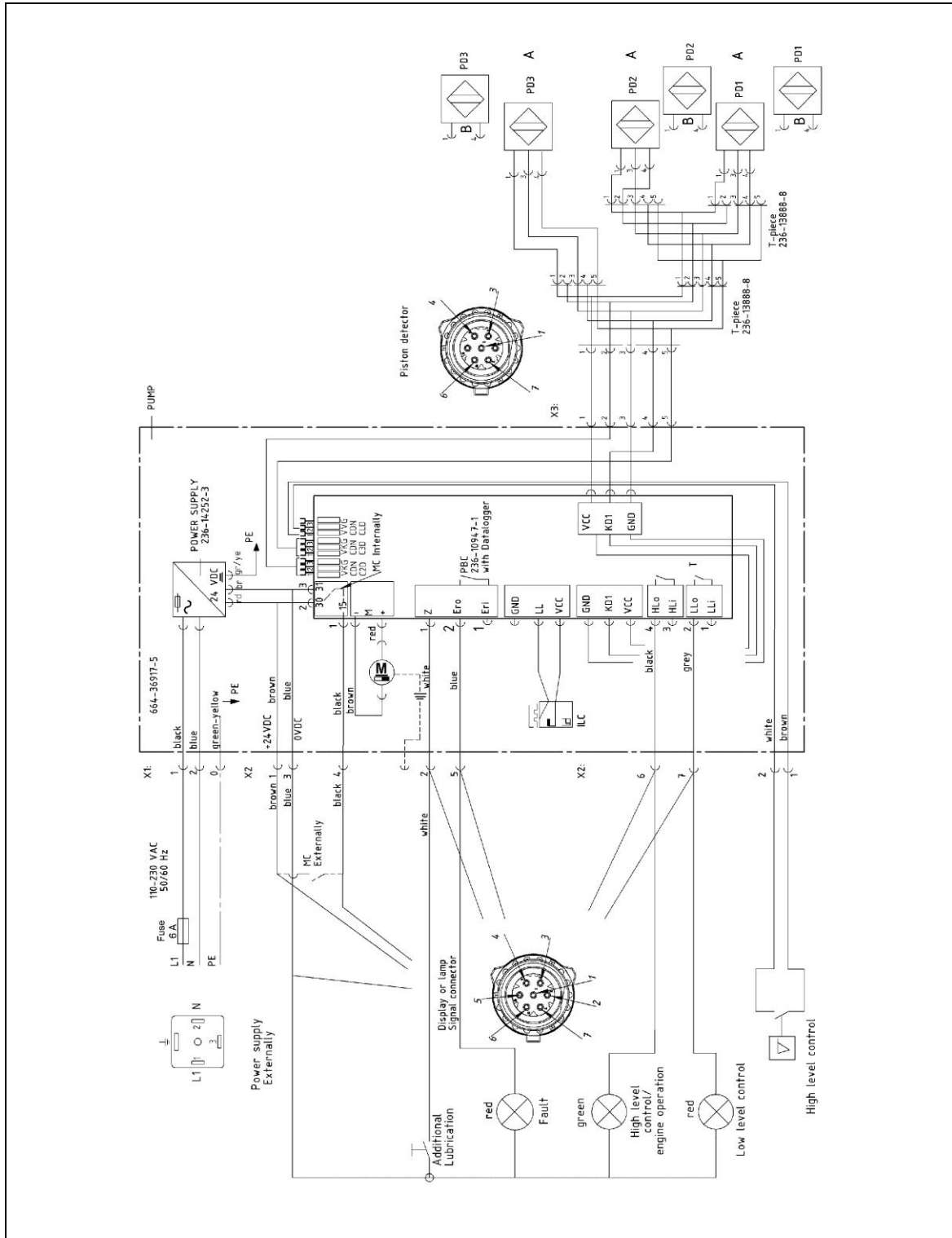
11.3 4A2 - MD21 (110 - 230 VAC)



Assembly Instructions

Pump P 243

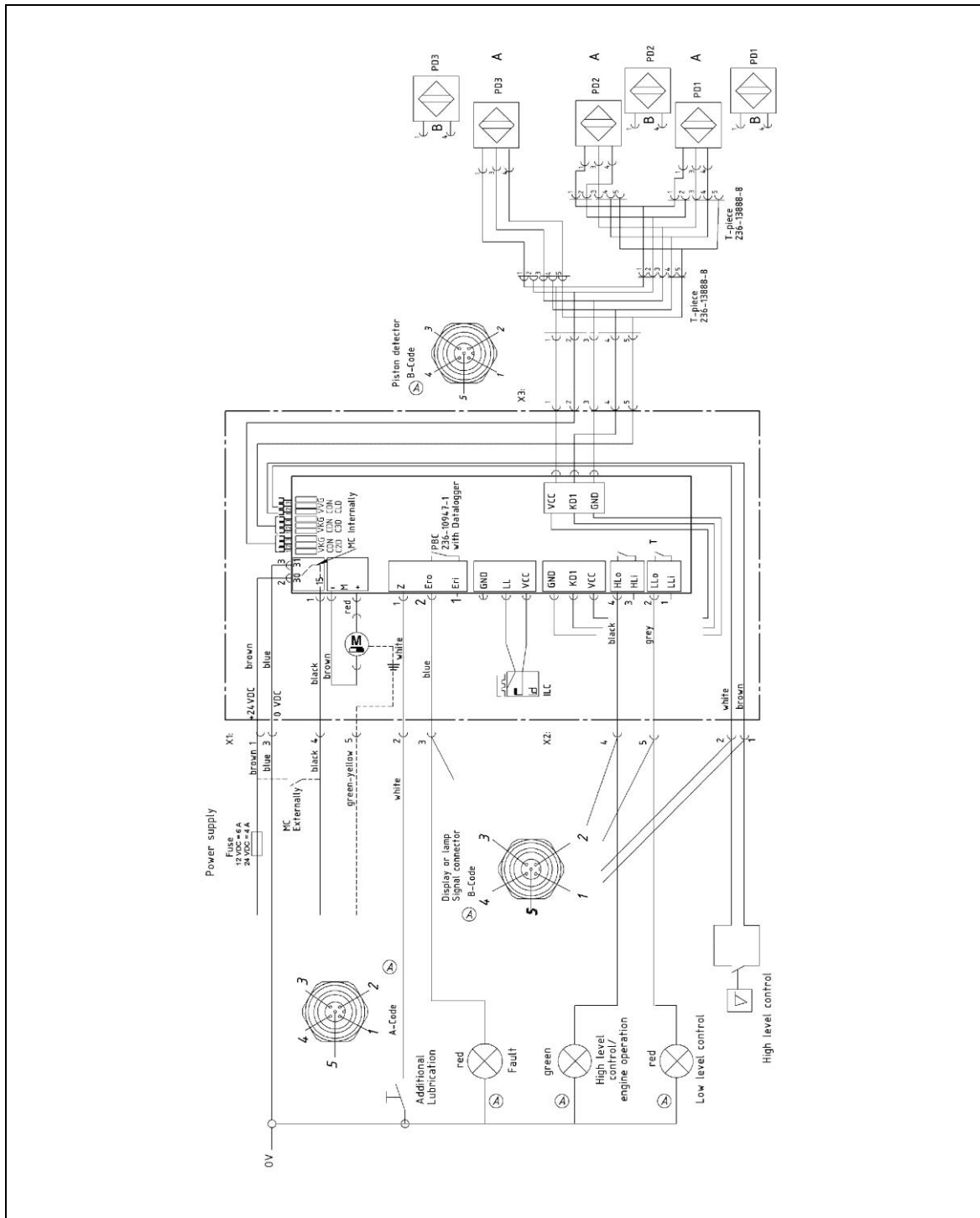
11.4 3A7 - MD20 (110 - 230 VAC)



Assembly Instructions

Pump P 243

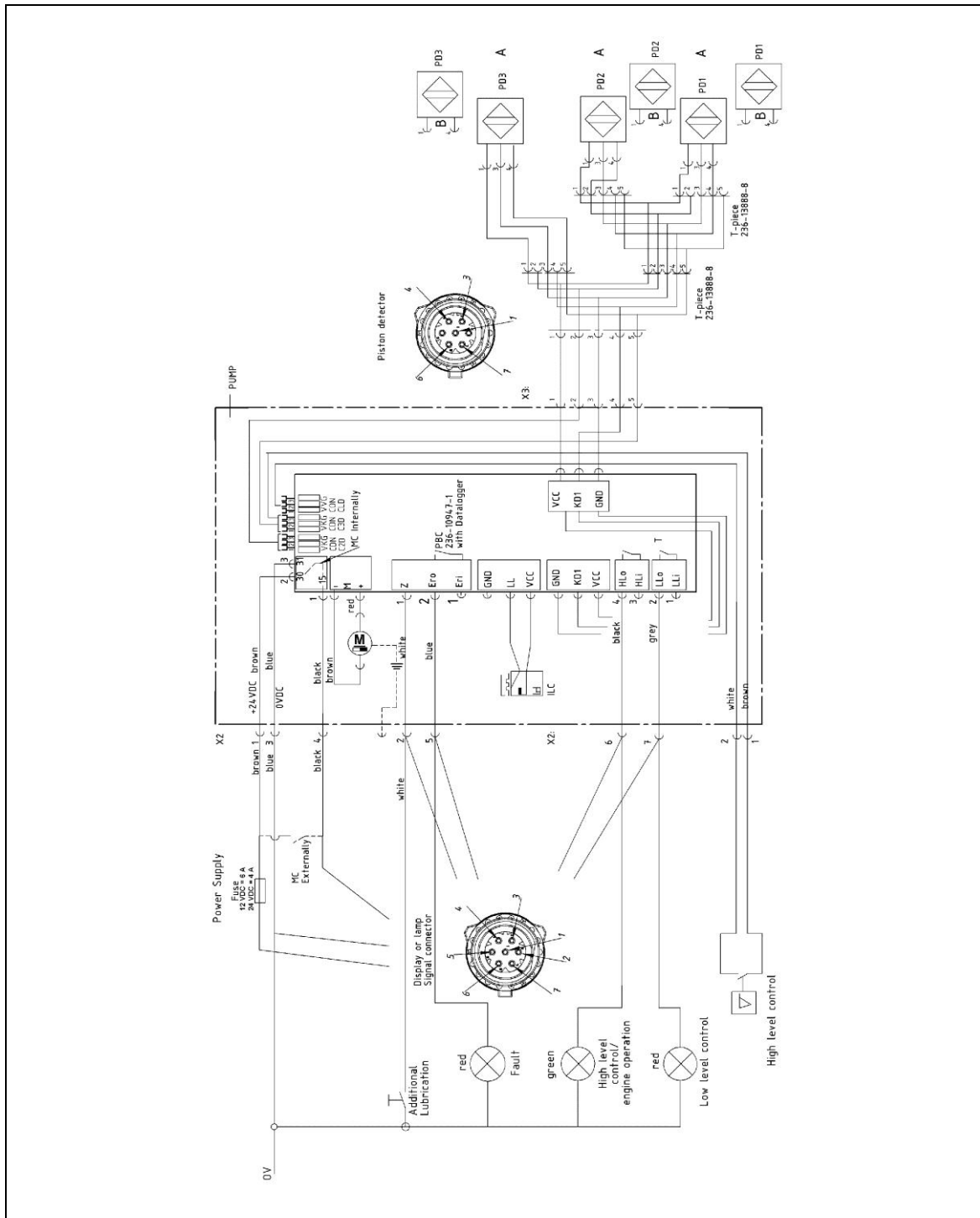
11.5 3A2 - MD20 (12 - 24 VDC)



Assembly Instructions

Pump P 243

11.7 2A7 - MD20 (12 - 24 VDC)



12. Type Identification Code

| | P243 | 2 XLBO | 3K6 | 12 | 2A | 7 | 16 | MD 20-1 |
|--|---|---------------------|---------------------|--|----|---|----|---------|
| Base type of pump | | | | | | | | |
| 243 | | | | | | | | |
| Reservoir specification | | | | | | | | |
| 2 / 4 / 8 / 15 | Reservoir capacity in litres | | | | | | | |
| X / Y | X = grease / Y = oil | | | | | | | |
| N / L / B | N = without low-level / L = with low-level B = with high and low level | | | | | | | |
| BO / F | BO = filling from top / F = filling from bottom | | | | | | | |
| Pump elements | | | | | | | | |
| [X]K5 | Piston diameter = 5 mm | | | | | | | |
| [X]K6 | Piston diameter = 6 mm | | | | | | | |
| [X]K7 | Piston diameter = 7 mm | | | | | | | |
| [X]B7 | Piston diameter = 7 mm | | | | | | | |
| [X]C7 | Piston diameter = 7 mm | | | | | | | |
| 00 | Without pump elements | | | | | | | |
| [X] | = no. of pump elements (1 - 3) | | | | | | | |
| Supply voltage | | | | | | | | |
| 12 / 24 | 12 / 24 VDC (bayonet plug / M12) | | | | | | | |
| 110 / 230 | 110 / 230 VAC (square plug) | | | | | | | |
| Electrical connection possibilities to the pump | | | | | | | | |
| 2A | <u>2 connections</u> L Supply voltage of pump, low-level signal R Piston detector | | | | | | | |
| 3A | <u>3 connections</u> L Supply voltage of pump, low-level signal R Piston detector | | | | | | | |
| 4A | <u>4 connections</u> L Supply voltage of pump + control pcb, low-level signal, illuminated pushbutton R Piston detector (M12) | | | | | | | |
| Type of connection | | | | | | | | |
| 1 | Square plug (110-230 VAC) | | | | | | | |
| 2 | M 12 plug (12-24 VDC) | | | | | | | |
| 7 | Bayonet plug 7/7 pole, DIN 72585 (to be used non-isolated only) | | | | | | | |
| Connections from the pump to external devices | | | | | | | | |
| 00 | Connecting plug with closure cap (square plug) | | | | | | | |
| 01 | Connecting plug and socket (square plug, M12 plug) | | | | | | | |
| 10 | Connecting plug and socket with cable 10 m (M12 plug) | | | | | | | |
| 16 | Bayonet plug 7/7 with cable 10 m. 7-core | | | | | | | |
| Control printed circuit boards | | | | | | | | |
| MD 21 | Potential-free (without jumper configuration) | | | | | | | |
| MD 20-8 | Relay 1 (E) = Plus | Relay 2 (V) = Plus | Relay 3 (L) = Plus | Adjustment if no indications are available regarding the control printed circuit board | | | | |
| MD 20-1 | Relay 1 (E) = Minus | Relay 2 (V) = Minus | Relay 3 (L) = Minus | | | | | |
| MD 20-2 | Relay 1 (E) = Minus | Relay 2 (V) = Minus | Relay 3 (L) = Plus | | | | | |
| MD 20-3 | Relay 1 (E) = Minus | Relay 2 (V) = Plus | Relay 3 (L) = Minus | | | | | |
| MD 20-4 | Relay 1 (E) = Minus | Relay 2 (V) = Plus | Relay 3 (L) = Plus | | | | | |
| MD 20-5 | Relay 1 (E) = Plus | Relay 2 (V) = Minus | Relay 3 (L) = Minus | | | | | |
| MD 20-6 | Relay 1 (E) = Plus | Relay 2 (V) = Minus | Relay 3 (L) = Plus | | | | | |
| MD 20-7 | Relay 1 (E) = Plus | Relay 2 (V) = Plus | Relay 3 (L) = Minus | | | | | |

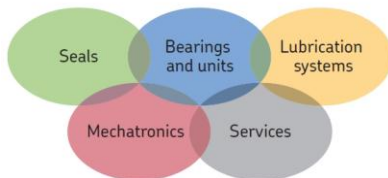
(E) = Error
(V) = High-level
(L) = Low-level

13. Notes

This image shows a full page of blank graph paper. The grid consists of small, uniform squares formed by thin, light gray lines. There are no margins, text, or other markings on the page.

Assembly Instructions

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The Power of Knowledge Engineering

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

Important information on product usage

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

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

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