BIJUR DELIMON
INTERNATIONAL

Operating manual

Chain lubrication aggregate WS-E

BA_2018_1_GB_WSE

INDEX

1. GENERAL

Prior to start up, we recommend to read these operating instructions carefully as we do not assume any liability for damages and operating troubles which result from the nonobservance of these operating instructions!
The below described pump is designed for use in centralized lubrication systems or to supply downstream lubrication systems.
Any use beyond the applications described in these operating instructions is considered to be not in accordance with the product's intended purposes. The manufacturer is not to be held responsilbe for any damages resulting from this: the user alone bears the corresponding risk.
As to figures and indications in these operating instructions we reserve the right to make technical changes which might become necessary for improvements.

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2. SAFETY

These operating instructions contain fundamental instructions which are to be observed during erection, operation and maintenance. Therefore it is absolutely necessary for the fitter and the competent qualified staff/user to read these operating instructions before installation and start-up. The operating instructions must be available at all times at the place of use of the machine/system.

Not only the general safety instructions stated under this main point "safety" are to be observed, but also the other specific safety instructions stated under the other main points.

2.1 Identification of safety warnings in the operating instructions

The safety warnings contained in these operating instructions which, if not observed, may cause dangers to people, are specially marked with general danger symbols

 safety sign according to DIN 4844, warning about a danger spot, in case of warning about electric voltage with

 safety sign according to DIN 4844, warning about dangerous electric voltage.

In case of safety instructions which, if not observed, may cause damage to the product and its function, the word

ATTENTION

is inserted.
Instructions that are directly attached to the machine, as for example

- rotational direction arrow
- identifications for fluid connections

must be observed at all events and maintained in a fully legible condition.

- Note: There is an increased skid risk in case of spilled/leaked out lubricants. They are to be removed at once properly.

 Safety sign according to DIN 4844, warning about skid risk.

2.2 Personnel qualification and training

The operating, maintaining, inspecting and erecting personnel must have the appropriate qualification for such work. Area of responsibility, competence and supervision of the personnel have to be regulated by the user. If the personnel do not have the necessary knowledge, they have to be trained and given instructions. This can be effected, if necessary, by the manufacturer/supplier on behalf of the user of the machine. Furthermore, the user has to make sure that the contents of the operating instructions are fully understood by the personnel.

2.3 Dangers in case of nonobservance of the safety instructions

The nonobservance of the safety instructions may result in hazards to persons, to the environment and to the product. The non-observance of the safety instructions may lead to the loss of any claims for damages.
In detail, the nonobservance may for instance lead to the following hazards:

- Failure of important functions of the product/system/machine
- Failure of prescribed methods for maintenance and repair
- Harzard to persons by electrical, mechanical and chemical influences
- Hazard to the environment by the leakage of dangerous substances

2.4 Safety conscious working

The safety instructions stated in these operating instructions, the existing national regulations as to the accident preventation as well as possible internal working, operating and safety rules of the user are to be observed.

2.5 Safety instructions for the user/operator

- If hot or cold product or machine parts lead to dangers, these parts have to be protected against touch.
- Protection against touch for moving parts (e. g. coupling) must not be removed when the machine is in operation.
- Leakages (e. g. from the shaft seal) of hazardous goods to be delivered (e. g. explosive, toxic, hot) are to be removed in such a way that there is no danger to persons and environment. Legal rules are to be observed.
- Hazards caused by electrial power are to be excluded (for details please refer for instance to the rules of the VDE and the local power supply companies).

2.6 Safety instructions for maintenance, inspection and installation work

The user has to take care that all the maintenance, inspection and installation work is executed by authorized and qualified skilled personnel who have informed themselves adequately by thoroughly studying the operating instructions.
Basically, work on the machine is only to be carried out during shut-down. It is obligatory to observe the shut-down procedure described in the operating instructions.
Pumps or pump aggregates that deliver media being hazardous to health have to be decontaminated. Immediately after completion of the work, all safety and protective equipments have to be reinstalled and/or reactivated.

- Advice: When working with compressed air, do wear glasses.

(DIN 4844 – Use breathing mask)

- Advice: Observe EC-Safety Data Sheet for materials of consumption and additives used and use personal protective equipment.

2.7 Unauthorized conversion and manufacture of spare parts

Conversion or modifications to the product are only permitted when agreed with the manufacturer. Original spare parts and accessories authorized by the manufacturer serve to ensure safety. The use of other parts may render the liability for consequencial losses null and void.

2.8 Unacceptable modes of operation

The operational reliability of the product supplied is only guaranteed if the product is used in accordance with its intended purposes as per section 1 - General - of the operating instructions. The limiting values specified in the data sheet must on no account be exceeded.

2.9 Guidelines & standards

1., 2. and 3. guideline (see data sheet: R&N_2009_X_GB)

2.10 Notes on environmental protection and waste disposal

In correct operation with lubricants, the components are subject to the special requirements set by environmental legislation.
The general requirements for lubricants are specified in the respective safety data sheets.
Used lubricants are hazardous forms of waste and therefore require special supervision in the sense of § 41 paragraph 1 sentence 1 and paragraph 3 no. 1 of KrW-/AbfG (Closed-Loop Waste Management Act).
Used oils must be handled in compliance with AltölV (Waste Oil Ordinance).
The devices or components contaminated with lubricant must be disposed of by a certified waste management company.
Records of proper waste management must be filed in conformance to NachwV (Ordinance on Waste Recovery and Disposal Records).

GENERAL PRODUCT FEATURES

- Gear wheel pump unit with 1.2 litre delivery volume
- Primary field of application in WS-E chain lubrication systems for the automatic lubrication of chains, joints, rollers, hinges etc.; another possible field of application is the oiling of built-in parts (engine crankshaft)
- Suitable for mineral oils with an operating viscosity of between 40 and 900 mm^2s^{-1} (cSt)
- Operating pressure of up to 30 bar (ensured via an internal pressure relief valve)
- Up to 7 lubrication cycles (depending on the viscosity) can be performed per second
- Surface coating DELIMON Standard RAL 7004 (Signal grey) C2M

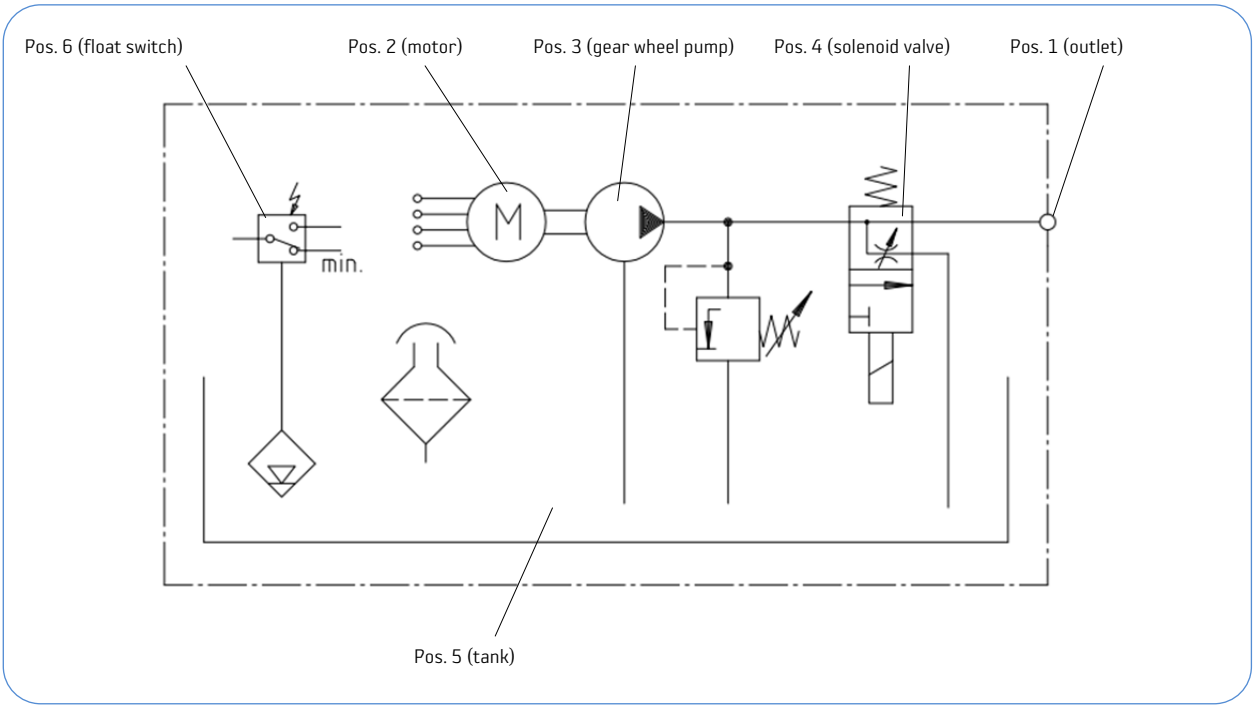
3. APPLICATION

The WS-E gear wheel pump unit is primarily used in single-line systems with dynamic dividers of type ZE-E, and when connected in this way, the unit allows for the targeted and metered lubrication of moving lubrication points by means of a flying drop (up to 7 drops per second, depending on the viscosity).
Another possible application consists of use with static single-line dividers or use as a delivery pump in connection with a solenoid valve at the end of the main line.

4. STRUCTURE AND MODE OF ACTION

The WS-E chain lubrication unit essentially consists of:

1. 1 outlet
2. Three-phase or alternating current motor
3. Gear wheel pump
4. Solenoid valve for direct or alternating current
5. Tank (4-litre metal tank or 12-litre aluminium tank as standard)
6. Min. float switch



Chain lubrication unit - schematic presentation of the chain lubrication unit

The WS-E gear wheel pump is available with 4-litre or 12-litre tank sizes as standard.

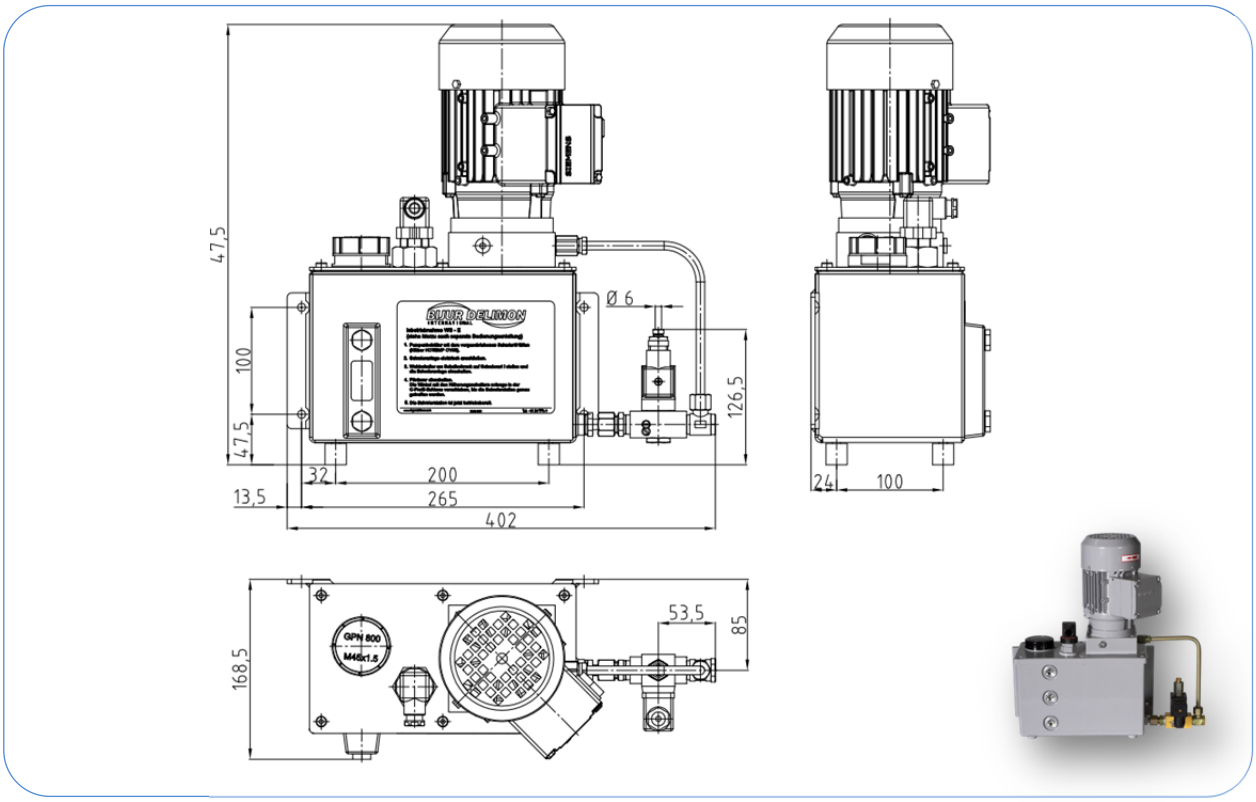
4. STRUCTURE AND MODE OF ACTION

Starting the power supply to the motor causes the oil inside the tank to be sucked in by the flange-mounted gear wheel pump, and and to be delivered to the solenoid valve from the pump body via the external tube. The oil is delivered back into the tank via the de-energised solenoid valve, and is almost entirely de-pressurised.

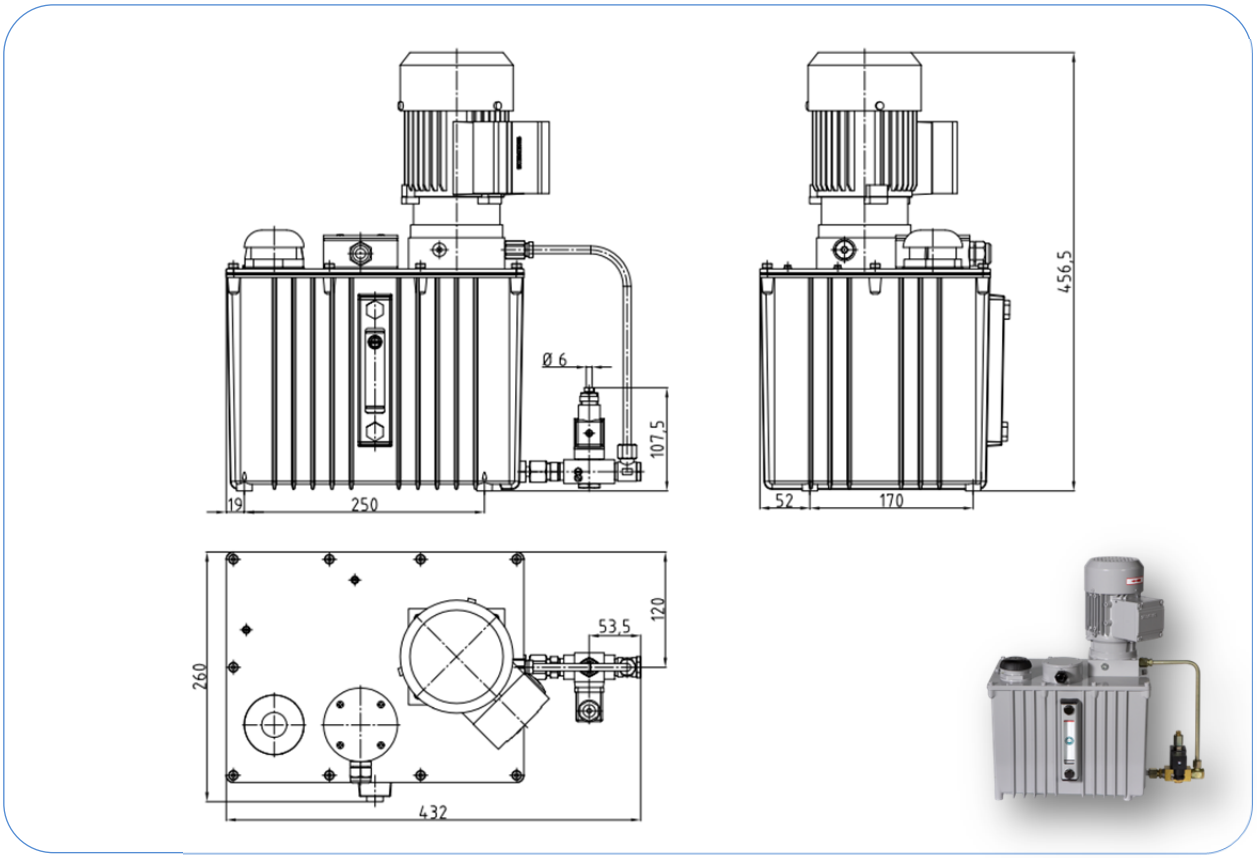
When the power supply to the solenoid valve is started, the valve is mechanically switched and the oil cycle is interrupted. The oil is delivered abruptly in the direction of the outlet, and if the unit is being used in the WS-E system, then the oil can serve the following ZE-E dividers. These then deliver their pre-stored quantity of lubricant to the lubrication points at high speed via the spray nozzles (in the form of a targeted drop).

Interrupting the power supply to the solenoid valve causes the valve to be mechanically switched back to its starting position. The pressure in the main line drops, and the oil cycle described above begins again as long as the motor is being supplied with power. In de-energised state, the solenoid valve has connected all of the connections to one another. However, the special design within the solenoid valve ensures that the connected main line cannot run empty and that it retains residual pressure.

5. DIMENSIONS (mm)



WS-E 4 litre



WS-E 12 litre

6. TECHNICAL DATA

Technical specifications of the unit

Operating pressure max. ..... 30 bar
Permissible ambient temperature range ..... 0 to +40°C
Delivery volume at a rated motor speed of 3000 rpm ..... 1200 cm^3/min
Delivery volume at a rated motor speed of 3600 rpm ..... 1440 cm^3/min
Tank volume ..... 4 or 12 litres

Suitable lubricants with a mineral oil base:
- Mineral oil ..... 40...900 mm^2s^{-1} operating viscosity
- Synthetic oils, solid additives and solvents ..... on request

Connectible pipelines:
- Outlet ..... Ø 6 mm

Dimensions ..... see images on page 6

Weight:
- Unit with 4-litre tank (steel) ..... 12.5 kg
- Unit with 12-litre tank (aluminium) ..... 5.6 kg

Technical specifications of the motor (see appendix for datasheets):
- Alternating current motor (art. no.: 76911M358) ..... 1/N/PE AC 50Hz 230V, 0.18kW, 3000 rpm
- Three-phase motor (art. no.: 769115213) ..... 3/PE AC 50Hz 400V, 0.18kW, 3000 rpm
- UL alternating current motor (art. no.: 76911M293) ..... 1/N/PE AC 60Hz 115V, 0.18kW, 3600 rpm
- UL three-phase motor (art. no.: 76911M090) ..... 3/PE AC 60Hz 115V, 0.18 kW, 3600 rpm

Technical specifications of the solenoid valve (see appendix for datasheets):
- Solenoid valve (art. no.: 38152M129) ..... DC 24V, 24W
- Solenoid valve (art. no.: 381521133) ..... 1/N/PE AC 50Hz 230V, 19VA

Technical specifications of the float switch (see appendix for datasheets):

For 4-litre tank, operating voltage 10..48V (art. no.: 39161S088)
- Max. switching current ..... 0.5 A
- Max. switching capacity ..... 5 VA
- Switching outputs for ..... advance warning and empty

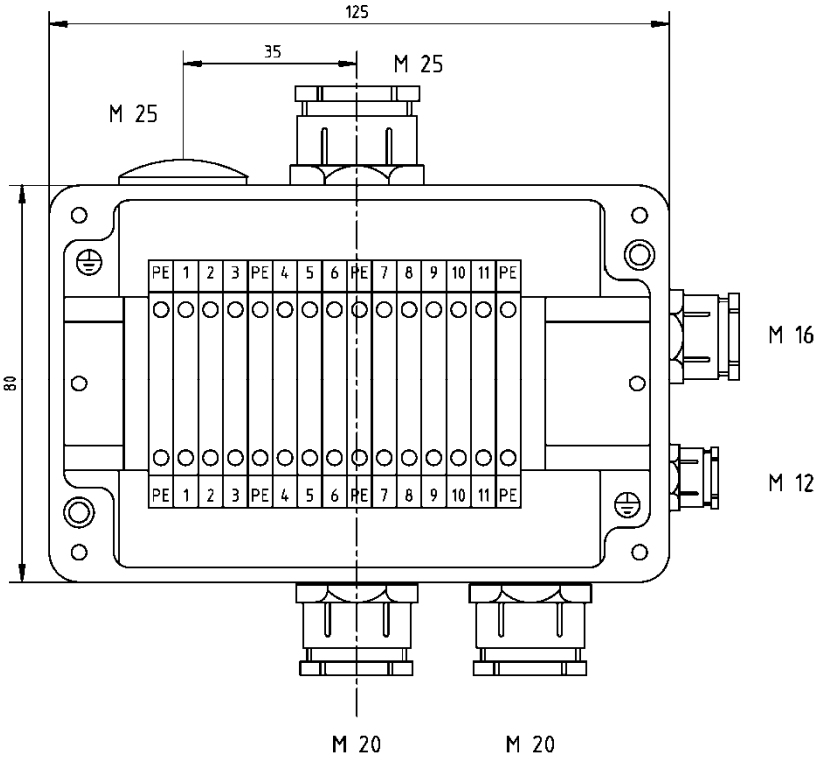
For a 4-litre tank, max. operating voltage 250V (art. no.: 39161S089)
- Max. switching current ..... 0.5 A
- Max. switching capacity ..... 10 VA
- Switching outputs for ..... advance warning and empty

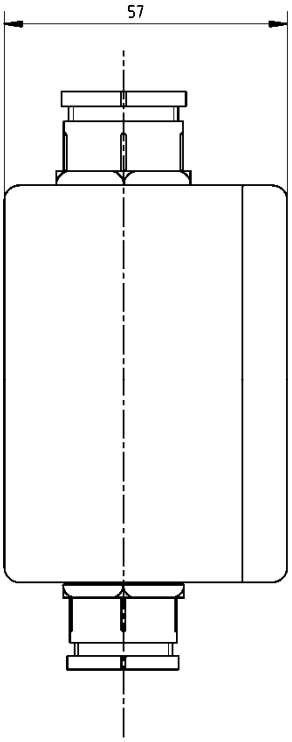
For a 12-litre tank, max. operating voltage 250V (art. no.: 391611113)
- Max. switching current ..... at 24V = 1A; at 120V = 0.5A; at 230V = 0.261A
- Max. switching capacity 60VA
- Switching outputs for ..... empty

6. TECHNICAL DATA

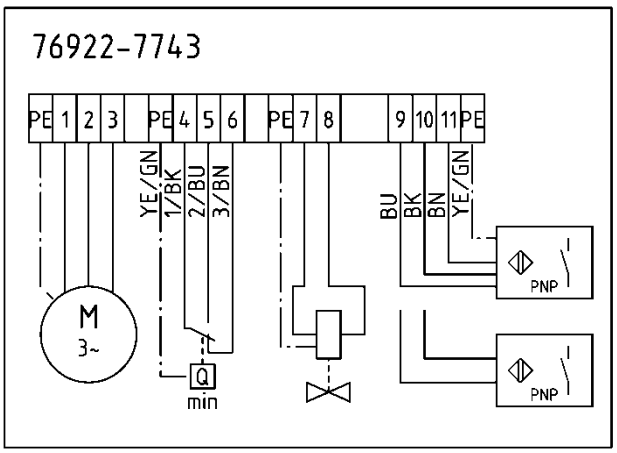
Wiring diagram for terminal box 76922-7743

Connection dimensions: 113 mm x 52 mm





Central drilled holes with bottom of housing



7. UNIT CONFIGURATION AND CODING

Coding example:

WSE	01	A	02	24	B	03

Number of outlets:
1 outlet - 01

Revision A
(no selection)

Drive type:
Alternating current motor 230V, 50Hz - 01
Three-phase motor 400V, 50Hz - 02
UL alternating current motor 115V, 60Hz - 15
UL three-phase motor 115V, 60Hz - 12

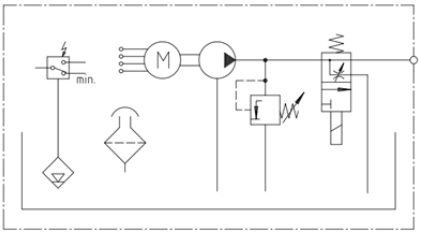
Cycle valve:
Direct current DC 24V - 24
Alternating current AC 230V - 23

Tank:
4 litre, metal - A
12 litre, aluminium - B

Accessories:
None - 00
Float switch for 4 litre, 2x min, 12-48V - 01
Float switch for 4 litre, 2x min, 250V - 02
Float switch for 12 litre, 1x min, 250V - 03
Terminal box (12-litre version only) - 04
Automotive system (PSA) with filling via sealing nipple for 4-litre version - 05
Automotive system (PSA) with filling via sealing nipple for 12-litre version - 06

Coding example results with accessories:

WSE01A0224B03



WSE01A0123B04

WSE01A0223A05

WSE01A0124B06

8. ASSEMBLY, INSTALLATION AND COMMISSIONING

ATTENTION Assembly must only be performed by qualified specialist personnel. Suitable standard assembly tools must be used.

Contact our Service department if necessary. Our service technicians or assembly supervisors are available to help with assembly, training and instruction either on a one-off basis or for longer periods to be settled by daily rate.

Installation position and mounting:

In the 4-litre version, the pump unit is preferably attached to a wall via four mounting holes with Ø 7.5, using hexagon nuts M6 x 40 and washers. Floor mounting is also possible using the 4 rubber-metal buffers underneath the tank.

In the 12-litre version, the pump unit can only be floor-mounted. There are 4 threaded holes (M8x15) in the feet for this purpose.

The fixing screws are not included in delivery as standard, and must be ordered separately as accessories.

- When mounted onto a wall, the pump unit must always be in a vertical installation position,or when floor-mounted, the motor must always be facing upwards.
- The unit must be mounted tension-free onto a flat surface.

Positioning the pump unit

When installing the pump unit, it must be ensured that it is positioned as closely and centrally as possible to the connected lubrication points. In connection with the ZE-E lubricant divider, it must also be ensures that the distance between the pump unit and the furthest ZE-E divider does not exceed 5 m.

- The pump unit must be easily accessible for maintenance and inspection purposes.

Assembling the pipelines and tubes:

ATTENTION

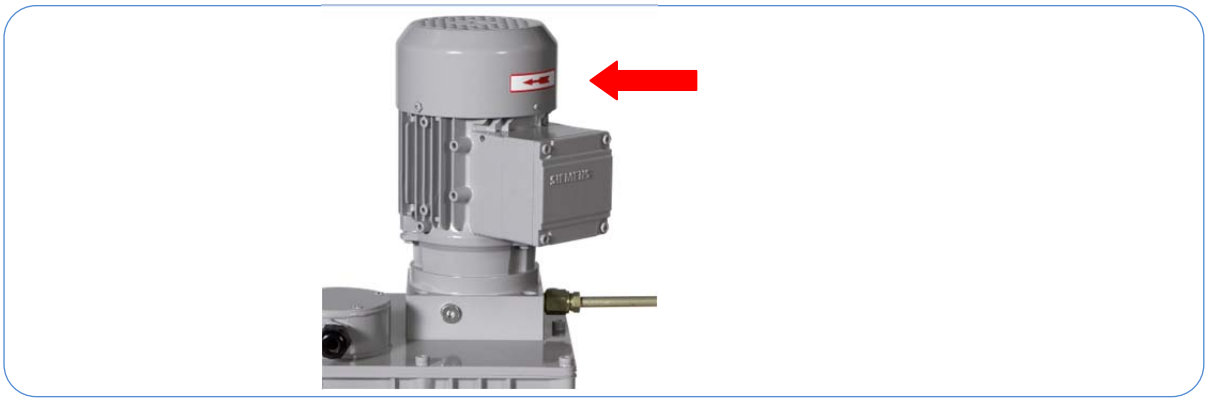
- Arrange the tubing such that ventilation is possible (with a slight incline from the pump unit to the dividers).
- Only ever use clean oils!
- Dirt particles can cause system failure!
- Clean conditions must be ensured during assembly.
- The pipes must be checked for impurities (e.g. chippings) prior to connection to the pump unit and must be flushed out if necessary.

Commissioning:

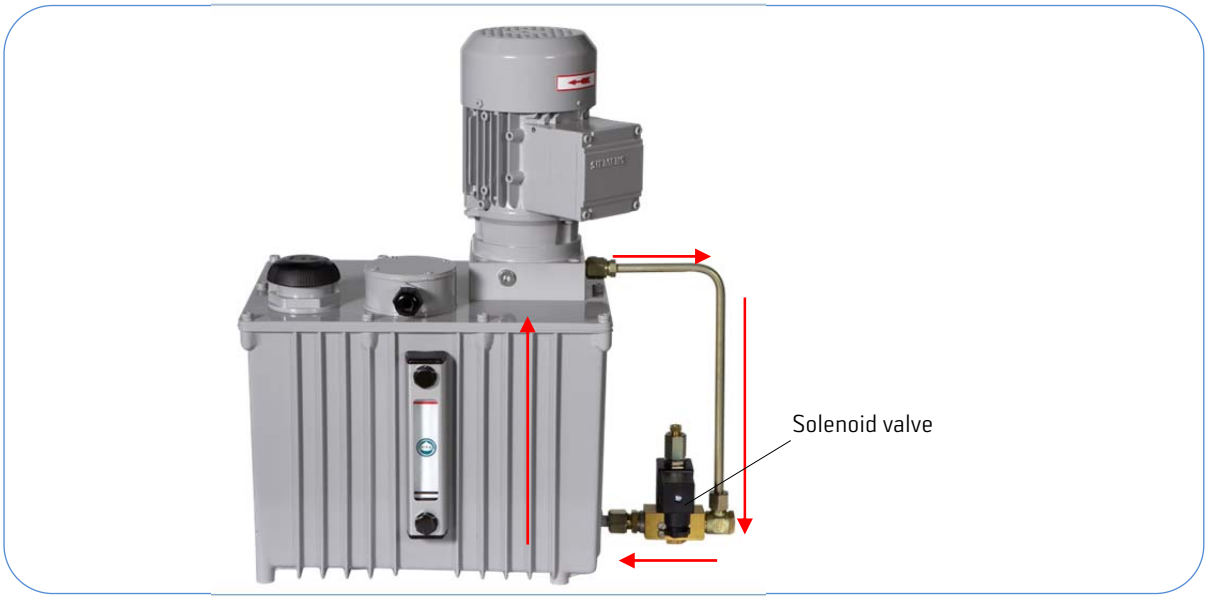
The pump unit itself does not require any ventilation, although when used in combination with the ZE-E dividers, the system will need to be ventilated when the pump unit is re-installed or replaced. The ventilation process is described below.

- Make sure that all connected pipelines are correctly fitted.
- Fill the oil tank before commissioning the pump unit or lubrication system!

- Check whether the motor rotation direction is correct when the power supply is turned on. (Arrow on the motor)

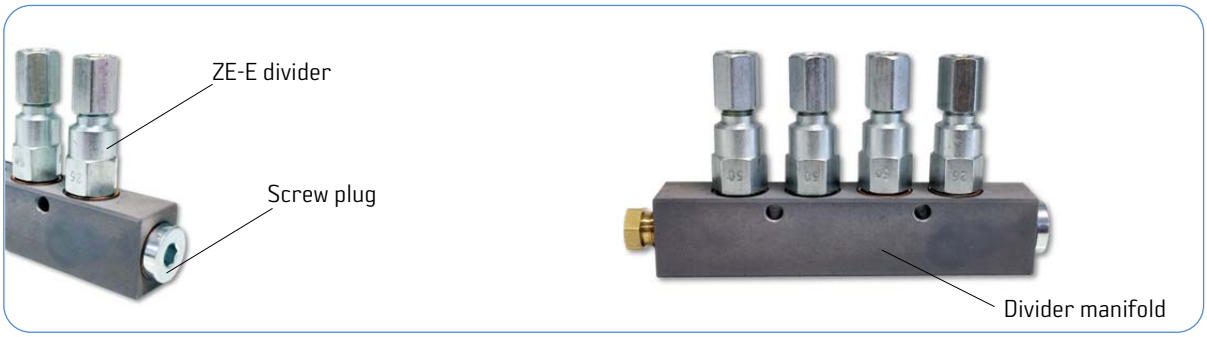


- The oil is circulated via the opened solenoid valve (in a de-pressurised state).

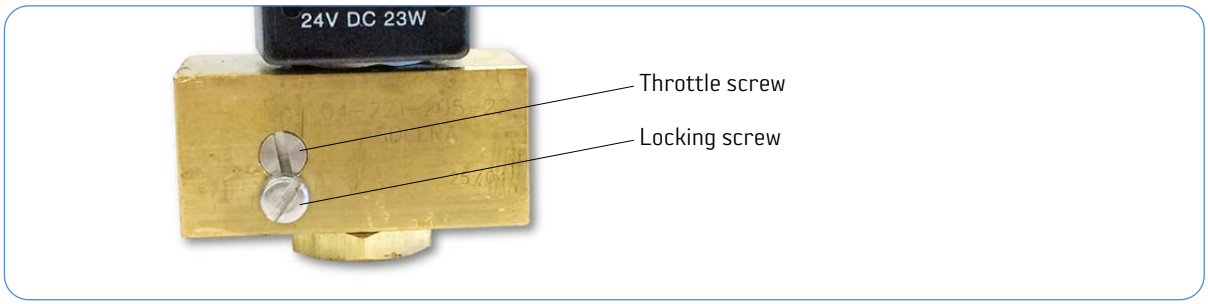


- Remove the plug on the solenoid valve in order to prevent pulsing during the adjustment phase.

- Then carefully ventilate the pipelines by undoing the screw plug on the divider manifold. A container must be placed underneath the open divider manifold in order to ensure that the surrounding area is not contaminated by escaping oil. If multiple divider manifolds are being used within the system, then ventilation must be performed starting with the nearest and ending with the furthest divider manifold.



- As soon as oil with no air bubbles can be seen, the screw plug should be re-tightened.
- The throttle screw on the solenoid valve must then be turned very slowly in a clockwise direction to close it until all ZE-E divider release a fine, continual stream of oil as a result of the pressure build-up in the main line. It must be ensured that all dividers release a continual stream of oil, or at least a steady flow of drops. The individual dividers will deliver the oil on a staggered basis.



If not all of the dividers worked the first time (no visible functioning), then the procedure must be repeated by turning the throttle screw anti-clockwise all the way back against the locking screw, and then closing it again by slowly turning in a clockwise direction. The dividers will not start working at the same time; start-up will usually be staggered.

- If the pipelines, elements and nozzles are perfectly ventilated (a fine, continual stream of oil has come out of each nozzle), then the throttle screw must be fully opened by turning in an anti-clockwise direction (fully open = touching the locking screw).
- The disconnected plug must be re-connected to the solenoid valve.

- A lubrication cycle must then be performed. This is performed by triggering impulses in quick succession on the proximity switch, either by damping the electronic field or by repeatedly breaking the light barrier.

- Make sure that the pump unit does not exceed the permissible operating pressure. The pressure relief valve may need to be re-adjusted (30 bar). For information on adjusting the pressure relief valve, see item 9. Maintenance and servicing
- It is recommended that a pressure gauge be used to monitor the system pressure at a suitable point (directly behind the unit). The pressure should be monitored via a miniature measuring connection or a pressure switch (on the end of the main line behind the furthest divider).
- The system is now ready for operation.
- When the system is running, adjust the position of the nozzles and the response pressure of the proximity switch until the drops of oil accurately reach the required lubrication points. If necessary, hold a piece of paper in front of the nozzle opening to check whether a drop has been released.
- Once assembly is complete, check that the system is leak-tight and is working perfectly at each installed divider and lubrication point.

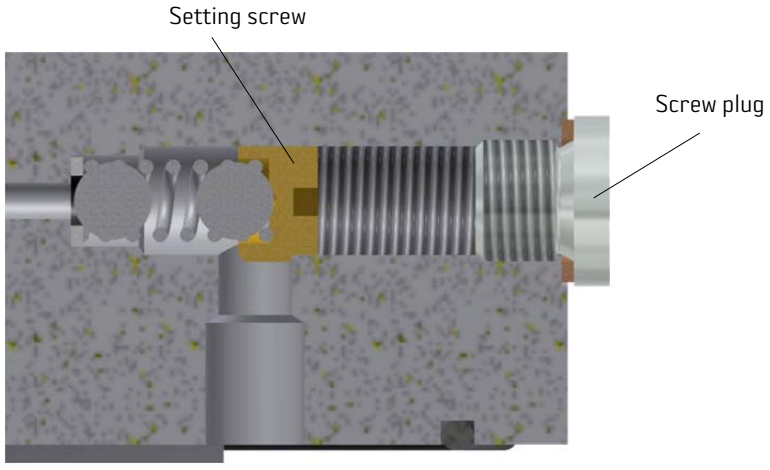
Continuous operation:
The pump unit is designed for continuous operation. It must be ensured that the specified operating pressure and temperature range are complied with during the entire operating phase. Only ever use approved lubricant that is free from any contamination.

Disassembly:

The pump unit must only be disassembled when at a standstill and when the system is de-pressurised.

9. MAINTENANCE AND SERVICING

There is no need for any particular maintenance or servicing work. The pressure build-up in the pump must be checked at regular intervals using a pressure gauge, and must be corrected as necessary using the pressure relief valve.



WS-E pressure relief

Remove the screw plug and use a standard screwdriver to turn the setting screw in a clockwise direction to increase the pressure. Turning the setting screw in an anti-clockwise direction reduces the pressure. Please note that the maximum permissible operating pressure is 30 bar. Once the pressure relief valve has been adjusted, the screw plug must be screwed back in again.

10. SPARE PARTS

WSEETA0001 – Spare parts kit - 4-litre gear wheel pump
WSEETA0002 – Spare parts kit - seals
WSEETA0003 – Spare parts kit - 12-litre gear wheel pump
WSEETA0004 – Spare parts kit - 12-litre gear wheel pump with tank cover and motor
WSEETA0005 – Spare parts kit - 12-litre tank
WSEETA0006 – Spare parts kit - 14-litre gear wheel pump with tank cover

11. STORAGE AND TRANSPORT

The unit should ideally be stored and transported vertically in order to ensure that it is not contaminated by lubricant residues in the tank. Other than that, there are no other particular transport or storage regulations.

12. SUITABLE SYSTEM COMPONENTS

The following distributor types are primarily used in combination with the pump unit:
ZE-E dividers (see ZE-E product documents).

13. PLATES

Company sign

Type plate