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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!

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 responsible 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.

The copyright on these operating instructions is kept reserved to the company DELIMON. These operating instructions are intended for the erecting, the operating and supervising personnel. They contain regulations and drawings of technical nature which must not – completely or partially - be distributed nor used nor communicated to others without authorization for competition purposes.

Company address, spare parts and service address

DELIMON

Arminstraße 15

D-40277 Düsseldorf

Phone : +49 211 77 74 0

Fax : +49 211 77 74 210

Branch office

Am Bockwald 4

D-08344 Grünhain-Beierfeld

E-mail : kontakt@bijurdelimon.com

www.bijurdelimon.com

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 machine 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. Safety (continuation)

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 machine. The nonobservance 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 machine/system
- Failure of prescribed methods for maintenance and repair
- Hazard 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 prevention 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 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 electrical 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.

Dangers at the pump FZ

Danger of squeezing when closing the reservoir lid!

When filling the reservoir while the pump is in operation, do not put your hand into the reservoir. Risk of injury by scraper and agitator.

In case of drive by oscillating lever, there is an increased risk of injury in the area of the oscillating lever.

During operation, the oscillating lever drive is to be protected against unintended touch by means of appropriate covers.

When handling lubricants, avoid pollutions of the environment.

For cleaning the outside of the pump use suitable solvent-free cleansing agents. Do not use high-pressure cleaning devices.

2. Safety (continuation)

- 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.



(DIN 4844 – Use breathing mask)

Before recommissioning, observe the points stated in section “initial start-up”.

2.7 Unauthorized conversion and manufacture of spare parts

Conversion or modifications to the machine 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 consequential losses null and void.

2.8 Unacceptable modes of operation

The operational reliability of the machine supplied is only guaranteed if the machine 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_1_GB)

3.0 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 AltöIV (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 CHARACTERISTICS

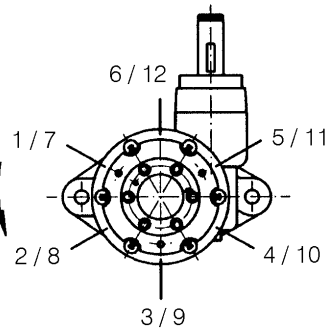
- Central piston technique
- Insert for anticlockwise and clockwise rotation
- Feed volume per outlet up to 60cm³/h
- Lubricants: oil, grease, liquid grease
- Surface signal grey RAL 7004

A PUMP TYPE FZA

B NUMBER OF OUTLETS

The outlets 1 - 6 are arranged in the upper row. Outlets being placed one above the other can only be joined in the order shown on the picture. Fusions begin at the outlets 1/7 and follow the direction of the arrow. Order of outlets see picture.

The pump body comprises a control sleeve to guide the piston and, allocated to each outlet, a setting spindle to set the piston stroke and thus the delivery rate of each outlet (up to 6 outlets) or of two outlets together which are placed one above the other (7 up to 12 outlets).



Designation and position of the outlets, order in case of combined outlets.

When it deals with 2 outlets with half the total output volume each, one outlet of the upper and lower row can be opened.

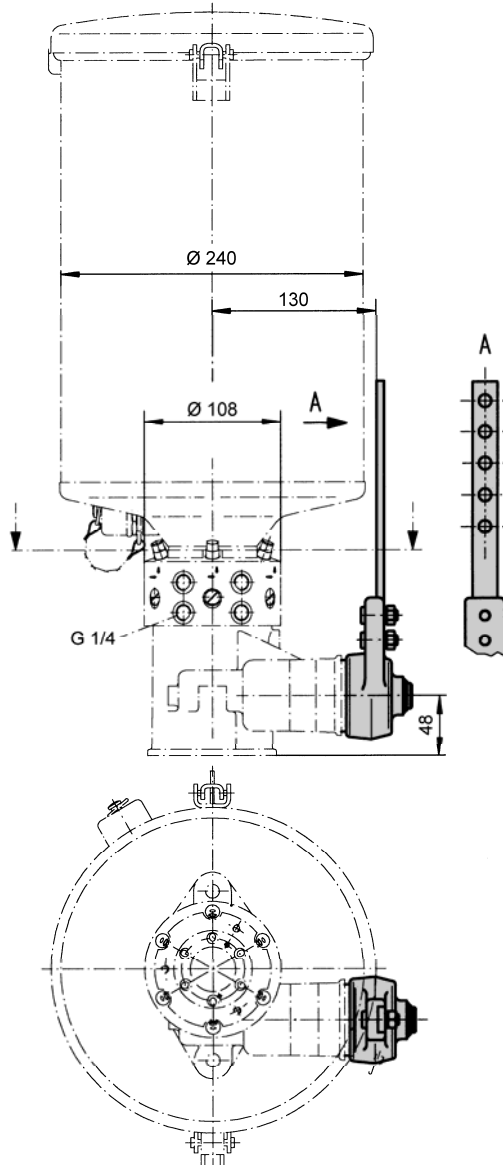
C INSPECTION

Stage A

D. KINDS OF DRIVE

Drive with oscillating lever

The assembly group constitutes an extension of the assembly group drive with free shaft end containing those parts being necessary for the oscillating lever drive. The oscillating lever is reciprocated by a suitable component part of the machine to be lubricated via an eccentric, a crank and rod, and at the same time, the worm wheel is always turned – regardless of the rotational direction of the driving shaft - in the same direction via the switch mechanism.

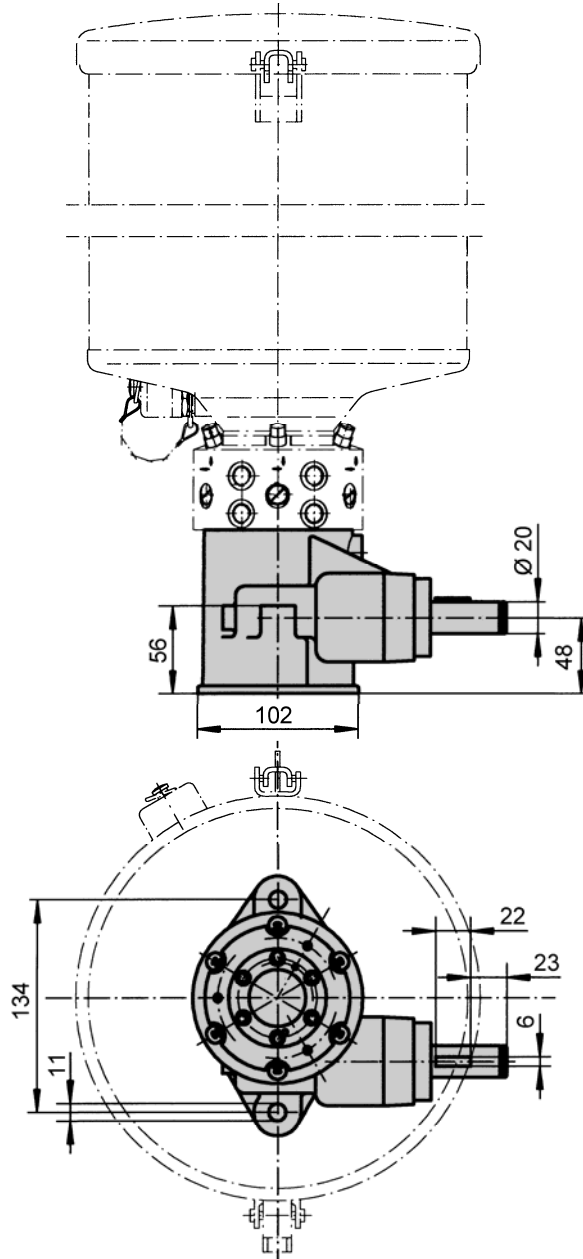


Drive with oscillating lever

D. KINDS OF DRIVE (continuation)

Drive with free shaft end

The assembly comprises the gearbox housing with the drive shaft and the worm wheel. The drive shaft is mounted in ball bearings. The plug screw is for filling the casing with oil. The plug screw is removed to facilitate the removal of the shaft with a mandrel.

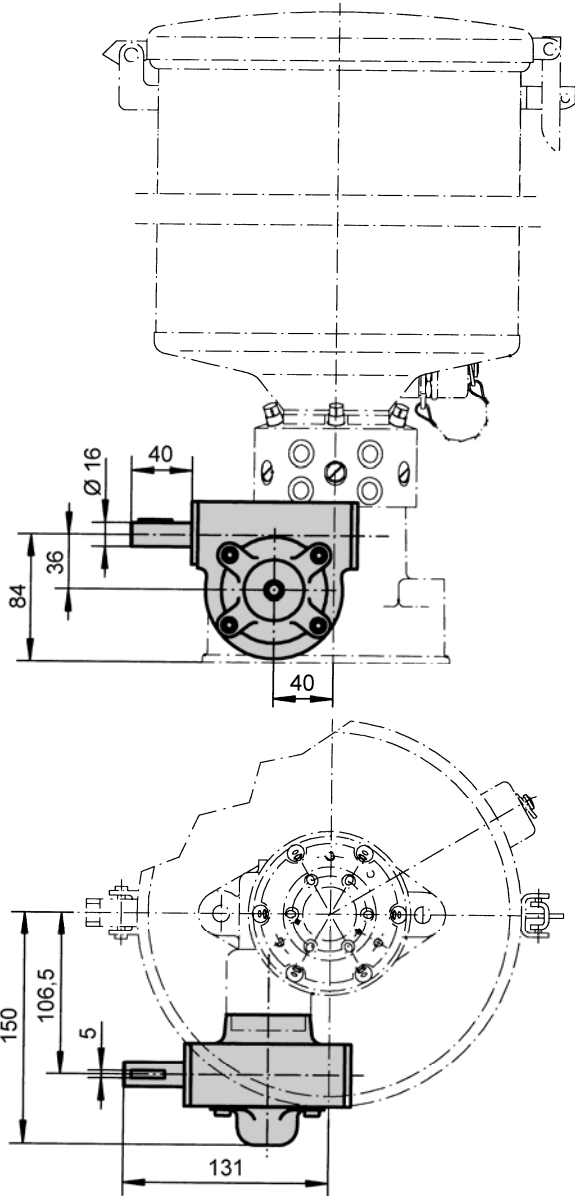


Rotary drive with free shaft end

D. KINDS OF DRIVE (continuation)

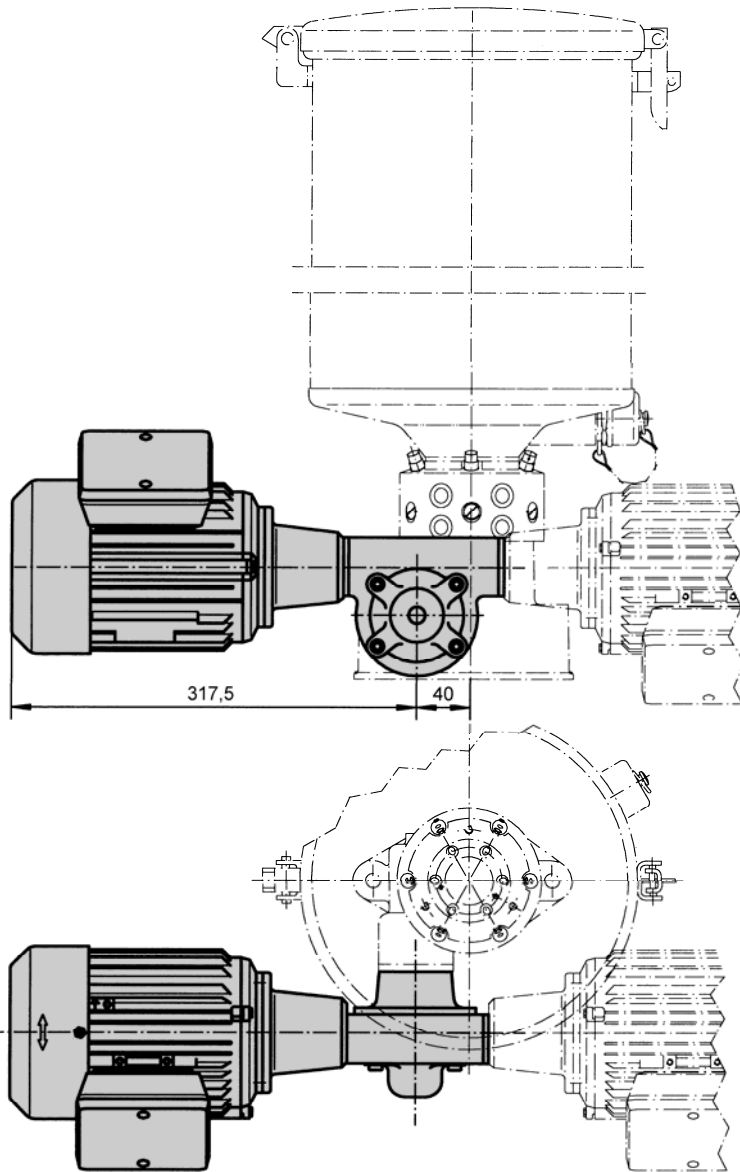
Drive with reduction gear or with reduction gear and motor

The assembly consists of the drive assembly with free shaft end, to which a second worm gear drive is added.



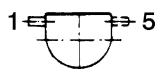
Drive with reduction gear

D. KINDS OF DRIVE (continuation)



Drive with reduction gear and motor

E. POSITION OF DRIVE

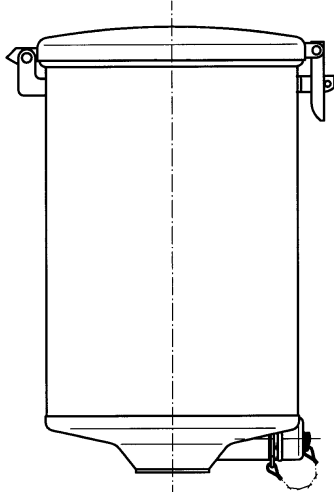


- Position 1 left
- Position 5 right
- without

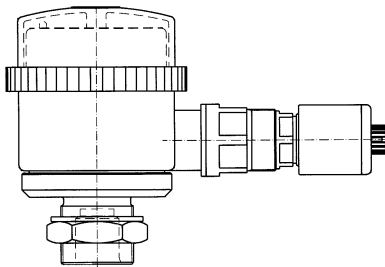
F. RESERVOIR

The lid can be hinged upwards. It can be secured against unauthorized opening by a padlock. The tank contains a feed unit consisting of a scraper for scraping the grease from the tank wall and a feed screw for slightly pressurising the grease in the pump inlet chamber.

A strainer is fitted in the bottom of the tank to protect the pump inlet chamber against dirt.

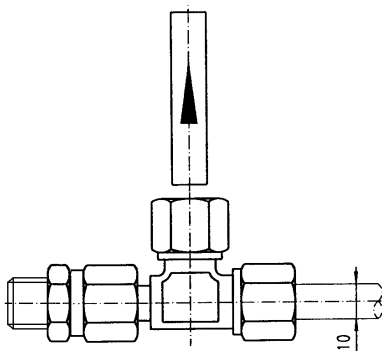


G. ACCESSORIES



Level switch

A level switch is available for the indication of the filling level in the reservoir. As sensor serves an ultrasonic sensor. As soon as the min. or max. level allowed has been obtained, a signal is released. With the help of a signal lamp at the reservoir, this signal can be used for the visual warning or for the control of an automatic filling facility. In case of receiving the order, we will attach particular operating instructions to the level switch with the following code: BA_2005_1_GB_76951_6011.



Pressure control

In case of receiving the order, we will attach particular operating instructions to the pressure control: PB_2005_1_GB_38132.

3. Application

The pump FZ-A is designed as a single-piston pump with up to 12 outlets. It is predominantly intended for multiline - centralized lubrication systems. The pump is usually driven by the flange motor or by the machine to be lubricated via an oscillating lever or a coupling.

4. Principle of operation (figures 1 and 2)

The top of the worm wheel (1) driven by a worm shaft is provided with 2 drivers with recesses in which a crosspiece (2) engages. In two other grooves of the crosspiece the drivers of the eccentric disk (3) engage and impart a rotary movement to the eccentric disk and the piston (4). The compression spring (5) located between the crosspiece and the eccentric disk presses the eccentric disk upwards. On its top surface the eccentric disk is provided with a cam which, due to its rotary movement, strikes the 6 setting spindles (6) arranged on the circumference of the pump and therefore forces the piston to perform one suction stroke each time.

The lubricant is supplied to the pump inlet chamber (S) by a feed unit.

The underside of the eccentric disk is provided with 6 cams. Due to the rotary movement the cams on the eccentric disk strike against a pressure cam (7), causing the piston to make a compression stroke each time. The piston has three vertical grooves (N), which terminate in an annular channel (R). On pumps with up to 12 (2 x 6) outlets the piston has two sets of three vertical grooves each terminating in an annular channel. During the suction stroke lubricant is drawn from the inlet chamber (S) into the vertical grooves of the piston and from there delivered into the annular channels (R). During the compression stroke the lubricant is delivered from the annular channel via a vertical groove into the pressure channel (D).

In continuous operation the pump can overcome a backpressure of 200 bar. Transient pressures of up to 250 bars are permitted. Safety valves can be installed in the discharge line as protection against overload.

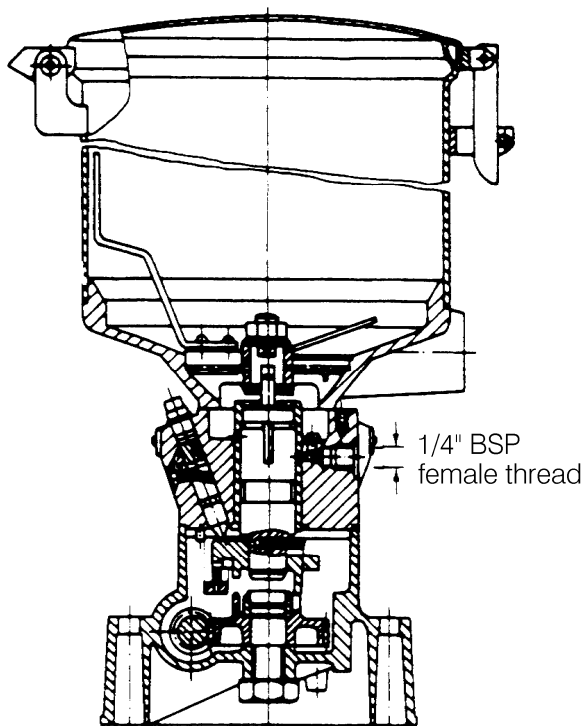


Fig. 1 Section through the pump FZ-A (6 outlets)

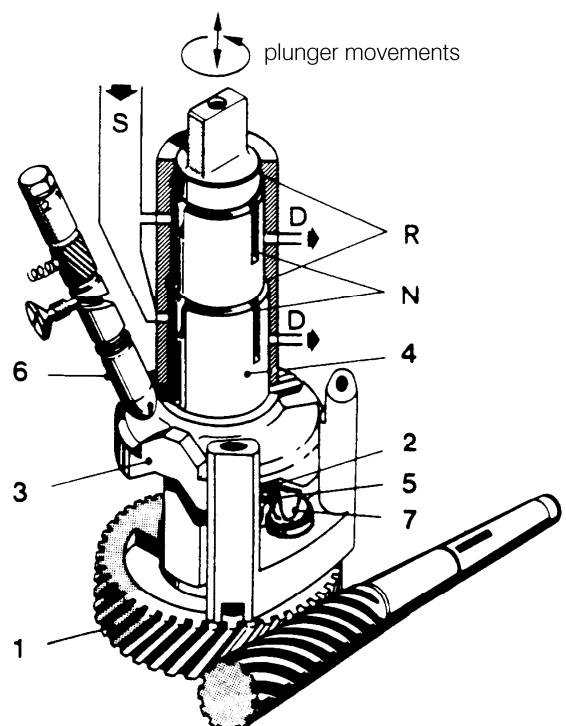


Fig. 2 Principle of operation (FZ-A, 12 outlets)

5. Rotational direction of drive

All pumps can be arranged for clockwise or anti-clockwise running, as required, with the same power and without modifications.

6. Specifications

Permissible back pressure: 200 bar
 for a short time: 250 bar

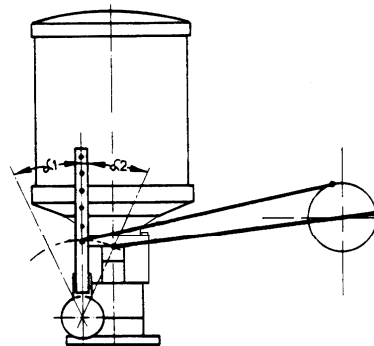
Permissible pump piston speed:

with running drive: max. 10 r.p.m.

with oscillating drive: max. 16 r.p.m.

Number of oscillating strokes: max. 300 min.⁻¹

In case that higher speed or less than < 1 is requested and also when distributors ZPA or E 4 are installed downstream, ask manufacturer.



In case of using the oscillating lever drive, the lever rod should be installed in such a way, that the amplitude of the oscillating lever is same in both directions $\alpha 1 = \alpha 2 = \max. 50^\circ$

Lever amplitude max. : 100°

Lever amplitude min. : 10°

7. Start-up

Installing and connecting the lubricating pump

The pump should be installed and mounted vertically. Connection of the motor to be control box must be carried out in accordance with the circuit diagram (paragraph concerning the direction of drive rotation to be observed).

Filling the lubricant tank and piping

All piping must be carefully cleaned before descaling and blowing through and filled with clean grease using a grease gun. For initial start-up, the grease tank is first filled up to the strainer with oil and then with grease, because otherwise a longer start-up time is required to allow venting. Before connecting the piping the pump must operate long enough at full capacity to ensure that the grease emerges evenly and without air from each outlet. Next, the piping should be connected (use sealing washers), until air-free grease emerges at the ends of the piping.

Once the bearings to be lubricated are also filled with grease, the piping can be connected to the lubricating points. The system can be started after adjustment of the required lubricant quantity.

Setting the delivery rate (figure 3)

At full capacity, corresponding to 0.1 cm³ lubricant per discharge and piston stroke, an arrow on the discharge identification points to the number 4 stamped on the head of the setting spindle (2.5). By turning the spindle clockwise the delivery is reduced. Reduction below 1/4 of the max. delivery (setting 1) should be avoided. In case of pumps having 7 to 12 outlets, the delivery rate of two vertically arranged outlets is adjusted by means of an adjusting spindle. The second arrow of the discharge identification points to the outlet bore relating to the setting spindle.

By changing the drive speed or the internal gear ratio of the pump or also by changing the altitude of the oscillating lever, the output volume of all outlets and thus the overall output volume is changed.

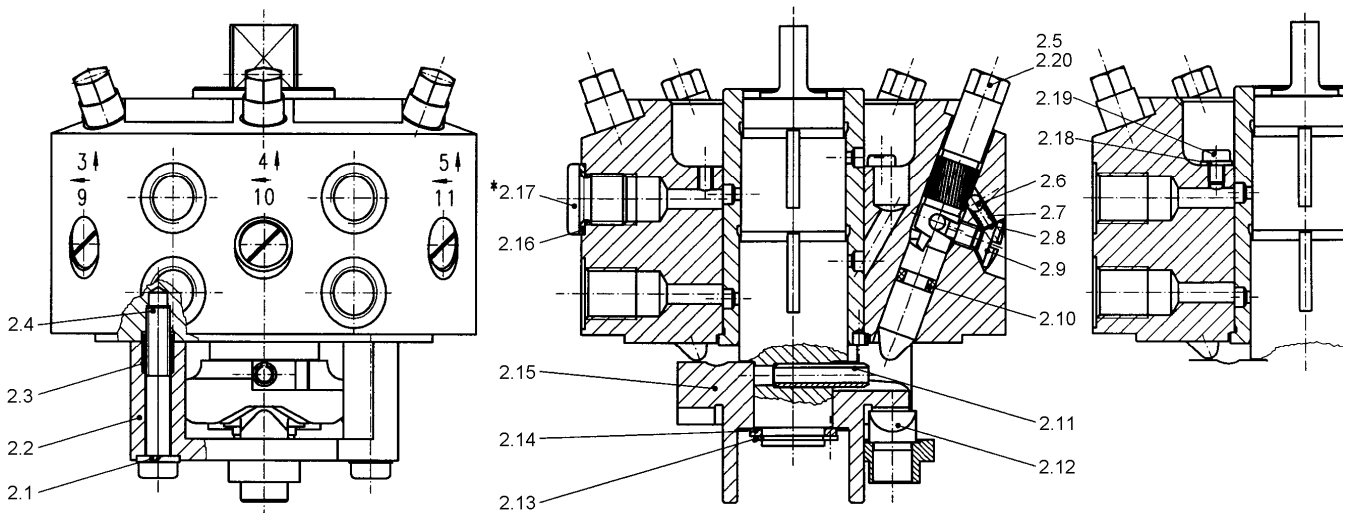


Figure 3 Pump body FZ-A

* In case that the outlet bores are closed by item no. 2.17, item nos. 2.18 and 2.19 are to be removed from the pertaining relieving bores.

8. Maintenance

Filling the grease tank

As soon as approximately 3/4 of the tank capacity are consumed, the grease tank should be refilled. The grease level should never drop to a level where the feed screw is visible, because air may otherwise penetrate into the piping. During filling, care should be taken to ensure that only clean grease is used and no dirt penetrates into the tank when the cover is opened, because this may result in malfunctioning. Filling via a filling valve and firmly installed pipelines is at all events to be preferred.

Changing the number of outlets (figure 3)

The pump is supplied with the required number of outlets in accordance with the order. If other operating conditions should arise, i.e. if outlets have to be blanked off or opened, the following procedure should be followed.

An outlet is blanked off by connecting the pressure channel to the pump inlet chamber. For this purpose the top discharge channels are joined to the pump inlet chamber by threaded connections. To blank off an upper outlet, the tank is removed and the cap screw M 4 x 6 (2.19) is removed from its threaded hole. When opening a blanked-off outlet, the cap screw should be screwed in, taking care to ensure good tightness by means of the sealing A 4 x 8 (2.18). Generally the associated outlet is either closed by means of a screw plug (2.17) or opened by removing the plug.

If it deals with pumps having two vertically arranged outlets, and the lower outlet shall also be shut down, you have to remove the setting spindle (2.5), the ball (2.6) and the compression spring (2.7). Before taking out the spindle, unscrew the shank screw (2.9). After this, insert the plug (2.20) in the bore of the setting spindle. For a later installation of the setting spindle, successively insert – after having unscrewed the shank screw (2.9) with sealing ring (2.8) – the ball and the compression spring. The locating screw brings spring and ball into the correct position as far as the shank meshes analogously with the spiral groove of the setting spindle on the occasion of the screwing-in process which now follows. Advantageously, you should use a new sealing ring and lubricate both ball and spring prior to inserting them.

When two outlets, which are arranged one upon the other, are shut down for a short time, the setting spindle is to be set to 0, and the outlets must not be closed. Use plastic plugs instead of screw plugs (2.17) to allow accidentally occurring delivery rates to escape and to thus avoid overpressure.



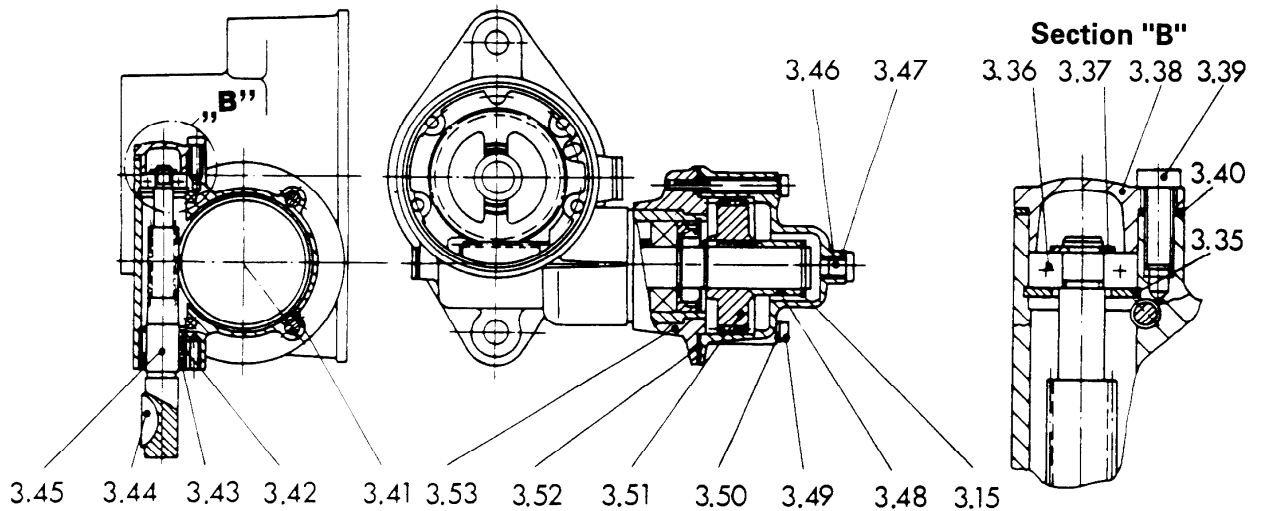
ATTENTION!

If the number of outlets is modified improperly, damage to the pump cannot be avoided.

8. Maintenance (continuation)

Removal of the drive shaft (see figure)

After removing the spring washer (3.11) and the cap, the circlip (3.13) should be removed. After loosening the plug (3.20) the drive shaft (3.12) including the roller bearings (3.17) and the sleeve (3.16) can be driven out using a copper dowel and a hammer.



Gearboxes:

The gearboxes are filled with lubricant type grease, Gearmaster LX00 (Messrs. Lubritech) or something comparable by the manufacturer. The filling should only be renewed when the gearbox is dismantled and cleaned.

Filling plugs:

Main gearbox 3.9
Reduction gear 3.20

9. Plates

Name plate 110 x 60 mm (75511-1531)



Type plate 110 x 60 mm (75511-1321)

