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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.

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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 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.

- 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. Safety (continuation)

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 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).

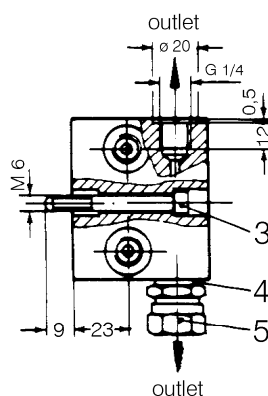
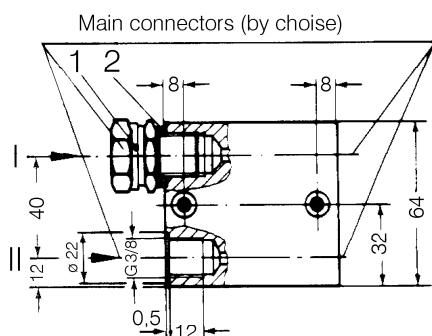
GENERAL PRODUCT CHARACTERISTICS

- Dual-line manifold block
- Grease and oil
- up to 8 outlets
- Metered volume: 0.5 / 1.5 / 3.0 cm³
- Material: maching steel

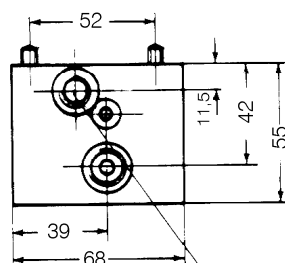
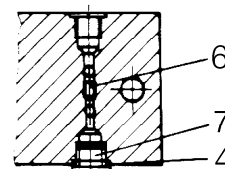
A. DISTRIBUTOR TYPE ZVB

B. NUMBER OF OUTLETS

1 – 8 outlets are possible

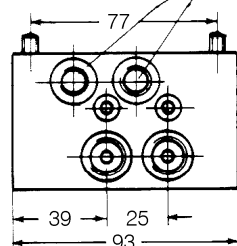


Where two facing outlets shall be cross-ported or separated, the set screw (6) and the screw plug (7) must removed or fitted.

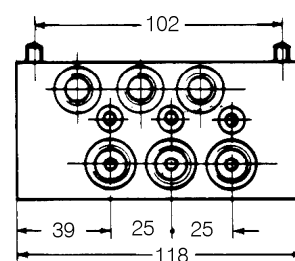


Distributor with 1 or 2 outlets

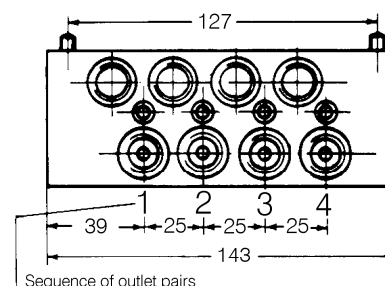
Connexion for metering volume adjustment



Distributor with 3 or 4 outlets



Distributor with 5 or 6 outlets



Distributor with 7 or 8 outlets

C. REVISION

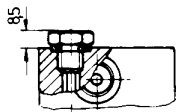
Status A

D. METERED VOLUME

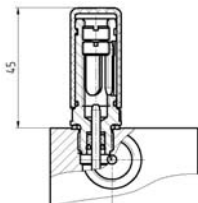
Metered volume: 0.5 / 1.5 / 3.0 cm³

Where no later variation of the metering quantity is requested the length of stroke is limited by a metering screw. That effects, that the piston displaces the same quantity with every stroke. Where an adjusting device is requested, instead of the metering screw, the length of stroke and consequently the metering quantity can be changed. The minimum quantity amounts app. 1/4 of the max. quantity.

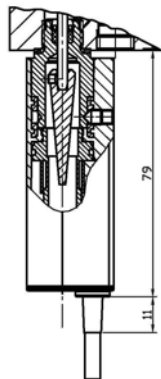
E. METERING



Metering screw 1/1 for 1 and 2 outlets
Metering screw 1/1 for 3 and 4 outlets
Metering screw 1/1 for 5 and 6 outlets
Metering screw 1/1 for 7 and 8 outlets



Adjusting device with motion indicator for 1 and 2 outlets
Adjusting device with motion indicator for 3 and 4 outlets
Adjusting device with motion indicator for 5 and 6 outlets
Adjusting device with motion indicator for 7 and 8 outlets



Metering screw 1/1 & sensor for 1 and 2 outlets
Metering screw 1/1 & sensor for 3 and 4 outlets
Metering screw 1/1 & sensor for 5 and 6 outlets
Metering screw 1/1 & sensor for 7 and 8 outlets
Adjusting device with motion indicator & sensor for 1 and 2 outlets
Adjusting device with motion indicator & sensor for 3 and 4 outlets
Adjusting device with motion indicator & sensor for 5 and 6 outlets
Adjusting device with motion indicator & sensor for 7 and 8 outlets

F. ACCESSORIES

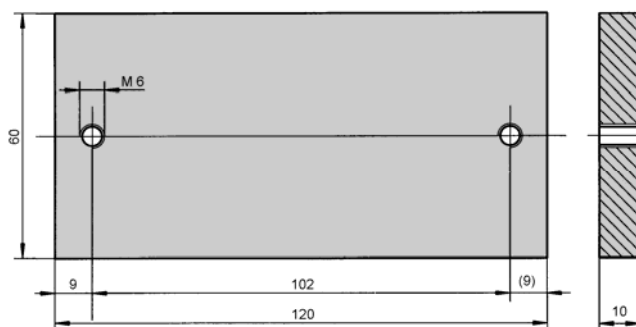
without

Weld-on plate as per SMS standard for 1 and 2 outlets incl. fixing screws

Weld-on plate as per SMS standard for 3 and 5 outlets incl. fixing screws

Weld-on plate as per SMS standard for 5 and 6 outlets incl. fixing screws

Weld-on plate as per SMS standard for 7 and 8 outlets incl. fixing screws



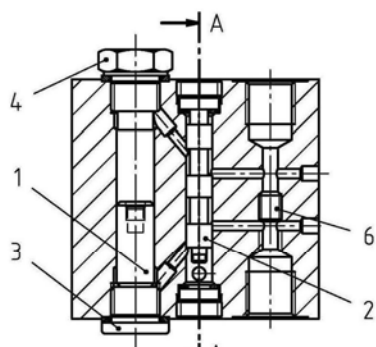
Example for distributor with 6 outlets

3. Application

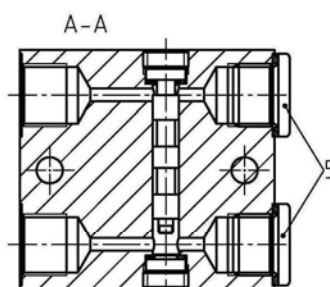
The distributors ZV-B are used for dual-line central lubrication systems for grease and for oil. Their function is to meter the lubricant and to press it through the lines to the lubrication points independently of back pressure.

4. Design

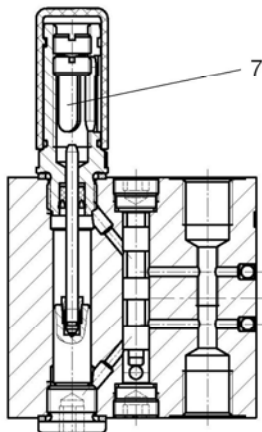
The distributors ZV-B are block type designed, and constructed in different metering volumes. Each distributor has two threaded holes G 3/8 on each of its two faces for the optional connection of the two main lines. For the connection of the friction point lines, the distributor has two to eight threaded holes G 1/4. The distributor does not have springs and works hydraulically, operated by the lubricant.



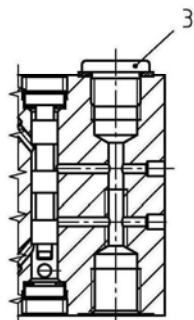
Distributor basic shape with metering screw code No. 1



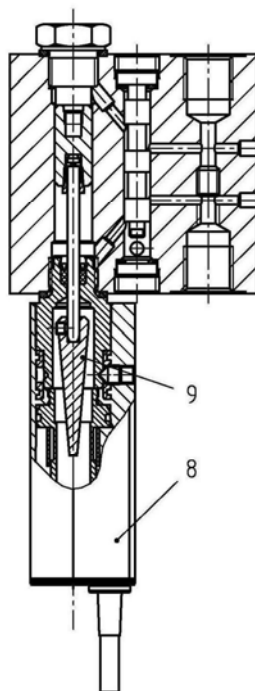
View of the main connections:
connection optional right hand or
left hand unused connections with
plug screw G 3/8 (5)



Distributor adjusting device /
motion indicator (7)



Combining of two facing outlets by
removing of the headless screw (6)
and insertion of a plug screw G 1/4
with gasket (3)



Distributor with metering screw 1 and
inductive metering monitoring (8, 9);
Monitoring can also be combined with
adjusting device / motion indicator (7)

4. Design (continuation)

Distributor configurations

- Basic shape with metering screw (4) code No. 1, feeds the nominal metering volume per stroke
- Distributor adjusting device / motion indicator (7), for continuously variable output between 100% (nominal volume) and 25% (lowest volume) by means of an adjustable stopper
- Distributor with inductive metering monitoring; the sensor (8) detects the piston's (1) position by means of a damping cone (9) and produces an analogical signal (4 ... 20mA)

Distributor with odd number of outlets

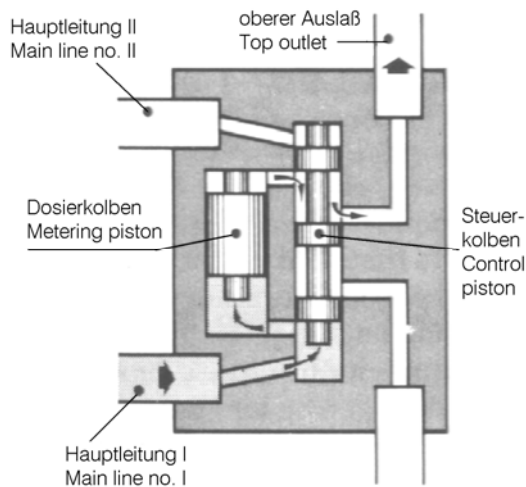
Where 1, 3, 5 or 7 lubrication points are connected to a distributor the headless screw (6) located between two facing outlets is removed by the manufacturer, and the unused outlets is sealed off by G 1/4 screw plug (3). As a result, the connected lubrication point is feed lubricant from both strokes of the metering piston (i.e. double the quantity).

When one more lubrication outlet shall fall out, do as described above.

5. Principle of operation

The distributor ZV-B has one metering piston (1) and one control piston (2) for every two lubrication points, connected. Depending on either main line no. I or main line no. II is pressurized, where the second main line must be relieved of pressure, only that lubrication point will be served which is associated with the main line concerned. As a result, an operating cycle always, includes two lubricating strokes.

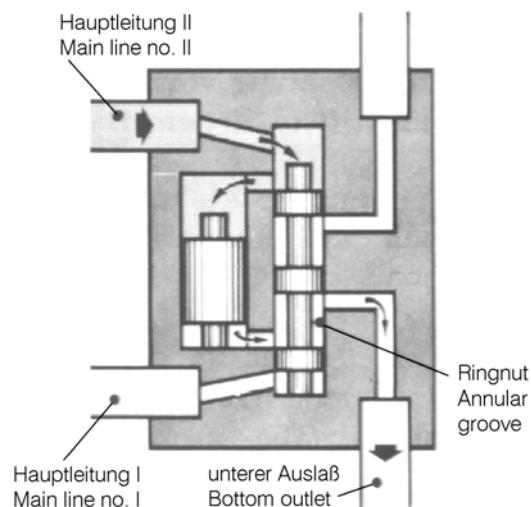
Stroke no. 1



During the lubrication pause both pistons (1 and 2) are located at their bottom terminal positions. As soon as main line no. I is pressurized while main line no. II is relieved the control piston (2) will move upwards first, and then the metering piston (1), so that the lubricant displaced by the metering piston (1) is pressed via the annular grooves in the control piston (2) to the top outlet. The lubricant displaced by the control piston (2) is passed into the relieved main line no. II.

5. Principle of operation (continuation)

Stroke no. 2



For lubrication stroke no. 2 the main line no. II is pressurized and the main line no. I relieved so that first the control piston (2) and then the metering piston (1) is moved, forcing the lubricant, displaced by the metering piston (1), out through the bottom outlet. The pressure in the lubrication point is equivalent to the pump's delivery pressure less the pressure drop caused by main line and distributor.

The pressure difference between the two main lines should be 50 bar at least, to obtain a sufficient control force for the control piston (2).

6. Specification

Operating pressure max.:	400 bar
Actuating pressure min.:	10 bar
Metering volume:	0.5; 1.5 or 3.0 cm ³
Actuating volume:	0.3 cm ³
Number of outlets:	1 to 8
Temperature range (Distributor with electrical monitoring) :	- 20° C to + 70° C
Temperature range (Distributor without electrical monitoring incl. protection cap) :	- 20° C to + 120° C
Suitable lubricants :	
Grease lubricants on mineral oil basis	up to NLGI-class 3 DIN 51818
Oil lubricants:	ISO VG 68 to 1500 (DIN 51519) as service viscosity 190 mm ² /s
Synthetic lubricants	at request

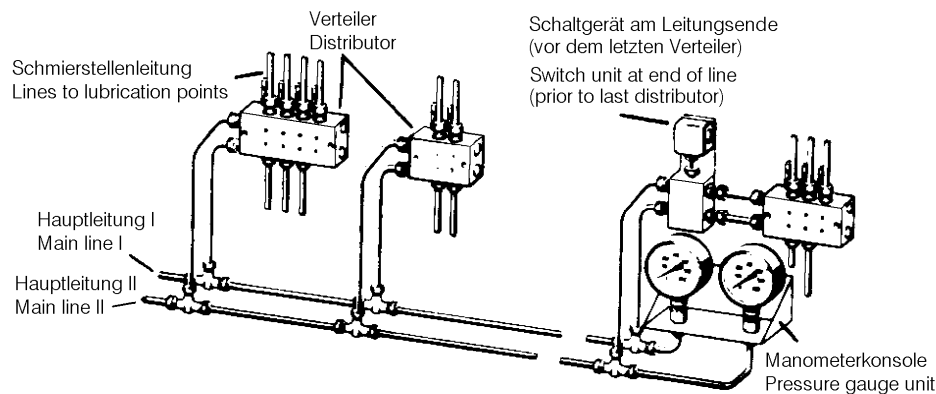


Pressurization of the distributors with more than 400 bar means danger to life and limb of persons.

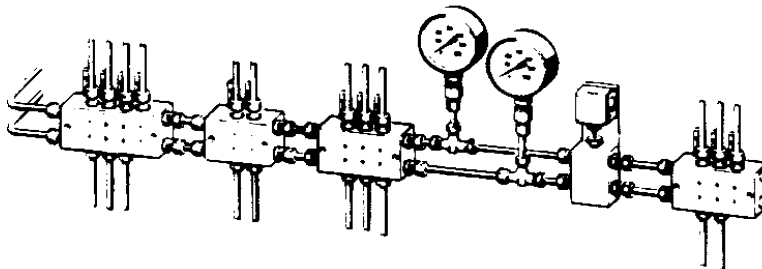
Specifications for inductive sensor see data sheet: 66925S001_2006_1_D-GB.

7. Installation

The distributors ZVB can be installed in any position described. With a view to possible removal of a distributor, however, they should be installed so that their will not be impede.



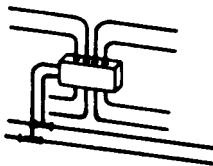
Connecting the distributors to the two main lines via feed lines (parallel arrangement)



Series arrangement of distributors.

Installation cost is lower than for the parallel arrangement. However, due to the pressure drop within these distributors this configuration is limited to smaller system. For larger systems a combined parallel-series arrangement is preferred.

In order to ensure that the lines to the distributor points can be removed at any time it is best to locate the tubing at an angle 90° from the distributors to the lubrication points, or to use banjo fittings.



Arrangement of lines to lubrication points to ensure ease of disassembly.

Two plug screws (5) are fitted to each distributor which are used to close the unused main line connctions. The plug screw (5) can be used on the right-hand of lefthand side, depending on the installation of the distributor concerned, or they can be removed when distributors are installed in series.

When larger quantities of dirt are generated at the installation site it is best to install the distribuotr so that the adjusting device are on the undersides. This will prevent excessive dirt accumulation on the adjusting device

For mounting distributors, without terminal switches the following screws are required: cheese-head screws M 6 x 50 DIN 7984.

In order to keep the grease circulating, even at the end of the main lines, there must be installed a distributor behind the terminal switch. This also will avoid function failures because of grease-hardening, grease-aging, or oil-separation from the grease and the saponification, resulting of this.

8. Start-up

Where distributors are fitted with a metering screw (4), their output rate is not adjustable. It can be changed only, by choosing different metering screws (on request).

Where an adjusting device with motion indicator is installed, the output rate can be adapted to the requirements.

One turn = app. 0.12 cm³; reducing the output rate below 1/4 of maximum rate is inadmissible.

Subsequent connecting of two facing outlets

Subsequently fall out of one lubrication point needs to remove the headless screw (6) between two facing outlets and to plug one outlet with a plug screw (3). The remaining outlet gets now the double metering volume.

9. Maintenance

All distributors parts exeption of the control pistons (2), metering pistons (1) and housing are exchangeable and can be ordered individually and/or replaced in-house.

New pistons (1 and 2) can be replaced at the manufacturer's works only.

Maximum cleanliness should be ensured during assembly, because any dirt particles entering the distributors can cause malfunctions and damage.

10. Plates

Type plate 26 x 52mm (75511-1311)

