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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)

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### **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).

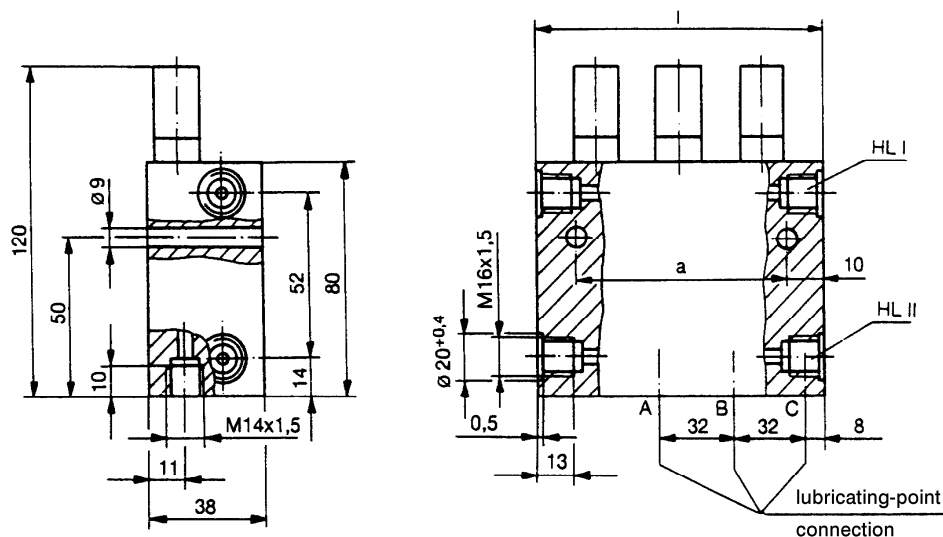
## GENERAL PRODUCT CHARACTERISTICS

- Dual-line manifold block
- Grease and oil
- up to 4 outlets
- Metered volume continuously adjustable from 0.4 to 2.0 cm<sup>3</sup> per half cycle

### A. DISTRIBUTOR TYPE PAG

### B. NUMBER OF OUTLETS

1 – 4 outlets are possible.



	Outlets			
	1	2	3	4
Length l	48	80	112	144
a	28	60	92	124

### C. INSPECTION

Stage A

### D. METERED VOLUME

Metered volume: 2.0 cm<sup>3</sup>

### E. MONITORING DEVICE

The metering valves are equipped with optical control unit which can be replaced by electric control unit.

### 3. Application

The distributors type PAG are used as lubricant manifolds in dual-line central systems. Due to their sturdy construction and long service life, they are predominantly applied upon servicing and extending already existing systems with "PAG distributors". The task of the distributors PAG consists in proportioning metered quantities of lubricant to the lubrication points.

The distributors are conceived in building-block design. One control and metering piston each is allocated to every lubricating point (4 maximum). The housing block also accommodates the connections for main lines and lubricating points and has fastening holes. Actuation is effected by alternate pressurization of main lines I and II. Complete metering of all metering points of valve is finished after pressurizing main lines I and II.

### 4. Design

#### Pressure pulse in main line I (HL I)

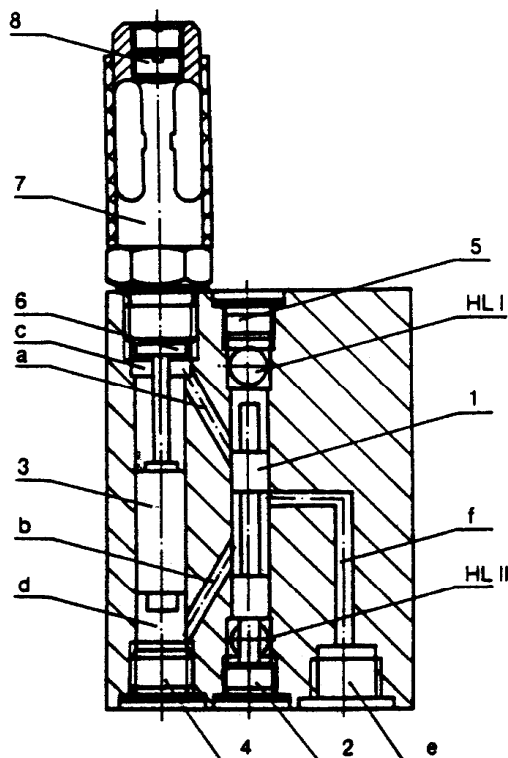
If main line I (HL I) is being pressurized, the lubricant will move the control piston (1) towards closure end plug (2). The lubricant is then led through channel (a) into chamber (c) pressing the metering piston (3) towards closure end plug (4). Lubricant provided in chamber (d) is delivered through channels (b) and (f) to the connection of lubricating point (e).

#### Pressure pulse in main line II (HL II)

If main line II (HL II) is being pressurized, the lubricant will move the control piston towards closure end plug (5). The lubricant is then led through channel (b) into chamber (d) pressing the metering piston against the stop (6). Lubricant provided in chamber (a) is delivered through channels (a) and (f) to the connection of lubricating point (e).

A piston rod is fastened for optical control of functionality to the metering piston signalling the piston motions of control unit (7) due to alternate moving-in and moving-out motions. The optical control unit included in standard outfit simultaneously serves for infinite variation of metered quantity via threaded pins (8). Thus, the stroke of metering piston is restricted.

Upon dispatch of metering valves, the metered quantity is set to maximum. Fastening of metering valves is ensured via welded plates.



## 5. Specification

Rated pressure: .....	400 bar
Operation pressure max.: .....	500 bar
Pickup pressure: .....	40 bar
Metered volume / lubricating-point connection: .....	0,4 ... 2 cm <sup>3</sup> continuously adjustable
Installation position: .....	optional
Number of outlets: .....	1 to 4
Temperature range: .....	- 30° C to + 80° C
Consistency index: .....	NLGI class 000 to 3, DIN 51818
Weights:	
PAG 41 .....	1.0 kg
PAG 42 .....	1.7 kg
PAG 43 .....	2.4 kg
PAG 44 .....	3.1 kg

## 6. Start-up

### Continuous adjustment of metered volume

The reduction of the metered volume should preferably be made prior to the installation of the distributors. The following working processes are necessary:

- Removal of headless pin (8) from the visual control facility
- Adjustment of the stroke of the piston rod to the desired value by means of the second ring follower. (The stroke of the piston rod up the turned groove corresponds to a metered volume of 1 cm<sup>3</sup>).
- Locking of this adjustment by means of the headless pin, which has been removed before.

If it is necessary to change the metered volume at the installed distributor, perform the above described working processes after having switched off the centralized lubrication pump and take care that the piston rod is fully retracted.

For the installation of the electric control facility, please refer to the particular installation instructions.

**At the version with electric control facility it is not possible to regulate the metered volume.**

## 7. Installation

Install distributors in such a way that the distances between lubrication point and distributor are as short as possible, that the control of the indicator pin is possible and that the distributors are not twisted during installation (sticking of the metering and pilot pistons).

It is possible to connect several distributors at the connection point of the main lines with the help of short pipe pieces. In this case, one can possibly do without individual fixing screws. For screwing down the distributors, it is essential for the realization of the wall distance being required for the screw fitting to use shim rings and/or weld plates.

For the sealing of the screw fittings, which are required for the connection of the lubrication point lines, the use of distance rings is necessary.

### ATTENTION!

Fastening torque for inlet fittings (M 16 x 1,5): max. 70 Nm

Fastening torque for outlet fittings (M 14 x 1,5): max. 35 Nm

## 8. Wartung

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The distributors are maintenance-free. It is not possible to exchange the metering or pilot pistons. In case of leakages at the external seal points, replace sealing elements. When the control facility is defective, replace the same as assembly group. Such a replacement is made as follows:

- Switch off grease pump when indicator pin is fully extended.
- Pressure relief of centralized lubrication system.
- Dismount control facility from distributor and take it off together with the metering piston.
- Separate control facility from metering piston by removing connecting element between indicator pin and metering piston.
- Connect new control facility with the dismounted metering piston and refix control facility with metering piston to the distributor.

Cleanliness is a very important factor for the above mentioned works.

## 9. Plates

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### Type plate





Type

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