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## 1. General

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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

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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-W9, warning about a danger spot ,

in case of warning about electric voltage with



safety sign according to DIN 4844-W8, 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 4844-2, W28, warning about skid risk.

## 2. Safety (continuation)

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### 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-G1 – Use breathing mask)

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



(DIN 4844-G4 – 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

#### Guidelines

1. Machines 98/37/EG
2. Low voltage 73/23/EWG
3. EMV 89/336/EWG

#### Standards

EN Reference	ISO Reference	acc. to guideline
• DIN EN 982, 9.96	(ISO 4413, 8.98)	(1.)
• DIN EN 983, 9.96	(ISO 4414, 8.98)	(1.)
• DIN EN 1050, 1.97	(ISO 14121, 2.99)	(1.)
• DIN EN ISO 1200-1 and -2, 4.04		(1.)
• DIN EN 60204-1, 11.98	(IEC 60204-1, 5.00)	(2.)
• DIN EN 60947-5-1, 2.05	(IEC I 60947-5-1, 11.03)	(2.)
• DIN EN 61000-6-2, 8.02	(IEC 61000-6-2, 1.05)	(3.)
• DIN EN 61000-6-3, 8.02	(IEC 61000-6-3, 1.05)	(3.)
• DIN EN 61000-6-4, 8.02	(IEC 61000-6-4, 1.05)	(3.)

### 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 AltöV (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

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- Function 4/2-way
- Hydraulically controlled
- Working pressure adjustable up to 250 bar or up to 350 bar
- Motion indicator

### A. VALVE TYPE SAK

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### B. WORKING PRESSURE

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250 bar  
350 bar

### C. INSPECTION

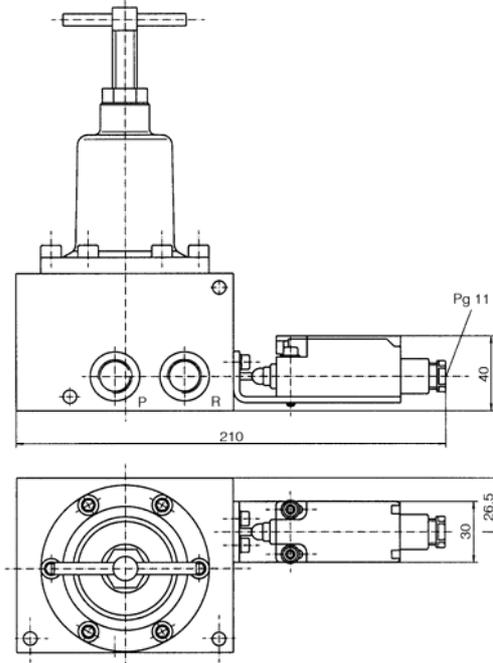
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Stage A

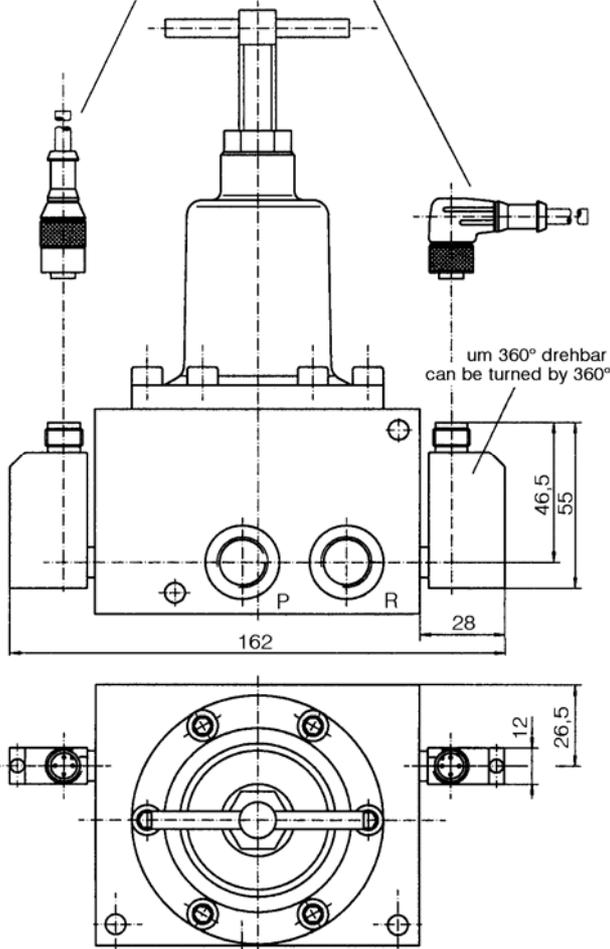
**D. MONITORING**

without

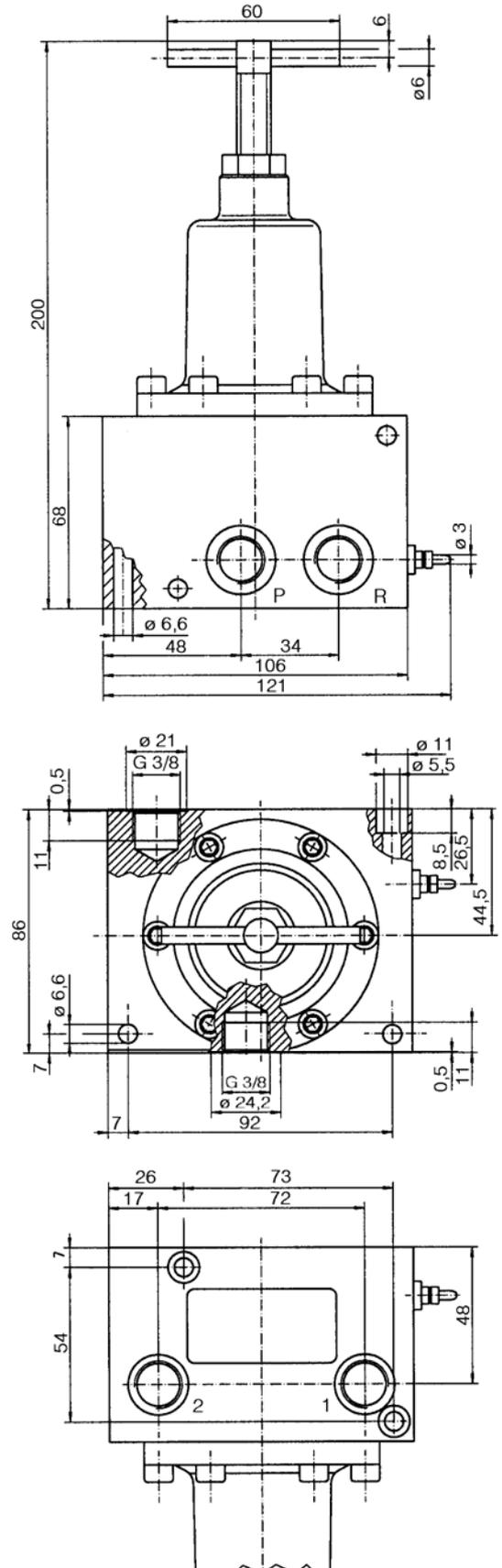
Limit switch



Version with 2 monitoring switches  
Stecker gehören nicht zum Lieferumfang  
Plugs do not belong to the extent of supply

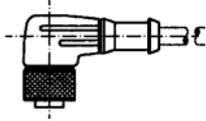


Version with motion indicator



## E. ACCESSORIES

without  
 Connection cable 10 m with angle switch



## 3. Application

As a hydraulic change-over valve for

- dual-line central lubrication systems
- single-line central lubrication systems

The design of the 4/2-way valve ensures a permanent exchange of the lubricant in all channels of the appliance. This is to avoid operating troubles resulting from an ageing and hardening of the lubricant, which are due to oil separations from the grease and to the resulting soap concentration.

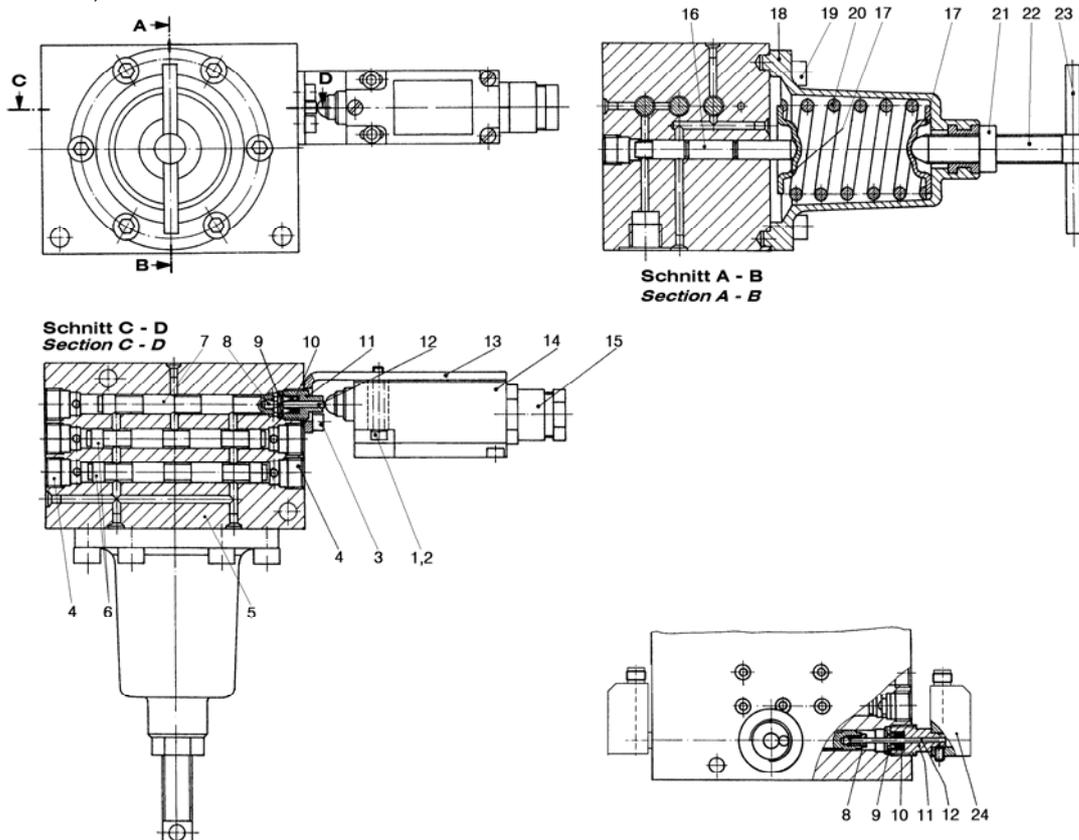
## 4. Principle of operation

Every time there is a pressure rise at the connection P, the 4/2-way valve causes an automatic change-over from one to the other of the two main delivery lines which are connected to the two connections 1 and 2, i.e. the two main delivery lines are pressurized alternately. When one main delivery line is pressurized, the other is connected to the R connection.

The change-over pressure is adjustable up to maximum of 250 and/or 350 bars by means of a pressure relief valve. It is necessary to ensure that the change-over pressure does not exceed the max. delivery pressure of the lubrication pump being used. An electrical limit switch reports the positions which the 4/2-way valve is set and enables the pump to be switched off on completion of the lubrication operation.

On single-line systems the connection 2 has to be closed by means of a plug screw. The valve then operates as a 3/2-way valve.

During the pressurizing phases there is a free passage from connection P to connection 1; during the intervals, from connection 1 to connection R.



## 5. Specification

### 4/2-way valve

Working pressure max.: ..... adjustable up to 250 bar or up to 350 bar  
 Change-over pressure: ..... adjustable 20 – 250 bar or 200 – 350 bar (according to version)  
 set to: ..... 150 bar or 200 bar (according to version)  
 Pipe connection: ..... 3/8 BSP female thread  
 Service temperature: ..... - 20° C up to + 80° C  
 Type of lubricants:  
 Grease up to penetration ..... NLGI-class 3 DIN 51818  
 Oils starting with viscosity of ..... 45 mm<sup>2</sup>s<sup>-1</sup>  
 Position of installation: ..... optional  
 Weight: ..... 4.4 kg

### Limit switch

Power supply max.: ..... 240 V  
 Switching current max.: ..... 10 A  
 Protection system: ..... IP 65  
 Switching symbol: 

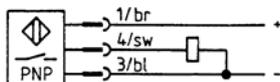
### Monitoring switch

Operating voltage: ..... 10 ... 30 V DC  
 Output current: ..... max. 200 mA  
 Switching function: ..... N/C (normally open)  
 Switching frequency: ..... max. 1000 Hz  
 Temperature range: ..... - 25° C to + 80° C

### Feed lines:

proof against wrong poling: ..... yes  
 shortcircuit proof: ..... no  
 Protection system: ..... IP 65 (in plugged condition)

### Connection diagram:

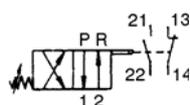


### Switching symbol

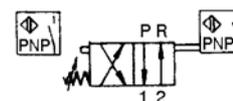
SA-K with motion indicator



SA-K with limit switch



SA-K with 2 monitoring switches



## 6. Maintenance

If the change-over in the 4/2-way valve does not occur, although the pump builds up the necessary pressure, check whether the change-over pressure in the 4/2-way valve has been set higher than the pressure at which the pressure relief valve in the pump opens.

If that is not the case, disconnect and remove the 4/2-way valve and disassemble it into its separate parts.

Wash all parts in benzine or paraffin, check them, oil them and reassemble them in the correct order after changing all the damaged parts and the sealings.

## 7. Plates

Type plate 26 x 52mm (75511-1311)



## Manufacturer's declaration

This manufacturer's declaration as to the fulfilment of the requirements according to the

- **EC machine guideline 98/37/EG**

is only valid in connection with the installation/operating instructions and the relating data sheet, both being valid for the product.

We,

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hereby declare on our sole responsibility that all products supplied by us and being relevant to guidelines and which this declaration refers to, conform to the mentioned standards and that they, if necessary, were released by a competent authority.

Applied, harmonized standards:
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See valid installation/operating instructions with relating data sheet
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We declare that this consignment comprises an incomplete machine and that the commissioning of the same remains prohibited until it has been determined that the machine into which the machine in question shall be installed, complies with the above mentioned regulations.

January 12, 2005		
Datum	ppa. Doris Dietzel Plant Manager	i.V. Andreas Wons Direktor Entwicklung & Konstruktion