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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, 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)

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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 – 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

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- Progressive group-lubrication distributor
- Control via solenoid valve
- up to 24 outlets
- electronic monitoring possible
- Metered volume variable from 0.1 cm<sup>3</sup>
- Lubricants: Grease, liquid grease and oil

### A. DISTRIBUTOR TYPE ZAG

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### B. NUMBER OF SEGMENTS

---

- 3 segments
- 4 segments
- 5 segments
- 6 segments
- 7 segments
- 8 segments
- 9 segments
- 10 segments
- 11 segments
- 12 segments

### C. INSPECTION

---

Stage A

### D. MONITORING

---

with non-return valve, with motion indicator  
with non-return valve, with monitoring switch

### E. THROTTLE INSERT

---

Low effect  
High effect

### F. SOLENOID VALVE

---

Version 24 V DC

### G. CODING OF THE OUTLETS

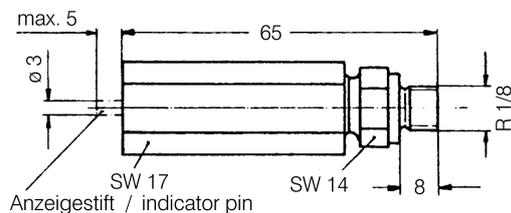
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A segment  
M segment  
E or M segment

### H. ACCESSORIES

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without  
Overpressure indicator 70 or 100 bar



## 3. Application

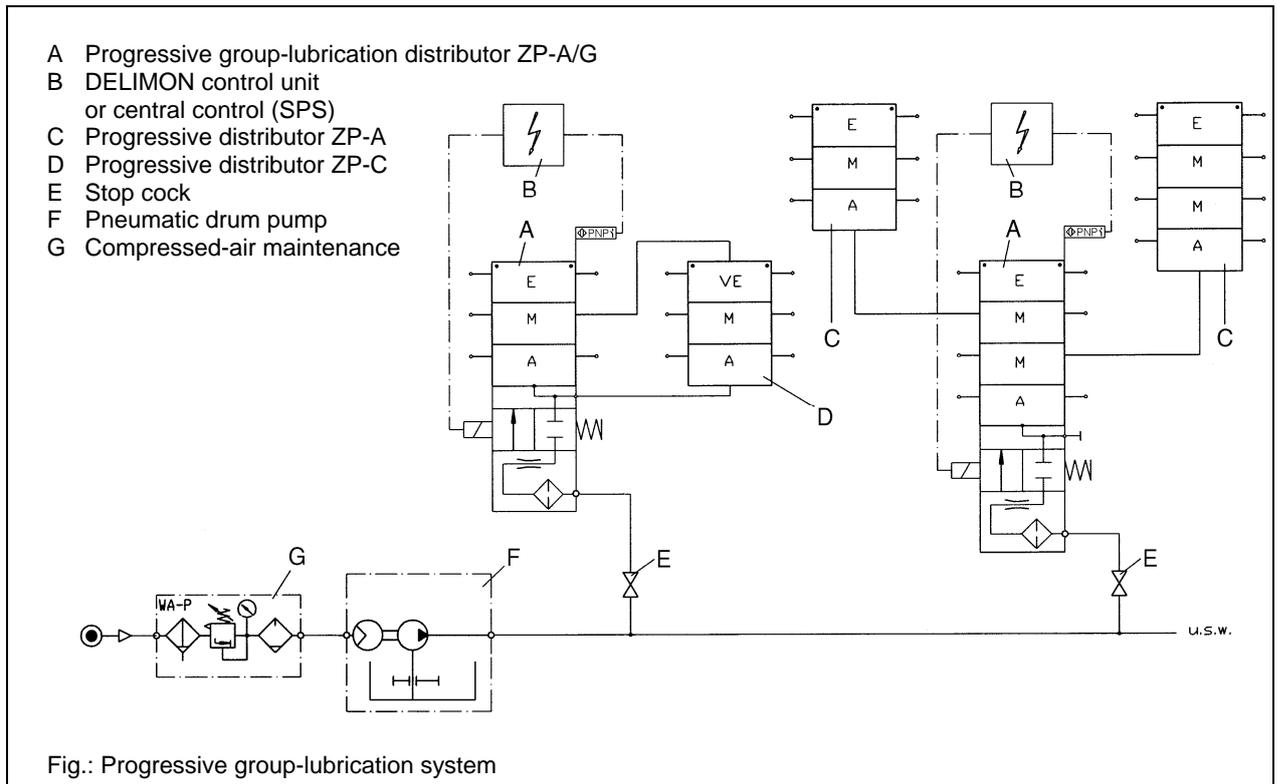
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Progressive group-lubrication distributors ZP-A/G are used in group lubrication systems where a lot of machines or plants, which are either of the same kind or similar to each other and erected in a hall, have to be supplied with lubricant individually and program-controlled.

The progressive group-lubrication distributor ZP-A/G has the task to control, filter, restrict and monitor the lubricant flow as main distributor in plants with a feed line being permanently under pressure. The lubricant is supplied to the lubrication points either directly or via further downstream connected progressive distributors (ZP-A or ZP-C).

Every use beyond this sector is considered to be not in accordance with the intended purpose of the product. The manufacturer is not to be held responsible for any damages which might result from such an improper use. The risk for this runs the user only.

#### 4. System scheme



#### 5. Design

The progressive group-lubrication distributor ZP-A/G is a compact unit consisting of:

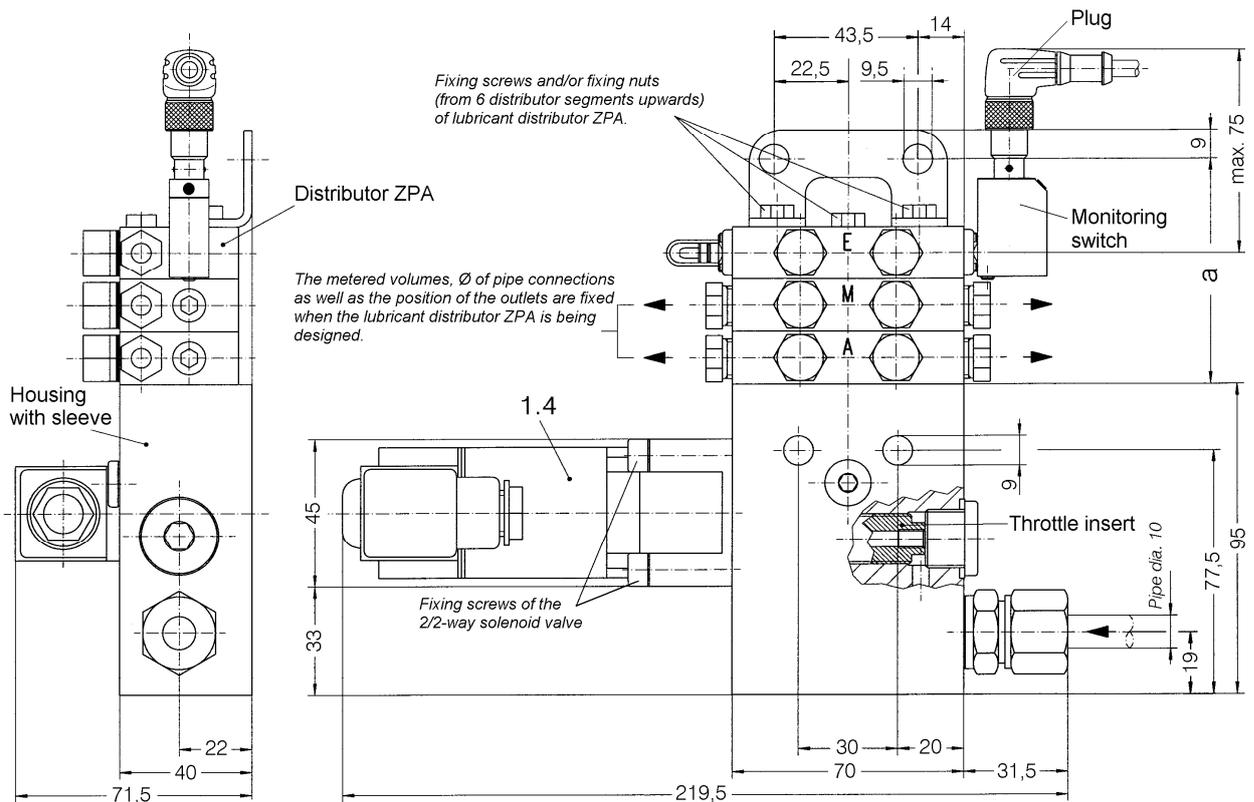
- Housing with mounted 2/2-way solenoid valve (NC), integrated filter and throttle insert.

Progressive distributors consist of several (in standard version of at least 3) individual segments, which are screwed with each other and sealed against each other, with integrated nonreturn valves and two motion indicators as well as a mounted monitoring switch.

Dependent on the arrangement in the distributor, the individual segments are manufactured in the following design:

- Initial- or A-segment
- Medium or M-segment
- Final- or E-segment

## 6. Drawing (measurement)



	Number of segments									
	3	4	5	6	7	8	9	10	11	12
<b>Dimension a</b>	68.5	84.50	100.50	116.50	132.50	148.50	164.50	180.50	196.5	212.50
<b>Weight approx. kg</b>	4.0	4.31	4.63	4.94	5.25	5.56	5.87	6.19	6.5	6.81

## 7. Fields of application

The fields of application of the progressive group-lubrication system are the following:

- The lime and cement industry where for instance screw conveyors, filtering installations, wrapping machines etc. are centrally supplied with lubricant.
- Basically, the progressive group-lubrication system can be used in all cases where a great number of lubrication groups have to be supplied with lubricant from a central grease station.
- When the pump station is placed centrally, it is possible to feed lubrication groups up to a range of 200 x 200 m.

## 8. Design

(Items. see "Principle of operation")

The progressive group-lubrication distributor ZP-A/G consists of: Housing (item no. 8), lubricant distributor ZP-A as well as a 2/2-way solenoid valve. In the housing are integrated: a throttle insert as well as a spring strainer.

The connection for the lubricant supply consists of a male stud fitting according to DIN 2353 for pipe Ø 10. The screw plug can be removed if required, and the connection having got free can be used for the insertion of a pressure gauge.

## 9. Function

The progressive group-lubrication distributor ZP-A/G is connected to a feed line being permanently under pressure.

Triggered by a signal of the electric control system, the 2/2-way solenoid valve opens, and lubricant is supplied under pressure via the filter and the throttle to the progressive distributor. Then the lubricant is divided into partial quantities, which are carried one after the other to the up to 24 possible outlets. This proportioning is effected by pistons, which are moved by the lubricant being under pressure and which forcibly control each other. The pistons move into their final positions and, as a result, the portions of lubricant before the pistons are supplied one after the other to lubrication points. The distributor works as long as it is fed with lubricant via the open 2/2-way solenoid valve.

The metered volume per piston stroke depends on the segment size and can optionally be 0.07; 0.1; 0.2; or 0.3 cm<sup>3</sup>.

There are different possibilities of merging several metered volumes and to lead them to one outlet.

Each single outlet is furnished with an integrated nonreturn valve. This has the advantage that the distributors work reliably even at higher counterpressures and with flexible line material.

2 motion indicators are screwed into the piston of segment E. They jut out of the distributor body and thus indicate the piston stroke. When one motion indicator has moved into both stroke directions once, this is a sign for the fact that all outlets of the distributors have supplied lubricant.

The motion indicators make a visual and - with mounted monitoring switch - an electrical operational monitoring of the progressive group-lubrication distributor ZP-A/G possible.

## 10. Specification

### Group-lubrication distributor

Type : ..... segment distributor controlled by 2/2-way solenoid valve

Installation position : ..... optional

Temperature range : ..... - 20° to + 80°C

Number of segments : ..... 3 ... 12

Number of outlets : ..... 1 ... 24

Operating pressure : ..... max. 160 bar

Usable lubricants based on mineral oils:

lubricating grease : ..... up to NLGI class 2 DIN 51818

oil : ..... service viscosity > 220 mm<sup>2</sup>/s; ISO VG 68, DIN 51519 at 20°C ambient temperature

Synthetic lubricants : ..... on request

For the volume flow, please see diagrams on pages 10 and 11.

### Progressive distributors ZP-A

Output volume each piston stroke ..... optional 0.1; 0.2 or 0.3 cm<sup>3</sup>

Opening pressure of the non-return valves ..... 2 bar

Response pressure ..... ≤ 10 bar

Pipe line connection: outlet ..... Ø 6

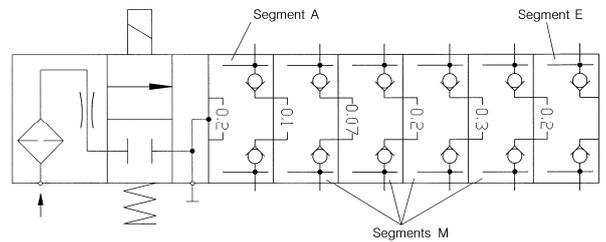
**ATTENTION**

It must be remembered that the lubricant metered by a given piston does not exit out of same element but in the adjacent element next to the inlet port. The quantity metered by the piston provided in the initial element is discharged out of the end element outlet port.

## 10. Specification (continuation)

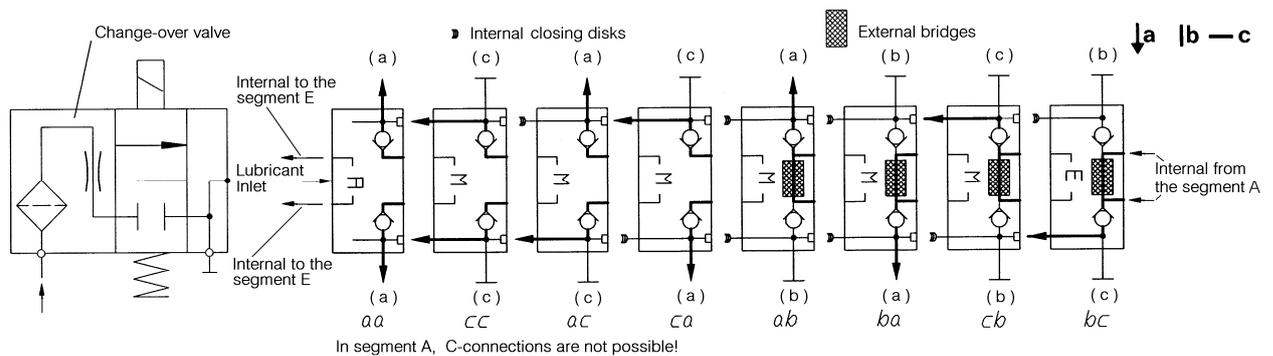
### Explanation (distributor ZP-A)

1. The basic design of the Progressive group-lubrication distributor ZP-A/G is illustrated by a symbol. The channel holes drawn into the symbol show that the metered volume of a segment from the progressive distributor ZP-A is fundamentally led into the segment being placed in front of it in direction of the "inlet". There is one exception for the initial segment the metered volume of which is led back into the final segment. Each segment of the distributor is provided with a marking regarding the metered volume.



- 01 is equal to  $0.1 \text{ cm}^3$  per piston stroke
- 02 is equal to  $0.2 \text{ cm}^3$  per piston stroke
- 03 is equal to  $0.3 \text{ cm}^3$  per piston stroke

2. There are 8 possibilities of merging several metered volumes of the distributor and to lead them to one outlet. Three symbols with letters are available to mark these possibilities and the arrangement of the outlets.



Symbol "a" shows the position of the outlet.

Symbol "b" shows the merging of the two metered volumes of a segment. For this purpose, a bridge is mounted to the segment concerned.

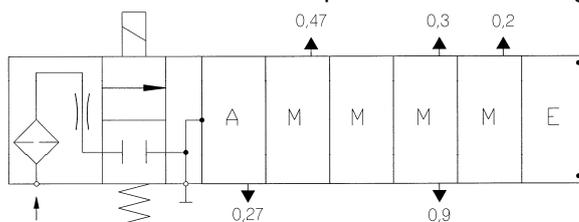
Symbol "c" designates the merging of the metered volumes of adjacent segments. For this purpose, the disks between the segments in direction of "inlet" are removed. This connection is not possible in the initial segment.

3. Metered volume at the outlet ( $\text{cm}^3$ )

### ATTENTION

Please take special care that the quantity of lubricant metered by a piston does not escape in the same but in the adjacent element in direction of the inlet.

The metered volume of the piston in the initial segment escapes at the final segment.



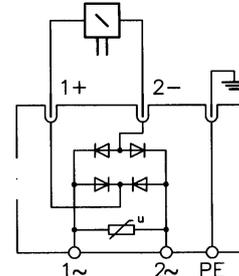
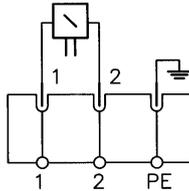
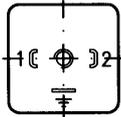
**10. Specification (continuation)**

**2/2-way solenoid valve (electrical data)**

Rated voltage	$U_N$	:	24 V DC	110 V AC 50/60 Hz	230 V AC 50/60 Hz
Nominal power	$P_N$	:	20 W	20 W	20 W
Current	$I_N$	:	0.83 A	0.2 A	0.1 A

Plug and switch symbols  
(DIN 43650 PG 9)

Magnetansicht  
Magnetic view

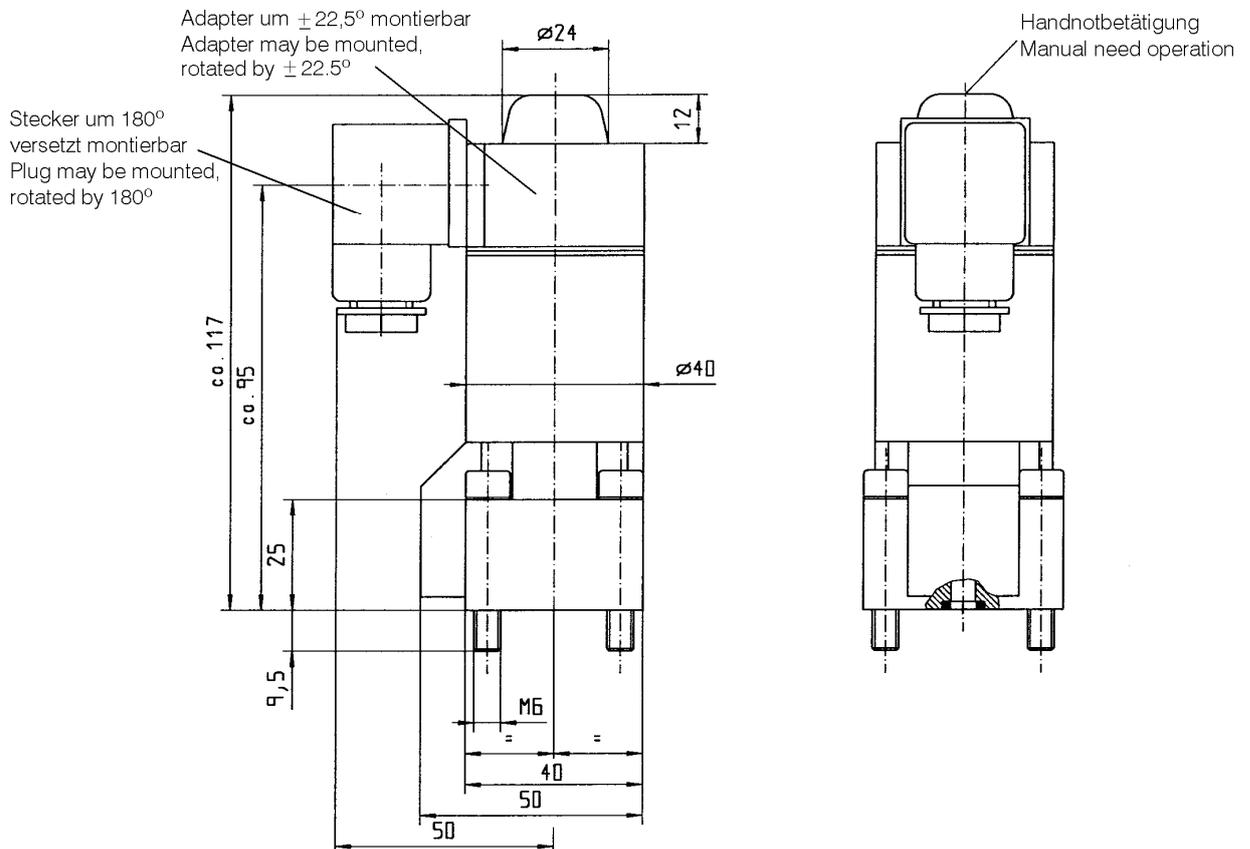
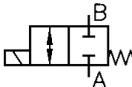


Function : ..... NC normally closed  
 Protection system of housing : ..... IP 54 according to DIN VDE 0470/EN 60529/IEC 529  
 (in case of a professional installation of the plug)  
 Insulating class : ..... F  
 Duty cycle : ..... 100 % ED max. at 35°C ambient temperature  
 Plug : ..... according to DIN 43650 with screw joint PG 9

**2/2-way solenoid valve (mechanical data)**

Type : ..... bevel seat valve  
 Emergency hand operation : ..... push button under rubber cap with return spring  
 Overlapping : ..... negative, i.e. when switching from the O position into the A position and vice versa,  
 the transition from the one into the other circuit symbol takes place gradually.

**Symbol:**

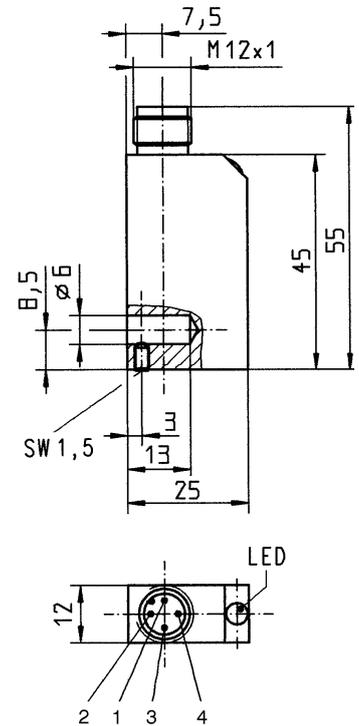
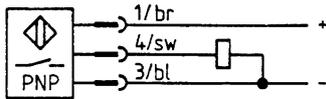


**10. Specification** (continuation)

**Monitoring switch**

Protection system : ..... IP 65 in plugged condition  
 Operating voltage : ..... 10 V to 30 V DC  
 Output current : ..... max. 200 mA  
 Switching function : ..... NO ( — )  
 Switching frequency . ..... max. 1000 Hz  
 Feed line :     Proof against wrong poling ..... yes  
                   Shortcircuit proof ..... no

**Connection diagram**



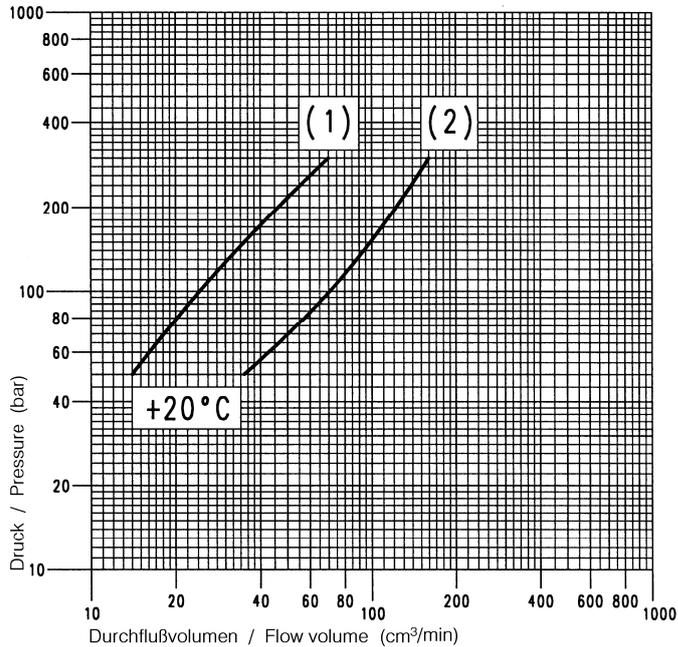
**Spring strainer**

Filter : ..... wire fabric 0.4 x 0.18 DIN ISO 4783 T.2  
 Filtering area : ..... 19 cm<sup>2</sup>

## 11. Flow diagrams

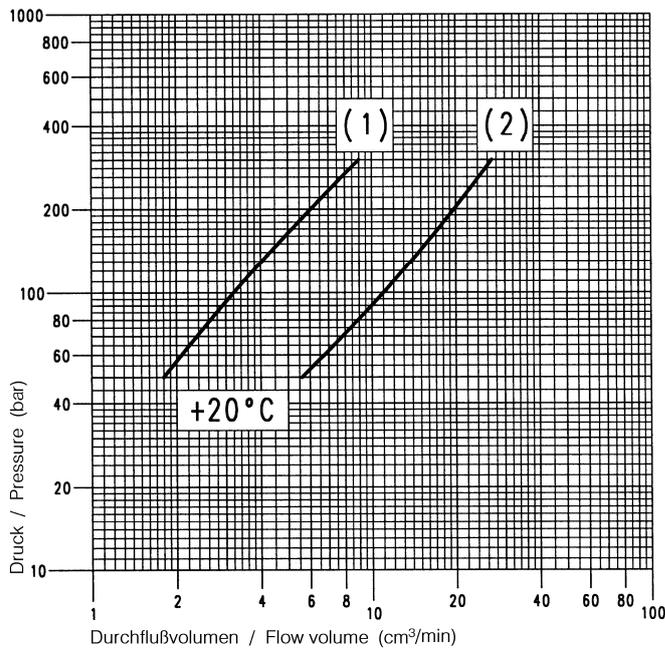
### Throttle insert

Flow volume of the throttle inserts at 0 bar counterpressure:



Flow medium: Oil Talona 40 Company: Shell, ISO VG 150 DIN 51519  
 ( $\approx 174 \text{ mm}^2/\text{s}$  at  $40^\circ\text{C}$ )  
 ( $\approx 650 \text{ mm}^2/\text{s}$  at  $20^\circ\text{C}$ )

Throttle (1) low effect / Throttle (2) high effect

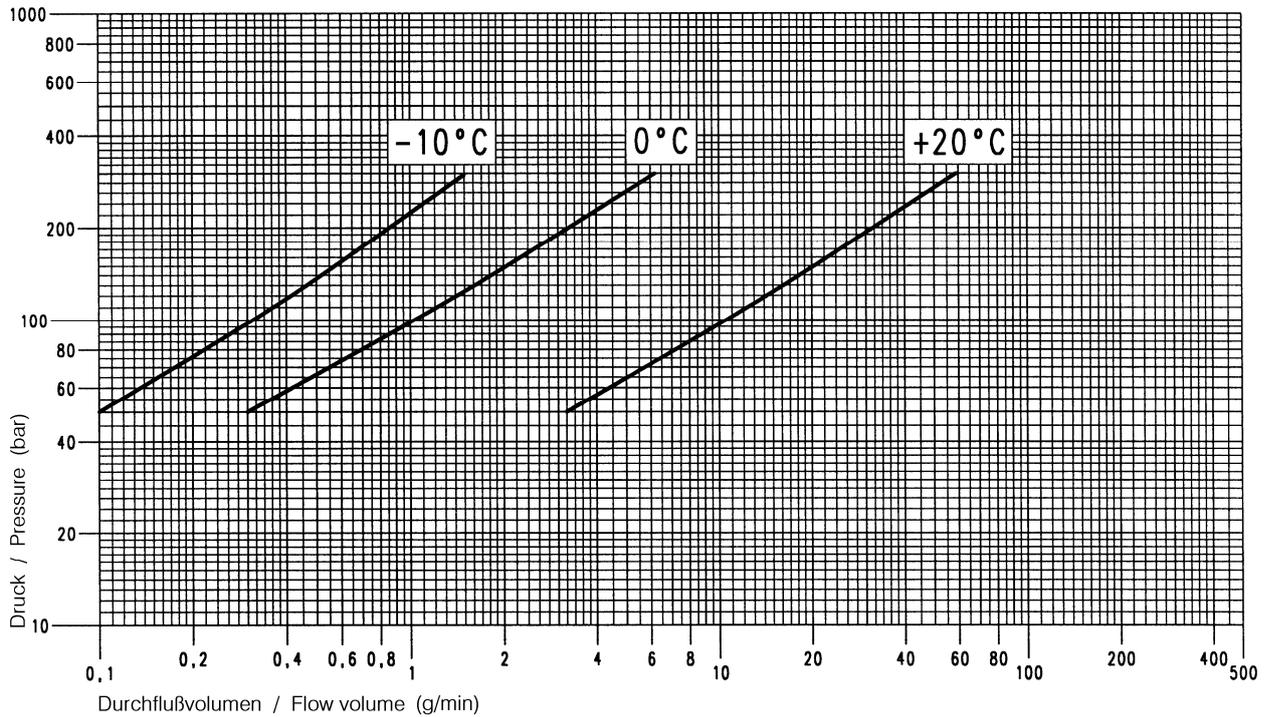


Flow medium: Oil Tellus C460 Company: Shell  
 ( $\approx 490 \text{ mm}^2/\text{s}$  at  $40^\circ\text{C}$ )  
 ( $\approx 2100 \text{ mm}^2/\text{s}$  at  $20^\circ\text{C}$ )

Throttle (1) low effect / Throttle (2) high effect

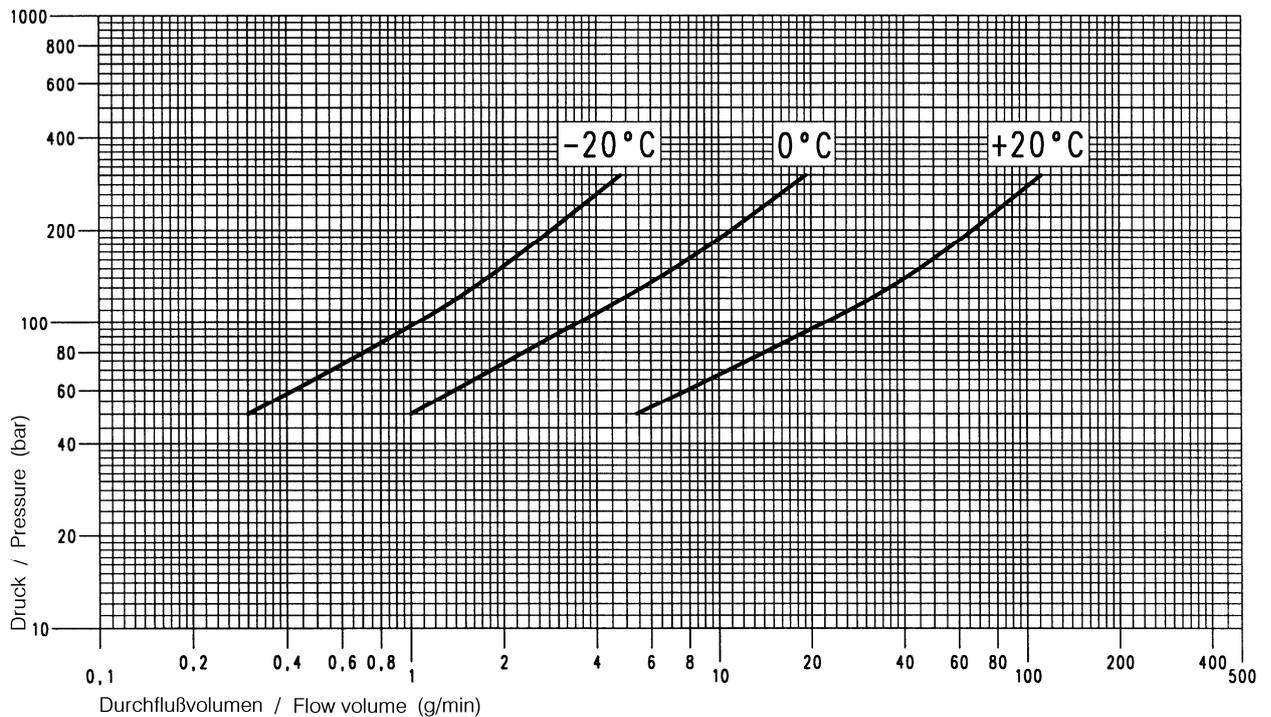
**11. Flow diagrams (continuation)**

**Throttle insert**



Flow medium: Grease Renolit MP Company: Fuchs  
Worked penetration NLGI-class 2

Throttle with low effect

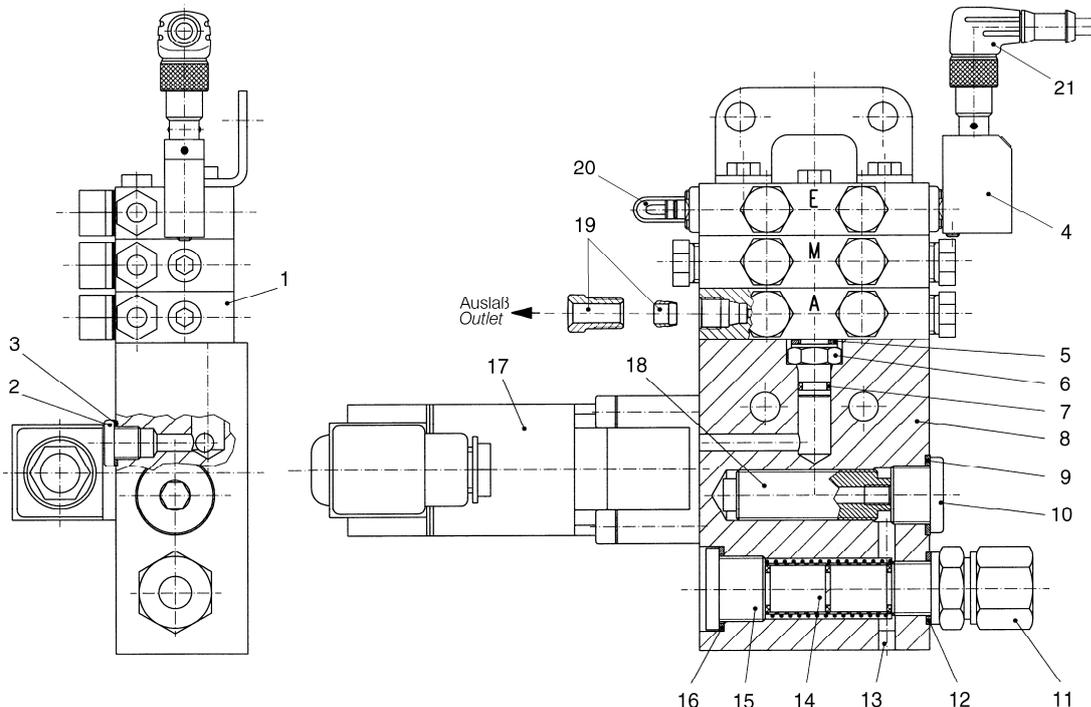


Flow medium: Grease Renolit MP Company: Fuchs  
Worked penetration NLGI-class 2

Throttle with high effect

## 12. Principle of operation

The 2/2-way solenoid valve (item no. 17) is normally closed. The lubricant is applied under pressure up to the 2/2-way solenoid valve (item no. 17). As soon as current is supplied to the 2/2-way solenoid valve (item no. 17), the same is opened, and the lubricant flows in a restricted and filtered state to the lubricant distributor ZP-A (item no. 1). The flow volume essentially depends on the kind of lubricant, the temperature, the incoming lubricant pressure and the operating time of the 2/2-way solenoid valve (item no. 17). The flow values for the throttle inserts (item no. 18) can be taken from the "flow diagrams".



## 13. Change of throttle insert

Remove screw plug (item no. 10) to lay bare the access to the throttle insert (item no. 18). By means of a screw M6 (screw length => 30 mm), which is screwed into the throttle insert (item no. 18), the latter can be pulled out of its bore hole. To install another and/or new throttle insert (item no. 18), proceed in reverse order.

## 14. Installation and Start-up

- The progressive group lubrication distributor ZP-A/G can be installed with the help of 4 screws M8 in no matter which position.
- The progressive group lubrication distributor ZP-A/G should be installed at a central place of easy access in order to obtain optimal line lengths towards the lubrication points.

### ATTENTION

- When installing the lines take care that they are clean and free from chips or other impurities.



- The connection to an electronic control unit has to be effected by qualified staff only and not under voltage.  
An electronical control unit has to be installed by qualified staff only.  
The local electrical rules have to be observed.

## 14. Installation and Start-up (continuation)

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Prior to commissioning, deaerate the progressive group-lubrication distributor ZP-A/G proceeding as follows:

- Remove lubricant lines from the connections of the lubricant distributor ZP-A (item no. 1).
- Switch 2/2-way solenoid valve (item no. 17) into through position (hand-operated).
- Keep 2/2-way solenoid valve (item no. 17) switched in through position until the lubricant escapes from all outlets of the lubricant distributor ZP-A (item no. 1) without air bubbles.
- Switch 2/2-way solenoid valve (item no. 17) into blocking position and reconnect lubricant lines to the respective connections of the lubricant distributor ZP-A (item no. 1).
- The progressive group lubrication distributor ZP-A/G is ready for use now.

## 15. Disassembly and Assembly

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The user has to take care that all kinds of assembly works are carried out by authorized and qualified specialists who have informed themselves sufficiently by studying the operating instructions thoroughly.



For all kind of works to be carried out at the machine or system, the machine or system must imperatively be out of operation. The procedure for stopping the machine or system described in the operating instructions must by all means be observed.

During the disassembly and assembly of the progressive group-lubrication distributor ZP-A/G do take care of cleanliness because dirt particles may cause failures and damages.



- Shut down machine or system according to the relevant instructions.



- Protect system by qualified staff against unintended switching on, loosen line socket at the 2/2-way solenoid valve (item no. 17), then pull it off.
- Disassemble lubricant feed line at the screw-in fitting (item no. 11).
- Remove progressive group-lubrication distributor ZP-A/G from the machine and/or system.
- Remove fixing screws and/or fixing nuts (from 6 distributor segments upwards) of the lubricant distributor ZP-A (item no. 1) and pull the latter from the housing (item no. 8).
- Disassemble stud (item no. 6) from segment A of the lubricant distributor ZP-A (item no. 1).
- Remove fixing screws of the 2/2-way solenoid valve (item no. 17), then remove the 2/2-way solenoid valve (item no. 17) from the housing (Pos. 8).
- Make free the access to the throttle insert (item no. 18) by removing screw plug (item no. 10).
- Use a screw M 6 (screw length => 30 mm), which is screwed into the throttle insert (item no. 18), to pull the throttle insert (item no. 18) out of its bore hole.
- Disassemble male stud fitting (item no. 11).
- Remove screw plug (item no. 15) and through this opening pull spring strainer (item no. 14) out of its bore hole.
- Clean parts in naphtha or petroleum ether.
- Check parts for damages.
- Replace damaged parts and old sealings by new ones.
- Assemble progressive group-lubrication distributor ZP-A/G in reverse order.



- Mount progressive group lubrication distributor ZP-A/G to the machine and/or into the system and attach lubricant feed line to the male stud fitting (item no. 11).
- Connect progressive group-lubrication distributor ZP-A/G electrically by qualified staff and remove protection against unintended switching on.
- Dispose of oil remnants and cleanser according to rule.

## 16. Fault finding

### Output volumes – Failure at the lubrication points

Is lubricant applied under pressure up to the progressive group-lubrication distributor ZP-A/G?

-- no --

Check lubricant supply.

yes

Does the 2/2-way solenoid valve switch?

-- no --

Check ectr. control unit and plug.  
Exchange 2/2-way solenoid valve if necessary.

yes

Open screw plug (item no. 10).  
Does lubricant flow out?

-- no --

Spring strainer (item no.14) is clogged. Dismantle and clean it. Exchange it, if damaged.

yes

Dismantle throttle insert (item no. 18) and clean it. After this, reinstall throttle insert and close bore hole with screw plug (item no. 10) again. Open screw plug (item no. 2) and let 2/2-way solenoid valve clock. Does lubricant flow out?

-- no --

2/2-way solenoid valve is clogged. Dismantle and clean it. Exchange 2/2-way solenoid valve if necessary.

yes

Close screw plug (item no. 2). Loosen lubricant connections at the lubricant distributor ZP-A. Switch 2/2-way solenoid valve into through position. Does lubricant escape from all distributor outlets?

-- no --

Lubricant distributor ZP-A is defective. Dismantle and exchange it. (For this, please also see printscript BA\_2002\_1\_GB\_ZPA).

yes

Are there bucklings and/or cloggings in the hose and/or pipework from the distributor to the lubrications points?

- yes -

Eliminate cloggings and bucklings. Exchange pipes, hoses or screw joints if necessary. For an easier finding of cloggings, switch the 2/2-way solenoid valve into through position and loosen lubricant line connections one after the other from the distributor. When the clogged line is being loosened, the distributor starts working again.

no

Does system work?

-- no --

Contact after-sales service of DELIMON.

## 17. Plates

### Type plate 26 x 52mm (75511-1311)

