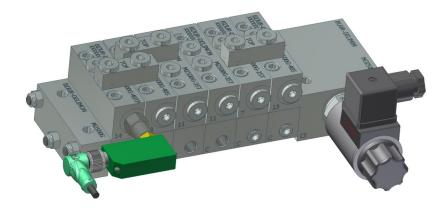


Operating instructions Modular progressive distributor M2500G

BA_2014_1_M2500G (35699)







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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 responsilbe 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

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

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.



4844, warning about skid risk.



2. SAFETY

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
- Harzard 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 preventation 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 electrial 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 consequencial 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: $R\&N_2009_X_GB)$

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

- Valve distributor plates
- Valve base segments
- Group lubricating valves
- Accessories
- Cylindrical standard threads to SAE, NPSF or BSPP.
- Integral group lubricating valve for area control.
- Operating pressure max.: with oil 300 bar and with grease 400 bar.
- Delivery quantity 0.08 to 1.31 cm³
- Zinc-nickel plating (free of Chromium-VI).
- Valve distributors with three to ten segments.

A. DISTRIBUTOR TYPE M2500G

B. NUMBER OF SEGMENTS

- 3 sections
- 4 sections
- 5 sections
- 6 sections
- 7 sections
- 8 sections
- 9 sections
- 10 sections

C. REVISION

Status A

D. MONITORING

without electrical monitoring with motion indicator(s) right hand with motion indicator(s) left hand optical cycle indicator "colour- change" right hand (without motion indicator) optical cycle indicator "colour- change" left hand (without motion indicator) monitoring switch 10 - 30 V DC, PNP right hand (with cable box angled) monitoring switch 10 - 30 V DC, PNP left hand (with cable box angled) monitoring switch 10 - 30 V DC, NPN right hand (with cable box angled) monitoring switch 10 - 30 V DC, NPN right hand (with cable box angled) monitoring switch 10 - 30 V DC, NPN left hand (with cable box angled) limit switch 240 V AC right hand limit switch 240 V AC left hand limit switch USA version right hand limit switch USA version left hand

E. THREAD TYPE

BSPP (G-) thread (standard) UNF thread NPSF thread



F. VERSION OF VALVE BLOCK

without valve block with valve block 230 V AC with valve block 115 V AC with valve block 24 V DC

G. CODING OF THE SEGMENTS / OUTLETS

see item no. 6.2.

H. ACCESSORIES

without

Overpressure indicator, non-relieving type, 42 bar (for selected number of outlets) Overpressure indicator, non-relieving type, 83 bar (for selected number of outlets) Overpressure indicator, non-relieving type, 111 bar (for selected number of outlets) Overpressure indicator, non-relieving type, 152 bar (for selected number of outlets) Overpressure indicator, relieving type, 69 bar (for selected number of outlets) Overpressure indicator, relieving type, 104 bar (for selected number of outlets) Overpressure indicator, colour yellow, burst pressure 100 bar (for selected number of outlets) Burst disc indicator, colour red, burst pressure 121 bar (for selected number of outlets) Burst disc indicator, colour purple, burst pressure 224 bar (for selected number of outlets) Burst disc indicator, colour purple, burst pressure 62 bar (for selected number of outlets) Burst disc indicator, colour orange, burst pressure 141 bar (for selected number of outlets)



3.1 Description

M2500G modular progressive distributors have the following basic configuration (see also Fig. 1):

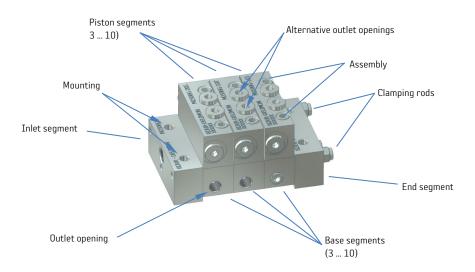


Fig. 1

Depending on the desired number of outlets and metering quantities, attach from 1 to 10 "functional twin segments" to the inlet segment with the lubricant inlet opening (with selectable thread options). These each consist of a base segment (which has 2 outlet openings) and a piston segment mounted above it. The metering quantity displaced into the piston segment is normally fed through to the outlet openings of this associated base segment (outlets may not located alongside each other). The end of the block is formed by the end segment, which is identical for all distributor variants.

The inlet segment, base segment and end segment are clamped together with 3 clamping rods. The clamping rods are round rods with the same thread at each end. They are screwed into the inlet segment. During assembly the basic segment and end segment, which contain through holes, are assembled to each other and self-locking nuts attached to the ends to secure them. The functionally necessary connection holes between these segments are sealed (against leakage to the outside) by Orings in the contact faces (see Fig. 2).

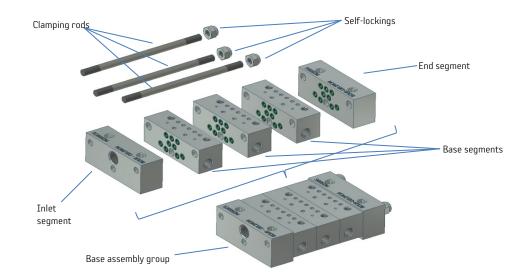
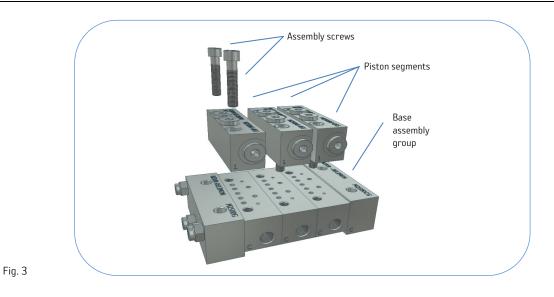


Fig. 2

The base assembly group (see Figs. 2 and 3) can be regarded as an assembly unit in its own right. It remains a constant element which generally remains unchanged even if changes in metering quantities are required. Each selected piston segment is bolted to the base segment with 2 hexagon socket-head screws ("assembly screws"; see Fig. 3). The connection holes between these two segments are also sealed with 0-rings.





There is no connection between the individual piston segments (air gap). This is a great advantage of the M2500G, it means that any piston segment can be exchanged without major assembly work (just undo the assembly screws then tighten them again) if for instance the metering quantity of an existing distributor subsequently needs to be changed (see Fig. 4).

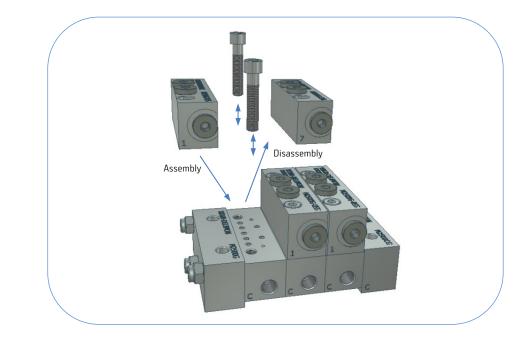


Fig. 4

3.2 Variation in the metering quantities / number of outlets

So as to be able to cater for a very wide range of applications and provide the greatest possible number of metering quantity variants in conjunction with the specified number of outlets (to match the existing lubrication points), the M2500G has been designed with the following design features:

Configurable number of segments

This means the "functional twin segments", see Fig. 5.

The number of these ranges from a minimum of 3 to a maximum of 10. Selection of the number depends on the desired number of lubrication points in conjunction with the required metering quantities.



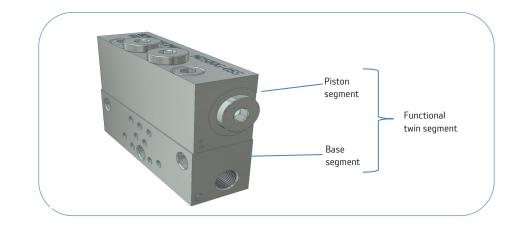


Fig. 5

Piston dimensions

Piston segments with various different piston diameters (4, 5, 7 and 9 mm) and different axial strokes allow selection of the required quantities of lubricant. These are used to generate the various different metering categories (see Table 1).

Piston segments in "S" and "T" versions

The piston segments are available either as S (= Single outlet) or as T (Twin outlet) versions. This is also shown in the legend on the top face of the segment (see Fig. 6).

During a lubricating cycle (lubricating cycle: all the pistons of the distributor perform a back and forth movement in a positively actuated cycle) a "T" piston segment delivers the same quantity of lubricant in the direction of each of the two outlet openings. It has an internal grub screw which blocks the connection between the two outlets.

An "S" piston segment lacks this grub screw. It delivers the entire quantity (i.e. a double quantity) in the direction of only one of the outlet openings. As a rule one of the outlet openings in the respective base segment is then blocked with a plug screw (except in the case where an "alternative outlet opening", optionally right-hand or left-hand, is open. Then both the outlet openings of the base segment must be blocked).

A listing of the available metering quantities for the various piston segments is shown in Table 1:

Metering	Delivery qu	antity [cm³]	Piston segment						
category	т	s	T = Twinc	utlet segment	S = Single outlet segment				
	Twin outlet	Single outlet	Standard (without pin)	with indicator pin	Standard (without pin)	with indicator pin			
05	0.08	0.16	Х	-	Х	-			
10	0.16	0.33	Х	-	Х	-			
15	0.25	0.49	Х	-	Х	-			
20	0.33	0.66	Х	Х	Х	Х			
25	0.41	0.82	Х	Х	Х	Х			
30	0.49	0.98	Х	Х	Х	Х			
35	0.57	1.15	Х	Х	Х	Х			
40	0.66	1.31	Х	Х	Х	Х			

Table 1

The function of the piston segments shown in this table is explained under Point 3.4 ("Monitoring"). These are piston segments with indicator pins (their design restricts the range of metering quantities they can deliver).



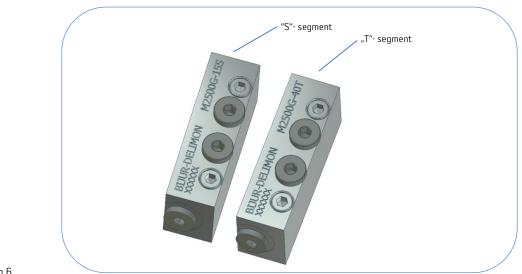
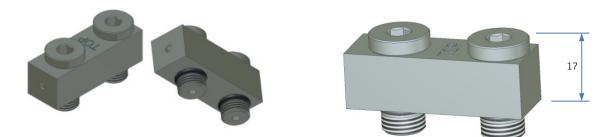


Fig 6

Cross-port version



In order to achieve outputs of large amounts of lubricant, adjoining piston segments can optionally be connected by means of cross-ports (lubricant bridging pieces, bolted on). These direct the lubricant towards the end segment.

Note that in this case the "normal" outlet openings (the outlet openings of the respective base segment used without a crossport fitted) must be closed off, because now the "alternative outlet opening" (see Fig. 1) is being used as the lubricant transport opening.

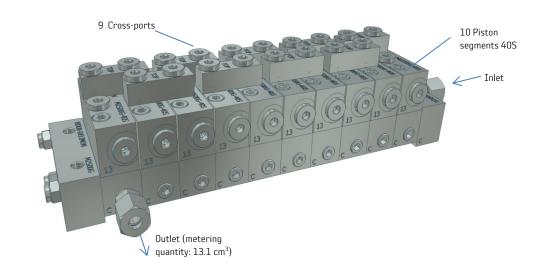
Furthermore it should be noted that an "S" piston segment can accept a maximum of one bolted-on cross-port, a "T" piston segment can accept a maximum of 2 bolted-on cross-ports. In addition, cross-ports cannot be chained together in sequence (without a gap), otherwise a collision would occur.

In this connection see also Fig. 7. This shows the arrangement on alternate sides.

A theoretical extreme variant, which certainly would not be encountered in practice, is described below to provide the user with an understanding of the arrangement of cross-ports:

Requirement:	pro	hin the range of available selections for the product code of an M2500G distributor as a standard duct, a variant with only a single outlet and the maximal available metering quantity for an M2500G ributor is specified.
Solution:	1.)	The distributor may have only "S" piston segments (even just 1 "T" segment would result in the number of outlets being greater than 1).
	2.)	The distributor must be fitted with 10 functional twin segments, otherwise the maximum metering quantity will not be achieved
	3.)	Selection of piston segments rated for the maximum metering quantity (1.31 cm ³ per lubricating cycle) The distributor could then appear as follows (see Fig. 7):





Bypass segment

Fig 7

The bypass segment (see Fig. 8) can be bolted on to the existing distributor in place of a piston segment.

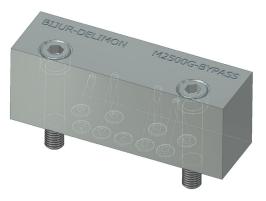


Fig. 8

Its external dimensions are the same as those of a piston segment, but it does not contain a piston and has merely a bridging function. When it is fitted as an exchange item, the open outlet holes on the respective base should be blocked (see also Fig. 9).

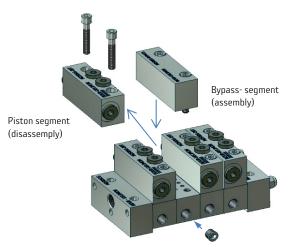


Fig. 9



The practical use of this element arises when for instance the number of lubrication points in an existing system has to be reduced but it is not desired to change the basic configuration of the distributor (the basic group remains the same / no change to the attachment of the distributor).

The bypass segment is seldom required for a newly installed distributor, unless it is desired to configure it for the option of subsequently adding further lubrication points (or metered quantities).

3.3 M2500G as a group lubrication distributor with solenoid valves

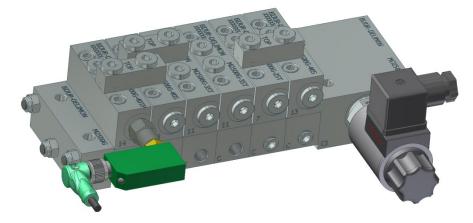


Fig. 10

In contrast to the normal version, the M2500G as a group lubrication distributor requires a special inlet segment which is dimensionally larger (designated the "valve block" in the code), which can accept a solenoid valve (see "Dimensions"). The 3 solenoid valves are suitable both for grease and also for oil. The codes allow selection of the 24 V DC, 110 V and 230 V AC versions. They are for use in group lubrication systems.

The following 2/2 solenoid valves are available:

- 1. 2/2-way solenoid valve, NC, PN350, 24 V DC / Art. no.: 38152M115
- 2. 2/2-way solenoid valve, NC, PN350, 115 V AC / Art. no.: 38152M116
- 3. 2/2-way solenoid valve, NC, PN350, 230 V AC / Art. no.: 38152M117

(respective cable connection box for each: Cable connection box DIN 43650 - AF3 - PG11 / Art. no.: 769282923)

3.4 Monitoring



Fig. 11

Special piston segments can be fitted with visual indicators or electrical switches for functional monitoring of the distributor and for controlling the system. These can be selected by the appropriate item in the distributor code. The visual indication or electrical switching operation is actuated by the movement of the piston (stop). Right-hand and left-hand versions are available. If necessary, multiple indicators / switches can be fitted to a distributor at any desired piston segment positions. Note that a switch or optical indicator that requires a movement pin can be fitted only to metering categories 20 (piston diameter 7 mm) and above (see Table 1). The various monitoring elements are described in more detail below:



Monitoring switch (with elbow plug)

Attachment of this switch requires a piston segment with a movement indicator pin. There is a choice between the PNP and NPN versions.

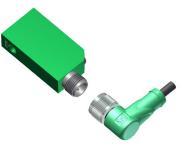
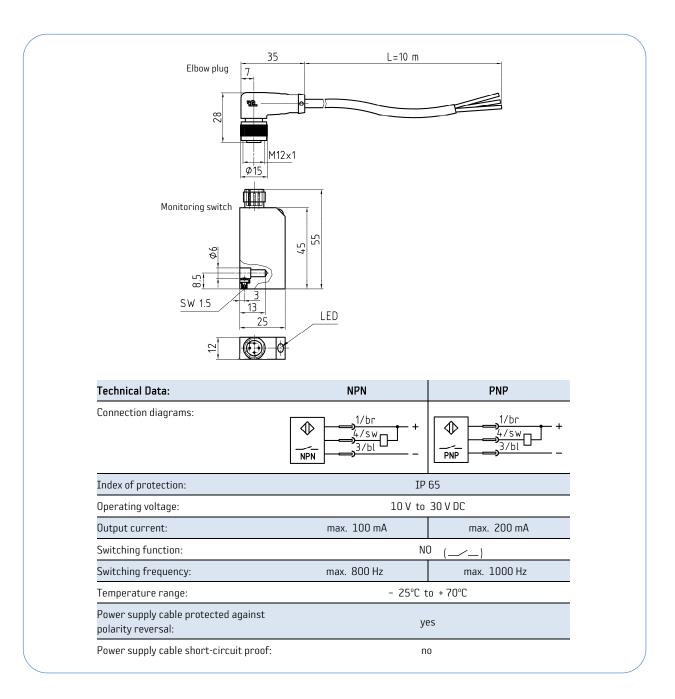


Fig. 12





Limit switches

Attachment of this switch requires a piston segment with a movement indicator pin.

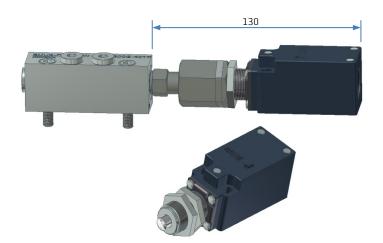
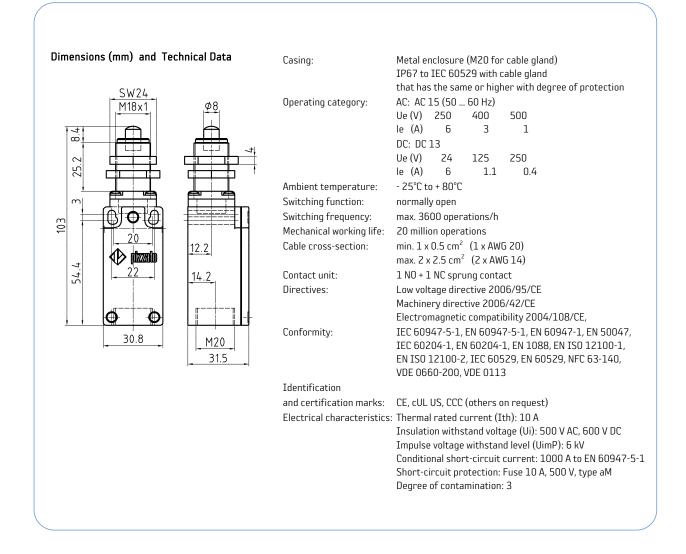


Fig. 13





Limit switch (version USA) 125/250V AC; Art. no. MC13974B



Fig. 14

This switch is used primarily by customers in the USA. It requires a piston element with a movement indicator pin for activation. (further details on request)

Monitoring with movement indicator



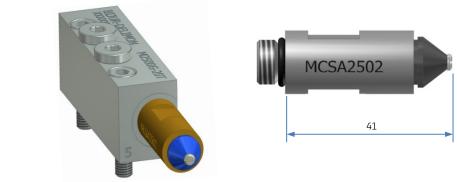
Fig. 15

Fig. 16

This visual indicator is intended for the base version, where it performs the equivalent function to the monitoring switch. Instead of the switch (see under "Monitoring switch") it contains a transparent protective cap. The pin is visible at each lubricating action.

If necessary this version can easily be exchanged for the version with the monitoring switch.

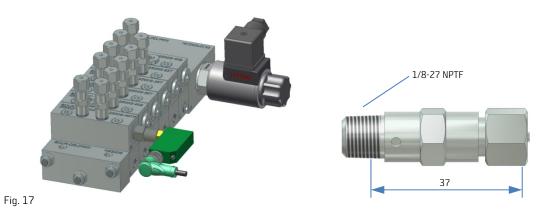
Visual "colour-change" cycle indicator



These visual indicators can be fitted to each piston segment (without pin) instead of the piston stop screw. They contain a magnet which alternates as the piston moves. This causes a coloured liquid to be displaced, leading to an alternating light/dark effect.



Pressure indicators



These indicators are spring-loaded and can be set for specific pressures. The indicator pin on the pressure indicator visibly protrudes outwards when the trigger pressure is reached. When the pressure falls back again the pin returns to its original position.

The following "excess pressure indicators" are available:

Description	Article number
Pressure indicator, relieving, 35 bar	21355
Pressure indicator, relieving, 70 bar	213510
Pressure indicator, relieving, 105 bar	213515
Pressure indicator, relieving, 140 bar	213520

Table 2

This can be selected in the product code (see 6.) under "Accessories" (see "H"). Depending on the number of outlets the indicator for a specific pressure can be fitted in the alternative outlet opening. Note that the indicators cannot be fitted in conjunction with a cross-port.

Bursting disc indicators

A bursting disc indicator can be screwed into the alternative outlet opening of the desired valve segment instead of the sealing screw. It incorporates a disc which bursts when the pressure in the system is too high. Bursting disc indicators cannot be combined with a cross-port.

The following variants are available:							
Article no.	Bursting pressure	Colour of the disc	Exchange disc kit*				
10412YW	100 bar	yellow	FT15423YWK				
10412RD	120 bar	red	FT15423RDK				
10412PR	220 bar	lilac	FT15423PRK				
10412YN	250 bar	yellow/neutral	FT15423YNK				
* The discs are supplied in packs of 10							

1/8-27 NPTF

* The discs are supplied in packs of 10.

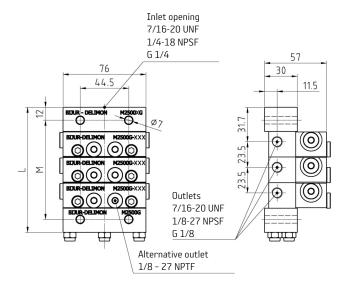
Table 3

15



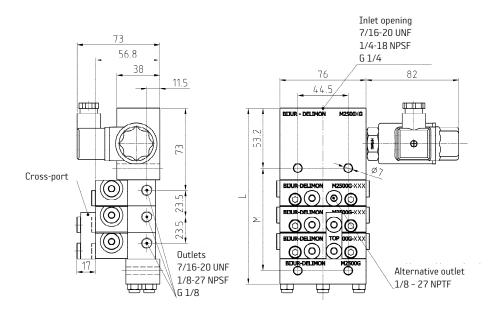
4. **DIMENSIONS** (mm)

Standard distributor with standard inlet segment



Number of segments	М	L
3	91.0	115.0
4	114.5	138.5
5	138.0	162.0
6	161.5	185.5
7	185.0	209.0
8	208.5	232.5
9	232.0	256.0
10	255.5	279.5

Group lubrication distributor with 2/2-way-solenoid valve



Number of segments	М	L
3	91.0	115.0
4	114.5	138.5
5	138.0	162.0
6	161.5	185.5
7	185.0	209.0
8	208.5	232.5
9	232.0	256.0
10	255.5	279.5



5. SPECIFICATION

Max. operating pressure:	
Oil:	300 bar
Grease:	400 bar
2/2-way solenoid valves:	350 bar
Delivery quantity / cycle (1 segment):	0.08 to 1.31 cm ³
Ambient temperature:	20°C to 120°C
Monitoring switch:	25°C to 70°C
Limit switch:	
2/2-way solenoid valves:	20°C to 60°C
Lubricants, consistency / viscosity:	
Mineral oil:	SAE 10
Grease class:	NLGI 2
Seal material:	Viton
Segment material:	Steel, Zn-Ni plated (free of Cr-VI)

6. CODING

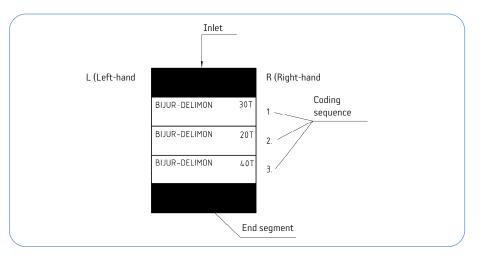
6.1 Explanation

The M2500G should be coded according to the summary from "A." to "H." (see pages 5 – 6). Note especially here that:

For "D." (monitoring):	for the distributor several monitoring variants are available for selection. Since the number of coding characters is limited to 2, the largest number should be selected here, e.g. the "09" for the selected monitoring switch "05" and limit switch "09". For this special case, the code "X01" (according to "H. Accessories") should be appended and the additional monitoring variant (here "05") described verbally (e.g.: Segment 3 with monitoring switch 05).
For "E." (thread):	The choice "C", "A" or "B" allows only one type of thread to be selected. This applies both to the inlet and also to the outlet openings. A combination such as "UNF" for inlet, "G" for outlet is not permitted. see also under 6. (Dimensions).

6.2 Coding the segments / outlets

The desired functional twin segments (base segment with its associated piston segment) are coded from the inlet segment towards the end segment:





6. CODING

This establishes the link between metering quantity and the position / number of the outlets. Each twin segment is described 1. by a code number and 2. by a code letter (e.g.: "3A"). The selection is made according to Table 4:

End segment

	Code number	Metering			Meteri	nu uua	ntity [cı	m ³]	1	
	\downarrow	category	-		T segment			S segment		
	1	05			0.08		0.10			
	2 10 0.16		0.32							
	3	15			0.25		0.50)		
	4	20			0.33		0.60	5		
	5	25			0.41		0.82	2		
	6	30			0.49		0.98	3		
	7	35			0.57		1.14	4		
	8	40			0.66		1.37	2		
			Pisto	n segr	nent w	ithout	movemer	it indica [.]	tor pin	
				Standard with cross-port			t			
			Т	SL	SR	TCL	T2C	TCR	SCL	SCR
	Coding letter	\rightarrow	А	В	С	D	Е	F	G	Н
Symbol:			-			•	•••		F	
Piston segment with movement indicator pin										
									P	
				idard	CD		cross-port		6.01	COD
	Codina Late	<u> </u>	Т	SL	SR	TCL	T2C	TCR	SCL	SCR
	Coding letter	→	I	J	К	L	M	N	P	Q
	Symb	ool:					╘┱╼┙	╶┨╌┓┫┙	╘╉╾┙	└┓┛
 T : piston T segment; base segment with 2 outlets SL : piston S segment; base segment with 1 left-hand outlet SR : piston S segment; base segment with 1 right-hand outlet TCL : piston T segment; with left-hand cross-port (= base segment: 1 right-hand outlet) T2C : piston T segment; with right-hand and left-hand cross-ports (= base segment: 0 outlets) TCR : piston T segment; with right-hand cross-port (= base segment: 1 left-hand outlet) SCL : piston T segment; with left-hand cross-port (= base segment: 0 outlets) SCR : piston T segment; with right-hand cross-port (= base segment: 0 outlets) 										

Table 4

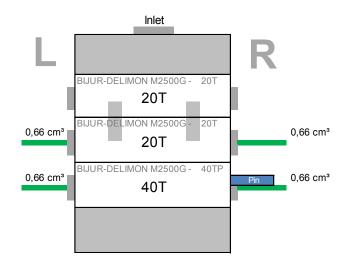


6. CODING

Here is an example of coding for a distributor with 3 functional twin segments:

Coding: M2503A01C004E4A8I00

Number of segments	:	03 (3 segments)
Monitoring	:	01 (with movement indicator / right-hand);
Thread	:	C (BSPP/G);
Valve block	:	00 (without);
Segment / outlet coding	:	1.) 4E = 20T segment with left-hand and right-hand cross-ports
		2.) 4A = 20T segment (2 outlets)
		3.) 8I = 40T segment + pin (2 outlets)
Accessories	:	00 (without)



7. PLATES

Rating plate



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