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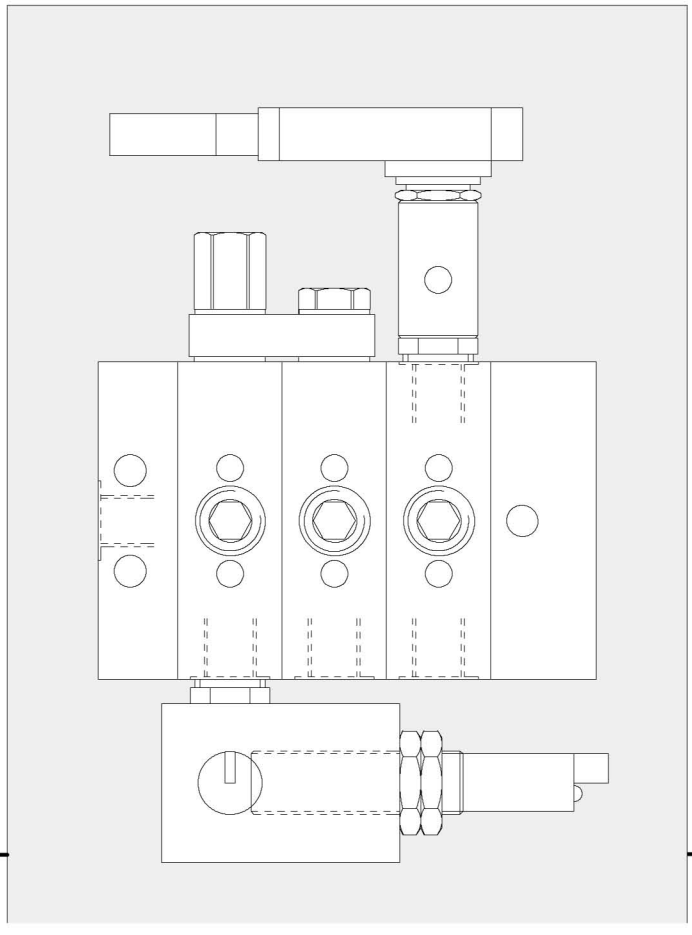
PROGRESSIVE DISTRIBUTOR SX 1

Technology, You can Rely on



Progressive distributor of modular design
- lubricants oil and grease
- rough type of construction
- problem–free extendable repectively reduceable
- individual changeable dosage elements
- grading of dosage volume is possible
- operation check is possible respectively retrofit installable

PS 4000.00.0998GB

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GENERAL

The job of the SX 1 progressive distributor is to divide up a volume of lubricant delivered by a pump directly, or as a main distributor, via other progressive distributors (subdistributors) to the lubricating points connected.
The lubricant is divided up in equal parts to the lubricating points connected when all the metering elements (agent elements) have the same metering and no outlet is closed. Through individual arrangement of the progressive distributor with metering elements of different metering amounts, it is possible to divide up the metering volume with reference to the lubricating points.
The metering volumes specified in the following table are discharged once to the outlets with each of the progressive distributor's pistons rotations.

TECHNICAL DATA

model:	Follower piston distributors of modular design
dosage volume:	see table
no. of dosage elements:	minimum 3 maximum 10
control pressure:	5 bar
permissible excessive pressure:	400 bar
volume stream range (oil):	5 up to 500 cm^3 / min.
lubricants:	oil and grease
viscosity range of oil:	> 50 mm^2 / sec.
penetration range:	NLGI – Kl. 3
temperature range:	– 30° C up to + 80° C
operating temperature:	medium: – 30° C up to + 70° C
material:	steel, zinc – plated
weight:	see table

dosage volume per piston circulation

dosage element	code	dosage volume [1]
SX1 – 05	05	0,068 cm^3
SX1 – 10	10	0,105 cm^3
SX1 – 15	15	0,150 cm^3
SX1 – 20	20	0,210 cm^3
SX1 – 25	25	0,275 cm^3
SX1 – 35	35	0,350 cm^3
SX1 – 45	45	0,430 cm^3

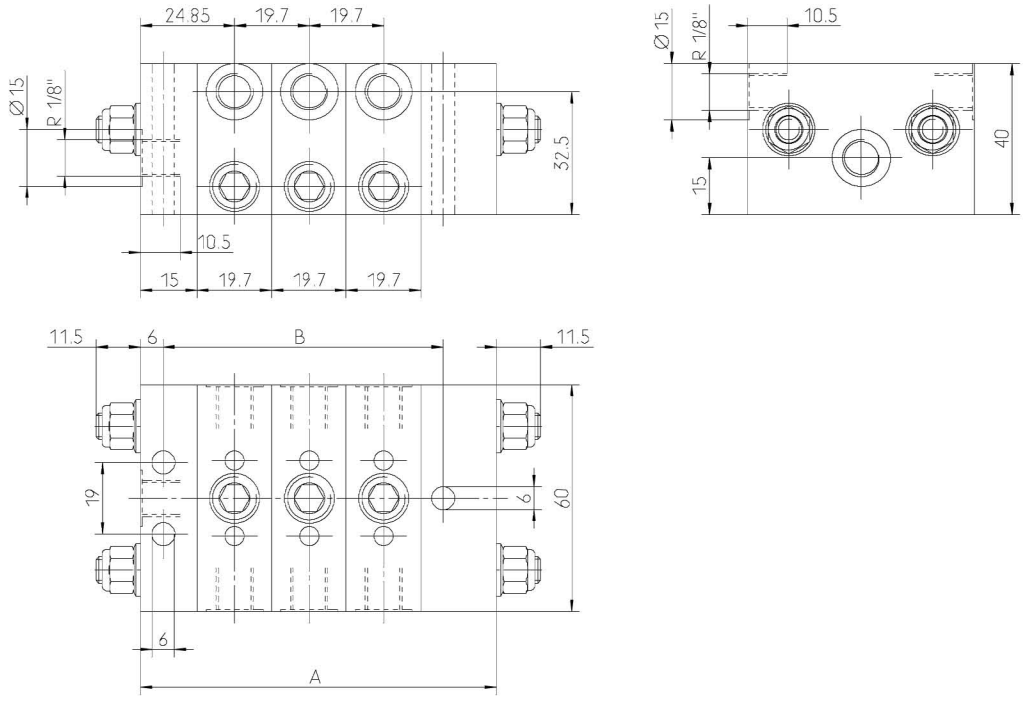
measures and weights

number [2]	measure A	measure B	weight [3]
03	94,1 mm	74,1 mm	1,600 kg
04	113,8 mm	93,8 mm	1,925 kg
05	133,5 mm	113,5 mm	2,280 kg
06	153,2 mm	133,2 mm	2,580 kg
07	172,9 mm	152,9 mm	2,900 kg
08	192,6 mm	172,6 mm	3,230 kg
09	212,3 mm	192,3 mm	3,560 kg
10	232,0 mm	212,0 mm	3,890 kg

[1] at outlet [2] of dosage elements [3] without couplings

You must be sure that outlets with grater back pressure compared with other outlets are given reduced metering volume.

DIMENSIONAL DRAWING



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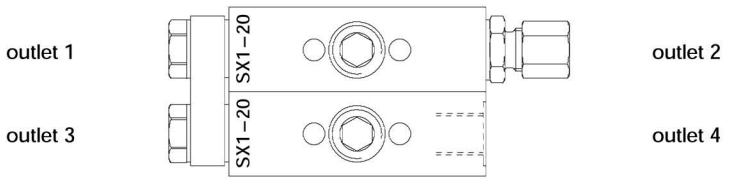
COMBINING OUTLETS

If only one outlet is required for a distributor element, one outlet can be closed and the lubricant that would come out of the second outlet can easily be diverted to the first outlet (see operating instructions).

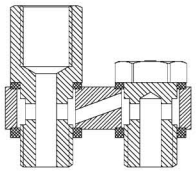
It is still possible to divert the lubricant coming out of an outlet through a distributor bridge into a subsequent distributor element, see Fig.:



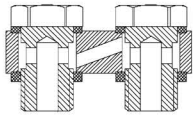
Because of the distributor bridge being added, in the example described above lubrication amount of 3 x 21 mm^3 / stroke comes out at outlet 4, i.e., the lubrication amounts of the bridged outlets 1 and 3 must be added to outlet 4.

Following pictures show distributor bridges with and without outlet.

Distributor bridge with outlet R 1/8"



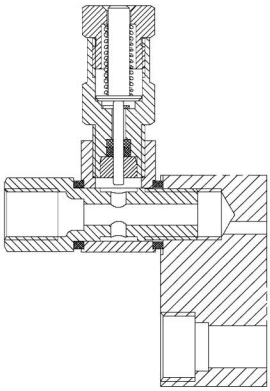
Distributor bridge



CONTROL INSTRUMENTS

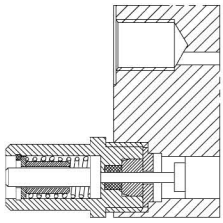
Pressure indicator

The pressure indicator, installed in the outlets by use of a swivelling union, makes appear – against the spring force – stroke indicator pin if there should be excessive service pressure or blockage of some lubricant pipe. As soon as the pressure in the lubricant pipe is decreased, for ex. by opening of the threaded union, that stroke indicator pin will return to its original position. Whenever those pressure indicators are used, installation into all pressure outlets is recommended in order to ensure quick identification of any blocked lubricant pipes.



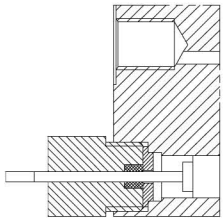
Stroke indicator

The stroke indicator (retrofit installation in place of the plug screw being possible) shows the piston movement of the progressive distributor. Each operation of the dosage pistons, i.e. after ejection of lubricant was effected from all the outlets, this stroke operation is made visible by that pin. That stroke indicator pin can be used also for switch operation purposes, its operational limits however being restricted to a service pressure of 40 bar and max. 50 strokes/minute.



Stroke check assembly

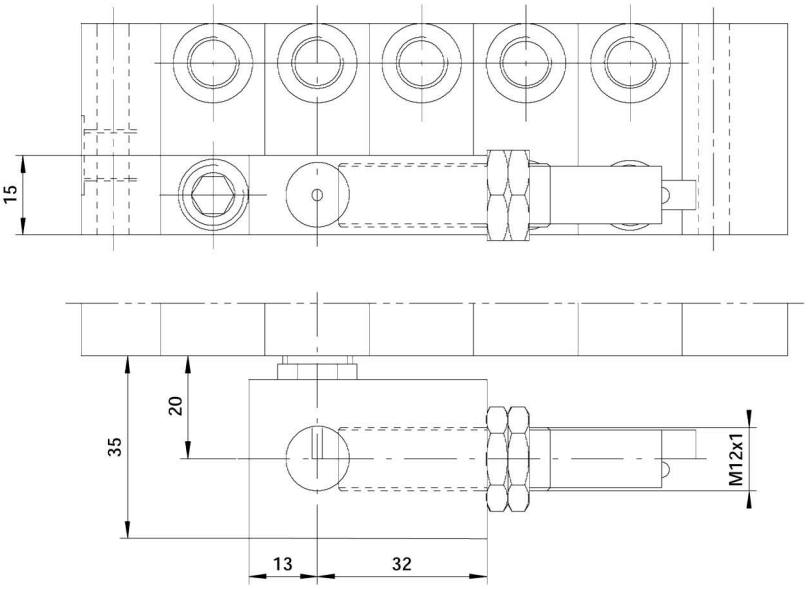
Function of the stroke check operation is the same as that of the stroke indicator, however there is no restriction of its service pressure nor of its number of strokes, as the indicator pin is fixed to the dosage piston. Retrofit installation of the stroke check assembly is possible only by replacement of some dosage element.



CONTROL INSTRUMENTS

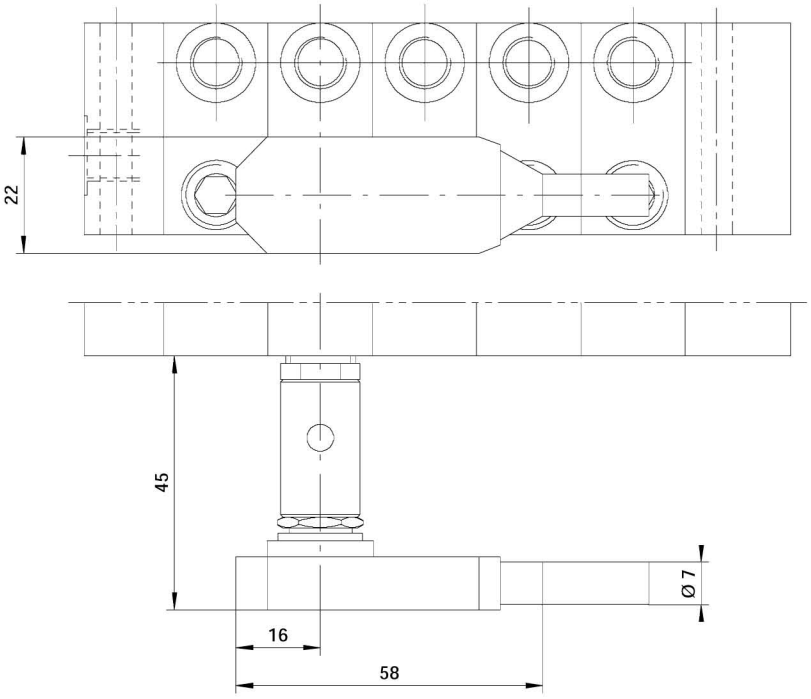
Proximity switch

Only possible by the dosage elements SX1 – 25, SX1 – 35 and SX1 – 45. The proximity switch installed as a control unit in place of the plugscrew is used to check the stroke movement of a piston. A switching rhythm is initiated with each cycle of operation of the dosage pistons.
As the switching pin is combined with the dosage piston, retrofit installation is possible only by replacement of the whole dosage element.



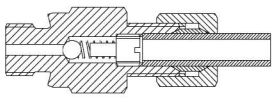
Microswitch

Only possible by the dosage elements SX1 – 25, SX1 – 35 and SX1 – 45. The method of operation of the microswitch used as a control unit is the same as that of the proximity switch. In view of the limited mechanical service life, progressive distributors with this control unit should be used only for systems with low rates of strokes.



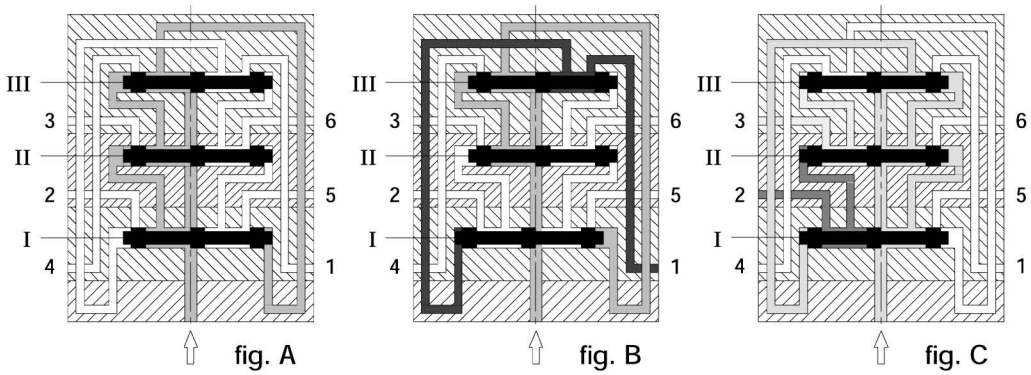
NON RETURN VALVE

The threaded outlet union with integrated non – return valve is used in SX 1 progressive distributors for points of lubrication or lubrication circuits with increased counterpressure, in order to ensure perfect distributor operation.



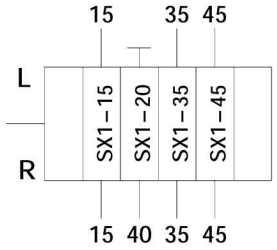
METHOD OF OPERATION

The individual components of a complete progressive distributor are the inlet element (without delivery piston), central element (dosage element) and the end element (without delivery piston); which are united to distribution blocs by means of tie rods, toothed lock washers and hexagon nuts. "O" rings are used to ensure sealing between the idividual elements.
Fig. A. Lubricant flows via the distributor inlet through all distributor elements to piston (I) (Fig. A). Piston (I) is displaced to the left and lubricant is forced from the l.–h. pressure chamber of the supply piston to outlet (1).
Fig. B. Subsequently, the metering pistons 2 & 3 are displaced in a similar manner and lubricant is fed to outlets 2 & 3.
Fig. C. Having displaced piston 3, the lubricant is fed to the lefthand side of piston 1 and lubricant from the righthand chamber is supplied to outlet 4.
The sequence is repeated via pistons 2 & 3, with lubricant being supplied via outlets 5 & 6. After the displacement of the piston 3, the lubricant is fed again to the righthand side of the first piston (Fig. A) and another cycle is commenced in the progressive distributor assembly.
The cycle described above is repeated for as long as lubricant is being supplied to the progressive distributor assembly by the pump.



ORDER DESCRIPTION

example of design



example of order (according to example of design)

progressive distributor — SX1 – 04/07 – 0/0 — R 15 / 40 / 35 / 45
L 15 / – / 35 / 45

number of dosage elements (03 ... 10)
number of outlets (01 ... 20)
pipe connector inlet: without = 0; dia. 4; 6 or 8
pipe connector outlet: without = 0; dia. 4; 6 or 8

lubricant amount division (according to example of design)

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ORDER–NO.		
	Start element	4000 970000
	Dosage elementSX1–05	4000 981000
	Dosage elementSX1–10	4000 982000
	Dosage elementSX1–15	4000 983000
	Dosage elementSX1–20	4000 984000
	Dosage elementSX1–25	4000 985000
	Dosage elementSX1–35	4000 986000
	Dosage elementSX1–45	4000 987000
	Dosage elementSX1–25 with stroke control, 24V DC; r.–h.	4000 985001
	Dosage elementSX1–35 with stroke control, 24V DC; r.–h.	4000 986001
	Dosage elementSX1–45 with stroke control, 24V DC; r.–h.	4000 987001
	Dosage elementSX1–25 with stroke control, 24V DC; l.–h.	4000 985002
	Dosage elementSX1–35 with stroke control, 24V DC; l.–h.	4000 986002
	Dosage elementSX1–45 with stroke control, 24V DC; l.–h.	4000 987002
	Dosage elementSX1–25 with proximity switch, M12x1; 24V DC; r.–h.	4000 985003
	Dosage elementSX1–35 with proximity switch, M12x1; 24V DC; r.–h.	4000 986003
	Dosage elementSX1–45 with proximity switch, M12x1; 24V DC; r.–h.	4000 987003
	Dosage elementSX1–25 with proximity switch, M12x1; 24V DC; l.–h.	4000 985004
	Dosage elementSX1–35 with proximity switch, M12x1; 24V DC; l.–h.	4000 986004
	Dosage elementSX1–45 with proximity switch, M12x1; 24V DC; l.–h.	4000 987004
	Dosage elementSX1–25 with proximity switch, M12x1; 230V AC; r.–h.	4000 985005
	Dosage elementSX1–35 with proximity switch, M12x1; 230V AC; r.–h.	4000 986005
	Dosage elementSX1–45 with proximity switch, M12x1; 230V AC; r.–h.	4000 987005
	Dosage elementSX1–25 with proximity switch, M12x1; 230V AC; l.–h.	4000 985006
	Dosage elementSX1–35 with proximity switch, M12x1; 230V AC; l.–h.	4000 986006
	Dosage elementSX1–45 with proximity switch, M12x1; 230V AC; l.–h.	4000 987006
	Dosage elementSX1 25 with microswitch r.–h.	4000 985007
	Dosage elementSX1 35 with microswitch r.–h.	4000 986007
	Dosage elementSX1 45 with microswitch r.–h.	4000 987007
	Dosage elementSX1 25 with microswitch l.–h.	4000 985008
	Dosage elementSX1 35 with microswitch l.–h.	4000 986008
	Dosage elementSX1 45 with microswitch l.–h.	4000 987008
	End element	4000 990000
	Pressure gaugeidicating 030 bar; colour code silver	40450001
	Pressure gaugeidicating 050 bar; colour code red	40450002
	Pressure gaugeidicating 070 bar; colour code white	40450003
	Pressure gaugeidicating 100 bar; colour code yellow	40450004
	Pressure gaugeidicating 150 bar; colour code black	40450005
	Pressure gaugeidicating 200 bar; colour code green	40450006
	Pressure gaugeidicating 250 bar; colour code blue	40450007
	Stroke indicator	435000110
	Proximity switch; M12x1; 24V DC	100091013
	Proximity switch; M12x1; 230V AC	100091006
	Microswitch	100091103

ORDER–NO.	Tie rods (2 ea. per distributor) for	
	03 ea. dosage elements	002141013
	04 ea. dosage elements	002141014
	05 ea. dosage elements	002141015
	06 ea. dosage elements	002141016
	07 ea. dosage elements	002141017
	08 ea. dosage elements	002141018
	09 ea. dosage elements	002141019
	10 ea. dosage elements	002141020
	washers (4 ea. per distributor)	0900125002132
	nuts (4 ea. per distributor)	090098200113
	Distributor bridge	4000980010010
	Distributor bridge with outlet	4000980010011
	Threaded union with non–return valve GE 6 R1/8″	0438000064
	Threaded union with non–return valve GE 8 R1/8″	0438000063

NOTICES

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Wheel flange central lubrication systems
Progressive distributors
Control and monitoring units

BAL SX1 0997GB

Subject to modifications !

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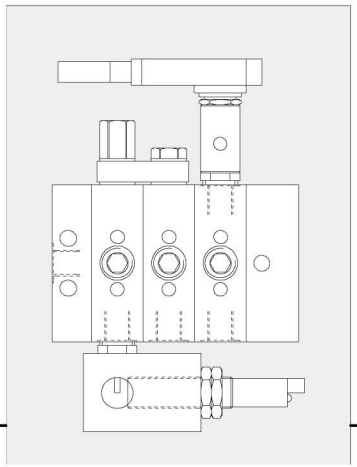
PROGRESSIVE DISTRIBUTOR

TYPE **SX1**

Operating– and Maintenance Instructions



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GENERAL

Progressive distributors type SX1 are defined as assemblies containing a series of pistons, whose function is to deliver lubricant to bearings; the lubricant itself provides an hydraulic force to operate these pistons in a progressive sequence: thus, each bearing connected to a piston receives a metered supply of lubricant, one after the other.
Should there be an obstacle to the flow of lubricant, e. g. crushing of the lubricant delivery pipe or excessive back pressure in the bearing, the progressive distributor block will be unable to proceed with this cycle. This blockage can be used to monitor the operation of a distributor assembly: when using an automatic pump, like the electric pump FKGM – EP, lubricant will be delivered via the pressure relief valve on the relevant pump element, thus giving an indication of the blockage. The progressive distributors are assembled in modular form and can suit the relevant number of lubrication points by extension or reduction in the number of individual elements. This modular design allows for combinations of various elements with differing rates of lubricant delivery.
Delivery outputs per piston stroke are achieved by the use of different pistons. In order to achieve a complete and correct cycle of operation, a progressive distributor assembly must always comprise a minimum of three operating elements.

TECHNICAL DATA

model	Follower piston distributors of modular design
dosage volume:	see table
no. of dosage elements:	minimum 3 maximum 10
control pressure:	5 bar
permissible excessive pressure:	400 bar
volume stream range (oil)	5 up to 500 cm^3 / min.
lubricants:	oil and grease
viscosity range of oil:	> 50 mm^2 / sec.
penetration range:	NLGI – Kl. 3
temperature range:	– 30° C up to + 80° C
operating temperature:	medium: 0° C up to + 70° C
material:	steel, zinc – plated
weight (without couplings):	see table in dimensional drawing

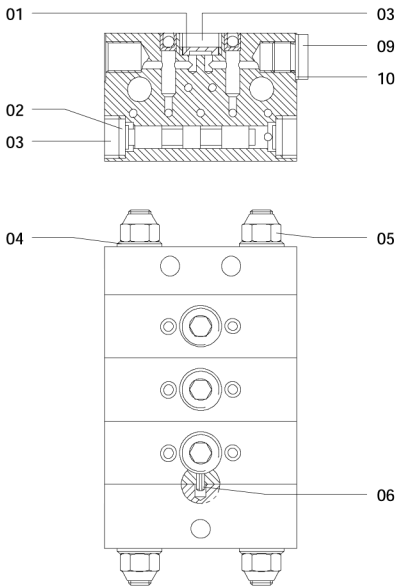
dosage volumes:

dosage element SX1 – 05	code 05	0,068 cm^3 at outlet
dosage element SX1 – 10	code 10	0,105 cm^3 at outlet
dosage element SX1 – 15	code 15	0,150 cm^3 at outlet
dosage element SX1 – 20	code 20	0,210 cm^3 at outlet
dosage element SX1 – 25	code 25	0,275 cm^3 at outlet
dosage element SX1 – 35	code 35	0,350 cm^3 at outlet
dosage element SX1 – 45	code 45	0,430 cm^3 at outlet

SPARE PART LIST

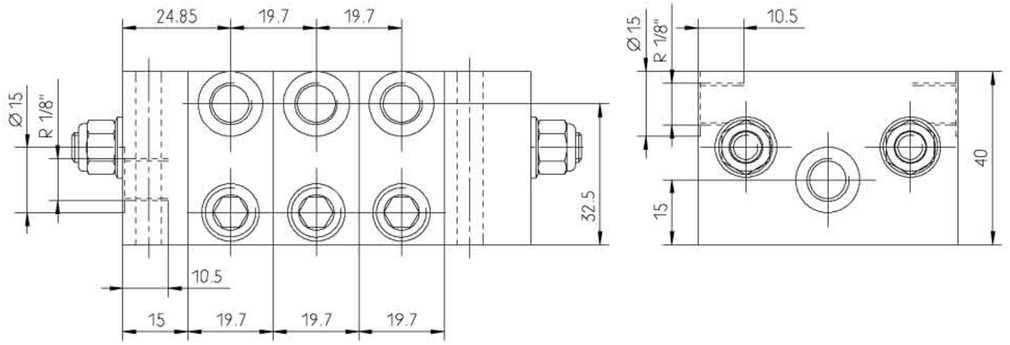
Item	Description	Part No.
01	seal allowing change of positions	0802000291
02	gasket	0802000295
03	lock screw for gasket	0802000300
04	washers (4 ea. per distributor)	0900125002132
05	nuts (4 ea. per distributor)	090098200113
06	clamping sleeve	09i0875201411
07	kit of seals (dosage element)	4000 98D000
08	kit of seals (starting element)	4000 97D000
09	plugscrew (outlet)	090090800313
10	sealing ring for plugscrew	090760303911

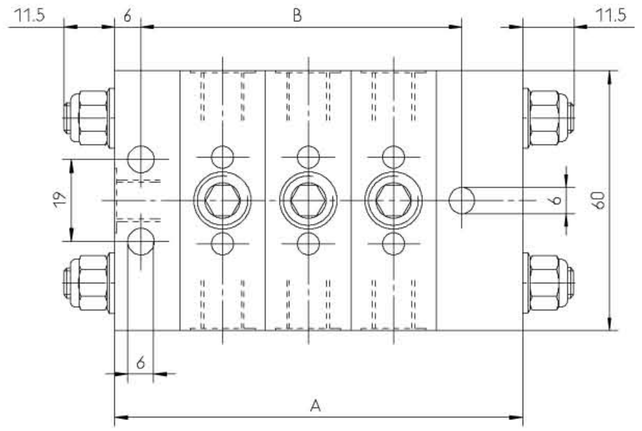
SPARE PART DRAWING



Description	Part No.
Dosage element SX1 25 with microswitch r.–h.	4000 985007
Dosage element SX1 35 with microswitch r.–h.	4000 986007
Dosage element SX1 45 with microswitch r.–h.	4000 987007
Dosage element SX1 25 with microswitch l.–h.	4000 985008
Dosage element SX1 35 with microswitch l.–h.	4000 986008
Dosage element SX1 45 with microswitch l.–h.	4000 987008
End element	4000 990000
Pressure gauge idicating 030 bar; colour code silver	40450001
Pressure gauge idicating 050 bar; colour code red	40450002
Pressure gauge idicating 070 bar; colour code white	40450003
Pressure gauge idicating 100 bar; colour code yellow	40450004
Pressure gauge idicating 150 bar; colour code black	40450005
Pressure gauge idicating 200 bar; colour code green	40450006
Pressure gauge idicating 250 bar; colour code blue	40450007
Stroke indicator	435000110
Proximity switch; M12x1; 24V DC	100091013
Proximity switch; M12x1; 230V AC	100091006
Microswitch	100091103
Tie rods (2 ea. per distributor) for	
03 ea. dosage elements	002141013
04 ea. dosage elements	002141014
05 ea. dosage elements	002141015
06 ea. dosage elements	002141016
07 ea. dosage elements	002141017
08 ea. dosage elements	002141018
09 ea. dosage elements	002141019
10 ea. dosage elements	002141020
Threaded union GE 4 R1/8"	04012010906
Threaded union GE 6 R1/8"	04012000906
Threaded union GE 8 R1/8"	04012020906
Threaded union with non–return valve GE 6 R1/8"	0438000064
Threaded union with non–return valve GE 8 R1/8"	0438000063
Distributor bridge	4000980010010
Distributor bridge with outlet	4000980010011
gasket for distributor bridge, top side	090760305121
gasket for distributor bridge, bottom side	090760305221

DIMENSIONAL DRAWING



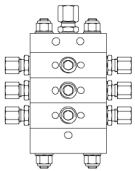


distributor	No. of dosage elements	measure A	measure B	weight
SX1 3/6	03	94,1 mm	74,1 mm	1,600 kg
SX1 4/8	04	113,8 mm	93,8 mm	1,925 kg
SX1 5/10	05	133,5 mm	113,5 mm	2,280 kg
SX1 6/12	06	153,2 mm	133,2 mm	2,580 kg
SX1 7/14	07	172,9 mm	152,9 mm	2,900 kg
SX1 8/16	08	192,6 mm	172,6 mm	3,230 kg
SX1 9/18	09	212,3 mm	192,3 mm	3,560 kg
SX1 10/20	10	232,0 mm	212,0 mm	3,890 kg

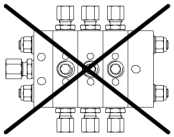
INSTALLATION

- SX 1 progressive distributor assemblies always should be installed with the pistons in horizontal position.
- The mounting surface must be flat and without obstructions to satisfactory pipe runs.

CORRECT



CORRECT



WRONG

METHOD OF OPERATION

The individual components of a complete progressive distributor are the inlet element (without delivery piston), central element (dosage element) and the end element (without delivery piston); which are united to distribution blocs by means of tie rods, toothed lock washers and hexagon nuts. "O" rings are used to ensure sealing between the idividual elements.
Fig. A. Lubricant flows via the distributor inlet through all distributor elements to piston (I) (Fig. A). Piston (I) is displaced to the left and lubricant is forced from the l.–h. pressure chamber of the supply piston to outlet (1).
Fig. B. Subsequently, the metering pistons 2 & 3 are displaced in a similar manner and lubricant is fed to outlets 2 & 3.
Fig. C. Having displaced piston 3, the lubricant is fed to the lefthand side of piston 1 and lubricant from the righthand chamber is supplied to outlet 4.
The sequence is repeated via pistons 2 & 3, with lubricant being supplied via outlets 5 & 6. After the displacement of the piston 3, the lubricant is fed again to the righthand side of the first piston (Fig. A) and another cycle is commenced in the progressive distributor assembly.
The cycle described above is repeated for as long as lubricant is being supplied to the progressive distributor assembly by the pump.

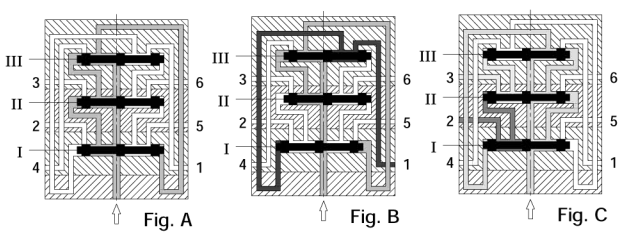
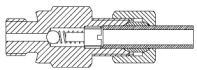


Fig. A Fig. B Fig. C

NON RETURN VALVE

The threaded outlet union with integrated non–return valve is used in SX 1 progressive distributors for points of lubrication or lubrication circuits with increased counterpressure, in order to ensure perfect distributor operation.



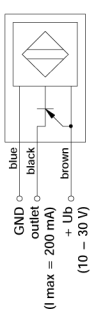
PART NO. (supplementary and spare parts)

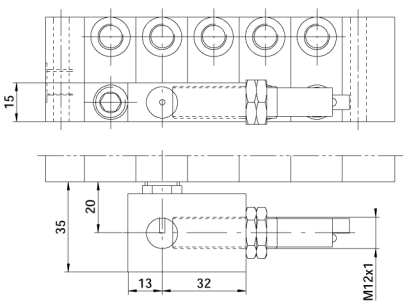
Description	Part No.
Start element	4000 970000
Dosage element SX1–05	4000 981000
Dosage element SX1–10	4000 982000
Dosage element SX1–15	4000 983000
Dosage element SX1–20	4000 984000
Dosage element SX1–25	4000 985000
Dosage element SX1–35	4000 986000
Dosage element SX1–45	4000 987000
Dosage element SX1–25 with stroke control, 24V DC; r.–h.	4000 985001
Dosage element SX1–35 with stroke control, 24V DC; r.–h.	4000 986001
Dosage element SX1–45 with stroke control, 24V DC; r.–h.	4000 987001
Dosage element SX1–25 with stroke control, 24V DC; l.–h.	4000 985002
Dosage element SX1–35 with stroke control, 24V DC; l.–h.	4000 986002
Dosage element SX1–45 with stroke control, 24V DC; l.–h.	4000 987002
Dosage element SX1–25 with proximity switch, 24V DC; r.–h.	4000 985003
Dosage element SX1–35 with proximity switch, 24V DC; r.–h.	4000 986003
Dosage element SX1–45 with proximity switch, 24V DC; r.–h.	4000 987003
Dosage element SX1–25 with proximity switch, 24V DC; l.–h.	4000 985004
Dosage element SX1–35 with proximity switch, 24V DC; l.–h.	4000 986004
Dosage element SX1–45 with proximity switch, 24V DC; l.–h.	4000 987004
Dosage element SX1–25 with proximity switch, 230V AC; r.–h.	4000 985005
Dosage element SX1–35 with proximity switch, 230V AC; r.–h.	4000 986005
Dosage element SX1–45 with proximity switch, 230V AC; r.–h.	4000 987005
Dosage element SX1–25 with proximity switch, 230V AC; l.–h.	4000 985006
Dosage element SX1–35 with proximity switch, 230V AC; l.–h.	4000 986006
Dosage element SX1–45 with proximity switch, 230V AC; l.–h.	4000 987006

CONTROL UNITS

Proximity switch

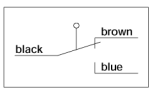
The proximity switch installed as a control unit in place of the plugscrew is used to check the stroke movement of a piston. A switching rhythm is initiated with each cycle of operation of the dosage pistons.
As the switching pin is combined with the dosage piston, retrofit installation is possible only by replacement of the whole dosage element.



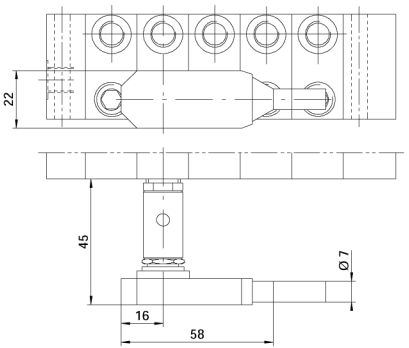


Microswitch

The method of operation of the microswitch used as a control unit is the same as that of the proximity switch. In view of the limited mechanical service life, progressive distributors with this control unit should be used only for systems with low rates of strokes.



U_{max} = 250 V/25 – 60 Hz
= 100 V – DC
I_{max} = 1 A / 230 V

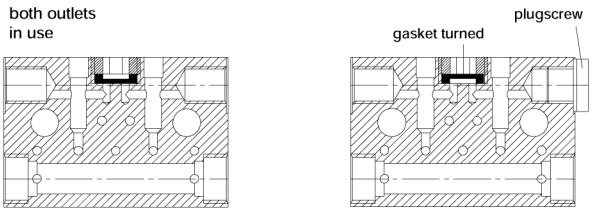


CLOSING / INTERCONNECTING OF OUTLETS

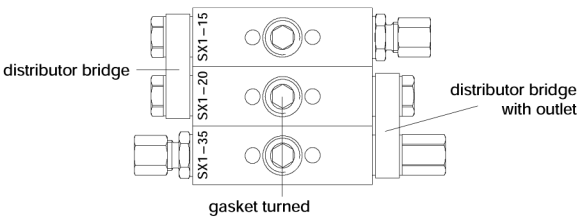
If there should be no need for use of some distributor outlet, it can be closed without any problem, taking into account the following points:
- The supply rate of the outlet to be closed must be added to the other outlet of the dosage element (installation of a smaller dosage element may be useful).
- Remove the packing lock screw, **turn the packing,** and re – tighten the packing lock screw.
- Use a plug screw to protect the outlet thread against contamination and dirtiness.

To increase the supply rate of an outlet, one or more outlets may be combined by turning the packing which allows change of positions or by use of a distributor bridge.

Combination of two outlets **of one dosage element** by turning the packing for change of positions



Combination of two outlets of dosage elements arranged in series, by means of a distributor bridge.



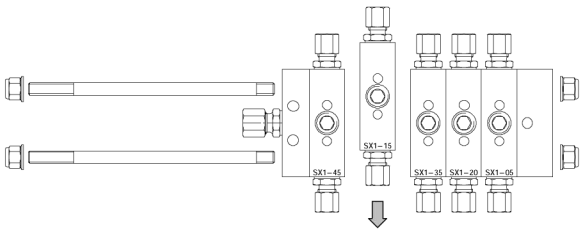
When distributor bridges are used, the supply rates of interconnected outlets must be added to each other.

In this example:
0,150 cm^3 + 0,210 cm^3 + 0,210 cm^3 + 0,350 cm^3 = 0,920 cm^3

EXTENSION OF SYSTEMS

Progressive distributors, SX1, consist of modular elements which can be extended or reduced, when required. This means that a further one or two outlets can be fed if a central element (dosage element) is added, for example, a distributor with 8 outlets (4 dosage elements) can be extended to up to 10 outlets (5 dosage elements).

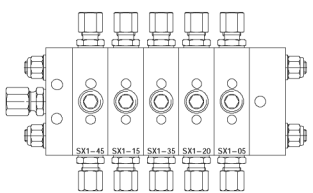
- Remove the cap nuts from the two ends of the distributor and remove the tie rods.
- Disassemble the distributor at that point where extension or reduction is to be done.
- Install (or remove, as required) the dosage element.



- Assemble distributor and tie rod for the distributor size concerned as per table herebelow. (Torque per tie rod: 12 Nm).

Distributor size	Tie rod size	Distributor size	Tie rod size
SX1 3/6	M 7 x 117	SX1 7/14	M 7 x 196
SX1 4/8	M 7 x 136	SX1 8/16	M 7 x 216
SX1 5/10	M 7 x 156	SX1 9/18	M 7 x 236
SX1 6/12	M 7 x 176	SX1 10/20	M 7 x 256

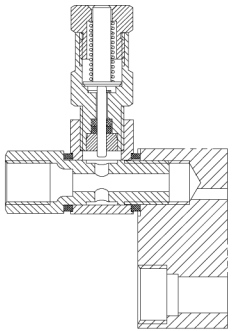
- Distributor after extension!



CONTROL INSTRUMENTS

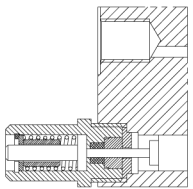
Pressure indicator

The pressure indicator, installed in the outlets by use of a swivelling union, makes appear – against the spring force – stroke indicator pin if there should be excessive service pressure or blockage of some lubricant pipe. As soon as the pressure in the lubricant pipe is decreased, for ex. by opening of the threaded union, that stroke indicator pin will return to its original position. Whenever those pressure indicators are used, installation into all pressure outlets is recommended in order to ensure quick identification of any blocked lubricant pipes.



Stroke indicator

The stroke indicator (retrofit installation in place of the plug screw being possible) shows the piston movement of the progressive distributor. Each operation of the dosage pistons, i.e. after ejection of lubricant was effected from all the outlets, this stroke operation is made visible by that pin. That stroke indicator pin can be used also for switch operation purposes, its operational limits however being restricted to a service pressure of 40 bar and max. 50 strokes/minute.



Stroke check assembly

Function of the stroke check operation is the same as that of the stroke indicator, however there is no restriction of its service pressure nor of its number of strokes, as the indicator pin is fixed to the dosage piston. Retrofit installation of the stroke check assembly is possible only by replacement of some dosage element.