## RE 20 482/07.02

Replaces: 10.97

## Pre-fill valve <br> Type SF

Nominal sizes 125 to 400
Series 4X
Maximum operating pressure 350 bar


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4 to 6

Ordering details


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Connection type A (for flange connections)

Connection type B
(for reservoir mounting)

Connection type K
(as check valve)

## Function, section

The type SF is a hydraulic pilot operated check valve. It is used for leak-free isolation of pressurised circuits, primarly press cylinders. Due it its good flow characteristics and the relatively low closing force of the main poppet compression spring (5), the valve is ideally suited for anti-cavitation functions and the pre-filling, for example, of the main cylinders on a press during fast closing movements.
The valve basically consists of the housing (1), control spool (2), main poppet (3), pilot poppet (4) and compression springs (5) and (6).

## Version without de-compression

In the valve free-flow occurs from A to B. In the opposite direction the main poppet (3) is held on its seat by spring (5) and the pressure acting on port B . When control port X is pressurised, the control spool (2) is forced down against the spring (6) and moves the main poppet (3) from its seat. Hence the valve now also has free-flow in the opposite direction.

## Version with de-compression

The way in which this version operates is very similar to the way in which the version without de-compression.
When control port X is pressurised the control spool (2) at first only opens the pilot poppet (4). Shock-free de-compression of the entrapped fuild is therby guaranteed.

## For both versions the following is true:

The opening time can be influenced by fitting a throttle in the pilot line.
The valve is designed on a modular basis, i.e. all models can be built up from one basic valve.
A limit switch can be fitted on the pilot piston to monitor the open position (on request).
See page 3 for the technical data to calculate the required control pressure.


Type SF... A1-1-4X/


Type SF... A0-1-4XI

Technical data (for applications outside these applications, please consult us!)


| Pressure fluid | M ineral oil (HL, HLP) to DIN 51 524; <br> Fast bio-degradable pressure fluids to <br> VDMA 24 568 (also see RE 90 221); HETG (rape seed oil); <br> Other pressure fluids on request |
| :--- | :--- |
| Pressure fluid temperature range | ${ }^{\circ} \mathrm{C}$ |
| Viscosity range | -30 to +80 |
| Degree of contamination | $\mathrm{mm}^{2} / \mathrm{s}$ |
| 10 to 800 |  | | Maximum permissible degree of contamination of the pressure |
| :--- |
| fluid is to NAS 1638 class 9. We therefore recommend a filter with |
| a minimum retention rate of $\mathrm{B}_{10} \geq 75$. |

Calculation of the required control pressure for opening the valve


| NS | $\mathbf{A}_{\mathbf{1}}$ <br> in $\mathbf{c m}^{\mathbf{2}}$ | $\mathbf{A}_{\mathbf{2}}{ }^{2)}$ <br> in $\mathbf{c m}^{\mathbf{2}}$ | $\mathbf{A}_{\mathbf{3}}$ <br> in $\mathbf{c m}^{\mathbf{2}}$ | $\mathbf{s}_{\mathbf{1}}$ <br> in $\mathbf{m m}$ | $\mathbf{s}_{\mathbf{2}}$ <br> in $\mathbf{m m}$ | $\mathbf{F}_{\mathbf{1}}$ <br> in daN | $\mathbf{F}_{\mathbf{2}}$ <br> in daN | $\mathbf{V}_{\mathbf{s t}}$ <br> in $\mathbf{c m}^{\mathbf{3}}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1 2 5}$ | 101 | 2.54 | 24.63 | 28 | 19 | 22 to 36 | 116 to 234 | 46.8 |
| $\mathbf{1 5 0}$ | 153.93 | 3.8 | 38.48 | 35 | 23 | 35 to 57 | 195 to 355 | 88.5 |
| $\mathbf{2 0 0}$ | 216.42 | 4.9 | 50.26 | 42 | 27 | 49 to 76 | 246 to 454 | 135.7 |
| $\mathbf{2 5 0}$ | 373.25 | 9.62 | 95.03 | 53 | 33 | 87 to 143 | 476 to 726 | 313.6 |
| $\mathbf{3 0 0}$ | 572.6 | 13.85 | 143.14 | 63 | 38 | 149 to 263 | 716 to 1104 | 543.9 |
| $\mathbf{3 5 0}$ | 826.57 | 21.24 | 213.83 | 78 | 46 | 218 to 388 | 1075 to 1560 | 983.6 |
| $\mathbf{4 0 0}$ | 1158 | 32.16 | 314.16 | 93 | 53 | 331 to 623 | 1591 to 2297 | 1665 |



| NS | B1 | B2 | B3 | 0 D1 | Ø D2 | D3 | Ø D4 | Ø D5 | Ø D6 | Ø D7 | Ø D8 | 0 D9 | Ø D10 | 0 D11 | Ø D12 | Ø D13 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 125 | 210 | 22 | 3 | 110 | 42 | G3/4 | 178 | 250 | 188 | 132 | 210 | 18 | 33 | 120 | 175 | 200 |
| 150 | 250 | 22 | 3 | 130 | 42 | G3/4 | 229 | 285 | 212 | 159 | 240 | 22 | 40 | 145 | 220 | 250 |
| 200 | 275 | 24 | 3 | 150 | 47 | G1 | 273 | 340 | 268 | 207 | 295 | 22 | 40 | 155 | 265 | 290 |
| 250 | 330 | 26 | 3 | 190 | 58 | G1 1/4 | 356 | 405 | 320 | 260 | 355 | 26 | 46 | 180 | 350 | 380 |
| 300 | 380 | 28 | 4 | 225 | 58 | G1 1/4 | 419 | 460 | 378 | 310 | 410 | 26 | 46 | 220 | 420 | 450 |
| 350 | 440 | 30 | 4 | 275 | 65 | G1 1/2 | 508 | 520 | 438 | 340 | 470 | 26 | 55 | 295 | 515 | 550 |
| 400 | 530 | 32 | 4 | 320 | 65 | G1 1/2 | 572 | 580 | 490 | 390 | 525 | 30 | 68 | 345 | 600 | 625 |


| NS | Ø D14 | Ø D15 | Ø D16 | D17 | H1 | H2 | H3 | H4 | H5 | N1 | N2 | T1 | T2 | T3 | T4 | T5 | R1 | Weight |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1 2 5}$ | 250 | 310 | 180 | M $30 \times 2$ | 490 | 136 | 185 | 35 | 80 | 8 | 12 | 37 | 26 | 5 | 40 | 1 | 3 | 75 kg |
| $\mathbf{1 5 0}$ | 310 | 380 | 230 | $M 36 \times 3$ | 604 | 160 | 220 | 35 | 90 | 8 | 12 | 37 | 26 | 5 | 60 | 1 | 3 | 135 kg |
| $\mathbf{2 0 0}$ | 350 | 420 | 270 | $M 36 \times 3$ | 695 | 180 | 255 | 35 | 100 | 12 | 15 | 37 | 26 | 5 | 50 | 1 | 3 | 185 kg |
| $\mathbf{2 5 0}$ | 445 | 530 | 355 | $M 42 \times 3$ | 835 | 240 | 320 | 55 | 120 | 12 | 18 | 57 | 42 | 8 | 60 | 1 | 5 | 365 kg |
| $\mathbf{3 0 0}$ | 525 | 610 | 425 | $M 42 \times 3$ | 1085 | 305 | 390 | 55 | 160 | 12 | 24 | 57 | 42 | 8 | 75 | 1 | 5 | 625 kg |
| $\mathbf{3 5 0}$ | 640 | 750 | 520 | $\mathrm{M} 52 \times 3$ | 1259 | 360 | 460 | 55 | 200 | 16 | 24 | 57 | 42 | 8 | 80 | 1 | 5 | 1200 kg |
| $\mathbf{4 0 0}$ | 720 | 850 | 605 | $\mathrm{M} 64 \times 3$ | 1463 | 423 | 510 | 55 | 210 | 16 | 20 | 57 | 42 | 8 | 95 | 1 | 5 | 1580 kg |



Converting connection type "B" to connection type " K"

1. Loosen the fixing screws (20)
2. Remove the control cylinder (4)

4 Control cylinder
5 Name plate
N2 Number of valve fixing screws equally spaced about the circumference. Fixing screws to DIN 912-10.9

| NS 125 | $M 30 \times 2 \times 120 ;$ | $M_{A}=1800 \mathrm{Nm}$ |
| :--- | :--- | :--- |
| NS 150 | $M 36 \times 3 \times 150 ;$ | $M_{A}=3100 \mathrm{Nm}$ |
| NS 200 | $M 36 \times 3 \times 150 ;$ | $M_{A}=3100 \mathrm{Nm}$ |
| NS 250 | $M 42 \times 3 \times 180 ;$ | $M_{A}=5100 \mathrm{Nm}$ |
| NS 300 | $M 42 \times 3 \times 230 ;$ | $M_{A}=5100 \mathrm{Nm}$ |
| NS 350 | $M 52 \times 3 \times 280 ;$ | $M_{A}=10800 \mathrm{Nm}$ |
| NS 400 | M $64 \times 3 \times 300 ;$ | $M_{A}=20000 \mathrm{Nm}$ | must be ordered separately.

T2 Depth of fit


| NS | Ø D1 | Ø D2 | D3 | Ø D10 | Ø D11 | Ø D12 | Ø D13 | Ø D14 | Ø D15 | Ø D16 | D17 | Ø D18 | Ø D19 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1 2 5}$ | 110 | 42 | $\mathrm{G} 3 / 4$ | 33 | 120 | 175 | 200 | 250 | 310 | 180 | M $30 \times 2$ | 159 | 156 |
| $\mathbf{1 5 0}$ | 130 | 42 | $\mathrm{G} 3 / 4$ | 40 | 145 | 220 | 250 | 310 | 380 | 230 | M $36 \times 3$ | 200 | 195 |
| $\mathbf{2 0 0}$ | 150 | 47 | G 1 | 40 | 155 | 265 | 290 | 350 | 420 | 270 | $\mathrm{M} 36 \times 3$ | 235 | 230 |
| $\mathbf{2 5 0}$ | 190 | 58 | $\mathrm{G1} 1 / 4$ | 46 | 180 | 350 | 380 | 445 | 530 | 355 | $\mathrm{M} 42 \times 3$ | 315 | 310 |
| $\mathbf{3 0 0}$ | 225 | 58 | $\mathrm{G1} 1 / 4$ | 46 | 220 | 420 | 450 | 525 | 610 | 425 | $\mathrm{M} 42 \times 3$ | 375 | 370 |
| $\mathbf{3 5 0}$ | 275 | 65 | $\mathrm{G1} 1 / 2$ | 55 | 295 | 515 | 550 | 640 | 750 | 520 | $\mathrm{M} 52 \times 3$ | 455 | 450 |
| $\mathbf{4 0 0}$ | 320 | 65 | $\mathrm{G1} 1 / 2$ | 68 | 345 | 600 | 625 | 720 | 850 | 605 | M $64 \times 3$ | 530 | 525 |


| NS | H1 | H2 | H4 | H5 | H6 | H7 | H8 | N2 | T1 | T2 | T3 | T4 | T5 | R1 | Weight |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1 2 5}$ | 490 | 136 | 35 | 80 | 25 | 207 | 28 | 12 | 37 | 26 | 5 | 40 | 1 | 3 | 60 kg |
| $\mathbf{1 5 0}$ | 604 | 160 | 35 | 90 | 26 | 248 | 31 | 12 | 37 | 26 | 5 | 60 | 1 | 3 | 105 kg |
| $\mathbf{2 0 0}$ | 695 | 180 | 35 | 100 | 27 | 298 | 36 | 15 | 37 | 26 | 5 | 50 | 1 | 3 | 145 kg |
| $\mathbf{2 5 0}$ | 835 | 240 | 55 | 120 | 38 | 379 | 44 | 18 | 57 | 42 | 8 | 60 | 1 | 5 | 295 kg |
| $\mathbf{3 0 0}$ | 1085 | 305 | 55 | 160 | 38 | 442 | 59 | 24 | 57 | 42 | 8 | 75 | 1 | 5 | 545 kg |
| $\mathbf{3 5 0}$ | 1259 | 360 | 55 | 200 | 50 | 500 | 60 | 24 | 57 | 42 | 8 | 80 | 1 | 5 | 1000 kg |
| $\mathbf{4 0 0}$ | 1463 | 423 | 55 | 210 | 63 | 577 | 80 | 20 | 57 | 42 | 8 | 95 | 1 | 5 | 1400 kg |



5 Name plate
N2 Number of valve fixing screws equally spaced about the circumference (for dimensions see page 5)
T2 Depth of fit
T6 Depth of fit

| NS | Ø D10 | Ø D11 | Ø D12 | Ø D13 | Ø D14 | Ø D15 | Ø D16 | D17 | Ø D20 | Ø D21 | H2 | H4 | H5 | N2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 125 | 33 | 120 | 175 | 200 | 250 | 310 | 180 | M $30 \times 2$ | 130 | 105 | 136 | 35 | 80 | 12 |
| 150 | 40 | 145 | 220 | 250 | 310 | 380 | 230 | M $36 \times 3$ | 160 | 130 | 160 | 35 | 90 | 12 |
| 200 | 40 | 155 | 265 | 290 | 350 | 420 | 270 | M $36 \times 3$ | 185 | 155 | 180 | 35 | 100 | 15 |
| 250 | 46 | 180 | 350 | 380 | 445 | 530 | 355 | M $42 \times 3$ | 250 | 206 | 240 | 55 | 120 | 18 |
| 300 | 46 | 220 | 420 | 450 | 525 | 610 | 425 | M $42 \times 3$ | 300 | 255 | 305 | 55 | 160 | 24 |
| 350 | 55 | 295 | 515 | 550 | 640 | 750 | 520 | M $52 \times 3$ | 350 | 305 | 360 | 55 | 200 | 24 |
| 400 | 68 | 345 | 600 | 625 | 720 | 850 | 605 | M $64 \times 3$ | 400 | 355 | 423 | 55 | 210 | 20 |


| NS | T1 | T2 | T3 | T4 | T5 | T6 | T7 | R1 | R2 | Weight |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1 2 5}$ | 37 | 26 | 5 | 40 | 14 | 12 | 3 | 3 | 0.5 | 45 kg |
| $\mathbf{1 5 0}$ | 37 | 26 | 5 | 60 | 14 | 12 | 3 | 3 | 0.5 | 90 kg |
| $\mathbf{2 0 0}$ | 37 | 26 | 5 | 50 | 14 | 12 | 3 | 3 | 0.5 | 105 kg |
| $\mathbf{2 5 0}$ | 57 | 42 | 8 | 60 | 21 | 19 | 4.5 | 5 | 1.6 | 205 kg |
| $\mathbf{3 0 0}$ | 57 | 42 | 8 | 75 | 21 | 19 | 4.5 | 5 | 1.6 | 355 kg |
| $\mathbf{3 5 0}$ | 57 | 42 | 8 | 80 | 30 | 27 | 8 | 5 | 1.6 | 670 kg |
| $\mathbf{4 0 0}$ | 57 | 42 | 8 | 95 | 30 | 27 | 6 | 5 | 1.6 | 950 kg |

Maximum flow $\mathbf{q}_{\mathrm{v}}$ in $\mathrm{L} / \mathrm{min}$ (A to $B$ ) for various applications

| NS | $\mathbf{1 2 5}$ | $\mathbf{1 5 0}$ | $\mathbf{2 0 0}$ | $\mathbf{2 5 0}$ | $\mathbf{3 0 0}$ | $\mathbf{3 5 0}$ | $\mathbf{4 0 0}$ |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Application 1 | 2500 | 3900 | 5600 | 10000 | 15600 | 22480 | 30600 |
| Application 2 | 2500 | 3650 | 5600 | 10000 | 14000 | 19050 | 24880 |
| Application 3 | 1700 | 2440 | 4340 | 6775 | 9750 | 13280 | 17340 |
| Application 4 | 1470 | 2120 | 3770 | 5890 | 8480 | 11540 | 15080 |
| Application 5 | 590 | 850 | 1510 | 2360 | 3400 | 4620 | 6050 |

If the pre-fill valve or pipe line is too small, gasses may be released from the oil with the resulting consiquential effects, which in turn often lead, in the long term, to damage to the cylinder seals.

## Applications

## Application 1



Application 3


Application 5


Application 2


Application 4


1 Cylinder
2 Pre-fill valve
3 This metal sheet is not included within the scope of supply. Its use avoids the formation of a depressed suction vortex if the reservoir is too small and at low oil levels (a).
a Min. 300 mm when cylinder is extended
b Up to 1000 mm at the maximum given flow


Please consult us when operating close to the limiting parameters. How ever, it is often sufficient to choose a pipe one size larger.

| Bosch Rexroth AG | Bosch Rexroth Limited | The data specified above only serve to describe <br> Industrial Hydraulics |
| :--- | :--- | :--- |
| the product. No statements concerning a certain |  |  |
| D-97813 Lohr am M ain | Cromwell Road, St Neots, | can be derived from our information. It must be |
| Zum Eisengießer 1 • D-97816 Lohr am Main | Cambs, PE19 2ES | remembered that our products are subject to a |
| Telefon $09352 / 18-0$ | Tel: $01480 / 223256$ | natural process of wear and ageing. |
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| eMail documentation@ boschrexroth.de | E-mail: info@boschrexroth.co.uk |  |
| Internet www.boschrexroth.de |  |  |

