

#### Actual issue see www.roemheld-group.com

# Subject to modifications

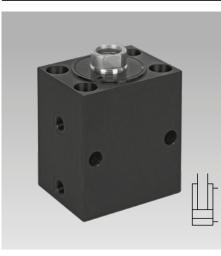
# Issue 11-21 E B 1.5100

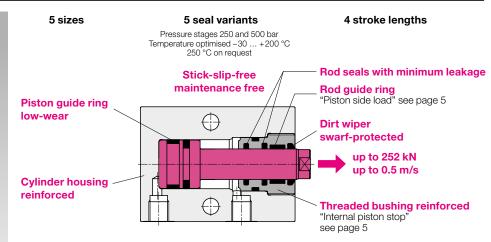
# **Block Cylinders S**

HILMA = STARK

OEMHELD

# double acting, max. operating pressure 250 bar and 500 bar use as punching cylinder max. 250 bar





#### Application

Hydraulic block cylinders are universally used for all linear movements with high force requirements and very small dimensions.

The block cylinder S can withstand high mechanical and thermal loads. Its preferred applications are:

- Punching\*)
- Deburring
- Forming such as bending, riveting, stamping • In mould making for actuating core pullers and slides
- In automatic manufacturing systems with very short cycle times

## Function

The double-acting function ensures high function safety as well as exactly calculable and repeatable stroke times.

## Description

The block cylinders S are equipped with the latest sealing technology, so that optimally adapted versions are available depending on the operating pressure (250 or 500 bar), temperature and hydraulic fluid.

At the piston rod outlet, the dirt wipers are largely protected against swarf by the recessed installation. All series are equipped with piston and rod guide rings which absorb side loads between the sliding components and prevent direct metal contact. This increases the service life and minimizes leakage. The admissible piston side load depends on the stroke and can be taken from the diagrams on page 5.

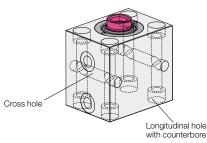
The internal piston stops are of sturdy design. The admissible piston speed depends on the mass fixed to the piston and can be read in the diagram on page 5.

## Important notes see page 6.

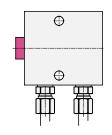
\*) Maximum operating pressure 250 bar Required for punching applications due to the high load caused by the cutting impact. Even with the high-pressure version (500 bar), the pressure must be limited to 250 bar. The advantage of this is the longer service life of the high-pressure seals.

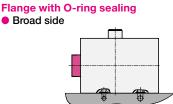
**Fixing possibilities** 

Possible mounting holes



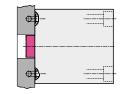
Hydraulic connecting possibilities **Pipe thread** 





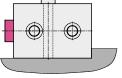
Rod side

Bottom side

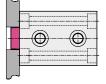


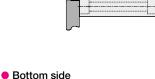










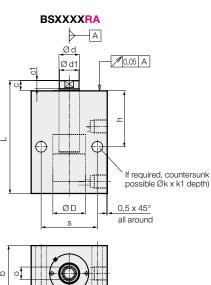


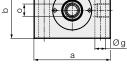
# **Pipe thread**

2 cross holes and

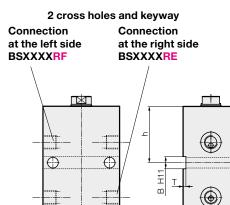
4 longitudinal holes

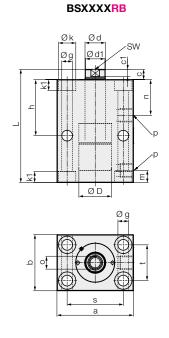






Fixing screws 8.8





Piston with internal thread and housing with centring collar BSXXXXRXXXXN2

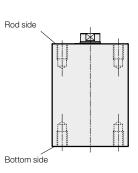
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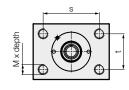
D

# Øef7

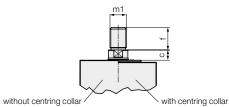
#### 4 threads

at the rod side **BSXXXXRC** at the bottom sideBSXXXXRD





Piston with external thread and housing without centring collar BSXXXXRXXXXN3 with centring collar BSXXXXRXXXN4



Centring collar only with housing RB and RC

Materials

Cylinder housing: high alloy steel, black oxide Piston: case-hardening steel, hardened and

			ground			
Size		4	5	6	7	8
Piston Ø D	[mm]	32	40	50	63	80
Rod Ø d	[mm]	20	25	32	40	50
Stroke ± 0.4	[mm]	25	25	25	25	25
Total length L +0.7/-0.3	[mm]	111	116	127	145	159
Weight, approx.	[kg]	2.7	3.7	5.7	10	18.2
Part no.		BS4XXXRX025NX	BS5XXXRX025NX	BS6XXXRX025NX	BS7XXXRX025NX	BS8XXXRX025NX
Stroke ± 0.4	[mm]	50	50	50	50	50
		136	141	152	170	184
Total length L $+0.7/-0.3$	[mm]					
Weight, approx.	[kg]	3.3	4.6	6.9	11.8	21.1
Part no.		BS4XXXRX050NX	BS5XXXRX050NX	DCCVVVDVCCNIV		BS8XXXRX050NX
Fai ( 110.		DJ4AAAAAUJUNA	DSSAARAUSUNA	BS6XXXRX050NX	BS7XXXRX050NX	DOONAANAUDUNA
Stroke ± 0.4	[mm]	75	75	75	75	75
	<b>[mm]</b> [mm]					
Stroke ± 0.4		75	75	75	75	75
<b>Stroke ± 0.4</b> Total length L +0.9/-0.5	[mm]	<b>75</b> 161	<b>75</b> 166	<b>75</b> 177	<b>75</b> 195	<b>75</b> 209
Stroke ± 0.4 Total length L +0.9/–0.5 Weight, approx. Part no.	[mm] [kg]	75 161 4 BS4XXXRX075NX	75 166 5.4 BS5XXXRX075NX	75 177 8 BS6XXXRX075NX	75 195 13.6 BS7XXXRX075NX	75 209 24 BS8XXXRX075NX
Stroke $\pm$ 0.4 Total length L +0.9/-0.5 Weight, approx. Part no. Stroke $\pm$ 0.4	[mm] [kg] [mm]	75 161 4 BS4XXXRX075NX 100	75 166 5.4 BS5XXXRX075NX 100	75 177 8 BS6XXXRX075NX 100	75 195 13.6 BS7XXXRX075NX 100	75 209 24 BS8XXXRX075NX 100
Stroke $\pm$ 0.4 Total length L $\pm$ 0.9/ $-$ 0.5 Weight, approx. Part no. Stroke $\pm$ 0.4 Total length L $\pm$ 0.9/ $-$ 0.5	[mm] [kg] <b>[mm]</b> [mm]	75 161 4 BS4XXXRX075NX 100 186	75 166 5.4 BS5XXXRX075NX 100 191	75 177 8 BS6XXXRX075NX 100 202	75 195 13.6 BS7XXXRX075NX 100 220	75 209 24 BS8XXXRX075NX 100 234
Stroke $\pm$ 0.4Total length L $\pm$ 0.9/ $-$ 0.5Weight, approx.Part no.Stroke $\pm$ 0.4Total length L $\pm$ 0.9/ $-$ 0.5Weight, approx.	[mm] [kg] [mm]	75 161 4 BS4XXXRX075NX 100 186 4.6	75 166 5.4 BS5XXRX075NX 100 191 6.2	75 177 8 BS6XXXRX075NX 100 202 9.1	75 195 13.6 BS7XXXRX075NX 100 220 15.4	75 209 24 BS8XXXRX075NX 100 234 26.8
Stroke $\pm$ 0.4 Total length L $\pm$ 0.9/ $-$ 0.5 Weight, approx. Part no. Stroke $\pm$ 0.4 Total length L $\pm$ 0.9/ $-$ 0.5	[mm] [kg] <b>[mm]</b> [mm]	75 161 4 BS4XXXRX075NX 100 186	75 166 5.4 BS5XXXRX075NX 100 191	75 177 8 BS6XXXRX075NX 100 202	75 195 13.6 BS7XXXRX075NX 100 220	75 209 24 BS8XXXRX075NX 100 234
Stroke $\pm$ 0.4Total length L $\pm$ 0.9/ $-$ 0.5Weight, approx.Part no.Stroke $\pm$ 0.4Total length L $\pm$ 0.9/ $-$ 0.5Weight, approx.	[mm] [kg] [mm] [mm] [kg]	75 161 4 BS4XXXRX075NX 100 186 4.6	75 166 5.4 BS5XXRX075NX 100 191 6.2	75 177 8 BS6XXXRX075NX 100 202 9.1 BS6XXXRX100NX	75 195 13.6 BS7XXXRX075NX 100 220 15.4	75 209 24 BS8XXXRX075NX 100 234 26.8

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Subject to modifications

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## Technical data • Dimensions • Selection aids

Size       i       5       6       7       8         Piston 0       [mm]       32       40       50       63       80         Rod 0 d       [100]       8.04/4.9       12.667.75       1863/11.9       31.178.0       50.267.03.03         Force to push at       200 bar       [N]       80.4/4.9       12.667.75       1863/11.9       63.17.186       50.267.03.03         Force to push at       200 bar       [N]       40.2       62.8       98.1       165.8       251.3         Force to pull at       250 bar       [N]       12.25       19.1       29       46.5       76.5         Coll volume per 10 rum stroka to extend / stroke to retract       [cm]       8.04/4.9       12.567.7       18.83/1.16       31.17/18.6       50.267.03       100.0760       160.07975         Flange F and E stroke to extend / stroke to retract       [cm]       280/170       460/280       550/320       1000.7600       160.07975         Flange F and E stroke to extend / stroke to retract       [cm]       100       10       14       14         0 cf 17       mm       105       105       13       17 <td< th=""><th></th><th></th><th></th><th></th><th>_</th><th>-</th><th>_</th><th></th></td<>					_	-	_	
Rod of d       Imm       200       25       32       40       500         Effective picton area       atroke to extend/stroke to retract       [mi]       8.04/4.9       12.56/765       19.63/11.59       311.77       8.03         Force to push at       200 bar       [NV]       8.0       13.4       49       77.9       125.6         Force to push at       200 bar       [NV]       4.9       7.7       11.6       18.6       30.6         Force to pull at       200 bar       [NV]       12.25       19.1       29       48.5       76.5         Oli volume per 10 mm stroke to extend / stroke to retract       [mm]       8.04/4.9       12.25/7.7       19.63/11.6       1560/930       500/500       1660/930       2500/157.0         Pine thread       stroke to extend / stroke to retract       [mm]       8.04/170       460/280       650/320       1000/600       1600/976         Bange S       stroke to extend / stroke to retract       [mm]       12       12       15       20       24         C       [mm]       105       630       30       300/580       1600/975       180/110       200/1500							-	-
Effective piston area       stroke to extend/stroke to retract       rem       8.04/4.9       12.66/766       19.63       31.17/18.6       50.28/30.63         Force to push at       250 bar       kM       20.1       31.4       49       77.9       125.6         Force to push at       250 bar       kM       40.2       62.8       98.1       155.8       251.3         Force to pull at       250 bar       kM       4.9       7.7       11.6       18.6       30.6         Coll volume per 10 mm stroke to extend / stroke to retract       (rm)       22.56/7.7       19.63/11.6       31.17/18.6       50.26/30.6         Atmissible flow rate for       astroke to extend / stroke to retract       (rm)       280/17.0       630/380       960/380       1560/930       2500/1530         Flange F and S       stroke to extend / stroke to retract       (rm)       280/170       260/120       550.320       1000/000       1600/975         a       (rm)       10.5       63       75       95       120         Barde F and S       stroke to extend / stroke to retract       (rm)       240.76       31.82       38.7x10.2       24.7         a<								
100 bar       INI       8       12.6       19.6       31.1       50.3         Force to push at       250 bar       INI       40.2       62.8       98.1       155.8       251.3         Force to pull at       250 bar       INI       4.9       7.7       11.6       18.6       30.8         Force to pull at       250 bar       INI       12.25       13.1       29       44.5       76.5         OI volume per 10 mm stroke to extend / stroke to retract       fmill       24.5       38.2       57.9       93       153.1         OI volume per 10 mm stroke to extend / stroke to retract       fmill       80/4/4.9       12.56/7.7       19.63/11.6       51.77.96       500.22       500/1530         Flange F and B       stroke to extend / stroke to retract       fmill       280 /170       460/280       550/320       1000/600       1600/975         a       fmm       15       63       75       95       120         b       fmm       10       10       14       14       14         0 d1 x c1       fmm       12       12       15       20       24 <t< th=""><th></th><th></th><th></th><th>-</th><th>-</th><th>-</th><th>-</th><th></th></t<>				-	-	-	-	
Force to push at       250 bar       [NI       40.2       62.8       98.1       155.8       251.31         100 bar       [NI       4.9       7.7       11.6       18.6       30.6         Force to pull at       250 bar       [NI       12.25       18.1       2.9       48.5       75.3         Ol volume per 10 mm stroke to extend / stroke to retract       [m1       8.04/4.9       12.56/7.7       11.66       18.6       20.6         Admissible flow rate for       admissible flow rate for       57.9       93       153.1         Plage F and 5 stroke to extend / stroke to retract       [m1]       2.60/7.20       650/320       1000/600       1600/975         Flange F and 5 stroke to extend / stroke to retract       [mm]       75       85       100       12       160/975         Flange F and 5       stroke to extend / stroke to retract       [mm]       12       15       2.0       24         C       [mm]       12       12       15       3.6       86       100         B H11       [mm]       13       17       21       14       14       14       14       14       14<	Effective piston area							
500 bar       [N]       40.2       62.8       98.1       155.8       251.3         Force to pull at       250 bar       [N]       12.25       18.1       29       46.5       78.5         600 volume per 10 mm stroke to extend / stroke to retract       [m]       8.04/4.9       12.56/7.7       19.63/11.6       61.77.16       50.26/30.6         Admissible flow rate for       Protected at stroke to extend / stroke to retract       [m]*8       420/120       550/320       1000/600       1600/975         Flange S       stroke to extend / stroke to retract       [m]*8       420/120       550/320       1000/600       1600/975         a       [m]       75       85       100       125       160         b       [m]       75       85       100       125       160         b       [m]       75       85       100       125       160         b       [m]       178       248/7.6       31.82       38.7       120         B H11       [m]       17       18       24.7       31.82       38.7       38.7       120         G d1 x c1       [m]								
100 bar       101 bar <t< td=""><td>Force to push at</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Force to push at							
Force to pull at       250 bar       [kl]       12.25       19.1       29       46.5       76.5         500 bar       [kl]       24.45       38.2       57.9       98       153.1         Oil volume per 10 mm       stroke to extend / stroke to retract       [cm²]       8.04/4.9       12.56/.7.7       19.63/11.6       31.17/18.6       50.26/30.6         Admissible flow rate for       stroke to extend / stroke to retract       [cm²]       8.04/4.9       12.56/.7.7       19.63/11.6       31.17/18.6       50.26/30.6         Flange F and B       stroke to extend / stroke to retract       [cm²]       280/170       460/280       550/320       1000/600       1600/975         a       [mm]       75       85       100       12.5       160         b       [mm]       12       12       15       20       24         c       [mm]       19x.78       24.76       31.8.2       38.74.10.2       48.10.2         d dt x c1       [mm]       19x.78       24.76       31.8.2       38.74.10.2       48.10.2         0 e17       [mm]       10.5       10.5       13       17       21 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
500 bar       PM       24.5       38.2       57.9       9.0       153.1         Oil volume per torms stroke to extend / stroke to retract       [cm?]       8.04/4.9       12.56/7.7       19.65/11.6       31.77/18.6       50.26/30.6         Pipe thread       stroke to extend / stroke to retract       [cm?]s       220/170       460/280       550/320       1000/600       1600/975         Plange F and B       stroke to extend / stroke to retract       [cm?]s       180/110       200/120       550/320       1000/600       1600/975         a       [cm?]s       180/110       100       10       14       14         c       [cm]       12       12       15       80       105         b111       [cm]       [m]       10.5       13       17       21         c       [m] </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
Oil volume per 10 mm stroke to extend / stroke	Force to pull at							
Admissible flow rate for       Pipe thread     stroke to extend / stroke to retract     [cm?/s]     280/170     460/280     550/320     1560/930     1500/470       Flange F and B     stroke to extend / stroke to retract     [cm?/s]     180/110     200/120     550/320     1000/600     1600/975       Flange F and B     stroke to extend / stroke to retract     [cm?/s]     180/110     200/120     550/320     1000/600     1600/975       B     mm     75     85     100     125     160     125     160       b     mm     75     63     75     95     120     24       C     [mm]     12     12     15     20     24       C     [mm]     16     10     14     14       Od rA     [mm]     160     105     13     17     21       h     [mm]     105     10.5     13     17     21       h     [mm]     17     17     20     28     33     33     33     33     33     33     33     33     33     33     34     24 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
Pipe thread       stroke to extend / stroke to retract       [cm?]s       2400/250       630/380       980/680       1560/930       2500/1530         Plange F and B       stroke to extend / stroke to retract       [cm?]s       280/170       460/280       550/320       1000/600       1600/975         a       [mm]       [cm?]s       180/110       200/120       550/320       1000/600       1600/975         a       [mm]       [cm?]s       180/110       200/120       550/320       1000/600       1600/975         B       [mm]       75       85       100       125       160         b       [mm]       10       10       14       14         c       [mm]       19X78       24X76       31X8.2       38.7x10.2       48.10.2         0 e17       [mm]       105       10.5       13       17       21         h       [mm]       10.5       10.5       13       17       21         h       [mm]       10.5       10.5       13       17       21.5         m       [mm]       127       27       30       30 <td></td> <td></td> <td>[cm<sup>3</sup>]</td> <td>8.04/4.9</td> <td>12.56/7.7</td> <td>19.63/11.6</td> <td>31.17/18.6</td> <td>50.26/30.6</td>			[cm <sup>3</sup> ]	8.04/4.9	12.56/7.7	19.63/11.6	31.17/18.6	50.26/30.6
Flange F and B       stroke to extend / stroke to retract       cm <sup>3</sup> /s       280/170       480/280       550/320       1000/600       1600/975         Flange S       stroke to extend / stroke to retract       cm <sup>3</sup> /s       180/110       200/120       550/320       1000/600       1600/975         a       mm       75       85       100       125       160         b       mm       75       85       100       125       160         B H11       mm       12       12       15       20       24         c       mm       12       12       31.82       38.7x10.2       48.10.2         Ø ef 7       mm       10.5       10.5       13       17       21         h       mm       200       22       28       36       45         Øg       mm       10.5       10.5       13       17       21         h       mm       10.5       10.5       13       17       21.5         h       mm       10.5       10.5       13       17       21.5         h       mm       10								
Flange S       stroke to extend / stroke to retract       [mm]       75       85       100       1600/675         a       [mm]       75       85       100       125       180         b       [mm]       12       12       15       20       24         C       [mm]       10       10       14       14         Ø d1 x c1       [mm]       100       10       14       14         Ø d1 x c1       [mm]       19x7.8       24x7.6       31 x8.2       38.7x10.2       48x10.2         Ø e17       [mm]       10.5       10.5       13       17       21         Å       [mm]       12.5       55       52       75       80         Å1       [mm]       17       17       20       26       33         Å1       [mm]       11       11       13       17       21.5         m       [mm]       12       14       15       180       24         M1       [mm]       13       17       21.5       18       24         m       [mm]								
a       mm       75       85       100       125       160         b       (mm)       55       63       75       95       120         c       (mm)       12       12       15       20       24         c       (mm)       10       10       14       14         Ød1xc1       (mm)       19x7.8       24x7.6       31x8.2       38.7x10.2       48x10.2         Øe17       (mm)       45       56       65       80       105         f       (mm)       20       22       28       36       45         Øg       (mm)       10.5       10.5       13       17       21         h       (mm)       27       27       30       30       30         Øk       (mm)       11       11       13       17       21.5         m       (mm)       114       15       18       24         m1       (mm)       114x1.5       M16x1.5       M20x1.5       M27 x2       M33x2         n       (mm)       33       36	Flange F and B	stroke to extend / stroke to retract						
b       [mm]       55       63       75       95       120         B H11       [mm]       12       12       15       20       24         c       [mm]       10       10       10       14       14         Ø d1 x c1       [mm]       19x7.8       24x7.6       31x8.2       38.7x10.2       48x10.2         Ø e17       [mm]       10.5       10.5       13       17       21         Ø       [mm]       10.5       10.5       13       17       21         Ø       [mm]       17       17       20       26       33         Ø       [mm]       11       11       13       17       21.5         M       [mm]       14       15       18       24       15	Flange S	stroke to extend / stroke to retract	[cm³/s]	180/110				
B H11       [mm]       12       12       15       20       24         c       [mm]       10       10       10       14       14         Ø d1 xc1       [mm]       19x.78       24x7.6       31x8.2       38.710.2       48x10.2         Ø ef7       [mm]       19x.78       24x7.6       31x8.2       38.710.2       48x10.2         Ø ef7       [mm]       10.5       56       65       80       105         f       [mm]       10.5       10.5       13       17       21         h       [mm]       10.5       55       62       75       80         M14       [mm]       11       11       13       17       21.5         m       [mm]       12       14       15       18       24         m	а		[mm]					
c       [mm]       10       10       10       14       14         Ø d1 x c1       [mm]       19x7.8       24x7.6       31.8.2       38.7 x10.2       48.x10.2         Ø e f7       [mm]       45       66       65       80       105         f       [mm]       20       22       28       36       45         Øg       [mm]       10.5       13       17       21         h       [mm]       10.5       55       62       75       80         h1       [mm]       11       11       13       17       21.5         m       [mm]       11       11       13       17       21.5         m       [mm]       11       11       13       17       21.5         m       [mm]       12       14       15       18       24         m1       [mm]       11       11       13       17       21.5         m       [mm]       35       36       42       51       53         o tapeth       [mm]       15			[mm]					
Ø d1 x c1       (mm)       19x7.8       24x7.6       31 x8.2       38.7x10.2       48x10.2         Ø e f7       (mm)       45       56       65       80       105         Ø e f7       (mm)       20       22       28       36       45         Øg       (mm)       10.5       10.5       13       17       21         h       (mm)       55       55       62       75       80         h1       (mm)       17       17       20       26       33         k1       (mm)       11       11       13       17       21.5         m       (mm)       12       14       15       18       24         m1       (mm)       12       14       15       18       24         m1       (mm)       12       14       15       18       24         m1       (mm)       12       14       15       53       53       53       53       53       53       53       53       53       53       53       53       53       53 <td>B H11</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	B H11							
Ø e f7       mm       45       56       65       80       105         f       mm       20       22       28       36       45         Øg       mm       105       105       13       17       21         h       mm       55       55       62       75       80         h1       (mm)       27       27       30       30       30         k1       (mm)       17       17       20       26       33         k1       (mm)       11       11       13       17       21.5         m       (mm)       12       14       15       M2 x15       M2 x2       M33x2         M1       (mm)       12       14       15       M6x24       M20x30         n       (mm)       M10x15       M10x15       M10 x18       M16x24       M20x30         n       (mm)       M10x15       M16x25       M20x30       M27 x40       M30x40         p       (mm)       G1/4       G3/8       G3/8       G1/2       G1/2         q	С		[mm]					
f   [mm]   20   22   28   36   45     Øg   [mm]   10.5   10.5   13   17   21     h   [mm]   55   55   62   75   80     h1   [mm]   27   27   30   30   30     Øk   [mm]   17   17   20   26   33     k1   [mm]   11   11   13   17   21.5     m   [mm]   12   14   15   18   24     m1   [mm]   12   14   15   18   24     m1   [mm]   12   14   15   M27 x2   M33x2     M x depth   [mm]   35   36   42   51   53     o x depth of thread   [mm]   35   36   42   51   53     o x depth of thread   [mm]   35   36   42   51   53     o x depth of thread   [mm]   33   36   42   51   53     o x depth of thread   [mm]   33   3   3   3   4     s   [mm]   112 x 15   M16x25   M20x30   M27 x 40   M30x40 <tr< td=""><td>Ø d1 x c1</td><td></td><td>[mm]</td><td>19x7.8</td><td>24 x 7.6</td><td>31 x 8.2</td><td>38.7 x 10.2</td><td>48 x 10.2</td></tr<>	Ø d1 x c1		[mm]	19x7.8	24 x 7.6	31 x 8.2	38.7 x 10.2	48 x 10.2
Øg       [mm]       10.5       10.5       13       17       21         h       [mm]       55       55       62       75       80         h1       [mm]       27       30       30       30         0k       [mm]       17       17       20       26       33         k1       [mm]       11       11       13       17       21.5         m       [mm]       12       14       15       18       24         M1       [mm]       12       14       15       M332       M332         Mx depth       [mm]       35       36       42       51       53         o x depth of thread       [mm]       33       3       3       4       5         g       [mm]       13       3       3 <td>Øef7</td> <td></td> <td>[mm]</td> <td>45</td> <td></td> <td>65</td> <td>80</td> <td>105</td>	Øef7		[mm]	45		65	80	105
h       (mm)       55       55       62       75       80         h1       (mm)       27       27       30       30       30         Øk       (mm)       17       17       20       26       33         K1       (mm)       11       11       13       17       21.5         m       (mm)       12       14       15       18       24         m1       (mm)       12       14       15       M27x2       M33x2         Mx depth       M10x15       M10x15       M10x15       M20x30       M27x40       M30x40         p       (mm)       35       36       42       51       53         ox depth of thread       (mm)       M12 x15       M16x25       M20x30       M27 x40       M30x40         p       (mm)       35       36       42       51       53         ox depth of thread       (mm)       M12 x15       M16x25       M20x30       M27 x40       M30x40         p       (mm)       3       3       5       5       7       S	f		[mm]	20				45
h1       [mm]       27       27       30       30       30         Qk       [mm]       17       20       26       33         k1       [mm]       17       17       20       26       33         k1       [mm]       11       11       13       17       21.5         m       [mm]       12       14       15       18       24         m1       [mm]       M14x1.5       M16x1.5       M20x1.5       M27x2       M33x2         M x depth       [mm]       35       36       42       51       53         o x depth of thread       [mm]       M12 x 15       M16x25       M20x30       M27 x 40       M30x40         p       [mm]       G 1/4       G3/8       G3/8       G 1/2       G 1/2         q       [mm]       S       63       76       95       120         t       [mm]       33       3       5       5       7         SW       [mm]       11       11       1.5       1.5       1.5         u +/-0.05       [mm]<	Øg							
Øk       [mm]       17       17       20       26       33         k1       [mm]       11       11       13       17       21.5         m       [mm]       12       14       15       18       24         m1       [mm]       M14.x1.5       M16x1.5       M20x1.5       M27.x2       M33x2         Mx depth       M10x15       M10x15       M10x15       M12.x18       M16x24       M20x30         n       [mm]       35       36       42       51       53         ox depth of thread       [mm]       M12.x15       M16x25       M20x30       M27 x40       M30x40         p       [mm]       G 1/4       G3/8       G3/8       G 1/2       G 1/2         q       [mm]       3       3       3       3       4       S         s       [mm]       35       63       76       95       120       1         t       [mm]       3       3       5       5       7       S         W       [mm]       11       1.1       1.1       1.	h		[mm]					
k1     imm     11     11     13     17     21.5       m     imm     imm     12     14     15     18     24       m1     imm     imm     M14x1.5     M16x1.5     M20x1.5     M27 x 2     M33x2       M x depth     M10x15     M10x15     M12 x 18     M16x24     M20x30     M27 x 40     M30x40       n     imm     35     36     42     51     53       o x depth of thread     imm     M12 x 15     M16x25     M20x30     M27 x 40     M30x40       p     imm     G1/4     G3/8     G3/8     G1/2     G1/2       q     imm     3     3     3     4     5       s     imm     35     63     76     95     120       t     imm     35     40     45     65     80       T     imm     33     3     5     7     55       SW     imm     11     1.1     1.1     1.5     1.5       u +/-0.05     imm     1.1     1.1     1.1     1.	h1		[mm]	27	27			
m       (mm)       12       14       15       18       24         m1       (mm)       M14x1.5       M16x1.5       M20x1.5       M27 x 2       M33x2         M x depth       m10x15       M10x15       M10x15       M12 x 18       M16x24       M20x30         n       (mm)       35       36       42       51       53         o x depth of thread       (mm)       M12 x 15       M16x25       M20x30       M27 x 40       M30x40         p       (mm)       G 1/4       G3/8       G3/8       G 1/2       G 1/2       G 1/2         q       (mm)       35       40       45       65       80         t       (mm)       35       40       45       65       80         T       (mm)       3       3       5       5       7         SW       (mm)       11       11       11       15       15         u       +/-0.05       (mm)       1.1       11       1.5       1.5         0 v1 extend       (mm)       5       6       6       8 <t< td=""><td>Øk</td><td></td><td>[mm]</td><td>17</td><td>17</td><td>20</td><td></td><td>33</td></t<>	Øk		[mm]	17	17	20		33
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	k1		[mm]	11	11	13	17	21.5
M x depth       M10 x15       M10 x15       M10 x18       M16x24       M20x30         n       [mm]       35       36       42       51       53         o x depth of thread       [mm]       M12 x15       M16x25       M20x30       M27 x40       M30x40         p       [mm]       G 1/4       G3/8       G3/8       G 1/2       G 1/2         q       [mm]       G 1/4       G3/8       G3/8       G 1/2       G 1/2         q       [mm]       S       3       3       3       4         q       [mm]       S       63       76       95       120         t       [mm]       35       40       45       655       80         T       [mm]       33       3       5       5       7         SW       [mm]       1.1       1.1       1.5       1.5       1.5         W +/- 0.05       [mm]       1.1       1.1       1.5       1.5       1.5         Øv1 extend       [mm]       5       6       6       8       8         Øv2 retract<	m		[mm]	12	14	15	18	24
n[mm]3536425153o x depth of thread[mm]M12 x 15M16x25M20x30M27 x 40M30x40p[mm]G 1/4G3/8G3/8G 1/2G 1/2q[mm]33334s[mm]55637695120t[mm]3540456580T[mm]33557SW[mm]111.11.11.51.5u +/- 0.05[mm]1.11.11.11.51.5u1 +/- 0.05[mm]1.11.11.11.51.5Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v4 retract[mm]44688Ø w + 0.2[mm]9.810.813.813.8Ø w1 + 0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	m1		[mm]	M14x1.5	M16x1.5	M20x1.5	M27 x 2	M33x2
o x depth of thread       Imm]       M12 x 15       M16x25       M20 x 30       M27 x 40       M30x 40         p       Imm]       G 1/4       G3/8       G3/8       G 1/2       G 1/2         q       Imm]       3       3       3       3       3       4         s       Imm]       55       63       76       95       120         t       Imm]       35       40       45       65       80         T       Imm]       3       3       5       5       7         SW       Imm]       17       21       27       36       41         u       +/-0.05       Imm]       1.1       1.1       1.5       1.5         u1 +/-0.05       Imm]       1.1       1.1       1.1       1.5       1.5         Ø v1 extend       Imm]       5       6       6       8       8         Ø v2 retract       Imm]       4.5       4.5       6       8       8         Ø v4 retract       Imm]       9.8       9.8       10.8       13.8       13.8 <td>M x depth</td> <td></td> <td></td> <td>M10x15</td> <td>M10x15</td> <td>M12 x 18</td> <td>M16x24</td> <td>M20x30</td>	M x depth			M10x15	M10x15	M12 x 18	M16x24	M20x30
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	n		[mm]	35	36	42	51	53
q[mm]33334s[mm]55637695120t[mm]3540456580T[mm]33557SW[mm]1721273641u+/-0.05[mm]1.11.11.11.51.5u1 +/-0.05[mm]1.11.11.11.51.5v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	o x depth of thread		[mm]	M12 x 15	M16x25	M20x30	M27 x 40	M30x40
s[mm]55637695120t[mm]3540456580T[mm]33557SW[mm]1721273641u+/-0.05[mm]1.11.11.11.51.5u1 +/-0.05[mm]1.11.11.11.51.5Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	р		[mm]		G3/8		G 1/2	G 1/2
tImm3540456580T[mm]33557SW[mm]1721273641u +/- 0.05[mm]1.11.11.11.51.5u1 +/- 0.05[mm]1.11.11.11.51.5Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]9.89.810.813.813.8Ø w +0.2[mm]7.87.89.813.813.8Ø w1 +0.2[mm]1214151824y[mm]3839455455.5	q		[mm]	3	3		3	4
T[mm]33557SW[mm]1721273641u $+/-0.05$ [mm]1.11.11.11.51.5u1 $+/-0.05$ [mm]1.11.11.11.51.5 $0$ v1 extend[mm]56688 $0$ v2 retract[mm]4.54.5668 $0$ v3 extend[mm]44688 $0$ v4 retract[mm]44688 $0$ v4 retract[mm]9.89.810.813.813.8 $0$ w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	S		[mm]	55	63		95	120
SW[mm]1721273641u +/- 0.05[mm]1.11.11.11.51.5u1 +/- 0.05[mm]1.11.11.11.51.5Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]44688Ø w +0.2[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	t		[mm]	35	40	45	65	80
u +/- 0.05[mm]1.11.11.11.51.5u1 +/- 0.05[mm]1.11.11.11.11.51.5Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]44668Ø w +0.2[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	Т		[mm]	3	3	5	5	7
u1 +/-0.05[mm]1.11.11.11.51.5Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]44668Ø w +0.2[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	SW		[mm]	17	21	27	36	41
Ø v1 extend[mm]56688Ø v2 retract[mm]4.54.5668Ø v3 extend[mm]44688Ø v4 retract[mm]44668Ø w +0.2[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	u +/- 0.05		[mm]	1.1	1.1			
Ø v2 retract     [mm]     4.5     4.5     6     6     8       Ø v3 extend     [mm]     4     4     6     8     8       Ø v4 retract     [mm]     4     4     6     6     8       Ø v4 retract     [mm]     4     4     6     6     8       Ø w +0.2     [mm]     9.8     9.8     10.8     13.8     13.8       Ø w1 +0.2     [mm]     7.8     7.8     9.8     13.8     13.8       x     [mm]     12     14     15     18     24       y     [mm]     38     39     45     54     55.5	u1 +/- 0.05		[mm]		1.1	1.1		1.5
Ø v3 extend     [mm]     4     4     6     8     8       Ø v4 retract     [mm]     4     4     6     6     8       Ø v4 retract     [mm]     4     4     6     6     8       Ø w +0.2     [mm]     9.8     9.8     10.8     13.8     13.8       Ø w1 +0.2     [mm]     7.8     7.8     9.8     13.8     13.8       x     [mm]     12     14     15     18     24       y     [mm]     38     39     45     54     55.5	Ø v1 extend			5	6		-	
Ø v4 retract[mm]44668Ø w +0.2[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	Ø v2 retract		[mm]	4.5	4.5	6	6	8
Ø w +0.2[mm]9.89.810.813.813.8Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	Ø v3 extend		[mm]				8	
Ø w1 +0.2[mm]7.87.89.813.813.8x[mm]1214151824y[mm]3839455455.5	Ø v4 retract		[mm]	4	4	6	6	8
x[mm]1214151824y[mm]3839455455.5	Øw +0.2		[mm]	9.8	9.8	10.8	13.8	13.8
x[mm]1214151824y[mm]3839455455.5	Ø w1 +0.2		[mm]	7.8	7.8	9.8	13.8	13.8
	х		[mm]	12	14	15	18	24
	У		[mm]	38	39	45	54	55.5
			[mm]	57	67	78	97	124

#### Selection aids

The opposite diagram allows a quick selection from five seal combinations.

Thus, the block cylinder S can be optimally adapted to the operating conditions, i.e. to

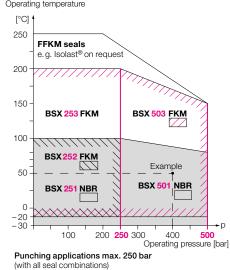
- the operating pressure 250 bar or 500 bar,
- the operating temperature up to 200 °C.

The sealing material must be selected taking the hydraulic oil into consideration:

- NBR (nitrile butadiene rubber) for
- Hydraulic oil HLP (-30...+100 °C)
- Other liquids \*)
- HFA, HFB, HFC (−10...+55 °C)
- FKM (fluor caoutchouc) for • Hydraulic oil HLP (-20...+100 °C)
- Highly inflammable hydraulic fluids\*)
- HFD (-20...+200 °C) \*) see also data sheet A0.100

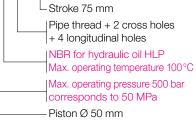
#### Available seal combinations dependent on the operating pressure and the operating pressure temperature

Operating temperature



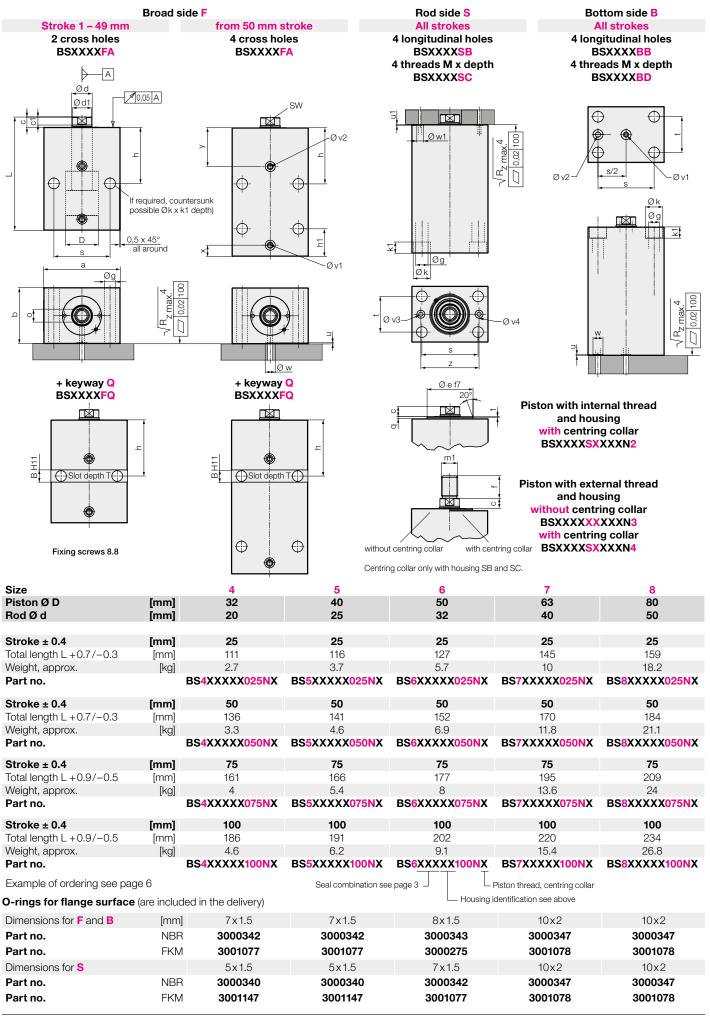
#### Example of ordering block cylinder S

Piston Ø 50 mm  $\rightarrow$  as per chart code 6 Operating pressure 400 bar  $\rightarrow$  500 bar = 50 MPa Operating temperature aprox. 50 °C with hydraulic oil HLP 32 → NBR seals → as per diagram type **BSX 501** Pipe thread + 2 cross holes + 4 longitudinal holes  $\rightarrow$  as per dimension drawing on page 2 code **RB** Stroke 75 mm → as per chart code 075N Part no. BS 6 501 RB 075 N1



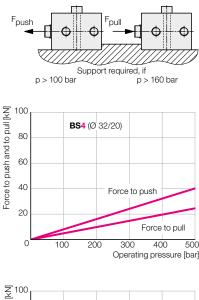
Code for part numbers see page 6

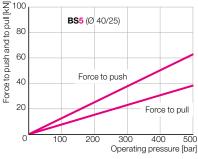
B 1.5100 / 11 - 21 E

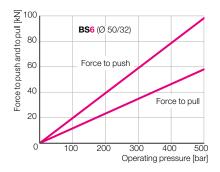


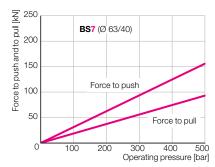
Römheld GmbH

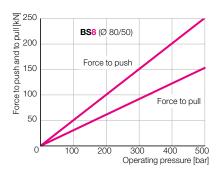
#### Force to push and to pull



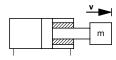








#### Internal piston stop



If the entire stroke of the block cylinder is used, the piston moves against the internal stops. The sudden load that occurs during this process is dependent on

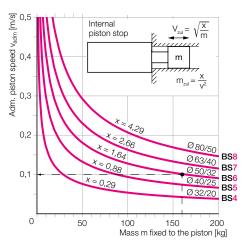
- the piston speed v
- the mass m connected to the piston.

This series can withstand high mechanical loads. However, certain limit values should not be exceeded, as shown in the diagram below.

- The admissible piston speed can be read off at a given mass.
- The maximum mass can be determined for a given piston speed.

For continuous operation with a high number of strokes, the maximum mass should be reduced to approx. 10% of the values in the diagram.

#### Admissible piston speed v<sub>adm</sub> as a function of the mass m fixed to the piston

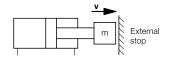


Example: BS6501RB075N1 (Ø50/32 x 75 stroke) m = 160 kg  $\rightarrow$  v<sub>adm</sub> = 0.1 m/s

#### **Punching applications**

Due to the cutting impact, the piston speed at the internal piston stop is usually not known. In such cases, an external stop is the better solution.

#### External stop of the mass



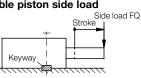
For critical designs and high number of strokes, it is better to drive the mass against external stops. They can be designed to be sturdy and, if required, even adjustable.

#### Stroke end cushioning

If an external stop is not possible, cylinders with hydraulic stroke end cushioning should be provided:

- Block cylinders 500 bar as per B1.530
- Hydraulic cylinders 200 bar as per B1.282
- · Block cylinders S with hydraulic stroke end cushioning on request

#### Admissible piston side load



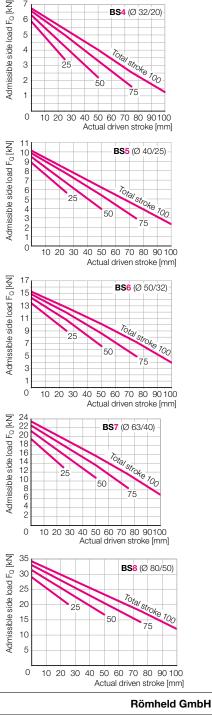
- The admissible load is dependent on
- the distance of the side load from the cylinder housing
- the total stroke of the block cylinder
- the actual driven piston stroke
- the operating temperature
- the hydraulic fluid.

The diagrams show the admissible side load for each size under the following conditions:

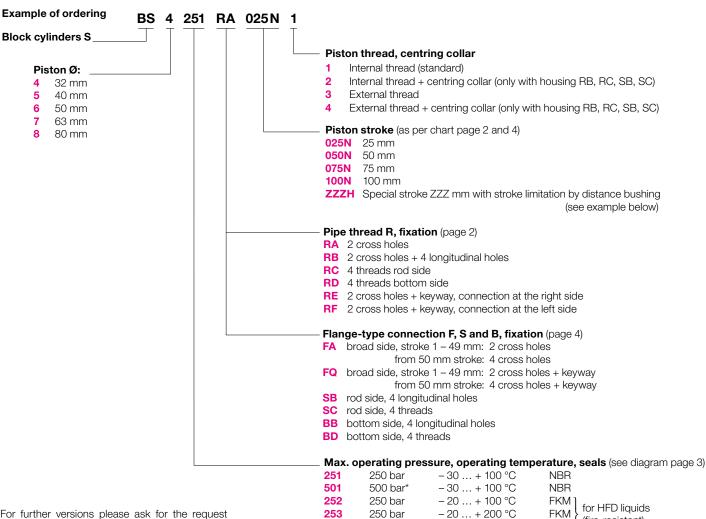
- the side load acts directly on the end of the piston rod
- the max. operating temperature is 80 °C
- medium hydraulic oil HLP as per DIN 51524-2
- Please contact us for other operating conditions.

#### Important note

To ensure that the block cylinder S can safely absorb the side loads from all directions, the version with keyway should be used.



5



For further versions please ask for the request form "Block cylinder S".

#### Stroke limitation by distance bushing

By shrinking a distance bushing onto the piston rod, we can shorten the series stroke by 5 to 29 mm.

Standard stroke	Possible stroke ±0.5 [mm]				
[mm]	H min.	H max.			
25	1 (10*)	20			
50	21	45			
75	46	70			
100	71	95			

\*) For max. service life H min. ≥10 mm

#### Example of ordering Block cylinder BS 6 501 RB 075N 1 Desired stroke 63 mm

The "standard stroke" is 75 mm As per chart "Possible stroke" =  $46 \dots 70$  mm The distance bushing is 75 - 63 = 12 mm high

#### New part no. BS 6 501 RB 063H 1

#### Note on flange type F

A stroke limitation of the selected block cylinder does not change the number of cross holes (2 or 4 off).

Distance bushing

503

500 bar\*

\*) For punching applications max. 250 bar

#### Important notes

– 20 ... + 150 °C

Block cylinders are intended exclusively for industrial applications and may only be operated with hydraulic oil.

FKM

(fire-resistant)

They can generate very high forces to be absorbed by the fixture or the machine.

In the effective area of the piston rod there is the danger of crushing. The manufacturer of the fixture or the machine is obliged to provide effective protection devices.

If block cylinders are fastened with screws across the cylinder axis, they must be supported above a specific operating pressure (see page 5 "Force to push and to pull").

If the piston moves against the internal piston stops in the block cylinder, the admissible piston speed must be reduced depending on the mass fixed to the piston (see page 5 "Internal piston stop").

For punching applications, the operating pressure must be limited to 250 bar to avoid extremely high loads due to the "cutting impact". This also applies to the high-pressure version BS50.

If the exact load on the internal piston stop cannot be calculated, an external stop should be provided for the tool (see page 5 "External stop of the mass").

When the piston rod is loaded by side loads, the admissible piston side load must be determined as a function of the piston stroke (see page 5 "Admissible piston side load").

# Römheld GmbH