



**Block Cylinders**

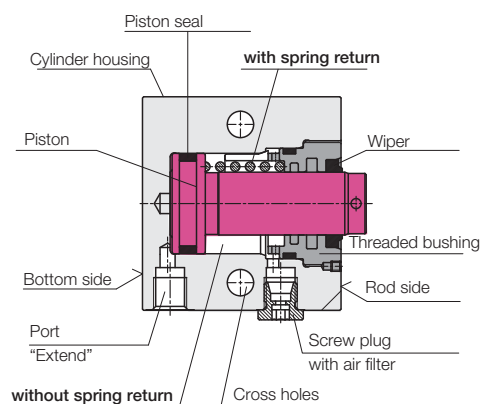
single acting, with and without spring return  
max. operating pressure 500 bar



**Advantages**

- 8 sizes each with 2 stroke lengths available
- Large range of diameter  
Piston Ø 16 up to 100 mm
- Large range of stroke 8 up to 100 mm
- Large range of force  
2 kN for piston Ø 16 mm and 100 bar  
392 kN for piston Ø 100 mm and 500 bar
- Large retention force
- Compact block design
- Many fixing possibilities
- Many connecting possibilities
- Case-hardened piston rod
- Alternatively NBR or FKM seals and wiper
- Operating temperature up to 200 °C with FKM seals
- Minimum leakage
- Maintenance free

**Design**



**Application**

Single-acting block cylinders can be used for all hydraulically-operated linear movements that do not require a retraction force or where the piston is retracted by an external force.

- |               |           |
|---------------|-----------|
| ● Positioning | ● Moving  |
| ● Clamping    | ● Closing |
| ● Supporting  | ● Locking |
| ● Locking     | ● Lifting |
| ● Riveting    | ● Pushing |

**Function**

**With spring return**

When pressurising the cylinder the piston extends. After pressure relief, the piston is retracted by spring force.

The pressure spring must not only overcome the friction forces, but must also supply the hydraulic oil back to the reservoir.

**Without spring return**

When pressurising the cylinder the piston extends. After pressure relief, the piston must be retracted by an external force. Since no pressure spring is installed, this single-acting block cylinder has the same stroke as the double-acting version with the same length.

**Material**

**Cylinder housing:** high alloy steel, black oxide\*

**Piston:** case-hardening steel, hardened and ground

**O-rings and wipers:**

NBR = nitrile-butadiene rubber  
Temperature range: -25 up to +100 °C

FKM = fluor caoutchouc  
Temperature range: -15 up to +200 °C

**Glydrings and back-up rings:**

PTFE = polytetrafluor ethylene  
Temperature range: -45 up to +200 °C

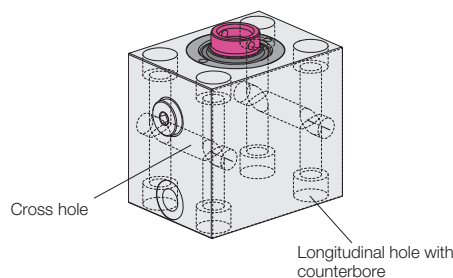
**Hydraulic fluid:** see data sheet A 0.100

Special versions for other hydraulic fluids and operating temperatures up to +250 °C are available on request.

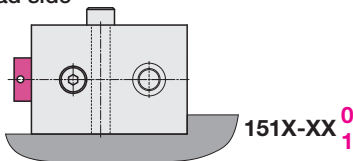
\* Size 1519 black matt lacquered

**Fixing possibilities**

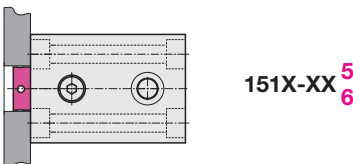
Possible mounting holes



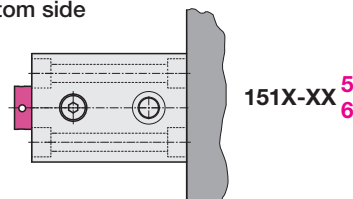
● **Broad side**



● **Rod side**

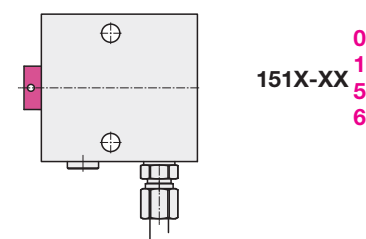


● **Bottom side**



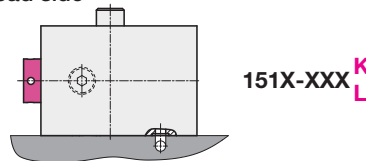
**Hydraulic connecting possibilities**

**Pipe thread**

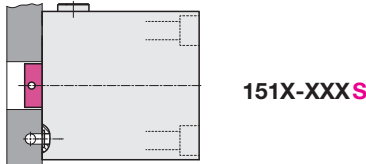


**Flange with O-ring sealing**

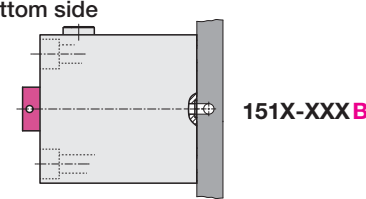
● **Broad side**



● **Rod side**



● **Bottom side**



# Pipe thread

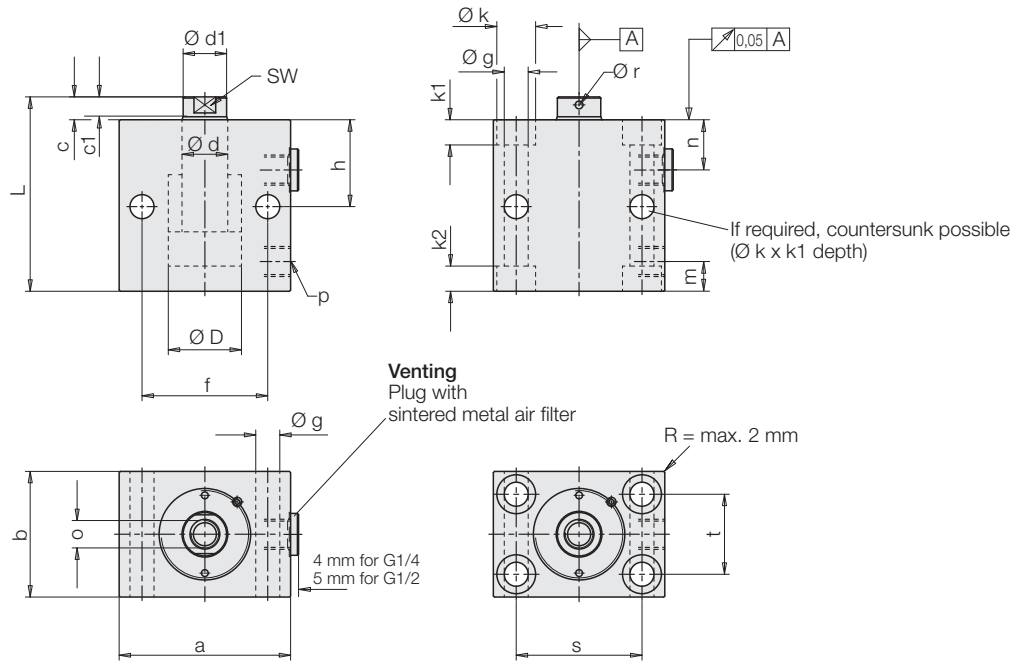
## 8 up to 100 mm stroke

2 cross holes

2 cross holes and  
4 longitudinal holes

151X-XX 0 (NBR)  
1 (FKM)

151X-XX 5 (NBR)  
6 (FKM)



| Piston Ø D | [mm] | 16 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
|------------|------|----|----|----|----|----|----|----|-----|
| Rod Ø d    | [mm] | 10 | 16 | 20 | 25 | 32 | 40 | 50 | 63  |

**With spring return** 8 up to 32 mm stroke **X = identification code for bore holes and seals → see above**

| Stroke ±0.6              | [mm] | 8        | 8        | 10       | 10       | 12       | 12       | 12       | 12       |
|--------------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|
| Total length L ±0.5      | [mm] | 62       | 71       | 85       | 89       | 100      | 116      | 131      | 145      |
| Min. spring return force | [N]  | 57       | 145      | 222      | 276      | 387      | 429      | 760      | 1200     |
| Weight approx.           | [kg] | 0.8      | 1.2      | 2        | 2.76     | 4.5      | 8.2      | 15.4     | 24.8     |
| Part-no.                 |      | 1511-00X | 1513-00X | 1514-10X | 1515-00X | 1516-00X | 1517-00X | 1518-00X | 1519-00X |

| Stroke ±0.6              | [mm] | 20       | 20       | 20       | 20       | 20       | 25       | 32       | 32       |
|--------------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|
| Total length L ±0.5      | [mm] | 97       | 101      | 110      | 114      | 125      | 149      | 179      | 205      |
| Min. spring return force | [N]  | 48       | 160      | 228      | 276      | 450      | 470      | 720      | 1230     |
| Weight approx.           | [kg] | 1.4      | 2        | 2.8      | 3.6      | 6.1      | 10.3     | 20.3     | 39       |
| Part-no.                 |      | 1511-02X | 1513-02X | 1514-12X | 1515-02X | 1516-02X | 1517-03X | 1518-04X | 1519-04X |

**Without spring return** 16 up to 100 mm stroke **X = identification code for bore holes and seals → see above**

| Stroke ±0.6         | [mm] | 16       | 20       | 25       | 25       | 25       | 30       | 32       | 40       |
|---------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|
| Total length L ±0.5 | [mm] | 62       | 71       | 85       | 89       | 100      | 116      | 131      | 145      |
| Weight approx.      | [kg] | 0.8      | 1.2      | 1.9      | 2.7      | 4.4      | 8        | 15       | 24       |
| Part-no.            |      | 1511-01X | 1513-01X | 1514-11X | 1515-01X | 1516-01X | 1517-01X | 1518-01X | 1519-01X |
| Stroke ±0.6         | [mm] | 50       | 50       | 50       | 50       | 50       | 63       | 80       | 100      |
| Total length L ±0.5 | [mm] | 97       | 101      | 110      | 114      | 125      | 149      | 179      | 205      |
| Weight approx.      | [kg] | 1.3      | 1.9      | 2.7      | 3.5      | 6        | 10       | 20       | 37       |
| Part-no.            |      | 1511-06X | 1513-06X | 1514-16X | 1515-06X | 1516-06X | 1517-07X | 1518-08X | 1519-09X |

## Dimensions

### Technical characteristics • Important notes

| Size                        |                        | 1511   | 1513   | 1514   | 1515   | 1516   | 1517   | 1518   | 1519   |
|-----------------------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Piston Ø D                  | [mm]                   | 16     | 25     | 32     | 40     | 50     | 63     | 80     | 100    |
| Rod Ø d                     | [mm]                   | 10     | 16     | 20     | 25     | 32     | 40     | 50     | 63     |
| Force to push at            | 100 bar [kN]           | 2.0    | 4.9    | 8.0    | 12.6   | 19.5   | 31.2   | 50.4   | 78.4   |
|                             | 500 bar [kN]           | 10.0   | 24.5   | 40.2   | 62.8   | 98.5   | 156.0  | 252.0  | 392.0  |
| Oil volume/<br>10 mm stroke | stroke to extend [cm³] | 2.01   | 4.91   | 8.05   | 12.56  | 19.63  | 31.17  | 50.26  | 78.54  |
| a                           | [mm]                   | 60     | 65     | 75     | 85     | 100    | 125    | 160    | 200    |
| b                           | [mm]                   | 35     | 45     | 55     | 63     | 75     | 95     | 120    | 150    |
| c                           | [mm]                   | 6 (7)* | 7      | 10     | 10     | 10     | 14     | 14     | 15     |
| Ø d1 x c1                   | [mm]                   | 9.2x4  | 15x5   | 19x6   | 24x6   | 30.5x6 | 38.7x9 | 48x10  | 61x12  |
| f                           | [mm]                   | 30     | 50     | 55     | 63     | 76     | 95     | 120    | 158    |
| Ø g                         | [mm]                   | 6.5    | 8.5    | 10.5   | 10.5   | 13     | 17     | 21     | 25     |
| h                           | [mm]                   | 30     | 33     | 38     | 40     | 44     | 50     | 60     | 64     |
| h1                          | [mm]                   | 24.5   | 26     | 27     | 27     | 30     | 41     | 47     | 54     |
| Ø k                         | [mm]                   | 11     | 13.5   | 17     | 17     | 20     | 26     | 33     | 40     |
| k1                          | [mm]                   | 7      | 9      | 11     | 11     | 13     | 17     | 21.5   | 25.5   |
| k2                          | [mm]                   | 4      | 9      | 11     | 11     | 13     | 17     | 21.5   | 25.5   |
| m                           | [mm]                   | 11     | 11     | 11     | 11     | 13     | 17     | 21     | 25     |
| n                           | [mm]                   | 16.5   | 18     | 22     | 24     | 27     | 26     | 34     | 35     |
| o x thread depth            | [mm]                   | M6x12  | M10x15 | M12x15 | M16x25 | M20x30 | M27x40 | M30x40 | M42x60 |
| p                           |                        | G1/4   | G1/4   | G1/4   | G1/4   | G1/4   | G1/2   | G1/2   | G1/2   |
| Ø r                         | [mm]                   | –      | –      | –      | 4      | 4      | 4      | 5      | 6      |
| s                           | [mm]                   | 40     | 50     | 55     | 63     | 76     | 95     | 120    | 158    |
| t                           | [mm]                   | 22     | 30     | 35     | 40     | 45     | 65     | 80     | 108    |
| SW                          | [mm]                   | 8      | 13     | 17     | –      | –      | –      | –      | –      |
| u ± 0.05                    | [mm]                   | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 1.5    | 1.5    | 1.5    |
| Ø v1 extend                 | [mm]                   | 3.5    | 4      | 5      | 6      | 6      | 8      | 8      | 8      |
| w + 0.2                     | [mm]                   | 9.8    | 9.8    | 9.8    | 9.8    | 10.8   | 13.8   | 13.8   | 13.8   |
| x                           | [mm]                   | 7      | 7.5    | 10     | 10     | 13     | 16     | 21     | 25     |

General tolerances as per DIN ISO 2768-mH

\* 7mm for 1511-02X and 1511-06X

#### Important notes

The block cylinders designed for industrial applications to transform hydraulic pressure to a linear movement and /or force. They can generate very high forces. The fixture or machine must be in the position to compensate the forces.

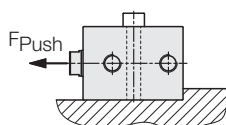
In the effective area of the clamping bolt there is the danger of crushing. The manufacturer of the fixture or the machine is obliged to provide effective protection devices.

#### Mounting

In principle, screws of tensile strength 8.8 can be used to secure the block cylinders.

#### Support

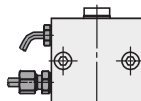
If block cylinders are fastened with screws across the cylinder axis, they must be supported for operating pressures of 160 bar and higher.



Support required, if p > 160 bar  
(see also page 5 "Keyway")

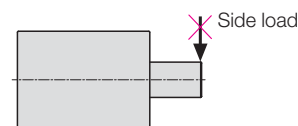
#### Venting of the spring area

If there is any danger that fluids penetrate through the sintered metal air filter into the spring area, a vent hose has to be connected and be placed in a protected position (see data sheet A 0.110).



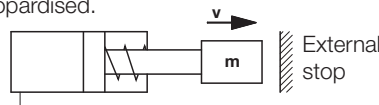
#### Side loads

Side loads cannot be compensated, since in the case of single-acting block cylinders the guide of the piston rod is not lubricated with hydraulic oil.



#### Admissible dynamic load

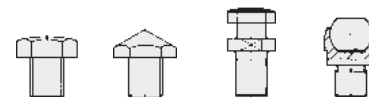
This block cylinder line is not equipped with stroke end cushioning, i.e. a weight **m** fixed to the piston will move with speed **v** against the internal stop without braking. Above all in extending direction, the threaded bushing is overloaded and the operating safety is jeopardised.



At piston speeds higher than 0.05 m/s and a weight that exceeds the own weight of the block cylinder, a cylinder with stroke end cushioning has to be used or the cylinder movement must be effected against an external stop. This is also valid for punching applications

#### Accessory - Contact bolts

As accessory different contact bolts and coupling pins are available. See data sheet G 3.800



For further application instructions see data sheet A 0.100 and program summary "Block Cylinders".

# Flange with O-ring sealing

## Broad side K

**With spring return**  
8 up to 12 mm stroke  
**Without spring return**  
16 up to 40 mm stroke

**2 cross holes**  
151X-**XX0K** (NBR)  
151X-**XX1K** (FKM)

## Broad side L

**With spring return**  
20 up to 32 mm stroke  
**Without spring return**  
50 up to 32 mm stroke

**4 cross holes**  
151X-**XX0L** (NBR)  
151X-**XX1L** (FKM)

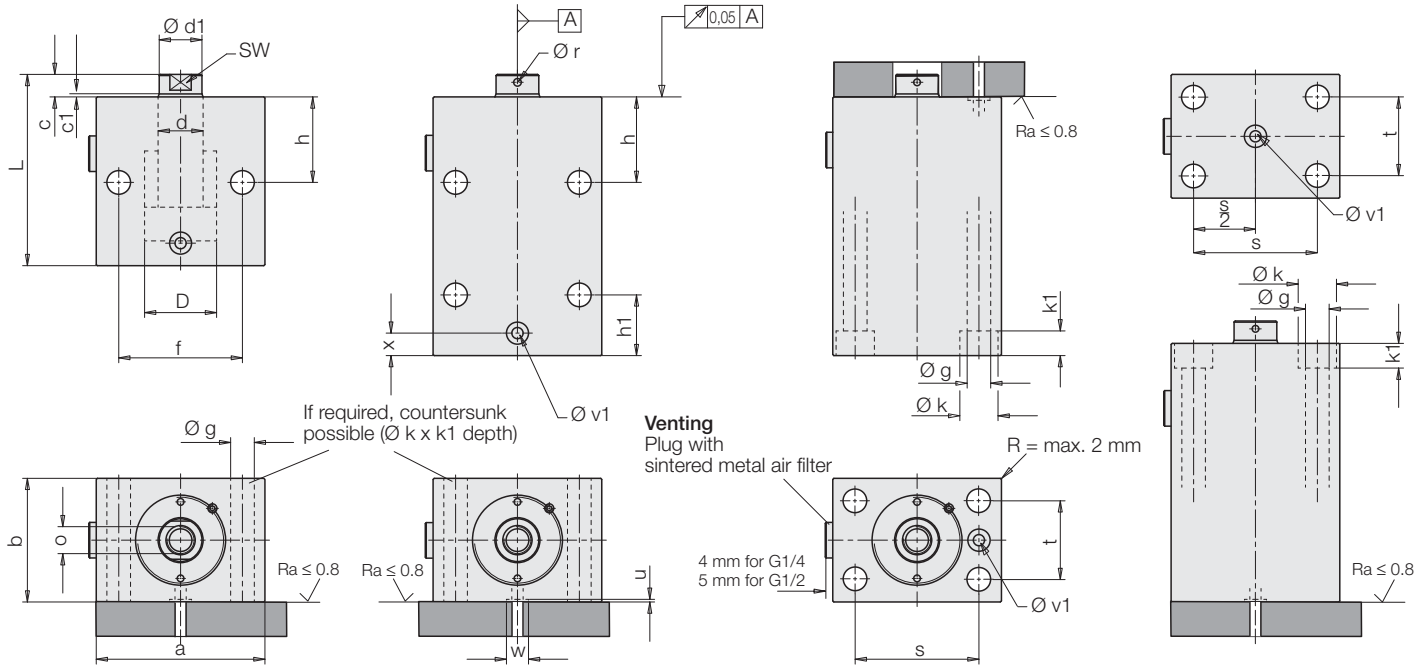
## Rod side S

**With spring return**  
8 up to 32 mm stroke  
**Without spring return**  
16 up to 100 mm stroke

**4 longitudinal holes**  
151X-**XX5S** (NBR)  
151X-**XX6S** (FKM)

## Bottom side B

**4 longitudinal holes**  
151X-**XX5B** (NBR)  
151X-**XX6B** (FKM)



|                   |      |    |    |    |    |    |    |    |     |
|-------------------|------|----|----|----|----|----|----|----|-----|
| <b>Piston Ø D</b> | [mm] | 16 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| <b>Rod Ø d</b>    | [mm] | 10 | 16 | 20 | 25 | 32 | 40 | 50 | 63  |

|                           |                      |   |           |           |           |           |           |           |           |
|---------------------------|----------------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>With spring return</b> | 8 up to 32 mm stroke | <b>XX</b> = identification code for sealing material and manifold mounting area → see above |           |           |           |           |           |           |           |
| <b>Stroke ±0.6</b>        | [mm]                 | 8   | 8         | 10        | 10        | 12        | 12        | 12        | 12        |
| Total length L +0.5/-0.8  | [mm]                 | 62  | 71        | 85        | 89        | 100       | 116       | 131       | 145       |
| Min. spring return force  | [N]                  | 57  | 145       | 222       | 276       | 387       | 429       | 760       | 1200      |
| Weight approx.            | [kg]                 | 0.8   | 1.2       | 2         | 2.76      | 4.5       | 8.2       | 15.4      | 24.8      |
| <b>Part-no.</b>           |                      | 1511-00XX   | 1513-00XX | 1514-10XX | 1515-00XX | 1516-00XX | 1517-00XX | 1518-00XX | 1519-00XX |
| <b>Stroke ±0.6</b>        | [mm]                 | 20  | 20        | 20        | 20        | 20        | 25        | 32        | 32        |
| Total length L +0.5/-0.8  | [mm]                 | 97  | 101       | 110       | 114       | 125       | 149       | 179       | 205       |
| Min. spring return force  | [N]                  | 48  | 160       | 228       | 276       | 450       | 470       | 720       | 1230      |
| Weight approx.            | [kg]                 | 1.4   | 2         | 2.8       | 3.5       | 6.1       | 10.3      | 20.3      | 39        |
| <b>Part-no.</b>           |                      | 1511-02XX   | 1513-02XX | 1514-12XX | 1515-02XX | 1516-02XX | 1517-03XX | 1518-04XX | 1519-04XX |

|                              |                        |   |           |           |           |           |           |           |           |
|------------------------------|------------------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Without spring return</b> | 16 up to 100 mm stroke | <b>XNNX</b> = identification code for sealing material and manifold mounting area → see above |           |           |           |           |           |           |           |
| <b>Stroke ±0.6</b>           | [mm]                   | 16  | 20        | 25        | 25        | 25        | 30        | 32        | 40        |
| Total length L +0.5/-0.8     | [mm]                   | 62  | 71        | 85        | 89        | 100       | 116       | 131       | 145       |
| Weight approx.               | [kg]                   | 0.8   | 1.2       | 1.9       | 2.7       | 4.4       | 8         | 15        | 24        |
| <b>Part-no.</b>              |                        | 1511-01XX   | 1513-01XX | 1514-11XX | 1515-01XX | 1516-01XX | 1517-01XX | 1518-01XX | 1519-01XX |
| <b>Stroke ±0.6</b>           | [mm]                   | 50  | 50        | 50        | 50        | 50        | 63        | 80        | 100       |
| Total length L +0.5/-0.8     | [mm]                   | 97  | 101       | 110       | 114       | 125       | 149       | 179       | 205       |
| Weight approx.               | [kg]                   | 1.3   | 1.9       | 2.7       | 3.5       | 6         | 10        | 20        | 37        |
| <b>Part-no.</b>              |                        | 1511-06XX   | 1513-06XX | 1514-16XX | 1515-06XX | 1516-06XX | 1517-07XX | 1518-08XX | 1519-09XX |

**O-rings for manifold-mounting area:** (included in the delivery)

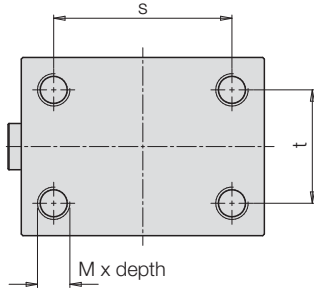
|            |      |          |          |          |          |          |          |          |          |
|------------|------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dimensions | [mm] | 7 x 1.5  | 7 x 1.5  | 7 x 1.5  | 7 x 1.5  | 8 x 1.5  | 10 x 2   | 10 x 2   | 10 x 2   |
| Part-no.   | NBR  | 3000-342 | 3000-342 | 3000-342 | 3000-342 | 3000-343 | 3000-347 | 3000-347 | 3000-347 |
| Part-no.   | FKM  | 3001-077 | 3001-077 | 3001-077 | 3001-077 | 3000-275 | 3001-078 | 3001-078 | 3001-078 |

## Standard variants

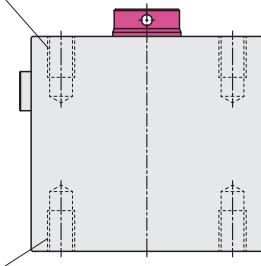
### Thread • Keyway • Stroke limitation

#### 4 threads at the front to fix the housing C, D

Instead of longitudinal holes and cross holes the block cylinders can be provided with 4 interior threads, alternatively at the rod side C or at the bottom side D.



#### Rod side: 151X-XXXC



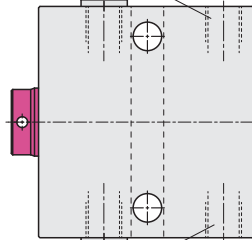
#### Bottom side: 151X-XXXD

#### Keyway to support the housing E, F, Q

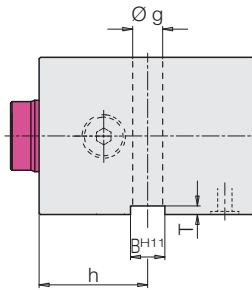
The block cylinders without longitudinal holes or interior thread can be equipped with a keyway for a key.

For pipe thread connection the position of the connecting threads have to be determined in advance (identification code E or F). For manifold-mounting connection (K or L) the identification code is Q.

#### Pipe thread connection at the right side: 151X-XXXE



#### Pipe thread connection at the left side: 151X-XXXF

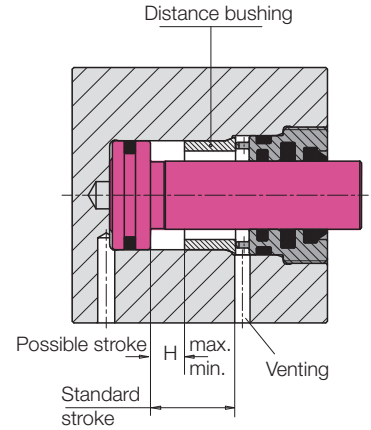


#### Manifold-mounting connection: 151X-XXXXQ

#### Stroke limitation by distance bushing H

The extending piston stroke of block cylinders can be limited by installing a distance bushing. The minimum stroke should not be less than 1 mm. The maximum stroke possible based on the standard stroke is indicated in the below table.

**Only without spring return!**



#### Example: Possible stroke

Block cylinder 1515-065  
Standard stroke 50 mm

#### As per table:

$H_{min} = 1 \text{ mm}$   
 $H_{max} = 50 - 3 = 47 \text{ mm}$

| Basic version          | Dimensions     |     |     |                  |   |      |    |                     |                     |
|------------------------|----------------|-----|-----|------------------|---|------|----|---------------------|---------------------|
|                        | 4 threads C, D |     |     | keyway E, F, Q   |   |      |    | stroke limitation H |                     |
| Part-no. (page 2 to 4) | M x depth      | s   | t   | B <sup>H11</sup> | T | Ø g  | h  | H <sub>min.</sub>   | H <sub>max.</sub>   |
| 1511-XXXX              | M 6 x 9        | 40  | 22  | 8                | 2 | 6.5  | 30 | 1                   | standard stroke - 3 |
| 1513-XXXX              | M 8 x 12       | 50  | 30  | 10               | 2 | 8.5  | 33 | 1                   | standard stroke - 3 |
| 1514-XXXX              | M 10 x 15      | 55  | 35  | 12               | 3 | 10.5 | 38 | 1                   | standard stroke - 3 |
| 1515-XXXX              | M 10 x 15      | 63  | 40  | 12               | 3 | 10.5 | 40 | 1                   | standard stroke - 3 |
| 1516-XXXX              | M 12 x 18      | 76  | 45  | 15               | 5 | 13   | 44 | 1                   | standard stroke - 4 |
| 1517-XXXX              | M 16 x 24      | 95  | 65  | 20               | 5 | 17   | 50 | 1                   | standard stroke - 4 |
| 1518-XXXX              | M 20 x 30      | 120 | 80  | 24               | 7 | 21   | 60 | 1                   | standard stroke - 6 |
| 1519-XXXX              | M 24 x 36      | 158 | 108 | 28               | 7 | 25   | 64 | 1                   | standard stroke - 6 |

General tolerances as per DIN ISO 2768-mH

All dimensions in mm.

#### Examples for ordering:

##### 4 threads

Block cylinder 1517-005 (pipe thread connection) with 4 threads M16 at the bottom side

**Part-no. 1517-005D**

Block cylinder 1517-005B (manifold-mounting connection) with 4 threads M16 at the bottom side

**Part-no. 1517-005BD**

##### Keyway

Block cylinder 1517-000 (pipe thread connection) with keyway and connecting thread at the left side

**Part-no. 1517-000F**

Block cylinder 1517-000K (manifold-mounting connection) with keyway

**Part-no. 1517-010KQ**

##### Stroke limitation

Block cylinder 1517-010 (pipe thread connection) with stroke limitation to 15 mm

**Part-no. 1517-010H15**

Block cylinder 1517-010K (manifold-mounting connection) with keyway and stroke limitation to 15 mm

**Part-no. 1517-010KQH15**

Possible combinations of standard variants see page 6.

