



## Block Cylinders

with adjustable stroke end cushioning and optional stroke end control  
 double acting, max. operating pressure 500 bar



### Application

Block cylinders with stroke end cushioning avoid a crash stop of the piston in the cylinder body in case of the following applications:

1. High piston speed
2. Additional load at the piston rod
3. An external stop to compensate the additional load is not possible

### Description

Just before the stroke end of the piston the cushioning spigot enters into the cushioning disc and reduces the flow rate in the return line and thereby also the piston speed. The residual speed can be adjusted in certain limits by an **adjustable flow control valve**. If required, the stroke ends can be controlled by pressure-resistant sensors.

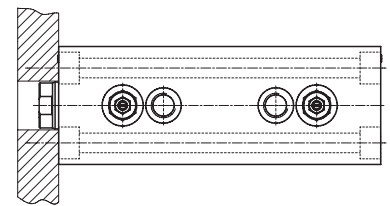
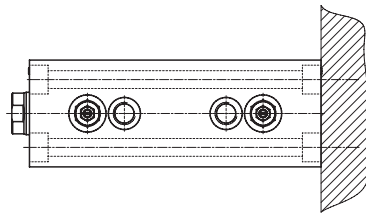
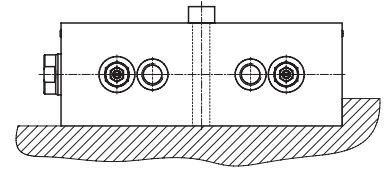
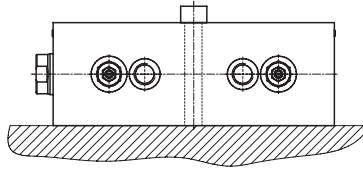
### Advantages

- 7 sizes each with 3 stroke lengths available
- Compact block design
- Same dimensions as the block cylinders as per data sheet B 1.509, except for total length
- Adjustable stroke end cushioning
- Unthrottled cylinder start from the stroke ends
- Optional stroke end control with pressure-resistant sensors
- Stroke end control adjustable up to 4 mm before the stroke end
- Multiple fixing possibilities
- Oil supply optionally with fittings or drilled channels
- Maintenance free
- FKM seals optional

### Important notes

Block cylinders are short-stroke cylinders. In comparison to standard hydro-cylinders, the cushioning strokes are relatively short, thereby the cushioning capacity is limited. Please consider the limit values in the chart. The high-pressure resistant sensors are delivered separately for mounting at place of installation in order to avoid transport damage. Please refer to the installation instructions on page 4. Consider the maximum environmental temperature of the sensors on page 4. Tolerances and angle dimensions as per DIN 7168-m. Operating conditions and other data see data sheet A 0.100.

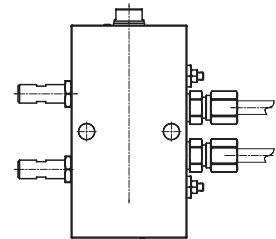
### Fixing possibilities



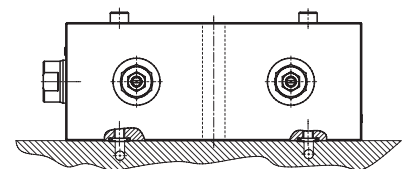
Cylinders must be backed up for operating pressures exceeding 160 bar

### Connecting possibilities

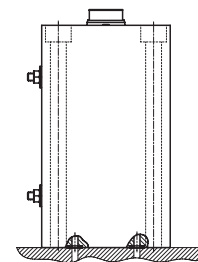
#### Version with connecting thread



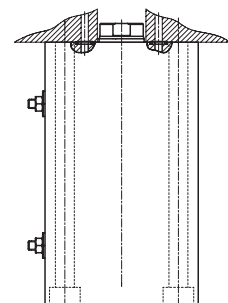
#### Version for manifold mounting with O-ring sealing (broad side)



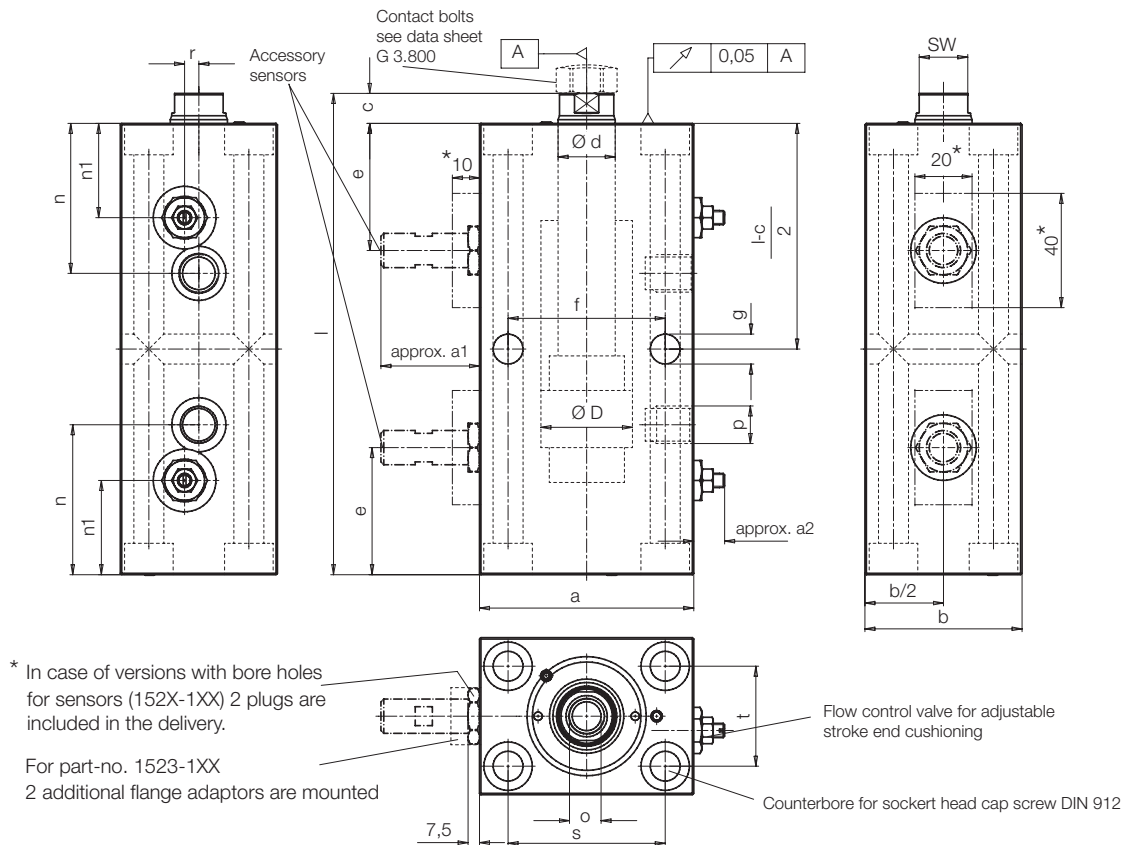
#### Version for manifold mounting with O-ring sealing (bottom side)



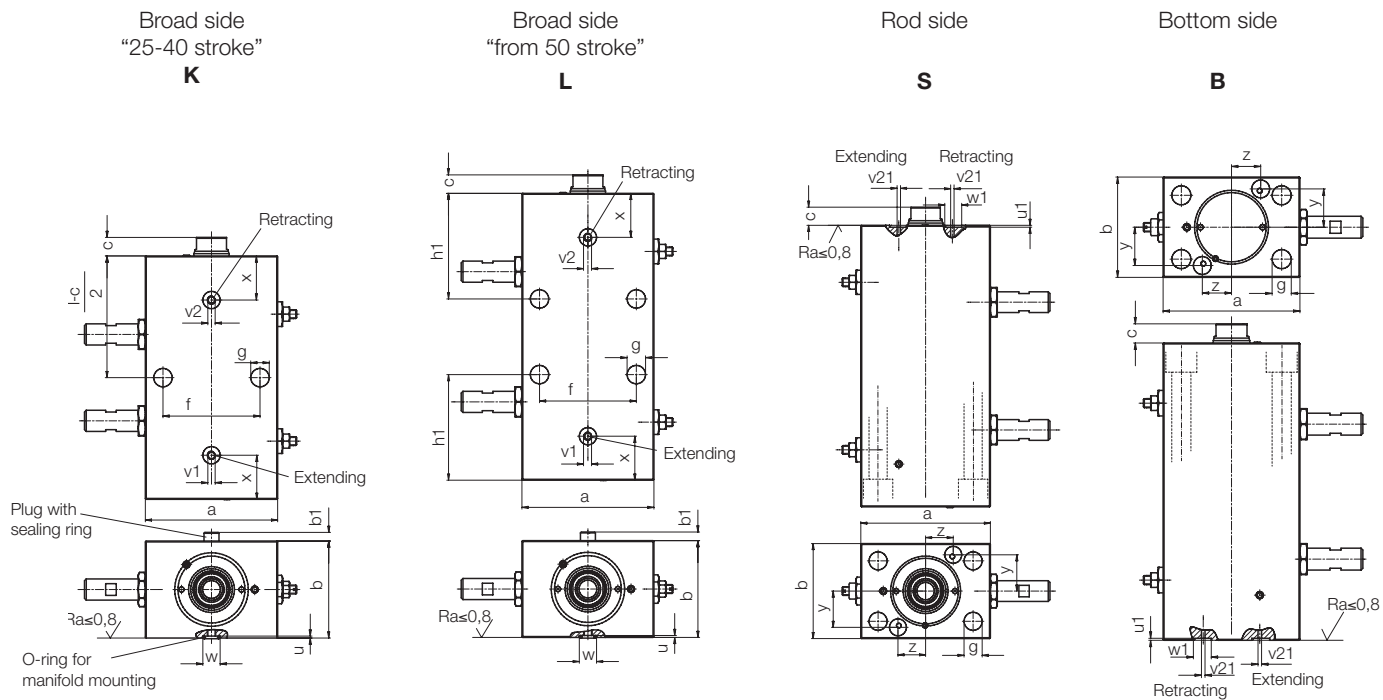
#### Version for manifold mounting with O-ring sealing (rod side)



Dimensions - Versions with connecting thread



Dimensions - Version for manifold mounting with O-ring sealing



Version "K" and "L"

For use of the sensors at the right side, the cylinder will be rotated by 180° and the plug with sealing ring and the O-ring for manifold mounting are exchanged.

## Dimensions

Piston Ø D	[mm]	25	32	40	50	63	80	100
Rod Ø d	[mm]	16	20	25	32	40	50	63
Force to push at	100 bar [kN]	4.9	8	12.56	19.63	31.17	50.26	78.54
	500 bar [kN]	24.5	40.2	62.8	98	156	251	392
Force to pull at	100 bar [kN]	2.9	4.9	7.6	11.6	18.6	30.6	47.3
	500 bar [kN]	14.5	24.5	38.3	57.9	93.0	153	236.8
Oil volume/ Stroke to extend	[cm <sup>3</sup> ]	4.91	8.05	12.56	19.63	31.17	50.26	78.54
10 mm stroke Stroke to retract	[cm <sup>3</sup> ]	2.9	4.9	7.6	11.6	18.6	30.6	47.3
a	[mm]	65	75	85	100	125	160	200
a1 + Switching distance	1.5 up to 2.5 [mm]	35.5	34	33	31	45.5	37	42.5
a2 + max. 2.5	[mm]	9	9	8	8	6	5	5
b	[mm]	45	55	63	75	95	120	150
b1	[mm]	4	5	5	5	7.5	7.5	7.5
c	[mm]	7	10	10	10	14	14	15
e	[mm]	40	44.5	46	49.5	54	62.5	68.5
f	[mm]	40	55	63	76	95	120	158
g	[mm]	8.5	10.5	10.5	13	17	21	25
h1	[mm]	52.5	60.0	60.0	65.0	72.0	85	102
n	[mm]	51	53.5	56	57.5	66	72	77
n1	[mm]	30	33	34	37	40.5	47	50
o x depth of thread	[mm]	M10x15	M12x15	M16x25	M20x30	M27x40	M30x40	M42x60
p		G1/4	G1/4	G1/4	G1/4	G1/2	G1/2	G1/2
r	[mm]	0	0	0	0	0	6	7
s	[mm]	50	55	63	76	95	120	158
t	[mm]	30	35	40	45	65	80	108
u ±0.05	[mm]	1.1	1.1	1.1	1.1	1.5	1.5	1.5
v1 extend	[mm]	M4	M5	M5	M5	M8	M8	M8
v2 retract	[mm]	M4	M5	M5	M5	M8	M8	M8
w +0.2	[mm]	9.8	9.8	9.8	9.8	13.8	13.8	13.8
u1 ±0.05	[mm]	0.7	1.1	1.1	1.1	1.5	1.5	1.5
v21 extend/retract	[mm]	2.8	2.8	4	6	8	8	8
w1 +0.2	[mm]	5.8	9.8	9.8	9.8	13.8	13.8	13.8
x	[mm]	21.5	25	25.5	28	31.5	37.5	39
y	[mm]	15	21	24	27.5	38	50	60
z	[mm]	16.5	16	20.5	25.5	29	30	40
SW	[mm]	13	17	22	26	34	41	55
Cushioning stroke approx.	[mm]	5.5	5	5	6.5	6.5	8	8
Dimensions O-ring (Version K, L, S, B)		7x1.5	7x1.5	7x1.5	7x1.5	10x2	10x2	10x2
<b>Part-no. O-ring</b>		<b>3000-342</b>	<b>3000-342</b>	<b>3000-342</b>	<b>3000-342</b>	<b>3000-347</b>	<b>3000-347</b>	<b>3000-347</b>
<b>Part-no. O-ring FKM</b>		<b>3001-077</b>	<b>3001-077</b>	<b>3001-077</b>	<b>3001-077</b>	<b>3001-078</b>	<b>3001-078</b>	<b>3001-078</b>
Only for 1523-XXX-B(S) O-ring 4x1		<b>3000-815</b>						
Only for 1523-XXX-B(S) O-ring 4x1 FKM		<b>3001-628</b>						

### Part-no. for connecting thread

Stroke ±1	[mm]	25	25	25	25	30	32	40
Total length l±1	[mm]	137.0	148.0	157.0	158.0	190.0	223.0	234.0
Weight	[kg]	2.5	3.7	5.3	7.3	13.3	26.2	42.0
<b>Part-no. without bore holes for sensors</b>		<b>1523-035</b>	<b>1524-035</b>	<b>1525-035</b>	<b>1526-035</b>	<b>1527-045</b>	<b>1528-045</b>	<b>1529-055</b>
<b>Part-no. with bore holes for sensors</b>		<b>1523-135</b>	<b>1524-135</b>	<b>1525-135</b>	<b>1526-135</b>	<b>1527-145</b>	<b>1528-145</b>	<b>1529-155</b>

Stroke ±1	[mm]	50	50	50	50	63	80
Total length l±1	[mm]	162.0	173.0	182.0	183.0	223.0	271.0
Weight	[kg]	3.0	4.4	6.1	8.5	15.7	31.8
<b>Part-no. without bore holes for sensors</b>		<b>1523-065</b>	<b>1524-065</b>	<b>1525-065</b>	<b>1526-065</b>	<b>1527-075</b>	<b>1528-085</b>
<b>Part-no. with bore holes for sensors</b>		<b>1523-165</b>	<b>1524-165</b>	<b>1525-165</b>	<b>1526-165</b>	<b>1527-175</b>	<b>1528-185</b>

Stroke ±1	[mm]	100	100	100	100	100	100	100
Total length l±1	[mm]	212.0	223.0	232.0	233.0	260.0	291.0	294.0
Weight	[kg]	3.9	5.7	7.7	10.7	18.3	34.1	53.0
<b>Part-no. without bore holes for sensors</b>		<b>1523-095</b>	<b>1524-095</b>	<b>1525-095</b>	<b>1526-095</b>	<b>1527-095</b>	<b>1528-095</b>	<b>1529-095</b>
<b>Part-no. with bore holes for sensors</b>		<b>1523-195</b>	<b>1524-195</b>	<b>1525-195</b>	<b>1526-195</b>	<b>1527-195</b>	<b>1528-195</b>	<b>1529-195</b>

Accessory sensor 80° (description see page 4)

<b>Part-no.</b>		<b>3829-180</b>	<b>3829-180</b>	<b>3829-180</b>	<b>3829-180</b>	<b>3829-030</b>	<b>3829-030</b>	<b>3829-204</b>
Accessory pull-type connector pnp (description see page 4)								
M12x1 knee-type								
<b>Part-no.</b>		<b>3829-049</b>	<b>3829-049</b>	<b>3829-049</b>	<b>3829-049</b>	<b>3829-049</b>	<b>3829-049</b>	<b>3829-049</b>
M12x1 straight								
<b>Part-no.</b>		<b>3829-078</b>	<b>3829-078</b>	<b>3829-078</b>	<b>3829-078</b>	<b>3829-078</b>	<b>3829-078</b>	<b>3829-078</b>

### Code for part-nos.:

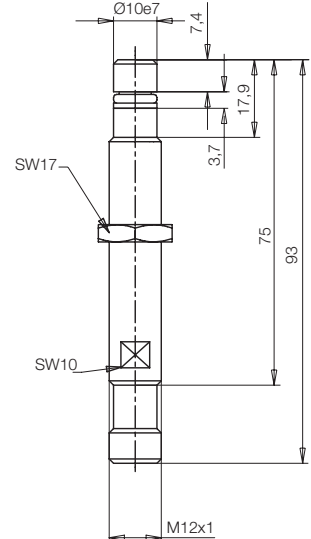
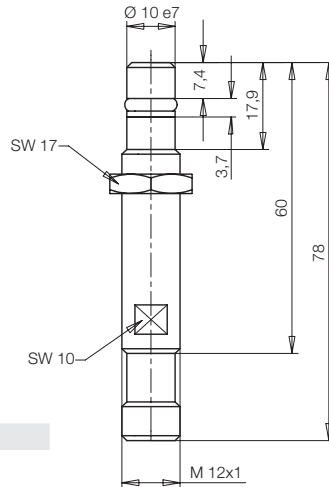
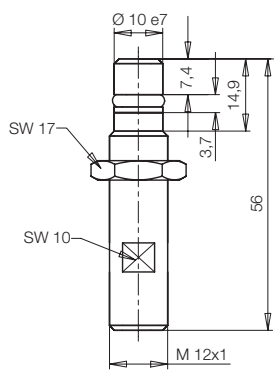
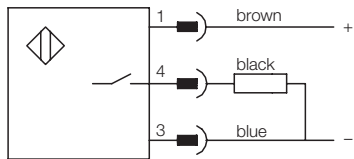
152X-XX6 -version with FKM seals  
for temperatures exceeding 100 °C up to max. 150 °C

### Versions for manifold mounting (page 2)

152X-XXX-K - version with connection at the broad side (25...40 stroke)  
L - version with connection at the broad side (from 50 stroke)  
152X-XXX-S - version with connection at the rod side  
152X-XXX-B - version with connection at the bottom side

# High-pressure resistant sensors max. operating pressure 500 bar

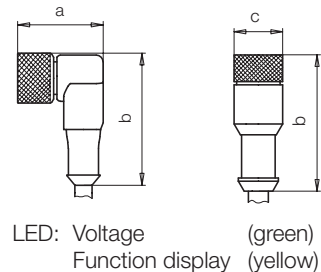
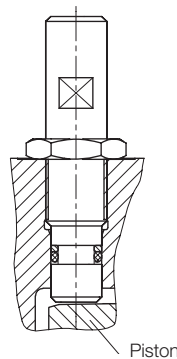
For block cylinders:	1523-XXX 1524-XXX 1525-XXX 1526-XXX		1527-XXX 1528-XXX		1529-XXX	
<b>General and technical characteristics</b>						
<b>Environmental temperature</b>	°C		-25...+80	-25...+120	-25...+80	
Rated operating distance Sn	mm	1.5	1.5	1.5	1.5	
Assured operating distance Sa	mm	0...1.2	0...2	0...1.2	0...1.2	
Repeatability	%	≤ 5	≤ 5	≤ 5	≤ 5	
Hysteresis	%	≤ 15	≤ 15	≤ 15	≤ 15	
Dimension DxT	mm	M12x1 x 56	M12x1 x 56	M12x1x78	M12x1 x 78	M12x1 x 93
Material of the body		1.4104	1.4104	1.4104	1.4104	1.4104
Material of sensing face		EP (duroplastic)	ceramics	EP (duroplastic)	ceramics	EP (duroplastic)
Code class	IP	68	68	68	68	68
Type of connection		Connector S4	Connector S4	Connector S4	Connector S4	Connector S4
<b>Electrical characteristics</b>						
Voltage		DC	DC	DC	DC	DC
Wiring		3 wires	3 wires	3 wires	3 wires	3 wires
Switching function		interlock	interlock	interlock	interlock	interlock
Output signal		pnp	pnp	pnp	pnp	pnp
Rated operating voltage	V	24 DC	24 DC	24 DC	24 DC	24 DC
Rated operating current	mA	200	200	200	200	200
Voltage	V	10...30 DC	10...30 DC	10...30 DC	10...30 DC	10...30 DC
Residual ripple	%	≤ 15	≤ 15	≤ 15	≤ 15	≤ 15
Switching frequency	Hz	1000	2000	1000	2000	1000
No-load current	mA	≤ 10/≤ 2	≤ 8	≤ 10/≤ 1	≤ 8	≤ 10/≤ 1
Voltage drop	V	≤ 1.5/-	≤ 2.5	≤ 1.5/-	≤ 2.5	≤ 1.5/-
Protection against short circuit		yes	yes	yes	yes	yes
Protection against reverse battery		yes	yes	yes	yes	yes
<b>Part-no. sensor</b>		<b>3829-180</b>	<b>3829-228</b>	<b>3829-030</b>	<b>3829-227</b>	<b>3829-204</b>
<b>Part-no. O-ring</b> (included in the delivery)		<b>3001-550</b>	<b>3001-550</b>	<b>3001-551</b>	<b>3001-551</b>	<b>3001-550</b>
<b>Part-no. Back-up ring</b>		<b>3001-552</b>	<b>3001-552</b>	<b>3001-552</b>	<b>3001-552</b>	<b>3001-552</b>



## Mounting and adjustment of sensors

### Front sensor:

- Extend piston rod completely
- Carefully, screw the sensors in to the stop at the piston  
Turn back the sensor:  
Rotation | Switching point before the final position  
1/4 | approx. 4 mm  
1 1/4 | approx. 1 mm
- Lock the sensor in this position by means of a nut
- Wire the switch electrically and check the function



### Rear sensor:

- Retract completely the piston rod  
(Further steps see front sensor)

Accessories for sensors	a	b	c	Code class	Environmental temperature	LED	Part-no.
Plug-type connector pnp M12, knee-type	25	39	-	IP68	-25...+70°C	yes	<b>3829-049</b>
Plug-type connector pnp M12, straight	-	41	14.5	IP68	-25...+70°C	no	<b>3829-078</b>
Plug-type connector pnp M12, knee-type	31.5	38	-	IP67	-40...+105°C	no	<b>3829-230</b>
Plug-type connector pnp M12, straight	-	35.5	14.5	IP67	-40...+105°C	no	<b>3829-229</b>

All plug-type connectors with 3 meters cable