

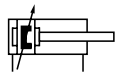
**Technical details**

<b>Operating pressure</b>	1 ... 10 bar
<b>Temperature range</b>	-20°C ... +80°C ( XGH: -10°C...+150°C )
<b>Max. stroke</b>	2500 mm
<b>Medium</b>	Filtered, oil-free and dried compressed air according to ISO 8573-1:2010, Class 7:2:4, instrument air, free of aggressive additives. Alternatively the pressure dew point must be at least 10°C below lowest occurring ambient temperature.
<b>Materials</b>	Cylinder tube: Al, (painted) End caps: Al-die-cast (painted) Piston rod: steel hard chrome plated (optional 1.4301) Seals: PU, NBR (optional FKM)
	Cylinders in accordance with 2014/34/EU (ATEX) available. (Chapter 13)

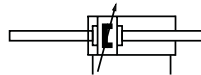


Double acting cylinder with adjustable cushions and magnetic piston for proximity sensors. Standard stroke lengths in table below, additional lengths on request.

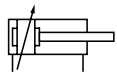
**Versions**



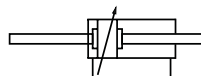
050, 054, 000, 004  
double acting, adjustable cushioning, with magnetic piston



450, 454, 400, 404  
double acting, double end piston rod, adjustable cushioning, with magnetic piston

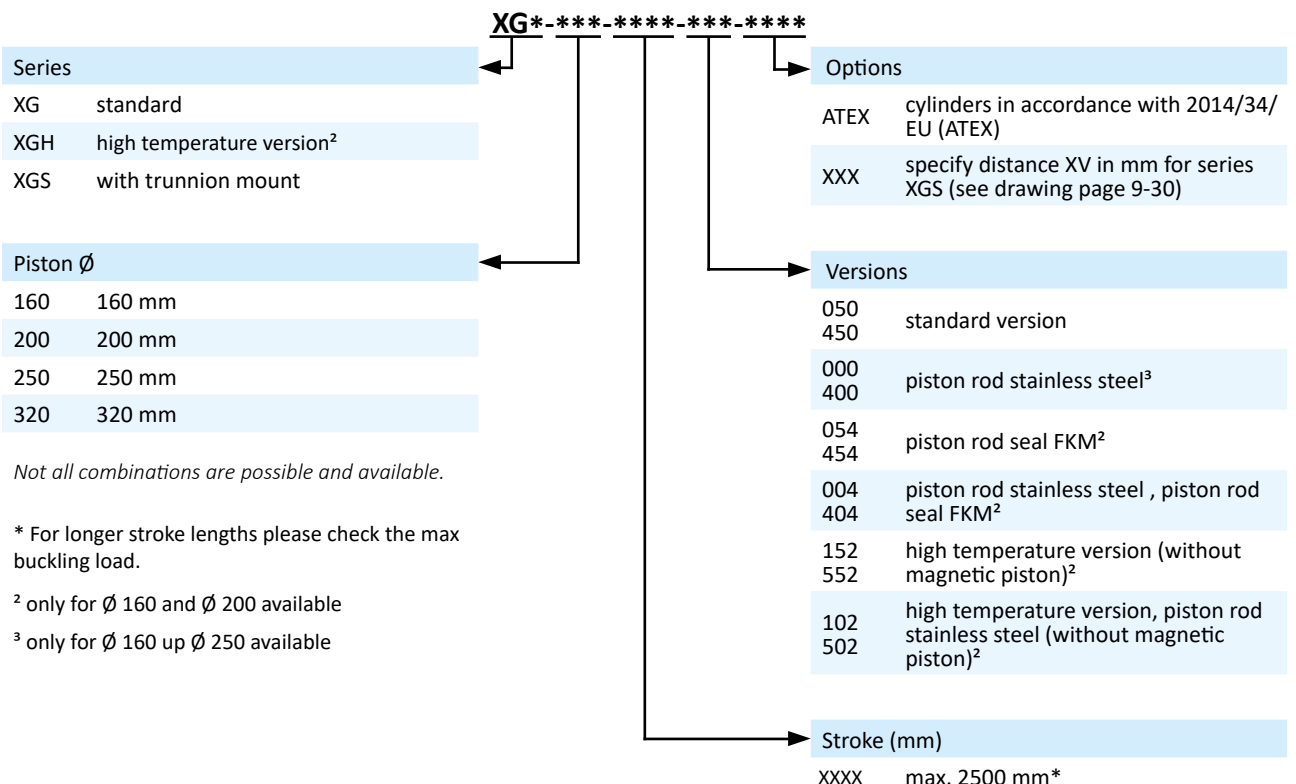


152, 102  
double acting, adjustable cushioning



552, 502  
double acting, double end piston rod, adjustable cushioning

**Order code**



Not all combinations are possible and available.

\* For longer stroke lengths please check the max buckling load.

<sup>2</sup> only for Ø 160 and Ø 200 available

<sup>3</sup> only for Ø 160 up Ø 250 available

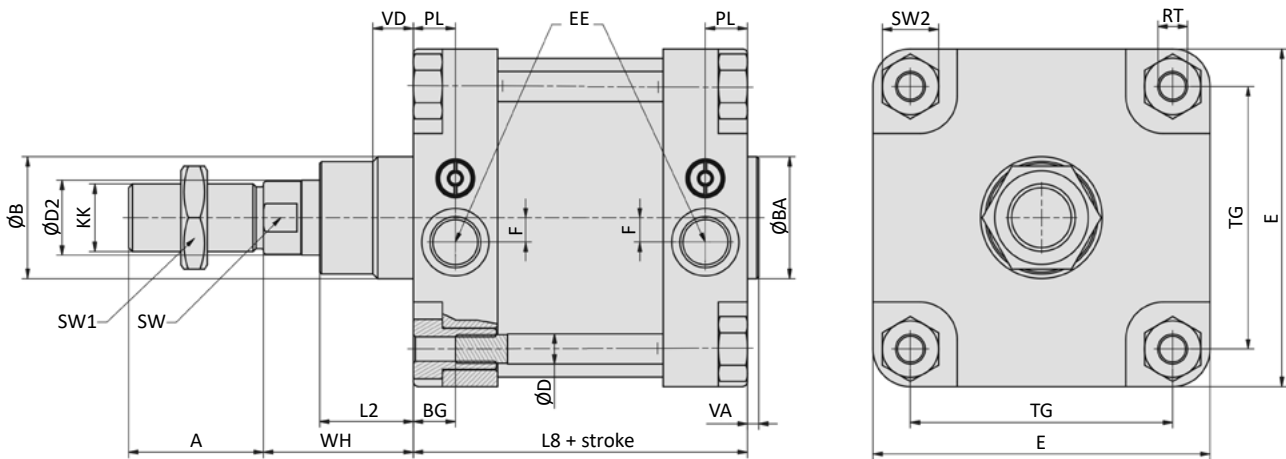
## Series XG

### ISO 15552, double acting

#### Technical data

Model-no.:	XG-160-...	XG-200-...	XG-250-...	XG-320-...
Piston $\varnothing$ (mm)	160	200	250	320
Force at 6 bar (N)	Extension	10852	16956	26494
	Retraction	10174	16278	25434
Connection	G3/4	G3/4	G1	G1
Piston rod thread	M36 x 2	M36 x 2	M42 x 2	M48 x 2
Cushioning length (mm)	50	50	60	65

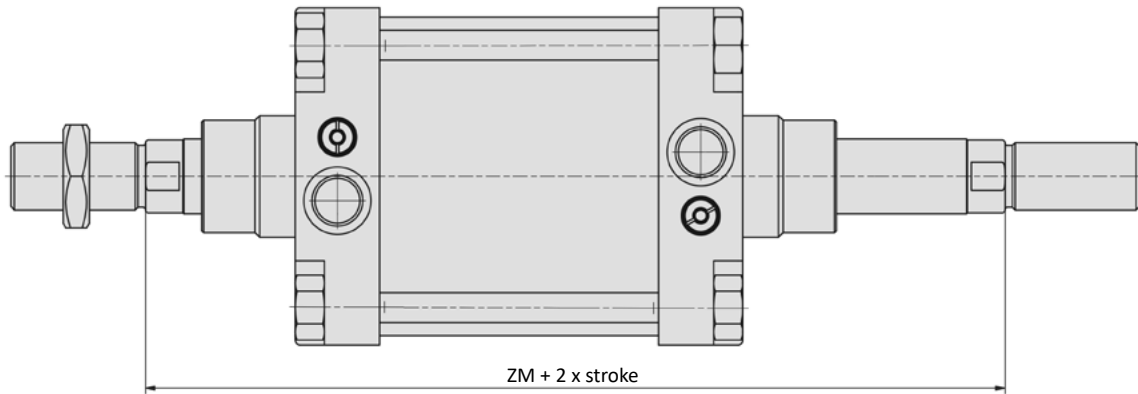
#### Dimensions series XG



Piston $\varnothing$	A	$\varnothing B$	$\varnothing BA$	BG	$\varnothing D$	$\varnothing D2$	E	EE	F	KK	L2
160	72	65	65	22.5	16	40	180	G3/4	13	M36 x 2	50
200	72	75	75	22.5	16	40	220	G3/4	13	M36 x 2	55
250	84	90	90	25	20	50	268	G1	15	M42 x 2	67
320	96	110	110	28	25	63	340	G1	0	M48 x 2	82

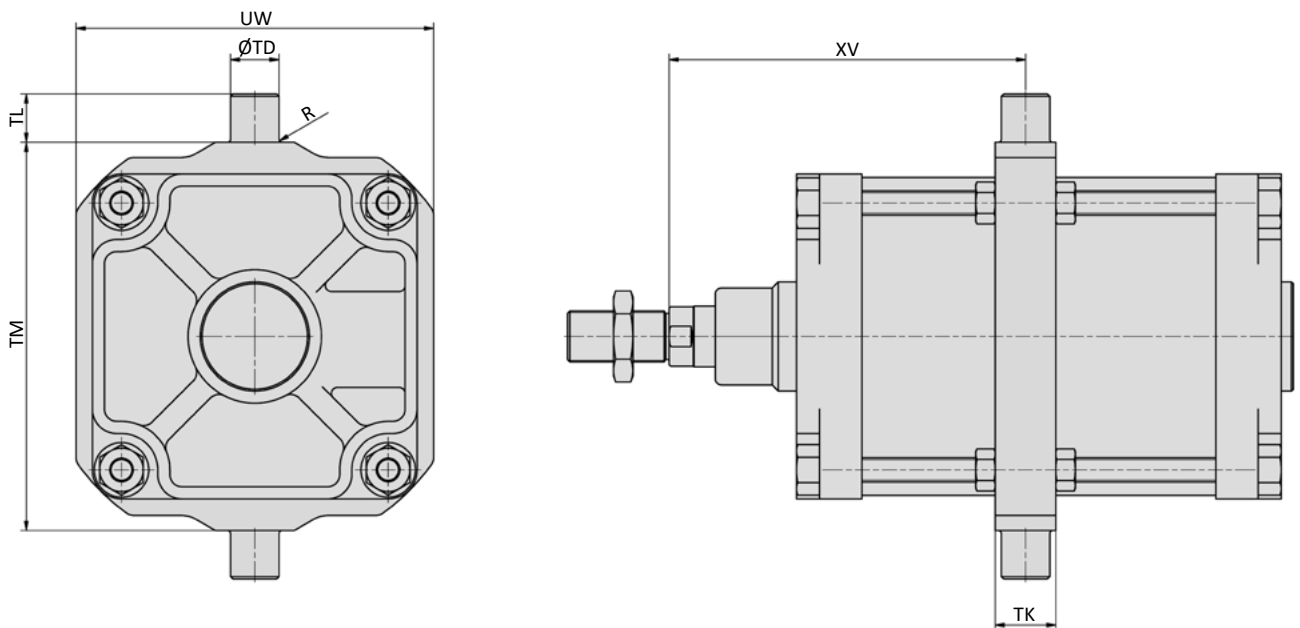
Piston $\varnothing$	L8	PL	RT	SW	SW1	SW2	TG	VA	VD	WH
160	179.5	22.5	M16	36	55	30	140	6	21.5	80
200	180	22.5	M16	36	55	30	175	6	26.5	95
250	200	31	M20	46	65	36	220	10	20	105
320	220	31	M24	55	75	46	270	10	20	120

Piston $\varnothing$ (mm)		160	200	250	320
Weight (kg)	0 mm stroke	15.0	20.0	28.5	48.4
	each 100 mm stroke	2.0	2.5	3.8	6.2

**Dimensions series XG (addition at double end piston rod)**


<b>Piston Ø (mm)</b>	160	200	250	320
<b>ZM</b>	340	370	410	460

<b>Piston Ø (mm)</b>	160	200	250	320
<b>Weight (kg)</b>				
<b>0 mm stroke</b>	16.9	22.5	32.3	54.8
<b>each 100 mm stroke</b>	3.3	3.5	4.0	6.4

**Dimensions series XGS (addition at mounted trunnion mount)**


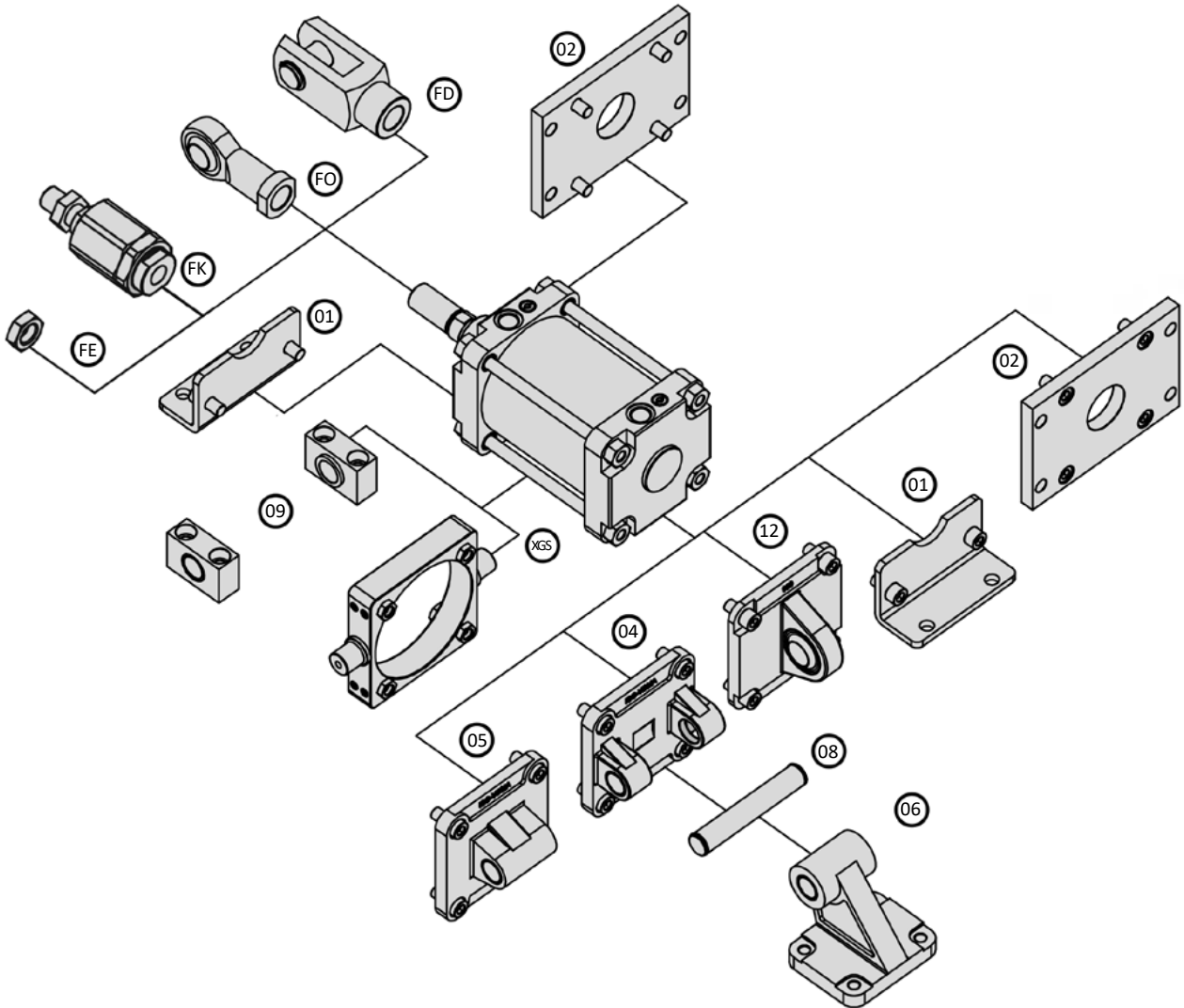
<b>Piston Ø</b>	<b>R</b>	<b>Ø TD</b>	<b>TK</b>	<b>TL</b>	<b>TM</b>	<b>UW</b>	<b>XV<sub>min</sub></b>
<b>160</b>	2.5	32	40	32	200	190	153
<b>200</b>	2.5	32	40	32	250	240	168
<b>250</b>	2.5	40	50	40	320	295	200
<b>320</b>	2.5	50	70	50	400	370	231

<b>Piston Ø (mm)</b>	160	200	250	320
<b>Weight (kg)</b>				
<b>0 mm stroke</b>	19.2	27.3	41.0	72.6
<b>each 100 mm stroke</b>	2.0	2.5	3.8	6.2

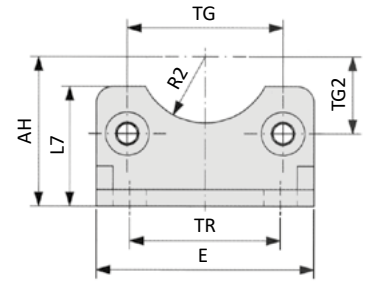
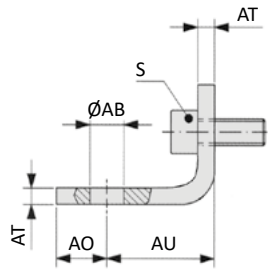
# Series XG

Mounting accessories

## Mounting accessories VLB-xxx-yy



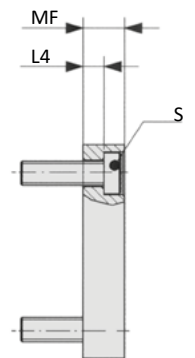
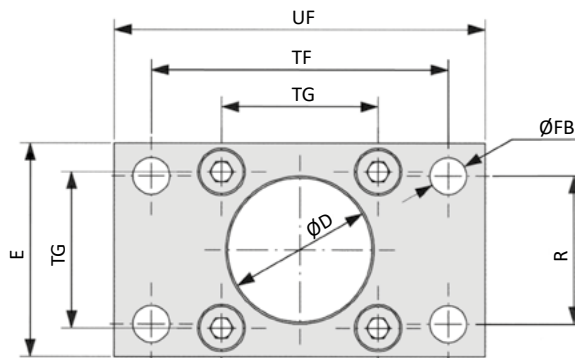
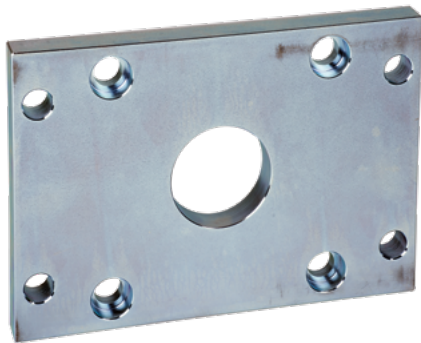
**VLB-xxx-01 Foot mount**



Model-no.:	Ø AB	AH	AO	AU	AT	E	L7	R2	S	TG	TG2	TR
<b>VLB-160-01</b>	18	115	15	60	9	180	100	32.5	M16 x 30	140	70	115
<b>VLB-200-01</b>	22	135	30	70	12	220	100	37.5	M16 x 30	175	87.7	135
<b>VLB-250-01</b>	26	165	25	75	14	270	150	45	M20 x 40	220	110	165
<i>tolerances and adjustments</i>	H14	JS16		± 0.2	± 1			H15		± 0.3		JS14

material: steel, zinc plated; 2 x 2 screws in accordance with EN ISO 4762 are included

**VLB-xxx-02 Flange mount**



Model-no.:	Ø D	E	Ø FB	L4	MF	R	S	TF	TG	UF
<b>VLB-160-02</b>	65	180	18	9.5	20	115	M16 x 30	230	140	260
<b>VLB-200-02</b>	75	220	22	12.5	25	135	M16 x 30	270	175	300
<b>VLB-250-02</b>	90	285	26	10.5	25	165	M20 x 30	330	220	400
<b>VLB-320-02</b>	110	350	33	15	30	200	M24 x 40	400	270	470
<i>tolerances and adjustments</i>	H11		H13	0 - 0.5	JS14	JS14		JS14	± 0.3	

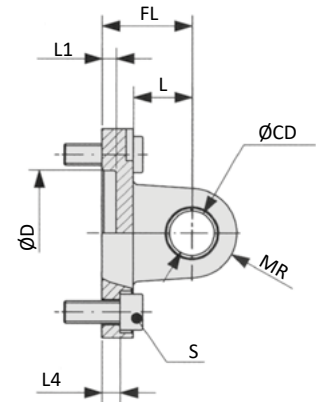
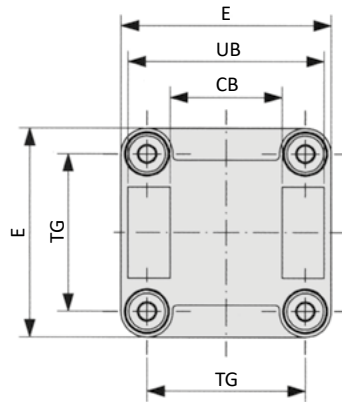
material: steel, zinc plated; 4 screws in accordance with DIN 7984 are included

## Series XG Mounting accessories

### VLB-xxx-04 Clevis mount with bushing



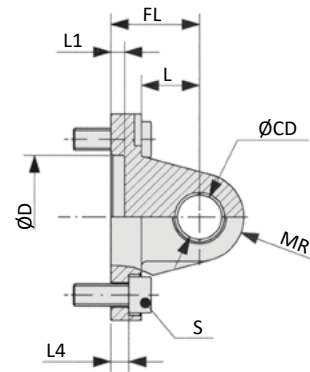
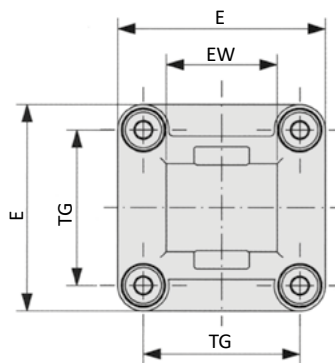
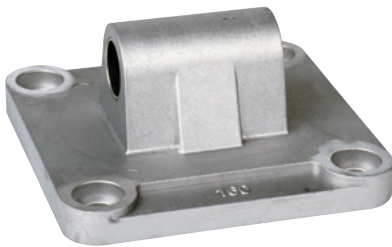
Inclusive clevis pin  
order no: **VLB-xxx-48**



Model-no.:	CB	Ø CD	Ø D	E	FL	L	L1	L4	MR	S	TG	UB
<b>VLB-160-04</b>	90	30	65	180	55	35	7	10	25	M16 x 30	140	170
<b>VLB-200-04</b>	90	30	75	220	60	35	7	11	25	M16 x 30	175	170
<b>VLB-250-04</b>	110	40	90	270	70	45	-*	11	40	M20 x 30	220	200
<b>VLB-320-04</b>	120	45	110	350	80	50	-*	15	45	M24 x 40	270	220
<i>tolerances and adjustments</i>	H14	H9	H11		± 0.2			± 0.5			± 0.3	h13

materials: Al, bushing steel and PTFE (Ø 250 and 320 without bushing); 4 screws in accordance with EN ISO 4762 are included  
\* through hole

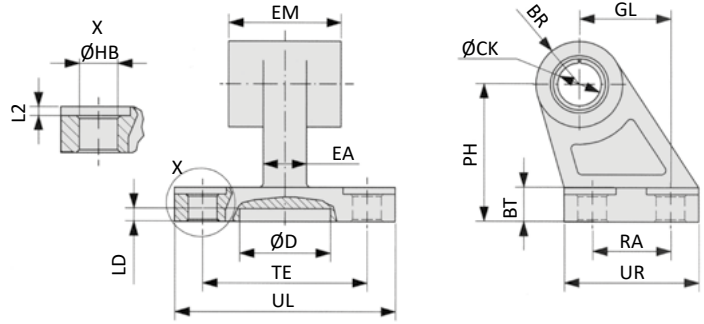
### VLB-xxx-05 Swivel mount



Model-no.:	Ø CD	Ø D	E	EW	FL	L	L1	L4	MR	S	TG
<b>VLB-160-05</b>	30	65	180	90	55	35	7	10	25	M16 x 30	140
<b>VLB-200-05</b>	30	75	220	90	60	35	7	11	25	M16 x 30	175
<b>VLB-250-05</b>	40	90	270	110	70	45	11	11	40	M20 x 30	220
<b>VLB-320-05</b>	45	110	350	120	80	50	15	15	45	M24 x 40	270
<i>tolerances and adjustments</i>	H9	H11		-0.5 -1.2	± 0.2			± 0.5			± 0.3

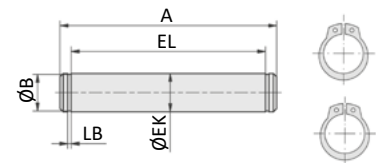
materials: Al, bushing steel and PTFE (Ø 250 and 320 without bushing); 4 screws in accordance with EN ISO 4762 are included

**VLB-xxx-06 Swivel mount 90°**



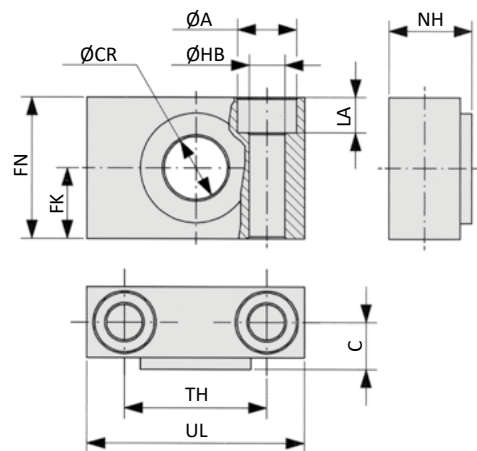
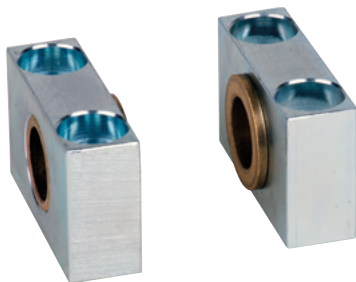
Model-no.:	BR	BT	Ø CK	Ø D	EA	EM	GL	Ø HB	L2	LD	PH	RA	TE	UL	UR
<b>VLB-160-06</b>	31.5	25	30	31	36	90	97	14	4	5	115	88	118	156	126
<b>VLB-200-06</b>	31.5	30	30	31	40	90	105	18	4	5	135	90	122	162	130
<i>tolerances and adjustments</i>			H9			-0.5 -1.5	JS14	H13			JS15	JS14	JS14		
	material: Al														

**VLB-xxx-08 Clevis pin**



Model-no.:	A	Ø B	Ø EK	EL	LB
<b>VLB-200-08</b>	178	28.6	30	171.5	1.60
<b>VLB-250-08</b>	211	37.5	40	202	1.85
<b>VLB-320-08</b>	234	42.5	45	222	1.85
<i>tolerances and adjustments</i>			e8	+ 3 0	
	material: steel, zinc plated; 2 snap rings are included				

**VLB-xxx-09 Bearing block**

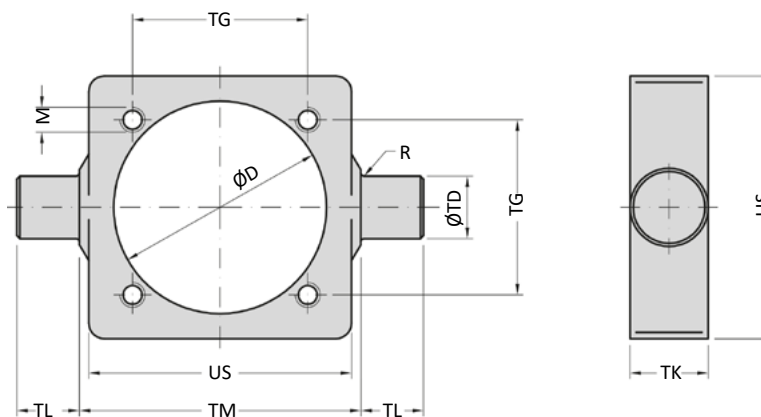


Model-no.:	Ø A	C	Ø CR	FK	FN	Ø HB	LA	NH	TH	UL
<b>VLB-200-09</b>	26	22.5	32	30	60	18	17	40	60	92
<b>VLB-250-09</b>	33	31	40	35	70	22	20	56	70	140
<i>tolerances and adjustments</i>			H9	± 0.2		H13			± 0.3	
	materials: steel, zinc plated; bronze bushing									

## Series XG

### Mounting accessories

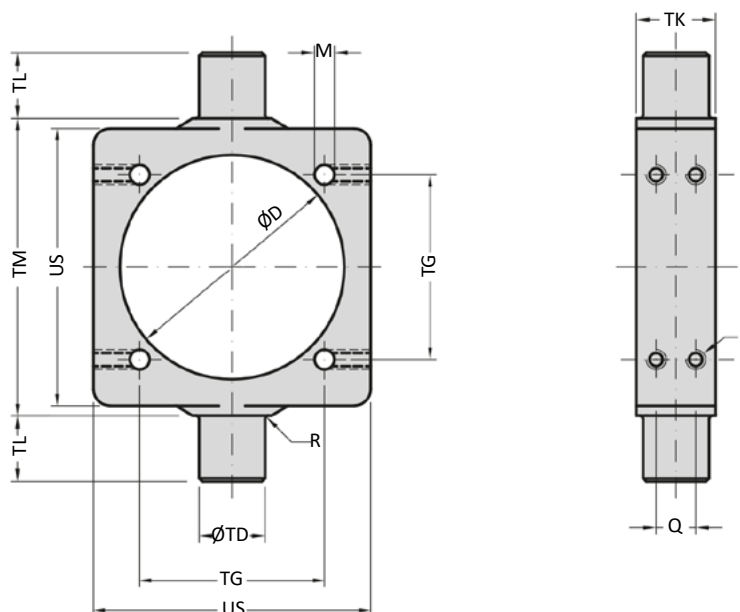
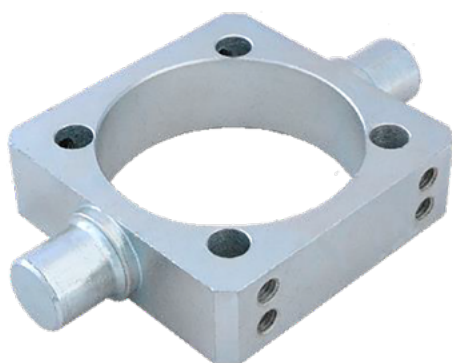
#### VLB-xxx-10 Trunnion mount, mounting on tie rods with thread



Model-no.:	$\phi D$	M	R	$\phi TD$	TG	TK	TL	TM	US
VLB-160-10	171	M16	2,5	32	140	46	32	200	198
VLB-200-10	214	M16	2,5	32	175	46	32	250	245
VLB-250-10	268	M20	2,5	40	220	56	40	320	304
VLB-320-10*	343	M24	2,5	50	270	70	50	400	370
<i>tolerances and adjustments</i>	+0,2 0		max	e9	$\pm 0,2$	max	h14	h14	max

material: steel, black plated, \*delivery on request

#### VLB-xxx-10-A Trunnion mount, mounting with clamping

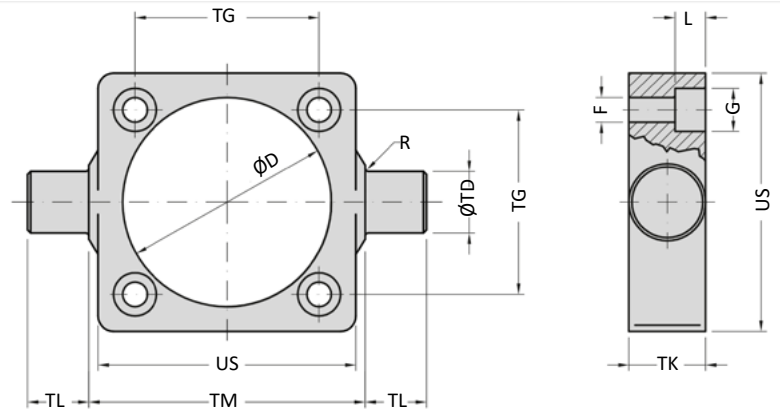
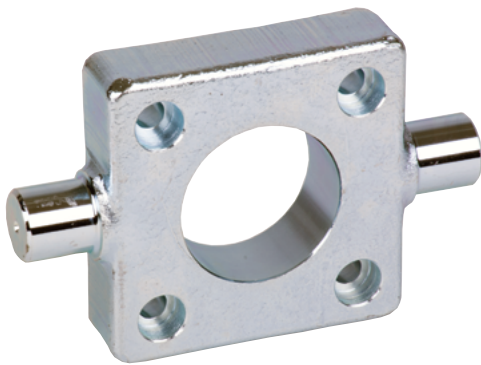


Model-no.:	$\phi D$	M	Q	R	$\phi TD$	TG	TK	TL	TM	US	Z
VLB-160-10-A	171,6	16,25	18	2,5	32	140	40	32	200	190	M12
VLB-200-10-A	214	16,25	18	2,5	32	175	40	32	250	240	M12
<i>tolerances and adjustments</i>	+0,2 0	+0,2 0	$\pm 0,2$	max	e9	$\pm 0,2$	max	h14	h14	max	

material: steel, zinc plated



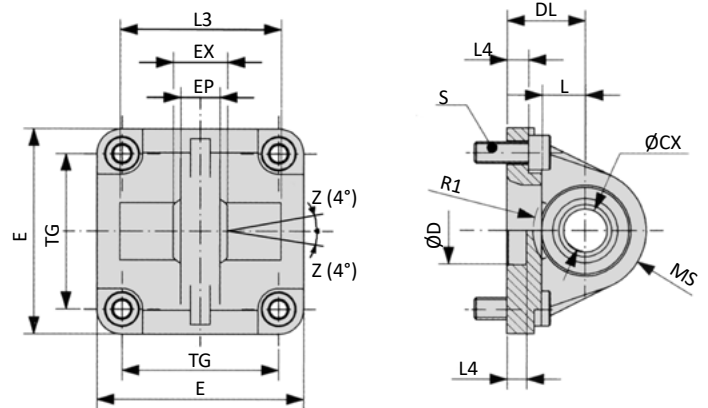
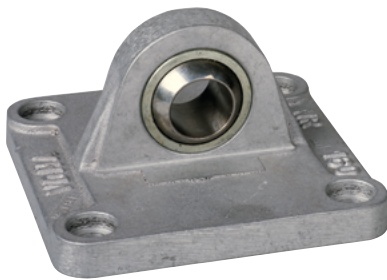
**VLB-xxx-11 Trunnion mount**



Model-no.:	Ø D	F	G	L	R	Ø TD	TG	TK	TL	TM	US
<b>VLB-160-11</b>	170	17	25	16	2,5	32	140	40	32	200	190
<b>VLB-200-11</b>	211	17	25	16	2,5	32	175	40	32	250	240
<i>tolerances and adjustments</i>	+0,2 0	H13	H13	+0,5 0	max	e9	±0,2	max	h14	h14	max

material: steel, zinc plated; 4 screws in accordance with EN ISO 4762 are included

**VLB-xxx-12 Swivel mount with spherical bearing**

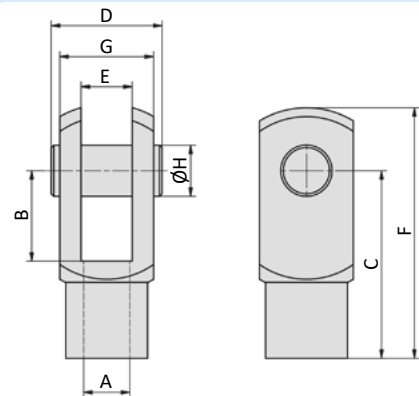


Model-no.:	Ø CX	Ø D	DL	E	EP	EX	L	L1	L3	L4	MS	R1	S	TG
<b>VLB-160-12</b>	35	65	55	180	28	43	35	7	-	10	45	-	M16 x 30	140
<b>VLB-200-12</b>	35	75	60	220	28	43	35	7	-	11	48	-	M16 x 30	175
<i>tolerances and adjustments</i>	H7	H11	±0,2								±0,5			±0,3

materials: Al, bearing steel, bronze bushing; 4 screws in accordance with EN ISO 4762 are included

## Series XG Mounting accessories

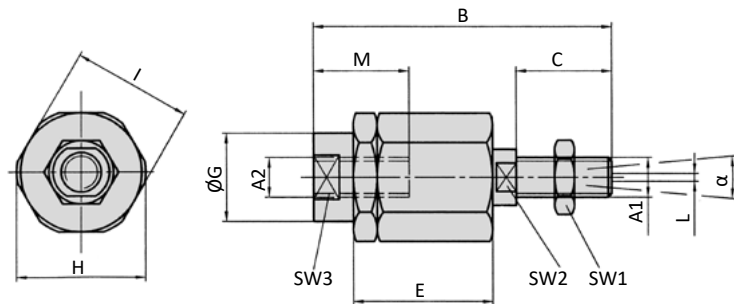
### FD-xxx Rod clevis



Model-no.:	for cylinder	A	B	C	D	E	F	G	H
FD-200	XG-160, XG-200	M36 x 2	72	144	84	35	188	70	35
FD-250	XG-250	M42 x 2	84	168	104.5	40	232	85	40
FD-320	XG-320	M48 x 2	96	192	117.5	50	265	96	50

material: steel, zinc plated

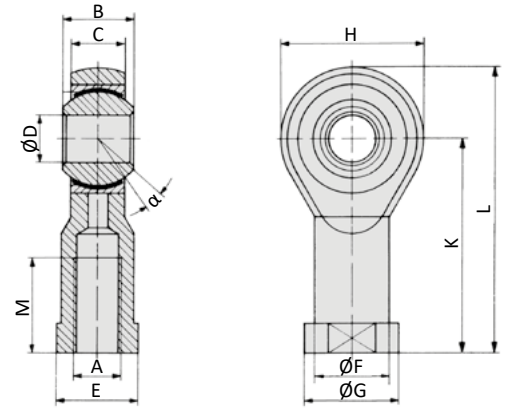
### FK-xxx Flexible coupling



Model-no.:	for cylinder	A1, A2	B	C	D	E	ØG	H	I	L	M	SW1	SW2	SW3	α
FK-200	XG-160, XG-200	M36 x 2	190	72	15.5	77	57	75	70	2	68	32	54	55	8°

material: steel, zinc plated

**FO-xxx Rod eye**

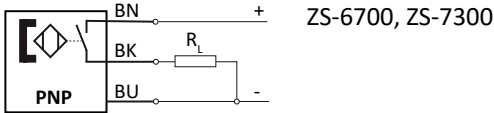
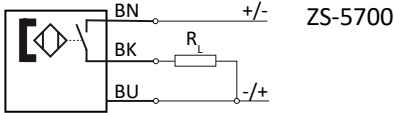
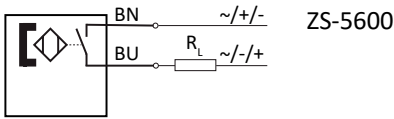


Model-no.:	for cylinder	A	B	C	ØD	E	ØF	ØG	H	K	L	M	α
<b>FO-160/200</b>	XG-160, XG-200	M36 x 2	43	28	35	50	46	58	80	125	165	56	16°
<b>FO-250</b>	XG-250	M42 x 2	49	33	40	55	53	65	91	142	187	60	16°
<b>FO-320</b>	XG-320	M48 x 2	60	45	50	60	65	75	117	162	218	65	14°

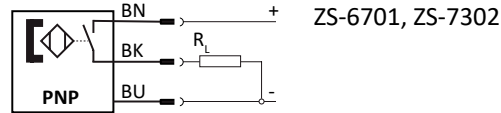
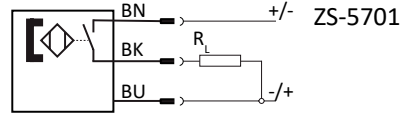
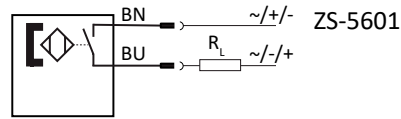
materials: steel, zinc plated, bearing steel, bronze bushing

## Series ZS Proximity sensors





### Proximity sensors with cable







### Proximity sensors with plug



### Technical data

Model-no.:	ZS-5600	ZS-5601	ZS-5700	ZS-5701
				
<b>Design</b>	2-pole Reed sensor	2-pole Reed sensor	3-pole Reed sensor	3-pole Reed sensor
<b>Contact function</b>	NO	NO	NO	NO
<b>Rated operational voltage</b>	5 ... 240 V AC / DC	5 ... 60 V AC / DC	5 ... 30 V DC	5 ... 30 V DC
<b>Rated operational current <math>I_E</math></b>	3 ... 100 mA	3 ... 100 mA	≤ 500 mA	≤ 500 mA
<b>Max. voltage drop at <math>I_E</math></b>	≤ 2.5	≤ 2.5	≤ 0.1	≤ 0.1
<b>Breaking capacity</b>	10 W	10 W	10 W	10 W
<b>Cable length</b>	3 m	0.3 m with M8 connection	5 m	0.3 m with M8 connection
<b>Temperature range</b>	-10 ... +70°C	-10 ... +70°C	-10 ... +70°C	-10 ... +70°C
<b>Protection</b>	IP 67	IP 67	IP 67	IP 67
<b>Switching status indication</b>	LED red	LED red	LED yellow	LED yellow

Model-no.:	ZS-6700	ZS-6701	ZS-7300	ZS-7302
				
<b>Design</b>	3-pole inductive	3-pole inductive	3-pole inductive	3-pole inductive
<b>Contact function</b>	NO	NO	NO	NO
<b>Output</b>	PNP	PNP	PNP	PNP
<b>Rated operational voltage</b>	5 ... 30 V DC	5 ... 30 V DC	10 ... 30 V DC	10 ... 30 V DC
<b>Rated operational current <math>I_E</math></b>	≤ 200 mA	≤ 200 mA	≤ 100 mA	≤ 100 mA
<b>Max. voltage drop at <math>I_E</math></b>	≤ 1.0	≤ 1.0	≤ 2.5	≤ 2.5
<b>Breaking capacity</b>	6 W	6 W	3 W	3 W
<b>Cable length</b>	3 m	0.3 m with M8 connection	6 m	0.3 m with M12 connection
<b>Temperature range</b>	-10 ... +70°C	-10 ... +70°C	-20 ... +60°C	-20 ... +60°C
<b>Protection</b>	IP 67	IP 67	IP 67	IP 67
<b>Switching status indication</b>	LED green	LED green	LED yellow	LED yellow
	-	-	II 3G Ex nA T4 II 3D Ex tD A22 IP67 T 125°C	II 3D Ex tc IIIC T125°C Dc X


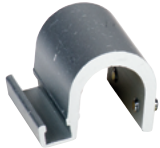
**Cable with bushing for proximity sensors**

<b>Model-no.:</b>	KA-30	KA-50	KA-51	KA-100	KA-101
<b>Connection</b>	M8, snap-in	M8, snap-in	M8, snap-in	M8, snap-in	M8, snap-in
<b>Version</b>	straight	straight	elbow 90°	straight	elbow 90°
<b>Cable length</b>	3 m	5 m	5 m	10 m	10 m

**Mounting**

For this cylinder series separate mounting brackets are necessary for the sensor mounting.

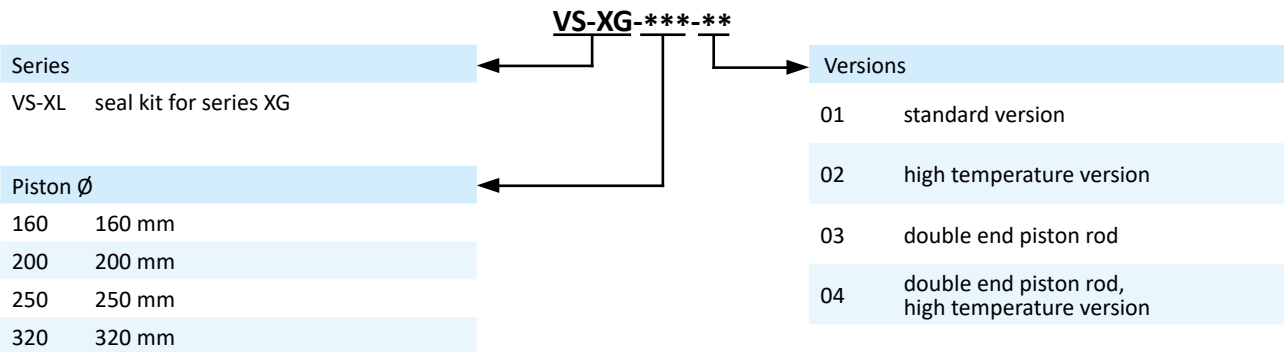
**Mounting brackets for proximity sensors**

<b>Model-no.:</b>	NT-250	HTM-080/100-1
		
<b>Design</b>	Sensor mounting	Mounting bracket for tie rod design
<b>For series</b>	HM, HE, CM, XG, XM	XG-160, XG-200

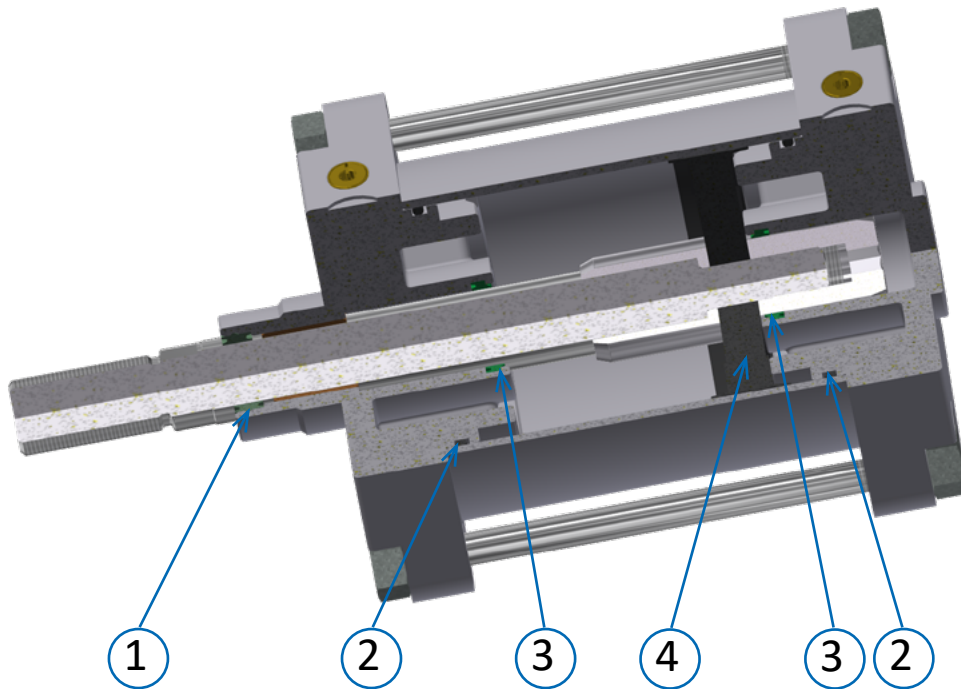
# Series XL

## Seal kits

### Order code



### Content



#### Standard version

Position	Part	Quantity
1	piston rod seal (PUR)	1*
2	O-ring (NBR)	2
3	cushion seal (PUR)	2
4	piston with magnet (NBR)	1
5	grease	2

\*2 pieces for version 03

#### High temperature version

Position	Part	Quantity
1	piston rod seal (FKM) + circlip	1*
2	O-ring (FKM)	2
3	cushion seal (FKM)	2
4	piston (FKM)	1
5	grease	2

\*2 pieces for version 04

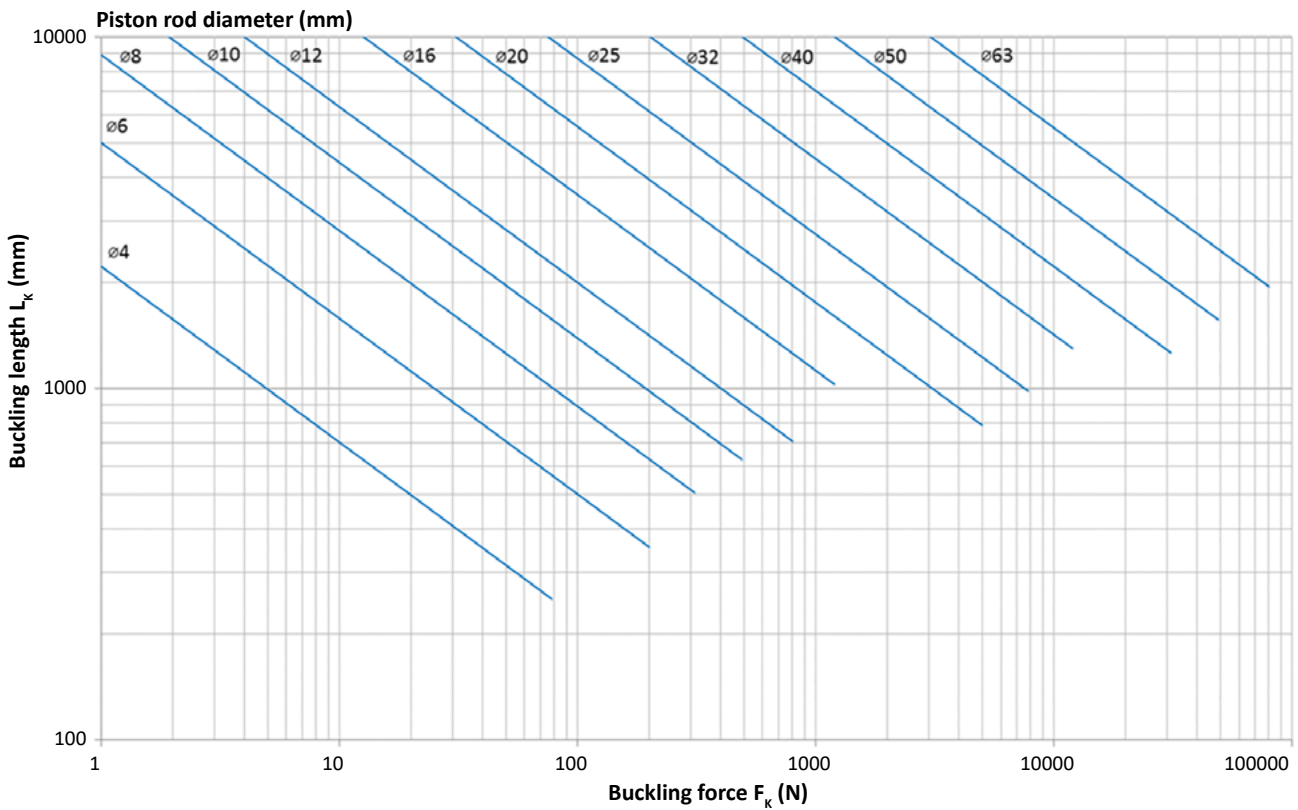
**Air consumption cylinder (NI for a single stroke of 100 mm, based upon extension)**

Piston-Ø	Pressure in bar						
	2	3	4	5	6	7	8
160	6,09	8,12	10,16	12,16	14,16	16,23	18,25
200	9,52	12,68	15,88	19,00	22,12	25,36	28,52
250	14,88	19,81	24,81	29,69	34,56	39,63	44,56

**Required flow rate (NI/min at p = 6 bar)**

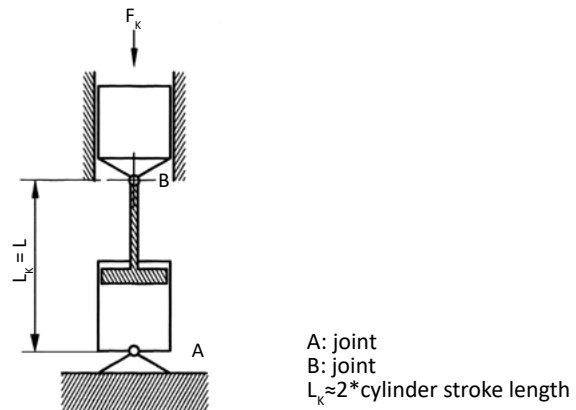
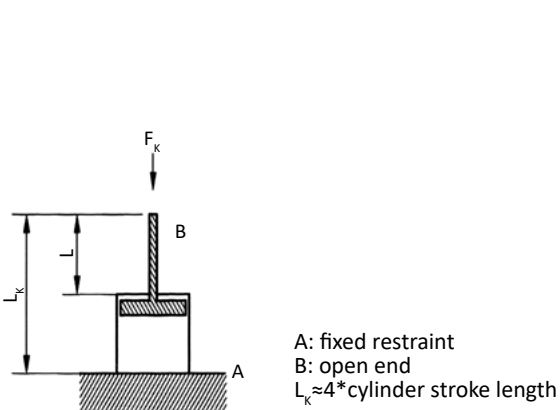
Piston-Ø	speed (m/s)				
	0,25	0,5	1	1,5	2
160	2110	4220	8440	12660	16881
200	3297	6594	13188	19782	26376

**Critical load diagram for the piston rod**



**First elastic case of buckling**

**Second elastic case of buckling**



Knowing the actual buckling case, either 1 or 2, and knowing the requested stroke length you can calculate the buckling length  $L_k$ . If you know the buckling force  $F_k$  (compressive force) you determine in the diagram above the intersection of both data. Choose the next graph line above to get the necessary rod diameter.