

ZG 1611

Standard Hydraulic Cylinder



Description:

Hydraulic standard cylinders **ZG 1611**

NP 160 bar (16 MPa)

with double-ended piston rod

In addition to the cylinders designed according to ISO standard 6020/1 and VW standard 39D920, STORZ hydraulic cylinder series ZBD 1611, the synchronous cylinder series ZG 1611 developed.

These hydraulic cylinders have a piston rod extending on both sides. Their components are essentially the same as for the standardized series ZBD 1611.

The standardized mounting types A, MT4, MF3 and MF1 have been supplemented by a foot mounting. Two piston rod diameters are assigned as standard to each piston rod diameters with the corresponding area ratios $\phi = 1.4$ and $\phi 2$ assigned.

To ensure a wide range of applications for the hydraulic cylinders, several seal variants and piston rod materials to choose from.

Technical data:

Nominal pressure	160 bar (16 MPa)
Static test pressure	240 bar (24 MPa)
Piston ϕ	25 - 200 mm
Area ratio ϕ	1,4 and 2
Temperature range (of the hydraulic fluid) ϑ min. ... ϑ max.	- 20° ... + 80° C
Viscosity range ν min. ... ν max.	(10... 600) 10⁻⁶ m²/s
Stroke speed range v min. ... v max.	0 - 0.5 m/s or 0 - 1 m/s depending on seal variant.
Hydraulic fluid	Mineral oil according to DIN 51524, HFD fluids. For HFA, HFB and HFC fluids please please consult us.



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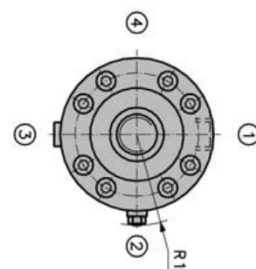
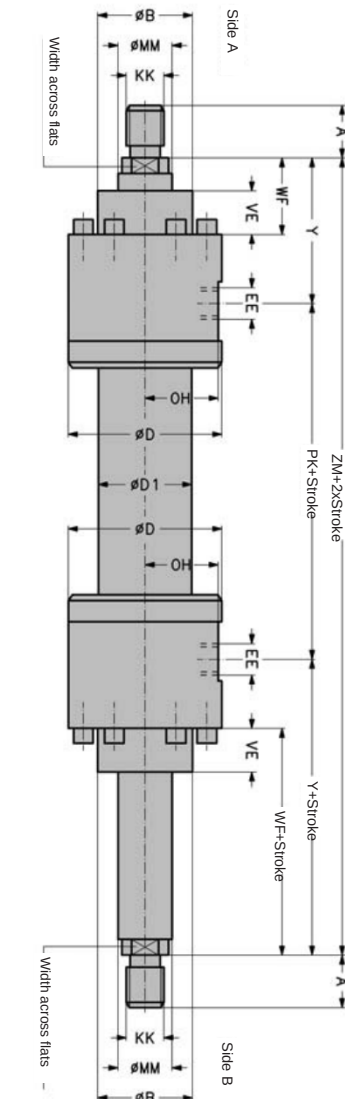
Available mounting types

A	Basic design	4
MT 4	Trunnion	5
MF 3	Round flange at cylinder head	6
MF 1	Angular flange at cylinder head	7
MS 2	Cylinder with foot mounting	8

further mounting types on request

Mounting type A - basic design

Piston Ø (mm)	Rod Ø (mm) MM	Annular areas A ₂ (cm ²)	ZM + 2 x stroke	Pipe connection EE Whitworth pipe thr./ Metric thread	Rod thread KK	A max.	Ø B ₁₈	Ø D	Ø D ₁ max. ¹⁾	PK + stroke	R ₁ ¹⁾	VE	WFWF + stroke	OH	V/ Y+stroke	Minimum stroke ²⁾	Width across flats
25	14	3,37	193	G ½	M12x1,25	16	32	56	33	77	42	15	28	25,5	58	30	12
32	18	5,50	217	G ¾	M14x1,5	18	40	67	42	89	44	19	32	30	64	26	15
40	22	8,77	239	G 1 ¼	M16x1,5	22	50	78	52	97	56	19	32	35	71	37	19
50	28	13,48	255	G 1 ½	M20x1,5	28	60	95	62	111	60	24	38	44	72	30	24
63	36	20,99	281	G ¾	M22x1,5	36	70	116	78	117	70	29	45	54	82	35	30
80	45	34,36	316	G 1	M27x2	45	85	130	95	134	80	36	54	62	91	29	36
100	56	53,91	378	G 1 ¼	M33x2	56	106	158	120	162	90	37	57	75	108	34	46
125	70	84,23	416	G 1 ½	M42x2	63	132	192	150	174	108	37	60	92	121	0	60
140 ⁴⁾	80	103,67	462	G 1 ¾	M48x2	75	145	215	170	194	125	40	64	103,5	134	0	65
160	90	137,44	477	G 2	M56x2	85	160	238	190	191	130	41	66	115	143	0	75
180 ⁴⁾	100	175,93	564	G 2 ¼	M64x3	90	185	260	210	214	150	45	75	126	175	0	85
200	110	219,13	604	G 2 ½	M73x3	95	200	285	235	224	160	45	75	138	190	0	95
	140	160,22		G 3	M80x3												120



Position of function bores 1-4
according to model code

① ② ③ ④ side determination

Tolerances	PK	SS	ZM	XS	Y	W	WC	WF	XV	Stroke
Stroke: 0-499	±1,5	±1,5	±2	±2	±2	±2	±2	±2	±2	+2
Stroke: 500-1249	±1,5	±2	±2	±2	±2	±2	±2	±2	±2	+2
Stroke: 1250-3149	±3	±3	±4	±4	±4	±4	±4	±4	±4	+5
Stroke: 3150-8000	±5	±5	±8	±8	±8	±8	±8	±8	±8	+8

Remarks:

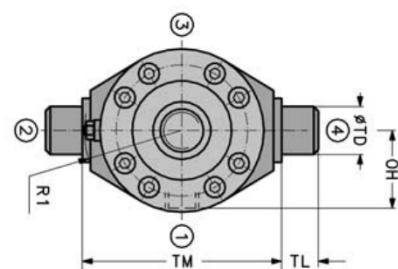
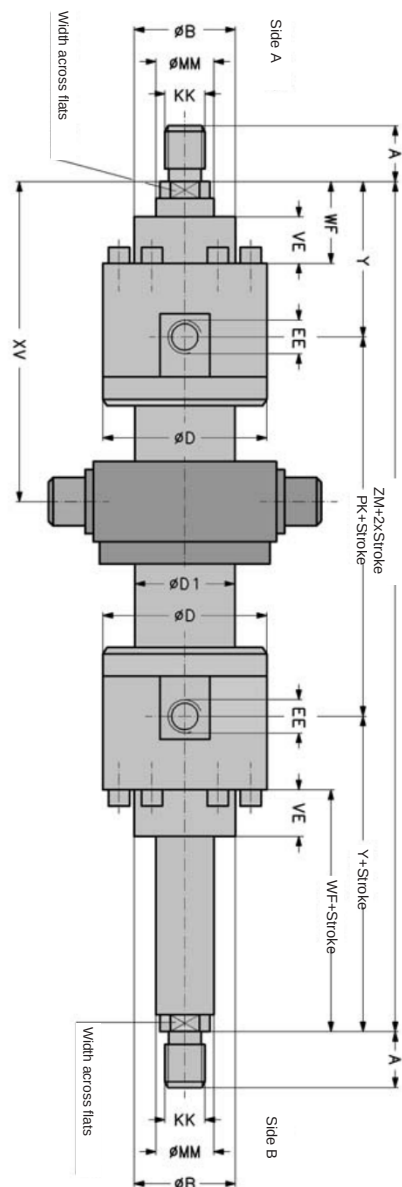
- Not standardized dimensions.
- Minimum stroke due to production. Shorter stroke lengths possible by using a spacer bush.
- Not standardized piston Ø

Mounting type MT4 - cylinder with trunnion

Piston Ø (mm)	Rod Ø (mm) MM	Annular areas A ₂ (cm ²)	ZM + 2 x stroke	Pipe connection EE Whitworth pipe thr./ Metric thread	Rod thread KK	A max.	Ø B ₁₈	Ø D	Ø D1 max. ¹⁾	PK + stroke R1 ¹⁾⁵⁾	ØTD ₁₈	TL _{js16}	TM _{h12}	VE	WF/VE + stroke	OH	XV ³⁾⁵⁾ min	XV+stroke max	Y/ Y+ stroke	Minimum stroke ²⁾	Width across flats	
25	14 18	3,37 2,36	193	G ¹ / ₄ M 14x1,5	M12x1,25	16	32	56	33	77	42	12	10	63	15	28	25,5	113	53	58	60	12 15
32	18 22	5,50 4,24	217	G ³ / ₈ M 18x1,5	M 14x1,5	18	40	67	42	89	44	16	12	75	19	32	30	128	62	64	66	15 19
40	22 26	8,77 6,41	239	G ¹ / ₂ M 22x1,5	M 16x1,5	22	50	78	52	97	56	20	16	90	19	32	35	152	69	71	93	19 24
50	28 36	13,48 9,46	255	G ¹ / ₂ M 22x1,5	M 20x1,5	28	60	95	62	111	60	25	20	105	24	38	44	160	79	72	101	24 30
63	36 45	20,99 15,27	281	G ³ / ₄ M 27x2	M 27x2	36	70	116	78	117	70	32	25	120	29	45	54	179	80	82	109	30 36
80	45 56	34,36 26,51	316	G ³ / ₄ M 27x2	M 33x2	45	85	130	95	134	80	40	32	135	36	54	62	199	95	91	114	36 46
100	56 70	53,91 40,06	378	G 1 M 33x2	M 42x2	56	106	158	120	162	90	50	40	160	37	57	75	243	123	108	140	46 60
125	70 90	84,23 59,10	416	G1 M 33x2	M 48x2	63	132	192	150	174	108	63	50	195	37	60	92	252	158	121	104	60 75
140 ⁴⁾	80 100	103,67 75,40	462	G1 ¹ / ₄ M 42x2	M 56x2	75	145	215	170	194	125	70	56	220	40	64	103,5	263	174	134	89	65 85
160	90 110	137,44 106,03	477	G1 ¹ / ₄ M 42x2	M 64x3	85	160	238	190	191	130	80	63	240	41	66	115	278	174	143	104	75 95
180 ⁴⁾	100 125	175,93 131,75	564	G1 ¹ / ₄ M 42x2	M 73x3	90	185	260	210	214	150	90	70	275	45	75	126	314	223	175	101	85 110
200	110 140	219,13 160,22	604	G1 ¹ / ₄ M 42x2	M 80x3	95	200	285	235	224	160	100	80	295	45	75	138	341	236	190	105	95 120

Remarks:

- Not standardized dimensions.
- Minimum stroke due to production. Shorter stroke lengths possible by using a spacer bush.
- State XV dimension in plain text when ordering.**
- Not standardized piston Ø
- If position 2 or 4 of the throttle screw is selected, there is a risk of collision between trunnion bracket and throttle screw. This must be checked by the user.



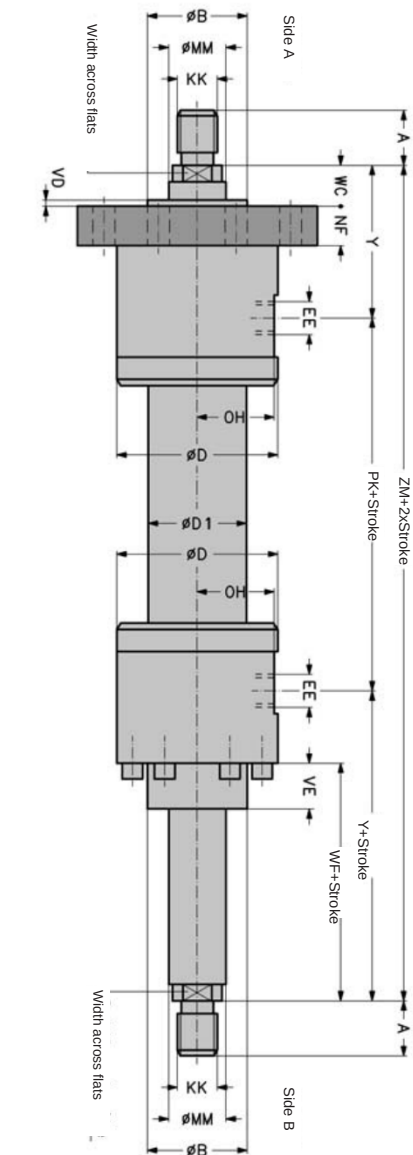
Position of function bores 1-4
according to model code.

① ② ③ ④ : side determination

Tolerances	PK	SS/ZM	XS/Y	W	WC	WF	XV	Stroke
Stroke: 0-499	±1,5	±1,5	±2	±2	±2	±2	±2	+2
Stroke: 500-1249	±1,5	±2	±2	±2	±2,8	±2	±2	+2
Stroke: 1250-3149	±3	±3	±4	±4	±4	±4	±4	+5
Stroke: 3150-8000	±5	±5	±8	±8	±8	±8	±8	+8

Mounting type MF3 - cylinder with round flange at cylinder head

Piston Ø (mm)	Rod Ø (mm) MM	Annular areas A ₂ (cm ²)	ZM + 2 x stroke	Pipe connection EE Whitworth pipe thr./ Metric thread	Rod thread KK	A max.	Ø B ₁₈	Ø D	Ø D ₁ max. 1)	Ø FB _{H13}	FC _{IS13}	PK + stroke	R ₁ ¹⁾⁶⁾	NF	UC	VD	VE	WC	WF + stroke	OH	Y/ Y+stroke	Minimum stroke ²⁾	Width across flats
25	14	3,37	193	G _{1/4} M 14x1,5	M12x1,25	16	32	56	33	6,6	75	77	42	12	90	3	15	16	28	25,5	58	30	12
32	18	5,50	217	G _{3/8} M 18x1,5	M 14x1,5	18	40	67	42	9	92	89	44	16	110	3	19	16	32	30	64	26	15
40	22	8,77	239	G _{1/2} M 22x1,5	M 16x1,5	22	50	78	52	9	106	97	56	16	125	3	19	16	32	35	71	37	19
50	28	13,48	255	G _{3/4} M 22x1,5	M 20x1,5	28	60	95	62	11	126	111	60	20	148	4	24	18	38	44	72	30	24
63	36	20,99	281	G ₁ M 27x2	M 27x2	36	70	116	78	13,5	145	117	70	25	170	4	29	20	45	54	82	35	30
80	45	34,36	316	G _{3/4} M 33x2	M 33x2	45	85	130	95	17,5	165	134	80	32	195	4	36	22	54	62	91	29	36
100	56	53,91	378	G ₁ M 42x2	M 42x2	56	106	158	120	22	200	162	90	32	238	5	37	25	57	75	108	34	46
125	70	84,23	416	G ₁ M 48x2	M 48x2	63	132	192	150	22	235	174	108	32	272	5	37	28	60	92	121	0	60
140 ⁴⁾	80	103,67	462	G _{1 1/4} M 42x2	M 56x2	75	145	215	170	22	260	194	125	35	295	5	40	30	64	103,5	134	0	65
160	90	137,44	477	G _{1 1/4} M 42x2	M 64x3	85	160	238	190	22	280	191	130	36	316	5	41	30	66	115	143	0	75
180 ⁴⁾	100	175,93	564	G _{1 1/2} M 42x2	M 73x3	90	185	260	210	26	320	214	150	40	365	5	45	35	75	126	175	0	85
200	110	219,13	604	G _{1 1/2} M 42x2	M 80x3	95	200	285	235	26	340	224	160	40	385	5	45	35	75	138	190	0	95
	140	160,22																					120



Position of function bores 1-4
according to model code.

① ② ③ ④ : side determination

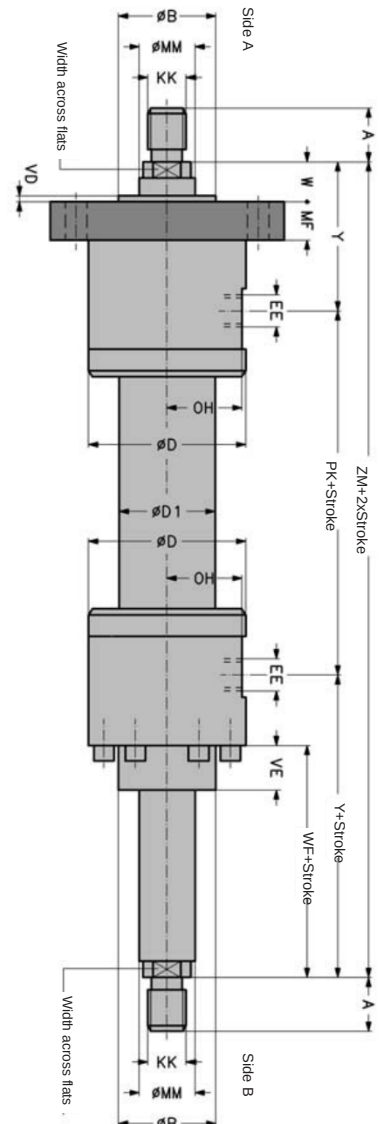
Tolerances	PK	SS	ZM	XS	Y	W	WC	WF	XV	Stroke
Stroke: 0-499	±1,5	±1,5	±2	±2	±2	±2	±2	±2	±2	±2
Stroke: 500-1249	±1,5	±2	±2	±2	±2,8	±2,8	±2,8	±2,8	±2,8	±2
Stroke: 1250-3149	±3	±3	±4	±4	±4	±4	±4	±4	±4	±5
Stroke: 3150-8000	±5	±5	±8	±8	±8	±8	±8	±8	±8	±8

Remarks:

- 1) Not standardized dimensions.
- 2) Minimum stroke due to production. Shorter stroke lengths possible by using a spacer bush.
- 4) Not standardized piston Ø
- 6) For dimension R 1 see basic design A

Mounting type MF1 - cylinder with rectangular flange at cylinder head

Piston Ø (mm)		Rod Ø (mm) MM	Annular areas A ₂ (cm ²)	ZM + 2 x stroke	Pipe connection EE Whitworth pipe thr./ Metric thread	Rod thread KK	A max.	Ø B ₁₈	Ø D	Ø D ₁ max. ¹⁾	E max.	Ø FB _{H13}	MF _{PK+stroke}	R _{JS13}	R _{L1} ¹⁶⁾	TF _{JS13}	UF max.	VE	W	WF + stroke	OH	Y Y + stroke	Minimum stroke ²⁾	Width across flats
25	14 18	3,37 2,36	193	G _{1/4} M 14x1,5	M12x1,25	16	32	56	33	50	6,6	12	77	28,7	42	69,2	85	15	16	28	25,5	58	30	12 15
32	18 22	5,50 4,24	217	G _{3/8} M 18x1,5	M 14x1,5	18	40	67	42	60	9	16	89	35,2	44	85	105	19	16	32	30	64	26	15 19
40	22 26	8,77 6,41	239	G _{1/2} M 22x1,5	M 16x1,5	22	50	78	52	70	9	16	97	40,6	56	98	115	19	16	32	35	71	37	19 24
50	26 36	13,48 9,46	255	G _{1/2} M 22x1,5	M 20x1,5	28	60	95	62	96	11	20	111	48,2	60	116,4	140	24	18	38	44	72	30	24 30
63	36 45	20,99 15,27	281	G _{3/4} M 27x2	M 27x2	36	70	116	78	115	13,5	25	117	55,5	70	134	160	29	20	45	54	82	35	30 36
80	45 56	34,36 26,51	316	G _{3/4} M 27x2	M 33x2	45	85	130	95	132	17,5	32	134	63,1	80	152,5	185	36	22	54	62	91	29	36 46
100	56 70	53,91 40,06	378	G ₁ M 33x2	M 42x2	56	106	158	120	157	22	32	162	76,5	90	184,8	225	37	25	57	75	108	34	46 60
125	70 90	84,23 59,10	416	G ₁ M 33x2	M 48x2	63	132	192	150	190	22	32	174	90,2	108	217,1	255	37	28	60	92	121	0	60 65
140 ⁴⁾	80 100	103,67 75,40	462	G _{1 1/4} M 42x2	M 56x2	75	145	215	170	-	22	-	194	-	125	-	-	40	30	64	103,5	134	0	85 95
160	90 110	137,44 106,03	477	G _{1 1/4} M 42x2	M 64x3	85	160	238	190	-	22	-	191	-	130	-	-	41	30	66	115	143	0	95 110
180 ⁴⁾	100 125	175,93 131,75	564	G _{1 1/4} M 42x2	M 73x3	90	185	260	210	-	26	-	214	-	150	-	-	45	35	75	126	175	0	85 110
200	110 140	219,13 160,22	604	G _{1 1/4} M 42x2	M 80x3	95	200	285	235	-	26	-	224	-	160	-	-	45	35	75	138	190	0	95 120



Position of function bores 1-4
according to model code.

1 2 3 4 : side determination

Tolerances	PK	SS	ZM	XS	Y	W	WC	WF	XV	Stroke
Stroke: 0-499	±1,5	±1,5	±2	±2	±2	±2	±2	±2	±2	±2
Stroke: 500-1249	±1,5	±2	±2	±2	±2	±2	±2	±2	±2	±2
Stroke: 1250-3149	±3	±3	±4	±4	±4	±4	±4	±4	±4	±5
Stroke: 3150-8000	±5	±5	±8	±8	±8	±8	±8	±8	±8	±8

Remarks:

- Not standardized dimensions.
- Minimum stroke due to production. Shorter stroke lengths possible by using a spacer bush.
- Not standardized piston Ø
- For dimension R1 see basic design A.

Piston Ø (mm)		Rod Ø (mm) MM		Annular areas A ₂ (cm ²)		SS + stroke		ZM + 2 x stroke		Pipe connection EE Whitworth pipe thr./ Metric thread		Rod thread KK		A max.		Ø B max.		Ø D max.1)		LH _{h14}		PK + stroke		R ₁ ¹⁾⁶⁾		S _{js13}		ØSB _{H13}		ST max.		TE _{js13}		TS _{js13}		US max.		WF/WF + stroke		OH		XS		Y/ Y + stroke		Minimum stroke ²⁾		Width across flats	
25	14	18	3,37 2,36	155	193	G 1/4 M 14x1,5	M12x1,25	16	32	56	33	32	77	42	20	25	9	32	56	73	92	28	25,5	18	58	30	12	15																					
32	18	22	5,50 4,24	176	217	M 18x1,5	M 14x1,5	18	40	67	42	38	89	44	25	11	38	67	90	110	32	30	19,5	64	26	15	19																						
40	22	28	8,77 6,41	198	239	G 1/2 M 22x1,5	M 16x1,5	22	50	78	52	43	97	56	25	11	43	78	100	120	32	35	19,5	71	37	19	24																						
50	28	36	13,48 9,46	211	255	G 3/4 M 28x1,5	M 20x1,5	28	60	95	62	52	111	60	32	14	52	95	120	145	38	44	22	72	30	24	30																						
63	36	45	20,99 15,27	221	281	G 1 M 36x2	M 27x2	36	70	116	78	62	117	70	32	18	62	116	150	180	45	54	29	82	35	30	36																						
80	45	56	34,36 26,51	246	316	G 3/4 M 45x2	M 33x2	45	85	130	95	70	134	80	40	22	70	130	170	210	54	62	34	91	29	36	46																						
100	56	70	53,91 40,06	312	378	G 1 M 56x2	M 42x2	56	106	158	120	82	162	90	50	26	82	158	205	250	57	75	32	108	34	46	60																						
125	70	90	84,23 59,10	351	416	G 1 M 70x2	M 48x2	63	132	192	150	100	174	108	56	33	100	192	245	300	60	92	32	121	0	75	95																						
140 ⁴⁾	80	100	103,67 75,40	391	462	G 1 1/4 M 80x2	M 56x2	75	145	215	170	112	194	125	58	33	112	215	270	325	64	103,5	35	134	0	85	105																						
160	90	110	137,44 106,03	404	477	G 1 1/4 M 90x2	M 64x3	85	160	238	190	119	191	130	60	33	119	238	295	350	66	115	36	143	0	95	120																						
180 ⁴⁾	100	125	175,93 131,75	481	564	G 1 1/4 M 100x2	M 73x3	90	185	260	210	134	214	150	68	39	134	260	325	390	75	126	41	175	0	110	140																						
200	110	140	219,13 160,22	525	604	G 1 1/4 M 110x2	M 80x3	95	200	285	235	145	224	160	72	39	145	285	350	415	75	138	39	190	0	120	160																						

1) Not standardized dimensions.
2) Minimum stroke due to production. Shorter stroke lengths possible by using a spacer bush.
4) Not standardized piston Ø
6) For dimension R 1 see basic design A.



	PK	SS	ZM	XS	Y	W	WC	WF	XV	Stroke
Tolerances										
Stroke: 0-499	± 1.5	± 1.5		± 2			± 2			± 2
Stroke: 500-1249	± 1.5			± 2			± 2.8			± 2
Stroke: 1250-3149	± 3			± 4			± 4			± 5
Stroke: 3150-8000	± 5	± 5		± 8			± 8			± 8

[illegible]

Order example: Double-acting hydraulic cylinder 160 bar nominal pressure with the following data:
Piston- 63 mm, rod- 36 mm, mounting type MT4, stroke 300 mm, seal variant RG.
End position cushioning yes, position of throttle screw side A side 2, side B side 2.
Piston rod surface B, piston rod end 1, piston rod material C.
Pipe connection version G. Position of pipe connection side A on side 1, side B on side 1.
Bleed screw E. position of bleed screw side A on side 3, side B on side 3.

Subject to change without notice!

Notes - remarks - comments - special requests

Lined area for notes and remarks.

Sketch

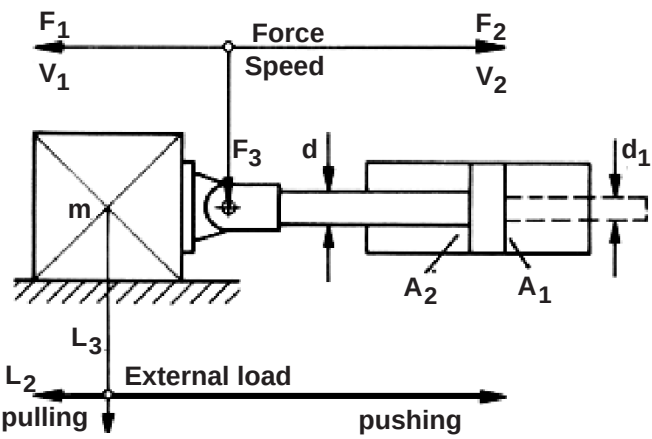
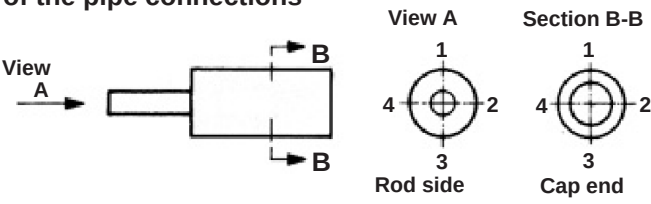
Grid area for sketching.

Requirements list for hydraulic cylinders

Customer address..... Telephone/fax.....

..... Person in charge.....

..... Department.....

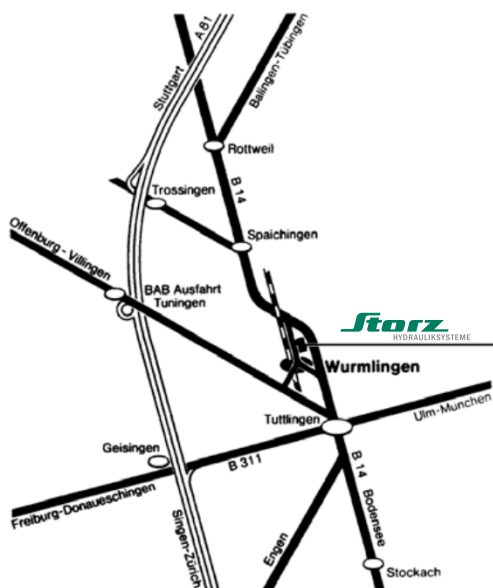
Load diagram																					
 Force Speed External load L₃ neither pushing nor pulling load																					
13	Required Cylinder forces	F ₁	N																		
		F ₂	N																		
14	max. Lateral force	F ₃	N																		
15	Switching frequency	Double strokes per min. Double strokes per sec.																			
16	min. + max. Amplitude (α min; α max) + associated frequency (f)	α_{min} + f α_{max} + f																			
17	Moving Mass	kg																			
18	Temperature range of hydraulic fluid ∅ m min....∅ m max	°C																			
	Ambient temperature range ∅ m min....∅ m max	°C																			
desired radial position of the pipe connections																					
																					
19	Size of Port connections	Cap end	Rod side																		
20	Piston rods Material	Standard	Stainless																		
21	Painting	Standard	without																		
		Special																			
Accessories																					
End positions																					
Position feedback																					
Clamping head																					
Position measuring system stating the Pos. accuracy <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th></th> <th style="width: 50px;">yes</th> <th style="width: 50px;">no</th> </tr> </thead> <tbody> <tr><td>inductive</td><td></td><td></td></tr> <tr><td>digital</td><td></td><td></td></tr> <tr><td>Ultrasonic</td><td></td><td></td></tr> <tr><td>potentiometric</td><td></td><td></td></tr> <tr><td>capacitive</td><td></td><td></td></tr> </tbody> </table> ○					yes	no	inductive			digital			Ultrasonic			potentiometric			capacitive		
	yes	no																			
inductive																					
digital																					
Ultrasonic																					
potentiometric																					
capacitive																					
Remarks and notes on the application or special requests please with date and signature!																					

Cylinder data			
1	Operating pressure	min	bar
		max	bar
2	Piston Ø	D	mm
3	Rod Ø	d	mm
		d ₁	mm
4	Mounting type		
5	Stroke	S	mm
6	Stroke speed max.	V _{1max}	m/s
		V _{2max}	m/s
7	Pressure medium		
8	Rod seal Wiper		
9	Piston seal		
10	Piston rod end		
11	Air bleed	yes	no
		M 8x1	R 1/4"
12	End position cushioning	Cap end	
		Rod side	

Product range



Hydraulic cylinders to DIN/ISO
Hydraulic standard cylinders
Hydraulic telescopic cylinders
Hydraulic cylinders with position measuring systems
Test-machine cylinders
Special cylinders for all fields of application
Standardized mounting parts
Hydraulic power units and components
Plant engineering



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