

ZT 212

Hydraulic Telescopic Cylinder



Description:

Hydraulic Telescopic Cylinder ZT 212
NP 120 bar (12 MPa)
double-acting

Technical data:

Nominal pressure 120 bar (12MPa)

Static test pressure 180 bar (18 MPa)

Piston ø 32 - 280 mm

Temperature range
(of the hydraulic fluid)
θ m min. ... θ m max. - 20° ... + 80° C

Viscosity range
ν min. ... ν max. (10... 600) 10⁻⁶ m²/s

Stroke speed range 0 - 0,5 m/s

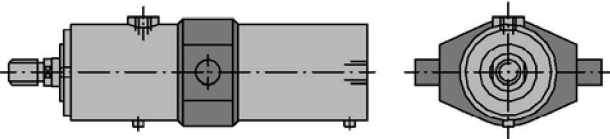
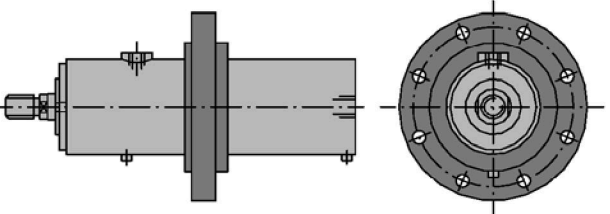
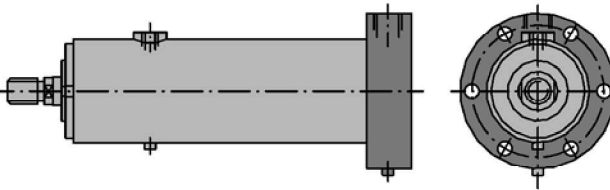
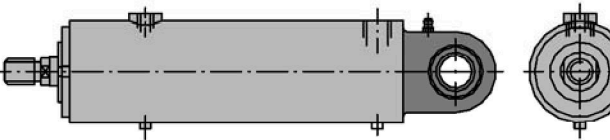
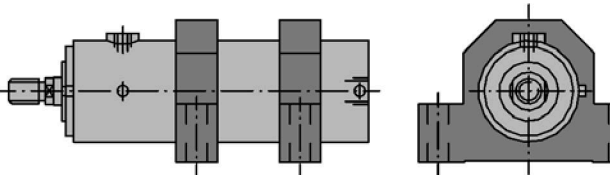
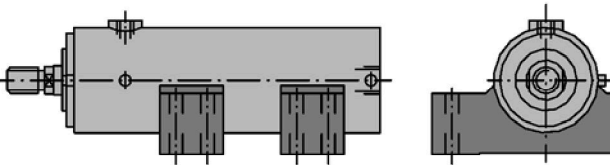
Hydraulic fluid Mineral oil according to DIN 51524, HFD fluids.
For HFA, HFB and HFC fluids please
consult us.



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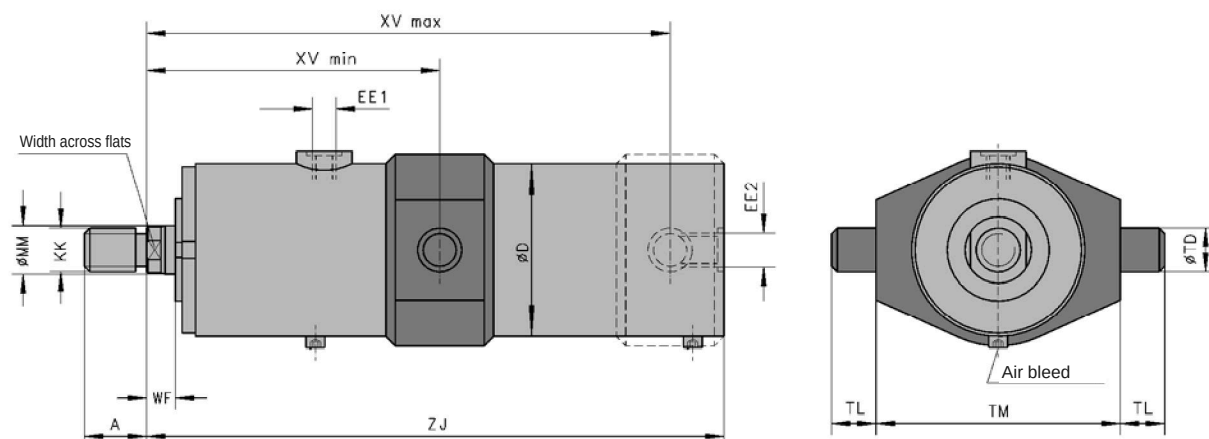
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Available mounting types

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further mounting types on request

Mounting type B trunnion



smallest stage Ø MM	ZJ	Min. stroke/stage	EE 1	EE 2	KK	A		Ø D	WF	XV		TL	TM _{h13}	ØTD _{f8}	Width across flats	
										min.	max.					
2-stage																
22	H ₂ ⁺ + 160	23	G ³ / ₈	G ¹ / ₂	M 20 x1,5	28		78	13	136		H ₂ + 113	20	110	25	18
52	H ₂ + 201	37	G ¹ / ₂	G ³ / ₄	M 33 x 2	45		121	16	172	variable	H ₂ + 135	32	150	40	41
90	H ₂ + 249	46	G ¹ / ₂	G 1	M 42 x 2	56		168,3	20	202		H ₂ + 156	50	205	63	75
130	H ₂ + 298	59	G ³ / ₄	G1 ¹ / ₄	M 48 x 2	63		244,5	23	237		H ₂ + 178	63	290	80	115
180	H ₂ + 337	87	G 1	G1 ¹ / ₂	M 64 x 3	85		318	25	275		H ₂ + 188	80	375	110	160
3-stage																
22	H ₃ + 188	47	G ¹ / ₂	G ³ / ₄	M 20 x 1,5	28		121	13	169	variable	H ₃ + 122	32	150	40	18
52	H ₃ + 239	51	G ¹ / ₂	G 1	M 33 x 2	45		168,3	16	198		H ₃ + 147	50	205	63	41
90	H ₃ + 291	63	G ³ / ₄	G1 ¹ / ₄	M 42 x 2	56		244,5	20	234		H ₃ + 171	63	290	80	75
130	H ₃ + 335	87	G 1	G 1 ¹ / ₂	M 48 x 2	63		318	23	273		H ₃ + 186	80	375	110	115
4-stage																
22	H ₄ + 227	60	G ¹ / ₂	G 1	M 20 x 1,5	28		168,3	13	195	variable	H ₄ +135	50	205	63	18
52	H ₄ + 282	68	G ³ / ₄	G1 ¹ / ₄	M 33 x 2	45		244,5	16	230		H ₄ + 162	63	290	80	41
90	H ₄ + 329	90	G 1	G 1 ¹ / ₂	M 42 x 2	56		318	20	270		H ₄ + 180	80	375	110	75

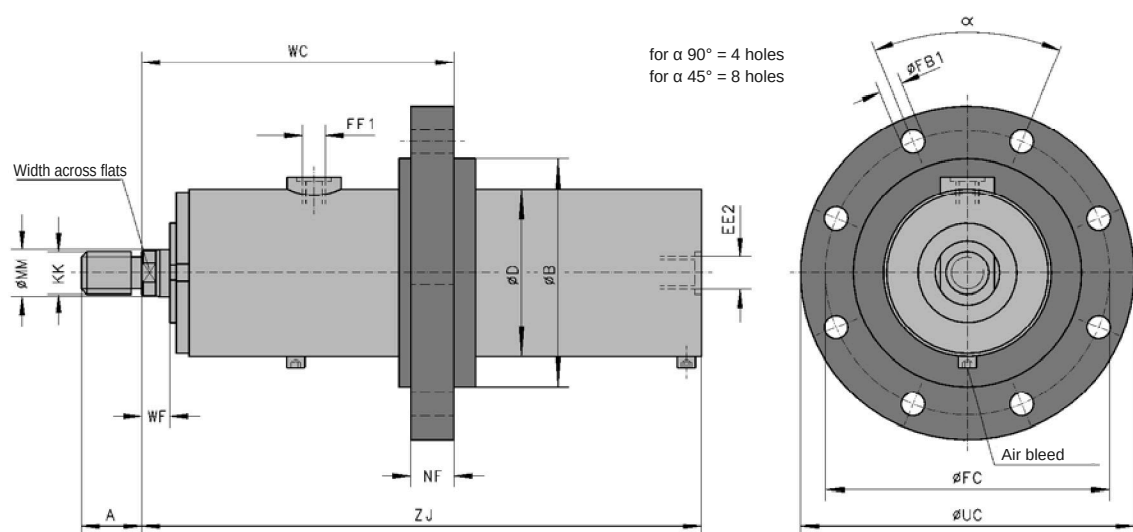
Piston/rod Ø (mm)	32 / 22	63 / 52	100 / 90	140 / 130	200 / 180	280 / 250
Piston area A ₁ (cm ²)	8,04	31,17	78,54	153,94	314,16	615,75
Rod area A _s (cm ²)	3,80	21,24	63,62	132,73	254,47	490,87
Retraction area A _R (cm ²)	4,24	9,93	14,92	21,21	59,69	124,88

Caution:

Due to the large area ratios A₁ / A_R the rod-side connection must not be throttled. It is recommended to safeguard the rod-side pressure with a suitable pressure relief valve set to the permissible operating pressure of 120 bar.

H* = Stroke (mm)

Mounting type CA round flange at cylinder head



smallest stage Ø MM	ZJ	Min. stroke/stage	EE 1	EE 2	KK	A	Ø D	WF	WC	Ø UC	Ø FC _{js13}	Ø B _{f8}	ØFB1	NF	α	Width across flats
2-stage																
22	H ₂ * + 160	23	G 3/8	G 1/2	M 20 x 1,5	28	78	13	145	155	132	106	11	20	4 x 90°	18
52	H ₂ * + 201	37	G 1/2	G 3/4	M 33 x 2	45	121	16	178	205	175	146	18	25	4 x 90°	41
90	H ₂ * + 249	46	G 1/2	G 1	M 42 x 2	56	168,3	20	208	255	225	190	18	32	8 x 45°	75
130	H ₂ * + 298	59	G 3/4	G 1 1/4	M 48 x 2	63	244,5	23	235	360	320	270	22	40	8 x 45°	115
180	H ₂ * + 337	87	G 1	G 1 1/2	M 64 x 3	85	318	25	270	455	410	350	26	50	8 x 45°	160
3-stage																
22	H ₃ * + 188	47	G 1/2	G 3/4	M 20 x 1,5	28	121	13	175	205	175	146	18	25	4 x 90°	18
52	H ₃ * + 239	51	G 1/2	G 1	M 33 x 2	45	168,3	16	204	255	225	190	18	32	8 x 45°	41
90	H ₃ * + 291	63	G 3/4	G 1 1/4	M 42 x 2	56	244,5	20	232	360	320	270	22	40	8 x 45°	75
130	H ₃ * + 335	87	G 1	G 1 1/2	M 48 x 2	63	318	23	268	455	410	350	26	50	8 x 45°	115
4-stage																
22	H ₄ * + 227	60	G 1/2	G 1	M 20 x 1,5	28	168,3	13	201	255	225	190	18	32	8 x 45°	18
52	H ₄ * + 282	68	G 3/4	G 1 1/4	M 33 x 2	45	244,5	16	228	360	320	270	22	40	8 x 45°	41
90	H ₄ * + 329	90	G 1	G 1 1/2	M 42 x 2	56	318	20	265	455	410	350	26	50	8 x 45°	75

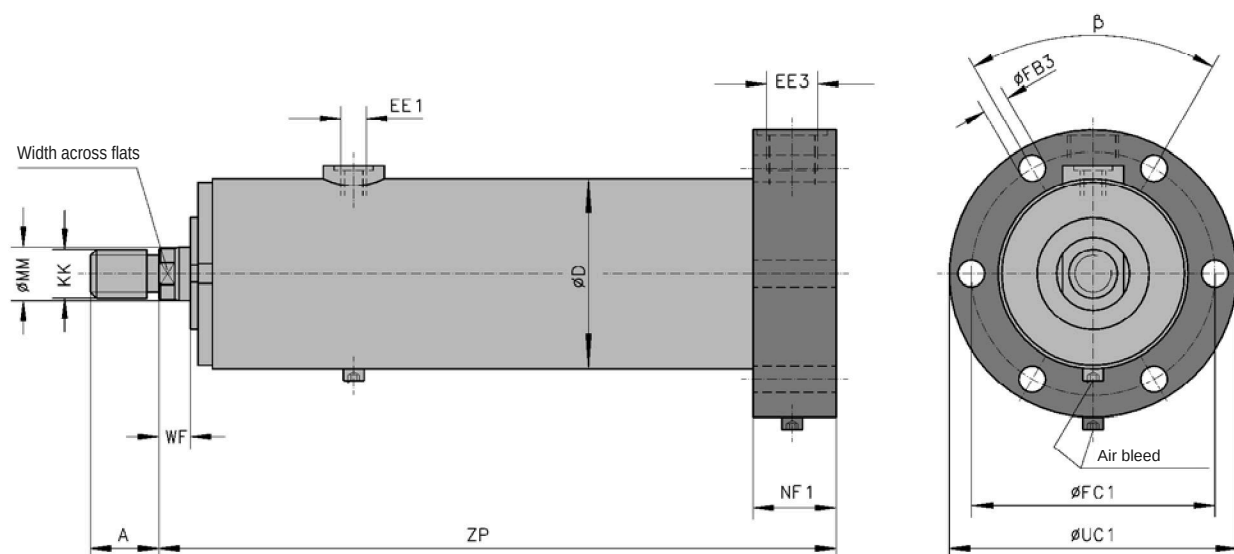
Piston/rod Ø (mm)	32 / 22	63 / 52	100 / 90	140 / 130	200 / 180	280 / 250
Piston area A ₁ (cm ²)	8,04	31,17	78,54	153,94	314,16	615,75
Rod area A _s (cm ²)	3,80	21,24	63,62	132,73	254,47	490,87
Retraction area A _R (cm ²)	4,24	9,93	14,92	21,21	59,69	124,88

Caution:

Due to the large area ratios A₁ / A_R the rod-side connection must not be throttled. It is recommended to safeguard the rod-side pressure with a suitable pressure relief valve set to the permissible operating pressure of 120 bar.

H* = Stroke (mm)

Mounting type CB round flange at cylinder cap



smallest stage Ø MM	ZP	Min. stroke/stage	EE1	EE3	KK	A	Ø D	WF	Ø UC1	Ø FB3	NF1	β	Width across flats
2-stage													
22	H ₂ * + 178	23	G 3/8	G 1/2	M 20 x 1,5	28	78	13	118	11	34	6 x 60°	18
52	H ₂ * + 217	37	G 1/2	G 1/2	M 33 x 2	45	121	16	175	14	34	6 x 60°	41
90	H ₂ * + 261	46	G 1/2	G 3/4	M 42 x 2	56	168,3	20	238	18	40	6 x 60°	75
130	H ₂ * + 313	59	G 3/4	G 1	M 48 x 2	63	244,5	23	328	22	51	8 x 45°	115
180	H ₂ * + 357	87	G 1	G 1 1/4	M 64 x 3	85	318	25	428	27	61	12 x 30°	160
3-stage													
22	H ₃ * + 204	47	G 1/2	G 1/2	M 20 x 1,5	28	121	13	175	14	34	6 x 60°	18
52	H ₃ * + 251	51	G 1/2	G 3/4	M 33 x 2	45	168,3	16	238	18	40	6 x 60°	41
90	H ₃ * + 306	63	G 3/4	G 1	M 42 x 2	56	244,5	20	328	22	51	8 x 45°	75
130	H ₃ * + 355	87	G 1	G 1 1/4	M 48 x 2	63	318	23	428	27	61	12 x 30°	115
4-stage													
22	H ₄ * + 239	60	G 1/2	G 3/4	M 20 x 1,5	28	168,3	13	238	18	40	6 x 60°	18
52	H ₄ * + 297	68	G 3/4	G 1	M 33 x 2	45	244,5	16	328	22	51	8 x 45°	41
90	H ₄ * + 349	90	G 1	G 1 1/4	M 42 x 2	56	318	20	428	27	61	12 x 30°	75

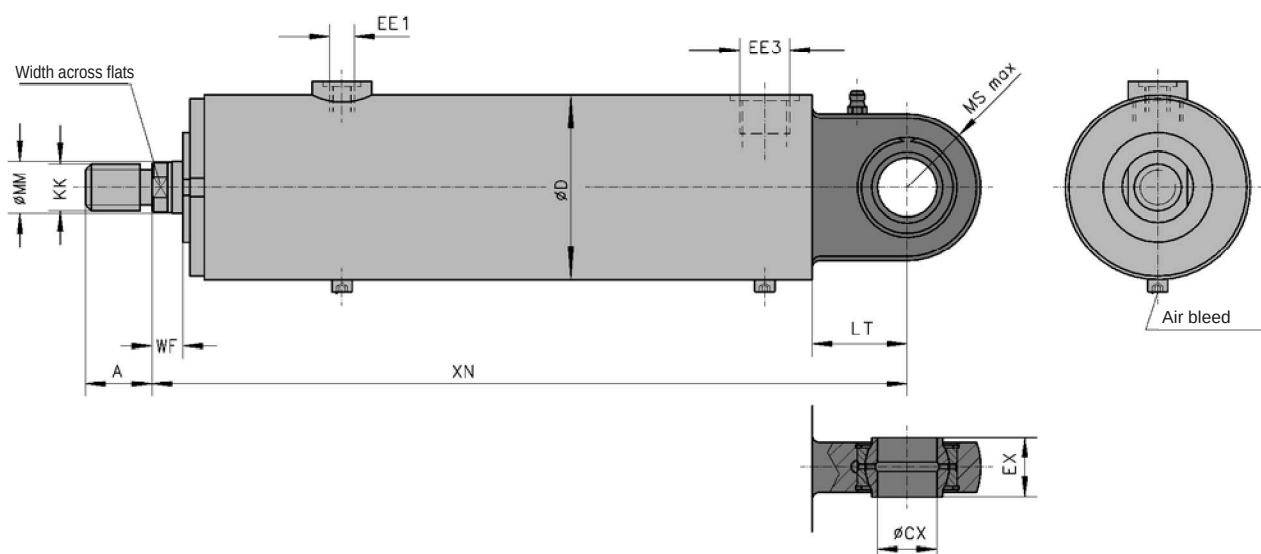
Piston/rod Ø (mm)	32 / 22	63 / 52	100 / 90	140 / 130	200 / 180	280 / 250
Piston area A ₁ (cm ²)	8,04	31,17	78,54	153,94	314,16	615,75
Rod area A _s (cm ²)	3,80	21,24	63,62	132,73	254,47	490,87
Retraction area A _R (cm ²)	4,24	9,93	14,92	21,21	59,69	124,88

Caution:

Due to the large area ratios A₁ / A_R the rod-side connection must not be throttled. It is recommended to safeguard the rod-side pressure with a suitable pressure relief valve set to the permissible operating pressure of 120 bar.

H* = Stroke (mm)

Mounting type DB spherical eye at cylinder cap



smallest stage Ø MM	XN	Min. stroke/stage	EE1	EE3	KK	A	Ø D	WF	ØCX ^{H7}	EX _{h 12}	LT	MS _{max}	Width across flats
2-stage													
22	H ₂ [*] + 218	23	G 3/8	G 1/2	M 20 x 1,5	28	78	13	25	25	40	31	18
52	H ₂ + 277	37	G 1/2	G 1/2	M 33 x 2	45	121	16	40	40	60	49	41
90	H ₂ + 336	46	G 1/2	G 3/4	M 42 x 2	56	168,3	20	50	50	75	59	75
130	H ₂ + 403	59	G 3/4	G 1	M 48 x 2	63	244,5	23	63	63	90	71	115
180	H ₂ + 497	87	G 1	G 1 1/4	M 64 x 3	85	318	25	100	100	140	112	160
3-stage													
22	H ₃ + 254	47	G 1/2	G 1/2	M 20 x 1,5	28	121	13	32	32	50	38	18
52	H ₃ + 326	51	G 1/2	G 3/4	M 33 x 2	45	168,3	16	50	50	75	59	41
90	H ₃ + 396	63	G 3/4	G 1	M 42 x 2	56	244,5	20	63	63	90	71	75
130	H ₃ + 495	87	G 1	G 1 1/4	M 48 x 2	63	318	23	100	100	140	112	115
4-stage													
22	H ₄ + 314	60	G 1/2	G 3/4	M 20 x 1,5	28	168,3	13	40	40	75	49	18
52	H ₄ + 387	68	G 3/4	G 1	M 33 x 2	45	244,5	16	63	63	90	71	41
90	H ₄ + 489	90	G 1	G 1 1/4	M 42 x 2	56	318	20	100	100	140	112	75

Piston/rod Ø (mm)	32 / 22	63 / 52	100 / 90	140 / 130	200 / 180	280 / 250
Piston area A₁ (cm²)	8,04	31,17	78,54	153,94	314,16	615,75
Rod area A_s (cm²)	3,80	21,24	63,62	132,73	254,47	490,87
Retraction area A_R (cm²)	4,24	9,93	14,92	21,21	59,69	124,88

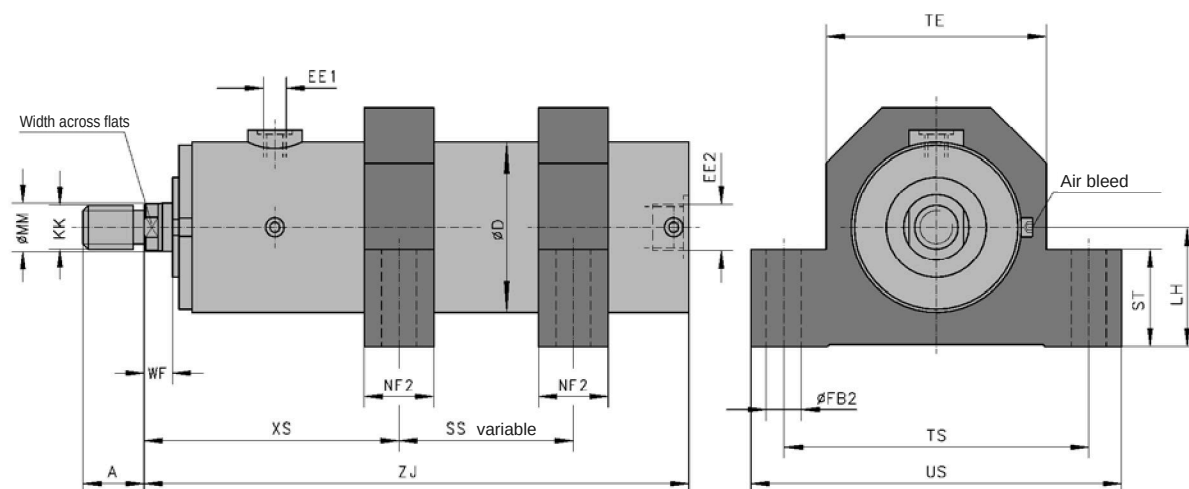
Caution:

Due to the large area ratios A₁ / A_R the rod-side connection must not be throttled. It is recommended to safeguard the rod-side pressure with a suitable pressure relief valve set to the permissible operating pressure of 120 bar.

H* = Stroke (mm)

Mounting type EA-1 cylinder with foot mounting

Piston $\varnothing$ 63, $\varnothing$ 100 mm



smallest stage $\varnothing$ MM	ZJ	Min. stroke/stage	EE1	EE2	KK	A	$\varnothing$ D	WF	$\varnothing$ FB2 ^{H 13}	$\varnothing$ TS _{js 13}	US	TE	XS	NF2	ST	LH _{h14}	SS	Width across flats
2-stage																		
22	H ₂ + 160	23	G 3/8	G 1/2	M 20 x 1,5	28	78	13	16	140	170	101	137	32	55	55		18
52	H ₂ + 201	37	G 1/2	G 3/4	M 33 x 2	45	121	16	22	195	232	150	168	40	75	75	variable	41
90	H ₂ + 249	46	G 1/2	G 1	M 42 x 2	56	168,3	20	26	220	270	-	123	70	56	100		75
130	H ₂ + 298	59	G 3/4	G 1 1/4	M 48 x 2	63	244,5	23	33	320	380	-	133	100	80	150		115
180	H ₂ + 337	87	G 1	G 1 1/2	M 64 x 3	85	318	25	33	400	460	-	145	140	100	190		160
3-stage																		
22	H ₃ + 188	47	G 1/2	G 3/4	M 20 x 1,5	28	121	13	22	195	232	150	168	40	75	75	variable	18
52	H ₃ + 239	51	G 1/2	G 1	M 33 x 2	45	168,3	16	26	220	270	-	119	70	56	100		41
90	H ₃ + 291	63	G 3/4	G 1 1/4	M 42 x 2	56	244,5	20	33	320	380	-	130	100	80	150		75
130	H ₃ + 335	87	G 1	G 1 1/2	M 48 x 2	63	318	23	33	400	460	-	143	140	100	190		115
4-stage																		
22	H ₄ + 227	60	G 1/2	G 1	M 20 x 1,5	28	168,3	13	26	220	270	-	116	70	56	100		18
52	H ₄ + 282	68	G 3/4	G 1 1/4	M 33 x 2	45	244,5	16	33	320	380	-	126	100	80	150	variable	41
90	H ₄ + 329	90	G 1	G 1 1/2	M 42 x 2	56	318	20	33	400	460	-	140	140	100	190		75

Piston/rod $\varnothing$ (mm)	32 / 22	63 / 52	100 / 90	140 / 130	200 / 180	280 / 250
Piston area A ₁ (cm ²)	8,04	31,17	78,54	153,94	314,16	615,75
Rod area A _s (cm ²)	3,80	21,24	63,62	132,73	254,47	490,87
Retraction area A _R (cm ²)	4,24	9,93	14,92	21,21	59,69	124,88

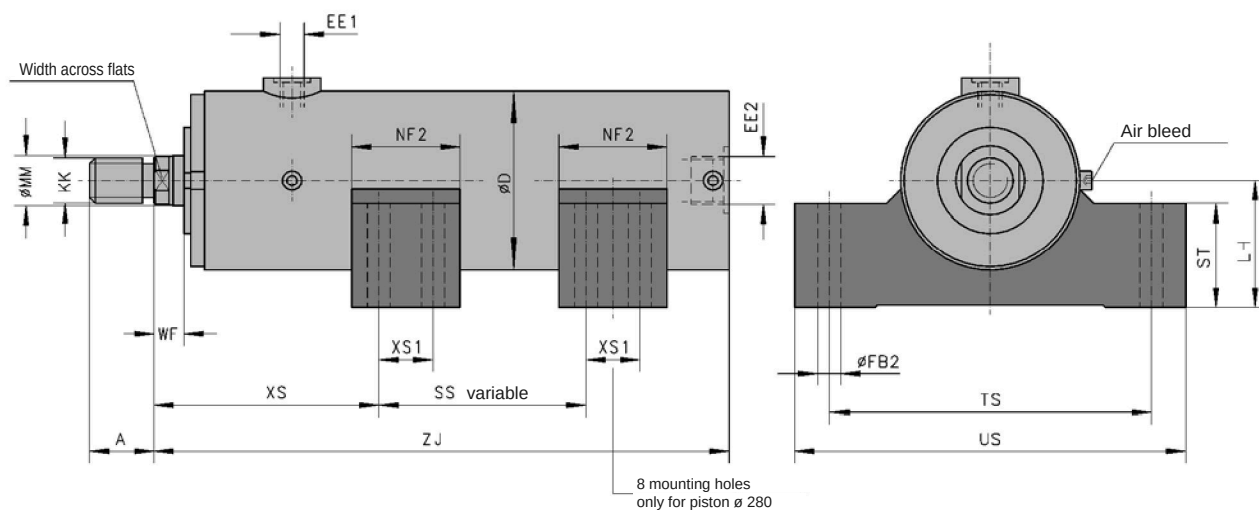
Caution:

Due to the large area ratios A₁ / A_R the rod-side connection must not be throttled. It is recommended to safeguard the rod-side pressure with a suitable pressure relief valve set to the permissible operating pressure of 120 bar.

H* = Stroke (mm)

Mounting type EA-2 cylinder with foot mounting

Piston $\varnothing$ 140, $\varnothing$ 200, $\varnothing$ 280 mm



smallest stage $\varnothing$ MM	ZJ	Min. stroke/stage	EE1	EE2	KK	A	$\varnothing$ D	WF	$\varnothing$ FB ^{H 13}	TS	US	XS	XS1	NF2	ST	LH	SS	Width across flats
2-stage																		
22	$H_2^* + 160$	23	G $\frac{3}{8}$	G $\frac{1}{2}$	M 20 x 1,5	28	78	13	16	140	170	137	-	32	55	55		18
52	$H_2^* + 201$	37	G $\frac{1}{2}$	G $\frac{3}{4}$	M 33 x 2	45	121	16	22	195	232	168	-	40	75	75	variable	41
90	$H_2^* + 249$	46	G $\frac{1}{2}$	G 1	M 42 x 2	56	168,3	20	26	220	270	123	-	70	56	100	variable	75
130	$H_2^* + 298$	59	G $\frac{3}{4}$	G $1\frac{1}{4}$	M 48 x 2	63	244,5	23	33	320	380	133	-	100	80	150		115
180	$H_2^* + 337$	87	G 1	G $1\frac{1}{2}$	M 64 x 3	85	318	25	33	400	460	145	80	140	100	190		160
3-stage																		
22	$H_3^* + 188$	47	G $\frac{1}{2}$	G $\frac{3}{4}$	M 20 x 1,5	28	121	13	22	195	232	168	-	40	75	75	variable	18
52	$H_3^* + 239$	51	G $\frac{1}{2}$	G 1	M 33 x 2	45	168,3	16	26	220	270	119	-	70	56	100	variable	41
90	$H_3^* + 291$	63	G $\frac{3}{4}$	G $1\frac{1}{4}$	M 42 x 2	56	244,5	20	33	320	380	130	-	100	80	150		75
130	$H_3^* + 335$	87	G 1	G $1\frac{1}{2}$	M 48 x 2	63	318	23	33	400	460	143	80	140	100	190		115
4-stage																		
22	$H_4^* + 227$	60	G $\frac{1}{2}$	G 1	M 20 x 1,5	28	168,3	13	26	220	270	116	-	70	56	100	variable	18
52	$H_4^* + 282$	68	G $\frac{3}{4}$	G $1\frac{1}{4}$	M 33 x 2	45	244,5	16	33	320	380	126	-	100	80	150	variable	41
90	$H_4^* + 329$	90	G 1	G $1\frac{1}{2}$	M 42 x 2	56	318	20	33	400	460	140	80	140	100	190		75

Piston/rod $\varnothing$ (mm)	32 / 22	63 / 52	100 / 90	140 / 130	200 / 180	280 / 250
Piston area A_1 (cm ²)	8,04	31,17	78,54	153,94	314,16	615,75
Rod area A_s (cm ²)	3,80	21,24	63,62	132,73	254,47	490,87
Retraction area A_R (cm ²)	4,24	9,93	14,92	21,21	59,69	124,88

Caution:

Due to the large area ratios A_1 / A_R the rod-side connection must not be throttled. It is recommended to safeguard the rod-side pressure with a suitable pressure relief valve set to the permissible operating pressure of 120 bar.

H^* = Stroke (mm)

Model code

ZT 212 -	B -	100/90 -	63/52 -	32/22 -	900 -	K	G -	
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Double-acting

Telescopic cylinder

Nominal pressure 120 bar (12 MPa)
without end position cushioning

Mounting types

B	Trunnion (state dimension l8 when ordering!)
CA	round flange at cylinder head
CB	round flange at cylinder cap
DB	spherical eye at cylinder cap
EA	foot mounting

Stages (piston / rod ø)

280 / 250
200 / 180
140 / 130
100 / 90
63 / 52
32 / 22

Cylinder stroke in mm

Rod seal

K U-cup seal (material Perbunan NBR)

Piston seal

G Teflon seal (material PTFE + NBR O-ring)

Version code

(specified by the manufacturer)

Order example:

Double-acting telescopic cylinder, 120 bar nominal pressure
with the following data:

Mounting type: trunnion, 3 stages, largest stage 100/90,
stroke 900 mm, rod seal: U-cup seal of Perbunan,
piston seal: Teflon seal of PTFE + NBR O-ring.

Type: ZT 212-B-100/90-63/52-32/22-900-KG

Determination of installation dimension L:

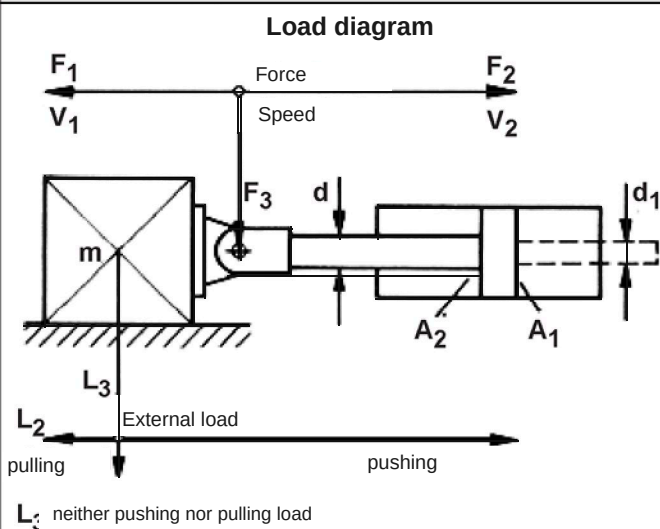
$$= \frac{\text{Stroke}}{\text{No. of stages}} + \dots$$

$$\text{Example: } L_1 = \frac{900}{3} + 188 = 488 \text{ mm}$$

Requirements list for hydraulic cylinders

Customer address		Telephone/Fax	
.....		Contact person	
.....		Department	

Load diagram

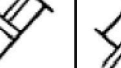
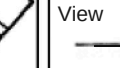


L_3 : neither pushing nor pulling load

13	Required cylinder forces	F_1	N
		F_2	N
14	max. Side 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)	$\alpha_{min} + f$	
		$\alpha_{max} + f$	
17	Moving mass		kg
18	Temperature range of hydraulic fluid $\vartheta_{min} \dots \vartheta_{max}$	°C	
	Ambient temperature range $\vartheta_{min} \dots \vartheta_{max}$	°C	

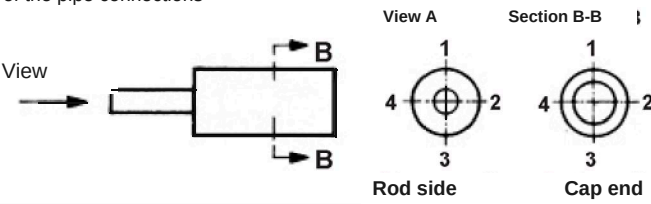
Cylinder installation position



a
b
c
d
e

desired radial position of the pipe connections



Cylinder data			
1	Operating pressure	min	bar
		max	bar
2	Piston $\varnothing$	D	mm
3	Rod $\varnothing$	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	Hydraulic fluid		
8	Rod seal Wiper		
9	Piston seal		
10	Piston rod end		
11	Air bleed	yes	M 8x1 R 1/4" no
12	End position cushioning	Cap end	
		Rod side	

Accessories End positions Position feedback Clamping head Position measuring system with indication of the Pos. accuracy	yes	no
	inductive	
	digital	
	Ultrasonic	
	potentiometric	
	capacitive	

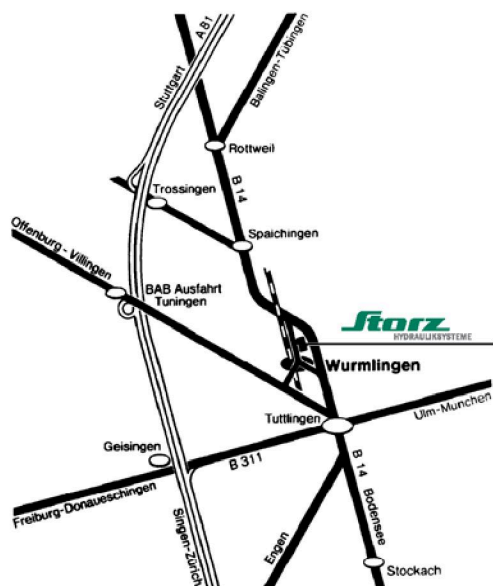
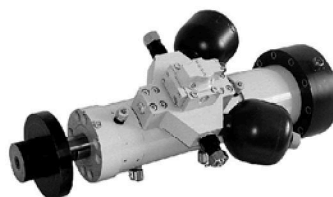
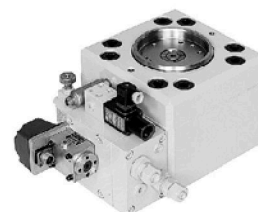
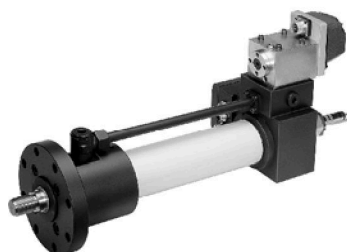
Remarks and notes on the application or special requests please with date and signature!



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 applications
Standardized mounting parts
Hydraulic power units and components
Plant engineering



Storz
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