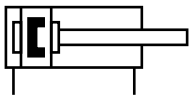
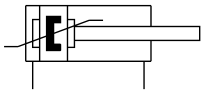
Datasheet

Function
cushioning P



PPS cushioning



-N- Diameter
12 ... 125 mm

-T- Stroke length
1 ... 500 mm

General technical data Piston diameter	12	16	20	25	32	40	50	63	80	100	125
Standard	Based on ISO 21287		Conforms to ISO 21287								Based on ISO 21287
Design	Piston										
	Piston rod										
	Cylinder barrel										
Operating mode	Double-acting										
Cushioning											
P	Elastic cushioning rings/plates at both ends										
PPS	–		Pneumatic cushioning, self-adjusting at both ends								–
Cushioning length											
PPS [mm]	–		3	3.5	4	5	6	7	7.5	10	–
Position sensing	Via proximity switch										
Type of mounting	Via through-hole										
	With female thread										
	With accessories										
Mounting position	Any										

Technical data – Basic version and variants Piston diameter	12	16	20	25	32	40
Pneumatic connection						
–	M5	M5	M5	M5	G1/8	G1/8
Female piston rod thread						
–	M3	M4	M6	M6	M8	M8
Male piston rod thread						
–	M5	M6	M8	M8	M10x1.25	M10x1.25

Technical data – Basic version and variants					
Piston diameter	50	63	80	100	125
Pneumatic connection					
–	G1/8	G1/8	G1/8	G1/8	G1/4
Female piston rod thread					
–	M10	M10	M12	M12	M16
Male piston rod thread					
–	M12x1.25	M12x1.25	M16x1.5	M16x1.5	M20x1.5

Operating and environmental conditions											
Piston diameter	12	16	20	25	32	40	50	63	80	100	125
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]										
Note on the operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)										
Operating pressure											
in [MPa]											
–	0.1 ... 1		0.06 ... 1								
PPS	–		0.15 ... 1			0.1 ... 1					–
Q	0.15 ... 1		0.1 ... 1								
Q-S6	0.15 ... 0.6		0.1 ... 0.6								
S1	–			0.1 ... 1	–	0.1 ... 1	–	0.1 ... 1	–	0.1 ... 1	–
S2, S20	0.15 ... 1		0.12 ... 1		0.1 ... 1			0.08 ... 1			
S6	0.1 ... 1		0.06 ... 1								
S11	0.045 ... 1				0.025 ... 1						
R8, TT	–		0.15 ... 1			0.1 ... 1					–
in [bar]											
–	1 ... 10		0.6 ... 10								
PPS	–		1.5 ... 10			1 ... 10					–
Q	1.5 ... 10		1 ... 10 1								
Q-S6	1.5 ... 6		... 6								
S1	–			1 ... 10	–	1 ... 10	–	1 ... 10	–	1 ... 10	–
S2, S20	1.5 ... 10		1.2 ... 10		1 ... 10			0.8 ... 10			
S6	1 ... 10		0.6 ... 10								
S11	0.45 ... 10				0.25 ... 10						
R8, TT	–		1.5 ... 10			1 ... 10					–
in [psi]											
–	14.5 ... 145		8.7 ... 145								
PPS	–		21.76 ... 145			14.5 ... 145					–
Q	21.76 ... 145		14.5 ... 145								
Q-S6	21.76 ... 87		14.5 ... 87								
S1	–			14.5 ... 145	–	14.5 ... 145	–	14.5 ... 145	–	14.5 ... 145	–
S2, S20	21.76 ... 145		17.4 ... 145		14.5 ... 145			11.6 ... 145			
S6	14.5 ... 145		8.7 ... 145								
S11	6.53 ... 145				3.63 ... 145						
R8, TT	–		21.76 ... 145			14.5 ... 145					–
Ambient temperature1) [°C]											
–	–20 ... +80										
S6	0 ... +120										
S10, S11	+5 ... +80										
R3	–20 ... +80										
TT	–		–40 ... +80								–

Operating and environmental conditions

Piston diameter	12	16	20	25	32	40	50	63	80	100	125
Corrosion resistance class CRC1)											
–	2 - Moderate corrosion stress										
R3	3 - High corrosion stress										
F1A	0 - no corrosion stress										

Forces [N] and impact energy [J] Piston diameter	12	16	20	25	32	40	50	63	80	100	125
Theoretical force at 6 bar, advancing											
–	68	121	188	295	483	754	1178	1870	3016	4712	7363
S1	–	–	–	295	–	754	–	1870	–	4712	–
S2	51	90	141	247	415	686	1057	1750	2827	4524	7069
Theoretical force at 6 bar, retracting											
–	51	90	141	247	415	686	1057	1750	2827	4524	7069
S1	–	–	–	247	–	633	–	1681	–	4417	–
S2	51	90	141	247	415	686	1057	1750	2827	4524	7069
Max. impact energy in the end positions											
–	0.07	0.15	0.2	0.3	0.4	0.7	1 –	1.3	1.8	2.5	3.3
S1	–	–	–	0.3	–	0.7	0.5	1.3	–	2.5	–
S6, S10, S11, TT	0.035	0.075	0.1	0.15	0.2	0.35	0.8	0.65	0.9	1.25	1.75
K10	– –	–	0.16	0.24	0.32	0.56	0.48	1	1.4	2	2.6
S20		0.016	0.024	0.083	0.15	0.39		0.62	0.8	0.9	0.95

Note

These specifications represent the maximum values that can be achieved. The maximum permissible impact energy must be observed.

Permissible impact speed: $V = \sqrt{\frac{2 \times E}{m1 + m2}}$

Maximum permissible mass: $m2 = \frac{2 \times E}{v^2} - m1$

V	Permissible impact speed
E	max. impact energy
m1	Moving mass (drive)
m2	Moving payload

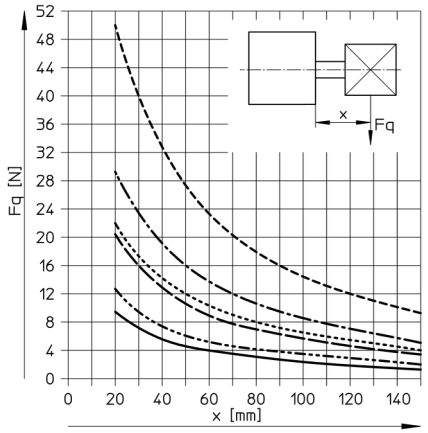
Note

The maximum impact energy is still maintained in combination with cushioning PPS.

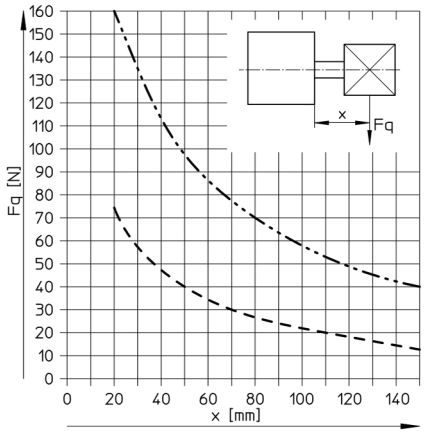
Max. energy conversion capacity [J] Piston diameter	20	25	32	40	50	63	80	100
For cushioning PPS	0.65	0.8	1	1.7	2.8	4.8	8	12

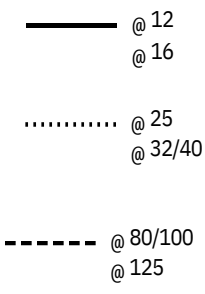
Max. lateral force Fq as a function of projection x

@ 12 ... 63



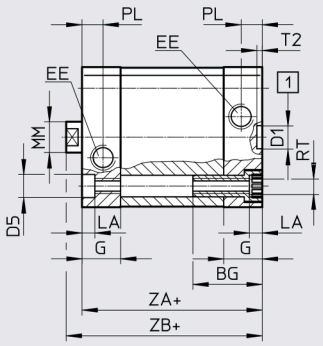
@ 80 ... 125



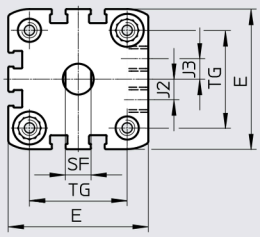


Dimensions – Basic version

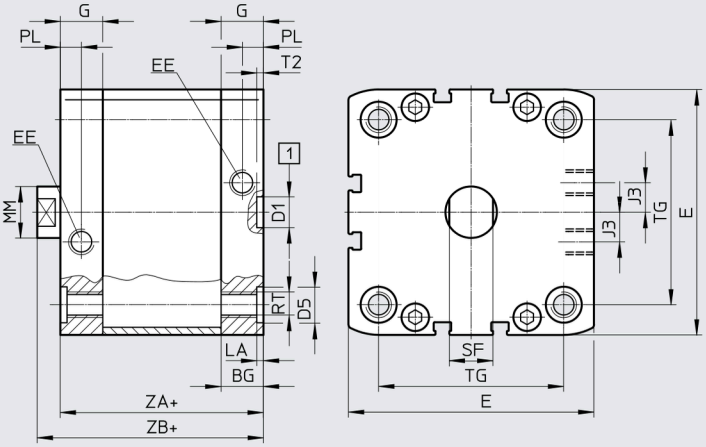
@ 12 ... 63



@ 32 ... 63

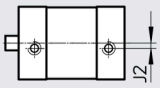


@ 80 ... 125



@ 12 ... 25

@ 12

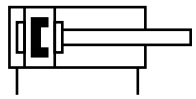


\+ = plus stroke length

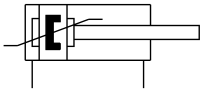
[1] = Drilled hole for centring pin/sleeve

@ [mm]	BG min.	D1 @ H9	D5 @	E	EE	G	J2	J3	PW +0.2
~~12~~				27.5 +0.3		10.5	2	–	
~~16~~	17		6^{F9}	29 +0.3	M5	11			3.5
~~20~~				35.5 +0.3			2.6		
~~25~~	19.5	9	9^{F9}	39.5 +0.3		12			
~~32~~				47 +0.3			6		
~~40~~	26			54.5 +0.3	G1/8	15			5
~~50~~				65.5 +0.3			8		
~~63~~	27		12^{F9}	75.5 +0.3					
~~80~~							11.5		
~~100~~	17	12	15	95.5 +0.6		16.5			2.6
~~125~~	21.5			113.5 +0.6		21.5	20		
	20		–	134.6 +0.3	G1/4	20	21.15		–

@ [mm]	MM @	PL +0.2	RT	SF h13	T2 +0.1	TG ±0.2	ZA ±0.6	ZB +1.2	ZB PPS +1.3
12	6	6	M4	5	2.1	16	35	39.2	–
16	8			7		18		39.7	
~~20~~	10		M5	9		22	37	42.5	42.5
~~25~~						26	39	44.5	45.3
~~32~~	12	8.2	M6	10		32.5	44	50	50.6
~~40~~						38	45	51.1	51.7
~~50~~	16		M8	13	2.6	46.5		52.7	53.2
~~63~~						56.5	49	56.5	57
~~80~~	20		M10	17		72	54	62.9	63.4
~~100~~		10.5				89	67	76	76.8
~~125~~	25		M12	21		110	81	92	–

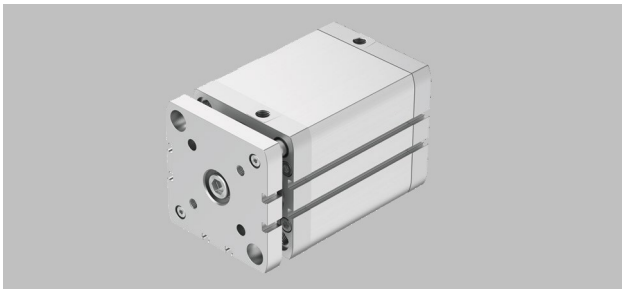


PPS cushioning



-N- Diameter
12 ... 100 mm

-T- Stroke length
1 ... 400 mm



General technical data										
Piston ⌀	12	16	20	25	32	40	50	63	80	100
Pneumatic connection	M5	M5	M5	M5	G1/8	G1/8	G1/8	G1/8	G1/8	G1/8
Design	Piston									
	Piston rod									
	Cylinder barrel									
Mode of operation	Double-acting									
Cushioning										
P	Elastic cushioning rings/pads at both ends									
PPS	–		Pneumatic cushioning, self-adjusting at both ends							
Cushioning length										
PPS [mm]	–		3	3.5	4	5	6	7	7.5	10
Position sensing	Via proximity switch									
Type of mounting	With through-hole / female thread / accessories									
Mounting position	Any									

Operating and environmental conditions										
Piston ⌀	12	16	20	25	32	40	50	63	80	100
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]									
Note on operating/ pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)									
Operating pressure										
in [MPa]										
–	0.15 ... 1			0.1 ... 1						
PPS			0.19 ... 1			0.14 ... 1				
in [bar]										
–	1.5 ... 10			1 ... 10						
PPS	–		1.9 ... 10			1.4 ... 10				
in [psi]										
–	21. 76 ... 145			14.5 ... 145						
PPS	–		27.56 ... 145			20.31 ... 145				
Ambient temperature1) [°C]										
–	–20 ... +80									
Corrosion resistance class CRC2)	2 - moderate corrosion stress									

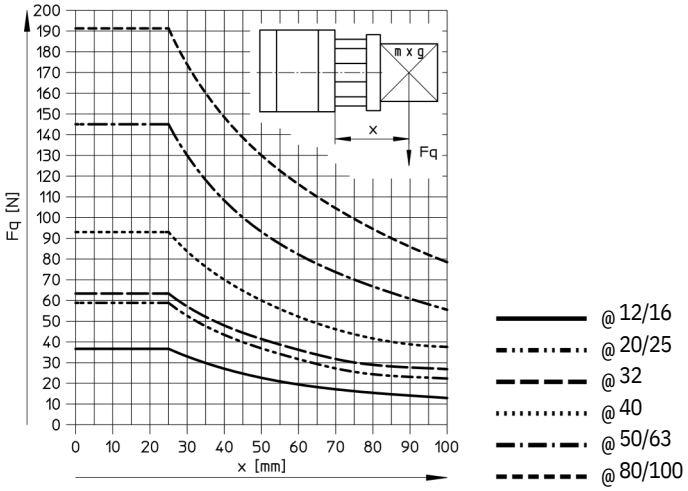
Forces [N] and impact energy [J]										
Piston @	12	16	20	25	32	40	50	63	80	100
Theoretical force at 6 bar, advancing										
–	68	121	188	295	483	754	1178	1870	3016	4712
Theoretical force at 6 bar, retracting										
–	51	90	141	247	415	686	1057	1750	2827	4524
Max. impact energy at the end positions										
–	0.07	0.15	0.2	0.3	0.4	0.7	1.0	1.3	1.8	2.5

-H- Note

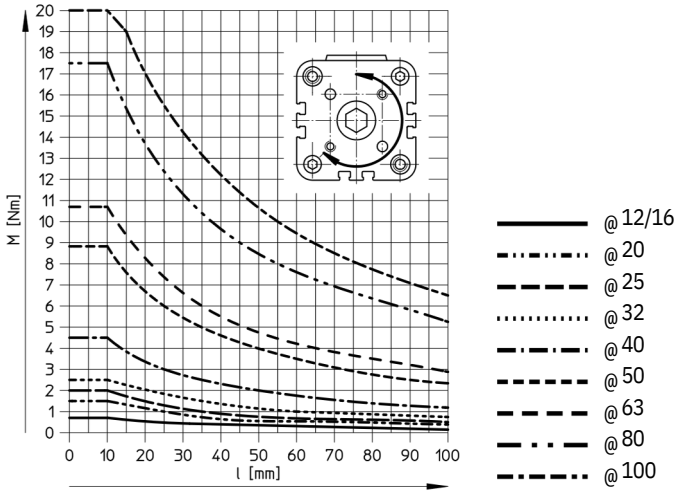
In combination with the self-adjusting cushioning (PPS), the maximum impact energy is still obtained.

Max. energy conversion capacity [J]								
Piston @	20	25	32	40	50	63	80	100
For self-adjusting cushioning (PPS)	0.65	0.8	1	1.7	2.8	4.8	8	12

Max. lateral force Fq as a function of the projection x

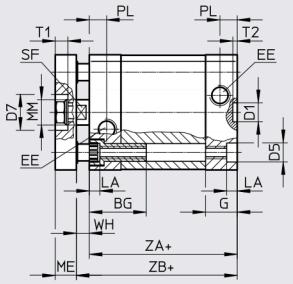


Torque M as a function of stroke length l

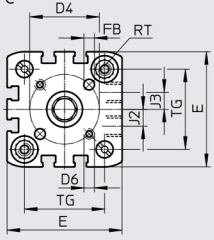


Dimensions – Basic version

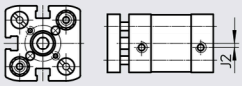
@ 12 ... 63



@ 32 ... 63

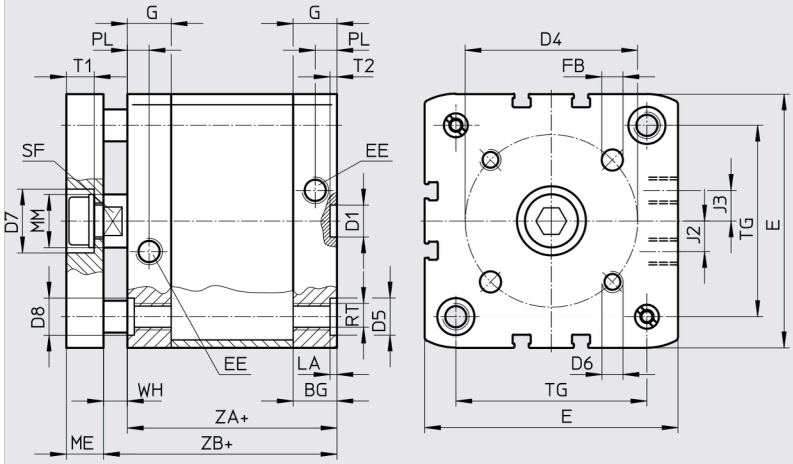


@ 12 ... 25 @ 12



\+ = plus stroke length

@ 80 ... 100



\+ = plus stroke length

@ [mm]	BG min.	D1 @ H9	D4 ±0.1	D5 @	D6	D7 @ H9	D8	E	EE	FB @ H8	G	J2	J3
12	17	9	12	6^{F9}	M3	–	–	27.5 +0.3	M5	3	10.5	2	–
16			14					29 +0.3			11	2.6	
20	19.5		17	9^{F9}	M4			35.5 +0.3		4	12		
25			22		M5	14		39.5 +0.3		5			
32	26		28			17		47 +0.3	G1/8		15	6	
40			33					54.5 +0.3				8	
50	27	12	42	12^{F9}	M6	22		65.5 +0.3		6			
63			50					75.5 +0.3				11.5	
80	17		65	15	M8	24	14	95.5 +06		8	16.5		
100	21.5		80		M10			113.5 +0.6		10	21.5	20	

@ [mm]	LA +0.2	ME	MM @ H8	PL +0.2	RT	ST H13	T1	T2 +0.1	TG ±0.2	WH +1.3	WH PPS +1.4	ZA ±0.6	ZB +1.2	ZB PPS +1.3
12	3.5	6	6	6	M4	5	–	2.1	16	4.2	–	35	39.2	–
16			8			7			18	4.7			39.7	
20	5	8	10		M5	9			22	5.5	5.5	37	42.5	42.5
25							5		26		5.5	39	44.5	45.3
32		10	12	8.2	M6	10	6		32.5	6	6.5	44	50	50.6
40									38	6.1	6.6	45	51.1	51.7
50		12	16		M8	13	7.5	2.6	46.5	7.7	8.2		53.2	53.2
63									56.5	7.5	8	49	57.1	57
80	2.6	14	20		M10	17	10.5		72	8.9	9.4	54	62.9	63.4
100				10.5					89	9	9.8	67	76	76.8