FORKARDT

SDVN

Adjustable industrial shock absorbers

WORKHOLDING SOLUTIONS WORLDWIDE

General information

FORKARDT offers, with its new SDVN series, an extremely comprehensive range of versatile shock absorbers for
application within a wide variety situations.

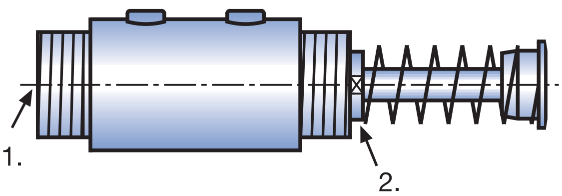
At a glance guide to the most important advantages:

46 various sizes according to requirements

Piston-diameters	6 - 125 mm	
Stroke	13 - 500 mm	
Working loads	1.5 - 240,000 Nm	

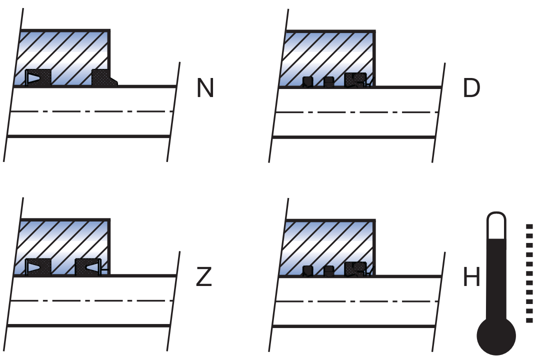
DIN / ISO
Piston & piston rod diameter as per DIN 24334
Seal specifications as per IS0 5597

Adjustable at both ends
From piston diameter of 12 mm:
1. On base
2. On adjusting sleeve

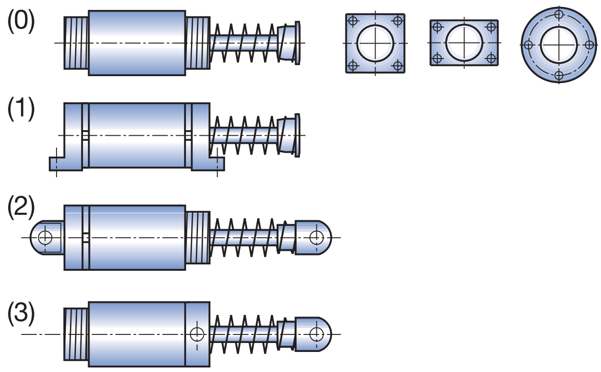


Depending on requirements four different seal systems available

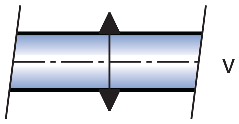
N = Polyurethane groove seals for normal applications.
D = Double PTFE-Seal system for extreme conditions.
Z = Cylinder seals for direct integration with pneumatic cylinders.
H = Double PTFE-Seal system, together with Viton-0-rings, for high temperatures.



Mounting variations
(0) • Screw mounting either end
(1) • Foot mounting
(2) • Swivel mounting
(3) • Centre trunnion mounting
• Accessories: Square, rectangular or round flanges (suitable for front or rear). External reservoir, silencer, silencer plate.



Strengthened piston rod
Above the 32mm diameter piston sizes a larger rod is available for use with an external oil reservoir or limited stroke.



Special versions
- Telescope designs
- Double end working shock absorbers
- Cylinders with integrated shock absorbers
- Shock absorbers with rust free, nickel plated or chromed external parts
- Crane shock absorbers
- Chair lift shock absorbers
- Pre-set or self-adjusting dampers
- Mid-stroke variants
- Special installation models

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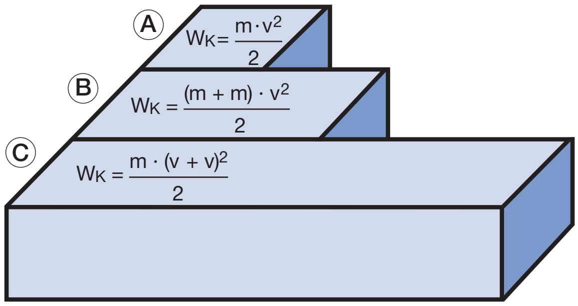
The kinetic energy



Ⓐ *Kinetic energy*
Ⓑ *Double mass = Double energy*
Ⓒ *Double speed = Quadrupled energy*

The ever increasing growth of automation in all industries demands increased speeds of transport and movement. This results in higher velocity and kinetic energies, which, in proportion, quadruple in relation to this increase.

High movement energy generates

- Damage
- Disturbance
- Production scrap
- Repairs
- Noise

- all of which lead to additional costs!

Costs which arise from the energy of unrestricted motion can be contained.
FORKARDT- Industrial shock absorbers absorb the motion energy. They stop movements softly and reliably.
The additional times needed for this controlled deacceleration remain minimal and can be calculated precisely.

Adjustable shock absorbers - why?

No two shock loads are the same. Indeed, it is often not even possible to calculate precisely the actual loads involved.
Pre-set or the so called self-adjusting dampers are often overburdened, because they are designed to function over a limited range. It is often necessary to undertake laborious trials before an acceptable mode of operation can be established, this can be costly.
Therefore, for the multitude of industrial applications the stepless adjustable designs are preferable. In a few seconds the optimum performance can be achieved. Variable loads can be accommodated with ease. As such, time consuming and costly trials can be eliminated.

Therefore:
Don’t deal with uncertainty - select a stepless adjustable shock absorber from FORKARDT first time.

Areas of application:

FORKARDT GEFITEC - Industrial Shock Absorbers		
for arresting	to facilitate	for use on
workpieces	automation	handling equipment
strips	machining	industrial robots
plates	forming	linear handling units
slabs	loading	rotary handling units
bars	unloading	machine tools
tubes	gripping	plastics processing machines
springs	lifting	textile machines
levers	lowering	packing machines
covers	swivelling	paper making machines
flaps	positioning	welding plants
doors	conveying	mechanisms
gates	closing	transfer equipment
windows	sorting	conveyors and elevators
frames	stacking	manipulators
guards	bundling	wood working machines
gate valves	indexing	pallet conveyors
sildes	handling	
carriages	machine linking	
cylinders	feeding	

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How does a FORKARDT industrial shock absorber work?

What happens, when...

...the piston rod ⓵ is pushed in?

The piston ⓶ presses the oil medium within the cylinder bore ⓷ through a series of nozzles ⓸. Progressively, nozzles are closed by the advancing piston, and the displaced oil is then accumulated within the sleeve ⓹.

...the piston rod is pushed out?

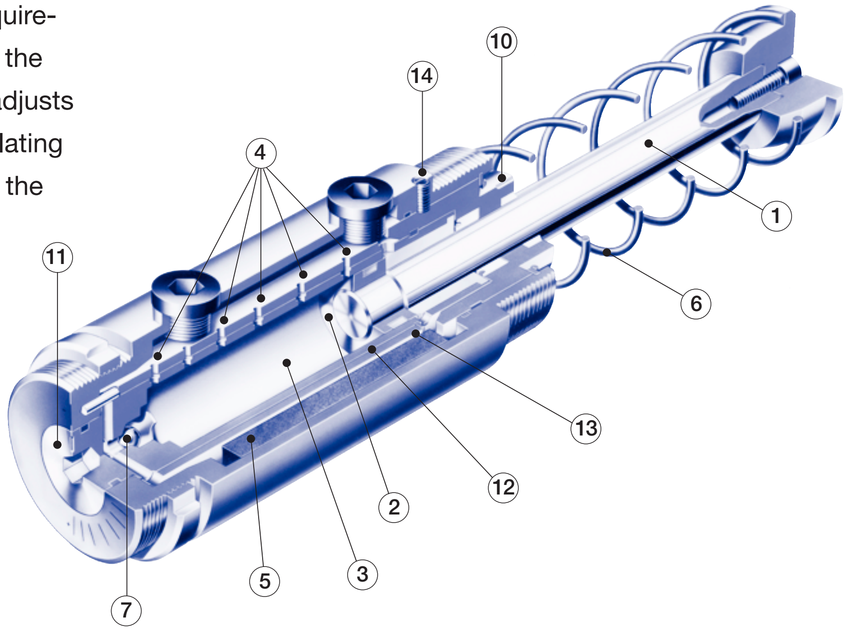
Normally this is performed by the spring ⓺. The oil flows back into the cylinder through the non-return valve ⓻.

...the shock absorber is adjusted?

Adjustment is effected according to requirements by either tightening or loosening the adjusters ⑩ and ⑪. This respectively adjusts either the cylinder sleeve ⑫ or the regulating sleeve ⑬. The cross sectional areas of the nozzles are continually changing and in practice this provides harder or softer damping. The adjusters can then be locked with the grubscrews ⑭.

FORKARDT - Industrial shock absorbers offer:

- Linear deceleration
- Minimal braking force
- Sensitive and stepless adjustment
- High performance
- Good safety reserves at maximum performance
- Reliability
- Simple servicing
- Metric dimensions
- Variable adaptability with modular programme
- Adjustable from either end
- Seal systems according to application requirements



FORKARDT industrial shock absorbers in comparison

to alternative methods

Throughout industry a multitude of damping elements are used with various effects and with varying degrees of effectiveness. High output machines however require an equally high degree of quality damping elements.

It is not acceptable to compromise your solutions. FORKARDT products deliver a wide variety of damping systems for an even wider variety of applications.

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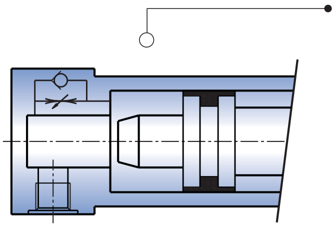
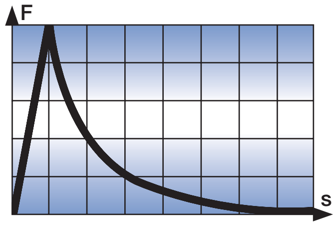
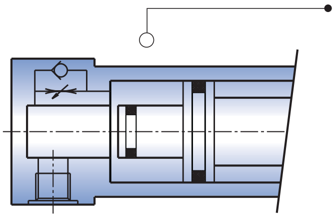


1. Hydraulic end cushioning

The oil flows through an adjustable nozzle. The abrupt closure of this flow area results in a high pressure (force) at the start of the damping stroke. The greater part of the energy is then absorbed after a few mm of piston stroke. The cylinder force then pushes the piston to its end position.

Force distance - diagram

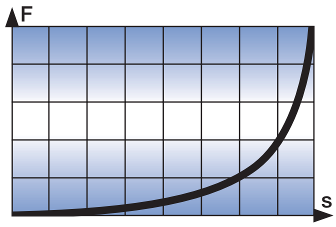


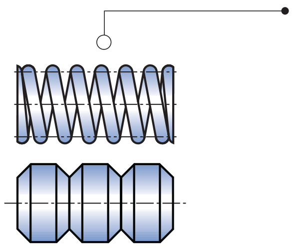


2. Pneumatic end cushioning

Air is compressible. Consequently the damping function is completed only at the end of cushion stroke. The air has been heavily compromised and is used as an energy store. The mass in motion springs back from this effect. Peak pressures of 50-60 bar are not unusual. Pneumatic cylinders are therefore often more bulky in an effort to achieve an adequate cushioning effect.

Force distance - diagram

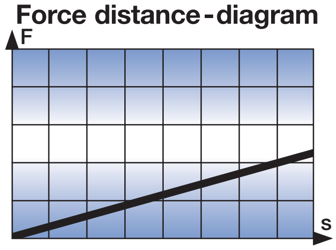


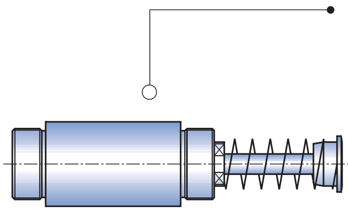


3. Elastic mediums

Spring and rubber dampers provide in principle an elastic damping effect. Whereby the energy is momentarily absorbed and then released. Elastic mediums are normally only recommended for secondary applications.

Force distance - diagram

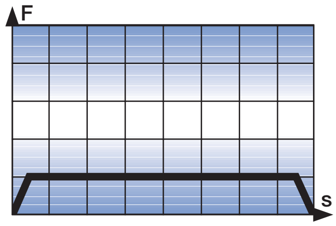


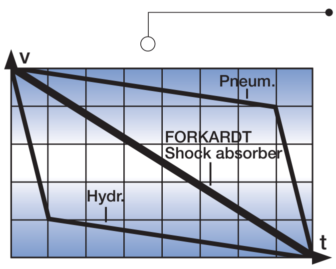


4. FORKARDT GEFITEC industrial shock absorbers

The decelerating forces are low and remain constant throughout the entire stroke. FORKARDT industrial shock absorbers generate less power during function than alternative techniques. The energy is absorbed equally over the entire stroke length. This manner of converting kinetic energy into heat energy approaches the theoretical optimum.

Force distance - diagram





Force distance diagram (all damping elements)

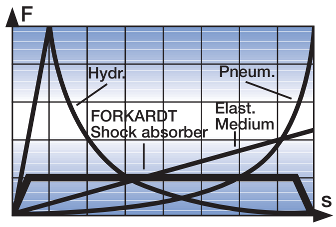
A direct comparison indicates at once the significant advantages of FORKARDT industrial shock absorbers.

- Low and constant deceleration forces throughout the entire stroke (force distance diagram)
- Constant speed of arrest until static (speed time diagram)

Resulting in:

- Greater productivity
- Simple design
- Less noise
- Better motion arrest
- Energy effective
- Increased economy

Speed time - diagram



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Performance data

Type SDVN	piston ø mm	stroke mm	energy consumption ratings per stroke① Nm/Hub	per hour (IT) ③ kNm/h	per hour (AT) ④ kNm/h ②	max. braking load kg	return force Min. N	Max. N	allowable side force	weight basic vers. approx. kg
6 - 13	6	13	14	36	-	70	9	15	3°	0.09
8 - 13	8	13	25	45	-	125	9	21	4°	0.15
8 - 25		25	50	58	-	250	9	24	3°	0.18
10 - 25	10	25	75	70	-	375	14	26	3°	0.28
10 - 50		50	150	92	-	750	15	27	1,5°	0.40
12 - 25	12	25	125	80	120	625	29	50	4°	0.6
12 - 50		50	250	105	152	1,250	26	56	2°	0.75
12 - 75		75	375	130	195	1,875	26	58	1°	0.9
18 - 25	18	25	250	120	180	1,250	56	76	4°	1.1
18 - 50		50	500	150	225	2,500	36	76	3°	1.3
18 - 75		75	750	180	270	3,750	38	76	2°	1.6
18 - 100		100	1,000	210	315	5,000	36	76	1°	1.9
25 - 25	25	25	500	165	248	2,500	83	115	5°	2.0
25 - 50		50	1,000	200	300	5,000	50	115	4°	2.2
25 - 75		75	1,500	235	352	7,500	48	106	2°	2.5
25 - 100		100	2,000	270	405	10,000	50	115	1°	2.9
32 - 50	32	50	1,600	250	375	8,000	97	187	5°	3.7
32 - 75		75	2,400	290	435	12,000	123	226	4°	4.1
32 - 100		100	3,200	330	495	16,000	88	226	3°	4.7
32 - 150		150	4,800	370	555	24,000	73	203	2°	5.6
40 - 50	40	50	2,500	350	525	12,500	154	275	5°	6.5
40 - 75		75	3,750	400	600	18,750	184	322	4°	7.0
40 - 100		100	5,000	450	675	25,000	138	322	3°	8.0
40 - 150		150	7,500	550	825	37,500	144	322	2°	9.5
40 - 200		200	10,000	650	975	50,000	138	322	1°	11.0
50 - 50	50	50	4,000	560	840	20,000	250	373	5°	12.0
50 - 75		75	6,000	650	975	30,000	188	373	4°	13.0
50 - 100		100	8,000	740	1.100	40,000	251	469	3°	14.0
50 - 150		150	12,000	920	1.380	60,000	142	469	2°	17.0
50 - 200		200	16,000	1.080	1.620	80,000	251	469	1°	20.0
63 - 75	63	75	9,000	910	1.365	45,000	382	683	4°	24.0
63 - 100		100	12,000	1.000	1.500	60,000	281	683	3°	26.0
63 - 150		150	18,000	1.200	1.800	90,000	280	693	2°	30.0
63 - 200		200	24,000	1.400	2.100	120,000	281	683	1°	34.0
80 - 100	80	100	20,000	1.400	2.100	100,000	546	834	4°	48.0
80 - 150		150	30,000	1.700	2.550	150,000	402	834	3°	51.0
80 - 200		200	40,000	2.000	3.000	200,000	546	834	2°	61.0
80 - 300		300	60,000	2.500	3.750	300,000	402	834	1°	77.0
100 - 125	100	125	37,500	2.100	3.150	187,500	497	1,275	4°	78.0
100 - 250		250	75,000	2.800	4.200	350,000	396	1,296	3°	101.0
100 - 375		375	112,500	3.500	5.250	562,000	367	1,317	2°	124.0
100 - 500		500	150,000	4.200	6.300	750,000	396	1,296	1°	148.0
125 - 125	125	125	60,000	3.000	4.500	300,000	717	2,096	4°	165.0
125 - 250		250	120,000	4.000	6.000	600,000	642	2,427	3°	204.0
125 - 375		375	180,000	5.000	7.500	900,000	607	2,427	2°	243.0
125 - 500		500	240,000	6.000	9.000	1,200,000	642	2,427	1°	285.0

Technical data:

Permissible velocity 0.2 - 5 m/s

Permissible temperature range 0 - 80°C

(variations on request)

Various mountings possible
Fixed stop should be 1 mm before end of stroke

① When used as emergency damper: + 40% permissible
② With dash reservoir and oil circuit higher values achievable
③ Internal reservoir
④ External dash reservoir

Special variations by request

All dampers can be steplessly adjusted to the specified load within the permissible consumption rating.

When using the internal hydraulic reservoir - the damper is immediately operable after mounting.

Oil Specification: H-LP 32 (ISO-VG3)

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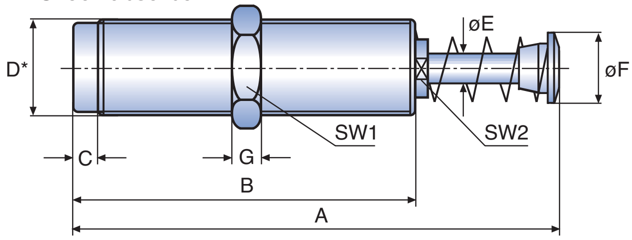
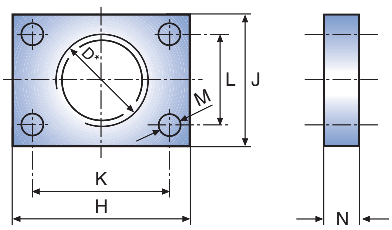
Dimensions SDVN 6 bis 10

Shock absorber





Rectangular flange
Steel, black oxide

Order example

SDVN 8 - 25 - M 20 x 1.5

Type
Piston ø
Stroke
Thread

Dampers are supplied as standard with internal reservoir and spring return They are ready for use upon assembly

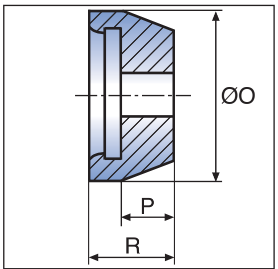
Accessory:

Rectangular flange for SDVN 8 - M 20 x 1.5

Type					* Special thread						Rectangular flange					
SDVN	A	B	C	D*	on request	øE	øF	G	SW1	SW2	H	J	K	L	øM	N
6 - 13	100	73	7	M 16 x 1.5	-	5	12	5	19	7	35	25	27	17	4.5	10
8 - 13 8 - 25	100 138	74 97	7	M 20 x 1.5	M 22 x 1.5	6	15	6	24	10	40	30	32	22	4.5	12
10 - 25 10 - 50	143 227	102 147	7	M 24 x 1.5	M 25 x 1.5 M 27 x 1.5, M 27	8	19	8	30	13	50	35	40	25	5.5	12

*We reserve the right to change dimensions. Arrange end stop 0.5 -1 mm before end of stroke. Adjustment by rotating SW2. * Use standard threads. Special threads not suitable for new version.*

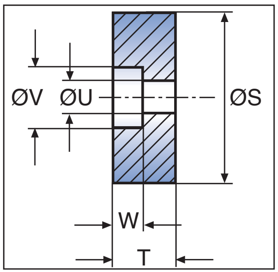
Additional accessories:



Stop head:
To push over the ram head
Advantage:
Noise reduction
Material:
Nylon

Stop head for				
SDVN	strokes	ø O	P	R
6	13	16	6	11
8	13, 25	20	6	11
10	25, 50	24	8	13

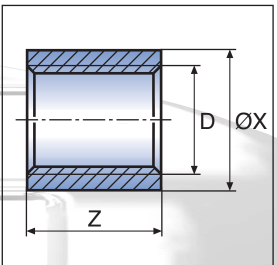
Order example:
Head for SDVN 6



Stop plate:
To be fitted to item to be braked
Advantage:
Noise reduction
Material:
Nylon

Stop plate for						
SDVN	strokes	ø S	T	ø U	ø V	W
6	13	12	8	3.2	6	3.5
8	13, 25	16	8	3.2	6	3.5
10	25, 50	20	10	4.2	7.5	5

Order example:
Stop plate for SDVN 10



Fixed stop:
Screwed on thread of damper
Advantage:
No external stop required
Material:
Steel, black oxide

Fixed stop for				
SDVN	strokes	D	ø X	Z
6	13	M 16 x 1.5	20	30
8	13, 25	M 20 x 1.5	25	30
10	25, 50	M 24 x 1.5	32	50

Order example:
Fixed stop for SDVN 8 - M 20 x 1.5

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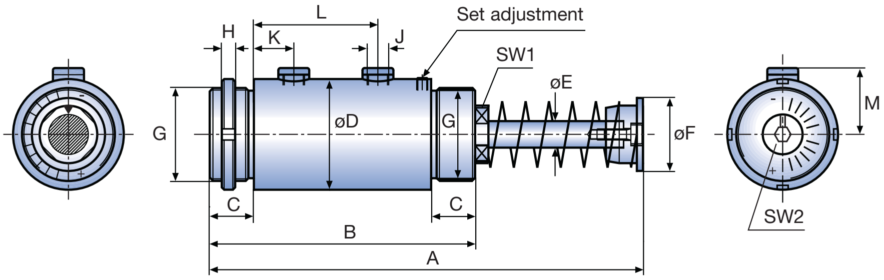
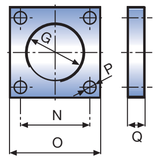
SDVN 12 to 125 Dimension chart

Mounting style 0 / square, rectangular and round flange

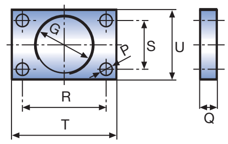
Mounting style 0 Screw mounting



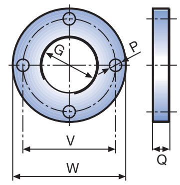
Square flange
(accessory)



Rectangular flange
(accessory)



Round flange
(accessory)



Type	Mounting style 0 = Screw mounting												Square, rectangular and round flange									
SDVN	A	B	C	øD	øE*	øF	G	H	J	K	L	M	N	O	øP	Q	R	S	T	U	V	W
12 - 25	138	83	16	38	8	25	M32x1.5	6	M5	15	30	22	35	45	6,5	8	42	28	54	40	52	63
12 - 50	189	108									55											
12 - 75	255	133									80											
18 - 25	146	95	20	52	12	33	M42x1.5	6	R1/8"	18	-	29	50	65	9	12	60	35	75	50	68	83
18 - 50	196	120									56											
18 - 75	246	145									81											
18 - 100	328	170									106											
25 - 25	155	105	22	64	16	40	M52x1.5	8	R1/8"	20	-	35	55	70	9	12	65	45	80	60	80	95
25 - 50	205	130									58											
25 - 75	265	155									83											
25 - 100	334	180									108											
32 - 50	225	140	25	77	20	50	M65x1.5	8	R1/8"	24	59	42	70	90	11	16	80	55	100	75	100	120
32 - 75	280	165									84											
32 - 100	330	190									109											
32 - 150	455	240									159											
40 - 50	255	165	32	95	25	62	M80x2	10	R1/2"	28	64	58	85	110	13	20	100	70	125	95	120	142
40 - 75	315	190									89											
40 - 100	365	215									114											
40 - 150	485	265									164											
40 - 200	620	315									214											
50 - 50	300	192	38	120	32	78	M100x2	12	R1/2"	30	73	70	110	140	17	25	120	90	150	120	150	178
50 - 75	350	217									98											
50 - 100	406	242									123											
50 - 150	506	292									173											
50 - 200	677	342									223											
63 - 75	380	240	41	150	40	95	M125x2	14	R3/4"	43	101	90	130	160	17	25	-	-	-	-	180	208
63 - 100	430	265									126											
63 - 150	555	315									176											
63 - 200	700	365									226											
80 - 100	488	300	48	180	50	112	M150x3	14	R1"	50	125	105	160	200	21	30	-	-	-	-	220	255
80 - 150	588	350									175											
80 - 200	785	400									225											
80 - 300	985	500									325											
100 - 125	585	375	55	220	63	138	M180x3	18	R1 1/2"	70	170	125	190	230	26	35	-	-	-	-	265	305
100 - 250	885	500									295											
100 - 375	1,180	625									420											
100 - 500	1,530	750									545											
125 - 125	655	420	65	290	80	178	M240x3	22	R11/2"	70	190	165	250	300	32	40	-	-	-	-	350	400
125 - 250	955	545									315											
125 - 375	1,265	670									440											
125 - 500	1,625	795									565											

All models supplied with internal reservoir and Spring ready for assembly.
**) Models above SDVN 32 with mounting style 2 and 3 are available with heavy duty piston rod. With style 0 and 1 heavy duty piston rod only available with shortened stroke (Stop ring).*
In this instance take the next size up of piston rod diameter.
Further accessories (stop head, stop plate or silencer) available upon request.

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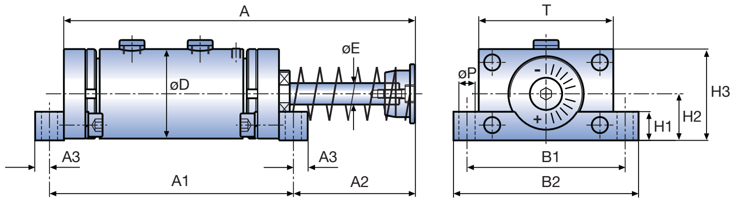
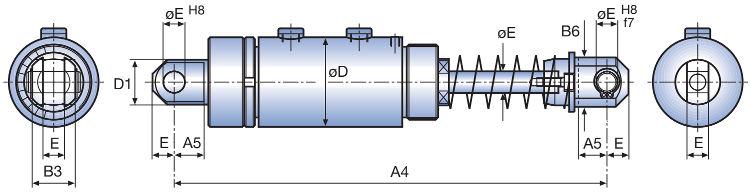
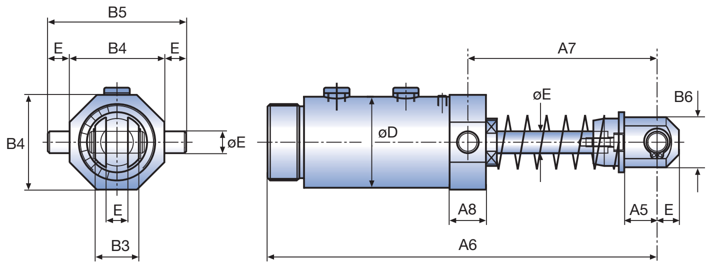
Mounting style 1 Foot mounting



Mounting style 2 Swivel mounting



Mounting style 3 Centre trunnion mounting



Order example

SDVN 12 - 25 - 0 - 0 - N - V

- Type
- Piston-ø
- Stroke
- Mounting style
  - 0 = Screw mounting
  - 1 = Foot mounting
  - 2 = Swivel mounting
  - 3 = Centre trunnion mounting
- Function style
  - 0 = Internal reservoir, with spring
  - 1 = Internal reservoir less spring
  - 2 = Less internal reservoir with spring
  - 3 = Less internal reservoir less spring
- Seal style
  - N = Polyurethane groove seals (Standard)
  - D = Double PTFE seal system
  - H = Viton seals
  - Z = Seals for direct connection on cylinders.
- Heavy duty piston

*Above 32 ø piston only available with mounting type 2 and 3 or shortened stroke possible.

Type	size		mounting style 1 - foot mounting										mounting style 2						mounting style 3				
SDVN	øD	øE	A1	A2	A3	B1	B2	H1	H2	H3	øP	T	A4	A5	B3	B6 approx.	D1	E	A6	A7	A8	B4	B5
12 - 25	38	8	95	49	6	60	72	12	20	40	6.5	54	167	11.5	16	20	20	8	150	75	16	40	56
12 - 50			120	75									218						201	101			
12 - 75			145	116									284						267	142			
18 - 25	50	12	111	43	8	80	95	16	26	51	9	75	191	18	24	28	25	12	164	79	20	52	76
18 - 50			136	68									241						214	104			
18 - 75			161	93									291						264	129			
18 - 100			186	150									373						346	186			
25 - 25	62	16	125	40	10	85	100	20	32	63	9	80	211	24	32	36	36	16	179	85	22	65	97
25 - 50			150	65									261						229	110			
25 - 75			175	100									321						289	145			
25 - 100			200	144									390						358	189			
32 - 50	75	20	164	73	12	110	130	24	40	78	11	100	295	30	40	40	40	20	255	128	26	80	120
32 - 75			189	103									350						310	158			
32 - 100			214	128									400						360	183			
32 - 150			264	203									525						485	258			
40 - 50	95	25	195	75	15	140	165	30	50	98	13	125	345	38	50	50	50	25	293	144	32	100	150
40 - 75			220	110									405						353	179			
40 - 100			245	135									455						403	204			
40 - 150			295	205									575						523	274			
40 - 200			345	290									710						658	359			
50 - 50	120	32	228	90	18	170	200	36	63	123	17	150	410	48	65	72	65	32	348	174	40	125	189
50 - 75			253	115									460						398	199			
50 - 100			278	146									516						454	230			
50 - 150			328	196									616						554	280			
50 - 200			378	317									787						725	401			
63 - 75	150	40	280	120	20	180	210	40	80	160	17	160	515	60	80	86	80	40	440	216	50	160	240
63 - 100			305	145									565						490	241			
63 - 150			355	220									690						615	316			
63 - 200			405	315									835						760	411			
80 - 100	180	50	350	163	25	220	260	50	100	200	21	200	655	75	100	110	100	50	563	281	60	190	290
80 - 150			400	213									755						663	331			
80 - 200			450	360									952						860	478			
80 - 300			500	460									1,152						1,060	578			

We reserve the rights to change dimensions
Arrange end stop 1 mm before end of stroke.
All models supplied with internal reservoir and spring ready for assembly.
Refer to mounting style 0 for dimns not given basic style. Various mounting possibilities.

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Formular and specimen calculations

Symbols and values applied In the formulae:

W_K	=	kin. energy/stroke (less propelling force)	Nm/Hub
W_G	=	kin. energy/stroke ($W_G = W_K + A$)	Nm/Hub
W_H	=	kin. energy/ hour (W_G bzw. W_K x Z)	Nm/h
m	=	weight (mass)	kg
v	=	impact velocity	m/s
h	=	drop height	m
s	=	shock absorber stroke	m
g	=	gravitational forces	9,81 m/s^2
a	=	acceleration / deceleration	m/s^2
F	=	additional propelling force	N
M_D	=	drive torque	Nm

A	=	propulsive power (F · s)	Nm
H_M	=	Engine holds moment-factor (2.5 normal)	1... 2.5
P	=	power output	kW
Z	=	strokes per hour	-
J	=	mass moment of inertia	kgm^2
ω	=	angular velocity	s^{-1}
R, r	=	radius	m
α	=	angle	°
D / d	=	diameter	cm
p	=	system pressure	bar
Fv	=	deceleration force	N
Fs	=	support force ($F_s = F_v$ x 2...3)	N
1 N	**=**	**0.102 kp - 1 kp**	**= 9.81 N**
1 Nm	**=**	**0.102 mkp - 1 mkp**	**= 9.81 Nm**

General calculations

Calculation for deceleration force

$$Fv = \frac{W_G}{s} \times 1.15\ ^{*)} \quad (N)$$

Fs = 2....3 x Fv

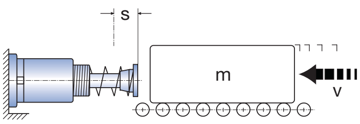
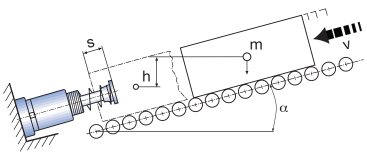
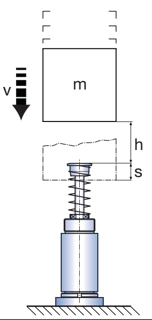
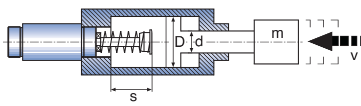
Calculation for deceleration time

$$t = \frac{2 \times s}{v} \times 1.15\ ^{*)} \quad (s)$$

Calculation for deceleration

$$a = \frac{v^2}{2 \times s} \times 1.15\ ^{*)} \quad (m/s^2)$$

**) Correction factors. Apply only by optimum adjustment and conditions.*

Example	Load	Formulae equations	Calculation equations / options
Mass less drive force 	m = 200 kg v = 2 m/s Z = 60 **required:** W_K, W_H	$W_K = \frac{m \cdot v^2}{2}$ $W_H = W_K \cdot Z$	$W_K = \frac{200 \cdot 2^2}{2}$ **= 400 Nm/stroke** $W_H = 400 \cdot 60$ **= 24,000 Nm/h** **selected:** 1 x SDVN 18 - 50 oder: 2 x SDVN 12 - 50
Mass on incline 	m = 900 kg h = 0.25 m s = 0.1 m α = 15° Z = 30 **required:** v, W_K, A, W_G, W_H	$v = \sqrt{2 \cdot g \cdot h}$ $W_K = \frac{m \cdot v^2}{2}$ $A = m \cdot g \cdot s \cdot \sin \alpha$ $W_G = W_K + A$ $W_H = W_G \cdot Z$	$v = \sqrt{2 \cdot 9.81 \cdot 0.25}$ **= 2.21 m/s** $W_K = \frac{900 \cdot 2.21^2}{2}$ **= 2,198 Nm** A = 900 · 9.81 · 0,1 · 0.259 **= 228.5 Nm** W_G = 2,198 + 228.5 **= 2,426.5 Nm** W_H = 2,426.5 · 30 **= 72,795 Nm/h** **selected:** 1 x SDVN 32 - 100 or: 2 x SDVN 25 - 100
Free fall 	m = 550 kg v = 0,8 m s = 0,1 m z = 10 **required:** W_G, v, W_H,	$W_G = m \cdot g \cdot (h+s)$ $v = \sqrt{2 \cdot g \cdot h}$ $W_H = W_G \cdot Z$	W_G = 550 · 9.81 · (0.8 + 0.1) **= 4,856 Nm** $v = \sqrt{2 \cdot 9.81 \cdot 0.8}$ **= 3.96 m/s** W_H = 4.856 · 10 **= 48,560 Nm/h** **selected:** 1 x SDVN 40 - 100 or: 2 x SDVN 32 - 100 or: 3 x SDVN 25 - 100
End cushioning of cylinders 	m = 25 kg v = 1.8 m/s D = 6.3 cm d = 2 cm p = 6 bar s = 0.025 m Z = 720 **required:** W_K, F, A, W_G, W_H	$W_K = \frac{m \cdot v^2}{2}$ $F = \frac{(D^2 - d^2) \cdot \pi}{4} \cdot p \cdot 9.81$ $A = F \cdot s$ $W_G = W_K + A$ $W_H = W_G \cdot Z$	$W_K = \frac{25 \cdot 1.8^2}{2}$ **= 40.5 Nm** $F = \frac{(6.3^2 - 2^2) \cdot 3.14}{4} \cdot 6 \cdot 9.81$ **= 1,650 N** A = 1,650 · 0.025 **= 41.25 Nm** W_G = 40.5 + 41.25 **= 81.75 Nm** W_H = 81.75 · 720 **= 58,860 Nm/h** **selected:** 1 x SDVN 12 - 25

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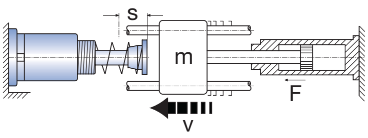
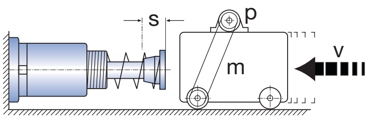
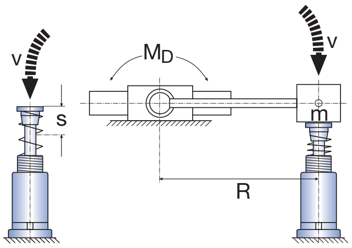
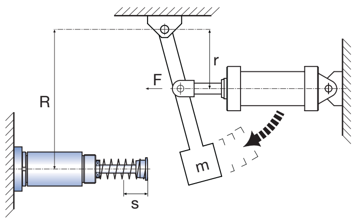
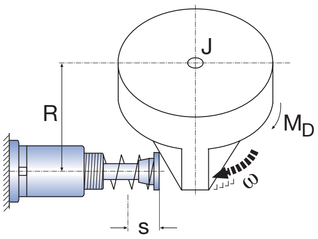
Formular and specimen calculations

Example	Load	Formulae equations	Calculation equations / options
Mass with additional drive force 	m = 280 kg v = 1.6 m/s F = 3,200 N s = 0.05 m Z = 550 **required:** W_G, W_H	$W_G = \frac{m \cdot v^2}{2} + F \cdot s$ $W_H = W_G \cdot Z$	$W_G = \frac{280 \cdot 1.6^2}{2} + 3{,}200 \cdot 0.05$ **= 518.4 Nm** $W_H = 518.4 \cdot 550$ **= 285,120 Nm/h** **selected:** 2 x SDVN 18 - 50 or: 1 x SDVN 25 - 50 *with external reservoir*
Mass with motor drive 	m = 2,400 kg v = 1.5 m/s P = 2.5 kW s = 0.1 m H_M = 2.5 Z = Emergency **required:** W_K, A, W_G	$W_K = \frac{m \cdot v^2}{2}$ $A = \frac{P \cdot s \cdot 1{,}000 \cdot H_M}{v^2}$ $W_G = W_K + A$	$W_K = \frac{2{,}400 \cdot 1.5^2}{2}$ **= 2,700 Nm** $A = \frac{2.5 \cdot 0.1 \cdot 1{,}000 \cdot 2.5}{1.5}$ **= 417 Nm** $W_G = 2{,}700 + 417$ **= 3,117 Nm/h** **selected:** 1 x SDVN 32 - 100 or: 2 x SDVN 25 - 100
Mass with index drive 	m = 800 kg v = 1.2 m/s M_D = 33,600 Nm R = 1.2 m s = 0.05 m Z = 240 **required:** W_K, A, W_G, W_H	$W_K = \frac{m \cdot v^2}{2}$ $A = \frac{M_D}{R} \cdot s$ $W_G = W_K + A$ $W_H = W_G \cdot Z$	$W_K = \frac{800 \cdot 1.2^2}{2}$ **= 576 Nm** $A = \frac{33{,}600}{1.2} \cdot 0.05$ **= 1,400 Nm** $W_G = 576 + 1{,}400$ **= 1,976 Nm** $W_H = 1{,}976 \cdot 240$ **= 474,240 Nm/h** **selected:** 1 x SDVN 50 - 50 or: 2 x SDVN 32 - 50 or: 2 x SDVN 25 - 50 *with external reservoir*
Swing mass with additional drive 	m = 230 kg v = 0.8 m/s R = 1.5 m r = 0.75 m F = 6,500 N s = 0.1 m Z = 120 **required:** W_K, A, W_G, W_H	$W_K = \frac{m \cdot v^2}{2}$ $A = \frac{F \cdot r}{R} \cdot s$ $W_G = W_K + A$ $W_H = W_G \cdot Z$	$W_K = \frac{230 \cdot 0.8^2}{2}$ **= 73.6 Nm** $A = \frac{6{,}500 \cdot 0.75}{1.5} \cdot 0{,}1$ **= 325 Nm** $W_G = 73.6 + 325$ **= 398.6 Nm** $W_H = 398.6 \cdot 120$ **= 47,832 Nm** **selected:** 1 x SDVN 18 - 100 or:
Rotating mass 	J = 500 kgm^2 ω = 2 s^{-1} M_D = 1,500 Nm R = 0.6 m s = 0.05 m Z = 480 **required:** W_K, A, W_G, W_H	$W_K = \frac{J \cdot \omega^2}{2}$ $A = \frac{M_D}{R} \cdot s$ $W_G = W_K + A$ $W_H = W_G \cdot Z$	$W_K = \frac{500 \cdot 2^2}{2}$ **= 1,000 Nm** $A = \frac{1{,}500}{0.6} \cdot 0.05$ **= 125 Nm** $W_G = 1{,}000 + 125$ **= 1,125 Nm** $W_H = 1{,}125 \cdot 480$ **= 540,000 Nm/h** **selected:** 1 x SDVN 32 - 50 *with closed circuit oil* or: 1 x SDVN 40 - 50 *with external reservoir* or: 1 x SDVN 50 - 50

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