

An International World Class Engineering and
Manufacturing Company

American
Metric®
Corporation



Ametric® Automation & Deceleration Technology

Air Springs
Gas Springs
Speed Controls
Rotary Dampers
Shock Absorbers
Deceleration Cylinders
and more...



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Legend

M - self compensating linear

S - self compensating linear

SB - self compensating linear for side forces

SK - self compensating linear, compact

E - adjustable, linear

EB - adjustable for side forces

P - self compensating progressive

PB - self compensating progressive for side forces

SELECTION

Five basic criteria are required for sizing the shock absorbers:

1.	Impacting mass m (kg)
2.	Impact speed v (m/s)
3.	Additional external forces acting on the mass e.g. propelling force F (N)
4.	Number of strokes of the shock absorber per hour X (1/h)
5.	Number of parallel shock absorbers In individual cases, other additional information may be required.

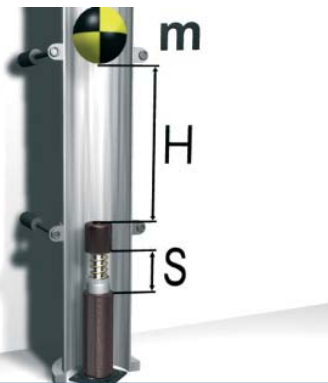
Legend

W_k	(Nm)	Kinetic energy
W_A	(Nm)	Propelling force energy
W_{kg}	(Nm)	Total energy / $W_k + W_A$
$W_{kg/h}$	(Nm/h)	Total energy per hour
m	(kg)	Mass
m_e	(kg)	Effective mass
v	(m/s)	Impact speed
v_e	(m/s)	Effective speed
X	(1/h)	Number of strokes per hour

S	(m)	Stroke
F	(N)	Propelling force
F_p	(N)	Pneumatic drive force
M	(Nm)	Torque
R/r	(m)	Radius
H	(m)	Height
g	(m/s ²)	Acceleration due to gravity (9,81 m/s ²)
J	(kgm ²)	Moment of inertia

ω	(1/s)	Angular velocity
P	(kW)	Drive power
HM	(1)	Arresting torque factor for motors - (normal=2,5)
μ	(1)	Coefficient of friction (steel: $\mu=0,2$)
α	(°)	Angle
a	(m/s ²)	Acceleration/Deceleration
t	(s)	Deceleration time
F_G	(N)	Counter force

FALLING MASS

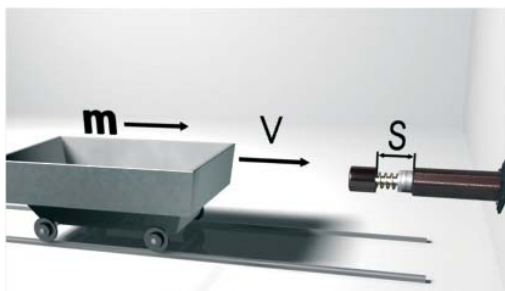


$$\begin{aligned}
 m &= 20 \text{ kg} \\
 H &= 0,2 \text{ m} \\
 S &= 0,019 \text{ m} \\
 X &= 400 / \text{h}
 \end{aligned}$$

$$\begin{aligned}
 W_k &= m \cdot g \cdot H &= 39 \text{ Nm} \\
 W_A &= m \cdot g \cdot S &= 4 \text{ Nm} \\
 W_{kg} &= W_k + W_A &= 43 \text{ Nm} \\
 W_{kg/h} &= W_{kg} \cdot X &= 17.187 \text{ Nm/h} \\
 m_e &= \frac{2 \cdot W_{kg}}{v_e^2} &= 21,9 \text{ kg} \\
 v &= v_e = \sqrt{2 \cdot g \cdot H}
 \end{aligned}$$

$$\begin{aligned}
 WS &= M 0,5 \times 19 - 1 \\
 WE &= M 0,5 \times 19
 \end{aligned}$$

MASS WITHOUT PROPELLING FORCE



$$\begin{aligned}
 m &= 1.200 \text{ kg} \\
 v &= 1,3 \text{ m / s} \\
 X &= 210 / \text{h}
 \end{aligned}$$

$$\begin{aligned}
 W_{kg} &= \frac{m \cdot v^2}{2} &= 1.014 \text{ Nm} \\
 W_{kg/h} &= W_{kg} \cdot X &= 212.914 \text{ Nm} \\
 v &= v_e \\
 m_e &= \frac{2 \cdot W_{kg}}{v_e^2} &= 1.200 \text{ kg}
 \end{aligned}$$

$$\begin{aligned}
 WE &= M 1,5 \times 2 - 1 \\
 WS &= M 1,5 \times 2 - 2
 \end{aligned}$$

SELECTION

MASS WITH PROPELLING FORCE, HORIZONTAL C1

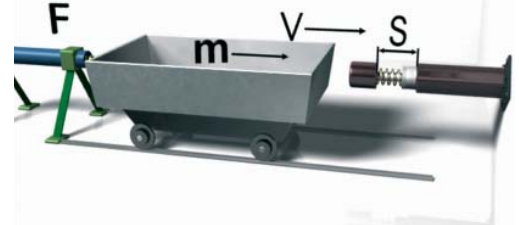
Mass vertical propelling force: downward (C2) / upward (C3)

$$\begin{aligned}
 m &= 200 \text{ kg} \\
 v &= 1,3 \text{ m/s} \\
 F_P &= 2.400 \text{ N} \\
 S &= 0,04 \text{ m} \\
 X &= 210 / \text{h} \\
 W_k &= \frac{m \cdot v^2}{2} = 169 \text{ Nm} \\
 W_A &= F \cdot S = 96 \text{ Nm} \\
 W_{kg} &= W_k + W_A = 265 \text{ Nm} \\
 W_{kg/h} &= W_{kg} \cdot X = 55.650 \text{ Nm/h} \\
 m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 313 \text{ kg}
 \end{aligned}$$

WE - M 1,0 x 40
WP - M 1,0 x 40

$$W_{\downarrow} = (F + m \cdot g) \cdot S \quad \text{C2}$$

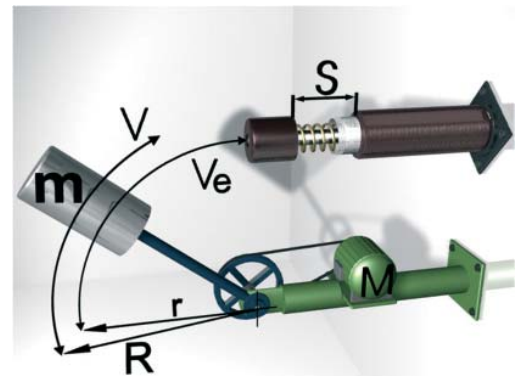
$$W_{\uparrow} = (F - m \cdot g) \cdot S \quad \text{C3}$$



SWINGING MASS WITH PROPELLING FORCE C1

$$\begin{aligned}
 m &= 190 \text{ kg} \\
 v &= 1 \text{ m/s} \\
 r &= 0,3 \text{ m} \\
 M &= 300 \text{ Nm} \\
 R &= 0,9 \text{ m} \\
 S &= 0,025 \text{ m} \\
 X &= 590 / \text{h} \\
 W_k &= \frac{m \cdot v^2}{2} = \frac{J \cdot \omega^2}{2} = 95 \text{ Nm} \\
 W_A &= \frac{M \cdot S}{r} = 25 \text{ Nm} \\
 W_{kg} &= W_k + W_A = 120 \text{ Nm} \\
 W_{kg/h} &= W_{kg} \cdot X = 70.800 \text{ Nm/h} \\
 v_e &= r \cdot \omega = \frac{v \cdot r}{R} = 0,33 \text{ m/s} \\
 m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 2.203 \text{ kg}
 \end{aligned}$$

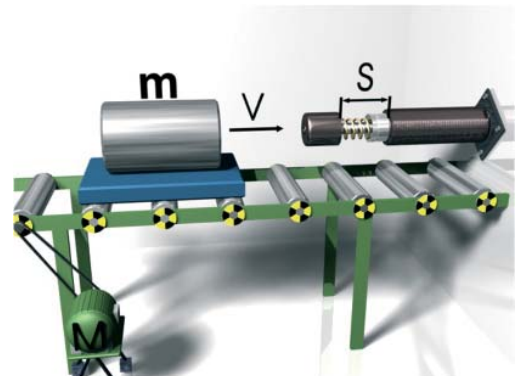
WS - M 1,0 - 4
WE - M 1,0



MASS ON DRIVEN ROLLERS C1

$$\begin{aligned}
 m &= 30 \text{ kg} \\
 v &= 2 \text{ m/s} \\
 S &= 0,019 \text{ m} \\
 \mu &= 0,2 \text{ (St\aa l)} \\
 X &= 300 / \text{h} \\
 W_k &= \frac{m \cdot v^2}{2} = 60 \text{ Nm} \\
 W_A &= m \cdot g \cdot S \cdot \mu = 1,2 \text{ Nm} \\
 W_{kg} &= W_k + W_A = 61,2 \text{ Nm} \\
 W_{kg/h} &= W_{kg} \cdot X = 18.335 \text{ Nm/h} \\
 v &= v_e \\
 m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 30,6 \text{ kg}
 \end{aligned}$$

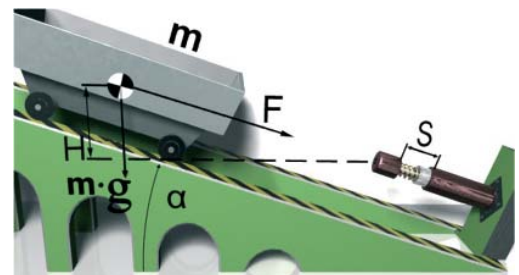
WE - M 0,5 x 19
WP - M 0,5 x 19 - 1



MASS ON INCLINE C1

$$\begin{aligned}
 m &= 200 \text{ kg} \\
 H &= 0,3 \text{ m} \\
 \alpha &= 25^\circ \\
 S &= 0,025 \text{ m} \\
 X &= 200 / \text{h} \\
 W_k &= m \cdot g \cdot H = 589 \text{ Nm} \\
 W_A &= m \cdot g \cdot \sin \alpha \cdot S = 21 \text{ Nm} \\
 W_{kg} &= W_k + W_A = 610 \text{ Nm} \\
 W_{kg/h} &= W_{kg} \cdot X = 121.866 \text{ Nm/h} \\
 v &= v_e = \sqrt{2 \cdot g \cdot H} \\
 m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 208 \text{ kg}
 \end{aligned}$$

WE - M 1,5 x 1 - 0
WP - M 1,5 x 1 - 1



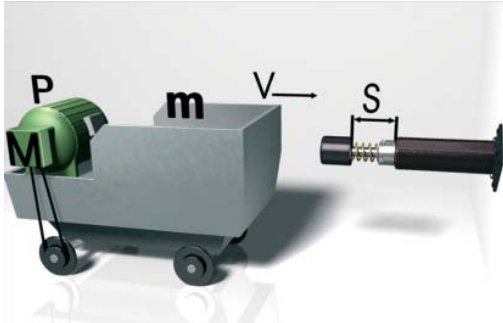
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Group 051

SELECTION

G MASS WITH MOTOR DRIVE

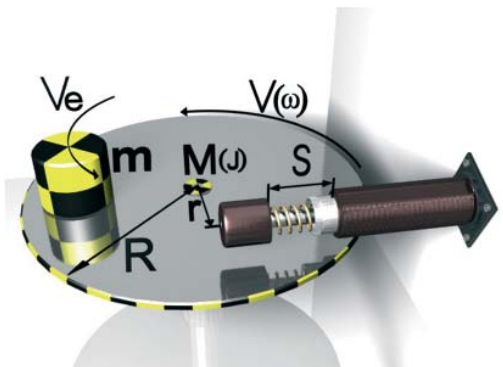


$$\begin{aligned} m &= 1.200 \text{ kg} \\ v &= 1,5 \text{ m / s} \\ HM &= 2,5 \\ P &= 3 \text{ kW} \\ S &= 0,075 \text{ m} \\ X &= 50 / \text{h} \end{aligned}$$

$$\begin{aligned} W_k &= \frac{m \cdot v^2}{2} = 1.350 \text{ Nm} \\ W_A &= \frac{P \cdot HM \cdot 1000 \cdot S}{v} = 375 \text{ Nm} \\ W_{kg} &= W_k + W_A = 1.725 \text{ Nm} \\ W_{kg/h} &= W_{kg} \cdot X = 86.250 \text{ Nm/h} \\ v &= v_e \\ m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 1.534 \text{ kg} \end{aligned}$$

$$\begin{aligned} WE - M &1,5 \times 3 - 1 \\ WS - M &1,5 \times 3 - 2 \end{aligned}$$

ROTARY TABLE WITH PROPELLING FORCE

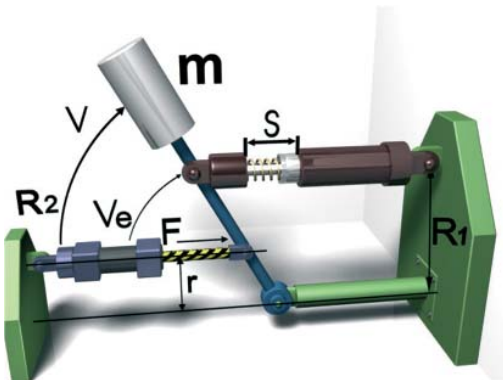


$$\begin{aligned} J &= 320 \text{ kgm}^2 \\ \omega &= 2 \text{ s}^{-1} \\ M &= 1.000 \text{ Nm} \\ r &= 0,5 \text{ m} \\ S &= 0,025 \text{ m} \\ X &= 20 / \text{h} \end{aligned}$$

$$\begin{aligned} W_k &= \frac{m \cdot v^2}{2} = \frac{J \cdot \omega^2}{2} = 640 \text{ Nm} \\ W_A &= \frac{M \cdot S}{r} = 50 \text{ Nm} \\ W_{kg} &= W_k + W_A = 650 \text{ Nm} \\ W_{kg/h} &= W_{kg} \cdot X = 13.800 \text{ Nm/h} \\ v_e &= r \cdot \omega = \frac{v \cdot r}{R} = 1,0 \text{ m/s} \\ m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 1.380 \text{ kg} \end{aligned}$$

$$\begin{aligned} WE - M &1,5 \times 1 - 1 \\ WS - M &1,5 \times 1 - 2 \end{aligned}$$

I MASS WITH PROPELLING FORCE



$$\begin{aligned} m &= 100 \text{ kg} \\ v &= 1,5 \text{ m / s} \\ F &= 1.200 \text{ N} \\ S &= 0,025 \text{ m} \\ r &= 0,5 \text{ m} \\ R1 &= 0,6 \text{ m} \\ R2 &= 0,9 \text{ m} \\ X &= 120 / \text{h} \end{aligned}$$

$$\begin{aligned} W_k &= \frac{m \cdot v^2}{2} = 112,5 \text{ Nm} \\ W_A &= \frac{M \cdot S}{R1} = \frac{F \cdot r \cdot S}{R1} = 25 \text{ Nm} \\ W_{kg} &= W_k + W_A = 137,5 \text{ Nm} \\ W_{kg/h} &= W_{kg} \cdot X = 16.500 \text{ Nm/h} \\ v_e &= R1 \cdot \omega = \frac{v \cdot R1}{R2} = 1,0 \text{ m/s} \\ m_e &= \frac{2 \cdot W_{kg}}{v_e^2} = 275 \text{ kg} \end{aligned}$$

$$\begin{aligned} WE - M &1,0 \\ WS - M &1,0 - 2 \end{aligned}$$

! For a utilization per stroke >80 % an approval of Ametric is necessary!

Formulas

EFFECTIVE MASS

$$m_e = \frac{2 \cdot W_{kg}}{v_e^2}$$

COUNTERFORCE

$$F_G = \frac{W_{kg} \cdot 1,5^*}{S}$$

DECELERATION TIME

$$t = \frac{2 \cdot S}{v_e} \cdot 1,2^*$$

DECELERATION RATE

$$a = \frac{v_e^2}{2 \cdot S} \cdot 1,2^*$$

STROKE

$$S = \frac{v_e^2}{2 \cdot a} \cdot 1,2^*$$

*Calculation for optimum setting. Allow a safety margin!

THREADS

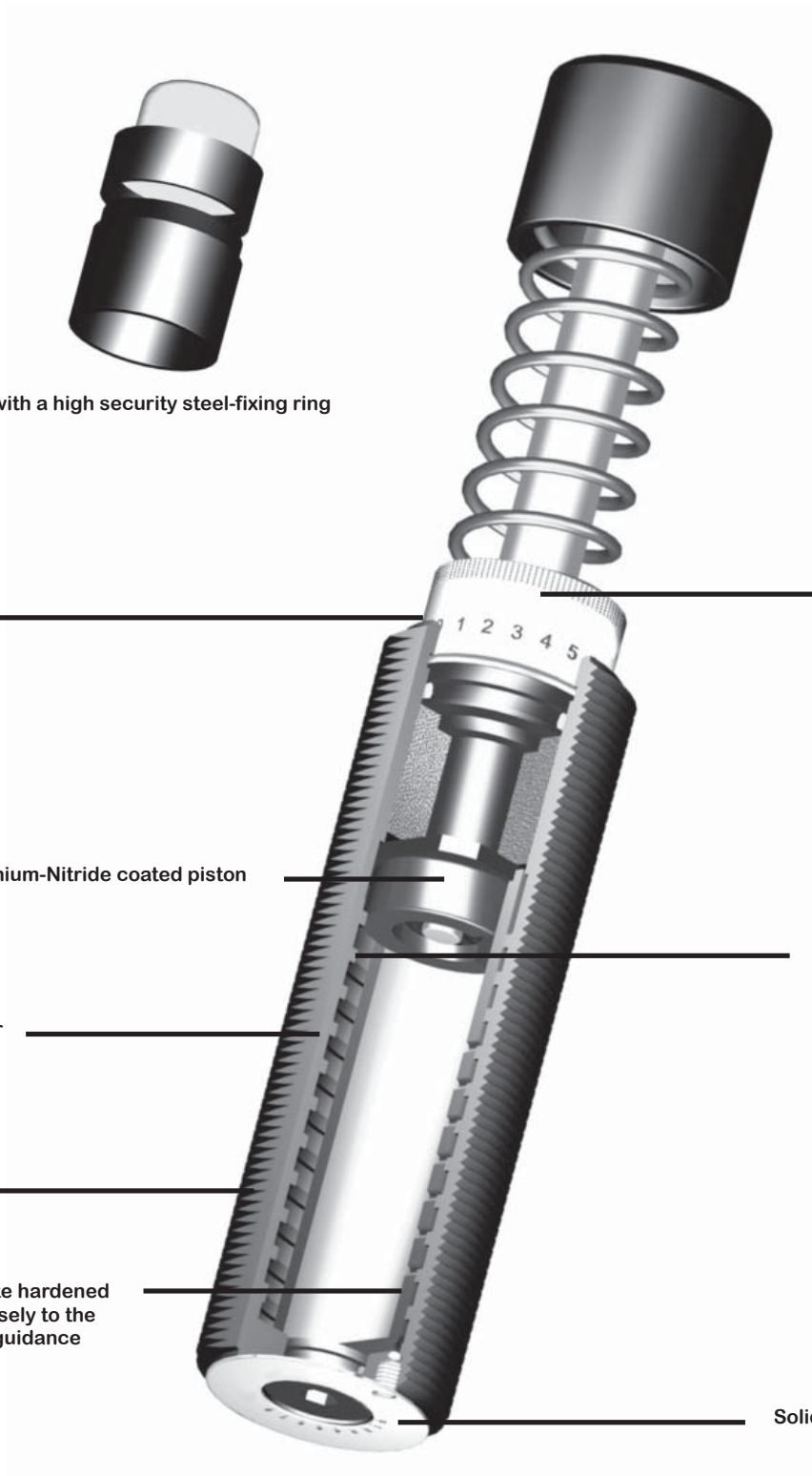
		mm	Nm / HB	mm	
M 4x0,35	WS-M 4x4-1 / 2	4	0,4	29,0	10 - 11
M 5x0,5	WS-M 5x4-1 / 2	4	0,6	29,0	10 - 11
M 6x0,5	WS-M 6x5-1 / 2 / 3	5	1,0	32,0	10 - 11
M 8x1 3/8-32 UNEF (U)	WS-M 8x5-1 / 2 / 3	5	1,5	35,0	10 - 11
	WE-M 0,1	7	4,0	56,0	12 - 13
	WS-M 0,1-1 / 2 / 3	7	4,0	51,0	12 - 13
	WP-M 0,1-1 / 2 / 3	7	4,0	51,0	12 - 13
M 10x1 3/8-32 UNEF (U) 7/16-28 UNEF (UF)	WS-M 10x6-1 / 2 / 3	6	2,2	37,0	10 - 11
	WS-M 10x8-1 / 2 / 3	8	3,0	48,0	10 - 11
	WE-M 0,15	10	15,0	59,5	12 - 13
	WS-M 0,15-1 / 2 / 3 / 4	10	15,0	59,5	12 - 13
	WP-M 0,15-1 / 2 / 3	10	15,0	59,5	12 - 13
	WEB-M 0,15	8	12,0	64,0	29
	WSB-M 0,15-1 / 2 / 3 / 4	8	12,0	64,0	29
	WPB-M 0,15-1 / 2 / 3	8	12,0	64,0	29
M 12x1 7/16-28 UNEF (UF) 1/2-20 UNF (UH)	WS-M 12x10-1 / 2 / 3	10	9,0	61,0	10 - 11
	WE-M 0,2	12	22,0	77,0	12 - 13
	WS-M 0,2-1 / 2 / 3 / 4	12	22,0	77,0	12 - 13
	WP-M 0,2-1 / 2 / 3	12	22,0	77,0	12 - 13
	WEB-M 0,2	10	18,0	84,0	29
	WSB-M 0,2-1 / 2 / 3 / 4	10	18,0	84,0	29
	WPB-M 0,2-1 / 2 / 3	10	18,0	84,0	29
	WE-M 0,25	14	30,0	96,0	14 - 15
M 14x1 M 14x1,5 (L) 1/2-20 UNF (UF) 9/16-18 UNEF (UC)	WS-M 0,25-0 / 1 / 2 / 3 / 4	14	30,0	92,0	14 - 15
	WP-M 0,25-1 / 2 / 3	14	30,0	92,0	14 - 15
	WEB-M 0,25	14	24,0	103,5	29
	WSB-M 0,25-0 / 1 / 2 / 3 / 4	14	24,0	100,0	29
WPB-M 0,25-1 / 2 / 3	14	24,0	100,0	29	
M 16x1 M 16x1,5 (L)	WE-M 0,35	14	35,0	96,0	14 - 15
	WS-M 0,35-0 / 1 / 2 / 3 / 4	14	35,0	92,0	14 - 15
	WP-M 0,35-1 / 2 / 3	14	35,0	92,0	14 - 15

		mm	Nm / HB	mm	
M 32x1,5	WE-M 1,25x1-0 / 1 / 2	25	300	138	18 - 19
M 33x1,5 (H)					
M 36x1,5 (L)	WS-M 1,25x1-0 / 1 / 2 / 3 / 4	25	300	138	18 - 19
1 1/4-12 UNF (U)	WP-M 1,25x1-1 / 2 / 3	25	300	138	18 - 19
1 3/8-12 UNF (UF)	WE-M 1,25x2-0 / 1 / 2	50	500	188	18 - 19
	WS-M 1,25x2-0 / 1 / 2 / 3 / 4	50	500	188	18 - 19
	WP-M 1,25x2-1 / 2 / 3	50	500	188	18 - 19
M 32x1,5	WSK-M 1,25-1 / 2 / 3	12	90	67	30
M 45x2	WE-M 1,5x1-0 / 1 / 2	25	870	146	20 - 21
M 42x1,5 (K)					
M 45x1,5 (L)	WS-M 1,5x1-0 / 1 / 2 / 3 / 4	25	870	146	20 - 21
1 3/4-12 UNF (U)	WP-M 1,5x1-1 / 2 / 3	25	870	146	20 - 21
	WE-M 1,5x2-0 / 1 / 2	50	1350	196	20 - 21
	WS-M 1,5x2-0 / 1 / 2 / 3 / 4	50	1350	196	20 - 21
	WP-M 1,5x2-1 / 2 / 3	50	1350	196	20 - 21
	WE-M 1,5x3-0 / 1 / 2	75	2100	246	20 - 21
	WS-M 1,5x3-0 / 1 / 2 / 3 / 4	75	2100	246	20 - 21
	WP-M 1,5x3-1 / 2 / 3	75	2100	246	20 - 21
M 62x2	WE-M 2,0x1-0 / 1 / 2	25	1500	186	22 - 23
M 64x2 (L)					
2 1/2-12 UNF (U)	WS-M 2,0x1-0 / 1 / 2 / 3 / 4	25	1500	186	22 - 23
	WP-M 2,0x1-1 / 2 / 3	25	1500	186	22 - 23
	WE-M 2,0x2-0 / 1 / 2	50	2500	236	22 - 23
	WS-M 2,0x2-0 / 1 / 2 / 3 / 4	50	2500	236	22 - 23
	WP-M 2,0x2-1 / 2 / 3	50	2500	236	22 - 23
	WE-M 2,0x4-0 / 1 / 2	100	5000	336	22 - 23
	WS-M 2,0x4-0 / 1 / 2 / 3 / 4	100	5000	336	22 - 23
	WP-M 2,0x4-1 / 2 / 3	100	5000	336	22 - 23
	WE-M 2,0x6-0 / 1 / 2	150	8000	453	22 - 23
	WS-M 2,0x6-0 / 1 / 2 / 3 / 4	150	8000	453	22 - 23
	WP-M 2,0x6-1 / 2 / 3	150	8000	453	22 - 23

We reserve the right to make changes without further notice!

FUNDAMENTALS

Patented System



Noise reducing stop cap with a high security steel-fixing ring

Integrated end stop

Hardened, Aluminum-Titanium-Nitride coated piston

Machined flats for spanner

Fully threaded housing

Adjustable one-piece nitrite hardened pressure tube, that fits closely to the housing thus giving good guidance

ProAdjust
Protected Adjustment

Helix-Principle
+ 300% Energy / - 50% Costs

ProTec
Solid base without retaining ring

FUNDAMENTALS

Working Principle

Shock absorbers are closed hydraulic components which operate on the basis of displacement. When the piston rod is pushed into the cylinder, the piston displaces the oil through the orifices which are progressively closed off. As a result the speed of the piston rod proportionally decreases to the stroke covered. The displaced oil is compensated by an accumulator.

Mega-Line

By virtue of a helix inside (starting from size 1,25), the throttle orifices of the hardened pressure tube can be opened or closed by turning. Based on this construction principle the adjustment-tube is no longer necessary. The new available space is now used by a very much larger diameter piston thus dramatically increasing the energy capacity

of the shock absorber. Depending on the model up to 300% more energy absorption can be achieved (Helix-Principle).

The deceleration characteristic of the shock absorber is determined by different sizes of the throttle orifices. The external dimensions remain identical. Adjustable and self-compensating shock absorbers can be delivered with linear or progressive deceleration characteristics. Based on this construction principle the pressure tube is positioned close to the housing thus giving all models a long guidance system, which intern offers the greatest protection against side-forces. Adjustable models of the WE-M range are supplied with front and rear adjustment.

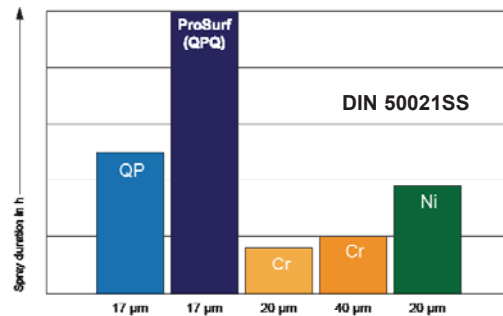
Shock absorbers within the Mega-Line are provided with an integrated end stop. The adjustment collar is protected under the stop cap so no damaging load can impact on the collar, all load is absorbed by the integrated end stop on the housing (ProAdjust). All Mega-Line shock absorbers are supplied with a solid body and a closed base without retaining ring (ProTec).

ProSurf - Surface Protection

- ▶ New surface protection against corrosion
- ▶ QPQ Coating
- ▶ Longer lifetime
- ▶ Available for (Mega-Line) series M4 up to 1,0
- ▶ On request for (Mega-Line) series 1,25 up to 4,0



Salt spray test

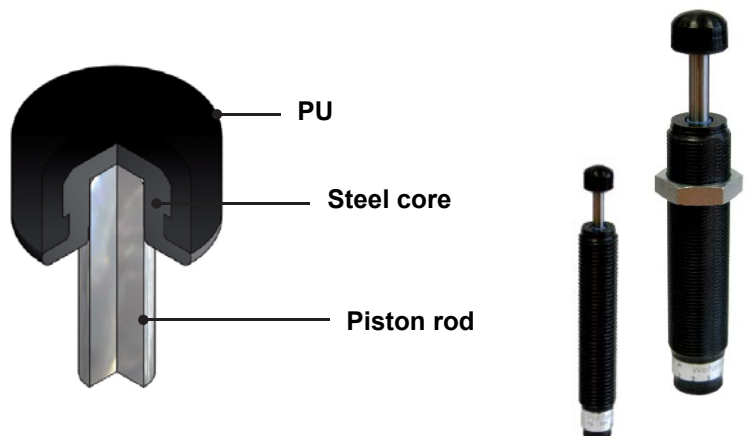


Soft Touch - Stop Cap (AP)

- ▶ 40% noise reduction and
- ▶ 60% extended lifetime compared to standard cap
- ▶ Softer deceleration of the mass
- ▶ Increased protection of the impact surface

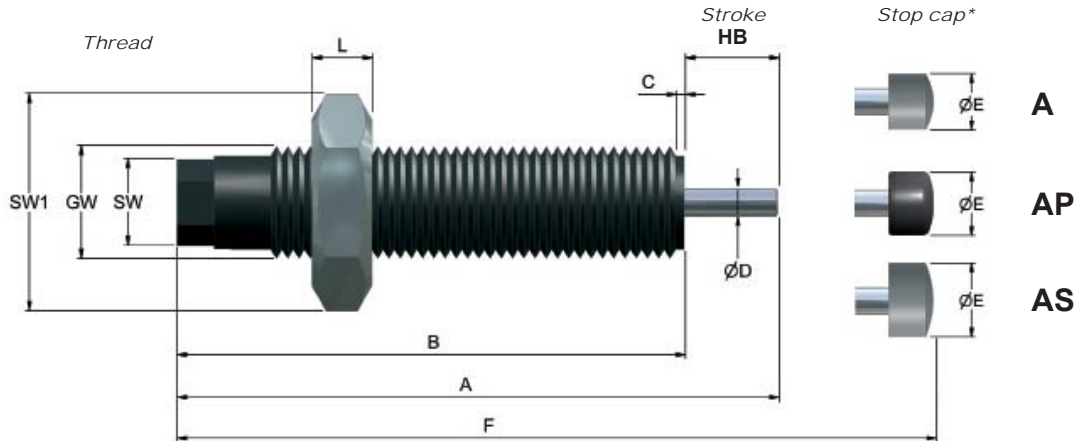
Ordering Information

Add "AP" after the part no.



SHOCK ABSORBER

Mega-Line M4 - M12



*A: Plastic / AP: Soft Touch (Page 5) / AS: Steel

Dimensions

	GW Standard	A mm	B mm	C mm	Ø D mm	ØE (A) mm	ØE (AP) mm	ØE (AS) mm	F (A) mm	F (AP) mm	F (AS) mm	L mm	SW mm	SW1 mm
WS-M 4 x 4	M 4 x 0,35	29,0	25,0	2,0	1,5	3,0	-	-	33,0	-	-	3,0	3,0	7,0
WS-M 5 x 4	M 5 x 0,5	29,0	25,0	2,0	1,5	3,0	-	-	33,0	-	-	3,0	4,0	8,0
WS-M 6 x 5	M 6 x 0,5	32,0	27,0	2,0	2,0	5,0	-	-	37,0	-	-	3,0	4,0	8,0
WS-M 8 x 5	M 8 x 1	35,0	30,0	2,5	2,3	6,0	6,5	-	41,0	41,5	-	3,0	5,5	11,0
WS-M 10 x 6	M 10 x 1	37,0	31,0	2,5	3,0	6,0	8,5	8,5	43,5	43,5	43,5	3,0	7,0	13,0
WS-M 10 x 8	M 10 x 1	48,0	40,0	2,5	3,0	6,0	8,5	8,5	54,5	54,5	54,5	3,0	7,0	13,0
WS-M 12 x 10	M 12 x 1	61,0	51,0	2,5	4,0	10,0	10,0	10,0	69,0	69,5	69,0	4,0	9,0	14,0

Performance

	Stroke mm	Energy absorption			Effective mass			Impact Speed m/s	Return spring force N
		Constant load*	Emergency*		-1 (soft)	-2 (medium)	-3 (hard)		
		Nm/HB (max.)	Nm/HB (max.)	Nm/h (max.)	min. - max.kg	min. - max.kg	min. - max.kg		
WS-M 4 x 4	4	0,4	0,7	1500	0,1 - 1	0,9 - 3,2	-	0,2 - 1,5	2 - 7
WS-M 5 x 4	4	0,6	1,0	1800	0,1 - 1,2	1,0 - 5,0	-	0,2 - 2,0	2 - 7
WS-M 6 x 5	5	1,0	1,5	3000	0,05 - 1	0,8 - 2,8	1,5 - 4	0,2 - 2,5	2 - 5
WS-M 8 x 5	5	1,5	2,0	4000	0,25 - 3	0,7 - 6	3 - 9	0,2 - 2,5	2 - 5
WS-M 10 x 6	6	2,2	3,0	12000	0,7 - 3	3 - 10	8 - 18	0,2 - 2,5	3 - 6
WS-M 10 x 8	8	3,0	4,0	24000	0,9 - 9	2 - 12	9 - 23	0,2 - 3	3 - 6
WS-M 12 x 10	10	9,0	12,0	27450	1 - 15	10 - 42	25 - 61	0,2 - 3	4 - 10

Specifications

WS-M..... self-compensating, linear

Temperature-20°C - +80°C

Weight M4x4 / M5x4 / M6x5 : 3 g / M8x5 : 7 g
M10x6 : 11 g / M10x8 : 14 g / M12x10 : 30 g

Material..... Housing: ProSurf
Piston rod: hardened stainless steel

Torque: Max force by using the flats..... M4x4: 0,8 Nm / M5x4: 1,0 Nm
M6x5: 1,2 Nm / M8x5: 2 Nm
M10xX: 4 Nm / M12x10: 8 Nm

Included..... 1 lock nut
Instructions for use and assembly

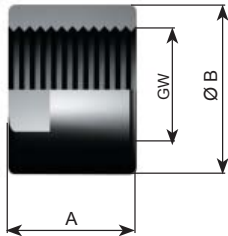
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Group 051

ACCESSORIES

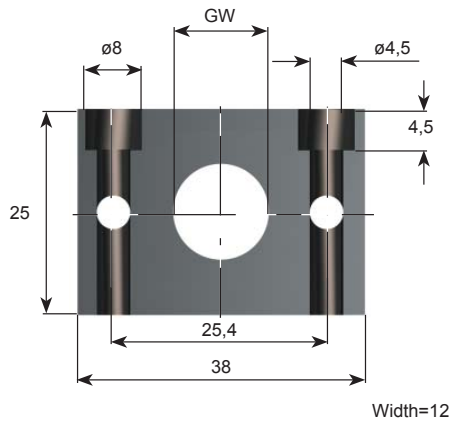
Mega-Line M8x5 - 12x10

Stop Limit Nut



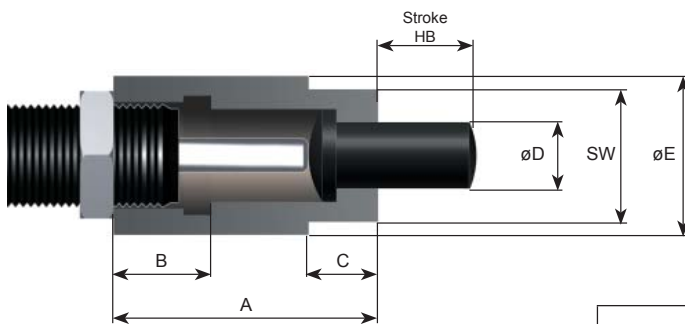
GW	A mm	Ø B mm
M 8 x 1	12	11
M 10 x 1	15	14
M 12 x 1	20	16

Rectangular Flange



GW
M 10 x 1
M 12 x 1

AK1 for Side Forces



	GW	A mm	B mm	C mm	Ø D mm	Ø E mm	SW mm
M 10 x 6	M 10 x 1	17,5	7	5	7	14	13
M 10 x 8	M 10 x 1	20,5	7	5	7	14	13
M 12 x 10	M 12 x 1	23,0	7	5	9	15	14
0,15	M 10 x 1	23,5	7	5	6	14	13
0,2	M 12 x 1	25,0	7	5	9	15	14

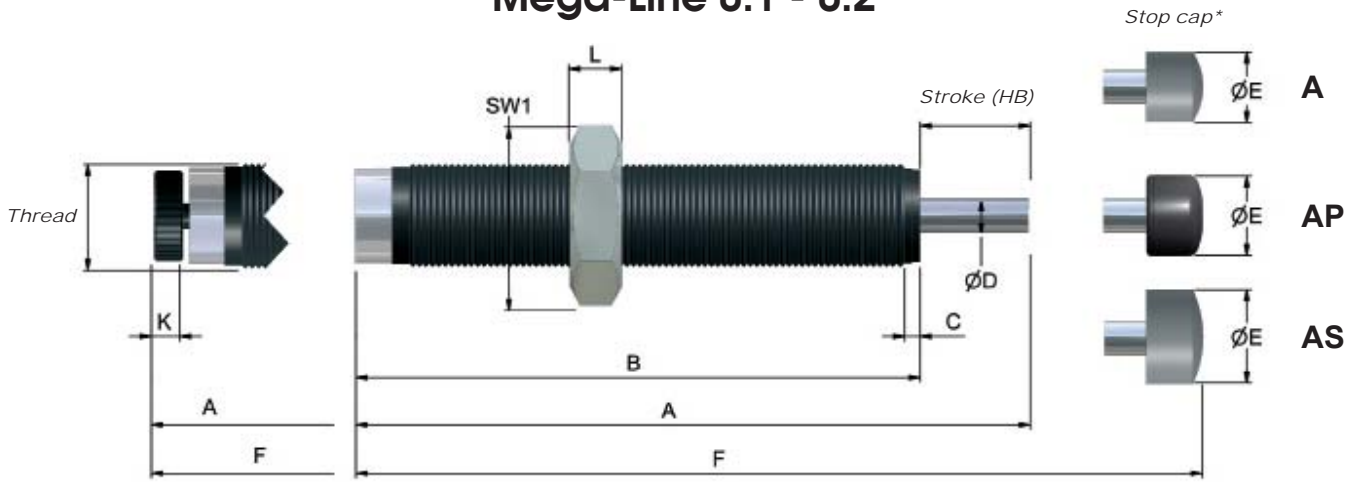


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SHOCK ABSORBER

Mega-Line 0.1 - 0.2



*A: Plastic / AP: Soft Touch (Page 5) / AS: Steel

Dimensions

	Thread Standard	A mm	B mm	C mm	Ø D mm	ØE (A) mm	ØE (AP) mm	ØE (AS) mm	F (A) mm	F (AP) mm	F (AS) mm	L mm	SW mm	K mm
WE-M 0,1	M 8 x 1	56,0	45,0	2,5	2,5	6	6,5	-	61,5	62,0	-	3	11	3,5
WS-M 0,1	M 8 x 1	51,0	44,0	2,5	2,5	6	6,5	-	57,0	58,0	-	3	11	-
WP-M 0,1	M 8 x 1	51,0	44,0	2,5	2,5	6	6,5	-	57,0	58,0	-	3	11	-
WE-M 0,15	M 10 x 1	62,0	48,5	2,5	3,0	6	8,5	8,5	68,5	68,5	68,5	3	13	3,5
WS-M 0,15	M 10 x 1	59,5	49,5	2,5	3,0	6	8,5	8,5	66,0	66,0	66,0	3	13	-
WP-M 0,15	M 10 x 1	59,5	49,5	2,5	3,0	6	8,5	8,5	66,0	66,0	66,0	3	13	-
WE-M 0,2	M 12 x 1	81,5	66,0	2,5	4,0	10	10,0	10	89,5	90,0	89,5	4	14	3,5
WS-M 0,2	M 12 x 1	77,0	65,0	2,5	4,0	10	10,0	10	85,0	85,0	85,0	4	14	-
WP-M 0,2	M 12 x 1	77,0	65,0	2,5	4,0	10	10,0	10	85,0	85,0	85,0	4	14	-

Performances

	Stroke mm	Energy absorption		Effective mass				Impact Speed m/s	Return spring force N
		Constant load Nm/HB (max.)	Nm/h (max.)	-1 (soft)	-2 (medium)	-3 (hard)	-4 (very hard)		
				min. - max.kg	min. - max.kg	min. - max.kg	min. - max.kg		
WE-M 0,1	7	4	14.400	0,65 - 50	-	-	-	0,2 - 3,5	2,5 - 6
WS-M 0,1	7	4	14.400	0,65 - 2,0	1,3 - 5,5	1,7 - 50	-	0,2 - 5,0	2,5 - 6
WP-M 0,1	7	4	14.400	0,3 - 0,9	0,65 - 2,0	1,8 - 8	-	0,2 - 5,0	2,5 - 6
WE-M 0,15	10	15	24.000	1,0 - 500	-	-	-	0,2 - 3,5	3,6 - 8
WS-M 0,15	10	15	24.000	1,6 - 7,5	6,1 - 71	61 - 252	232 - 750	0,2 - 5,0	3,6 - 8
WP-M 0,15	10	15	24.000	1,0 - 2,2	2,0 - 7,5	6,1 - 71	-	0,2 - 5,0	3,6 - 8
WE-M 0,2	12	22	35.200	9 - 800	-	-	-	0,2 - 3,5	3,5 - 7
WS-M 0,2	12	22	35.200	2,0 - 11	10 - 107	104 - 360	343 - 1.100	0,2 - 5,0	3,5 - 7
WP-M 0,2	12	22	35.200	1,5 - 2,8	2 - 21	17 - 92	-	0,2 - 5,0	3,5 - 7

Specifications

WS-M.....Self-compensating, linear Torque: max force by using the flats..... 0,1: 2,0 Nm / 0,15 : 6 Nm
 0,2 : 10 Nm
 WP-M.....Self-compensating, progressive Temperature-20°C - +80°C
 WE-M.....Adjustable, linear Material..... Housing: ProSurf
 Weight 0,1 : 10 g / 0,15 : 20 g / 0,2 : 36 g Piston rod: hardened stainless steel

Included 1 lock nut
 Instructions for use and assembly

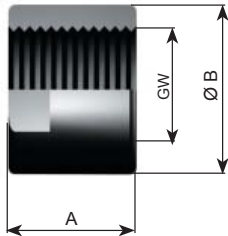
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ACCESSORIES

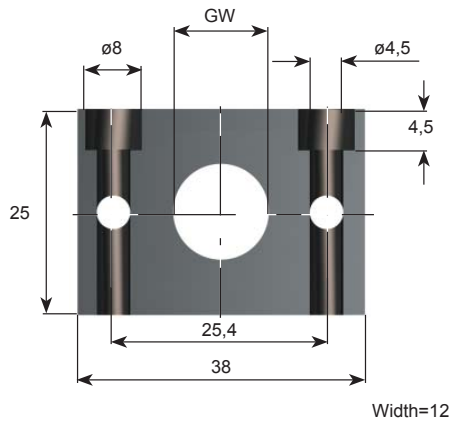
Mega-Line M8x5 - 12x10 / 0.1-0.2

Stop Limit Nut



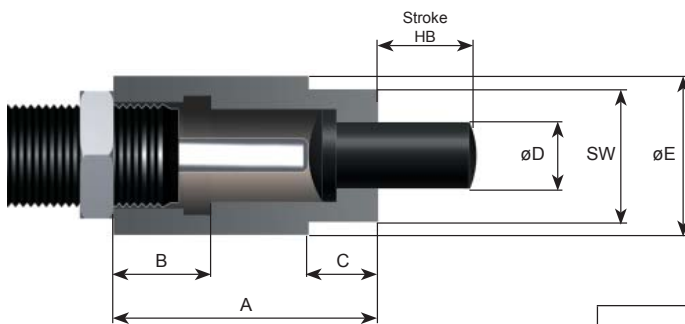
GW	A mm	Ø B mm
M 8 x 1	12	11
M 10 x 1	15	14
M 12 x 1	20	16

Rectangular Flange



GW
M 10 x 1
M 12 x 1

AK1 for Side Forces



	GW	A mm	B mm	C mm	Ø D mm	Ø E mm	SW mm
M 10 x 6	M 10 x 1	17,5	7	5	7	14	13
M 10 x 8	M 10 x 1	20,5	7	5	7	14	13
M 12 x 10	M 12 x 1	23,0	7	5	9	15	14
0,15	M 10 x 1	23,5	7	5	6	14	13
0,2	M 12 x 1	25,0	7	5	9	15	14

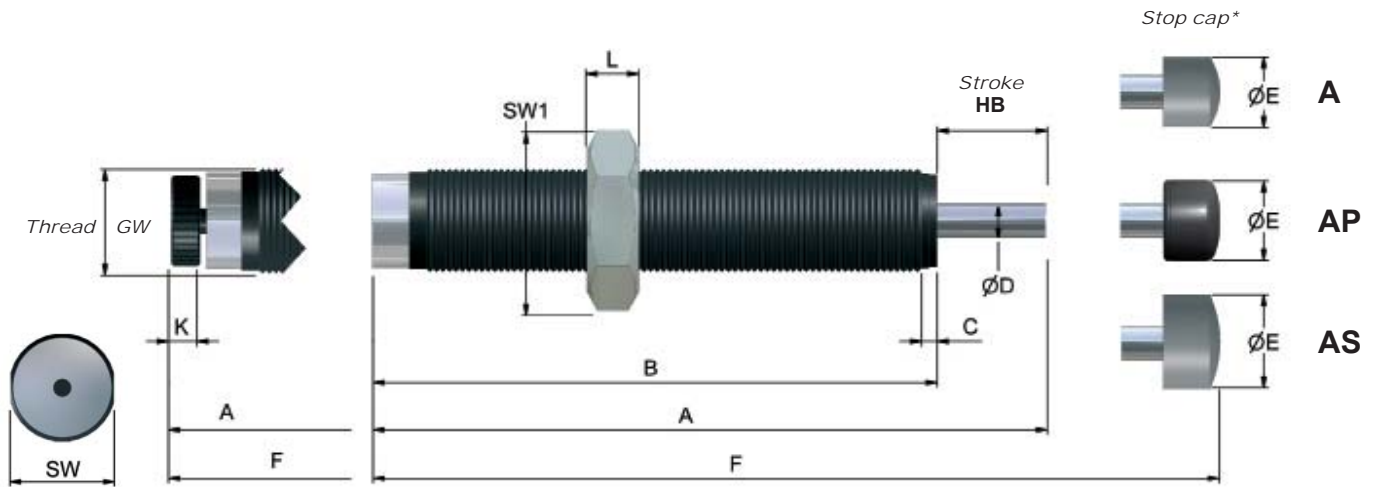


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SHOCK ABSORBER

Mega-Line 0.25-0.5



*A: Plastic / AP: Soft Touch (Page 5) / AS: Steel

Dimensions

	GW*	A mm	B mm	C mm	ØD mm	ØE (A) mm	ØE (AP) mm	ØE (AS) mm	F (A) mm	F (AP) mm	F (AS) mm	K mm	L mm	SW mm	SW1 mm
WE-M 0,25	M 14 x 1	97	78	2,5	4	10	10	10	105	105	105	4,5	5	13	17
WS-M 0,25	M 14 x 1	92	78	2,5	4	10	10	10	100	101	100	-	5	13	17
WP-M 0,25	M 14 x 1	92	78	2,5	4	10	10	10	100	101	100	-	5	13	17
WE-M 0,35	M 16 x 1	97	78	2,5	4	10	10	10	105	105	105	4,5	6	14	19
WS-M 0,35	M 16 x 1	92	78	2,5	4	10	10	10	100	101	100	-	6	14	19
WP-M 0,35	M 16 x 1	92	78	2,5	4	10	10	10	100	101	100	-	6	14	19
WE-M 0,5 x 13	M 20 x 1	94	75	2,5	6	12	17	16	104	105	104	6	6	18	24
WS-M 0,5 x 13	M 20 x 1	88	75	2,5	6	12	17	16	98	99	98	-	6	18	24
WP-M 0,5 x 13	M 20 x 1	88	75	2,5	6	12	17	16	98	99	98	-	6	18	24
WE-M 0,5 x 19	M 20 x 1	113	88	2,5	6	12	17	16	123	125	123	6	6	18	24
WS-M 0,5 x 19	M 20 x 1	107	88	2,5	6	12	17	16	117	119	117	-	6	18	24
WP-M 0,5 x 19	M 20 x 1	107	88	2,5	6	12	17	16	117	119	117	-	6	18	24
WE-M 0,5 x 40	M 20 x 1	171	125	2,5	6	12	17	16	181	183	181	6	6	18	24
WS-M 0,5 x 40	M 20 x 1	165	125	2,5	6	12	17	16	175	177	177	-	6	18	24
WP-M 0,5 x 40	M 20 x 1	165	125	2,5	6	12	17	16	175	177	177	-	6	18	24

*Optional Threads: page 3

Performances

	Stroke mm	Energy absorption		Effective mass				
		Constant load* Nm/HB (max.)	Nm/h (max.)	-0 (very soft) min. - max.kg	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 0,25	14	30	50.000	-	1,6 - 1500	-	-	-
WS-M 0,25	14	30	50.000	0,9 - 8	3,5 - 17	9,9 - 76	62 - 252	250 - 950
WP-M 0,25	14	30	50.000	-	0,8 - 3,7	3 - 26	21 - 165	-
WE-M 0,35	14	35	52.500	-	6,5 - 1750	-	-	-
WS-M 0,35	14	35	52.500	1,9 - 4,5	4 - 25	22 - 90	85 - 428	420 - 1320
WP-M 0,35	14	35	52.500	-	1,1 - 6,4	5 - 28	25 - 280	-
WE-M 0,5 x 13	13	65	52.000	-	6 - 3250	-	-	-
WS-M 0,5 x 13	13	65	52.000	1,8 - 8,5	7,5 - 36	20 - 160	130 - 610	520 - 3500
WP-M 0,5 x 13	13	65	52.000	-	1,8 - 8,5	6,4 - 58	44 - 360	-
WE-M 0,5 x 19	19	100	76.500	-	9 - 4.500	-	-	-
WS-M 0,5 x 19	19	100	76.500	2,6 - 10,6	10 - 86	40 - 209	170 - 800	680 - 4.050
WP-M 0,5 x 19	19	100	76.500	-	2,6 - 12,5	10 - 89	69 - 555	-
WE-M 0,5 x 40	40	125	95.625	-	12 - 6.300	-	-	-
WS-M 0,5 x 40	40	125	95.625	3,5 - 16	14 - 69	40 - 305	250 - 1.180	1.000 - 6.250
WP-M 0,5 x 40	40	125	95.625	-	3,5 - 20	13 - 100	90 - 690	-

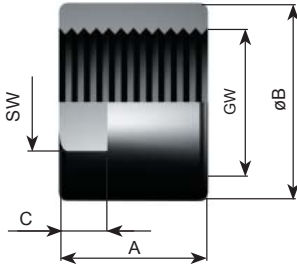
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ACCESSORIES

Mega-Line 0.25-0.5

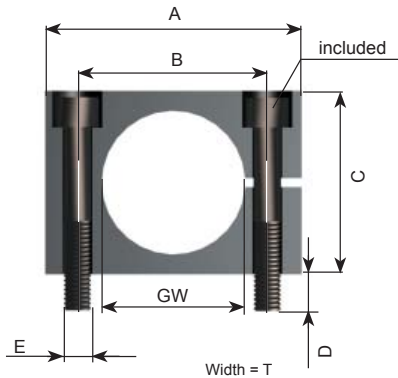
Stop Limit Nut



GW*	A mm	Ø B mm	C mm	SW mm
M 14 x 1	20	18	6	15
M 16 x 1	25	21	8	19
M 20 x 1	35	25	8	22

*Optional Threads: page 3

Rectangular Flange



GW*	A mm	B mm	C mm	D mm	E mm	T mm
M 14 x 1	32	20	20	5	M5	12
M 16 x 1	40	28	25	6	M6	20
M 20 x 1	40	28	25	6	M6	20

*Optional Threads: page 3

Specifications

WS-M..... Self-compensating, linear

WP-M..... Self-compensating, progressive

WE-M..... Adjustable, linear

Weight 0.25 : 0.05 kg / 0.35 : 0.07 kg
0.5 : 0.14 kg / 0.5 x 40 : 0.20 kg

Impact Speed WE-M : 0.08 - 6.0 m/s
WS-M : 0.08 - 6.0 m/s
WP-M : 0.30 - 8.0 m/s

Returning Spring Force 0.25 / 0.35 : 13 N/min - 23 N/max
0.5 / 0.5x40 : 12 N/min - 23 N/max

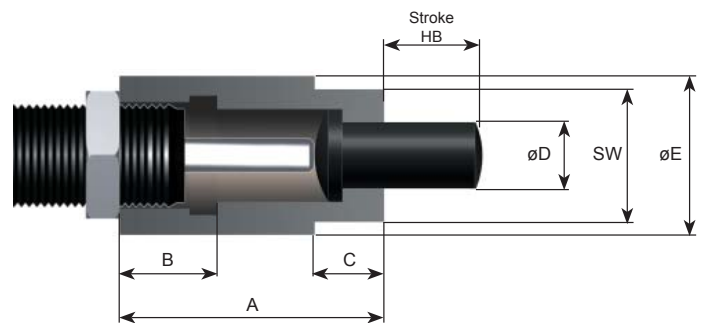
Torque: max force by using the flats..... 0.25 / 0.35 : 20 Nm
0.5 / 0.5x40 : 25 Nm

Temperature -20°C - +90°C

Material..... housing: ProSurf
piston rod: hardened stainless steel

Included..... 1 lock nut
instructions for use and assembly

AK1 for Side Forces

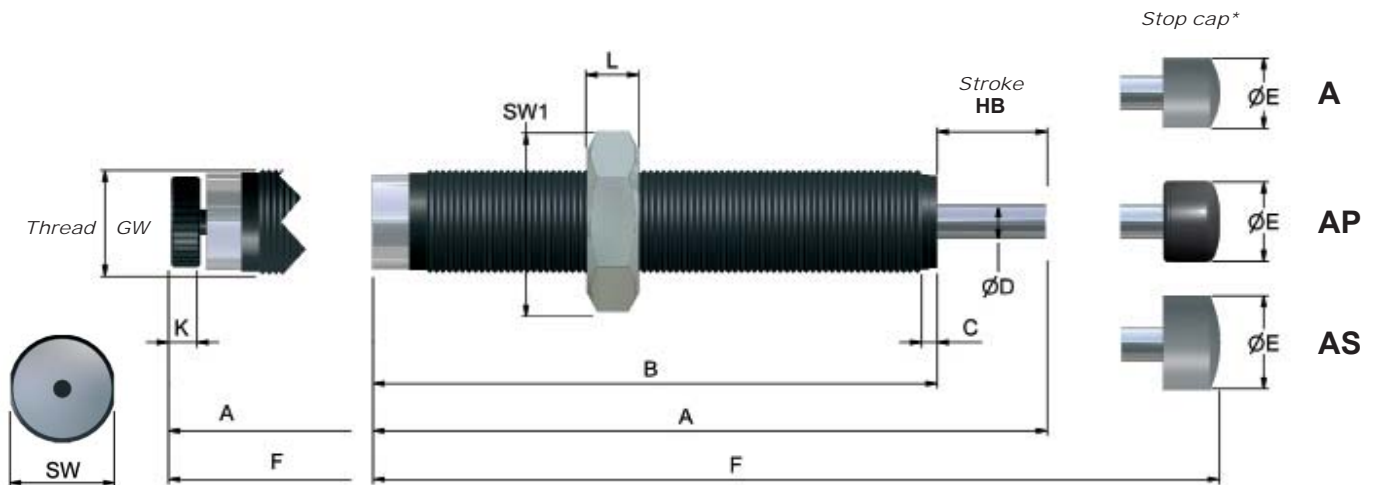


	GW*	A mm	B mm	C mm	ø D mm	ø E mm	SW mm
WE-M / WS-M / WP-M 0,25	M14x1	32,0	10,0	6	9	18	15
WE-M / WS-M / WP-M 0,35	M16x1	33,0	10,0	5	12	20	17
WE-M / WS-M / WP-M 0,5x19	M20x1	42,0	16,0	8	12	24	22

*Optional Threads: page 3

SHOCK ABSORBER

Mega-Line 1.0



*A: Plastic / AP: Soft Touch (Page 5) / AS: Steel

Dimensions

	GW*	A mm	B mm	C mm	øD mm	øE (A) mm	øE (AP) mm	øE (AS) mm	F (A) mm	F (AP) mm	F (AS) mm	K mm	L mm	SW mm	SW1 mm
WE-M 1,0	M 24 x 1,5	141	108	3,5	8	16	21	20	154	156	154	8	8	23	30
WS-M 1,0	M 24 x 1,5	133	108	3,5	8	16	21	20	146	148	146	-	8	23	30
WP-M 1,0	M 24 x 1,5	133	108	3,5	8	16	21	20	146	148	146	-	8	23	30
WE-M 1,0 x 40	M 24 x 1,5	178	130	3,5	8	16	21	20	191	193	191	8	8	23	30
WS-M 1,0 x 40	M 24 x 1,5	170	130	3,5	8	16	21	20	183	185	183	-	8	23	30
WP-M 1,0 x 40	M 24 x 1,5	170	130	3,5	8	16	21	20	183	185	183	-	8	23	30
WE-M 1,0 x 80	M 24 x 1,5	321	233	3,5	8	16	21	20	334	336	334	8	8	-	30
WS-M 1,0 x 80	M 24 x 1,5	313	233	3,5	8	16	21	20	326	328	326	-	8	-	30
WP-M 1,0 x 80	M 24 x 1,5	313	233	3,5	8	16	21	20	326	328	326	-	8	-	30

*Optional Threads: page 3

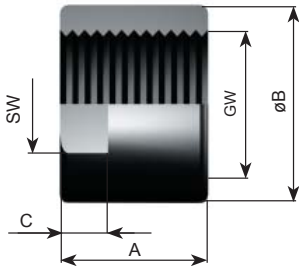
Performances

	Stroke mm	Energy absorption		Effective mass				
		Constant load* Nm/HB (max.)	Nm/h (max.)	-0 (very soft) min. - max.kg	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 1,0	25	220	105.600	-	22 - 11.000	-	-	-
WS-M 1,0	25	220	105.600	6 - 29	24 - 120	70 - 460	440 - 2.050	1760 - 10.800
WP-M 1,0	25	220	105.600	-	6 - 27,5	21 - 195	150 - 1200	-
WE-M 1,0 x 40	40	390	175.500	-	38 - 18.000	-	-	-
WS-M 1,0 x 40	40	390	175.500	15 - 103	44 - 216	135 - 962	780 - 3.600	3100 - 19.500
WP-M 1,0 x 40	40	390	175.500	-	10 - 48	39 - 340	270 - 2150	-
WE-M 1,0 x 80	80	390	175.500	-	38 - 18.000	-	-	-
WS-M 1,0 x 80	80	390	175.500	15 - 103	44 - 216	135 - 962	780 - 3.600	3100 - 19.500
WP-M 1,0 x 80	80	390	175.500	-	10 - 48	39 - 340	270 - 2150	-

ACCESSORIES

Mega-Line 1.0

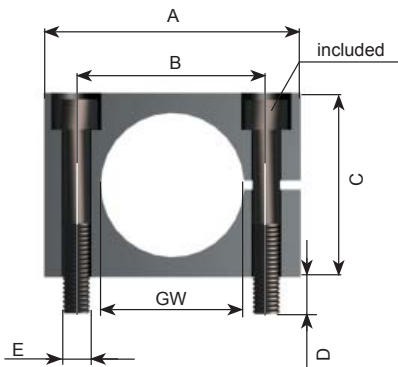
Stop Limit Nut



GW*	A mm	Ø B mm	C mm	SW mm
M 24 x 1,5	38	31	10	30

*Optional Threads: page 3

Rectangular Flange



GW*	A mm	B mm	C mm	D mm	E mm	T mm
M 24 x 1,5	46	33	32	6	M6	25

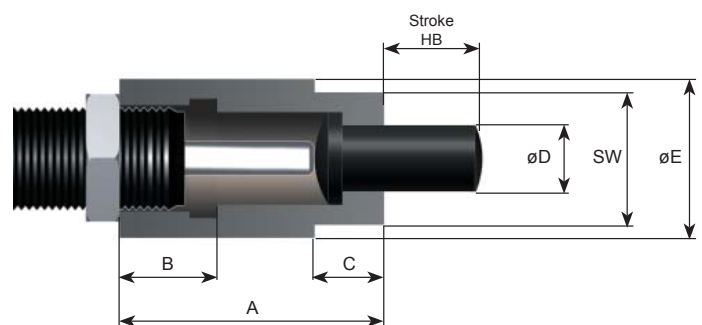
*Optional Threads: page 3

Width = T

Specifications

WS-M.....	Self-compensating, linear
WP-M.....	Self-compensating, progressive
WE-M.....	Adjustable, linear
Weight	1.0 : 0.29 kg 1.0x40 : 0.39 kg / 1.0x80 : 0.63 kg
Impact Speed	WE-M : 0.08 - 6.0 m/s WS-M : 0.08 - 6.0 m/s WP-M : 0.30 - 8.0 m/s
Returning Spring Force	1.0 : 15 N/min - 31 N/max 1.0x40 : 11 N/min - 20 N/max 1.0x80 : 14 N/min - 31 N/max
Torque: max force by using the flats.....	1.0 / 1.0x40 / 1.0x80 : 30 Nm
Temperature	-20°C - +90°C
Material.....	Housing: ProSurf Piston rod: hardened stainless steel
Included.....	1 lock nut Instructions for use and assembly

AK 1 for Side Forces



	GW*	A mm	B mm	C mm	ø D mm	ø E mm	SW mm
WE-M / WS-M / WP-M 1.0	M 24x 1,5			10	16	29	27

*Optional Threads: page 3

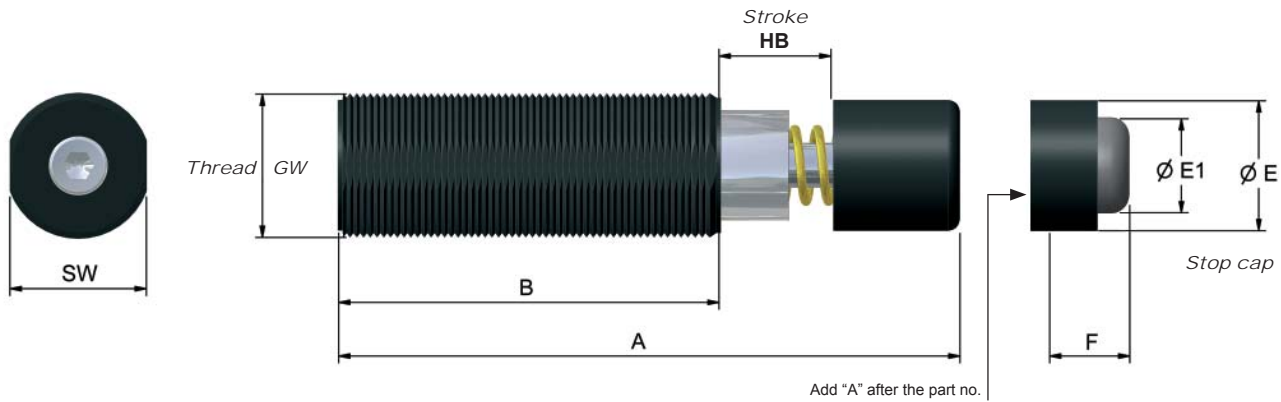


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SHOCK ABSORBER

Mega-Line 1.25



Dimensions

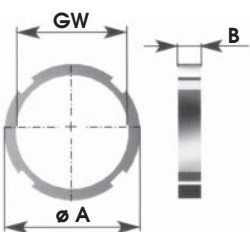
	GW* Standard	A mm	B mm	Ø E mm	Ø E1 mm	F mm	SW mm
WE-M 1,25 x 1	M 32 x 1,5	138	85	29	21	16	30
WS-M 1,25 x 1	M 32 x 1,5	138	85	29	21	16	30
WP-M 1,25 x 1	M 32 x 1,5	138	85	29	21	16	30
WE-M 1,25 x 2	M 32 x 1,5	188	110	29	21	16	30
WS-M 1,25 x 2	M 32 x 1,5	188	110	29	21	16	30
WP-M 1,25 x 2	M 32 x 1,5	188	110	29	21	16	30

*Optional Threads: page 3

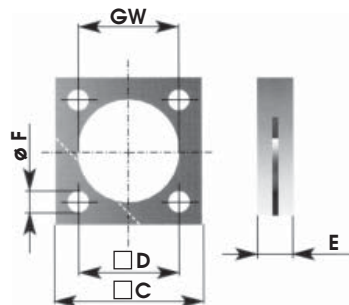
Performance

	Stroke mm	Energy absorption			Effective mass				
		Constant load Nm/HB (max.)	Nm/h (max.)	External tank Nm/h	-0 (very soft) min. - max.kg	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 1,25 x 1	25	300	120.000	240.000	10 - 100	60 - 2.950	600 - 89.000	-	-
WS-M 1,25 x 1	25	300	120.000	240.000	7 - 32	28 - 130	80 - 590	440 - 2.050	2.000 - 12.500
WP-M 1,25 x 1	25	300	120.000	240.000	-	7 - 35	30 - 260	207 - 1.650	-
WE-M 1,25 x 2	50	500	150.000	300.000	15 - 160	100 - 4.000	800 - 120.000	-	-
WS-M 1,25 x 2	50	500	150.000	300.000	13 - 60	56 - 240	160 - 1.200	1.000 - 4.200	4.000 - 25.000
WP-M 1,25 x 2	50	500	150.000	300.000	-	7 - 35	30 - 260	207 - 1.650	-

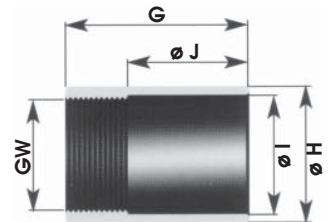
Lock Nut



Square Flange



Stop Limit Nut



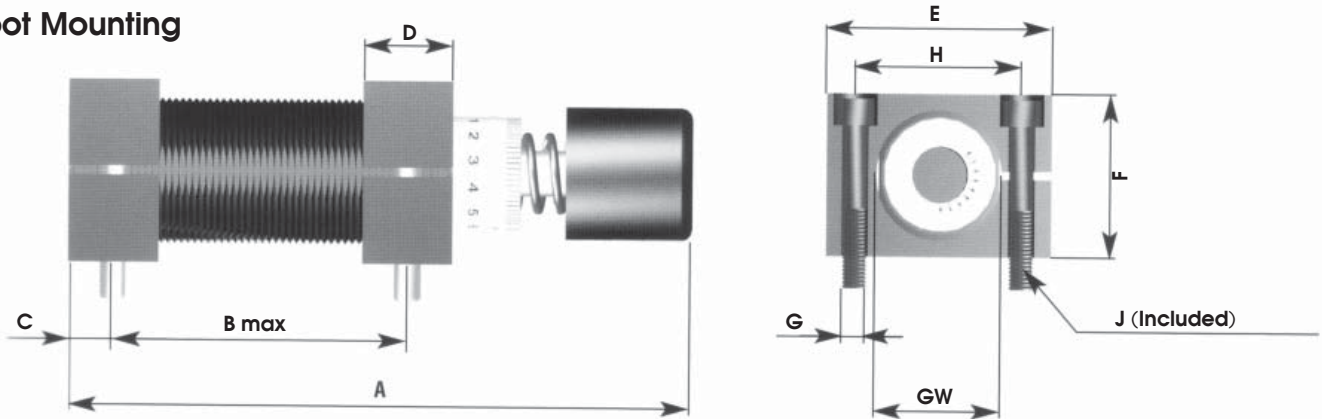
GW	Ø A mm	B mm	C mm	D mm	E mm	Ø F mm	G mm	Ø H mm	Ø I mm	Ø J mm
M 32x1.5	38	6.5	45	31	12	6.6	60	38	33	35

*Optional Threads: page 3

ACCESSORIES

Mega-Line 1.25

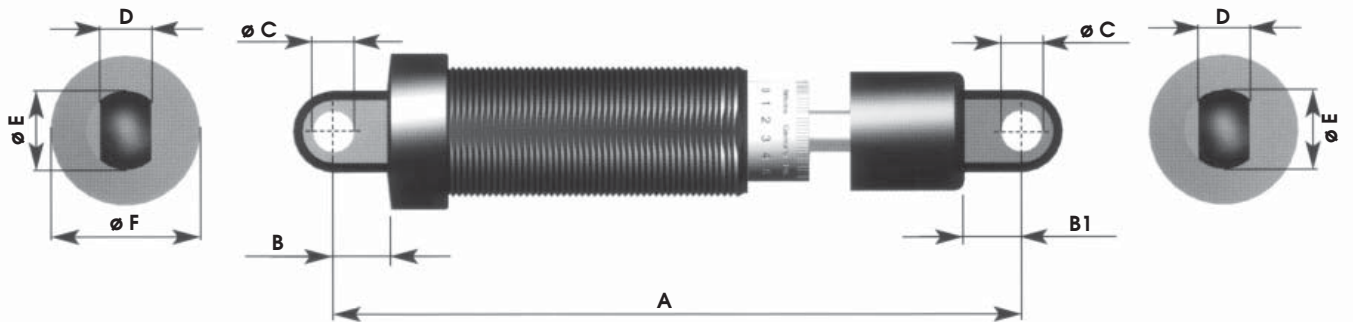
Foot Mounting



	GW*	A mm	B max mm	C mm	D mm	E mm	F mm	ø G mm	H mm	J mm
1.25x1	M 32x1.5	138	65	10	20	56	40	6.6	41	M6x40
1.25x2	M 32x1.5	188	90	10	20	56	40	6.6	41	M6x40

*Optional Threads: page 3

Clevis Mounting



	GW*	A max mm	B mm	B1 mm	ø C mm	D mm	ø E mm	ø F mm	G mm	H mm	I mm	J mm	ø K mm	L mm	M mm	N mm	ø O mm	P mm
1.25x1	M 32x1.5	168	14	14	10	13	20	38	45	32	14	34	6.5	22	13	5	10	20
1.25x2	M 32x1.5	218	14	14	10	13	20	38	45	32	14	34	6.5	22	13	5	10	20

*Optional Threads: page 3

Specifications

WS-M.....Self-compensating, linear
 WP-M.....Self-compensating, progressive
 WE-M.....Adjustable, linear

Weight 1.25 x 1: 0.45 kg / 1.25 x 2: 0.55 kg

Impact Speed WE-M : 0.02 - 6.0 m/s
 WS-M : 0.10 - 6.0 m/s
 WP-M : 0.40 - 8.0 m/s

Returning Spring Force 1.25 x 1 : 30 N/min - 50 N/max
 1.25 x 2 : 23 N/min - 50 N/max

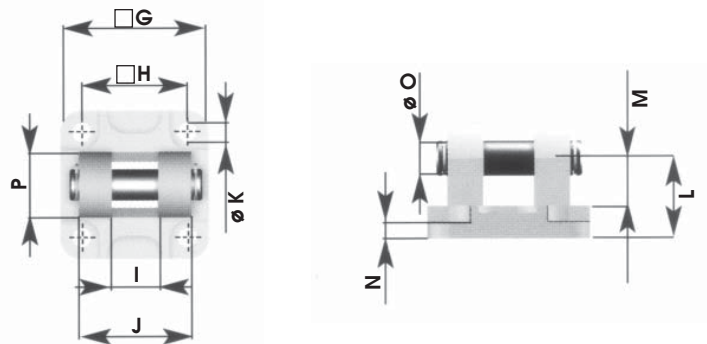
Torque: max force by using the flats..... 1.25 : 40 Nm

Temperature -20°C - +80°C

Material..... Housing: black finish
 Piston rod: hardened stainless steel

Included Instructions for use and assembly
 1-051-040120

Clevis Flange

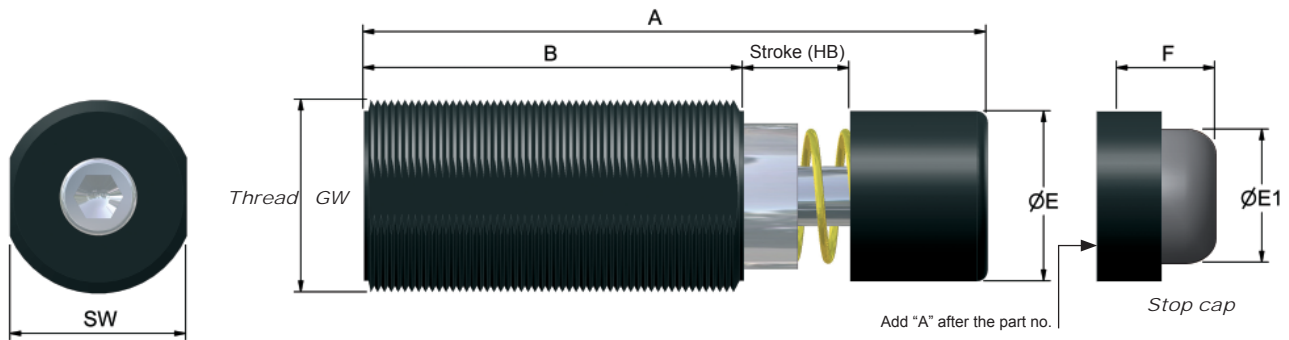


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Group 051

SHOCK ABSORBER

Mega-Line 1.5



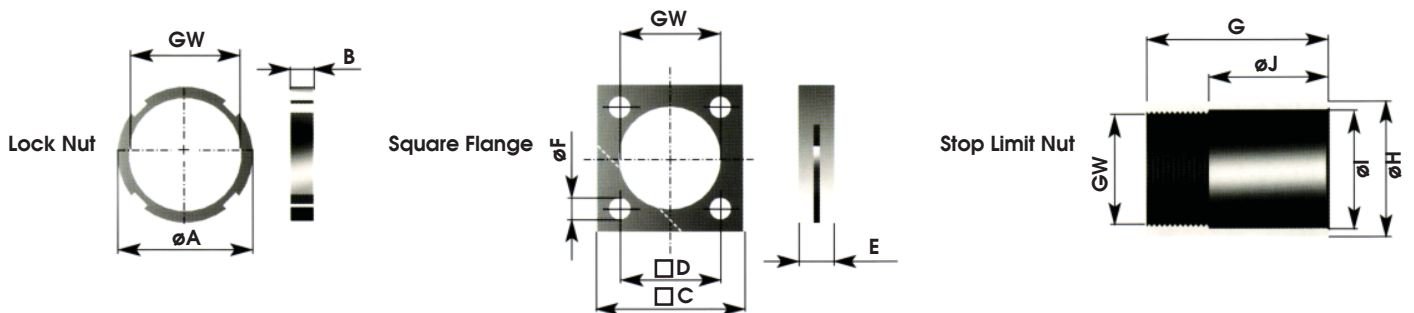
Dimensions

	GW*	A mm	B mm	Ø E mm	Ø E1 mm	F mm	SW mm
WE-M 1,5 x 1	M 45 x 2	148	89	39,6	31	18	41
WS-M 1,5 x 1	M 45 x 2	148	89	39,6	31	18	41
WP-M 1,5 x 1	M 45 x 2	148	89	39,6	31	18	41
WE-M 1,5 x 2	M 45 x 2	198	114	39,6	31	18	41
WS-M 1,5 x 2	M 45 x 2	198	114	39,6	31	18	41
WP-M 1,5 x 2	M 45 x 2	198	114	39,6	31	18	41
WE-M 1,5 x 3	M 45 x 2	248	139	39,6	31	18	41
WS-M 1,5 x 3	M 45 x 2	248	139	39,6	31	18	41
WP-M 1,5 x 3	M 45 x 2	248	139	39,6	31	18	41

*Optional Threads: page 3

Performances

	Stroke mm	Energy absorption			Effective mass				
		Constant load Nm/HB (max.)	Nm/h (max.)	External tank Nm/h	-0 (very soft) min. - max.kg	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 1,5 x 1	25	870	261.000	450.000	30 - 250	150 - 21.000	6.200 - 240.000	-	-
WS-M 1,5 x 1	25	870	261.000	450.000	24 - 114	98 - 480	280 - 2.100	1.740 - 8.200	6.960 - 43.500
WP-M 1,5 x 1	25	870	261.000	450.000	-	24 - 108	85 - 770	600 - 4.800	-
WE-M 1,5 x 2	50	1350	340.000	544.000	45 - 430	300 - 26.000	10.800 - 330.000	-	-
WS-M 1,5 x 2	50	1350	340.000	544.000	35 - 170	160 - 680	440 - 2900	2.700 - 12.700	10.800 - 67.500
WP-M 1,5 x 2	50	1350	340.000	544.000	-	37 - 160	130 - 1200	940 - 7500	-
WE-M 1,5 x 3	75	2100	420.000	670.000	70 - 670	450 - 27.600	16.800 - 500.000	-	-
WS-M 1,5 x 3	75	2100	420.000	670.000	40 - 270	240 - 1.100	670 - 5.000	4.200 - 19.500	16.800 - 105.000
WP-M 1,5 x 3	75	2100	420.000	670.000	-	58 - 260	200 - 1.850	1.450 - 11.600	-



GW	ØA mm	B mm	C mm	D mm	E mm	ØF mm	G mm	ØH mm	ØI mm	ØJ mm
M 45 x 2	54	8	55	43	12	9	65	54	47	35

*Optional Threads: page 3

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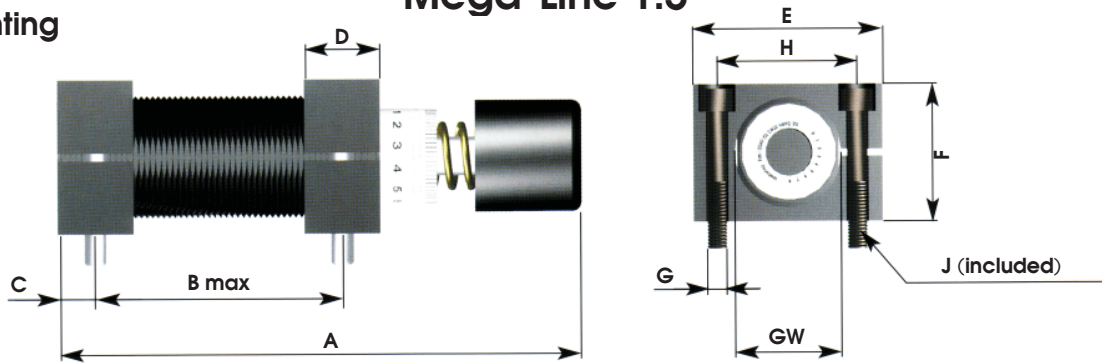
Group 051

1-051-040429

ACCESSORIES

Mega-Line 1.5

Foot Mounting

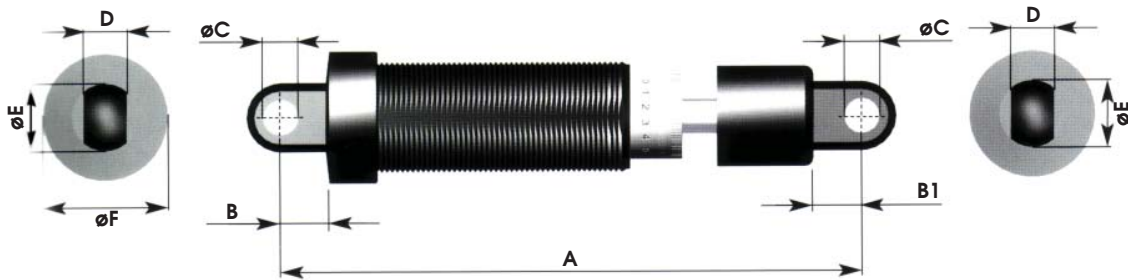


Dimensions

	GW	A mm	B max mm	C mm	D mm	E mm	F mm	øG mm	H mm	J mm
1.5 x 1	M 45 x 2	146	64	12.5	25	80	56	9	58	M 8 x 50
1.5 x 2	M 45 x 2	196	89	12.5	25	80	56	9	58	M 8 x 50
1.5 x 3	M 45 x 2	246	114	12.5	25	80	56	9	58	M 8 x 50

*Optional Threads: page 3

Clevis Mounting



Dimensions

	GW	A max mm	B mm	B1 mm	øC mm	D mm	øE mm	øF mm	G mm	H mm	I mm	J mm	øK mm	L mm	M mm	N mm	øO mm	P mm
1.5 x 1	M 45 x 2	200	28	18	16	20	28	53	65	46	21	45	9	27	15	6	16	29
1.5 x 2	M 45 x 2	250	28	18	16	20	28	53	65	46	21	45	9	27	15	6	16	29
1.5 x 3	M 45 x 2	300	28	18	16	20	28	53	65	46	21	45	9	27	15	6	16	29

*Optional Threads: page 3

Specifications

WS-M.....Self-compensating, linear
 WP-M..... Self-compensating, progressive
 WE-M.....Adjustable, linear

Weight 1.5x1: 0.95 kg / 1.5x2: 1.10 kg / 1.5x3 : 1.20 kg

Impact Speed WE-M : 0.02 - 6.0 m/s
 WS-M : 0.10 - 6.0 m/s / WP-M : 0.40 - 8.0 m/s

Returning Spring Force 1.5x1 : 50 N/min - 70 N/max
 1.5x2 : 35 N/min - 70 N/max
 1.5x3 : 35 N/min - 80 N/max

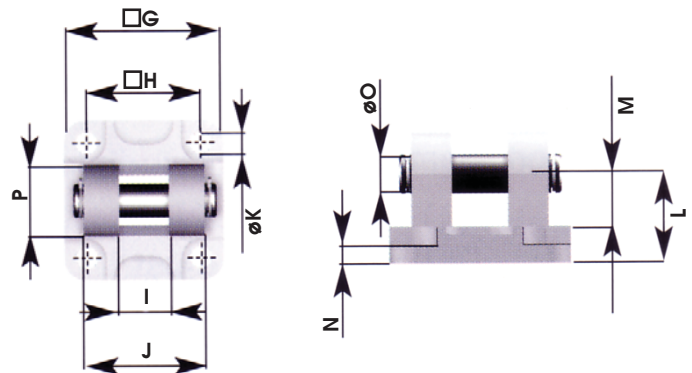
Torque: max force by using the flats..... 1.5 : 40 Nm

Temperature-20°C - +80°C

Material..... Housing: black finish
 Piston rod: hardened stainless steel

IncludedInstructions for use and assembly
 1-051-040429

Clevis Flange

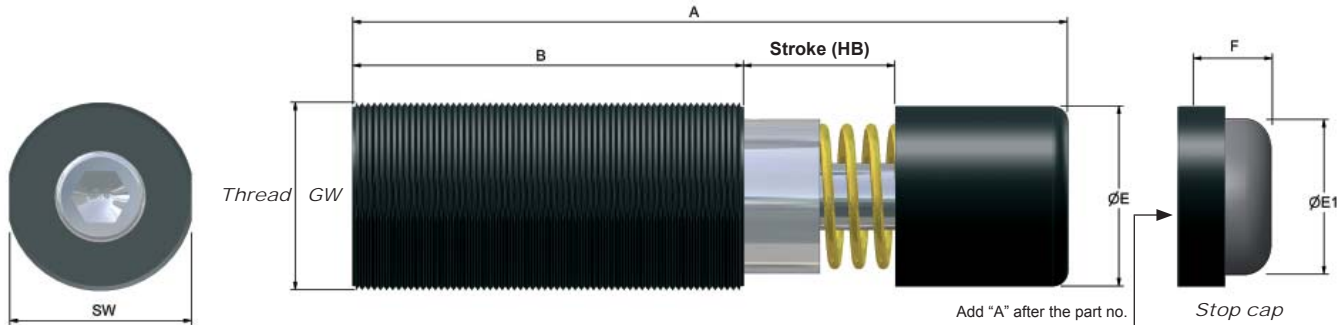


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Group 051

SHOCK ABSORBER

Mega-Line 2.0



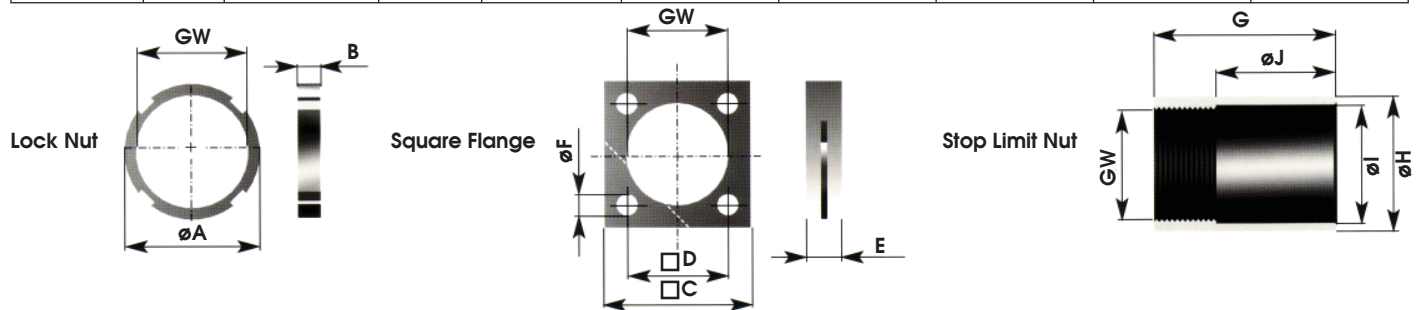
Dimensions

	GW*	A mm	B mm	Ø E mm	Ø E1 mm	F mm	SW mm
WE-M 2,0 x 1	M 62 x 2	186	104	59	49	25	60
WS-M 2,0 x 1	M 62 x 2	186	104	59	49	25	60
WP-M 2,0 x 1	M 62 x 2	186	104	59	49	25	60
WE-M 2,0 x 2	M 62 x 2	236	129	59	49	25	60
WS-M 2,0 x 2	M 62 x 2	236	129	59	49	25	60
WP-M 2,0 x 2	M 62 x 2	236	129	59	49	25	60
WE-M 2,0 x 4	M 62 x 2	336	179	59	49	25	60
WS-M 2,0 x 4	M 62 x 2	336	179	59	49	25	60
WP-M 2,0 x 4	M 62 x 2	336	179	59	49	25	60
WE-M 2,0 x 6	M 62 x 2	453	246	59	49	25	60
WS-M 2,0 x 6	M 62 x 2	453	246	59	49	25	60
WP-M 2,0 x 6	M 62 x 2	453	246	59	49	25	60

*Optional Threads: page 3

Performances

	Stroke mm	Energy absorption			Effective mass				
		Constant load Nm/HB (max.)	Nm/h (max.)	External tank Nm/h	-0 (very soft) min. - max.kg	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 2,0 x 1	25	1.500	150.000	240.000	60 - 480	300 - 41.150	12.000 - 470.000	-	-
WS-M 2,0 x 1	25	1.500	150.000	240.000	31 - 197	170 - 830	480 - 3.700	3.000 - 14.100	12.000 - 75.000
WP-M 2,0 x 1	25	1.500	150.000	240.000	-	31 - 187	150 - 1.330	1.030 - 8.300	-
WE-M 2,0 x 2	50	2.500	250.000	400.000	80 - 800	500 - 63.700	14.000 - 600.000	-	-
WS-M 2,0 x 2	50	2.500	250.000	400.000	52 - 330	280 - 1.385	800 - 6.150	5.000 - 23.500	20.000 - 125.000
WP-M 2,0 x 2	50	2.500	250.000	400.000	-	52 - 310	250 - 2.200	1.730 - 13.800	-
WE-M 2,0 x 4	100	5.000	350.000	525.000	160 - 1.600	1.000 - 62.500	40.000 - 1.000.000	-	-
WS-M 2,0 x 4	100	5.000	350.000	525.000	104 - 650	565 - 2.770	1.600 - 12.350	10.000 - 47.200	40.000 - 250.000
WP-M 2,0 x 4	100	5.000	350.000	525.000	-	100 - 625	490 - 4.400	3.460 - 27.700	-
WE-M 2,0 x 6	150	8.000	400.000	650.000	250 - 2.400	1.250 - 105.000	64.000 - 1.000.000	-	-
WS-M 2,0 x 6	150	8.000	400.000	650.000	160 - 1.050	905 - 4.430	2.560 - 1.9750	16.000 - 75.500	64.000 - 400.000
WP-M 2,0 x 6	150	8.000	400.000	650.000	-	160 - 1.000	790 - 7.100	5.530 - 44.000	-



GW	øA mm	B mm	C mm	D mm	E mm	øF mm	G mm	øH mm	øI mm	øJ mm
M 62 x 2	74	10	80	60	20	11	100	74	65	60

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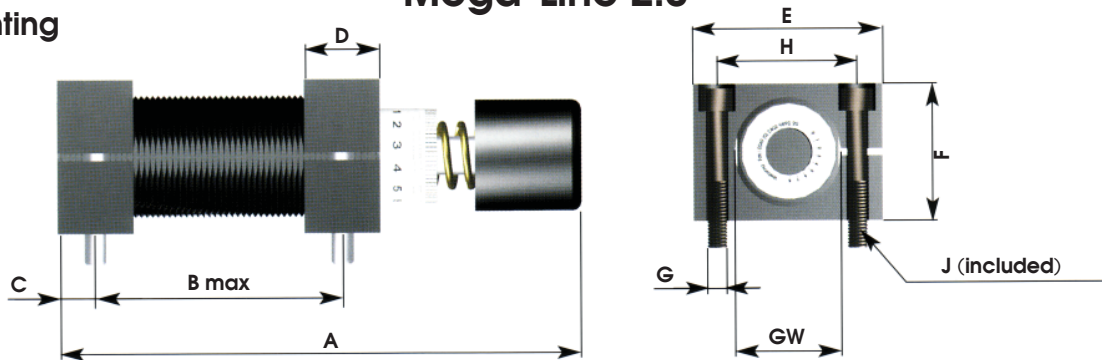
Group 051

1-051-040504

ACCESSORIES

Mega-Line 2.0

Foot Mounting

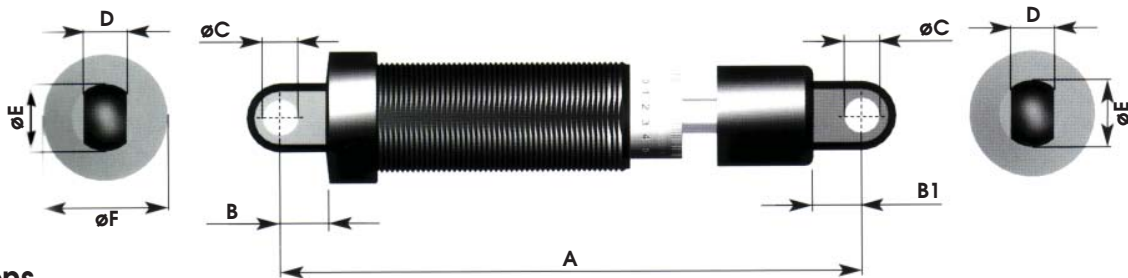


Dimensions

	GW	A mm	B max mm	C mm	D mm	E mm	F mm	øG mm	H mm	J mm
2.0 x 1	M 62 x 2	186	79	12.5	25	100	80	11	76	M 10 x 80
2.0 x 2	M 62 x 2	236	104	12.5	25	100	80	11	76	M 10 x 80
2.0 x 4	M 62 x 2	336	154	12.5	25	100	80	11	76	M 10 x 80
2.0 x 6	M 62 x 2	453	221	12.5	25	100	80	11	76	M 10 x 80

*Optional Threads: page 3

Clevis Mounting



Dimensions

	GW	A max mm	B mm	B1 mm	øC mm	D mm	øE mm	øF mm	G mm	H mm	I mm	J mm	øK mm	L mm	M mm	N mm	øO mm	P mm
2.0 x 1	M 62 x 2	272	35	35	20	24	40	74	95	72	25	65	11	36	22	10	20	42
2.0 x 2	M 62 x 2	322	35	35	20	24	40	74	95	72	25	65	11	36	22	10	20	42
2.0 x 4	M 62 x 2	422	35	35	20	24	40	74	95	72	25	65	11	36	22	10	20	42
2.0 x 6	M 62 x 2	539	35	35	20	24	40	74	95	72	25	65	11	36	22	10	20	42

*Optional Threads: page 3

Specifications

WS-M.....Self-compensating, linear
 WP-M.....Self-compensating, progressive
 WE-M.....Adjustable, linear

Weight 2.0x1 : 2.0 kg / 2.0x2 : 3.0 kg
 2.0x4 : 3,9 kg / 2.0x6 : 4.8 kg

Impact Speed WE-M : 0.02 - 6.0 m/s
 WS-M : 0.10 - 6.0 m/s / WP-M : 0.40 - 8.0 m/s

Returning Spring Force 2.0x1 : 50 N/min - 130 N/max
 2.0x2 : 40 N/min - 130 N/max
 2.0x4 : 45 N/min - 130 N/max
 2.0x6 : 35 N/min - 130 N/max

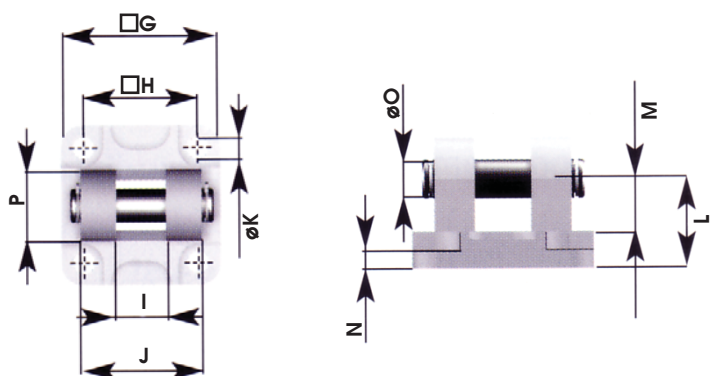
Torque: max force by using the flats.....2.0 : 40 Nm

Temperature-20°C - +80°C

Material..... Housing: black finish
 Piston rod: hardened stainless steel

Included Instructions for use and assembly
 1-051-040504

Clevis Flange



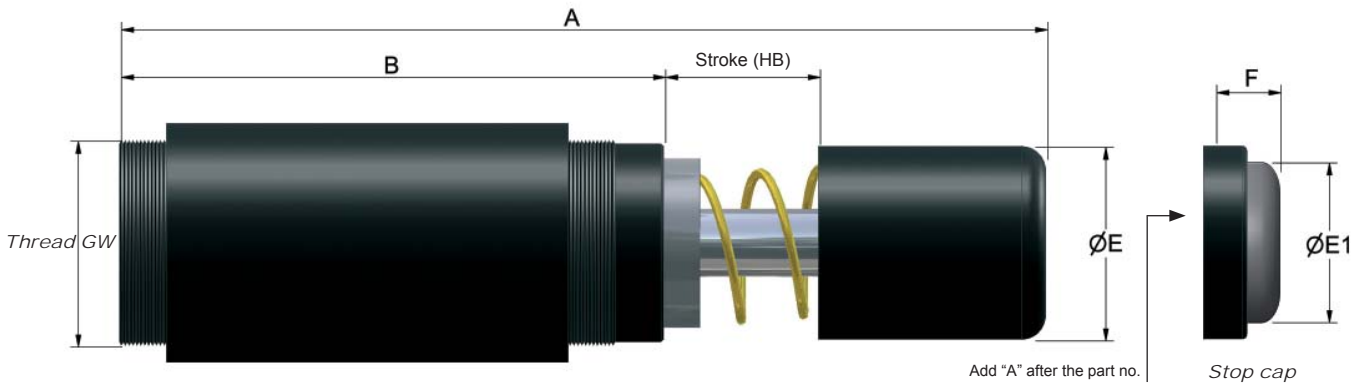
American Metric® Corporation



Group 051

SHOCK ABSORBER

Mega-Line 3.0



Dimensions

	GW	A mm	B mm	Ø E mm	Ø E1 mm	F mm
WE-M 3,0 x 2	M 85 x 2	319	225	80	66	25
WS-M 3,0 x 2	M 85 x 2	319	225	80	66	25
WP-M 3,0 x 2	M 85 x 2	319	225	80	66	25
WE-M 3,0 x 4	M 85 x 2	419	275	80	66	25
WS-M 3,0 x 4	M 85 x 2	419	275	80	66	25
WP-M 3,0 x 4	M 85 x 2	419	275	80	66	25
WE-M 3,0 x 6	M 85 x 2	569	325	80	66	25
WS-M 3,0 x 6	M 85 x 2	569	325	80	66	25
WP-M 3,0 x 6	M 85 x 2	569	325	80	66	25
WE-M 3,0 x 8	M 85 x 2	669	375	80	66	25
WS-M 3,0 x 8	M 85 x 2	669	375	80	66	25
WP-M 3,0 x 8	M 85 x 2	669	375	80	66	25
WE-M 3,0 x 10	M 85 x 2	769	425	80	66	25
WS-M 3,0 x 10	M 85 x 2	769	425	80	66	25
WP-M 3,0 x 10	M 85 x 2	769	425	80	66	25

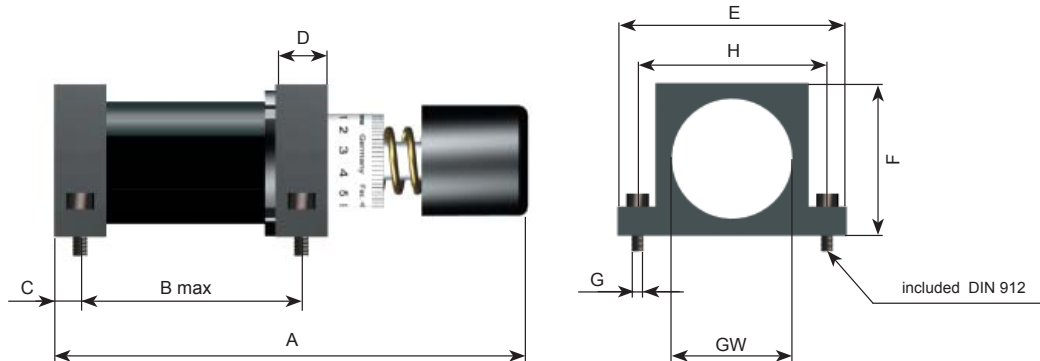
Performances

	Stroke mm	Energy absorption			Effective mass			
		Constant load Nm/HB (max.)	Nm/h (max.)	External tank Nm/h	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 3,0 x 2	50	4000	1200000	1500000	280 - 89000	-	-	-
WS-M 3,0 x 2	50	4000	1200000	1500000	695 - 2480	2000 - 6050	5550 - 15400	12500 - 40000
WP-M 3,0 x 2	50	4000	1200000	1500000	165 - 500	400 - 3550	2800 - 22000	-
WE-M 3,0 x 4	100	9000	1800000	2250000	600 - 112500	-	-	-
WS-M 3,0 x 4	100	9000	1800000	2250000	1750 - 5550	4500 - 13600	12500 - 34700	28800 - 88000
WP-M 3,0 x 4	100	9000	1800000	2250000	360 - 1125	890 - 8000	6300 - 50000	-
WE-M 3,0 x 6	150	14000	2100000	2625000	925 - 175000	-	-	-
WS-M 3,0 x 6	150	14000	2100000	2625000	3710 - 11700	7000 - 21200	19500 - 54000	44500 - 138200
WP-M 3,0 x 6	150	14000	2100000	2625000	555 - 1750	1380 - 12400	9700 - 77700	-
WE-M 3,0 x 8	200	19000	2660000	3325000	1250 - 237500	-	-	-
WS-M 3,0 x 8	200	19000	2660000	3325000	2750 - 8640	7500 - 28700	26400 - 73300	59400 - 187600
WP-M 3,0 x 8	200	19000	2660000	3325000	750 - 2375	1870 - 16800	13100 - 105000	-
WE-M 3,0 x 10	250	24000	2880000	3600000	1580 - 300000	-	-	-
WS-M 3,0 x 10	250	24000	2880000	3600000	4680 - 14800	12000 - 36200	33300 - 92600	75000 - 237300
WP-M 3,0 x 10	250	24000	2880000	3600000	950 - 3000	2370 - 21300	16600 - 133300	-

ACCESSORIES

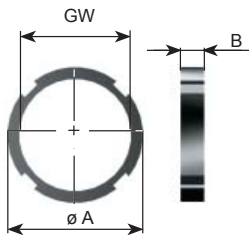
Mega-Line 3.0

Foot Mounting



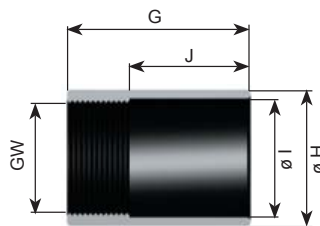
	GW	A mm	B max mm	C mm	D mm	E mm	F mm	G mm	H mm
3,0 x 2	M85 x 2	319	186	10	20	157	105	M12	134
3,0 x 4	M85 x 2	419	286	10	20	157	105	M12	134
3,0 x 6	M85 x 2	569	286	10	20	157	105	M12	134
3,0 x 8	M85 x 2	669	336	10	20	157	105	M12	134
3,0 x 10	M85 x 2	769	386	10	20	157	105	M12	134

Lock Nut



GW	ø A (mm)	B (mm)
M 85 x 2	99	10

Stop Limit Nut



	GW	G (mm)	ø H (mm)	ø I (mm)	J (mm)
3,0x2 - 3,0x4	M 85 x 2	85	100	83	63
3,0x2A - 3,0x4A	M 85 x 2	110	100	83	88
3,0x6 - 3,0x10	M 85 x 2	135	100	83	113
3,0x6A - 3,0x10A	M 85 x 2	160	100	83	138

*Optional Threads: page 3

Specifications

WS-M.....Self-compensating, linear
 WP-M.....Self-compensating, progressive
 WE-M.....Adjustable, linear

Weight3.0x2 : 7 kg / 3.0x4 : 9 kg / 3.0x6 : 12 kg
 3.0x8 : 15 kg / 3.0x10 : 20 kg

Impact Speed WE-M : 0.02 - 6.0 m/s
 WS-M : 0.10 - 6.0 m/s / WP-M : 0.40 - 8.0 m/s

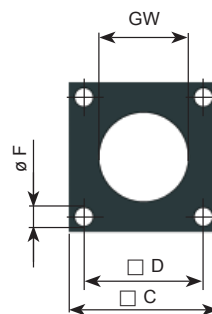
Returning Spring Force3.0x2 : 120 N/min - 200 N/max
 3.0x4 : 120 N/min - 250 N/max
 3.0x6 / 3.0x8 : 170 N/min - 250 N/max
 3.0x10 : 170 N/min - 280 N/max

Temperature-20°C - +80°C

Material..... Housing: black finish
 Piston rod: hardened stainless steel

IncludedInstructions for use and assembly

Square Flange



GW	C mm	D mm	ø F mm	T mm
M 85 x 2	140	111	17	20

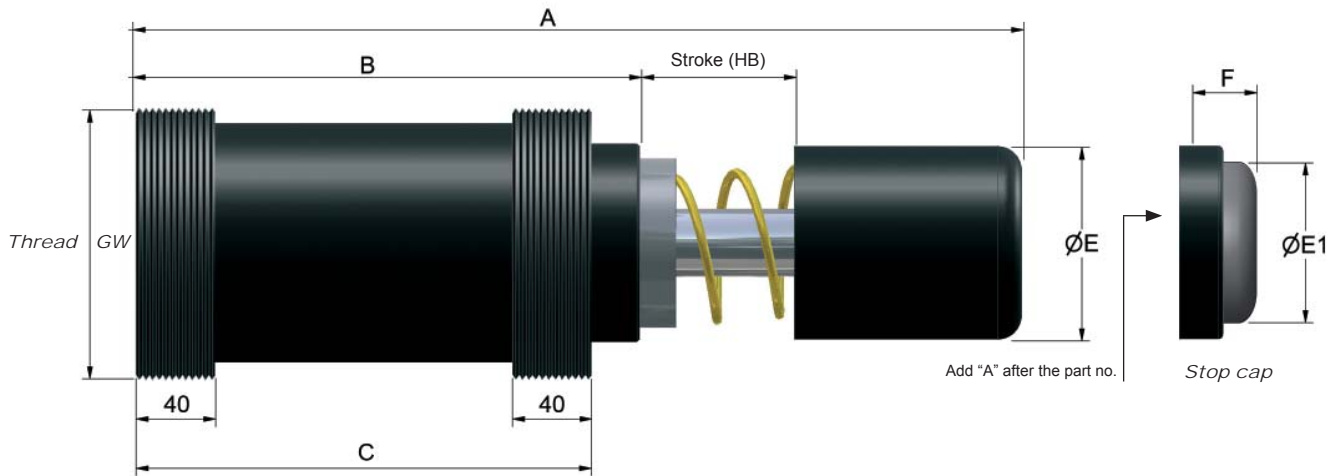


American Metric® Corporation

Group 051

SHOCK ABSORBER

Mega-Line 4.0



Dimensions

	GW Standard	A mm	B mm	C mm	Ø E mm	Ø E1 mm	F mm
WE-M 4,0 x 2	M 115 x 2	319	225	205	80	66	25
WS-M 4,0 x 2	M 115 x 2	319	225	205	80	66	25
WP-M 4,0 x 2	M 115 x 2	319	225	205	80	66	25
WE-M 4,0 x 4	M 115 x 2	419	275	255	80	66	25
WS-M 4,0 x 4	M 115 x 2	419	275	255	80	66	25
WP-M 4,0 x 4	M 115 x 2	419	275	255	80	66	25
WE-M 4,0 x 6	M 115 x 2	569	325	305	80	66	25
WS-M 4,0 x 6	M 115 x 2	569	325	305	80	66	25
WP-M 4,0 x 6	M 115 x 2	569	325	305	80	66	25
WE-M 4,0 x 8	M 115 x 2	669	375	355	80	66	25
WS-M 4,0 x 8	M 115 x 2	669	375	355	80	66	25
WP-M 4,0 x 8	M 115 x 2	669	375	355	80	66	25
WE-M 4,0 x 10	M 115 x 2	769	425	405	80	66	25
WS-M 4,0 x 10	M 115 x 2	769	425	405	80	66	25
WP-M 4,0 x 10	M 115 x 2	769	425	405	80	66	25

Performances

	Stroke mm	Energy absorption			Effective mass			
		Constant load Nm/HB (max.)	Nm/h (max.)	External tank Nm/h	-1 (soft) min. - max.kg	-2 (medium) min. - max.kg	-3 (hard) min. - max.kg	-4 (very hard) min. - max.kg
WE-M 4,0 x 2	50	4000	1200000	1500000	280 - 89000	-	-	-
WS-M 4,0 x 2	50	4000	1200000	1500000	695 - 2480	2000 - 6050	5550 - 15400	12500 - 40000
WP-M 4,0 x 2	50	4000	1200000	1500000	165 - 500	400 - 3550	2800 - 22000	-
WE-M 4,0 x 4	100	9000	1800000	2250000	600 - 112500	-	-	-
WS-M 4,0 x 4	100	9000	1800000	2250000	1750 - 5550	4500 - 13600	12500 - 34700	28800 - 88000
WP-M 4,0 x 4	100	9000	1800000	2250000	360 - 1125	890 - 8000	6300 - 50000	-
WE-M 4,0 x 6	150	14000	2100000	2625000	925 - 175000	-	-	-
WS-M 4,0 x 6	150	14000	2100000	2625000	3710 - 11700	7000 - 21200	19500 - 54000	44500 - 138200
WP-M 4,0 x 6	150	14000	2100000	2625000	555 - 1750	1380 - 12400	9700 - 77700	-
WE-M 4,0 x 8	200	19000	2660000	3325000	1250 - 237500	-	-	-
WS-M 4,0 x 8	200	19000	2660000	3325000	2750 - 8640	7500 - 28700	26400 - 73300	59400 - 187600
WP-M 4,0 x 8	200	19000	2660000	3325000	750 - 2375	1870 - 16800	13100 - 105000	-
WE-M 4,0 x 10	250	24000	2880000	3600000	1580 - 300000	-	-	-
WS-M 4,0 x 10	250	24000	2880000	3600000	4680 - 14800	12000 - 36200	33300 - 92600	75000 - 237300
WP-M 4,0 x 10	250	24000	2880000	3600000	950 - 3000	2370 - 21300	16600 - 133300	-

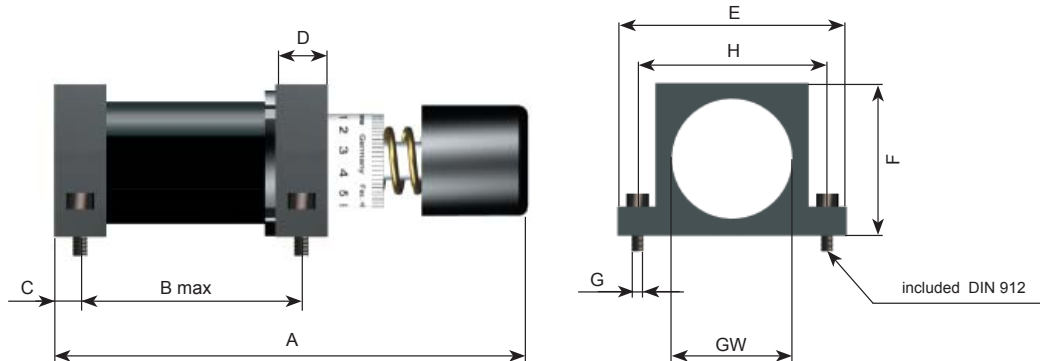
 American Metric® Corporation

Group 051

ACCESSORIES

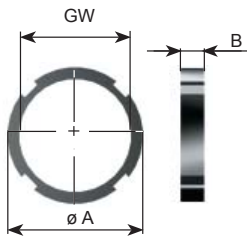
Mega-Line 4.0

Foot Mounting



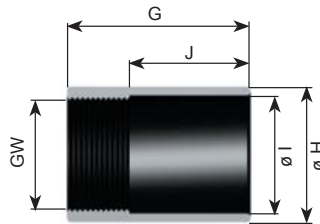
	GW	A mm	B max mm	C mm	D mm	E mm	F mm	G mm	H mm
4,0 x 2	M 115 x 2	319	180	12,5	25	203	149	M16x80	165
4,0 x 4	M 115 x 2	419	230	12,5	25	203	149	M16x80	165
4,0 x 6	M 115 x 2	569	280	12,5	25	203	149	M16x80	165
4,0 x 8	M 115 x 2	669	330	12,5	25	203	149	M16x80	165
4,0 x 10	M 115 x 2	769	380	12,5	25	203	149	M16x80	165

Lock Nut



GW	ø A (mm)	B (mm)
M 115 x 2	127	15

Stop Limit Nut



	GW	G (mm)	ø H (mm)	ø I (mm)	J (mm)
4,0x2 - 4,0x4	M115x2	106	130	110	66
4,0x2A - 4,0x4A	M115x2	131	130	110	91
4,0x6 - 4,0x10	M115x2	156	130	110	116
4,0x6A - 4,0x10A	M115x2	181	130	110	141

Specifications

WS-M.....Self-compensating, linear
 WP-M..... Self-compensating, progressive
 WE-M.....Adjustable, linear

Weight 4.0x2 : 10 kg / 4.0x4 : 12 kg / 4.0x6 : 15 kg
 4.0x8 : 18 kg / 4.0x10 : 23 kg

Impact Speed WE-M : 0.02 - 6.0 m/s
 WS-M : 0.10 - 6.0 m/s / WP-M : 0.40 - 8.0 m/s

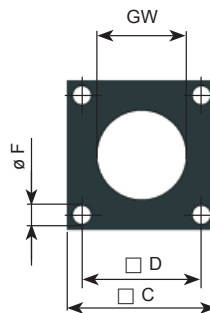
Returning Spring Force 4.0x2 : 120 N/min - 200 N/max
 4.0x4 : 120 N/min - 250 N/max
 4.0x6 / 4.0x8 : 170 N/min - 250 N/max
 4.0x10 : 170 N/min - 280 N/max

Temperature -20°C - +80°C

Material..... Housing: black finish
 Piston rod: hardened stainless steel

Included.....Instructions for use and assembly

Square Flange



GW	C mm	D mm	ø F mm	T mm
M 115 x 2	140	111	17	25

Width = T



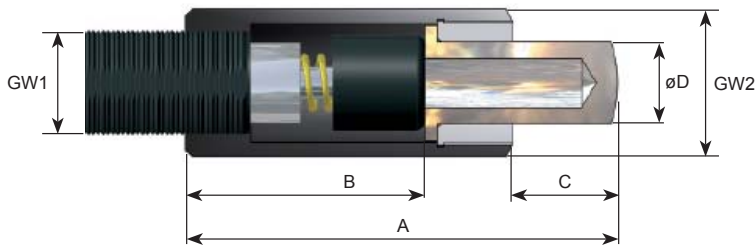
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ACCESSORIES

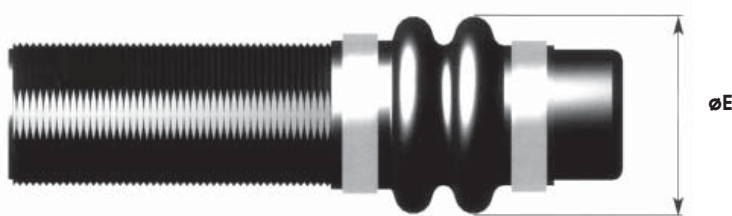
Mega-Line 1.25 - 2.0

AK1 for Side Forces



	GW1	GW2	A mm	B mm	C mm	ø D mm
1,25 x 1	M32x1,5	M45x2	132,0	73	32,0	25
1,25 x 2	M32,1,5	M45x2	184,5	98	59,5	25
1,5 x 1	M45x2	M62x2	135,5	77	31,5	35
1,5 x 2	M45x2	M62x2	182,0	102	53,0	35
2,0 x 1	M62x2	M85x2	158,5	102	29,5	55
2,0 x 2	M62x2	M85x2	208,5	127	54,5	55

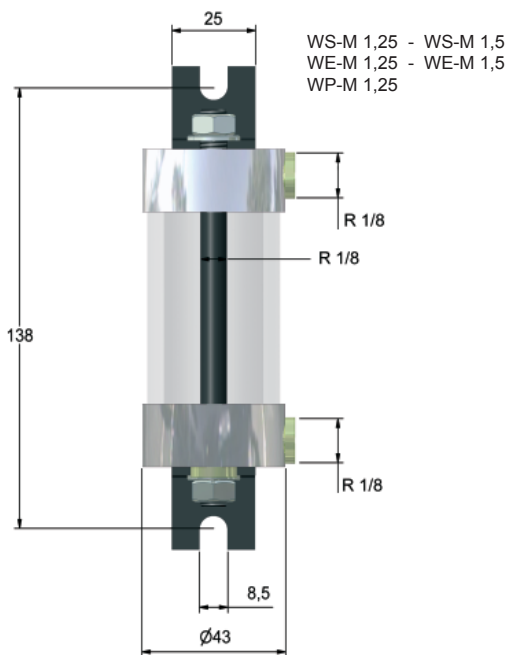
Bellow



	ø E mm
1.25 x 1 / 1.25 x 2	65
1.5 x 1	60
1.5 x 2 / 1.5 x 3	80
2.0 x 1 / 2.0 x 2 / 2.0 x 4 / 2.0 x 6	90

External Tank

AT 1



Ordering information

WE-M 1,25 x 2 - 1 AT

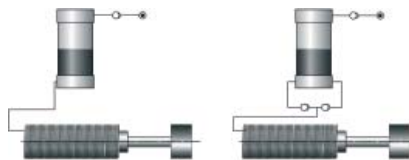
For shock absorbers without return spring

WE-M 1,25 x 2 - 1 ATF

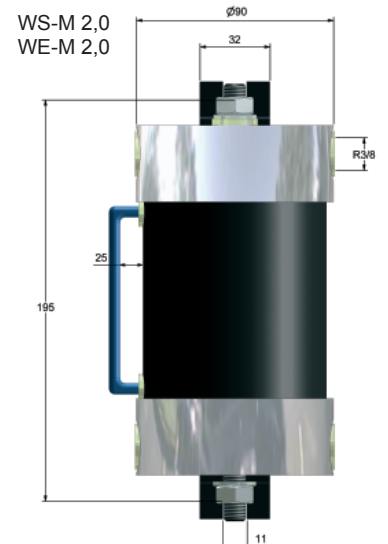
For shock absorbers with return spring

WM-AT 1

For external tank

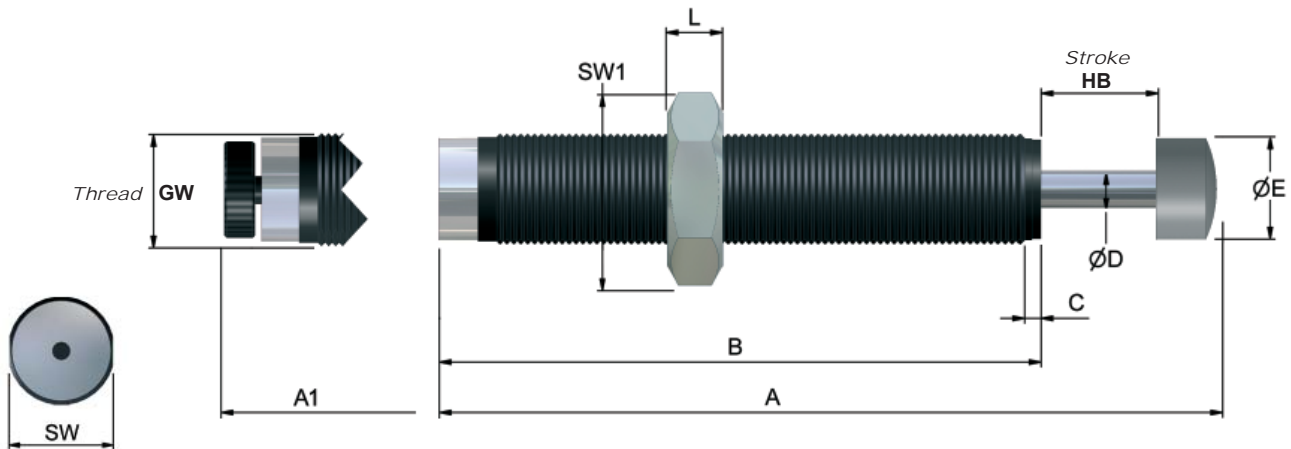


AT 2



SHOCK ABSORBER

WEB-M / WSB-M / WPB-M



Dimensions

			GW*	A mm	A 1 mm	B mm	C mm	Ø D mm	Ø E mm	L mm	SW mm	SW 1 mm
WSB-M 0,15-1/2/3/4	WPB-M 0,15-1/2/3	WEB-M 0,15	M 10 x 1,0	66,0	68,5	49,5	2,5	3	8,5	3	-	13
WSB-M 0,2-1/2/3/4	WPB-M 0,2-1/2/3	WEB-M 0,2	M 12 x 1,0	85,0	89,5	66,0	2,5	4	10	4	-	14
WSB-M 0,25-0/1/2/3/4	WPB-M 0,25-1/2/3	WEB-M 0,25	M 14 x 1,0	100,0	105,0	78,0	2,5	4	10	5	13	17
WSB-M 0,5x19 -0/1/2/3/4	WPB-M 0,5x19 -1/2/3	WEB-M 0,5 x 19	M 20 x 1,0	117,0	123,0	88,0	2,5	6	16	6	18	24
WSB-M 1,0-0/1/2/3/4	WPB-M 1,0-1/2/3	WEB-M 1,0	M 24 x 1,5	146,0	154,0	108,0	3,5	8	20	8	23	30

*Optional Threads: page 3

Performances

	Stroke mm	Energy absorption		Effective mass					Return spring force		Torque	Weight
		Nm/HB (max.)	Nm/h (max.)	-0 (very soft) min.-max.kg	-1 (soft) min.-max.kg	-2 (medium) min.-max.kg	-3 (hard) min.-max.kg	-4 (very hard) min.-max.kg	min. N	max. N	min. m/s	kg
WSB-M 0,15	8	12	24000	-	1,6 - 7,5	6,1 - 71	61 - 252	232 - 750	3,6	8	6	0,02
WSB-M 0,2	10	18	36000	-	2,0 - 11	10 - 107	104 - 360	343 - 1100	3,5	7	10	0,036
WSB-M 0,25	14	24	52800	0,9 - 8	3,5 - 17	9,9 - 76	62 - 252	250 - 1550	13	23	20	0,05
WSB-M 0,5x19	19	80	76800	2,6 - 10,6	10 - 86	40 - 209	170 - 800	680 - 4050	12	23	25	0,13
WSB-M 1,0	25	180	108000	6 - 29	24 - 120	70 - 460	440 - 2050	1760 - 10800	15	31	30	0,25
WPB-M 0,15	8	12	24000	-	1,0 - 2,2	2,0 - 7,5	6,1 - 71	-	3,6	8	6	0,02
WPB-M 0,2	10	18	36000	-	1,5 - 2,8	2 - 21	17 - 92	-	3,5	7	10	0,036
WPB-M 0,25	14	24	52800	-	0,9 - 2,4	2,3 - 26	21 - 165	-	13	23	20	0,05
WPB-M 0,5x19	19	80	76800	-	2,6 - 12,5	10 - 89	69 - 555	-	12	23	25	0,13
WPB-M 1,0	25	180	108000	-	6 - 27,5	21 - 195	150 - 1200	-	15	31	30	0,25
WEB-M 0,15	8	12	24000	-	1,0 - 500	-	-	-	3,6	8	6	0,02
WEB-M 0,2	10	18	36000	-	9 - 800	-	-	-	3,5	7	10	0,036
WEB-M 0,25	14	24	52800	-	1,6 - 1600	-	-	-	13	23	20	0,055
WEB-M 0,5x19	19	80	76800	-	9 - 4500	-	-	-	12	23	25	0,14
WEB-M 1,0	25	180	108000	-	22 - 11000	-	-	-	15	31	30	0,29

Specifications

Designed for side forces up to 15° without additional mounting parts

Accessories On enquiry

Included Instructions for use and assembly
1 Stop cap (Steel), 1 Lock nut

Material..... Housing: ProSurf

Temperature -20°C - +80°C

Integrated end stop..... Full stroke operation

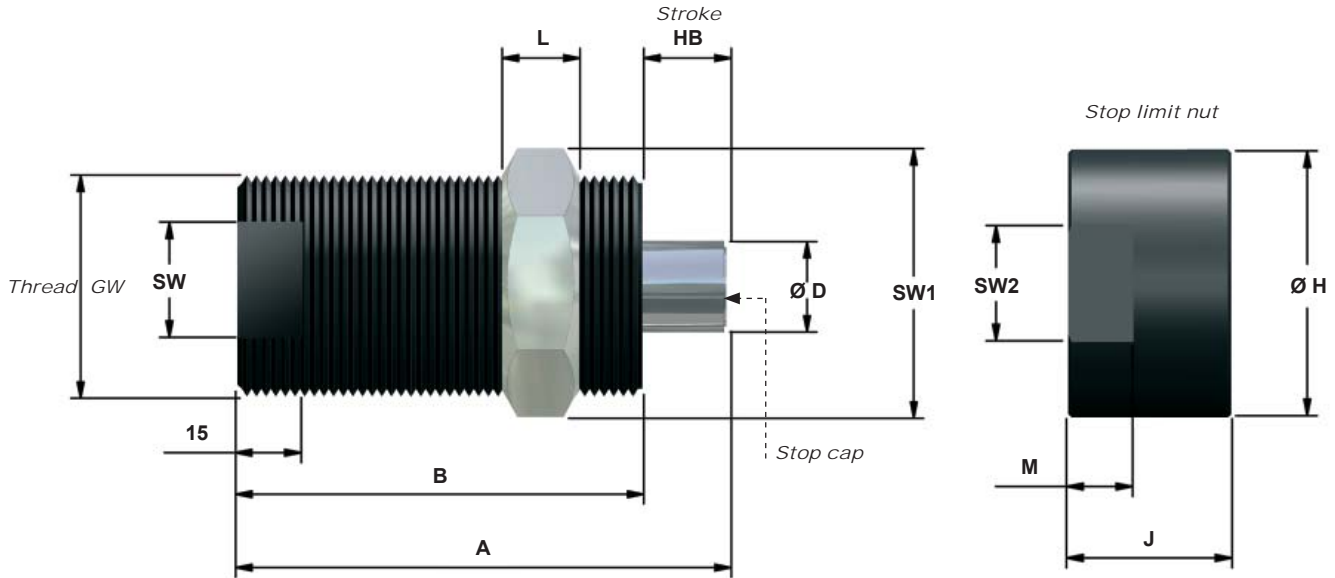


American Metric® Corporation

Group 051

SHOCK ABSORBER

WSK-M



Dimensions

	GW	A mm	B mm	Ø D mm	Ø H mm	J mm	L mm	SW mm	SW1 mm	SW2 mm	M mm
WSK-M 0,5	M 20 x 1,5	49	42	6	25	16	6	18	24	22	8
WSK-M 1,0	M 25 x 1,5	58	50	8	34	18	8	23	30	30	10
WSK-M 1,1	M 30 x 1,5	67	55	10	40	20	8	28	36	36	10
WSK-M 1,25	M 32 x 1,5	67	55	10	40	25	8	30	41	36	10

Performances

	Stroke mm	Energy absorption		Effective mass			Impact Speed	Return spring force		Weight
		Nm/HB (max.)	Nm/h (max.)	-1 (soft) min.-max.kg	-2 (medium) min.-max.kg	-3 (hard) min.-max.kg	V max. m/s	min. N	max. N	g
WSK-M 0,5	7	25	67.500	5 - 22	20 - 180	150 - 480	3,5	11	18	65
WSK-M 1,0	8	40	68.000	8 - 36	33 - 280	250 - 750	3,5	15	20	105
WSK-M 1,1	12	70	105.000	10 - 80	50 - 490	460 - 1.500	3,5	17	30	200
WSK-M 1,25	12	90	135.000	15 - 120	85 - 690	600 - 1.870	3,5	17	30	270

Specifications

WSK-MSelf-compensating, linear

High energy absorptionmax. 135,000 Nm/h

Temperature-20°C - +80°C

AccessoriesOn enquiry

IncludedInstructions for use and assembly

 American Metric® Corporation

Group 051

SHOCK ABSORBER

Stainless Steel Shock Absorbers

Thread	Series	Page
M 4x0,35	WS-M 4x4-1 / 2	10 - 11
M 5x0,5	WS-M 5x4-1 / 2	10 - 11
M 6x0,5	WS-M 6x5-1 / 2 / 3	10 - 11
M 8x1	WS-M 8x5-1 / 2 / 3	10 - 11
	WS-M 0,1-1 / 2 / 3	12 - 13
	WP-M 0,1-1 / 2 / 3	12 - 13
M 10x1	WS-M 10x6-1 / 2 / 3	10 - 11
	WS-M 10x8-1 / 2 / 3	10 - 11
	WE-M 0,15	12 - 13
	WS-M 0,15-1 / 2 / 3 / 4	12 - 13
	WP-M 0,15-1 / 2 / 3	12 - 13
	WEB-M 0,15	29
	WSB-M 0,15-1 / 2 / 3 / 4	29
	WPB-M 0,15-1 / 2 / 3	29
M 12x1	WS-M 12x10-1 / 2 / 3	10 - 11
	WE-M 0,2	12 - 13
	WS-M 0,2-1 / 2 / 3 / 4	12 - 13
	WP-M 0,2-1 / 2 / 3	12 - 13
	WEB-M 0,2	29
	WSB-M 0,2-1 / 2 / 3 / 4	29
	WPB-M 0,2-1 / 2 / 3	29
M 14x1	WE-M 0,25	14 - 15
M 14x1,5 (L)	WS-M 0,25-0 / 1 / 2 / 3 / 4	14 - 15
	WP-M 0,25-1 / 2 / 3	14 - 15
	WEB-M 0,25	29
	WSB-M 0,25-0 / 1 / 2 / 3 / 4	29
WPB-M 0,25-1 / 2 / 3	29	
M 16x1	WE-M 0,35	14 - 15
M 16x1,5 (L)	WS-M 0,35-0 / 1 / 2 / 3 / 4	14 - 15
	WP-M 0,35-1 / 2 / 3	14 - 15
M 20x1	WE-M 0,5x19	14 - 15
M 20x1,5 (L)	WS-M 0,5x19-0 / 1 / 2 / 3 / 4	14 - 15
	WP-M 0,5x19-1 / 2 / 3	14 - 15
	WS-M 0,5x13-0 / 1 / 2 / 3 / 4	14 - 15
	WP-M 0,5x13-1 / 2 / 3	14 - 15
	WE-M 0,5x40	14 - 15
	WS-M 0,5x40-0 / 1 / 2 / 3 / 4	14 - 15
	WP-M 0,5x40-1 / 2 / 3	14 - 15
	WEB-M 0,5x19	29
	WSB-M 0,5x19-0 / 1 / 2 / 3 / 4	29
	WPB-M 0,5x19-1 / 2 / 3	29

Thread	Series	Page
M 20x1,5	WSK-M 0,5-1 / 2 / 3	30
M 24x1,5	WE-M 1,0	16 - 17
M 25x1,5 (T)	WS-M 1,0-0 / 1 / 2 / 3 / 4	16 - 17
	WP-M 1,0-1 / 2 / 3	16 - 17
M 27x3 (R)	WE-M 1,0x40	16 - 17
	WS-M 1,0x40-0 / 1 / 2 / 3 / 4	16 - 17
	WP-M 1,0x40-1 / 2 / 3	16 - 17
	WEB-M 1,0	29
	WSB-M 1,0-0 / 1 / 2 / 3 / 4	29
	WPB-M 1,0-1 / 2 / 3	29
M 25x1,5	WSK-M 1,0-1 / 2 / 3	30
M 30x1,5	WSK-M 1,1-1 / 2 / 3	30
M 32x1,5	WS-M 1,25x1-0 / 1 / 2 / 3 / 4	18 - 19
M 33x1,5 (H)	WP-M 1,25x1-1 / 2 / 3	18 - 19
	WS-M 1,25x2-0 / 1 / 2 / 3 / 4	18 - 19
	WP-M 1,25x2-1 / 2 / 3	18 - 19
M 32x1,5	WSK-M 1,25-1 / 2 / 3	30
M 45x2	WS-M 1,5x1-0 / 1 / 2 / 3 / 4	20 - 21
M 45x1,5 (L)	WP-M 1,5x1-1 / 2 / 3	20 - 21
	WS-M 1,5x2-0 / 1 / 2 / 3 / 4	20 - 21
	WP-M 1,5x2-1 / 2 / 3	20 - 21
	WS-M 1,5x3-0 / 1 / 2 / 3 / 4	20 - 21
	WP-M 1,5x3-1 / 2 / 3	20 - 21
M 62x2	WS-M 2,0x1-0 / 1 / 2 / 3 / 4	22 - 23
M 64x2 (L)	WP-M 2,0x1-1 / 2 / 3	22 - 23
	WS-M 2,0x2-0 / 1 / 2 / 3 / 4	22 - 23
	WP-M 2,0x2-1 / 2 / 3	22 - 23
	WS-M 2,0x4-0 / 1 / 2 / 3 / 4	22 - 23
	WP-M 2,0x4-1 / 2 / 3	22 - 23
	WS-M 2,0x6-0 / 1 / 2 / 3 / 4	22 - 23
	WP-M 2,0x6-1 / 2 / 3	22 - 23

Benefits

- Corrosion resistance in wet environments
- Solid housing
- Short delivery times

Applications:

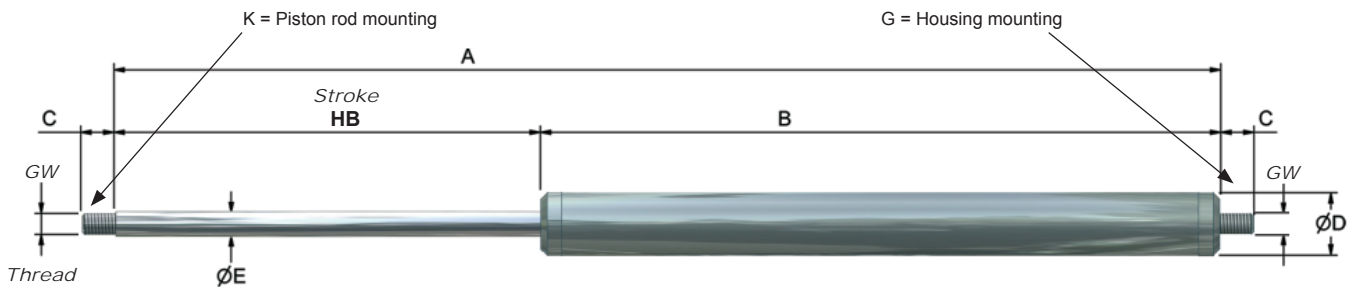
- Food industry
- Clean room technology
- Outside machinery



American Metric® Corporation

DECELERATION CYLINDER

WM-Z / WM-ZG



20% of the stroke without deceleration for the standard models (WM-Z).
Full stroke for the ZG series with volume compensation of the piston rod
Mounting: any position

Dimensions & Performances

	Stroke mm	Max. speed force N	Standard version Z		Version ZG		C mm	ø D mm	ø E mm	GW
			A mm	B mm	A mm	B mm				
WM-Z 1-050	50	1500	160	110	210	160	8	15	6	M 5
WM-Z 1-100	100	1500	260	160	310	210	8	15	6	M 5
WM-Z 1-150	150	1500	360	210	420	270	8	15	6	M 5
WM-Z 1-200	200	1500	470	270	520	320	8	15	6	M 5
WM-Z 2-050	50	3100	160	110	240	190	10	28	8	M 8
WM-Z 2-100	100	3100	260	160	340	240	10	28	8	M 8
WM-Z 2-150	150	3100	360	210	440	290	10	28	8	M 8
WM-Z 2-200	200	3100	460	260	540	340	10	28	8	M 8
WM-Z 2-250	250	3100	560	310	640	390	10	28	8	M 8
WM-Z 2-300	300	2800	660	360	740	440	10	28	8	M 8
WM-Z 2-350	350	2300	760	410	840	490	10	28	8	M 8
WM-Z 2-400	400	1800	860	460	940	540	10	28	8	M 8
WM-Z 3-100	100	10000	275	175	355	255	10	35	14	M 10
WM-Z 3-200	200	10000	475	275	555	355	10	35	14	M 10
WM-Z 3-300	300	10000	675	375	755	455	10	35	14	M 10
WM-Z 3-400	400	10000	875	475	955	555	10	35	14	M 10
WM-Z 3-500	500	8500	1075	575	1155	655	10	35	14	M 10
WM-Z 5-100	100	24000	320	220	420	320	25	50	18	M 16
WM-Z 5-200	200	24000	520	320	620	420	25	50	18	M 16
WM-Z 5-300	300	24000	720	420	820	520	25	50	18	M 16
WM-Z 5-400	400	24000	920	520	1020	620	25	50	18	M 16
WM-Z 5-500	500	22000	1120	620	1220	720	25	50	18	M 16
WM-Z 7-100	100	52000	320	220	470	370	35	70	28	M 24x2
WM-Z 7-200	200	52000	520	320	670	470	35	70	28	M 24x2
WM-Z 7-300	300	52000	720	420	870	570	35	70	28	M 24x2
WM-Z 7-400	400	52000	920	520	1070	670	35	70	28	M 24x2
WM-Z 7-500	500	50000	1120	620	1270	770	35	70	28	M 24x2

Specifications

Mounting..... WM-Z: vertical +/- 30°
WM-ZG: any position

Recommendation: vertical with the piston rod down

Coatinghousing: zinc plated

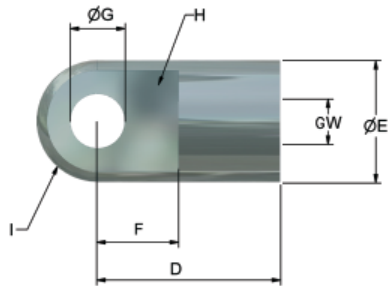
Temperature-20°C - +80°C

Extended Life Time..... piston rod: hard-chrome plated

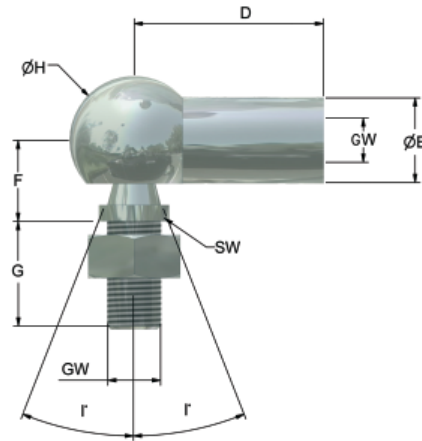
DECELERATION CYLINDER

Accessories

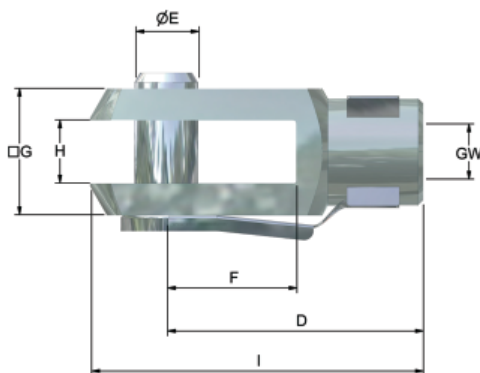
1 Male rod clevis



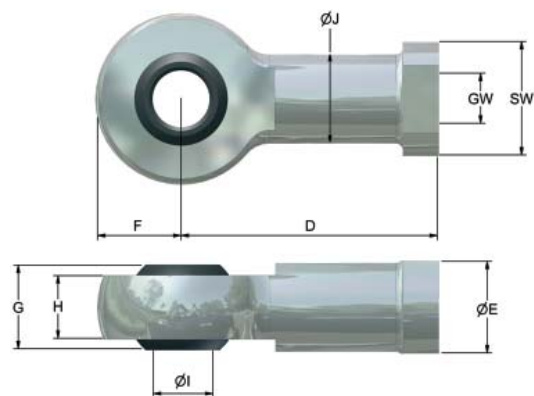
2 Angle joint (DIN 71802)



3 Female rod clevis (DIN 71752)



4 Spherical end bearing (DIN 648)



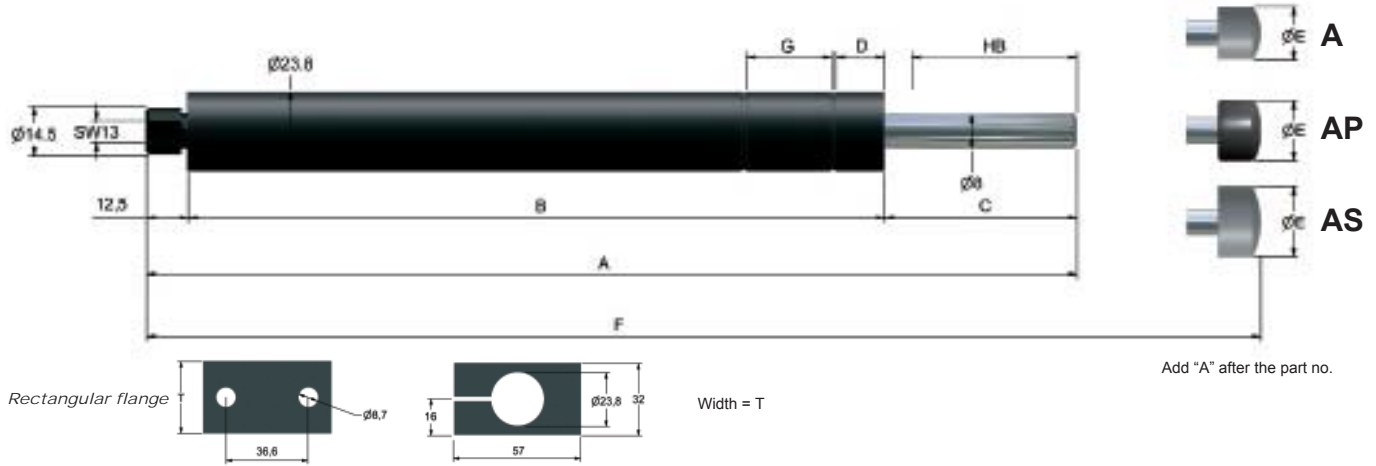
		Thread	D mm	ØE mm	F mm	G mm	H mm	I mm	J mm	SW mm
1	WM-Z 1	M 5	16	12	12	6,1	8	6	-	-
	WM-Z 2	M 8	19	14	12	8,1	10	7	-	-
	WM-Z 3	M 10	27	18	12	8,1	10	9	-	-
2	WM-Z 1	M 5	22	8	9	10	13	18	-	7
	WM-Z 2	M 8	30	13	13	16	20	18	-	11
	WM-Z 3	M 10	35	16	16	19	24	18	-	13
	WM-Z 5	M 16	45	22	20	28	30	18	-	16
3	WM-Z 1	M 5	20	5	9	10	5	26	-	-
	WM-Z 2	M 8	32	8	16	16	8	42	-	-
	WM-Z 3	M 10	40	10	20	20	10	52	-	-
	WM-Z 5	M 16	64	16	32	32	16	83	-	-
	WM-Z 7	M 24 x 2	100	25	50	50	25	132	-	-
4	WM-Z 1	M 5	27	11	9	8	6	5	9	9
	WM-Z 2	M 8	36	16	12	12	9	8	12,5	13
	WM-Z 3	M 10	43	19	14	14	10,5	10	15	17
	WM-Z 5	M 16	64	27	21	21	15	16	20	22
	WM-Z 7	M 24 x 2	94	42	30	31	22	25	33,5	36

Ordering Information

WM-Z 2-050-K3G4-C	
WM	Ametric
Z	Deceleration cylinder (Standard)
ZG	Deceleration cylinder with volume compensation of the piston rod
2	Diameter: 28 mm
050	Stroke: 50 mm
K3	Piston rod mounting: female rod clevis
G4	Housing mounting: spherical end bearing
C	Type of deceleration: A=push, B=pull, C=push and pull

SPEED CONTROLS

WM-V



Dimensions

	A mm	B mm	C mm	D mm	øE (A) mm	F (A) mm	øE (AP) mm	F (AP) mm	øE (AS) mm	F (AS) mm	G mm	T mm
WM-V 10	161	128	21	21,5	16	166	21	168	16	166	25,4	32
WM-V 20	202	157	33	19,1	16	207	21	209	16	207	25,4	32
WM-V 30	278	208	58	14,6	16	283	21	285	16	283	25,4	32
WM-V 40	351	256	83	14,6	16	356	21	358	16	356	25,4	50
WM-V 50	417	298	106	14,6	16	422	21	424	16	422	25,4	50
WM-V 60	524	381	131	14,6	16	529	21	531	16	529	25,4	50
WM-V 70	584	415	156	14,6	16	589	21	591	16	589	25,4	50

Performances

	Stroke mm	Speed force		Speed rates		Return spring force		Weight g
		min. N	max. N	m / min -1	m / min -2	min. N	max. N	
WM-V 10	13	25	3.700	12 - 40	0,015 - 15	12	28	350
WM-V 20	25	25	3.700	12 - 40	0,015 - 15	12	28	450
WM-V 30	50	35	3.700	12 - 40	0,015 - 15	15	32	550
WM-V 40	75	45	3.700	12 - 40	0,015 - 15	15	32	650
WM-V 50	100	45	3.700	12 - 40	0,015 - 15	15	32	800
WM-V 60	125	45	3.700	12 - 40	0,015 - 15	16	40	970
WM-V 70	150	45	3.700	12 - 40	0,015 - 15	16	40	1050

Specifications

Temperature -20°C - +90°C

Material housing: black finish

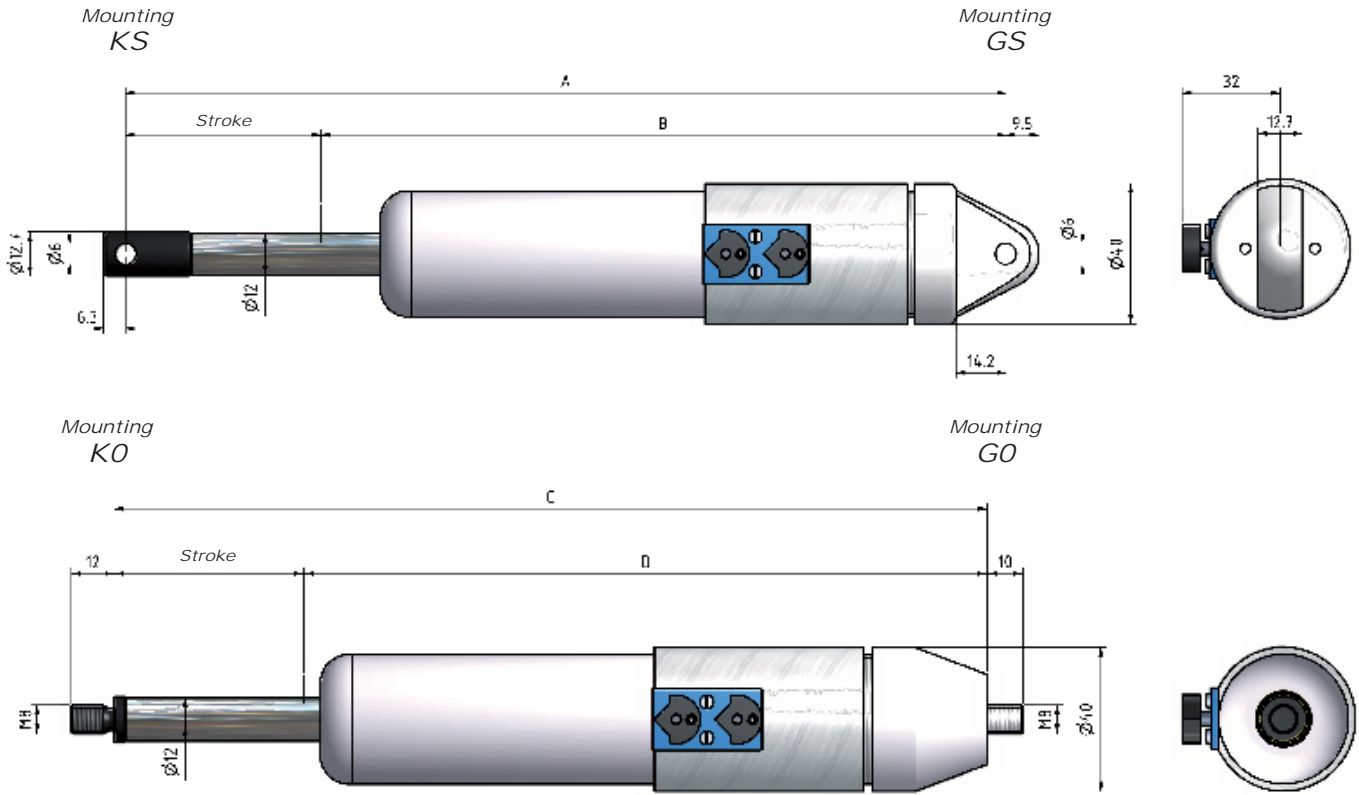
Including 1 retaining ring

..... instructions for use and assembly

Accessories stop cap, rectangular flange

SPEED CONTROL

WM-VD



Accessories Pages 33

Dimensions & Performances

	Stroke mm	Pull N max.	Push N max.	Pull - Push N min.	Speed rates m/min	A mm	B mm	C mm	D mm	Weight g
WM-VD 36 - 050	50	4000	4000	60	0,015 - 40	250	200	240	190	420
WM-VD 36 - 100	100	4000	3500	60	0,015 - 40	350	250	340	240	470
WM-VD 36 - 150	150	4000	2000	60	0,015 - 40	450	300	440	290	520
WM-VD 36 - 200	200	4000	1800	60	0,015 - 40	550	350	540	340	570
WM-VD 36 - 250	250	4000	1500	60	0,015 - 40	650	400	640	390	650

Ordering Information

WM-VD 36-100-K2G4-C

WM	Ametric
VD	Speed control, double-acting
36	Size
100	Stroke
K2	Piston rod - Angle joint
G4	Housing - Spherical end bearing
C	Type of deceleration: A=push, B=pull, C=push and pull

MOUNTING INSTRUCTIONS

Basic information

Shock absorbers may under no circumstances be painted, welded or held with clamps. In hazardous environments (dirt, humidity, oil) shock absorbers must be protected against damage and failure with the necessary accessory. If no further information is given the products can be used for side forces up to 3°. If several shock absorbers are used on the same application, the deceleration has to be distributed equally. The "Torque" (PERFORMANCE) indicates the maximum force by using the flats.

We reserve the right to make technical changes without prior notice.

The Ametric catalogue shows technical data with both minimum and maximum values. If a product is to be used in continuous operation and within a range of 20% from the minimum and maximum values shown, then written confirmation of suitability of use from Ametric is necessary.

Integrated end-stop

Up to the 4,0 Mega-Line series the shock absorbers are provided with an integrated end-stop. If the integrated end-stop is used the remaining energy before end of stroke must not be higher than 10% of the total energy.

For deceleration cylinders and speed controls (V, VD) a fixed stop must be provided 1 - 1,5 mm before end of stroke. For all models which are used as an emergency stop a fixed stop is necessary.

Adjustable shock absorbers, Speed controls (series E, EP, EB, V)

In order to adjust the shock absorber set the adjustment screw to "6" if the velocity is <1,3 m/s or to „4“ if the velocity is >1,3 m/s.

If the absorption is too soft (the mass impacts on the end stop), increase the adjustment by turning the adjustment screw clockwise. The maximum absorption is achieved when the highest number on the scale is reached. If the absorption still appears too soft choose the next larger model. If the absorption is too hard (the mass impacts excessively hard on the shock absorber or the stop cap), the adjustment should be reduced by turning the adjustment screw anti-clockwise. The minimum absorption is at "0" setting. If the absorption still appears too hard, choose the next smaller model. Secure the adjustment screw with the grub-screw. A hexagonal key is supplied for this purpose. Internal damage to the shock absorber can occur if it is not adjusted in gradual increments.

Self-compensating shock absorbers (series M, S, SK, SB, P, PB)

Self-compensating shock absorbers are available in five hardness levels:

They are separated from very soft (0) soft (1) and medium (2) to hard (3) and very hard (4). If the mass in a trial run impacts excessively hard on the fixed stop select the next harder model. If the mass impacts too hard on the shock absorber choose a softer version.



CERTIFICATE

The TÜV CERT Certification Body
of TÜV Rheinland Industrie Service GmbH

certifies in accordance with
TÜV CERT procedures that

American Metric Corporation
52 Metric Rd.
Laurens, SC 29360

has established and applies a quality management system for

Development, production and distribution of:
**Industrial shock absorbers, Heavy duty shock absorbers, Shock absorbers
for elevators, Deceleration cylinders, Speed controls.**
Distribution of air springs.

An audit was performed, Report No. 5148.

Proof has been furnished that the requirements according to

DIN EN ISO 9001:2000

are fulfilled.

The certificate is valid until **2010-05-31**.

Certificate Registration No. **01 100 5148**



Aachen, 2007-08-21

First certification 1995



TÜV Rheinland Group

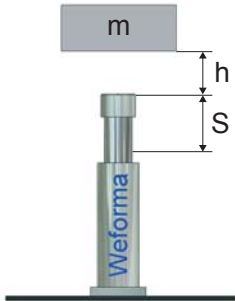
freuer
TÜV CERT Certification Body of
TÜV Rheinland Industrie Service
GmbH

www.tuv.com

HEAVY DUTY SHOCK ABSORBER

Selection

(1) FALLING MASS



Example

$m = 1000 \text{ kg}$
 $H = 1,5 \text{ m}$
 $S = 0,4 \text{ m}$
 $X = 1/h$
 $n = 1$

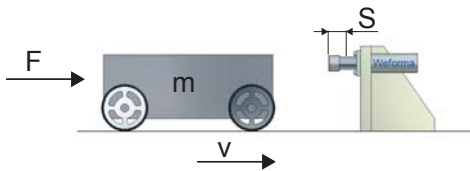
Formulas & Calculation

$W_k = m \cdot g \cdot H = 14.715 \text{ Nm}$
 $W_A = m \cdot g \cdot S = 3.924 \text{ Nm}$
 $W_{kg} = W_k + W_A = 18.639 \text{ Nm}$
 $W_{kg/h} = W_{kg} \cdot X = 18.639 \text{ Nm/h}$

Selection

LDS-40-400-XXXX

(2) LOAD AGAINST SOLID STOP



Example

$m = 40.000 \text{ kg}$
 $v = 2,5 \text{ m/s}$
 $F = 6.000 \text{ N}$
 $S = 0,2 \text{ m}$
 $X = 5/h$
 $n = 2$

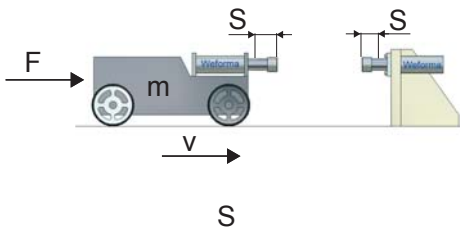
Formulas & Calculation

$W_k = \frac{m \cdot v^2}{2} = 125.000 \text{ Nm}$
 with propelling force
 $W_A = F \cdot S = 1.200 \text{ Nm}$
 $W_{kg} = (W_k + W_A) : n = 63.100 \text{ Nm}$
 $W_{kg/h} = W_{kg} \cdot X = 315.500 \text{ Nm/h}$
 $v_e = v$

Selection

HLS-100-200-XXXX

(3) LOAD AGAINST SOLID STOP WITH SHOCK ABSORBERS



Example

$m = 10.000 \text{ kg}$
 $v = 2,6 \text{ m/s}$
 $F = 4.000 \text{ N}$
 $X = 10/h$
 $S = 0,4 \text{ m}$

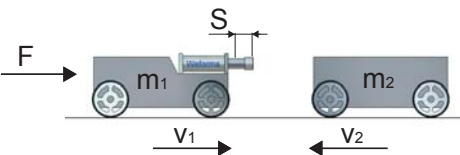
Formulas & Calculation

$W_k = \frac{m \cdot v^2}{2} : 2 = 16.900 \text{ Nm}$
 with propelling force
 $W_A = F \cdot S = 1.600 \text{ Nm}$
 $W_{kg} = W_k + W_A = 18.500 \text{ Nm}$
 $W_{kg/h} = W_{kg} \cdot X = 185.000 \text{ Nm/h}$
 $v_e = v / 2 = 1,3 \text{ m/s}$

Selection

LDS-40-400-XXXX

(4) LOAD AGAINST LOAD WITH ONE SHOCK ABSORBER



Example

$m1 = 5.000 \text{ kg}$
 $v1 = 1,6 \text{ m/s}$
 $m2 = 6.000 \text{ kg}$
 $v2 = 2,0 \text{ m/s}$
 $X = 6/h$
 $S = 0,5 \text{ m}$

Formulas & Calculation

$W_k = \frac{(m1 \cdot v1^2 + m2 \cdot v2^2)}{2 (m1 + m2)} = 17.672 \text{ Nm}$
 with propelling force
 $W_A = F \cdot S$
 $W_{kg} = W_k + W_A$
 $W_{kg/h} = W_{kg} \cdot X = 106.032 \text{ Nm/h}$
 $v_e = v1 + v2 = 3,6 \text{ m/s}$

Selection

LDS-32-500-XXXX

HEAVY DUTY SHOCK ABSORBER

Selection

LOAD AGAINST LOAD WITH SHOCK ABSORBERS (5)

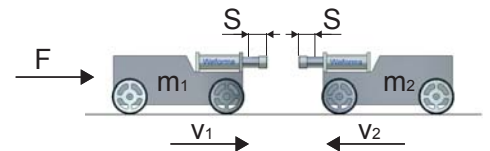
Example

m_1	= 15.000 kg	W_k	=	$\frac{(m_1 \cdot m_2) \cdot (v_1 + v_2)^2}{4(m_1 + m_2)}$	= 26.490 Nm
v_1	= 1,9 m/s				
m_2	= 16.000 kg	with propelling force			
v_2	= 1,8 m/s	W_A	=	$F \cdot S$	
X	= 12/h	W_{kg}	=	$W_k + W_A$	
S	= 0,4 m				
		$W_{kg/h}$	=	$W_{kg} \cdot X$	= 317.880 Nm/h
		v_e	=	$(v_1 + v_2) / 2$	= 1,85 m/s

Formulas & Calculation

Selection

LDS-50-400-XXXX



LOAD ON INCLINE (6)

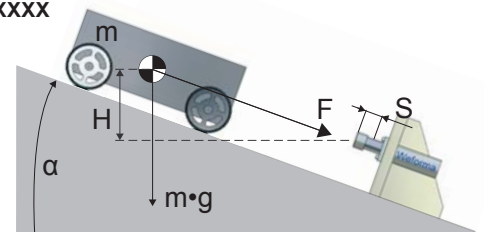
Example

m	= 21.000 kg	W_k	=	$m \cdot g \cdot H$	= 103.005 Nm
H	= 0,5 m	W_A	=	$m \cdot g \cdot \sin \alpha \cdot S$	= 46.303 Nm
α	= 22°	W_{kg}	=	$W_k + W_A$	= 149.308 Nm
S	= 0,6	$W_{kg/h}$	=	$W_{kg} \cdot X$	= 149.308 Nm/h
X	= 1/h	v	=	$v_e = \sqrt{2 \cdot g \cdot H}$	

Formulas & Calculation

Selection

HLS-100-600-XXXX



! For a utilization per stroke >80 % an approval of Ametric is necessary!

Formulas

COUNTERFORCE

$$F_G = \frac{W_{kg} \cdot 1,5^*}{S}$$

DECELERATION TIME

$$t = \frac{2 \cdot S}{v_e} \cdot 1,2^*$$

DECELERATION RATE

$$a = \frac{v^2}{2 \cdot S} \cdot 1,2^*$$

STROKE

$$S = \frac{v^2}{2 \cdot a} \cdot 1,2^*$$

*Calculation for optimum setting. Allow a safety margin!

LEGEND

W_k	(Nm)	Kinetic energy
W_A	(Nm)	Propelling force energy
W_{kg}	(Nm)	Total energy / $W_k + W_A$
$W_{kg/h}$	(Nm/h)	Total energy per hour
m	(kg)	Mass
m_e	(kg)	Effective mass
v	(m/s)	Impact speed
v_e	(m/s)	Effective speed
X	(1/h)	Number of strokes per hour

S	(m)	Stroke
F	(N)	Propelling force
H	(m)	Height
g	(m/s ²)	Acceleration due to gravity (9.81 m/s ²)
α	(°)	Angle
a	(m/s ²)	Acceleration/Deceleration
t	(s)	Deceleration time
F_G	(N)	Counter force



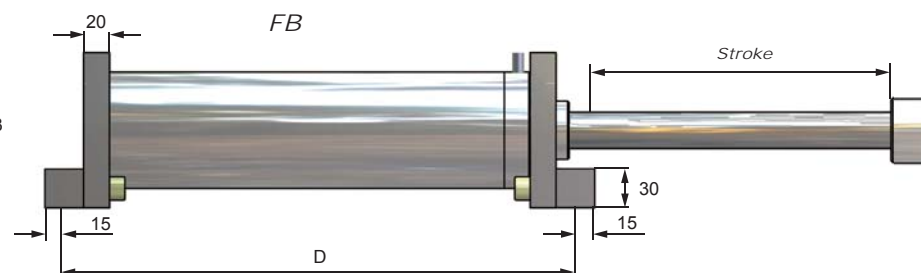
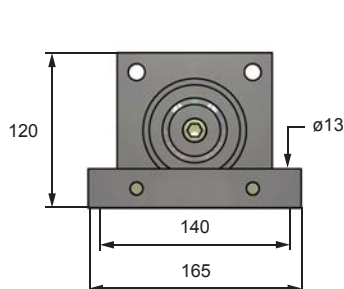
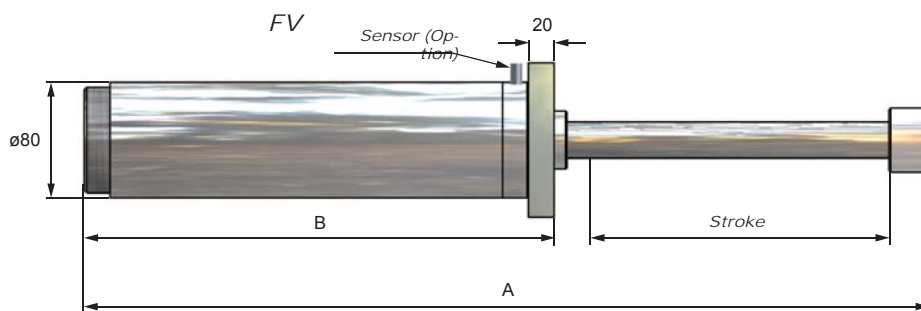
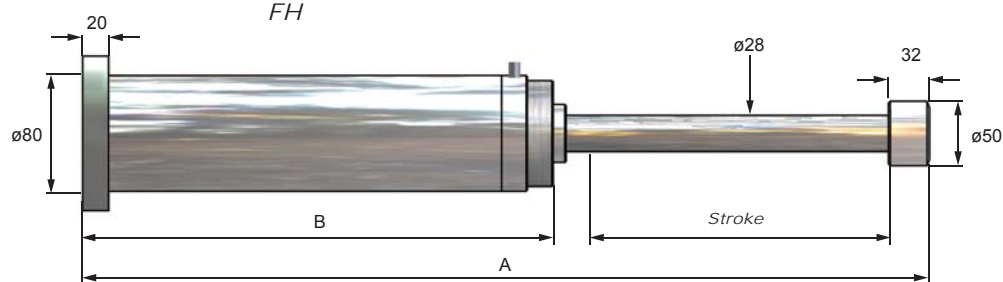
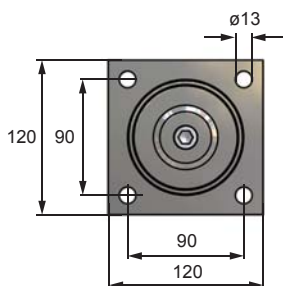
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HEAVY DUTY SHOCK ABSORBER

LDS 32

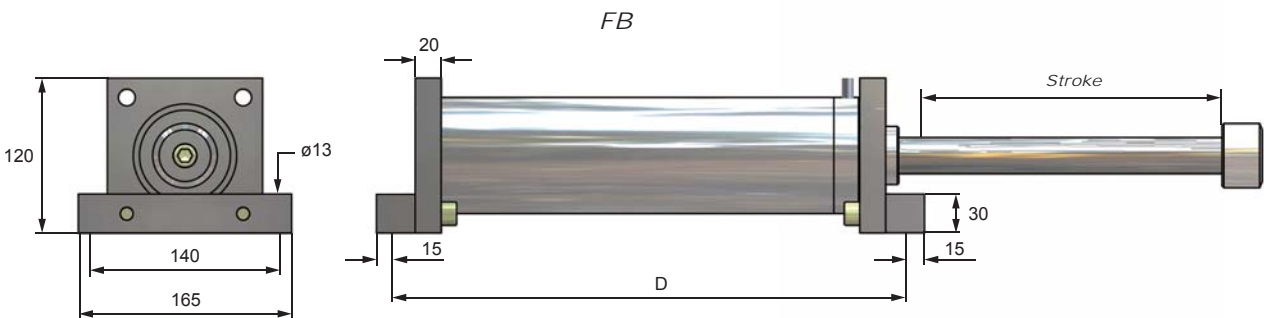
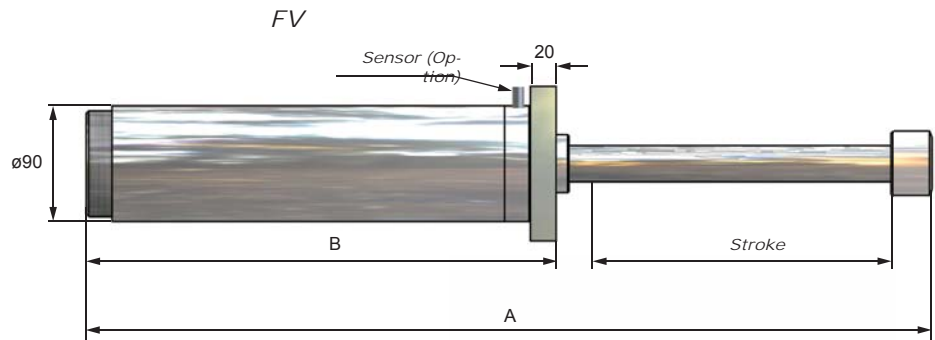
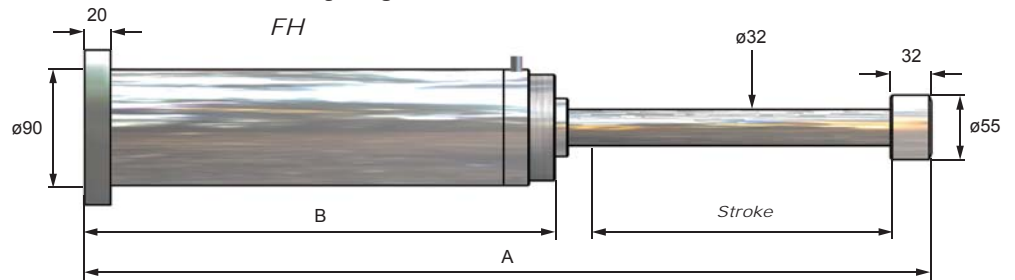
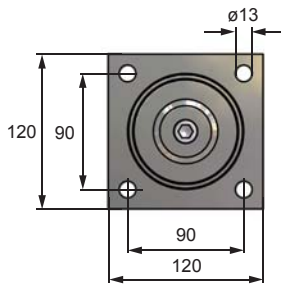
FH



	øPiston	Stroke	Energy/Stroke	max. Counterforce	max. angular tolerance		Weight		A mm	B mm	D mm
	mm	mm	Nm	N	Emergency	Constant Load	FV / FH kg	FB kg			
LDS-32-050	32	50	2000	50000	2,5	2,5	6	8	314	216	246
LDS-32-100	32	100	4000	50000	2,5	2,0	8	10	414	266	296
LDS-32-150	32	150	6000	50000	2,5	2,0	9	11	514	316	346
LDS-32-200	32	200	8000	50000	2,5	2,0	11	13	614	366	396
LDS-32-250	32	250	10000	50000	2,0	1,0	12	14	714	416	446
LDS-32-300	32	300	12000	50000	2,0	1,0	14	16	814	466	496
LDS-32-350	32	350	14000	50000	1,5	1,0	16	18	914	516	546
LDS-32-400	32	400	16000	50000	1,5	0,5	18	20	1014	566	596
LDS-32-450	32	450	18000	50000	1,0	0,5	20	22	1126	626	656
LDS-32-500	32	500	20000	50000	1,0	0,5	22	24	1236	686	716
LDS-32-550	32	550	22000	50000	1,0	0,5	24	26	1346	746	776
LDS-32-600	32	600	24000	50000	1,0	0,5	26	28	1456	806	836

HEAVY DUTY SHOCK ABSORBER

LDS 40



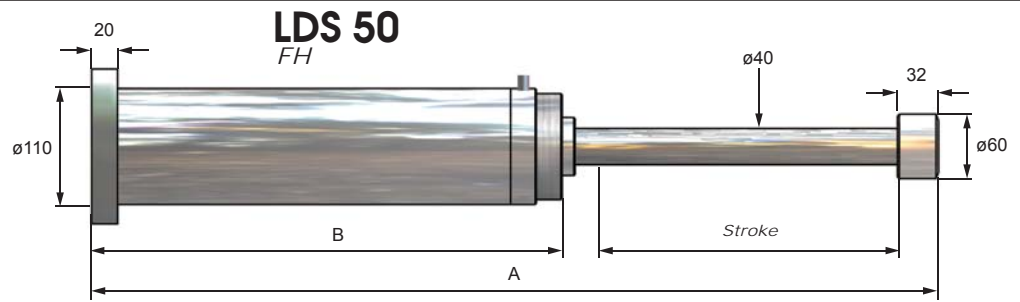
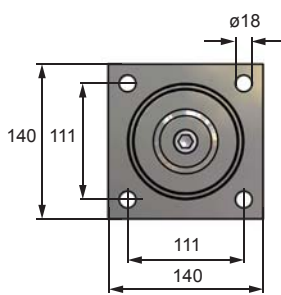
	øPiston	Stroke	Energy/Stroke	max. Counterforce	max. angular tolerance		Weight	Weight	A	B	D
	mm	mm	Nm	N	Emergency	Constant Load	FV / FH kg	FB kg			
LDS-40-050	40	50	3000	80000	2,5	2,5	10	12	298	206	236
LDS-40-100	40	100	6000	80000	2,5	2,0	12	13	398	256	286
LDS-40-150	40	150	9000	80000	2,5	2,0	13	15	498	306	336
LDS-40-200	40	200	12000	80000	2,5	2,0	15	17	598	356	386
LDS-40-250	40	250	16000	80000	2,5	1,0	16	18	698	406	436
LDS-40-300	40	300	19000	80000	2,5	1,0	18	20	798	456	486
LDS-40-350	40	350	22000	80000	2,0	1,0	19	21	898	506	536
LDS-40-400	40	400	25000	80000	2,0	0,5	21	23	1008	566	596
LDS-40-450	40	450	28000	80000	1,5	0,5	23	25	1118	626	656
LDS-40-500	40	500	32000	80000	1,5	0,5	25	27	1228	686	716
LDS-40-550	40	550	35000	80000	1,5	0,5	26	29	1338	746	776
LDS-40-600	40	600	38000	80000	1,0	0,5	28	30	1448	806	836
LDS-40-650	40	650	41000	80000	1,0	0,5	30	32	1558	866	896
LDS-40-700	40	700	44000	80000	1,0	0,5	33	35	1668	926	956
LDS-40-750	40	750	48000	80000	1,0	0,5	35	37	1778	986	1016
LDS-40-800	40	800	51000	80000	1,0	0,5	36	38	1888	1046	1076
LDS-40-850	40	850	50000	70000	1,0	0,5	38	40	1998	1106	1136
LDS-40-900	40	900	50000	70000	1,0	0,5	40	42	2108	1166	1196
LDS-40-950	40	950	49000	60000	1,0	0,5	42	44	2218	1226	1256
LDS-40-1000	40	1000	48000	60000	1,0	0,5	44	46	2328	1286	1316
LDS-40-1200	40	1200	43000	45000	1,0	0,5	46	48	2768	1526	1556



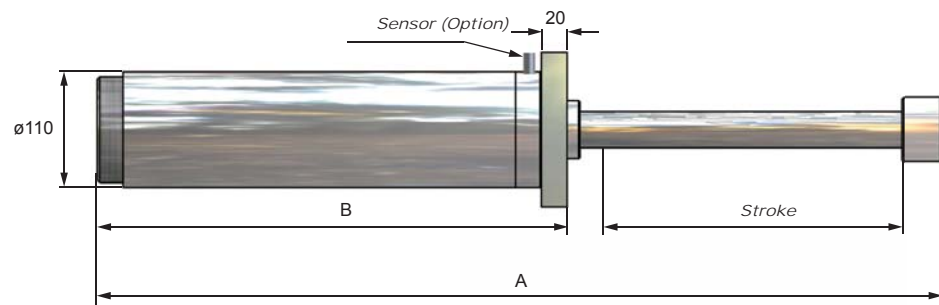
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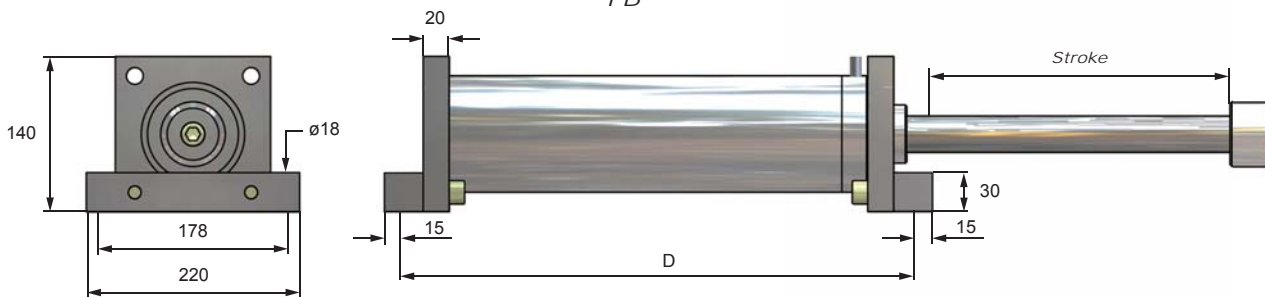
HEAVY DUTY SHOCK ABSORBER



FV

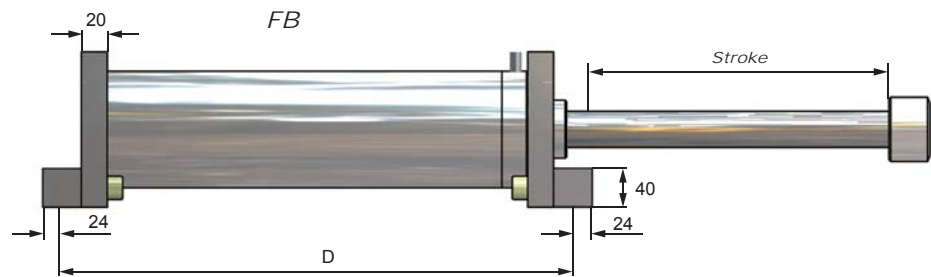
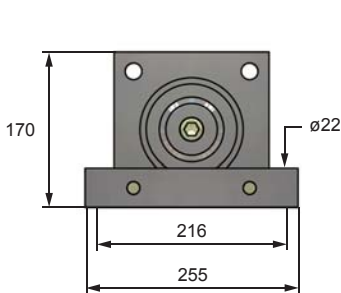
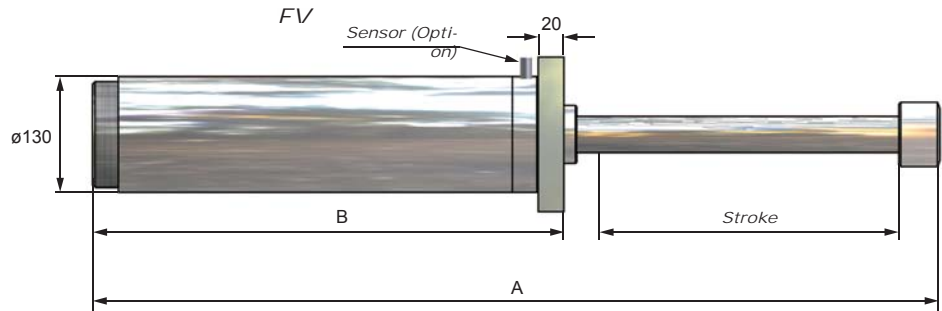
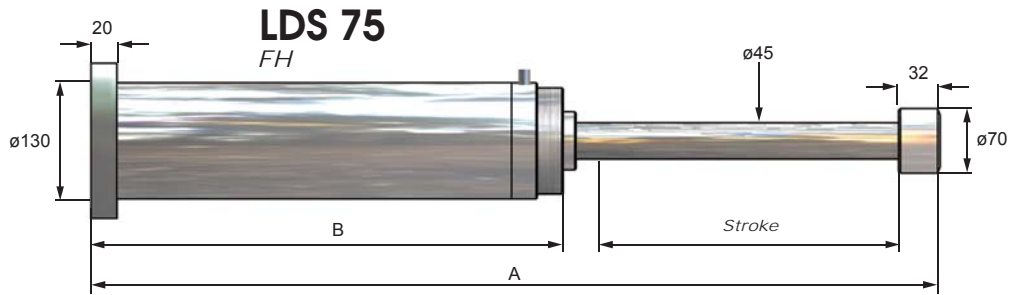
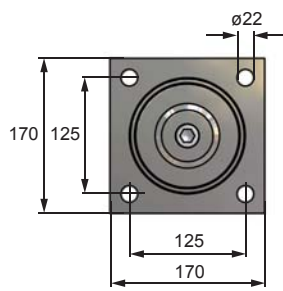


FB



	øPiston	Stroke	Energy/Stroke Nm	max. Counterforce N	max. angular tolerance		Weight FV / FH kg	Weight FB kg	A mm	B mm	D mm
	mm	mm			Emergency	Constant Load					
LDS-50-050	50	50	4000	120000	2,5	2,5	10	12	310	218	248
LDS-50-100	50	100	9000	120000	2,5	2,0	12	13	409	267	297
LDS-50-150	50	150	14000	120000	2,5	2,0	13	15	509	317	347
LDS-50-200	50	200	19000	120000	2,5	2,0	15	17	609	367	397
LDS-50-250	50	250	24000	120000	2,5	1,0	16	18	709	417	447
LDS-50-300	50	300	28000	120000	2,5	1,0	18	20	809	467	497
LDS-50-350	50	350	33000	120000	2,0	1,0	19	21	909	517	547
LDS-50-400	50	400	38000	120000	2,0	0,5	21	23	1009	567	597
LDS-50-450	50	450	43000	120000	1,5	0,5	23	25	1119	627	657
LDS-50-500	50	500	48000	120000	1,5	0,5	25	27	1229	687	717
LDS-50-550	50	550	52000	120000	1,5	0,5	26	29	1339	747	777
LDS-50-600	50	600	57000	120000	1,0	0,5	28	30	1449	807	837
LDS-50-650	50	650	62000	120000	1,0	0,5	30	32	1559	867	897
LDS-50-700	50	700	67000	120000	1,0	0,5	33	35	1669	927	957
LDS-50-750	50	750	72000	120000	1,0	0,5	35	37	1779	987	1017
LDS-50-800	50	800	76000	120000	1,0	0,5	36	38	1889	1047	1077
LDS-50-850	50	850	74000	100000	1,0	0,5	38	40	1999	1107	1137
LDS-50-900	50	900	72000	100000	1,0	0,5	40	42	2109	1167	1197
LDS-50-950	50	950	72000	90000	1,0	0,5	42	44	2219	1227	1257
LDS-50-1000	50	1000	72000	90000	1,0	0,5	44	46	2329	1287	1317
LDS-50-1100	50	1100	68000	80000	1,0	0,5	45	47	2569	1427	1457
LDS-50-1200	50	1200	64000	67000	1,0	0,5	46	48	2769	1527	1557

HEAVY DUTY SHOCK ABSORBER



	øPiston	Stroke	Energy/Stroke	max. Counterforce	max. angular tolerance		Weight	Weight	A mm	B mm	D mm
	mm	mm	Nm	N	Emergency	Constant Load	FV / FH kg	FB kg			
LDS-75-050	75	50	9600	240000	2.0	2.0	23	29	318	226	258
LDS-75-075	75	75	14400	240000	2.0	1.5	25	31	365	247	279
LDS-75-100	75	100	19200	240000	2.0	1.5	26	32	418	276	308
LDS-75-125	75	125	24000	240000	2.0	1.5	27	33	468	301	333
LDS-75-150	75	150	28800	240000	2.0	1.5	29	35	540	348	380
LDS-75-200	75	200	38400	240000	1.5	1.0	31	37	618	376	408
LDS-75-250	75	250	48000	240000	1.5	0.5	34	40	718	426	458
LDS-75-300	75	300	57600	240000	1.5	0.5	37	43	818	476	508
LDS-75-350	75	350	67200	240000	1.5	0.5	40	46	969	576	608
LDS-75-400	75	400	76800	240000	1.5	0.5	43	49	1070	627	659
LDS-75-450	75	450	86400	240000	1.5	0.5	45	51	1171	678	710
LDS-75-500	75	500	94000	235000	1.5	0.5	50	56	1272	729	761
LDS-75-600	75	600	112800	235000	1.0	0.5	56	62	1472	830	862
LDS-75-700	75	700	136900	230000	1.0	0.5	62	68	1675	932	964
LDS-75-800	75	800	134000	195000	1.0	0.5	67	73	1876	1033	1065
LDS-75-900	75	900	134000	185000	1.0	0.5	73	79	2125	1182	1214
LDS-75-1000	75	1000	134000	170000	1.0	0.5	79	85	2324	1282	1314
LDS-75-1100	75	1100	134000	160000	1.0	0.5	85	91	2525	1382	1414
LDS-75-1200	75	1200	134000	150000	1.0	0.5	91	97	2724	1482	1514
LDS-75-1400	75	1400	134000	140000	0.8	0.3	102	107	3275	1832	1864
LDS-75-1500	75	1500	130000	140000	0.8	0.3	105	110	3491	1948	1980
LDS-75-1600	75	1600	120000	140000	0.6	0.2	120	125	3725	2082	2114
LDS-75-1800	75	1800	120000	140000	0.5	0.2	140	145	4175	2332	2364

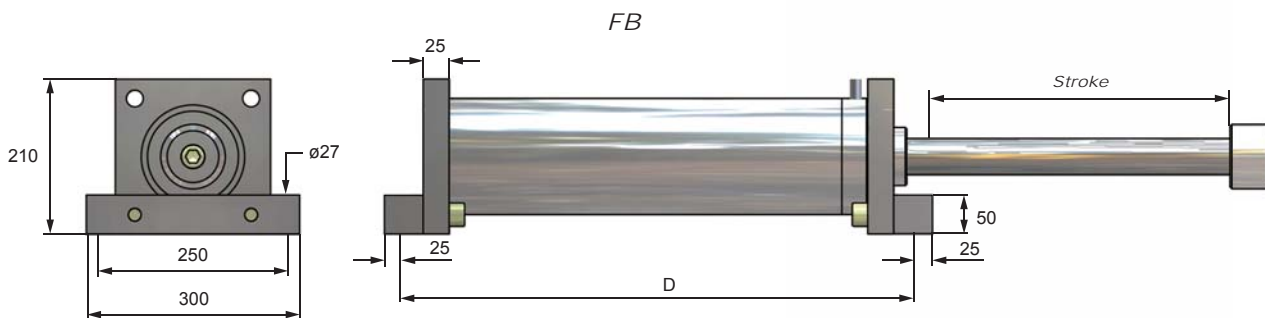
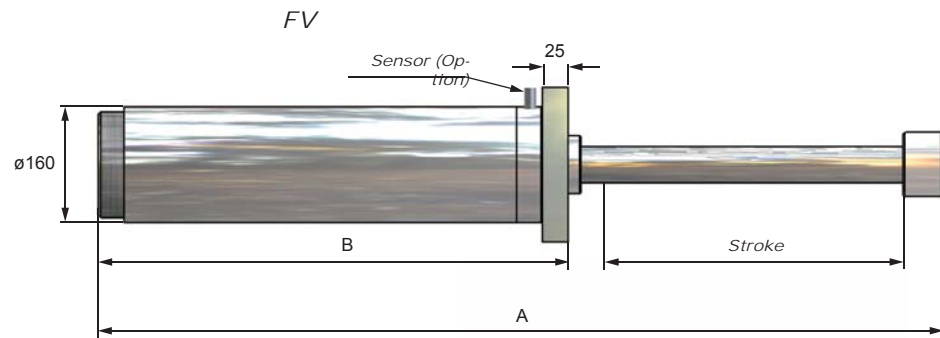
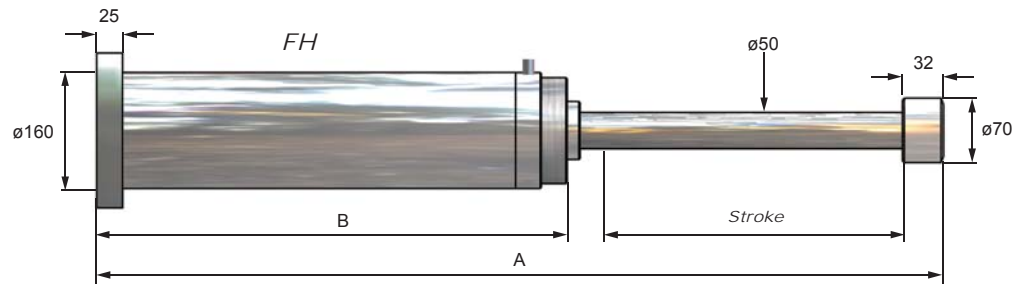
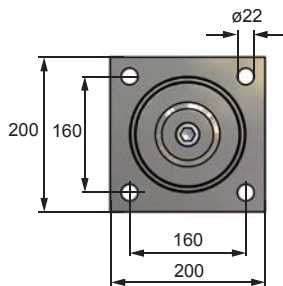


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Group 051

HEAVY DUTY SHOCK ABSORBER

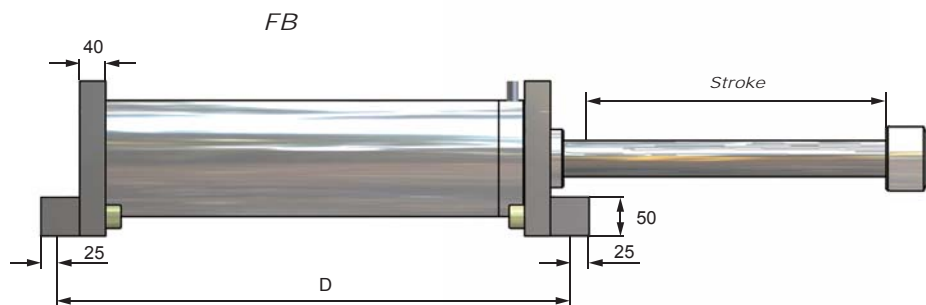
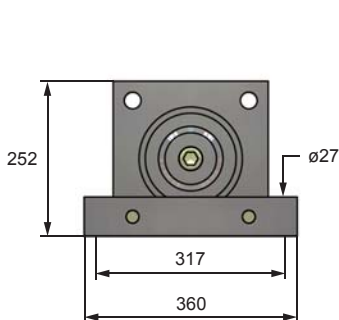
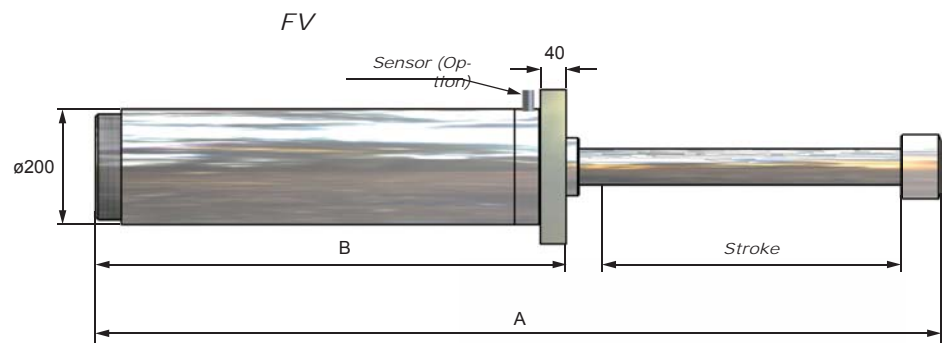
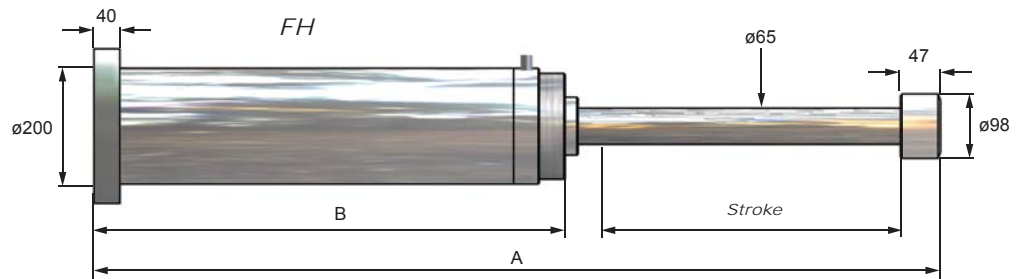
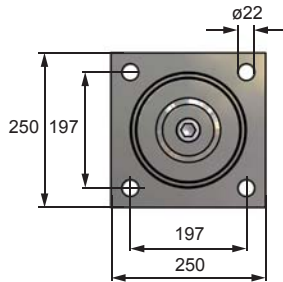
LDS 80



	øPiston	Stroke	Energy/Stroke	max. Counterforce	max. angular tolerance		Weight	Weight	A mm	B mm	D mm
	mm	mm	Nm	N	Emergency	Constant Load	FV / FH kg	FB kg			
LDS-80-050	80	50	11800	280000	2,0	2,0	26	32	418	325	375
LDS-80-100	80	100	24200	280000	2,0	1,5	29	35	543	400	450
LDS-80-150	80	150	36300	280000	2,0	1,5	32	38	643	450	500
LDS-80-200	80	200	48500	280000	1,5	0,5	34	40	768	525	575
LDS-80-250	80	250	61500	280000	1,5	0,5	37	42	868	575	625
LDS-80-300	80	300	73800	280000	1,5	0,5	41	47	993	650	700
LDS-80-400	80	400	98000	280000	1,5	0,5	46	52	1193	750	800
LDS-80-500	80	500	122300	275000	1,5	0,5	54	60	1418	875	925
LDS-80-600	80	600	147400	275000	1,0	0,5	61	67	1618	975	1025
LDS-80-700	80	700	171000	260000	1,0	0,5	65	71	1843	1100	1150
LDS-80-800	80	800	198000	245000	1,0	0,5	71	77	2043	1200	1250
LDS-80-900	80	900	210000	225000	1,0	0,5	76	82	2293	1350	1400
LDS-80-1000	80	1000	210000	225000	1,0	0,5	84	90	2493	1450	1500
LDS-80-1200	80	1200	200000	190000	1,0	0,3	98	103	2893	1650	1700
LDS-80-1400	80	1400	190000	150000	0,8	0,3	118	125	3393	1950	2000
LDS-80-1600	80	1600	190000	150000	0,6	0,2	140	150	3893	2250	2300
LDS-80-1800	80	1800	190000	150000	0,5	0,2	175	185	4293	2450	2500

HEAVY DUTY SHOCK ABSORBER

LDS 100



	øPiston	Stroke	Energy/Stroke	max. Counterforce	max. angular tolerance		Weight	Weight	A mm	B mm	D mm
	mm	mm	Nm	N	Emergency	Constant Load	FV / FH kg	FB kg			
LDS-100-050	100	50	15500	360000	2,0	2,0	55	90	425	313	363
LDS-100-100	100	100	31000	360000	2,0	1,5	60	95	525	363	413
LDS-100-150	100	150	46500	360000	2,0	1,5	65	100	625	413	463
LDS-100-200	100	200	62000	360000	1,5	1,0	70	105	725	463	513
LDS-100-250	100	250	77500	360000	1,5	0,5	75	110	825	513	563
LDS-100-300	100	300	93000	360000	1,5	0,5	85	120	1000	643	693
LDS-100-400	100	400	124000	360000	1,5	0,5	95	130	1200	743	793
LDS-100-500	100	500	155000	360000	1,5	0,5	105	140	1405	848	898
LDS-100-600	100	600	186000	360000	1,5	0,5	115	150	1605	948	998
LDS-100-700	100	700	217000	360000	1,0	0,5	125	160	1805	1048	1098
LDS-100-800	100	800	248000	360000	1,0	0,5	135	170	2015	1153	1203
LDS-100-900	100	900	279000	360000	1,0	0,5	145	180	2215	1253	1303
LDS-100-1000	100	1000	250000	300000	1,0	0,5	155	190	2415	1353	1403
LDS-100-1200	100	1200	212000	212000	1,0	0,5	165	210	2815	1553	1603

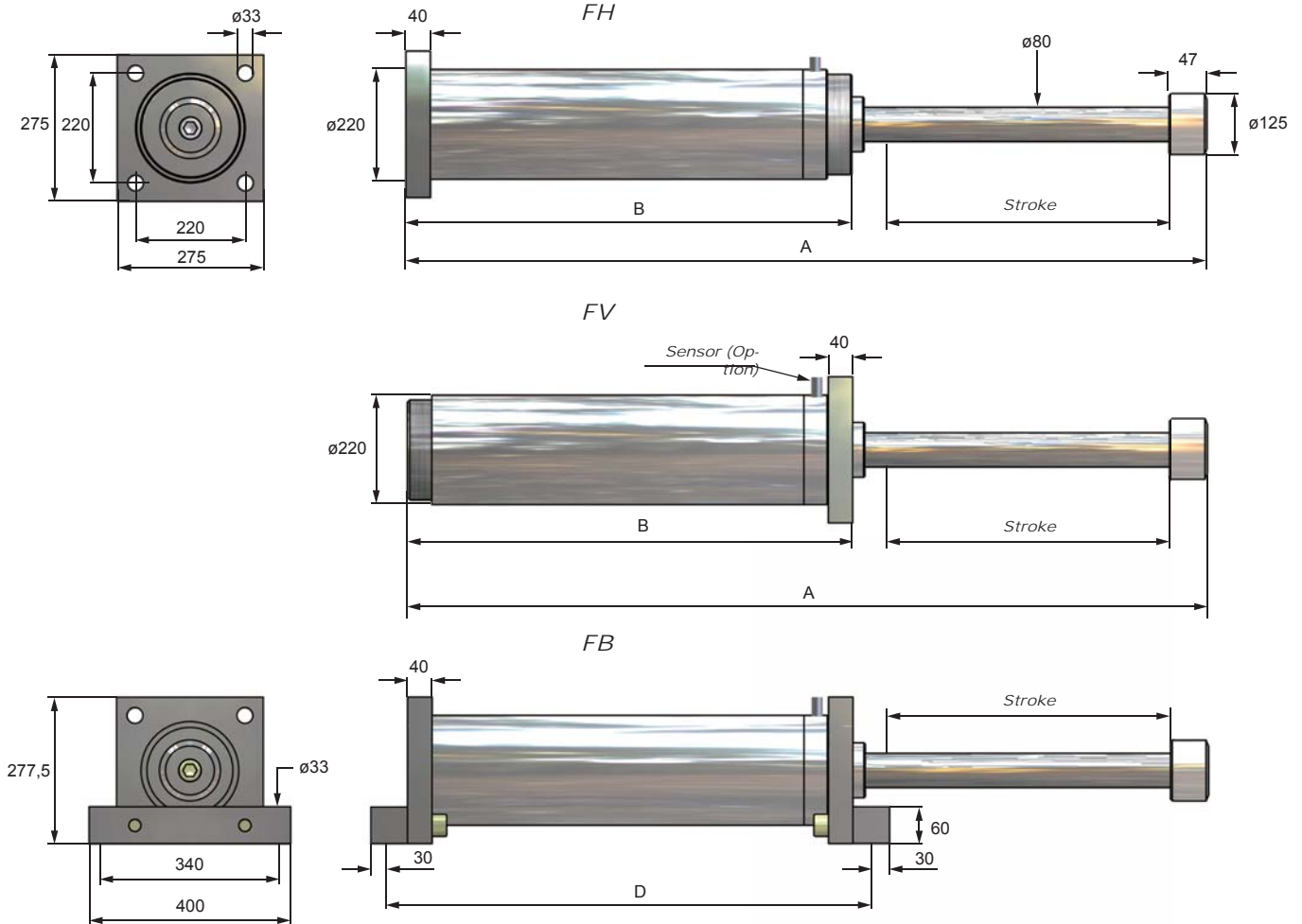


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HEAVY DUTY SHOCK ABSORBER

LDS 125

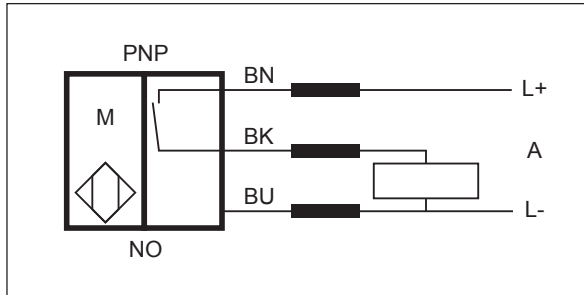
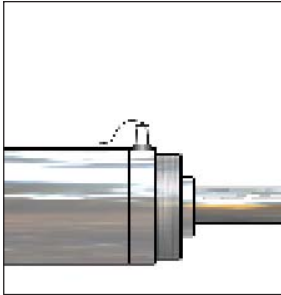


	øPiston	Stroke	Energy/Stroke	max. Counterforce	max. angular tolerance		Weight	Weight	A mm	B mm	D mm
	mm	mm	Nm	N	Emergency	Constant Load	FV / FH kg	FB kg			
LDS-125-050	125	50	23000	552000	2,0	2,0	85	127	462	295	355
LDS-125-100	125	100	46000	552000	2,0	1,5	90	132	562	345	405
LDS-125-150	125	150	69000	552000	2,0	1,5	99	141	662	395	455
LDS-125-200	125	200	92000	552000	1,5	1,0	105	147	762	445	505
LDS-125-250	125	250	115000	552000	1,5	0,5	115	157	872	505	565
LDS-125-300	125	300	138000	552000	1,5	0,5	120	162	984	567	627
LDS-125-400	125	400	185000	552000	1,5	0,5	135	177	1227	710	770
LDS-125-500	125	500	231000	552000	1,5	0,5	165	207	1475	858	918
LDS-125-600	125	600	277000	552000	1,5	0,5	180	222	1723	1006	1066
LDS-125-700	125	700	325000	552000	1,0	0,5	190	232	1970	1153	1213
LDS-125-800	125	800	370000	552000	1,0	0,5	205	247	2219	1302	1362
LDS-125-900	125	900	415000	552000	1,0	0,5	215	257	2467	1450	1510
LDS-125-1000	125	1000	460000	552000	1,0	0,5	230	272	2715	1598	1658
LDS-125-1200	125	1200	410000	410000	1,0	0,5	250	292	3211	1894	1954

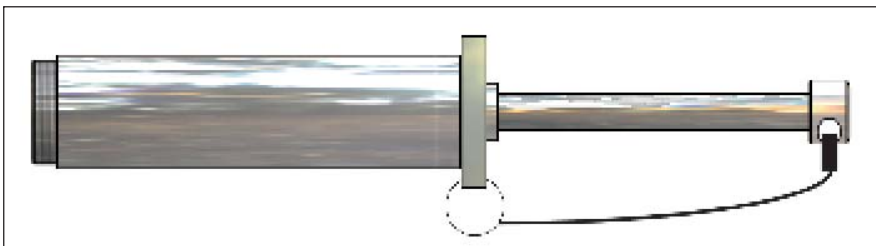
HEAVY DUTY SHOCK ABSORBER

Accessories

Proximity Switch

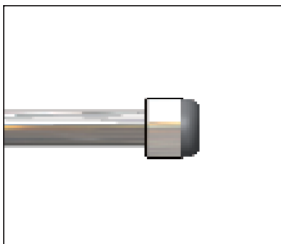


Security Chain



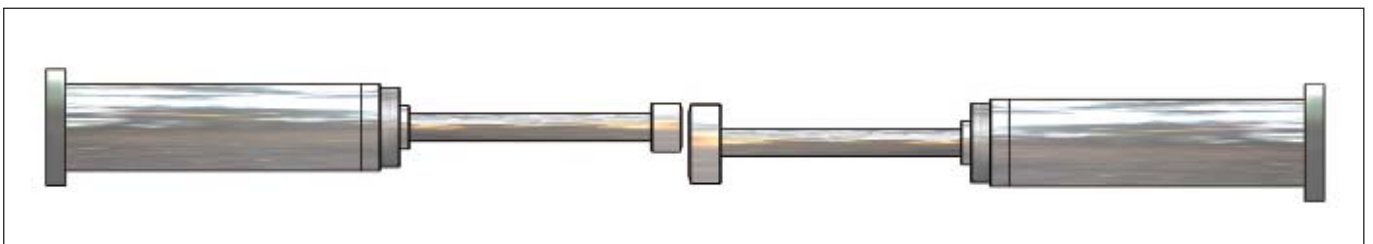
For safety reasons we recommend the use of a security chain when the installation height of the LDS / HLS heavy-duty shock absorber is 2 m or above. The customer decides on the use.

Stop Cap



	<i>D</i>	<i>F</i>	<i>ø E1</i>
LDS 32	39,5	18	31
LDS 40	59,0	25	49
LDS 50	59,0	25	49

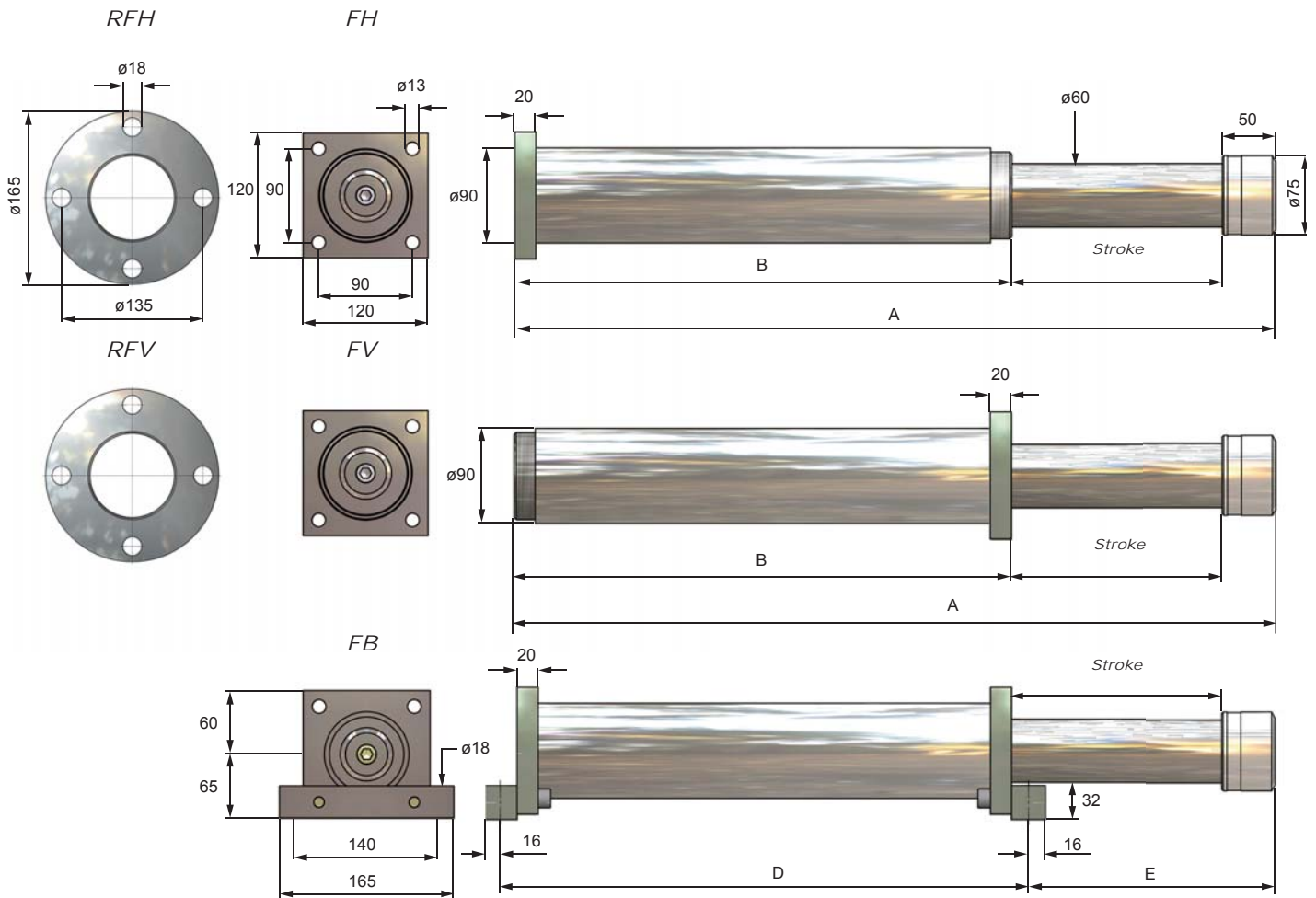
Enlarged Stop Cap



Application: Shock absorber against Shock absorber

HEAVY DUTY SHOCK ABSORBER

HLS 63

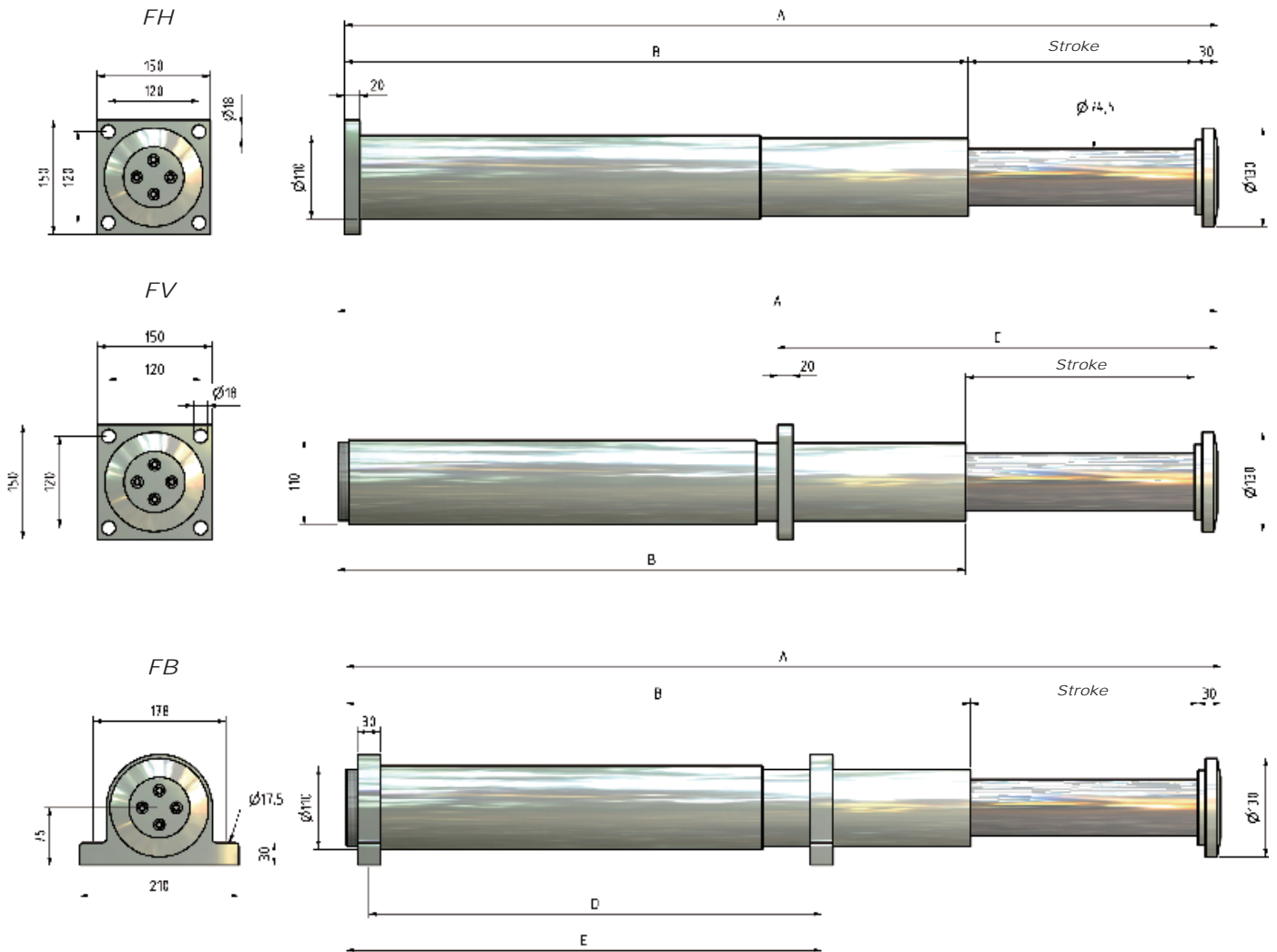


Rear flange recommended only for shock absorbers up to 300 mm stroke!

	ØPiston mm	Stroke mm	Energy/Stroke Nm	max. Counterforce N	Piston return force		max. angular tolerance °	Weight		A mm	B mm	D mm	E mm
					min. N	max. N		FV / FH kg	FB kg				
HLS-63-050	63	50	7500	180000	1500	14000	2,5	13,5	15,5	329	229	261	84
HLS-63-100	63	100	15000	180000	1500	14000	2,5	14,0	17,0	440	290	322	134
HLS-63-150	63	150	22500	180000	1500	18000	2,5	15,5	18,5	585	385	417	184
HLS-63-200	63	200	30000	180000	1500	19000	2,5	17,0	20,0	720	470	502	234
HLS-63-250	63	250	37500	180000	1500	21000	2,5	19,5	22,0	865	565	597	284
HLS-63-300	63	300	45000	180000	1500	21000	2,5	22,0	25,0	1000	650	682	334
HLS-63-350	63	350	52500	180000	1500	21000	2,5	24,0	27,0	1145	745	777	384
HLS-63-400	63	400	60000	180000	1500	21000	1,5	27,5	30,5	1280	830	862	434
HLS-63-500	63	500	75000	180000	1500	21000	1,5	30,0	33,0	1560	1010	1042	534
HLS-63-600	63	600	90000	180000	1500	21000	1,5	32,5	35,5	1840	1190	1222	634

HEAVY DUTY SHOCK ABSORBER

HLS 75



Rear flange recommended only for shock absorbers up to 300 mm stroke!

	øPiston mm	Stroke mm	Energy/Stroke Nm	max. Counterforce N	Piston return force		max. angular tolerance °	Weight FV / FH kg	Weight FB kg	A mm	B mm	C mm	D mm	E mm
					min. N	max. N								
HLS-75-050	75	50	15000	350000	4000	35000	2,5	20	26	363	283	153	174	239
HLS-75-100	75	100	30000	350000	4000	35000	2,5	24	30	493	363	213	254	319
HLS-75-150	75	150	45000	350000	4000	35000	2,5	29	35	623	443	273	334	399
HLS-75-200	75	200	60000	350000	4000	35000	2,5	34	40	838	608	359	474	539
HLS-75-300	75	300	90000	350000	4000	35000	2,5	44	50	1154	824	577	572	637
HLS-75-400	75	400	120000	350000	4000	35000	2,5	54	60	1468	1038	677	786	851
HLS-75-500	75	500	130000	300000	4000	35000	2,0	60	66	1719	1189	777	938	1002
HLS-75-600	75	600	150000	300000	4000	35000	1,5	67	73	1974	1344	877	1092	1157
HLS-75-700	75	700	160000	250000	4000	35000	1,5	75	81	2269	1539	977	1288	1352
HLS-75-800	75	800	170000	250000	4000	35000	1,5	84	90	2563	1733	1077	1482	1546
HLS-75-1000	75	1000	190000	230000	4000	35000	1,5	96	102	3063	2033	1277	1781	1846
HLS-75-1200	75	1200	200000	210000	4000	35000	1,5	112	118	3634	2004	1477	2152	2217

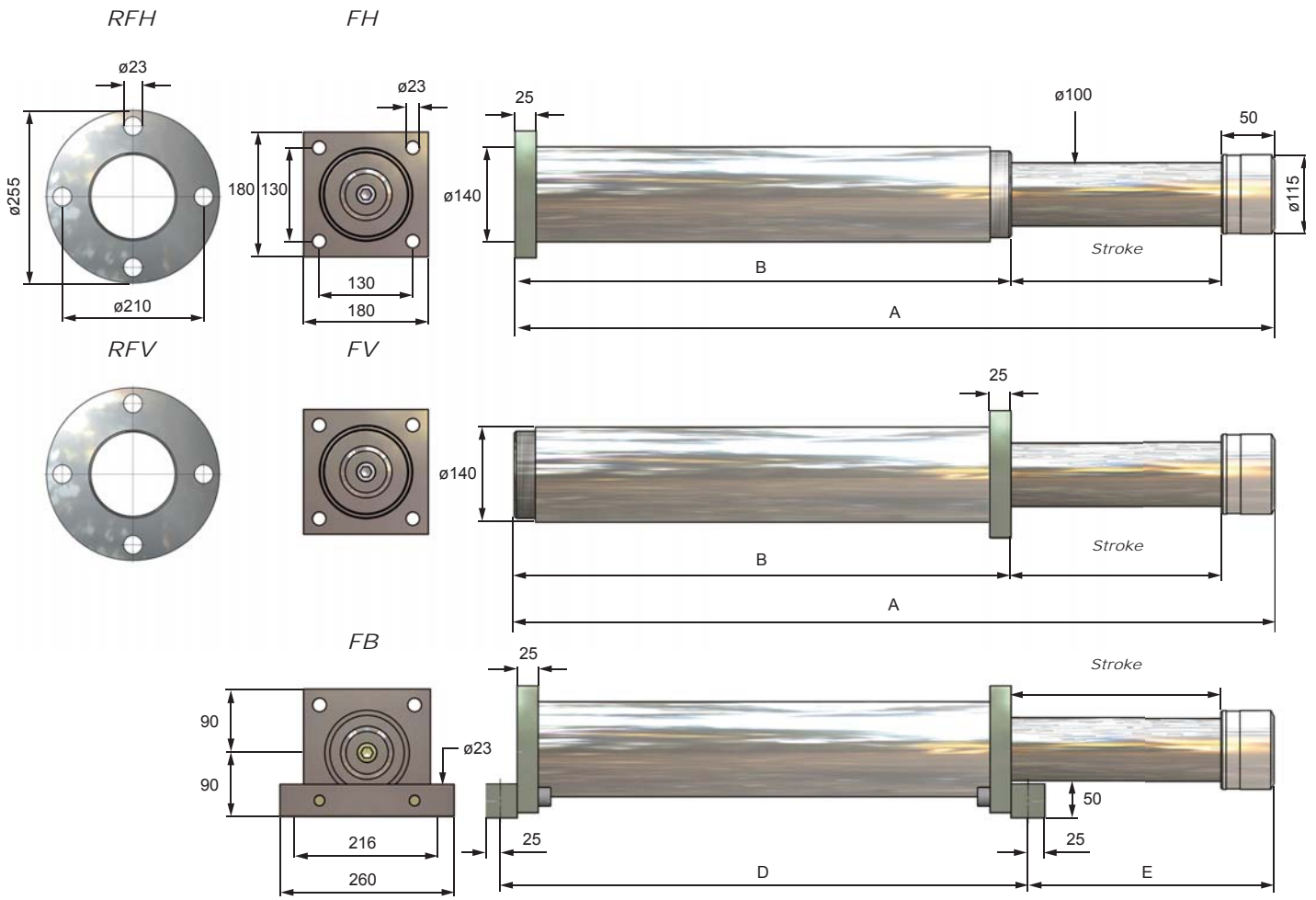


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HEAVY DUTY SHOCK ABSORBER

HLS 100



Rear flange recommended only for shock absorbers up to 300 mm stroke!

	øPiston mm	Stroke mm	Energy/Stroke Nm	max. Counterforce N	Piston return force		max. angular tolerance °	Weight FV / FH kg	Weight FB kg	A mm	B mm	D mm	E mm
					min. N	max. N							
HLS-100-050	100	50	19000	455000	3800	40000	2,5	37,5	45,0	405	305	355	75
HLS-100-100	100	100	39000	455000	3800	40000	2,5	40,0	47,5	505	355	405	125
HLS-100-150	100	150	55000	455000	3800	40000	2,5	43,0	50,5	605	405	455	175
HLS-100-200	100	200	76000	455000	3800	40000	2,5	49,0	56,5	740	490	540	225
HLS-100-250	100	250	95000	455000	3800	40000	2,5	56,0	63,5	875	575	625	275
HLS-100-300	100	300	115000	455000	3800	40000	2,5	62,0	69,5	1010	660	710	325
HLS-100-350	100	350	135000	455000	3800	40000	2,5	67,0	74,5	1145	745	795	375
HLS-100-400	100	400	155000	455000	3800	40000	1,5	74,0	81,5	1280	830	880	425
HLS-100-450	100	450	170000	455000	3800	40000	1,5	79,0	86,5	1415	915	965	475
HLS-100-500	100	500	190000	455000	3800	40000	1,5	85,0	92,5	1550	1000	1050	525
HLS-100-600	100	600	230000	455000	3800	46000	1,5	92,5	100,0	1820	1170	1220	625

HEAVY DUTY SHOCK ABSORBER

Instructions for use and assembly LDS / HLS

HLS and LDS series shock absorbers are delivered ready for installation

After receiving the shock absorbers, check for transport damage. This applies particularly for damage to the chrome finish on the piston rod. Before using, ensure that the part number in the order confirmation and on the shipping documents coincides with the number on the shock absorber.

Use the shock absorbers only as specified in the technical data, based on the design.

Always observe the following installation instructions:

- Ensure that shock absorbers are installed rigidly and vibration-free.
- Ensure that the stop surfaces are perpendicular to the stop cap and mounting flange
- Ensure that the mass is applied parallel to the damping direction and in the center of the stop cap/piston rod (see angle deviation in our catalog)
- The mounting bolts should not be more than 2 mm smaller than the intended mounting holes.
- Ensure that the shock absorbers are never subjected to direct or indirect distortion, because this would prevent the piston rod from moving.
- Protect the piston rod against damage
- From 800 mm stroke the shock absorber has to be mounted with foot mounting or with flanges at each side.

We recommend to use a front flang mounting from 300 mm stroke.

For safety reasons we recommend the use of a security chain when the installation height of the LDS / HLS heavy-duty shock absorber is 2 m or above. The customer decides on the use.

In creep gear (maximum shock absorber compression rate 0.5 m/s) the shock absorber should not be compressed more than 70% of its maximum stroke.

Operating temperature (standard version):

-20° C to max. +80° C;

Continuous operation (standard version):

-10° C to max. +70° C;

Operating temperature (LT version):

-32° C to max. +50° C;

Continuous operation (LT version):

-32° C to max. +50° C;

When used at low temperatures down to -32° C we recommend stationary installation; mobile mounting can result in leakage of the shock absorbers due to transfer of vibration!

Do not weld shock absorbers or subject to aggressive liquids. If shock absorbers are painted, ensure that the piston rod and the area where the piston rod enters the housing remain paint-free.

If it is not possible to maintain the above conditions, obtain written approval from Weforma Dämpfungstechnik GmbH before using.

If the piston rod does not extend by itself, the gas bladder can be filled through the pressure valve similar to a passenger car tire. Filling pressure: 6 bars/85 psi, Medium: Nitrogen, compressed air also possible.

The filling valve for gas is labelled "AIR". In the HLS series, it is located in the stop cap; in the LDS series in the front flange mounting; in older versions it is situated in the base of the housing.

The filling screw for oil is located in the front flange mounting in the LDS series and in the base section in the HLS. The filling screw for oil must not be opened by the customer without consulting Weforma.

After an accident be sure to check the shock absorber for proper function and leakage. Otherwise perform this test once a year.

Design: Compression of piston rod in creep gear; after the load is relieved the piston rod should return to the original position.

Caution: The shock absorber is charged with gas at a pressure of 6 bars and should never be opened by customers. Risk of injury!

The current versions of our operating and installation instructions apply.

We reserve the right to make changes without further notice!



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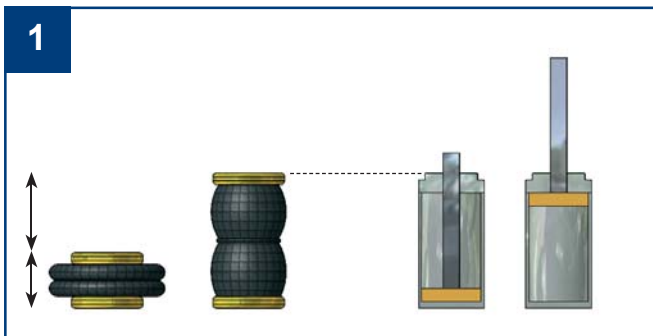
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AIR SPRINGS

Air springs are frequently used machine components for actuation and vibration isolation.

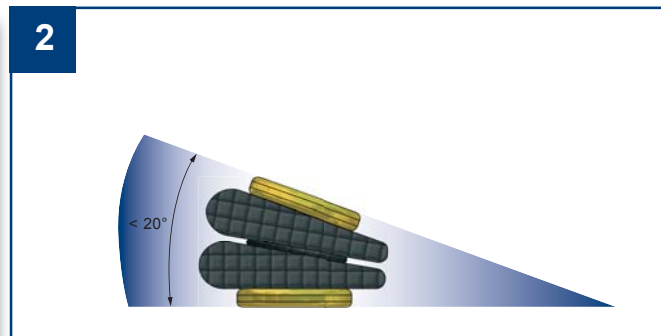
The products are made of high quality rubber. They are:

- resistant against compressed air containing oil, alkaline and acidic cleaning agents and non aggressive dust and contaminants
- resistant against the effects of weathering
- applicable for compressed air and water as driving media



Compact design (1)

Lateral misalignment: Ametric - air springs can be used with a misalignment of up to 20 mm



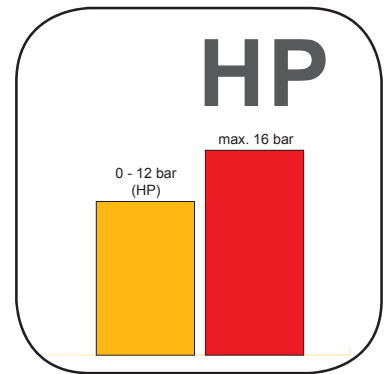
Tilt capability (2)

Dual function - combining vibration isolation with height adjustment
Easy installation
Maintenance free

AIR SPRINGS

WBE / WBZ / WBD

Operating pressure	0 - 8 bar
Temperature	-40°C - +50°C (+70°C)
Compressed air	oiled / oilfree
Lateral misalignment	max. 20 mm
Tilt capability	max. 20°
Return force	WBE, WBZ: 120 - 300 N WBD: 400 - 500 N



	Temperature	Limited Duration
Standard	-40°C - +50°C	+70°C
Eco	-20°C - +115°C	+130°C
WBE / WBZ / WBD		

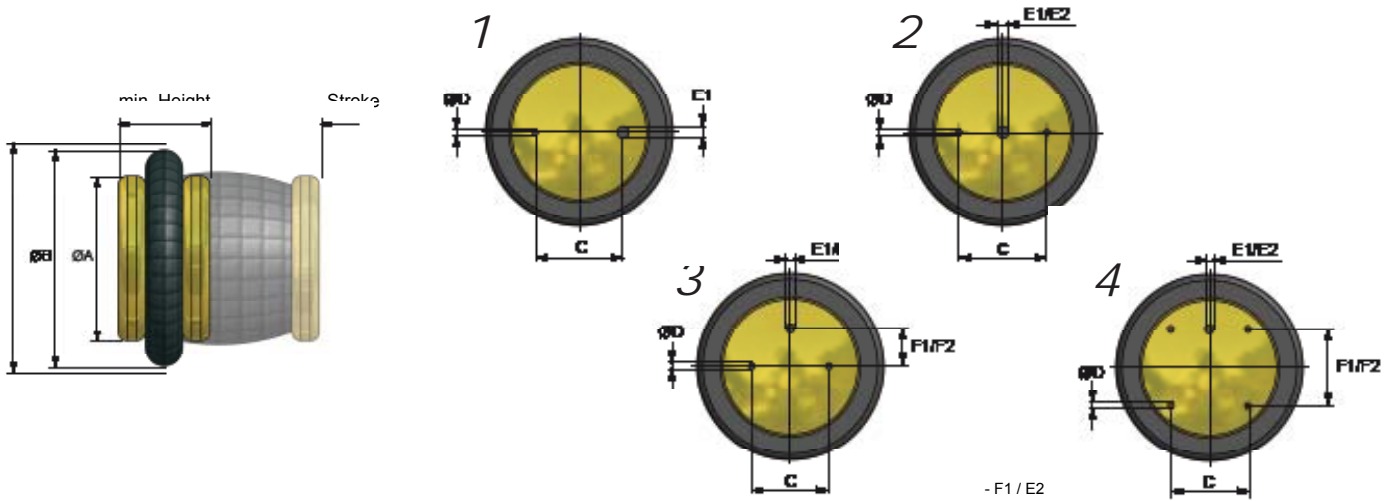
Connection plate available in stainless steel.

WBE / WBZ / WBD

	Operating Pressure
Standard version	0 - 8 bar
Strengthened version	0 - 12 bar
WBE / WBZ / WBD	

AIR SPRINGS

WBE



	Connection	Stroke mm	min. Diameter mm	min. Height mm	ø A mm	ø B mm	C mm	D mm	E1 mm	E2 mm	F1 mm	F2 mm	Weight kg	Volume in litre	
														Hmin	Hmax
WBE 100	1	60	160	50	90	145	20,0	M8	G1/8	-	-	-	0,9	0,2	0,6
WBE 150	2	45	165	50	108	165	44,5	M8	G1/4	-	-	-	1,2	0,2	0,5
WBE 200	2	64	180	51	108	165	44,5	M8	G1/4	-	-	-	1,2	0,4	1,2
WBE 300	2	85	230	50	141	215	70,0	M8	G3/4	G1/4	-	-	2,0	0,8	2,3
WBE 400	3	90	265	51	161	250	89,0	M8	G3/4	G1/4	38,1	44,5	2,3	1,3	3,2
WBE 410*	3	85	265	55	161	250	89,0	M8	G1/4	-	44,5	-	2,6	1,2	3,1
WBE 500	3	100	340	51	228	325	157,5	M8	G1	G1/4	66,0	73,0	3,9	3,4	7,8
WBE 510*	3	95	340	55	228	325	157,5	M8	G1/4	-	73,2	-	4,3	3,3	7,7
WBE 600	4	125	400	51	287	385	158,8	M8	G1	G1/4	158,8	158,8	5,9	3,5	11,0
WBE 700	4	135	420	51	287	405	158,8	M8	G1	G1/4	158,8	158,8	6,1	4,6	13,0

	Heigh	Load (kN)			Heigh	Load (kN)			Heigh	Load (kN)		
	mm	2 bar	4 bar	6 bar	mm	2 bar	4 bar	6 bar	mm	2 bar	4 bar	6 bar
WBE 100	60	1,8	3,5	5,2	80	1,4	2,8	4,2	100	0,8	1,6	2,5
WBE 150	60	2,0	4,0	5,0	70	1,8	3,4	5,1	80	1,5	2,7	4,0
WBE 200	60	2,8	5,6	8,3	90	1,5	3,4	4,5	100	1,2	2,6	4,0
WBE 300	60	4,1	8,0	13,0	90	3,3	6,9	11,0	120	1,9	4,3	6,9
WBE 400	60	5,5	11,0	17,0	90	4,6	9,5	15,0	120	3,1	6,5	10,5
WBE 410	60	5,5	11,0	17,0	90	4,6	9,5	15,0	120	3,1	6,5	10,5
WBE 500	60	10,5	22,0	32,0	90	9,5	19,0	29,0	120	8,0	16,0	24,0
WBE 510	60	10,5	22,0	32,0	90	9,5	19,0	29,0	120	7,5	15,0	23,0
WBE 600	60	17,0	32,0	49,0	110	13,8	27,5	42,0	150	9,0	19,0	30,0
WBE 700	80	17,0	33,4	50,3	140	13,3	27,0	41,0	160	11,1	23,0	35,0

	Force (kN) at recomm. design height			Natural frequency						Height	
	2 bar	4 bar	6 bar	HZ			U/min			min. mm	opt. mm
				2 bar	4 bar	6 bar	2 bar	4 bar	6 bar		
WBE 100	1,1	2,3	3,4	3,5	3,3	3,3	210	198	198	70	90
WBE 150	1,5	3,0	4,6	3,9	3,8	3,7	234	228	222	65	75
WBE 200	1,6	3,4	5,2	3,1	2,9	2,8	186	174	168	70	90
WBE 300	2,5	5,4	8,5	3,0	2,7	2,6	180	162	156	90	110
WBE 400	3,7	8,0	12,0	2,8	2,6	2,5	168	156	150	90	110
WBE 410	3,7	8,0	12,0	2,8	2,6	2,5	168	156	150	90	110
WBE 500	7,0	14,0	22,0	2,6	2,4	2,3	156	144	138	100	130
WBE 510	2,0	3,8	5,8	2,8	2,7	2,6	168	162	156	100	115
WBE 600	10,0	20,0	32,0	2,5	2,4	2,4	150	144	144	110	145
WBE 700	12,4	24,9	37,9	2,3	2,2	2,1	138	132	126	120	150

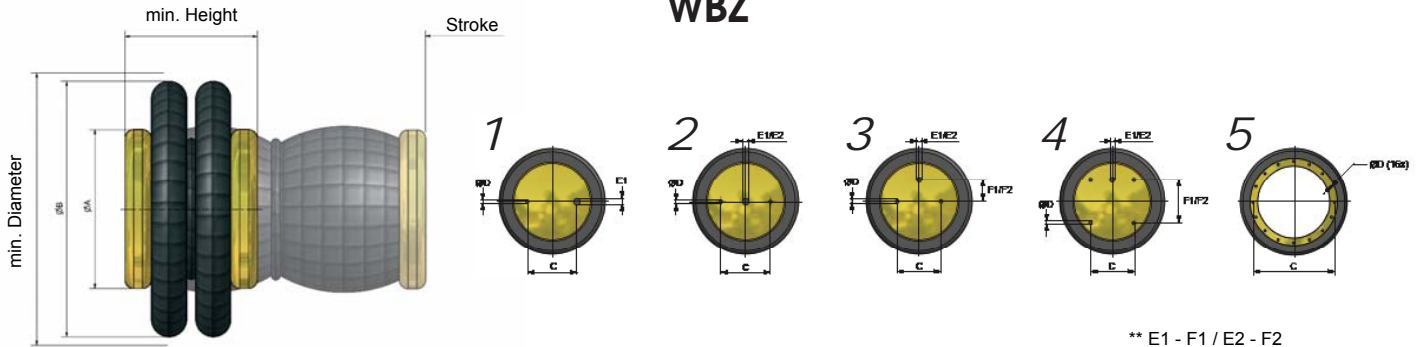
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AIR SPRINGS

WBZ



** E1 - F1 / E2 - F2

	Connection	Stroke mm	min. Diameter mm	min. Height mm	ø A mm	ø B mm	C mm	D mm	E1 mm	E2 mm	F1 mm	F2 mm	Weight kg	Volume in litre	
														Hmin	Hmax
WBZ 100	1	100	160	70	90	145	20,0	M8	G1/8	-	-	-	1,1	0,4	1,2
WBZ 200	2	125	180	75	108	165	44,5	M8	G1/4	-	-	-	1,5	0,7	1,8
WBZ 250	2	155	215	72	141	203	70,0	M8	G3/4	G1/4	-	-	2,1	1,2	3,2
WBZ 300	2	155	230	75	141	215	70,0	M8	G3/4	G1/4	-	-	2,4	1,2	3,7
WBZ 400	3	200	265	75	161	250	89,0	M8	G3/4	G1/4	38,1	44,5	3,0	1,7	6,2
WBZ 430	3	245	275	77	161	250	89,0	M8	G3/4	G1/4	38,1	44,5	3,5	3,0	9,8
WBZ 500	3	230	340	75	228	325	157,5	M8	G1	G1/4	66,0	73,0	4,8	4,0	13,5
WBZ 520	3	280	355	77	228	340	157,5	M8	G1	G1/4	66,0	73,0	5,1	8,0	17,0
WBZ 530	3	250	345	115	228	325	157,5	M8	G1	G1/4	66,0	73,0	5,2	8,0	16,0
WBZ 600	4	230	400	77	287	385	158,8	M8	G1	G1/4	158,8	158,8	6,9	6,0	22,0
WBZ 630	4	275	400	77	287	400	158,8	M8	G1	G1/4	158,8	158,8	7,3	10,0	29,0
WBZ 700	5	315	540	90	380	500	354,0	M8	-	-	-	-	14,4	12,0	48,0
WBZ 800	5	400	650	100	430	610	395,0	M16	-	-	-	-	16,7	20,0	90,0
WBZ 900	5	400	750	100	530	710	495,0	M16	-	-	-	-	18,2	32,0	127,0

	Heigh mm	Load (kN)			Heigh mm	Load (kN)			Heigh mm	Load (kN)		
		2 bar	4 bar	6 bar		2 bar	4 bar	6 bar		2 bar	4 bar	6 bar
WBZ 100	80	1,8	3,6	5,5	120	1,4	2,8	4,3	140	1,1	2,4	3,3
WBZ 200	80	2,8	5,7	8,0	140	1,9	4,0	5,8	180	1,1	2,3	3,5
WBZ 250	80	4,1	8,1	12,2	140	3,0	6,0	9,0	180	2,1	4,1	6,3
WBZ 300	80	4,5	9,0	13,7	160	3,3	6,5	9,9	200	2,3	4,8	7,3
WBZ 400	80	6,9	13,4	19,7	170	4,8	9,4	14,2	230	2,7	5,7	9,0
WBZ 430	110	6,2	12,3	18,7	170	5,5	11,0	16,6	290	2,7	5,6	9,0
WBZ 500	100	11,2	22,1	34,1	160	9,7	19,4	29,5	240	6,7	13,3	20,9
WBZ 520	100	12,2	24,4	36,3	220	9,7	19,5	29,4	320	4,4	9,4	14,5
WBZ 530	115	11,5	23,3	35,2	265	7,2	14,6	22,4	365	2,0	5,1	8,7
WBZ 600	100	16,2	32,3	48,7	200	13,1	26,4	40,0	240	11,0	22,1	33,6
WBZ 630	100	18,6	36,8	52,4	220	14,0	28,0	42,0	300	8,6	17,7	27,7
WBZ 700	90	30,0	60,0	90,0	210	24,0	50,0	75,0	330	15,6	31,3	47,0
WBZ 800	150	39,6	79,3	119,3	350	29,0	58,6	88,5	450	18,7	37,8	58,8
WBZ 900	100	60,7	123,0	186,0	300	49,3	102,0	155,0	500	26,0	53,0	84,0

	Force (kN) at recomm. design height			Natural frequency						Height	
				HZ			U/min			min. mm	opt. mm
	2 bar	4 bar	6 bar	2 bar	4 bar	6 bar	2 bar	4 bar	6 bar		
WBZ 100	0,7	1,5	2,4	2,8	2,8	2,7	168	168	162	150	160
WBZ 200	1,3	2,5	3,8	2,5	2,4	2,4	150	144	144	160	175
WBZ 250	2,2	4,5	6,8	2,3	2,2	2,1	138	132	126	155	175
WBZ 300	2,4	5,2	8,0	2,2	2,0	2,0	132	120	120	175	190
WBZ 400	3,4	7,0	10,7	2,0	1,9	1,9	120	114	114	195	210
WBZ 430	4,0	8,0	12,4	1,8	1,8	1,7	108	108	108	230	254
WBZ 500	6,7	13,3	20,6	2,1	1,8	1,8	126	108	108	220	240
WBZ 520	7,6	15,5	23,5	2,1	1,8	1,8	126	108	108	245	260
WBZ 530	7,6	15,6	23,5	2,1	1,8	1,8	126	108	108	235	250
WBZ 600	10,1	20,7	31,5	1,9	1,8	1,8	114	108	108	225	250
WBZ 630	11,5	23,4	35,9	1,6	1,6	1,5	96	96	90	245	260

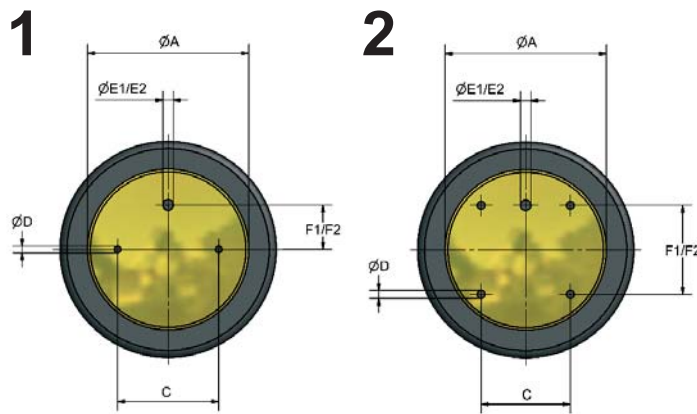
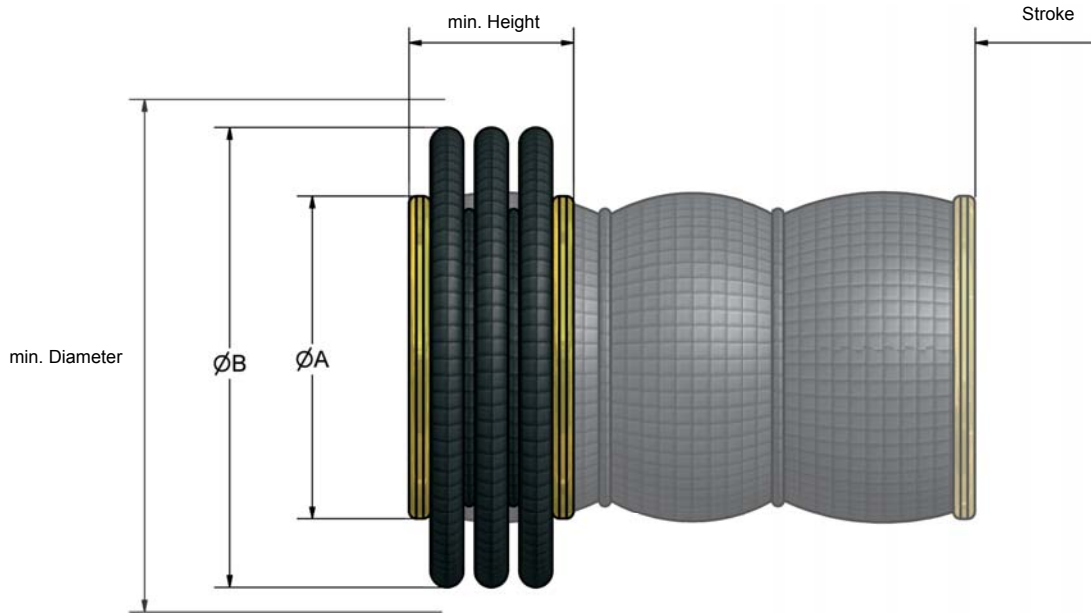


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AIR SPRINGS

WBD

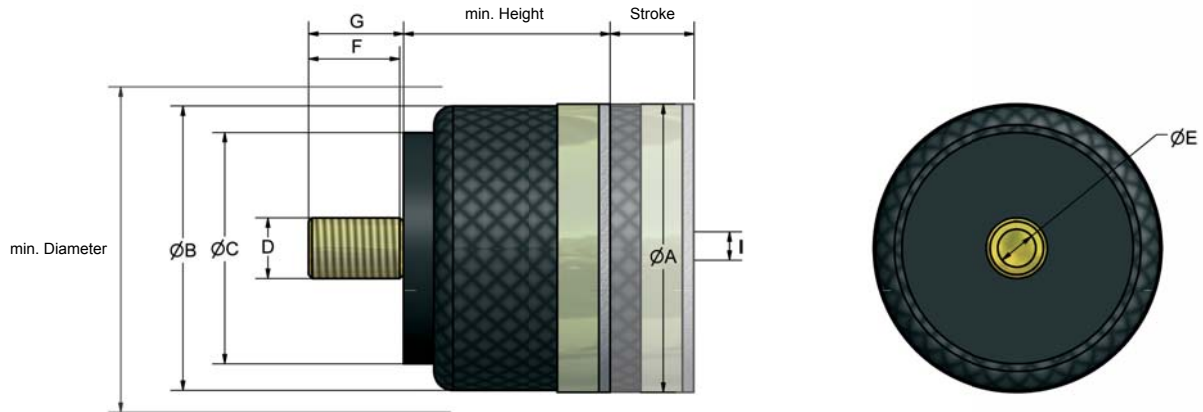


	Connection	Stroke mm	min. Diameter mm	min. Height mm	Ø A mm	Ø B mm	C mm	D mm	E1** mm	E2** mm	F1** mm	F2** mm	Weight kg	Volume in litre	
														Hmin	Hmax
WBD 500	1	280	345	110	228	325	157,5	M8	G1	G1/4	66,0	73	5,9	5,0	24,0
WBD 600	2	325	410	110	287	384	158,8	M8	G1	G1/4	158,8	158,8	8,0	5,5	33,0
WBD 700	2	395	430	115	287	405	158,8	M8	G1	G1/4	158,8	158,8	9,3	13,0	42,0

	Heigh mm	Load (kN)			Heigh mm	Load (kN)			Heigh mm	Load (kN)		
		2 bar	4 bar	6 bar		2 bar	4 bar	6 bar		2 bar	4 bar	6 bar
WBD 500	140	11,3	22,4	33,6	260	9,1	18,2	27,6	380	5,9	11,9	18,4
WBD 600	160	16,3	32,3	49,1	280	13,3	26,7	40,8	360	10,0	20,8	32,0
WBD 700	140	18,2	36,3	54,5	300	14,2	28,4	43,4	380	11,8	23,8	36,4

AIR SPRINGS

WSR



	Stroke mm	min. Diameter mm	min. Height mm	Ø A mm	Ø B mm	C mm	D mm	E mm	F mm	G mm	I mm	Weight kg	Volume in litre	
													Hmin	Hmax
WSR 20	33	70	30	34	60	34,0	M16	G1/8	25	25	M8	0,07	0,05	0,08
WSR 30	46	100	38	76	88	56,0	M16	G1/8	12	25	M8	0,2	0,1	0,2
WSR 100	110	100	95	75	80	50,0	M30 x 1,5	R3/8	16	18	M8	0,3	0,2	0,5
WSR 200	105	115	95	86,5	97	60,0	M30 x 1,5	R3/8	16	18	M8	0,4	0,3	0,7
WSR 300	105	140	95	106,5	123	80,0	M30 x 1,5	R3/8	16	18	M8	0,6	0,3	1,1
WSR 400	105	170	95	125	151	87,5	M30 x 1,5	R3/8	16	18	M8	0,7	0,7	1,7
WSR 500	105	190	95	148	173	114	M30 x 1,5	R3/8	16	18	M8	0,8	0,9	2,5

	Height mm	Load (kN)			Height mm	Load (kN)			Height mm	Load (kN)		
		2 bar	4 bar	6 bar		2 bar	4 bar	6 bar		2 bar	4 bar	6 bar
WSR 20	35	0,4	0,7	1,1	45	0,3	0,6	0,9	55	0,3	0,4	0,7
WSR 30	40	0,8	1,5	2,3	50	0,8	1,5	2,3	70	0,8	1,4	2,1
WSR 100	100	0,6	1,2	1,8	160	0,6	1,2	1,8	190	0,6	1,2	1,9
WSR 200	100	0,8	1,7	2,7	160	0,8	1,7	2,6	190	0,8	1,7	2,7
WSR 300	100	1,4	2,9	4,5	160	1,4	2,9	4,5	180	1,4	2,9	4,3
WSR 400	100	1,8	3,8	6,0	145	1,8	3,8	6,0	175	1,8	3,7	5,5
WSR 500	100	2,6	5,4	8,2	145	2,6	5,3	8,1	175	2,7	5,5	8,0

	Force (kN) at recomm. design height			Natural frequency						Height opt. mm
				HZ			U/min			
	2 bar	4 bar	6 bar	2 bar	4 bar	6 bar	2 bar	4 bar	6 bar	
WSR 20	0,3	0,6	0,9	3,4	3,3	3,2	204	198	192	45
WSR 30	0,8	1,5	2,3	2,7	2,7	2,6	162	162	156	60
WSR 100	0,6	1,2	1,8	2,3	2,1	2,1	138	126	126	150
WSR 200	0,8	1,7	2,6	2,1	1,9	1,8	126	114	108	150
WSR 300	1,4	2,9	4,5	2,2	2,0	1,8	132	120	108	150
WSR 400	1,8	3,8	6,0	2,0	1,8	1,8	120	108	108	150
WSR 500	2,6	5,3	8,1	2,1	2,1	2,0	138	126	120	140



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AN INTERNATIONAL WORLD CLASS ENGINEERING & MANUFACTURING COMPANY

From a world class range of metric drive components to an inventory of over 250,000 other metric and ANSI power transmission components to our quality customer service and on site machine shop service, Ametric's goal is simply to be your world class partner.

